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DIRECTOR'S OFFICE

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EXECUTIVE CHAMBERS

HONOLULU

BENJAMIN J. CAYETANO
GOVERNOR

November 5, 1999

TO: The Honorable Kazu Hayashida, Director
Department of Transportation

FROM: Acceptance of the Final Environmental Impact Statement for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase

With this memorandum, I accept the Final Environmental Impact Statement for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase as satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes. The economic, social and environmental impacts, which will likely occur should this project be built, are adequately described in the statement. The analysis, together with the comments made by reviewers, provides useful information to policymakers and the public.

My acceptance of the statement is an affirmation of the adequacy of that statement under the applicable laws.

I find that the mitigation measures proposed in the environmental impact statement will minimize the negative impacts of the project. Therefore, I direct the Department of Transportation and/or its agents to perform these, or alternative and at least equally effective, mitigation measures at the discretion of the permitting agencies. The mitigation measures identified in the environmental impact statement are listed in the attached document.

Benjamin J. Cayetano

BENJAMIN J. CAYETANO

Attachment

c: Honorable Bruce S. Anderson, Ph.D., M.P.H.
Office of Environmental Quality Control

1999-Oahu-FEIS-
Oahu Harbors

FINAL ENVIRONMENTAL IMPACT STATEMENT

for the

OAHU COMMERCIAL HARBORS 2020 MASTER PLAN IMMEDIATE PHASE

Oahu Island, Hawaii

Proposing Agency:

State Department of Transportation
Harbors Division

Accepting Authority:

Office of the Governor, State of Hawaii

Prepared By:

Wil Chee – Planning, Inc.
1400 Rycroft Street, Suite #928
Honolulu, Hawaii 96814

September 1999

Department of Transportation
State of Hawaii

Prepared by:
Harbors Division

Final

Environmental Impact Statement

for

The Oahu Commercial Harbors 2020 Master Plan – Immediate Phase

Oahu Island, Hawaii

This final Environmental Impact Statement was prepared under my direction, and the information submitted, to the best of my knowledge fully addresses the document content requirements set forth in Section 11-200-17, Hawaii Administrative Rules.

9/23/99
Date

Thomas Fujikawa
Chief, Harbors Division
Department of Transportation

ADDENDUM

1.0 PROJECT SUMMARY

1.1 Summary of Probable Impacts and Mitigation Measures

Adverse impacts of greatest concern are short-term impacts associated with construction activities of the proposed harbor improvements.

The quality of near shore waters in the vicinity of proposed project areas requiring pile driving activities is likely to diminish as a result of suspension of silt, sedimentation, and elevated turbidity during construction activities. Consequently, marine biological communities in these areas would also be impacted as a result of the increase in turbidity and sedimentation rates. The impacts to the water quality and marine biota are anticipated to be minimal and short-term in duration.

The Water Quality and Marine Biological Studies conducted for this EIS concluded that any sediments that might be resuspended into the water column by construction activities would be fine to medium sands. These sands would settle out rapidly with minimal effect on the resident marine organisms. Furthermore, any construction-related, resuspended sediments and turbidity are likely to rapidly dissipate as a result of the high level of circulation in the waters around the project areas. Water quality impacts would be mitigated by the development and implementation of erosion, sedimentation, and turbidity control measures that would effectively reduce the amount of soil and sediment accumulation.

Unavoidable but temporary noise and vibration impacts may occur during the construction of the proposed harbor improvement projects. The quality of the acoustic environment may be degraded to unacceptable levels during periods of construction because noise from construction activities are predicted to be audible at adjoining properties. Project specifications will be developed which would restrict vibration levels to below those at which structural damage to adjacent structures could occur, and also to levels below those at which annoyance in surrounding areas could occur. Modifications to construction procedures would be made to keep noise and vibration at acceptable levels.

The project areas within Honolulu Harbor are not utilized or inhabited by any rare, threatened, or endangered plant or animal species as listed by the U.S. Fish and Wildlife Service. However, the tidal mudflats in Keehi Lagoon are utilized by the endangered Hawaiian stilt or 'ae'o (*Himantopus mexicanus knudseni)* and other migratory shorebird species, and on rare occasion the threatened Green Sea Turtle (*Chelonia mydas*) has also been observed around the Ke'ehi Lagoon mudflats. No adverse impacts on the Hawaiian stilts or the Green Sea Turtle are anticipated because the proposed project would not affect the existing mudflat areas. The mudflat areas will be totally avoided during both the construction stages and long-term operation of the proposed facilities.

Harbors, like other port facilities, have the potential to introduce alien pest species into Hawaii. In harbor areas, the threat of alien species introduced into Hawaii's coastal

ADDENDUM

waters is always present. However, adverse impacts by alien species are not anticipated. Potential impacts would be mitigated by a combination of regulatory and technological measures described in section 3.8.

With respect to cultural resources, the project area is extensively urbanized and is situated on recently created land formed by numerous dredging and filling operations. Adverse impacts are not anticipated as no archaeological or cultural remains should be present within the proposed project areas. However, in the unlikely event cultural artifacts or human remains are inadvertently encountered during construction activities, all operations in vicinity of the discovery will immediately cease. The State Historic Preservation Division would be notified of the discovery, and immediate consultation with the Oahu Island Burial Council shall be sought before commencement of construction activities.

Other potentially adverse impacts include:

- Minor increase in stormwater runoff from paved areas, which will be mitigated by the installation of appropriate drainage systems
- An increase in the demand for utilities, which will be mitigated by energy efficient building design and energy conservation methods
- An increase in air pollution emissions from construction equipment and from increased road congestion during construction activities.
- Elevated fugitive dust levels from construction activities, although mitigation measures will be employed to ensure that dust emissions are minimal and remain at acceptable levels.
- Temporary, minor visual impacts resulting from construction activities and equipment.

Beneficial impacts will include:

- Provision of needed berthing and landside port facilities
- Modern cruise and excursion vessel port facilities which meet present industry standards
- Growth of Hawaii's tourism, commercial fishing, and shipping industries
- Employment benefits
- Local economic growth
- Increased government revenues

1.2 Alternatives Considered

The no action alternative would mean the existing operations at Honolulu Harbor would remain unchanged. Traffic congestion within Honolulu Harbor would not be alleviated. Existing vacant land areas and poorly maintained harbor facilities would remain underutilized and undeveloped. With this alternative, there would not be additional piers, storage yards, or passenger facilities to accommodate the anticipated growth of the State's tourism, commercial fishing, and shipping industries.

ADDENDUM

The no action alternative has been rejected from further consideration because; i) the goals of the 2020 PLAN would not be achieved, and ii) State and county development policies would not be implemented.

Suitable alternate locations for the proposed actions were not available. No other sites on Oahu would provide an economically feasible alternative for the proposed actions. The 2020 PLAN outlines a systematic approach for the improvement and development of Oahu's commercial harbors. The only other commercial harbor on Oahu in addition to the proposed project sites is Kewalo Basin. Kewalo Basin is not a feasible alternative as it would be unable to meet the needs of the proposed IP projects in terms of location, existing facilities, infrastructure, and economical considerations.

1.3 Unresolved Issues

The EIS consultation process yielded substantial input from government agencies, commercial businesses, private interest groups, and individuals. Comments were received on the EISPN and the Draft EIS (see Appendix A) which provided input on issues and concerns relative to the proposed action. The issues raised during the consultation program have been addressed in this Final EIS, and at this stage in the EIS process there are no outstanding issues or concerns that remain unresolved.

The State Department of Transportation – Harbors Division is aware that additional concerns regarding the proposed project may arise in the future. Therefore, the Department will continue to work with area residents and businesses, interest groups, and government agencies so that the final project plans meet project objectives and are responsive to public and agency concerns.

1.4 Compatibility with Land Use Plans and Policies and a Listing of Necessary Permits and Approvals

The proposed harbor improvements support existing plans, policies, and objectives set forth by the State of Hawaii and the City and County of Honolulu. The proposed improvements will be compatible with existing land uses in the project area and will support future land uses including residential, commercial, and industrial developments.

Applicable permits and approvals that may be required for the proposed action include:

1. Rivers Harbors Act Section 10 Permit, issued by the U.S. Army Corps of Engineers
2. Dept. of the Army Section 404 Permit, issued by the U.S. Army Corps of Engineers
3. Section 401 Water Quality Certification, issued by the State Department of Health
4. Coastal Zone Management Consistency Certification, issued by the Office of State Planning
5. Special Management Area Permit, issued by the Office of State Planning
6. Shoreline Setback Variance, issued by the Office of State Planning
7. HCDA Development Permit (for Pier 2), issued by the Hawaii Community Development Authority

ADDENDUM

8. National Pollution Discharge Elimination System (NPDES), issued by the State Department of Health
9. Noise Variance, issued by the State Department of Health
10. Permit for Air Emissions, issued by the State Department of Health
11. Water Use Permit, issued by the State Department of Land and Natural Resources
12. Environmental Review (Chapter 343, HRS), issued by the Office of Environmental Quality Control

9.0 SUMMARY OF UNRESOLVED ISSUES

The DOT-HAR consultation program yielded substantial input from government agencies, commercial businesses, private interest groups, and individuals. Comments were received on the EISPN and the Draft EIS (see Appendix A) which provided input on issues and concerns relative to the proposed action. The issues raised during the consultation program have been addressed in this Final EIS, and at this stage in the EIS process there are no outstanding issues or concerns that remain unresolved.

The DOT-HAR is aware that additional concerns regarding the proposed project may arise in the future. Therefore, DOT-HAR will continue to work with area residents and businesses, interest groups, and government agencies so that the final project plans meet project objectives and are responsive to public and agency concerns.

Table of Contents

1.0 PROJECT SUMMARY

PROPOSED ACTION:	Oahu Commercial Harbors 2020 Master Plan Improvements – Immediate Phase
PROPOSING AGENCY:	State of Hawaii Department of Transportation Harbors Division 79 South Nimitz Highway Honolulu, Hawaii 96813 Contact Person: Glenn Soma (808) 587-2503
ACCEPTING AUTHORITY:	Office of the Governor, State of Hawaii
EIS PREPARER:	Wil Chee – Planning, Inc. HMSA Center 1400 Rycroft Street, Suite 928 Honolulu, Hawaii 96814 Contact Person: Richard Stook (808) 955-6088
LOCATION:	Honolulu Harbor, Keehi Lagoon, and *Kalaeloa* Barbers Point Deep Draft Harbor, Island of Oahu
LAND OWNERSHIP:	State of Hawaii
TMK:	2-1-15:29,30; 2-1-01: 42, 45, 56; 1-1-76:03; 1-5-34: (various parcels); 1-5-36: (various parcels); 1-5-38: (various parcels); 2-1-01:58, 59, 60; 1-5-39: (various parcels); 1-5-32:02, 08, 17; 9-1-14:02, 08, 24.
EXISTING LAND USES:	Vacant, maritime industrial cargo and warehousing, cruise passenger operations, fishing industry operations.
PROPOSED USES:	Cruise passenger terminal, excursion vessel terminal, finger piers, lay berths, cargo terminals
LAND AREA:	Approximately 245.2 acres (Including EIS Incorporated and Exempt Honolulu Harbor Projects)

STATE LAND USE CLASSIFICATION:	Urban and Conservation Districts
DEVELOPMENT PLAN LAND USE:	Public Facilities
COUNTY ZONING:	*I-2 Intensive Industrial, I-3 Waterfront Industrial, P-I Restricted Preservation, and IMX-1 Industrial-Commercial Mixed Use*
SPECIAL DISTRICTS:	Hawaii Capital, Aloha Tower, and Chinatown Special Districts
PROPOSED ACTION:	The State Department of Transportation Harbors Division proposes to implement the immediate phase of their Oahu Commercial Harbors 2020 Master Plan by accomplishing a series of improvements to Honolulu Harbor which are scheduled to be initiated by the year *2005.*
IMPACTS:	The following studies (attached as appendices) have been conducted in conjunction with this EIS to determine the potential impacts and mitigation measures which may result from the proposed action: - Traffic Impact Assessment - Archaeological Impact Assessment - Noise Impact Assessment - Biological Impact Assessment - Water Quality Impact Assessment - Air Quality Impact Assessment

2.0 <u>INTRODUCTION AND PROJECT DESCRIPTION</u>

2.1 <u>Overview</u>

The State of Hawaii, Department of Transportation – Harbors Division (DOT-HAR) is responsible for administering the state-owned or controlled harbor facilities used by commercial cargo, passenger, and fishing operations. DOT-HAR is responsible for the control, management, use and regulation of commercial harbors and their improvements. The State of Hawaii receives the bulk of its goods through its commercial harbors, and DOT-HAR manages the harbor traffic, berthing, landside usage, and facility development of these harbors.

DOT-HAR has developed the Oahu Commercial Harbors 2020 Master Plan (hereafter referred to as the 2020 PLAN) as an update to the Honolulu Waterfront Master Plan and the 2010 Master Plan for Barbers Point Harbor. The 2020 PLAN is a conceptual master plan that addresses Honolulu, Kewalo Basin, and *Kalaeloa* Barbers Point Harbors as dependent harbors and functions as a long-range guide for the development and enhancement of these commercial ports. The 2020 PLAN ensures Oahu's commercial harbors will be capable of meeting the expanding needs of the State's growing economy through the year 2020.

DOT - HAR proposes to implement the 2020 PLAN by accomplishing a series of improvements at Honolulu Harbor that are scheduled to be initiated by the year *2005*. These improvements are designated Immediate Phase (IP) projects. DOT-HAR has determined that an Environmental Impact Statement (EIS) will be required for the proposed IP projects.

There are four major projects proposed which will be fully examined in this EIS for their potential direct, indirect, and cumulative impacts upon the environment. These four projects are listed below:

1. Construction of a cruise passenger terminal at Pier 2
2. Construction of finger piers at Piers 12 – 16
3. Construction of an excursion vessel terminal at Piers 24 – 29
4. Construction of lay berth facilities in Keehi Lagoon (along Lagoon Drive)

In addition to the four above-referenced projects, there are several other IP projects which either fall within classes of actions considered "exempt" from the EIS review process (in accordance with HAR 11-200-8) or have already had separate environmental documents prepared for them (in accordance with Chapter 343 HRS). The latter do not qualify as exempt projects and are incorporated into this EIS by reference.

The following IP projects are exempt from the EIS review process:

- The renovation and reconstruction of harbor facilities at Piers 5-7 (5.8 acres)
- Demolition and construction activities for the general cargo yard and construction of a ferry terminal at Piers 19-20 (4 acres).
- The extension of existing fuel lines at Piers 28-29 for bunkering purposes (0.9 acres)
- Demolition and construction activities for the neobulk cargo yard at Piers 31-34 (5 acres)

The following IP projects have been incorporated into the EIS by reference:

- The Domestic Commercial Fishing Village at Piers 36 - 38 (16.5 acres)

- Interisland Cargo Yard Improvements at Piers 39-40 (20.5 acres)
- The *Kalaeloa* Barbers Point Deep Draft Harbor Expansion Improvements (157 acres)
- *Kalaeloa* Barbers Point Harbor Perimeter Lighting (0.1 acres)

2.2 Scope and Authority

This Environmental Impact Statement (EIS) has been prepared pursuant to Chapter 343, Hawaii Revised Statutes (the EIS law) and associated Title 11, Chapter 200, Hawaii Administrative Rules, Department of Health, State of Hawaii. The use of State or county lands or funds, use of conservation lands, and use within a historic district trigger the EIS law for the proposed actions.

This EIS is intended to serve as a comprehensive environmental disclosure document. The intent of this document is to define the scope and analysis of the proposed actions and serve to ensure that comprehensive and systematic consideration is given to potential impacts of the proposed actions upon the natural and man-made environment.

2.3 Project Need and Objective

As previously mentioned, the 2020 PLAN addresses the Honolulu, Kewalo Basin and *Kalaeloa* Barbers Point Harbors as dependent harbors whose activities are closely entwined. The need for the proposed projects to be implemented in a concurrent planning effort is evidenced by the shared use of these three ports by harbor operators.

Kewalo Basin is generally reserved for commercial fishing and passenger cruise operations. Both these industries have exceeded the bounds of this harbor and are now significant users of Honolulu Harbor.

Honolulu Harbor is the hub of the State's commercial harbor operations. Essentially, all cargo destined for overseas shipment is consolidated and shipped out of the harbor, and almost all incoming overseas cargo passes through this port before being distributed throughout the State.

Presently, berthing and landside accommodations within Honolulu Harbor are reaching capacity therefore vessel traffic, lack of berths, and insufficient operational space are a daily problem. Thus the proposed expansion of commercial Harbor facilities in Ke'ehi Lagoon.

Kalaeloa Barbers Point Harbor, which provides maritime access for Oahu's growing central and leeward communities, was designed to alleviate some of Honolulu Harbor's congestion. However, *Kalaeloa* Barbers Point Harbor has already replaced Kahului Harbor as the State's second busiest harbor, and it is experiencing scheduling problems as well.

The 2020 PLAN addresses these existing problems by serving as a long-range planning guide for the development of safe, efficient, and economically viable harbor facilities.

Major objectives of the 2020 PLAN include:

- The proper development of Oahu's commercial harbors, thereby facilitating maritime shipments of the essential commodities required by the State of Hawaii and its citizenry.
- Optimal utilization of land and water resources committed to marine cargo, passenger, and fishing operations in an economically responsible manner.
- Provision of and access to terminals, and other harbor facilities in locations along the Honolulu waterfront, at *Kalaeloa* Barbers Point and other locations in a manner that best relates to and serves Hawaii's port system in an efficient, safe and secure manner.
- Minimization of impacts on environmental quality and recreational opportunities contiguous with port facilities.

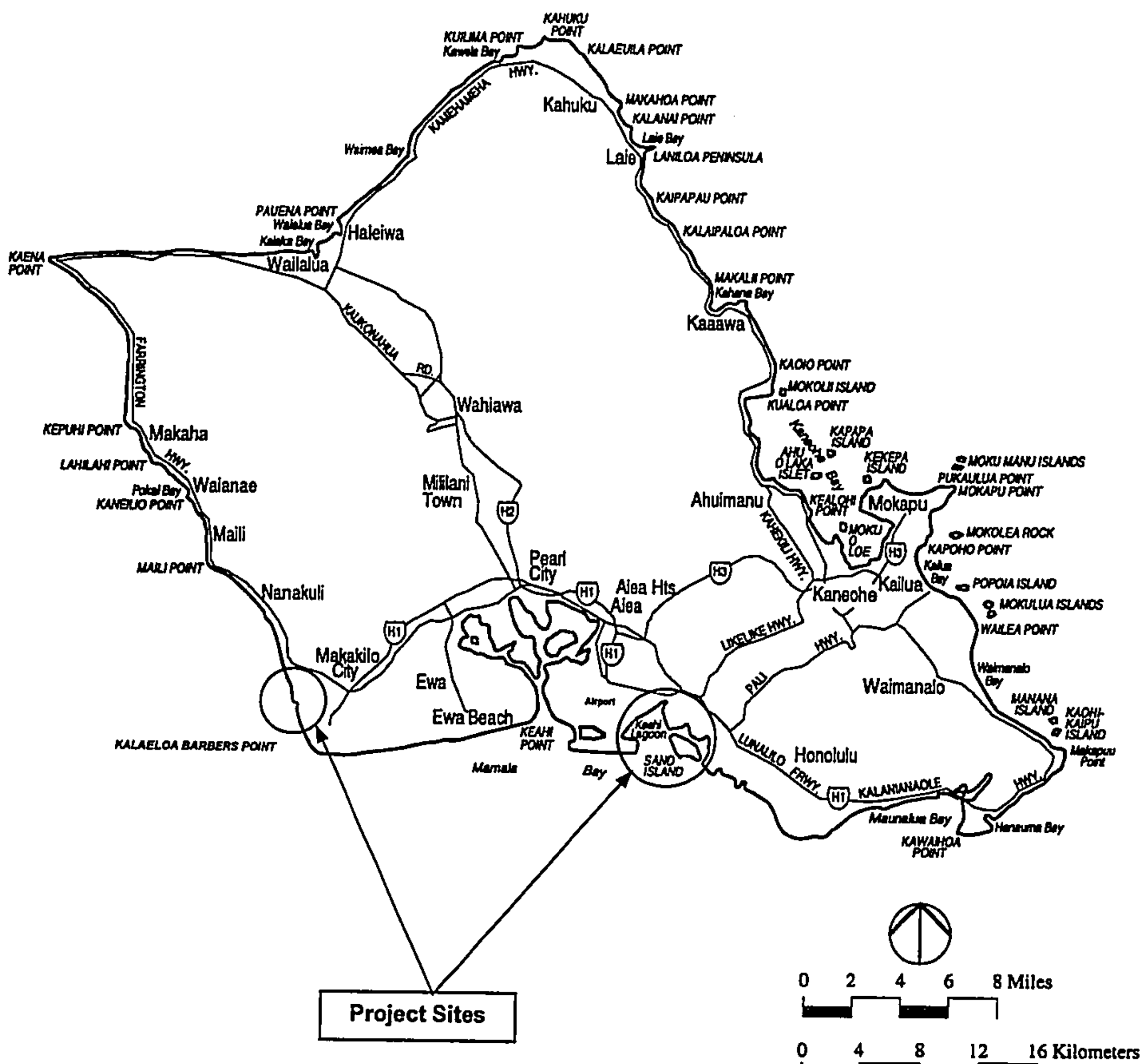
In summary, implementation of the 2020 PLAN to begin improvements to Oahu's commercial harbors is necessary considering Hawaii imports 80 percent of its food and merchandise and approximately 99 percent of these imports – food, clothing, building materials, cars, fuel – is shipped by sea (HDOT, 1997). As a result of Hawaii's geographic isolation, ocean shipping is the state's primary life-sustaining enterprise and there are no feasible alternatives to this procurement process.

2.4 Project Location

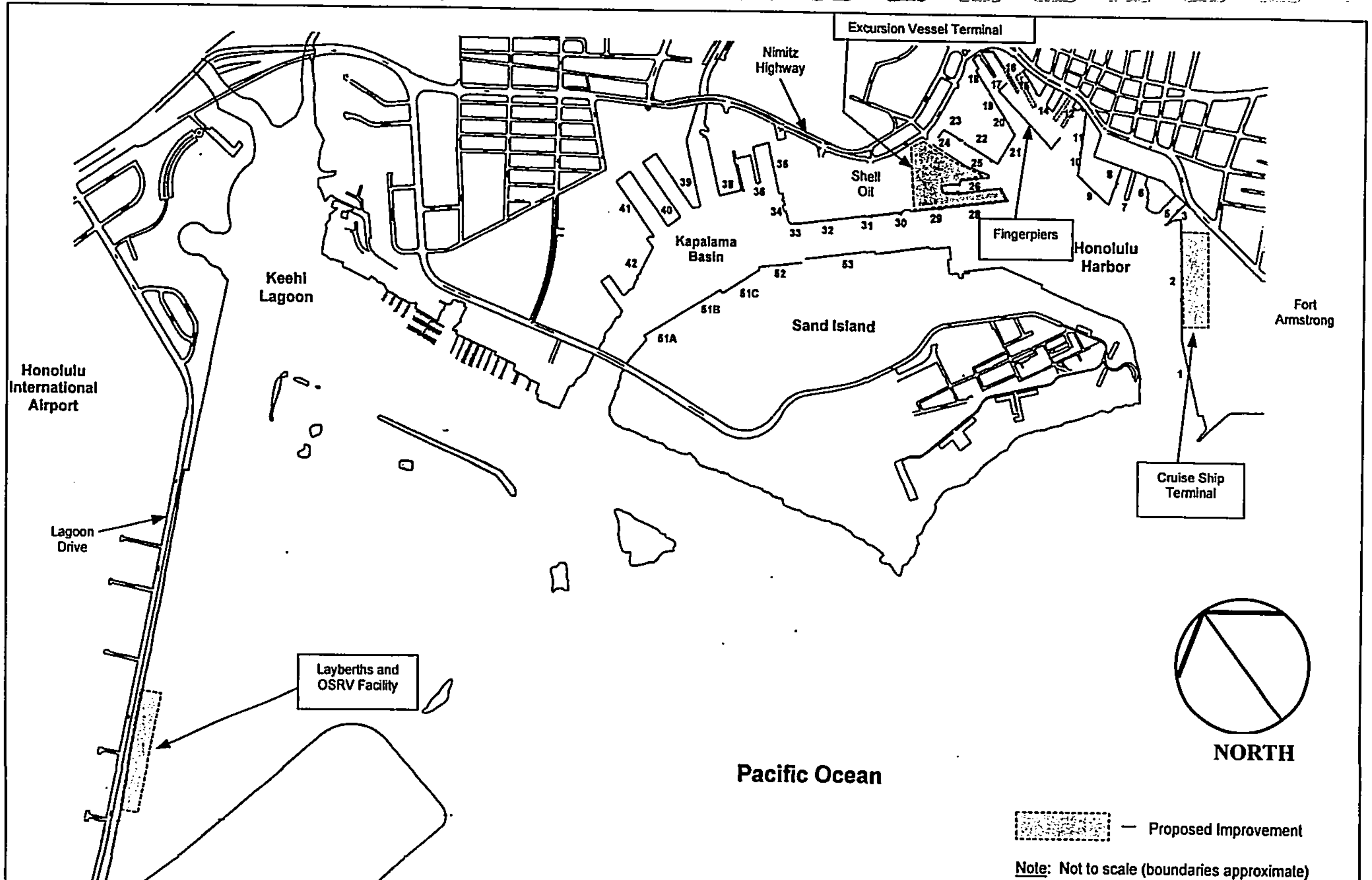
Proposed project areas are located on the southern shores of Oahu makai (seaward) of the Downtown Honolulu and Airport vicinities, and at *Kalaeloa* Barbers Point on Oahu's Leeward Shore (Figure 2-1).

Three of the four proposed major improvement projects addressed in this EIS are located at Honolulu Harbor (cruise passenger terminal at Pier 2, finger piers at Piers 12-16, excursion vessel terminal at Piers 24-29), and the fourth is located at Keehi Lagoon along Lagoon Drive (layberth and *OSRV* facility construction). (Figure 2-2).

The locations of the proposed cruise passenger terminal, finger piers, and excursion vessel terminal are situated within a large area bounded on the north by Nimitz Highway, on the south by Honolulu Harbor proper, on the east by Fort Armstrong, and on the west by Chevron and Shell Oil Co. Properties.



FINAL ENVIRONMENTAL IMPACT STATEMENT For THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN – IMMEDIATE PHASE	**Figure 2 - 1** **Project Location Map**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.



FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN IMMEDIATE PHASE	**Figure 2 – 2** **Project Site Map**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.

Keehi Lagoon is situated on the south shore of Oahu between Honolulu Harbor and the Honolulu International Airport. The location of the proposed lay berth facilities is in an area along Lagoon Drive adjacent to the Airport. The site is bounded by the airport on the North, the Department of Transportation – Airport Division's Fire Response Facility on the West, the privately owned Island Services Seaplane business on the east and Keehi Lagoon on the south.

The proposed project area is located within *I-2 Intensive Industrial, I-3 Waterfront Industrial, P-I Restricted Preservation, and IMX-1 Industrial-Commercial Mixed Use* zones. Figure 2-3 depicts the project area and surrounding land-use designations. Locations of the exempt and EIS Incorporated IP projects are illustrated in figures 2-4 and 2-5.

2.5 Existing Conditions and Surrounding Land Use

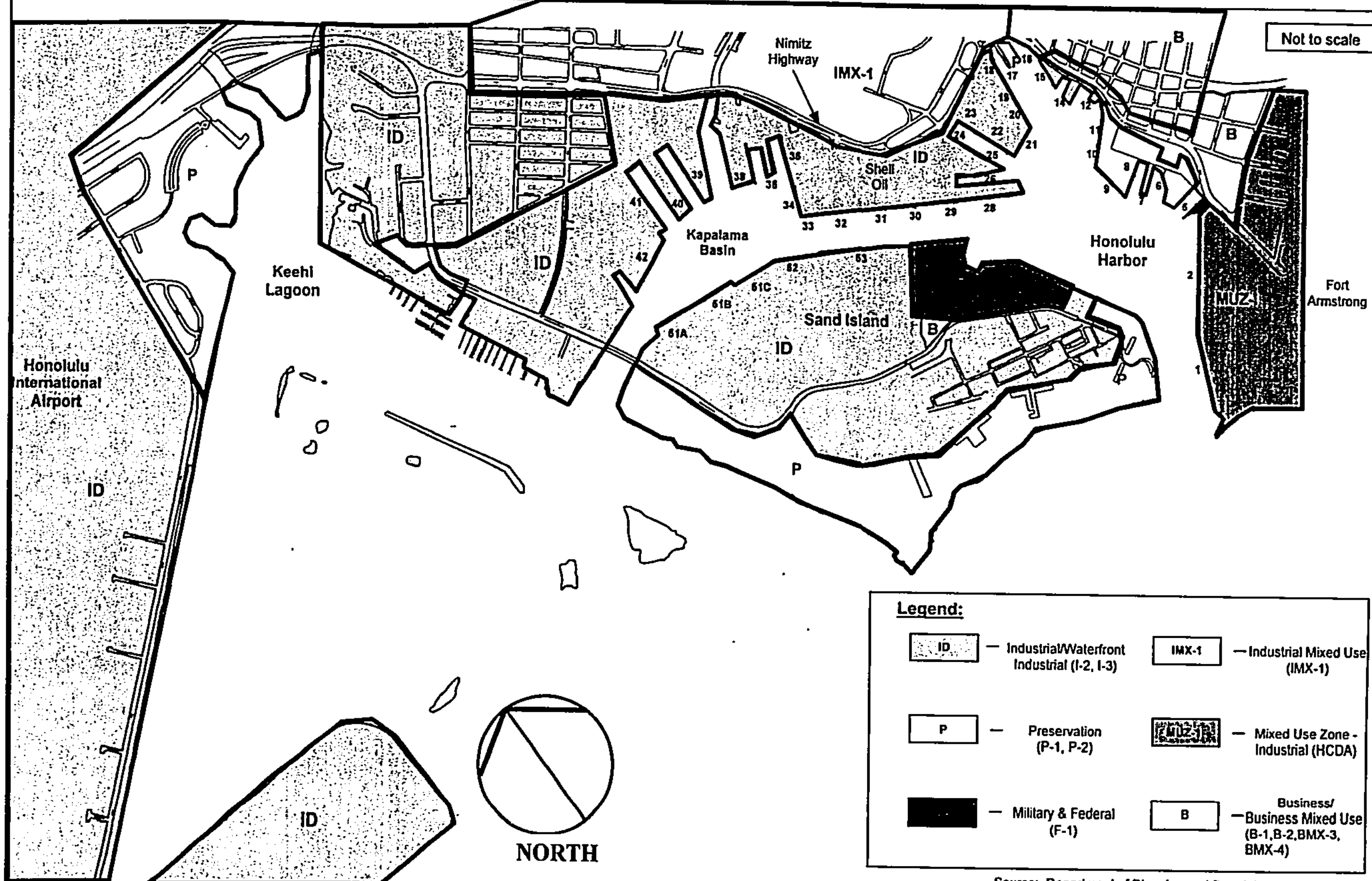
HONOLULU HARBOR

Commercial Shipping – Honolulu Harbor has served as Hawaii's main port of entry for goods from around the world since the late 18th century. Today, Honolulu Harbor still functions as Hawaii's life-line supplying the State with 98.6% of its imported goods and products (HDOT, 1997).

Honolulu Harbor is the central port facility of the State's commercial shipping industry handling over 11 million tons of cargo annually (HDOT, 1993). Commercial shipping operations at Honolulu Harbor are large-scale and diverse. Cargo is shipped either in bulk, individual units, or in containers. The major categories of cargo passing through Honolulu Harbor are described below.

- Automobiles – Some automobiles arrive and depart Honolulu Harbor in 40-foot containers and the remainder arrive on ships with RO/RO (roll-on/roll-off) capabilities. RO/RO cargo is cargo which is rolled or driven on and off ships, as opposed to cargo which is physically loaded onto a vessel. All arrival and departure modes require automobile storage at the terminal. For containerized movements, automobiles require parking before or after devanning, and for RO/RO movements, they require parking for short-term storage.

- Overseas Containers – Overseas (domestic and foreign) movements of general cargo arriving and departing Honolulu Harbor are primarily containerized. Shipping containers in the Hawaii trade range in size from 8'x8'x20' to 8'x8'x45'. Containers arriving at Honolulu Harbor are generally unloaded from the ship or barge and stacked in the container yard of the terminal. From the container yard, the container may be reloaded to a barge at the same facility for other overseas destinations or inter-island delivery, trucked to another facility for barge transshipment to inter-island destinations,



Source: Department of Planning and Permitting – Zoning Map 5

FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

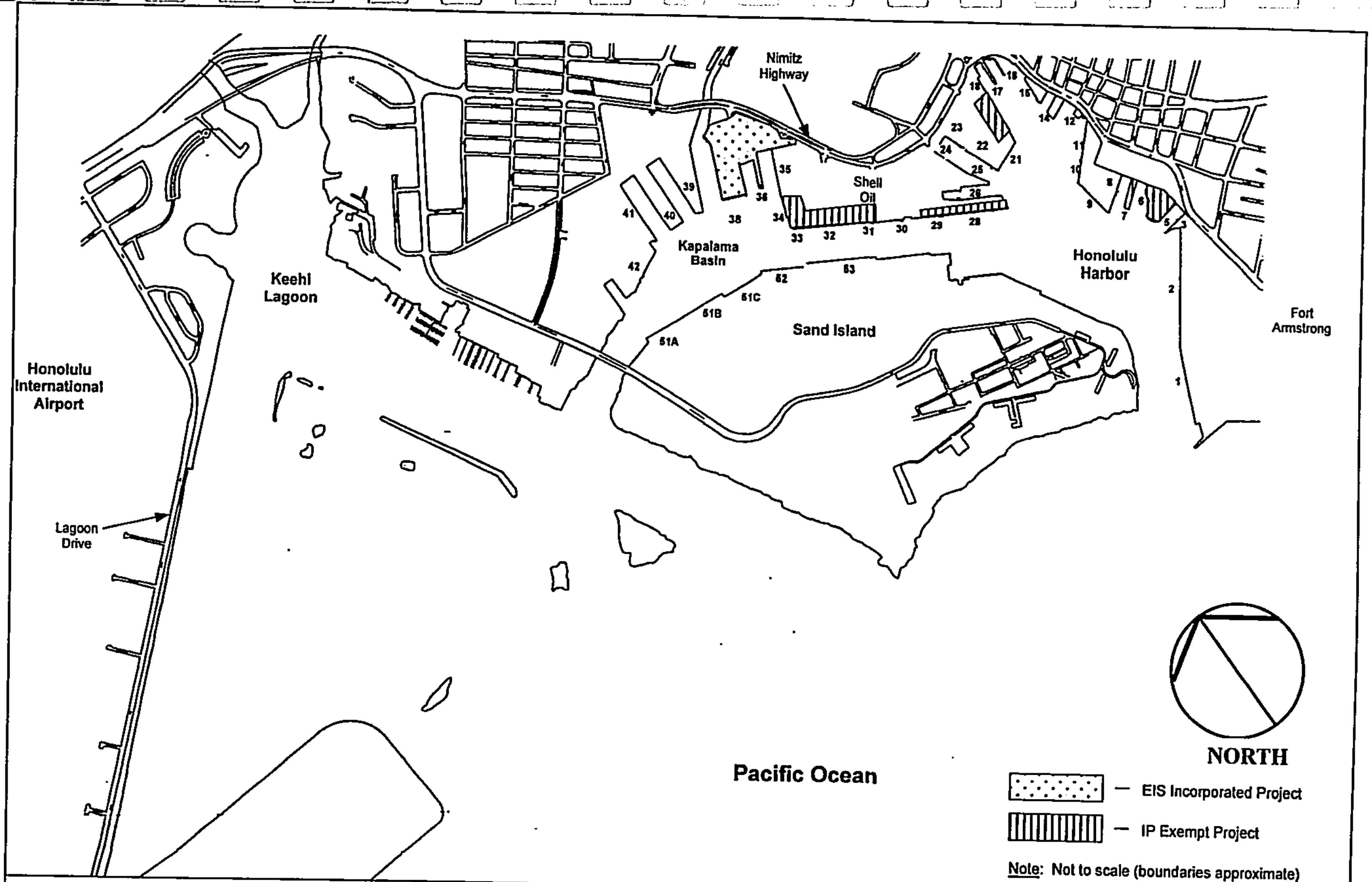
THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN
IMMEDIATE PHASE

Figure 2 – 3

Land Use Zoning Designations in Project Vicinity

Prepared for: State of Hawaii
Department of Transportation
Harbors Division

Prepared by: Wil Chee – Planning, Inc.



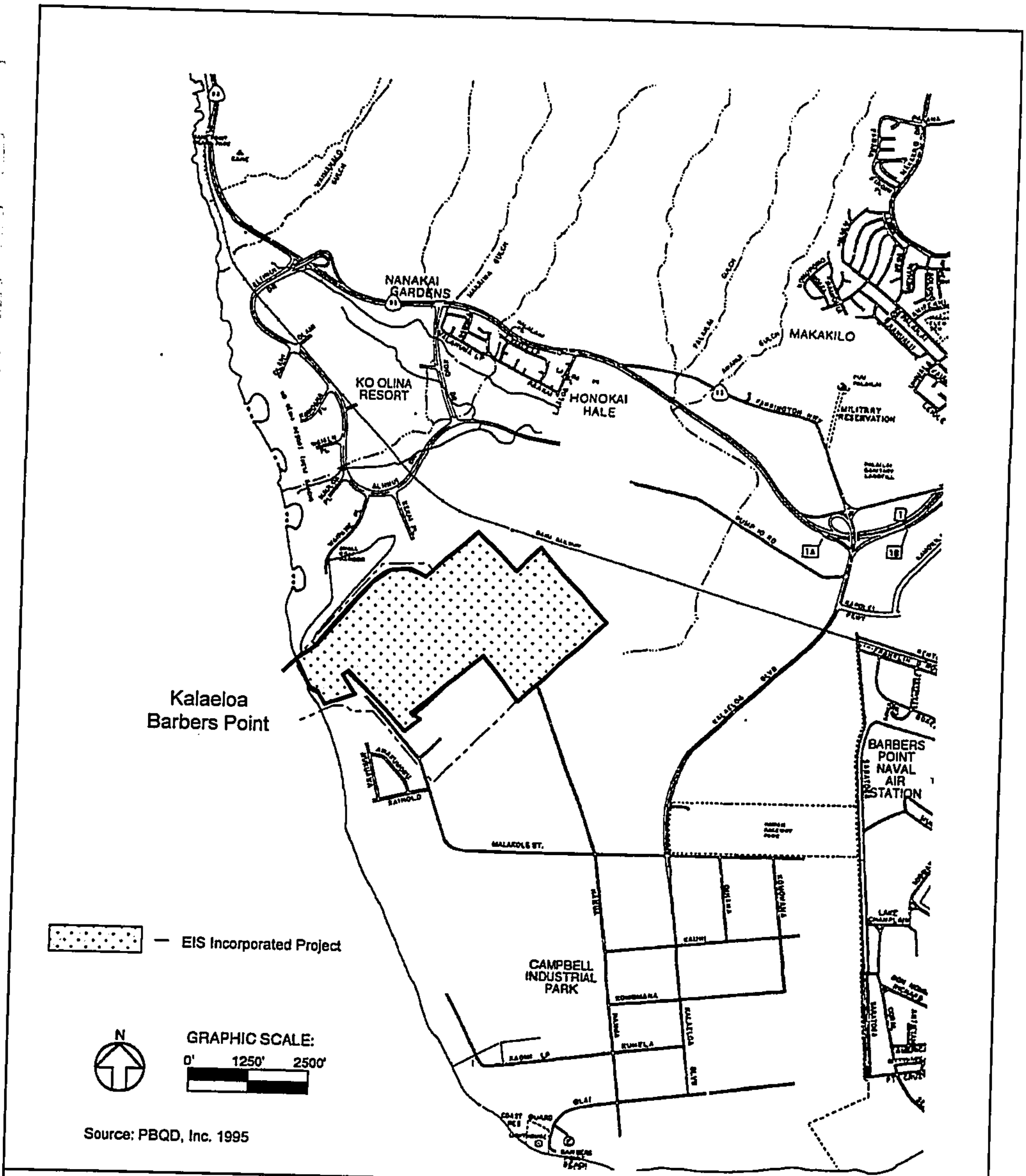
FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR
THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN
IMMEDIATE PHASE

Figure 2 – 4

Honolulu Harbor - Exempt and EIS Incorporated Projects

Prepared for: State of Hawaii
Department of Transportation
Harbors Division

Prepared by: Wil Chee – Planning, Inc.



FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN – IMMEDIATE PHASE	**Figure 2 - 5** **Kalaeloa Barbers Point - EIS Incorporated Projects**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.

trucked directly to consignees on Oahu, or emptied and its contents delivered by truck on Oahu.

- Neobulk – Includes cargo moving in large, unitized loads to promote efficient handling and storage of the commodity. Neobulk cargo includes lumber, steel, construction equipment/vehicles, and newsprint.

- Break Bulk/General Cargo - Break bulk general cargo can include almost any type of "small lot" commodity which can be shipped on a pallet as an individual unit.

- Dry Bulk – Includes dry good commodities which can be shipped in bulk (non-unitized) form. Examples of dry bulk cargo are grain, sugar, cement, and coal.

- Liquid Bulk – Includes fuel oil, diesel, gasoline, jet fuel, ammonia, molasses, etc., which are transported in vessels with capacities ranging from 10,000 to 35,000 dead weight tons.

- Inter-Island Cargo – Inter-island cargo consists primarily of commodities that are shipped through the Young Brothers facilities at Piers 39 and 40. The cargo consists of containers, automobiles, and break bulk cargo originating and shipped within the State.

The above-described cargo types are accommodated at various piers throughout Honolulu Harbor. Individual piers often handle a combination of cargo types. For example, Piers 1, 2, 19, 20, 31-34, 39, 40, 51, 52, and 53 all accommodate a combination of automobiles, overseas containers, neobulk, and dry bulk cargo.

Liquid bulk cargo is usually accommodated at specific piers. In Honolulu Harbor petroleum products are handled at Piers 30 – 34, and 51A. However, some of these piers also accommodate other cargo types in addition to petroleum products.

In addition to the extensive commercial shipping industry operations, Honolulu Harbor is home to commercial fishing and passenger vessel activities. There are two general types of passenger activities which occur at Honolulu Harbor: cruise ship (foreign and interisland) operations and excursion vessel operations.

Cruise Ships - Foreign cruise ships call at Honolulu Harbor, and passengers disembark for short stays. Interisland cruise ships travel around the Hawaiian Islands and make weekly calls at Honolulu Harbor. Cruise ships including the Norwegian Dynasty, Queen Elizabeth II, SS Independence, and Island Princess currently dock at Piers 9, 10 and 11, which are located adjacent to the Aloha Tower Marketplace (ATM).

The two-story ATM structure serves as both a cruise passenger terminal facility as well as public parking for Aloha Tower Marketplace patrons. Cruise ship operations take place on the ground level, and passengers disembark onto the second level.

Cruise ship passengers disembark via a ramp connected to the second level and proceed to the ground level to tour buses waiting along Fort Street. Cruise passengers can also be found waiting on the ground level of the parking structure amidst the associated operating cruise ship vehicles.

Prior to the construction of ATM, a ramp lead directly from Piers 5-7 to the second level of the current ATM parking structure. Tour buses could easily access the second level via this ramp and cruise ship passengers could be safely and conveniently picked up and dropped off. However, with the construction of ATM, the ramp was demolished thereby relegating direct bus service for passengers to the street level.

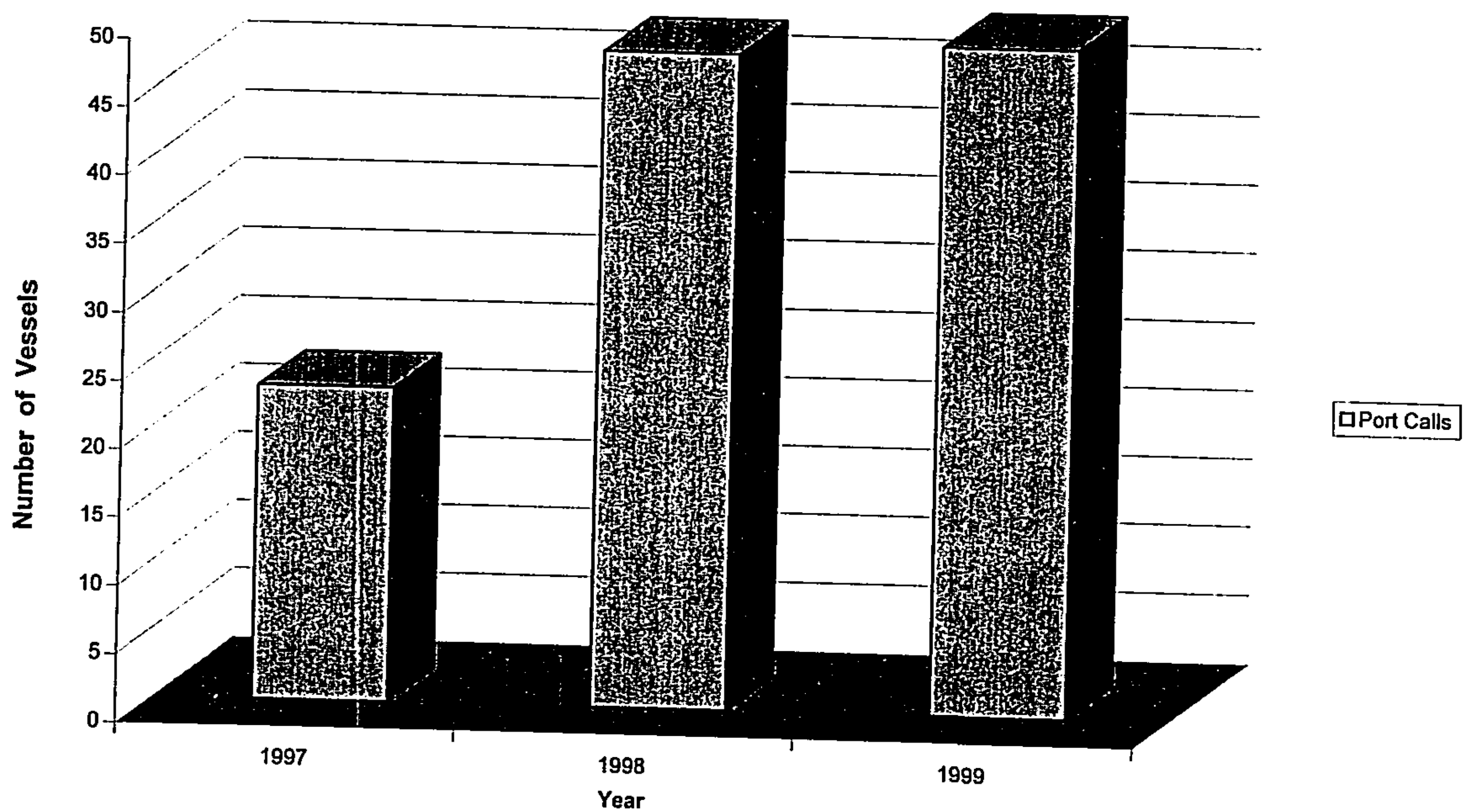
The existing cruise ship facilities at Piers 9, 10 and 11 are inadequate and they do not provide the desired amenities associated with modern day cruise terminal facilities. Due to the rapid growth of the cruise ship industry in conjunction with the lack of existing adequate cruise ship facilities, Pier 2 often serves as an overflow berth for cruise ships calling at Honolulu Harbor.

Existing facilities at Honolulu Harbor simply can not keep up with the growing demands of the cruise ship industry. Figure 2-6 shows the scheduled number of cruise ship port calls to Honolulu Harbor over the past three years. The numbers shown in the chart effectively illustrate the need for a state-of-the-art cruise ship facility at Honolulu Harbor.

<u>Excursion Vessels</u> - Excursion vessels are smaller in size than the foreign and interisland cruise vessels. These popular tourist cruises last only a few hours and often include meals and entertainment. For the most part, excursion vessels operate out of Kewalo Basin, but a few operate out of Honolulu Harbor as well. Piers that accommodate excursion vessel operations include Kewalo Basin and Honolulu Harbor's Piers 2, 5,6, 7, 12 and 40.

A trend towards larger excursion vessels is developing. Already, large vessels such as the Star of Honolulu, Navatek and Ali'i Kai are home-ported in Honolulu Harbor. Additionally, these large boats require extensive land support areas to accommodate the many tour buses needed to transport passengers. A fully loaded Star of Honolulu will accommodate approximately 1,500 passengers (HDOT, 1997). As Hawaii's tourists continually seek new avenues of recreation, Kewalo Basin and Honolulu Harbor receive increasing amounts of requests for excursion vessel facilities. The dramatic increase in passengers for the excursion vessels operated by Paradise Cruises, Ltd. (Star of Honolulu, Starlette, and Starlette II) is illustrated in Figure 2-7

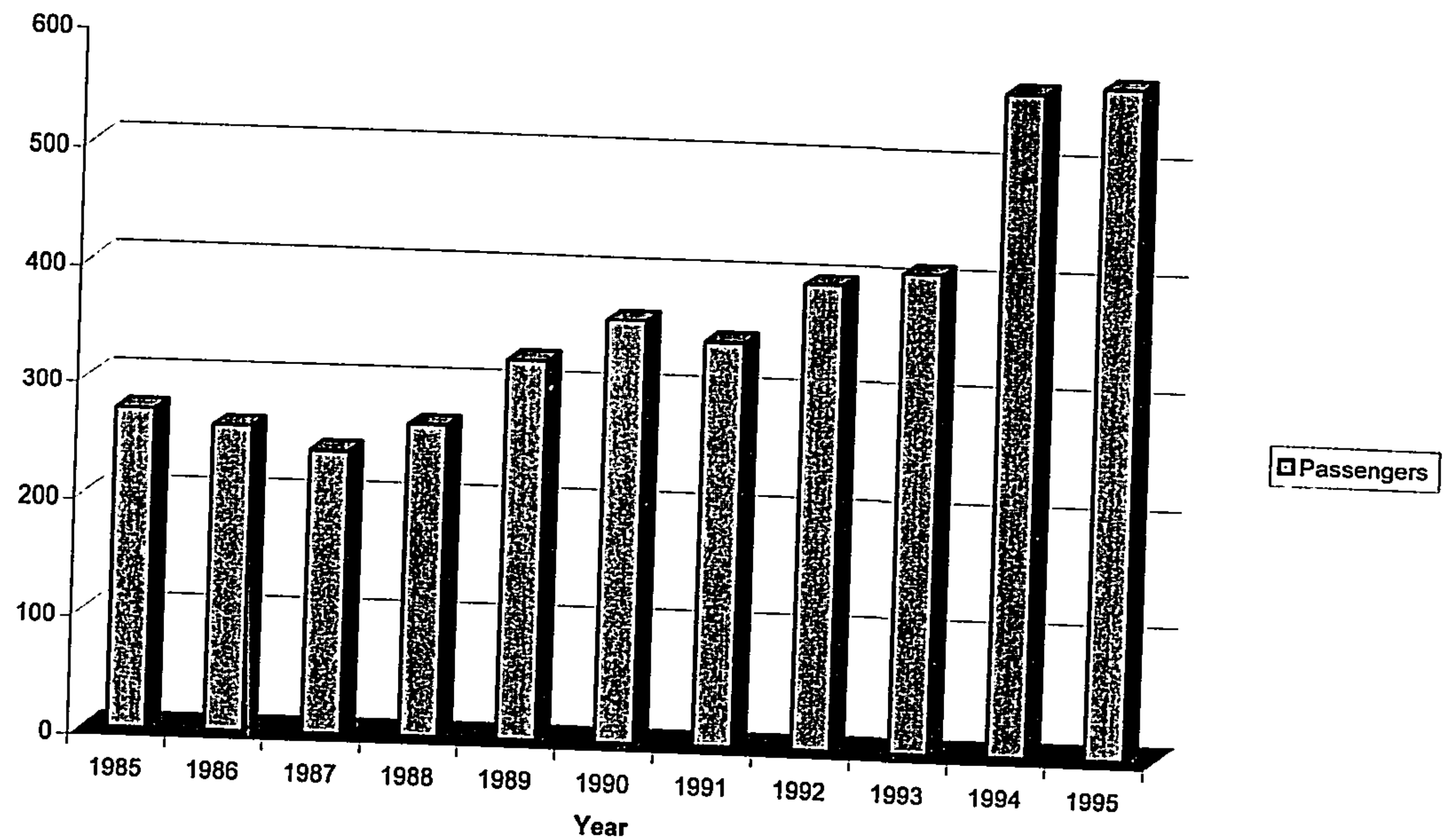
Foreign Cruise Ship Activity at Honolulu Harbor



Source: DOT-HAR

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN IMMEDIATE PHASE	**Figure 2 – 6** **Cruise Ship Port Calls At Honolulu Harbor**	Prepared for: State of Hawaii, Department of Transportation, Harbors Division Prepared by: Wil Chee – Planning, Inc.

Passengers Totals for a Typical Excursion Vessel Operator at Honolulu Harbor (in thousands)



Source: DOT-HAR/Paradise Cruises, Ltd.

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN IMMEDIATE PHASE	**Figure 2 – 7** **Excursion Vessel Passenger Totals**	Prepared for: State of Hawaii, Department of Transportation, Harbors Division Prepared by: Wil Chee – Planning, Inc.

<u>Commercial Fishing</u> - Commercial fishing operations, which include fish loading, storage, vessel repair, etc., are mainly accommodated at Kewalo Basin and Honolulu Harbor's Piers 15 through 18. Additionally, construction activities for the future "Domestic Commercial Fishing Village" at Piers 36 – 38 were recently initiated. The fishing village will consolidate Oahu's domestic fishing commercial fleet and many wholesaling operations while showcasing the fishing industry as a unique visitor attraction.

The areas adjacent to the proposed project sites in Honolulu Harbor contain a mixture of industrial, mixed commercial and industrial, and mixed commercial and residential land uses. Businesses in the area include wholesale and distribution facilities, manufacturing, auto repair shops, gasoline stations, retail stores, restaurants and bars.

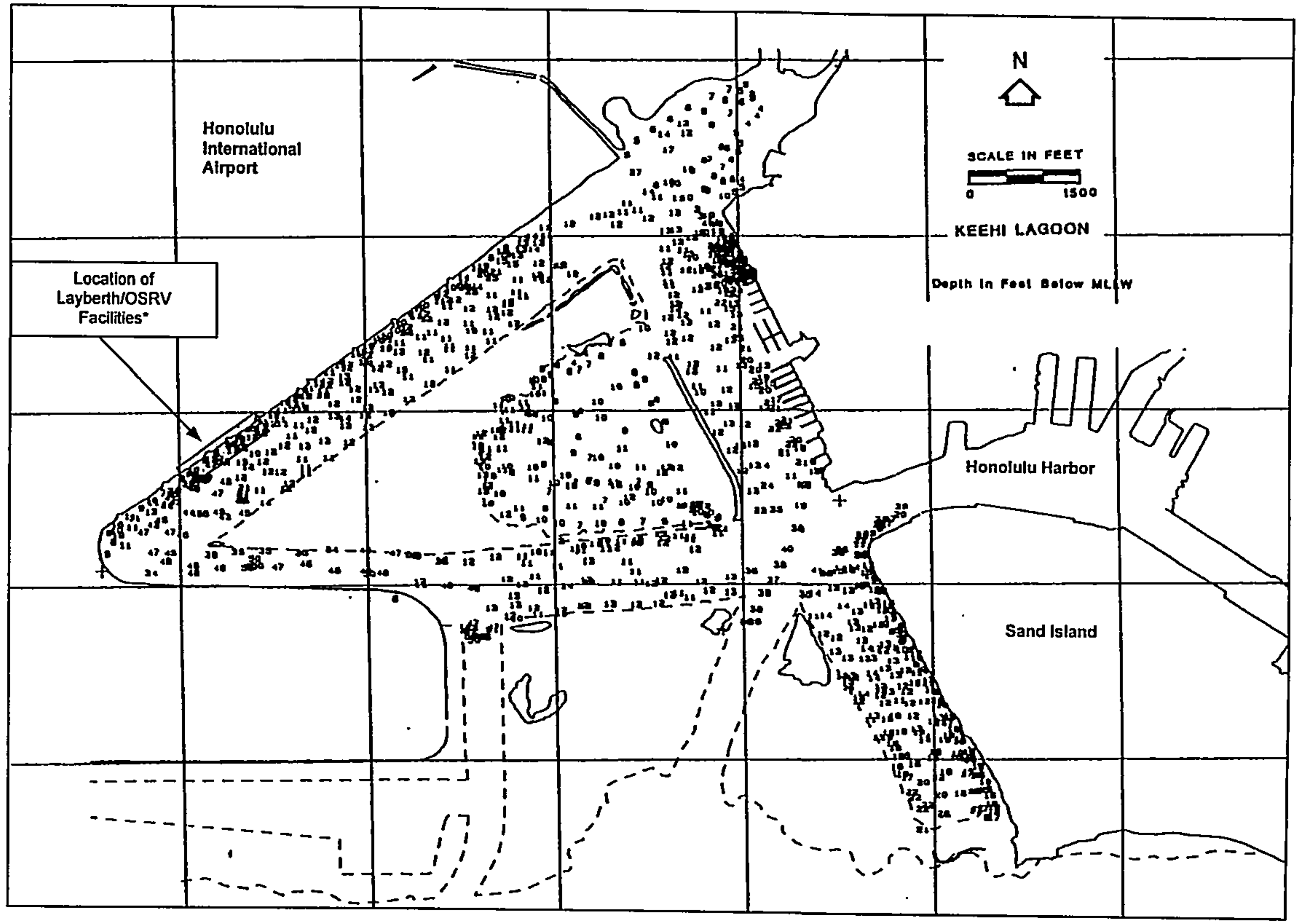
<u>KEEHI LAGOON</u>

Keehi Lagoon is situated on the south shore of Oahu between Honolulu Harbor and the Honolulu International Airport. The lagoon is a sheltered triangle-shaped body of water encompassing approximately 2.1 square miles. Located in the inner portion of the lagoon is an approximate 300 acre triangle reef remnant which is bordered by channels dredged for three seaplane runways. The depths of the channels bordering the remnant reef range from approximately 5 - 10 feet (northern corner) to 40 - 48 feet (south-west corner) between the mean lower low water (MLLW). Figure 2-8 illustrates the various water depths within Keehi Lagoon.

The lagoon is bordered by shallow fringe reef flats to the south, the airport to the north and west, and Kalihi Kai and Sand Island Industrial areas to the east. Keehi Lagoon and all of the perimeter shoreline areas are under the jurisdiction of the State of Hawaii.

The proposed project area along Lagoon Drive is located on land which is presently vacant and undeveloped. North and east of the proposed site are an assortment of commercial operations including various car dealerships, air freight companies, and the privately owned Island Seaplane Services, Inc. Island Seaplane Services, Inc. utilizes Seaplane Runway "B" for their operations. They have constructed a floating dock and office on Lagoon Drive opposite the United Parcel Service (UPS) facility, and is currently operating under a revocable permit issued by Airports Division. Situated to the north and west of the site is the Honolulu International Airport.

There are presently three (3) marinas in Ke'ehi Lagoon providing a total of about 500 berths. Ke'ehi Small Boat Harbor, owned and operated by the State, is the largest facility with about 300 berths. The other two marinas, Ke'ehi Marine Center and La Mariana Sailing Club, are privately owned and operated on lands



* = Project boundaries approximate

Source: Noda, E. K., 1987

FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN
IMMEDIATE PHASE

Figure 2 - 8

Water Depths at Keehi Lagoon

Prepared for: State of Hawaii
Department of Transportation
Harbors Division

Prepared by: Wil Chee – Planning, Inc.

leased from the State. A federally-designated offshore anchorage area is located within Seaplane Runway "D" across from the marinas. The State has installed permanent mooring buoys within this authorized mooring area (Noda, 1999).

Commercial ocean recreation areas have been established within Seaplane Runway "B" between the end of the Reef Runway and Kalihi Channel. A commercial windsurfing, sailing, and diving zone is designated along the seaward edge of the channel near Harris Island, and a commercial thrill craft (jet ski) zone is designated near Mokuoeo Island (east of the circulation channel off the end of the Reef Runway). Hawaiian Ocean Thrills has an existing facility known as "HOT Island" that is moored offshore Mokuoeo Island in Seaplane Runway "B". This moored floating facility is utilized for the commercial operation of recreational thrill craft and water sports, with two thrill craft areas, observation deck, swimming area and loading platform (Ibid.).

2.6 2020 PLAN - Immediate Phase Projects

As previously stated in section 2.1, the 2020 PLAN was developed and approved as a long-range, conceptual, land-use planning document. It should be noted that the proposed immediate phase improvements are based upon the latest existing conceptual project plans. All final improvement designs will be determined during the project's design stage and may vary somewhat from those presented in this FEIS. If drastic changes are required supplemental environmental studies will be undertaken.

2.6.1 Cruise Passenger Terminal at Pier 2

Existing Conditions

Pier 2 is located along the east side of the main channel to Honolulu Harbor approximately 3/4 of a mile from the channel entrance. The Pier 2 site is situated on the grounds of Fort Armstrong which is bounded on the east by Ala Moana Boulevard, by Keawe Street on the southeast, and by Pier 1 on the south. Adjoined by a knuckle (wharf bend), Pier 2 is contiguous with Pier 1; together these piers border the eastern side Honolulu Harbor's main channel. Pier 2 alone provides 1,779 linear feet of total berthing space and has the capability of docking two cruise vessels.

Pier 2 consists of a large cement pier apron that is supported on cement posts approximately two feet in diameter. The pier extends out approximately 33 feet from the shoreline, and the bottom depths range from approximately 5 feet deep directly adjacent to the shore to approximately 33 feet deep at the piers edge

Located east of and parallel to the pier apron is the Pier 2 Shed, which is the State's largest cargo shed. Currently, the Pier 2 Shed operates primarily as a cargo warehouse where container shipments from cargo vessels are unloaded.

High capacity forklifts are utilized at the site to transport containers throughout the site and load them onto cargo vessels and trucks. The Pier 2 shed is currently utilized by Aloha Cargo, Sause Brothers, the Foreign Trade Zone and U.S. Customs (Figure 2-9).

As mentioned earlier, Pier 2 also serves as an overflow cruise ship terminal. When a cruise ship arrives at Pier 2, passengers are discharged onto the pier apron and directed into the Pier 2 shed. A temporary baggage claim area is staged, and planters are used to create a more aesthetically pleasing atmosphere. However, it is clearly evident that these temporary terminal operations are housed within a large warehouse facility.

Proposed Cruise Passenger Terminal (approx. 13.8 acres)

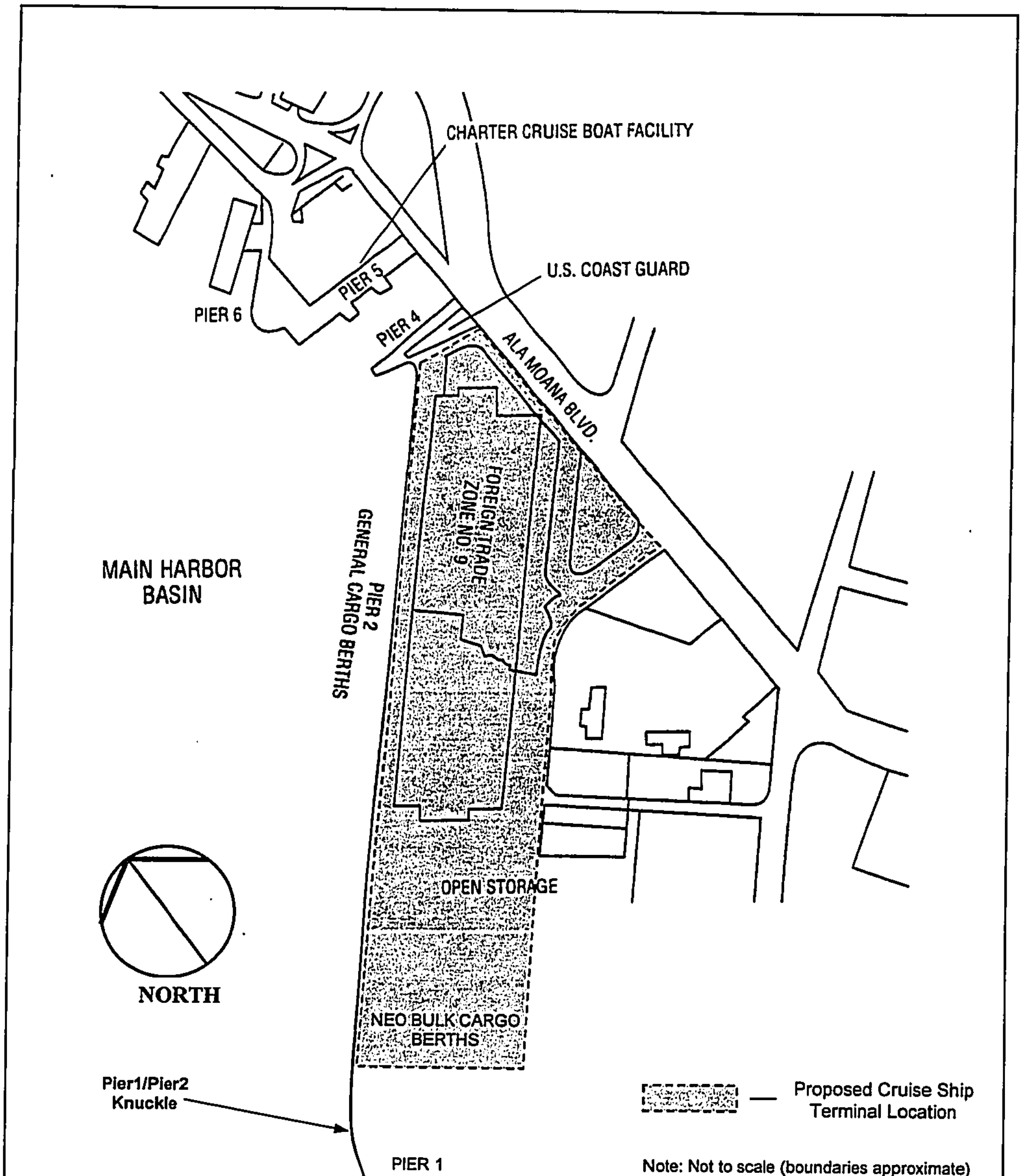
The proposed project would *involve the construction of* a passenger vessel terminal at Pier 2 capable of accommodating two cruise ships. The conceptual plan for the proposed facilities includes two terminal buildings, parking areas, and a new paved roadway to access the terminal buildings and parking facilities.

Additional project work includes the demolition of the existing Pier 2 shed, demolition of Channel Street, the extension of Punchbowl Street to South Street (via a proposed Ilalo Street extension), the installation and/or improvement of lighting, curbing, drainage, sewers, signage, landscaping, water supply, and signalized intersections would also be necessary.

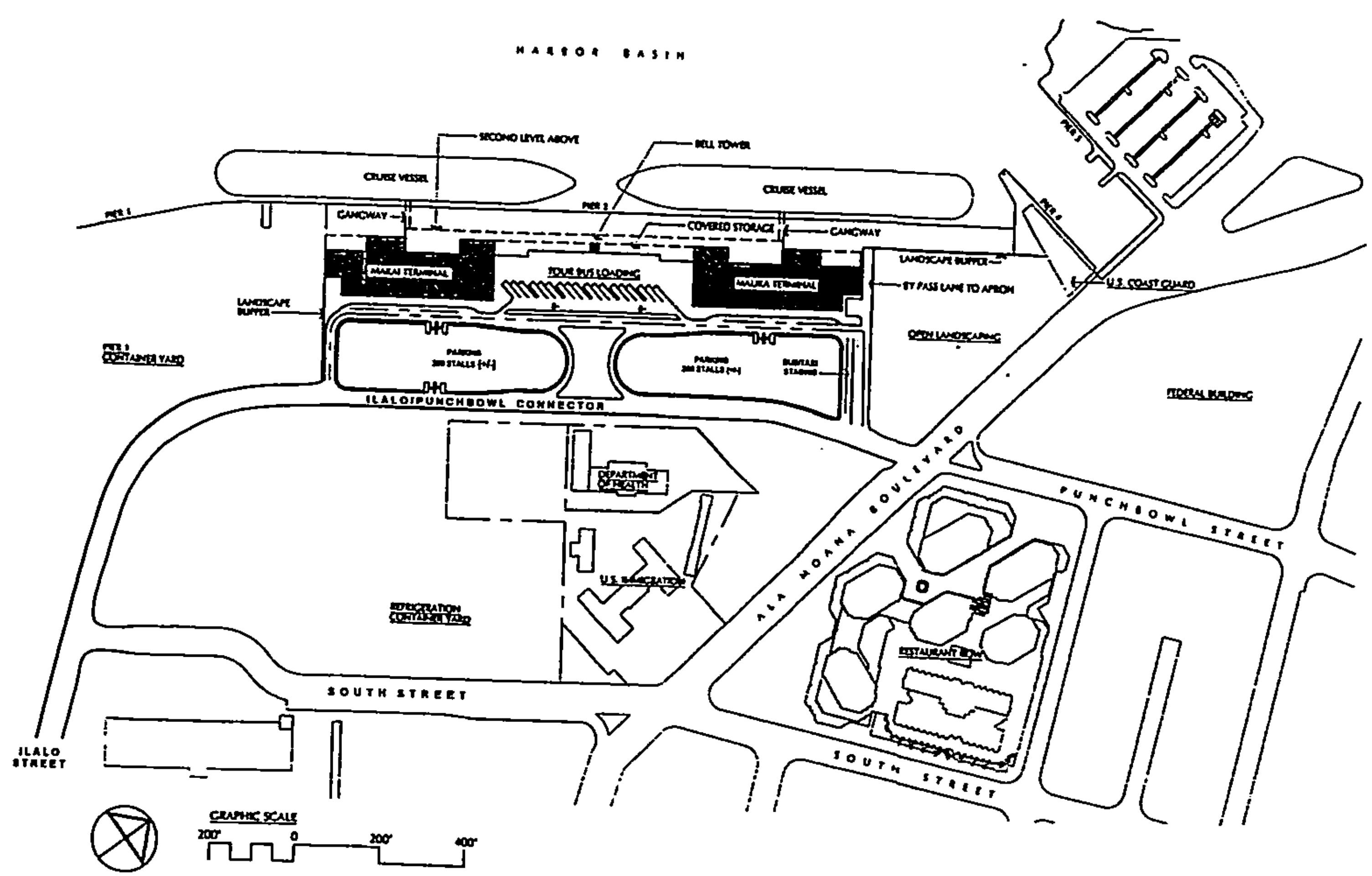
The Pier 2 Cruise Passenger Terminal will consist of two separate terminal buildings constructed along side each other. The two terminal buildings would be identified as the Mauka and Makai terminals. The northern terminal located closest to Ala Moana Boulevard will be designated the Mauka Terminal, and the southern terminal located adjacent to Pier 1 will be the Makai Terminal. The two terminal buildings will be approximately 475 feet apart separated by a common tour bus loading area and covered boarding area.

With its 1,779 linear feet of total berthing space, Pier 2 has the capability of docking two cruise vessels. At the proposed terminal, cruise ships will dock bow to bow with a 100 foot distance between each of the vessels. The proposed terminal buildings are situated and designed to accommodate two larger vessels approximately 850 feet in length, with the primary passenger entry portal being approximately 400 feet from the bow of the ship. When a large cruise ship (i.e., the Queen Elizabeth II) is docked with a medium-sized vessel, the makai vessel would extend 50 to 100 feet beyond the Pier 1-2 knuckle. The proposed cruise terminal facility is shown in Figure 2-10.

The Mauka and Makai terminals are two story buildings that are essentially identical in design. *The proposed two-story height and mauka-makai orientation of the long-axis of the planned terminal complex buildings is consistent with the City's vision for the redevelopment of the Honolulu Waterfront, as is the proposed*



FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN – IMMEDIATE PHASE	**Figure 2 – 9** **Existing Conditions at Pier 2**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.



FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN IMMEDIATE PHASE	**Figure 2-10** **Pier 2 – Cruise Ship Terminal Conceptual Plan**	Prepared for: State of Hawaii, Department of Transportation, Harbors Division Prepared by: Wil Chee – Planning, Inc.

system of internal roadways (see section 3.10). The size of the two proposed terminals is based on a design vessel with a 2000 passenger capacity. However, the terminals will be able to accommodate two vessels with a combined passenger total of over 2000 due to the phased disembarkation process practiced by foreign registered vessels.

Each proposed terminal building will consist of a 43,400 ft^2 ground level and a 31,100 ft^2 second level. Ground level operations will include check-in, baggage claim, baggage hold, and customs. Second level operations will include a passenger lounge, V.I.P. Lounge, Retail/Concession area, and an elevated concourse (Figure 2-11).

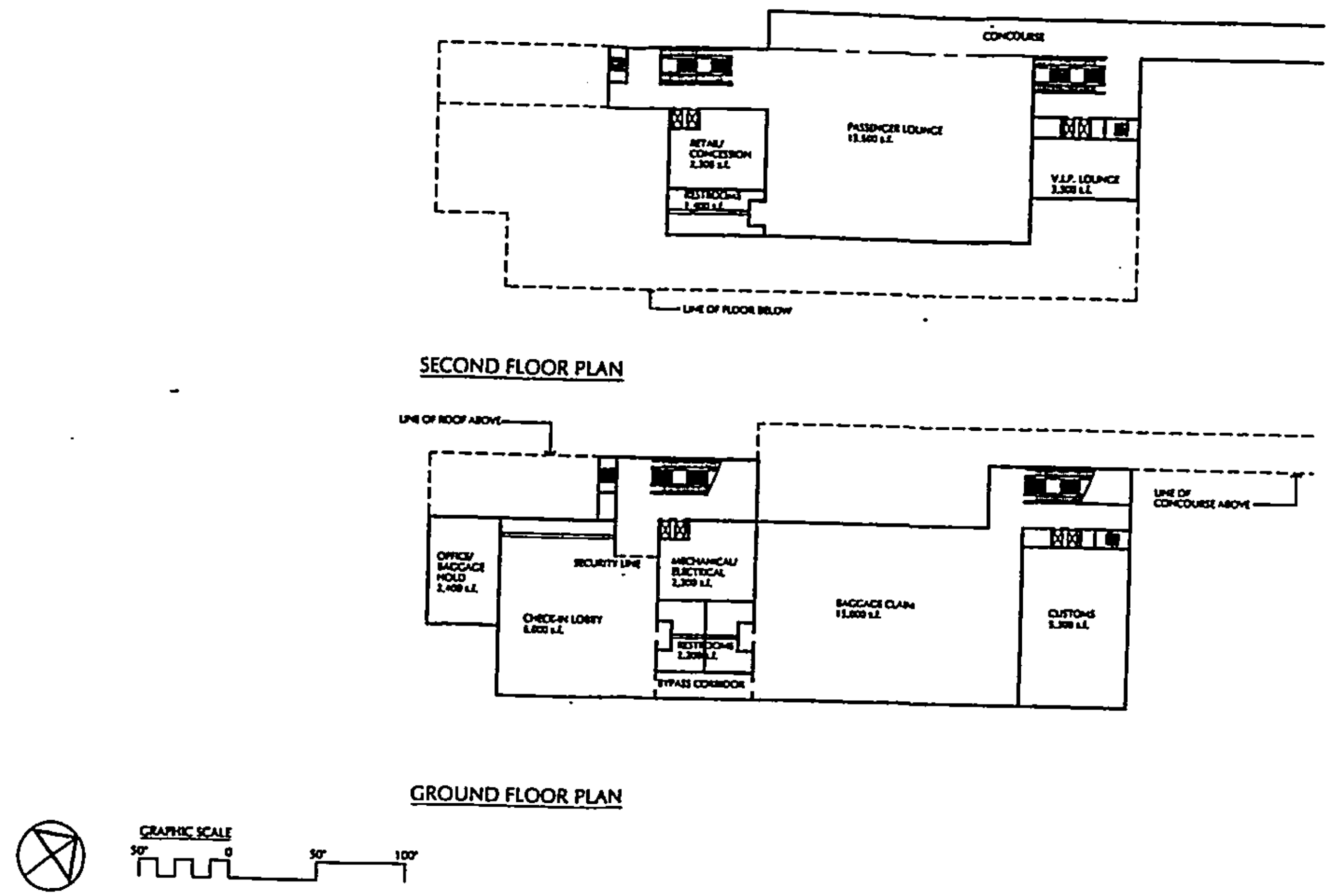
In addition to the project related improvements at Pier 2, the Hawaii Community Development Authority (HCDA) would commence with their proposed Ilalo Street improvements adjacent to the project site. These improvements involve the extension of Ilalo street at both its east and west ends. When complete, Ilalo Street will function as a connector between Ward Avenue and Punchbowl Street (HCDA, 1998). The proposed Ilalo Street improvement is discussed further in Section 3.10.

The cruise terminal facility will have an internal roadway system and parking areas that will provide sufficient space for queuing, stacking, drop-off, and turn-around functions of buses, taxis, and limousines. A vehicular circulation system which will adjoin the proposed Ilalo Street extension is proposed to link the two passenger terminals.

There is a provision for approximately 400 on-grade parking stalls within the vehicular circulation system inclusive of passenger rental car staging which will provide sufficient off-street parking. The common tour bus loading area will be situated between the two terminal buildings and consist of 18 bus stalls in a saw-tooth configuration to conform to the vehicular circulation system. Taxi cab and tour bus staging is located at the Mauka end of the parking area/project roadway system.

The vehicular access at the proposed Ilalo Street connector will be dedicated to circulation of passenger related traffic, which includes tour buses, taxi cabs, rental car shuttles, limousines, and public, private, and staff vehicles. Cargo/container traffic, store vehicles, baggage trucks, and other operationally related vehicles shall utilize the existing Pier 1 entrance at South Street for access to pier side activity. The segregation between operations and passenger related vehicular movement is intended to minimize congestion and cross-traffic and to optimize safety and efficiency.

The proposed cruise terminal would serve as Honolulu Harbor's primary cruise ship berthing facility. Piers 9, 10 and 11 at ATM and Piers 19 and 20 would



FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN – IMMEDIATE PHASE

Figure 2 – 11

Pier 2 - Cruise Ship Makai Terminal Conceptual Plan

Prepared for: State of Hawaii
Department of Transportation
Harbors Division

Prepared by: Wil Chee – Planning, Inc.

function as overflow berths for cruise ships when additional berthing area is required.

2.6.2 Finger Piers at Piers 12 through 16

Existing Conditions

Piers 12-16 are bounded on the east by Ala Moana Boulevard, on the south by Piers 10-11 and on the west by Piers 17-20. Nuuanu Stream outlets between Piers 15 and 16, producing a silty bottom in this area of Honolulu Harbor. Maintenance dredging is currently underway along these piers to ensure an 18-foot depth. A brief description of the existing conditions at each of the piers is provided below:

- The original Pier 12 was originally built in 1907, but is no longer present (Wilson, Okamoto, and Associates, 1968). Today, only a small area made up of cut coral blocks, extend to depths of approximately 20 feet, exist at the former site. This small coral block area (known today as Pier 12) has a berthing length of 50 linear feet and is used for small cruise boats and as an automobile parking area.

- Piers 13 and 14 have berthing lengths of 340 and 280 linear feet respectively. Pier 13 houses a 27,889 square foot shed and uses of these piers are tug boat mooring, automobile parking, and ice machine facilities.

- Pier 15 is a wooden pier with a total berthing length of 440 linear feet. The pier rests on cement piles approximately 2.5 feet in diameter. The pier is located in water depths up to 34 feet and is utilized by the waterfront Fireboat Station No. 29.

- Pier 16 is a 377-foot finger pier constructed in 1986. This finger pier has a total berthing area of 890 feet and is currently used by domestic longline fishing vessels for mooring, maintenance, and onboard repair work.

Proposed Finger Piers (approx. 0.5 acres)

The project involves the expansion of the berthing area at Piers 12 –16. This will be accomplished by the reconstruction and expansion of existing piers and the construction of new finger piers. These improvements are designed to accommodate a greater number of domestic commercial fishing vessels. In addition to domestic commercial fishing vessels, excursion/tour vessels may also utilize Piers 12 – 16. However, use of Piers 12-16 by excursion/tour vessels will not involve operational activities and will be limited to docking purposes only.

Proposed improvements will be undertaken at Piers 12, 15 and 16 and will consist of the reconstruction and extension of Pier 12, the extension of Pier 16, and construction of new finger piers at Piers 12a and 15a.

The Finger Pier 12a will be constructed in between Piers 12 and 13. Finger Pier 12a will be approximately 475 feet in length by 10 feet in width, extending directly into Honolulu Harbor.

Finger Pier 15a will be constructed as an attachment to the northern end of Pier 15 and will provide an additional 10 berths. Finger Pier 15a will consist of a segment approximately 30' wide by 140' long which will extend westward into the harbor. At the end of this 30' x 140' segment there will be an additional extension measuring approximately 20' in width by 450' in length. This additional section will extend southward in the direction of Pier 14.

The proposed improvements at Pier 16 would involve the construction of an extension approximately 300' long by 20' wide at the end of Pier 16 into Honolulu Harbor. The Pier 16 extension will provide an additional 6 berths. Figure 2 – 12 illustrates the proposed improvements at Piers 12 – 16.

2.6.3 Excursion Vessel Terminal at Piers 24 through 29

Existing Conditions

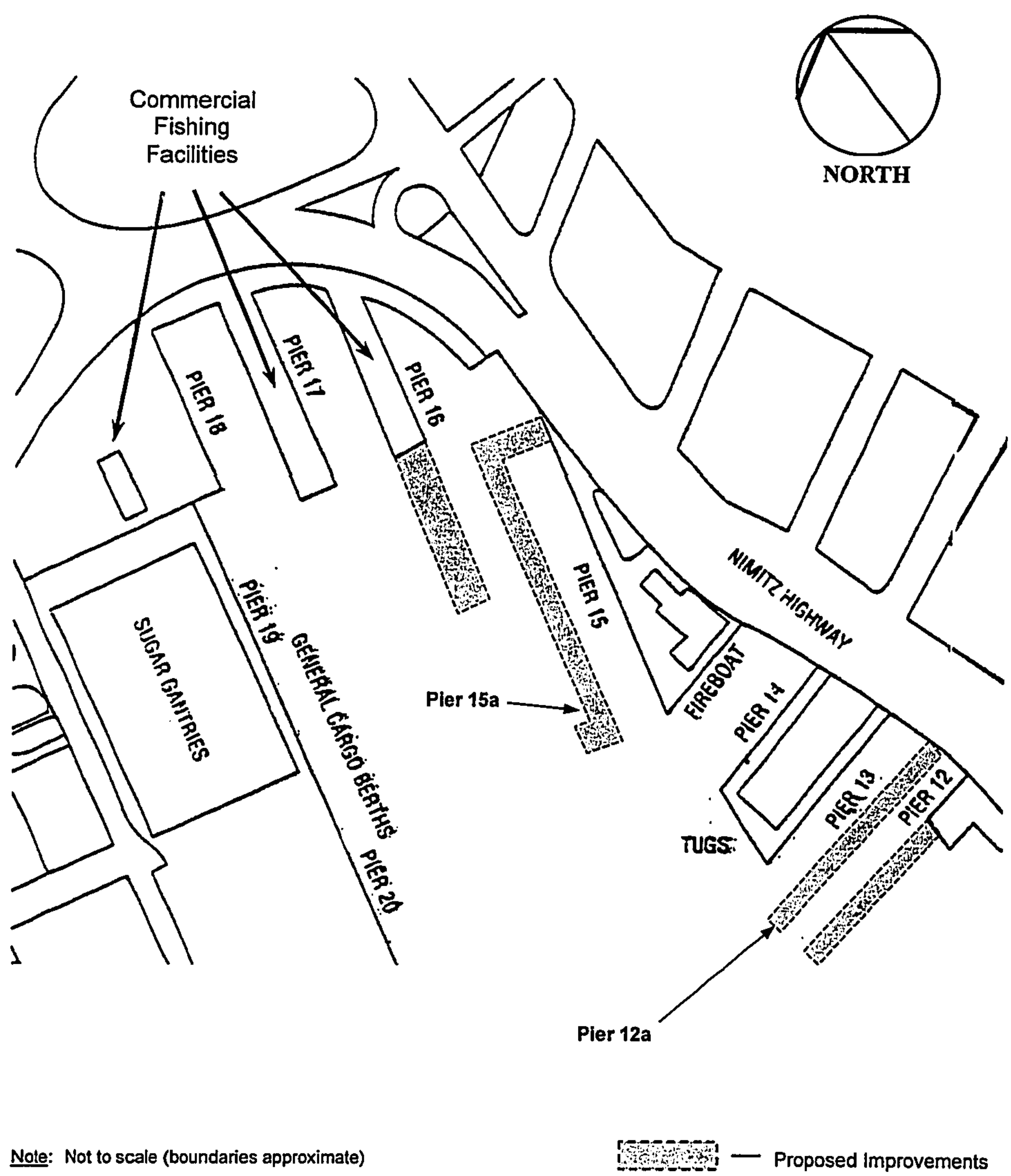
Piers 24 through 29 are bounded on the north by Nimitz Highway, on the east by the Pier 21-22 tug berths and the Pier 23 grain terminal and on the west and south by Piers 28-29 (Figure 2-13). Almost the entire area comprising Piers 24 – 29 is paved with either asphalt or concrete. The exceptions are the waterfront apron areas, which are pile-supported concrete piers.

The large Pier 24-29 interisland barge sheds occupy most of the project area and will be demolished. The sheds, which are currently vacant, have not been well maintained and are in varying degrees of disrepair. Until recently, the Pier 24-29 sheds housed the Young Brothers Break Bulk Terminal. Young Brothers Ltd. has since moved its interisland cargo operations entirely to the new Pier 39 - 40 shed.

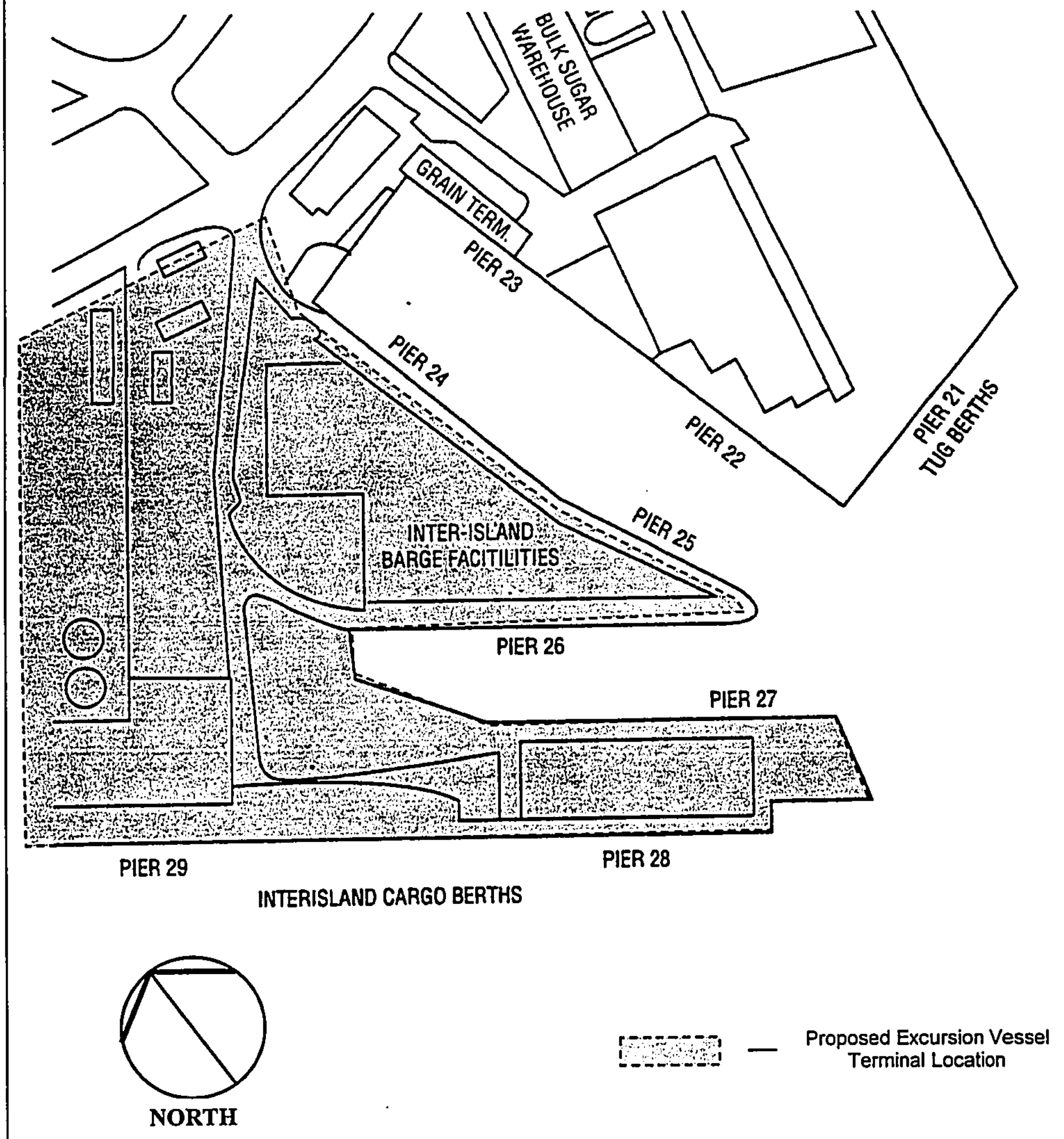
Proposed Excursion Vessel Terminal (approx. 15.4 acres)

This project involves the construction of a commercial excursion vessel passenger terminal at Piers 24 – 29. The proposed terminal will accommodate the same types of excursion and tour operations presently operating out of Kewalo Basin.

The improvements will involve the demolition of the existing Inter-Island Barge Operations Buildings and the construction of a new single-story structure which



FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN – IMMEDIATE PHASE	**Figure 2 - 12** **Finger Piers at Piers 12 - 16**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.



Note: Not to scale (boundaries approximate)

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN – IMMEDIATE PHASE	Figure 2 - 13 Existing Conditions at Piers 24-29	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.

will serve as the commercial excursion vessel terminal. The terminal building will include a covered passenger waiting area approximately 600 feet in length along Piers 24 and 25. The entrance to the terminal facility will be at the existing Pacific Street and Nimitz Highway intersection. This intersection will be signalized and will provide access for both Diamond Head and Ewa bound traffic.

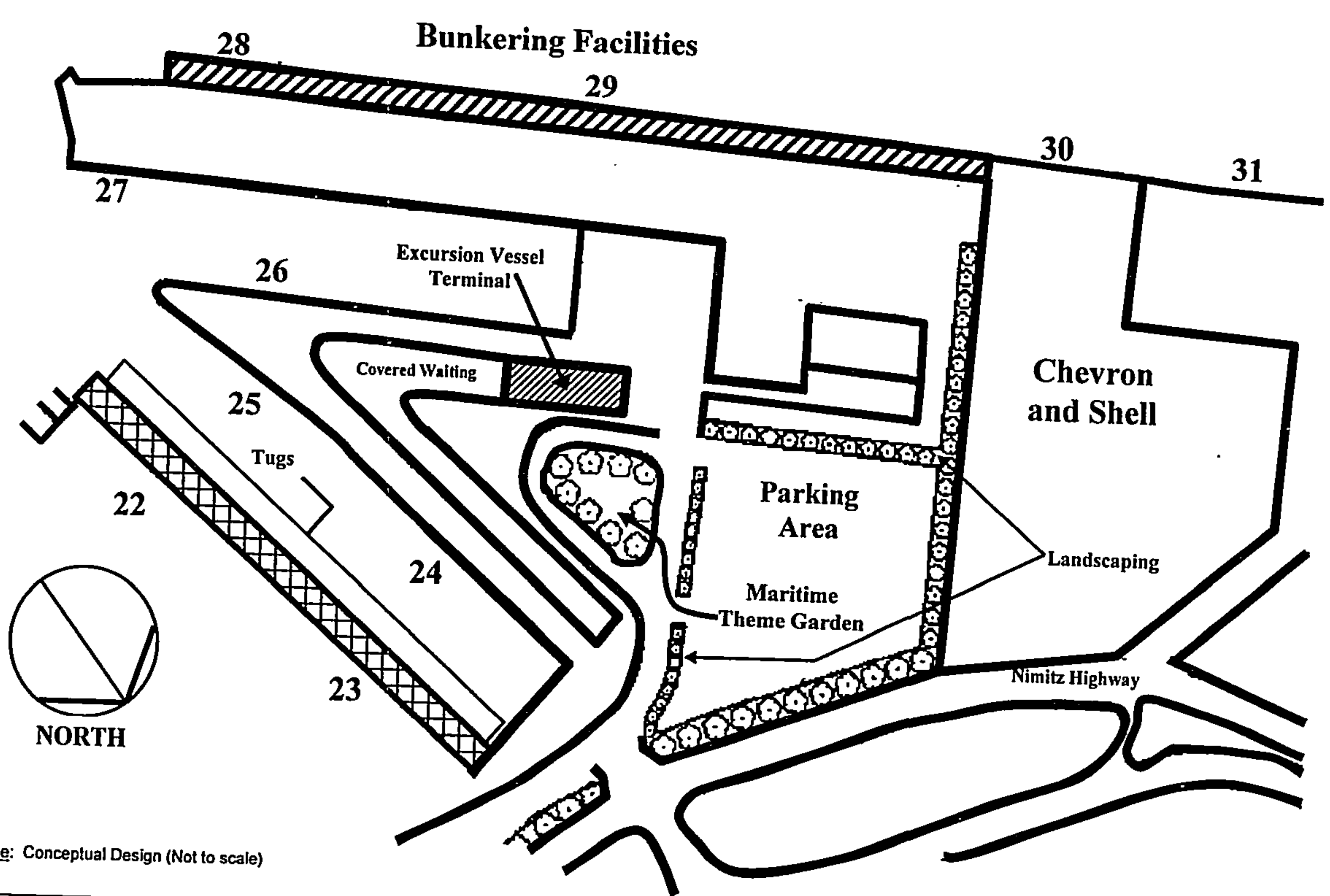
In addition to the terminal building, the proposed project will include a maritime theme garden, roadways, installation and/or improvement of lighting, curbing, drainage, sewers, signage, landscaping, and a paved parking area which would provide sufficient space for queuing, stacking, drop-off, and turn-around functions of buses, taxis, and limousines. The four-acre parking lot would be situated mauka of the proposed terminal facility and adjacent to Nimitz Highway. *The proposed single-story height, planned landscaping, and maritime theme garden are also consistent with the City's vision for the redevelopment of the Honolulu Waterfront.* (Figure 2-14).

A vehicular ferry terminal was originally being considered as part of the proposed Pier 24-29 improvements. However, the proposed terminal has since been relocated to Piers 19-20 and included as an IP exempt project. *Recently, commercial operators in Honolulu Harbor have suggested that the proposed Excursion Vessel Terminal be constructed at Piers 19-20. The site for the proposed improvements remains Piers 24-29. However, during the design phase the viability of the Pier 19-20 location will be considered. If the proposed improvements are relocated to Piers 19-20, adverse environmental impacts are not anticipated because of the similarities in land area, existing land use, and the proximity of the two sites.*

2.6.4 Lay Berths and *OSRV* Facility along Lagoon Drive at Keehi Lagoon

<u>Existing Conditions</u>

The approximately 1.5-mile stretch of coastline along Lagoon Drive is bounded on the north and west by the Honolulu International Airport, and on the east by Keehi Lagoon Park. The Department of Transportation - Airports Division's Fire Response Facility is located on the western most end of the proposed site. The street is lined on the makai side with paved sidewalks. The DOT-Airports Division has recently undertaken beautification efforts along this stretch, planting palm trees and naupaka shrubs along the coastline. The shoreline is lined with intermittent concrete piles and boulder-reinforced areas. A wooden dock which houses the office for the sea plane business is located about 500 yards east of the site. The reef remnant wetland area can be seen directly off shore across the channel in Keehi Lagoon.



Note: Conceptual Design (Not to scale)

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN – IMMEDIATE PHASE	**Figure 2 – 14** **Excursion Vessel Terminal at Piers 24-29 Conceptual Plan**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.

Construction of Layberths (Approximately 5.7 acres)

Layberths are berthing areas which function as simple "parking stalls". The berthing space is either rented (usually long-term) or used for the storage of impounded vessels. There are no operational activities associated with the proposed layberth facilities.

This project involves the construction of layberths to accommodate foreign and domestic commercial fishing vessels, barges, and other vessels. Based upon information from fishing boat agents, the current demand for fishing boat berthing space is an estimated 15 commercial foreign fishing vessels that desire to stop over in Hawaii on an annual basis, with average stays of 20 - 40 days (Noda, 1999) The proposed layberths will be constructed to the east of the existing DOT - Airports Division's Fire Response Facility along the western end of Lagoon Drive. In addition to the proposed layberth structure, paving of the adjacent road, perimeter fencing, and installation of utilities (fresh water, electricity, communications) would also be necessary.

The proposed improvements along Lagoon Drive will also include a berthing facility for Oil Spill Response Vessels (*OSRV*). *OSRV* emergency response vessels function to contain and cleanup oil spills.

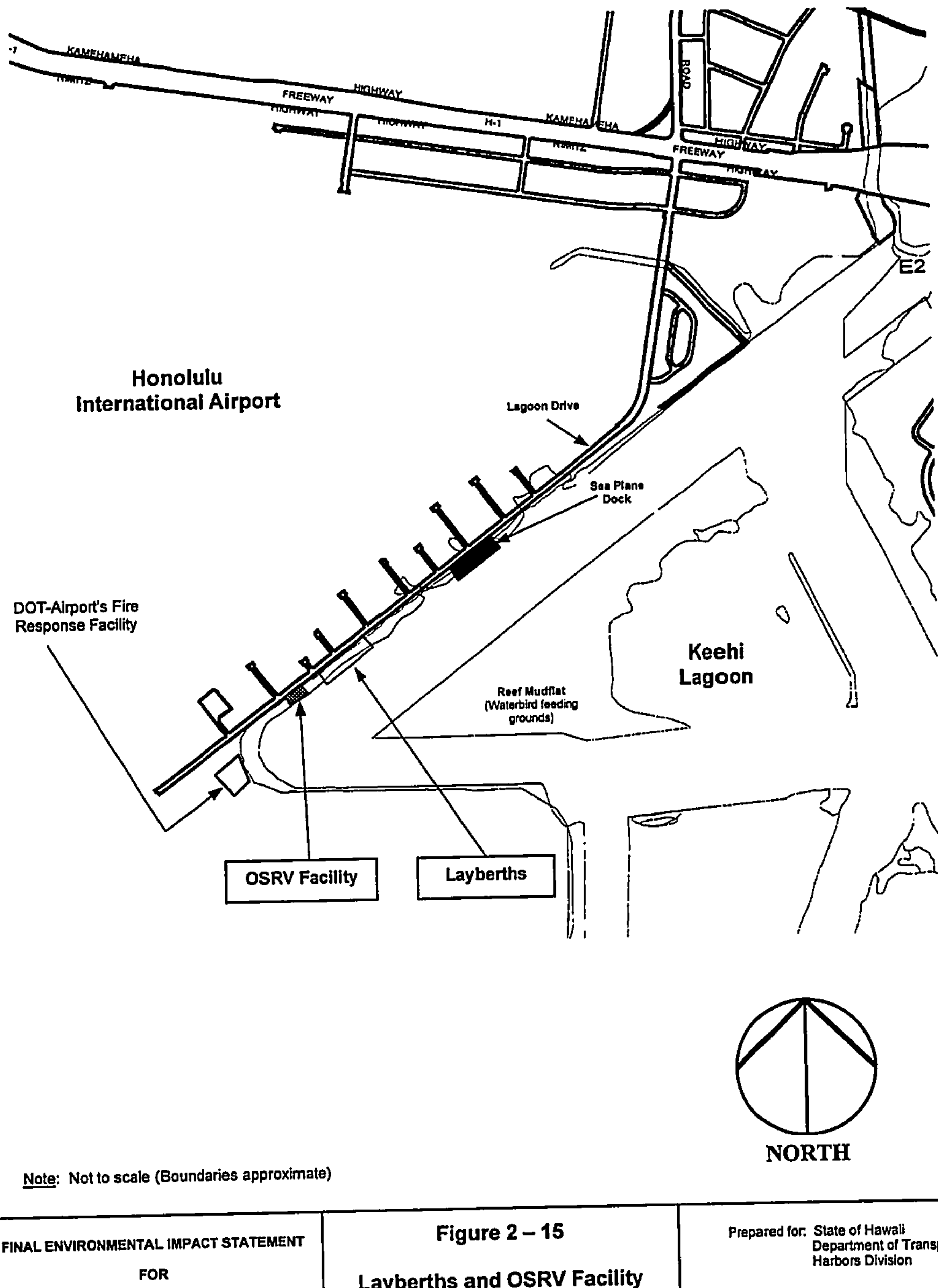
There are two primary *OSRV* emergency response vessels that operate in Honolulu Harbor: the Hawaii Responder and the Clean Island Council. Presently, both vessels berth at Pier 35 along with six small police vessels. The Clean Island Council is 130 feet in length and requires a 50' x 50' warehouse space, and the Hawaii Responder is 208 feet long and needs approximately 20,000 square feet adjacent to its berth.

The proposed *OSRV* facility will be adjacent to the western end of the layberths and will be designed to meet the needs of these two vessels. Specifically, the proposed *OSRV* facility will include warehouse space, office space, marginal wharf, water, telephone, electrical, and sewer systems.

The layberths and *OSRV* facility site is expected to extend approximately 2,100 feet along Lagoon Drive. The proposed location of the layberths and the *OSRV* facility are illustrated in Figure 2 – 15.

The proposed *OSRV* site will consist of a pier facility that would accommodate both *OSRV* vessels. The pier will be 365 feet in length and will extend approximately 100 feet seaward of the shoreline near the interface between the 12' and 45' water depths. A 20,000 square foot warehouse will be situated on the pier platform to accommodate the needs of the *OSRV* vessels.

The proposed layberth facilities will consist of a fixed 800-foot marginal pier which will accommodate vessels in a "Tahitian" style mooring arrangement. The



Note: Not to scale (Boundaries approximate)

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN - IMMEDIATE PHASE	**Figure 2 – 15** **Layberths and OSRV Facility and Vicinity**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.

marginal pier will be able to accommodate 7 - 10 vessels that average between 140 - 180 feet in length, and about 10 - 15 vessels that average 100-feet or less in length. A comfort station will be sited adjacent to the marginal pier.

The larger vessels utilizing these facilities would be located in the deeper portion of the channel while the smaller vessels would be located in the shallow areas. The advantage of the Tahitian style mooring arrangement is the flexibility in accommodating various vessel sizes with minimal capital costs. Mooring buoys can easily be rearranged as necessary. The proposed designs for these projects are shown in Figure 2 - 16.

Dredging activities will not be necessary for the proposed improvements. The foreign and domestic commercial fishing vessels which would be using the proposed layberths have an average draft depth of 15 and 10 feet respectively. These vessels will easily be able to navigate within the sea plane runway and negotiate the turn around the western-most corner of the Keehi Lagoon "triangle". The western corner of the triangle has a large turning radius (approximately 800 feet wide) through which vessels can navigate in depths of 38 – 47 feet BSL (Figure 2-8).

2.7 EIS Incorporated Projects

This section summarizes the IP projects which have either already been implemented or have already had separate environmental documents prepared for them.

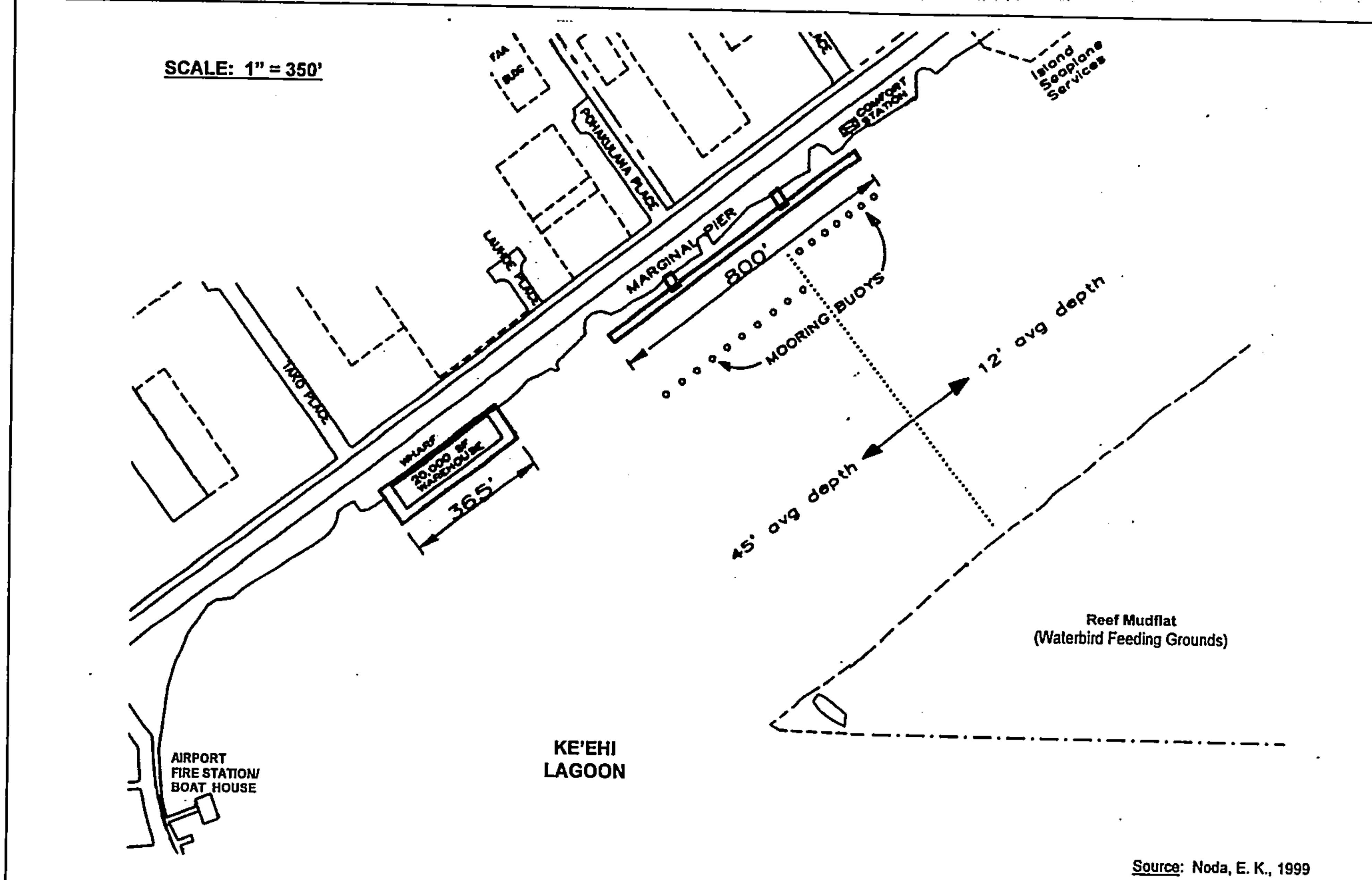
2.7.1 The Domestic Commercial Fishing Village at Piers 36-38
(Finding of No Significant Impact, 1998)

The primary objective of developing the Piers 36-38 Fishing Village is to provide a central support facility for the local commercial fishing fleet and their associated customers, primarily wholesalers and the fish auction. Concurrent to this objective is the State's desire to provide a unique visitor attraction intended to provide greater visibility for Hawaii's commercial fishing industry as a resource for tourism. In addition to wholesaling seafood and related products, tenants will be encouraged to provide limited retail sales. Purchases could be delivered to buyers' hotels or shipped overseas.

The findings and determinations of the environmental review process for this project indicated that there would be no significant adverse impacts to the environment, and a Finding of No Significant Impact was issued.

2.7.2 Interisland Cargo Yard Improvements at Piers 39-40
(Finding of No Significant Impact, 1991)

The proposed project consists of constructing a Roll-On, Roll-Off (Ro/Ro) berth at Pier 39A, Honolulu Harbor, Oahu. The project also includes reconstruction of



Source: Noda, E. K., 1999

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN IMMEDIATE PHASE	**Figure 2 - 16** **Layberth and OSRV Facilities at Keehi Lagoon (Conceptual Plan)**	Prepared for: State of Hawaii, Department of Transportation, Harbors Division Prepared by: Wil Chee – Planning, Inc.

approximately one thousand sixty five (1,065) feet of existing apron within Piers 39 and 40 and complete demolition of the existing Pier 39 shed and a portion of Pier 40 shed. The proposed improvement involves driving precast prestressed piles, construction reinforced concrete pile caps, concrete deck and miscellaneous site work.

The findings and determinations of the environmental review process for this project indicated that there would be no significant adverse impacts to the environment. The action has been implemented and Young Brothers has moved their operations from Piers 24-26 to Piers 39-40.

2.7.3 The *Kalaeloa* Barbers Point Deep Draft Harbor Expansion Improvements

(Environmental Impact Statement Preparation Notice, 1998)

The proposed action consists of the following elements:

- Deepening the harbor basin;
- Deepening and flaring the entrance channel; and
- Constructing a jetty on the north side of the harbor entrance.

The existing harbor consists of a 450-foot wide and 42 feet deep, 3,100-foot long entrance channel; a 38-foot deep inshore channel (980 feet long and 450 feet wide, flaring to 650 feet over the last 200 feet); and a 92 acre inshore basin 38 feet in depth. The harbor also incorporates a 21-foot deep barge basin. Currently, the State is excavating a 600 foot by 1,100-foot deep extension along the northeast margin.

The proposed project would deepen the harbor channel to a maximum proposed depth of 48 feet and all of the 38-foot deep basin (including the area currently being extended) to 45 feet. The proposed jetty would be 450 feet long.

A Supplemental Environmental Impact Statement (SEIS) is presently being prepared. This SEIS will address in detail the potential direct, indirect, and cumulative impacts of the proposed action upon the natural and manmade environment.

2.7.4 *Kalaeloa* Barbers Point Harbor Perimeter Lighting

(Finding of No Significant Impact, 1998)

The project proposes to develop a new navigational lighting system along the northwestern margin of *Kalaeloa* Barbers Point Harbor, Oahu, Hawaii, and to upgrade the existing navigational lights at the entrance to the harbor. The project involves construction of a new navigational lighting system and extension of electrical services from the existing infrastructure on Kekai Place in West Beach Estate to the new system.

The findings and determinations of the environmental review process for this project indicated that there would be no significant adverse impacts to the environment, and a Finding of No Significant Impact was issued.

2.8 Project Schedule and Cost

The proposed IP projects consist of a development plan phase, design phase and a construction phase. Preliminary overall project costs for the construction phase are estimated to be approximately $30 million. Majority of the funding for the projects would come from the Harbors Special Fund and a portion from revenue bonds.

Project development plans are presently in their conceptual stages which will be followed by the design phase. The construction phase for the proposed action will be initiated after all required permits and approvals are obtained. The construction phase for the cruise passenger terminal at Pier 2, and the excursion vessel terminal at Piers 24 – 29 are scheduled to commence in the year 2000 with completion targeted for 2001. Construction activities for the finger piers at Piers 12 – 16, and the lay berth facilities along Lagoon Drive are anticipated to begin in the year 2001 with completion targeted for 2003.

3.0 PHYISICAL ENVIRONMENT: EXISTING CONDITIONS, IMPACTS AND MITIGATION MEASURES

3.1 Climate

3.1.1 Existing Conditions

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 humidity, and the infrequency of severe storms. Northeasterly tradewinds prevail throughout the year although its frequency varies from more than 90 percent during the summer months to 50 percent in January. The average annual wind velocity is approximately 10 miles per hour.

The mean temperature measured at Honolulu International Airport ranges from 70 degrees Fahrenheit in the winter to 84 degrees Fahrenheit in the summer. The temperatures at the waterfront project area may be slightly cooler due to increased wind velocities near the open waters. The average annual precipitation in the vicinity of the site is approximately 24 inches, with most of the rainfall occurring between November and April. Relative humidity ranges between 56 and 72 percent.

As in most of Hawaii, the surface winds in the project area are influenced by northeast tradewinds. However, the "normal" northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the winter and on into early Spring. The seasonal differences in wind conditions in vicinity of the project are illustrated in Figure 3 - 1.

3.1.2 Potential Impacts

The proposed projects will not affect the local climate of the area, and mitigation measures are not anticipated to be necessary.

3.2 Topography and Soils

3.2.1 Existing Conditions

Honolulu Harbor is at the edge of Oahu's south central coastal plain. The coastal plain and much of the southern edge of Oahu is underlain by "caprock" consisting of coral reef which is partly covered by alluvium (silt, sand, and gravel) carried down from the mountains. Beneath the caprock is basalt, the volcanic rock base, which comprises all of the major Hawaiian Islands.

Soils in the entire project area belong to the Lualualei-Fill Land-Ewa association. These soils originated from past dredging activities at Honolulu Harbor and Kapalama Basin. This association occurs on coastal plains and is characterized by deep, nearly level to moderately sloping, well-drained soils that have a fine or moderately fine textured subsoil, and areas of fill land. Fill soils are classified as useful for urban development, including airports, housing areas and industrial facilities (USDA, 1972).

The island of Oahu is not subject to volcanic eruptions or significant earthquakes. It is in Seismic Zone 2A which is characterized by earthquakes that may cause minor damage to structures (ICBO, 1994).

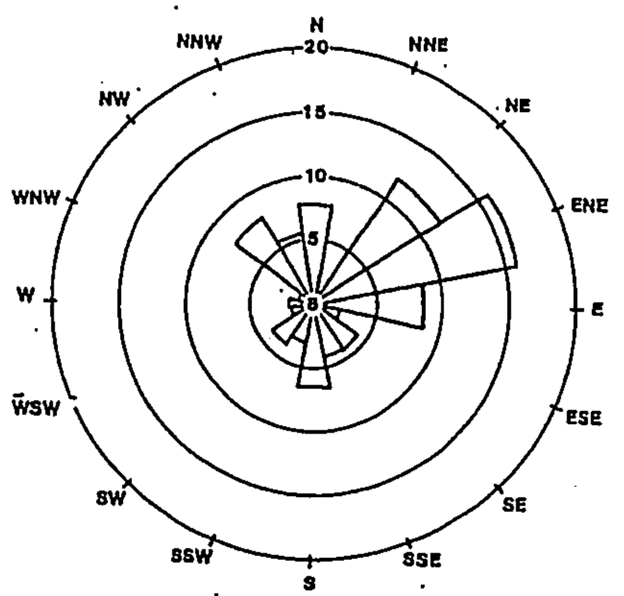
3.2.2 Potential Impacts

The Fill soils within the project area would experience disruption as a result of construction activities such as pile driving, drilling and excavations for utility and drainage improvements. Potential short-term construction related impacts from soil erosion and sedimentation are discussed in section 3.9. Additionally, the proposed projects require no dredging of these fill lands. Thus, there will be no stockpiling of dredge spoils at upland sites to alter the area's topography.

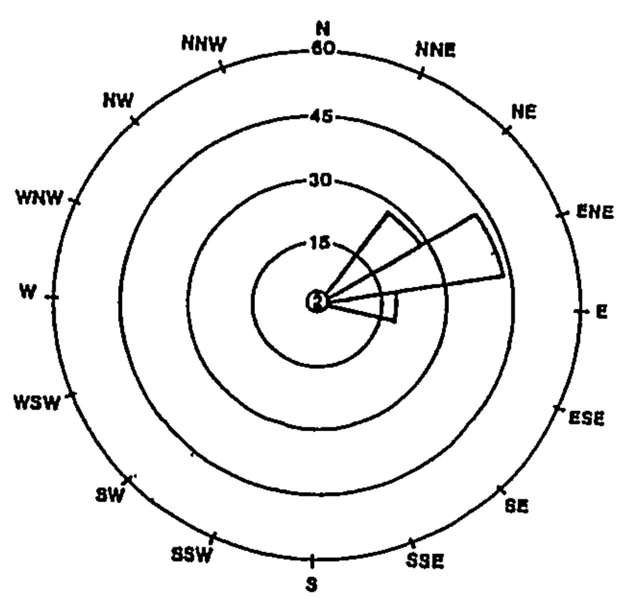
3.2.3 Proposed Mitigation Measures

The proposed project will not adversely affect the topography and soils of the area, and mitigation measures are not anticipated to be necessary.

January Wind Rose
Honolulu International Airport



August Wind Rose
Honolulu International Airport



Source: National Weather Service
Historic Records, 1940-57

Center Values = % Calm Winds

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN IMMEDIATE PHASE	**Figure 3-1** **Seasonal Wind Conditions in Project Vicinity**	Prepared for: State of Hawaii Department of Transportation Harbors Division Prepared by: Wil Chee – Planning, Inc.

3.3 Geology and Hydrology

3.3.1 Existing Conditions

Oahu's south central coast is geographically referred to as the Honolulu Plain. The geological composition of the Honolulu Plain plays an important role in the hydrological character of Oahu's leeward coastline.

The caprock layer is formed at the interface between upper sedimentary layers and the underlying basalt of the plain. The caprock forms a zone of low permeability which extends along the coastline, and in the project area, is believed to be between 800 to 900 feet thick. This impervious zone prevents the seaward movement of potable water from the basaltic aquifers.

Honolulu Harbor area was created by the continual flow of fresh water from *Nu'uanu Valley into the ocean.* The freshwater restricted the growth of coral which resulted in the forming of a basin and the beginnings of the harbor. The freshwater flows also cut channels through the existing coral reef in which sand eventually began to accumulate. These sand accumulations grew over time, forming what would later become Sand Island (HDOT, 1997). Over the years spoils from harbor dredging activities were used to expand the size of Sand Island to what it is today.

Surface waters in the immediate vicinity of the project area consist of four streams: the Nuuanu Stream which discharges into Honolulu Harbor at Piers 15 and 16, Kapalama Stream which discharges into Honolulu Harbor (Kapalama Basin) at Piers 38-39, and Kalihi and Moanalua Streams which discharge into Keehi Lagoon. Water quality of these streams is strongly influenced by surface runoff from surrounding industrial, commercial, and residential areas.

3.3.2 Potential Impacts

Almost all lands within the project areas have already been paved. During construction activities various areas will be unearthed and subsequently repaved. These construction related changes in site drainage patterns will be temporary and are not anticipated to have any long term adverse impacts on site hydrology.

Existing unpaved areas at the proposed layberth/*OSRV* facility site along lagoon drive will need to be paved. The area to be paved is relatively small (approximately *58,000* ft^2), and would only minimally increase the volume of surface runoff.

3.3.3 Proposed Mitigation Measures

The proposed projects are subject to regulation under the National Pollution Discharge System (NPDES) Permit System. The NPDES Permitting process will also require the submission of a Best Management Practices Plan (BMPP) which will address methods of runoff, erosion, and sediment control at the project sites. The NPDES permit system and BMPP are discussed in further detail in section 3.9.

The increased runoff resulting from newly paved areas at the proposed Keehi Lagoon project sites is not expected to have significant adverse impacts. However, if necessary, a Drainage Plan will be prepared during the design phase of the proposed projects to ensure that the future storm drainage systems are properly sized.

3.4 Tsunami and Flood Hazard

3.4.1 Existing Conditions

According to the Flood Insurance Rate Map prepared by the Federal Emergency Management Agency (FEMA, 1990), the entire project site, with the exception of Keehi Lagoon, is designated as being outside the 500 year flood plain. The project site located at Keehi is designated as being in an undetermined flood hazard area.

Tsunami occur as a series of waves that strike a coastline, and the waves decrease in height over time. Tsunami can cause serious damage to coastal areas. The degree of tsunami damage is dependent upon several factors including an area's topography, wave origin, and wave intensity.

In the event of a tsunami flooding of on-shore port facilities, strong currents in the area close to harbor entrances could put ships at risk, and large water movements may produce surging forces on both moored ships and ships underway.

3.4.2 Potential Impacts

Tsunami are natural occurrences over which humans have little control. The threat of a tsunami always exists as their frequency and intensity are unpredictable. The destructive potential of a tsunami depends mainly on the wave runup height and the levels of the shores they inundate.

The proposed projects will not entail any reduction or increase in shoreline levels at Honolulu Harbor or Keehi Lagoon. Therefore, the extent of overland flooding as a result of tsunami would not be affected by the proposed projects.

3.4.3 Proposed Mitigation Measures

Damage from tsunami will be minimized by following Oahu Civil Defense evacuation procedures. Measures would include the evacuation of ships, personnel, vehicles, containers, and other cargo from flood prone areas. The proposed harbor facilities will be designed, constructed, and operated in accordance with potential for tsunami flood inundation.

3.5 Terrestrial Biology

3.5.1 Existing Conditions

Honolulu Harbor

The project sites within Honolulu Harbor are located in an urban area, and existing land uses are predominantly industrial and commercial in nature. All of the proposed project sites have been highly disturbed and are dominated by manmade structures and areas paved over with asphalt or cement. The presence of terrestrial flora and fauna is both scattered and sparse.

Flora present on-site include common introduced species such as haole koa (*Leucaena leucocephala*), kiawe (*Prosopis pallida*), wedelia ground cover (*Wedelia trilocata*), and several weedy species of grasses.

Given the urban character of the Harbor, terrestrial fauna which might exist here include feral animals such as cats (*Felix domesticus*), rats (*Rattus spp.*), dogs (*Canis familiaris*), and Small Indian Mongoose (*Herpestes auropunctatus*). Some species of migratory shorebirds may occasionally pass through but not settle at the proposed project sites.

Keehi Lagoon

The proposed project site at Keehi Lagoon is situated in the vicinity of industrial and commercial land use operations but is less developed than the Honolulu Harbor sites. The flora present on the Keehi Lagoon triangle reef islets and surrounding shoreline is limited in diversity and is dominated by introduced species. The most abundant introduced plant species present is the American mangrove (*Rhizophora mangle*). Other exotic varieties of plants include coconut trees (*Cocos nucifera*), akulikuli-kai (*Batis maritima*), small kiawe (*Prosopis pallida*), ironwood (*Casuarina equestifolia*), kolu (*Acacia farnesiana*), sea mulberry (*Conocarpus erecta*), wedelia ground cover (*Wedelia trilocata*), and various weedy species of grasses.

There are no endemic species present, and only three indigenous species are known to exist in the project area. These species are the milo (*Thespisia populnea*), akulikuli (*Sesuvium portlacastrum*), and the seaside heliotrope (*Heliotropium curassavicum*). None of these species is considered threatened or endangered (Noda, 1989).

Keehi Lagoon serves as a resting and feeding site for a variety of bird life. The largest group of birds recorded in the Keehi Lagoon area are introduced species. Previous surveys have recorded 17 species of introduced birds none of which are threatened or endangered, and a number have proven to be serious pests in Hawaii. Native bird species including the black-crowned night *heron (Nycticorax n. hoactli*), brown booby (*Sula leucogatser*), white tern (*Gygis alba*), common noddy (*Anous stolidus*), and great frigatebird (*Fregata minor palmerstoni*) have been recorded flying over but not nesting in the Keehi Lagoon area (Noda, 1989).

One of the most important habitat features of the Keehi Lagoon area are the offshore inter-tidal mudflats. These mudflats are exposed during low-tide conditions and provide a resting and foraging area for various shorebirds such as the wandering tattler or ulili (*Heteroscelus incanus*), sanderling or hunakai (*Calidris alba*), the ruddy turnstone or akekeke (*Arenaria interpres*), the Pacific golden-plover or Kolea (Pluvialis fulva), and the endemic the Hawaiian stilt or 'ae'o (*Himantopus mexicanus knudseni*). Additionally, the mudflats provide a staging area where each shorebird species congregates with their own kind prior to flying off as a flock during migrations to northern breeding sites (USFWS, 1999).

The ulili (Heteroscelus incanus), sanderling or hunakai (Calidris alba), the ruddy turnstone or akekeke (Arenaria interpres), and the Pacific golden-plover or Kolea (Pluvialis fulva) are all migratory bird species afforded protection under the Migratory Bird Treaty Act (16 USCS section 703). The Hawaiian stilt is the only species found at Keehi Lagoon that is listed as endangered by the Federal government (USFWS, 1996). The Hawaiian stilt and its Keehi Lagoon habitat are discussed further in section 3.7.

3.5.2 Potential Impacts

The proposed actions are not expected to have a significant adverse impact on plant resources in the project area. A majority of the construction activities will occur on previously disturbed areas. It is likely that abundant plant species such as kiawe and mangrove trees, Haole koa shrubs, and weedy grasses will need to be removed from undeveloped portions of the proposed sites. These introduced species are all regionally abundant floral resources.

The proposed improvements are also not expected to have a significant impact on the terrestrial fauna communities in the project area. In Honolulu Harbor construction will take place in previously disturbed areas, and the faunal species which may be affected are common and abundant in the region.

3.5.3 Proposed Mitigation Measures

In order to secure habitat protection for shorebird species which utilize the Keehi Lagoon mudflats, the final project design will avoid the mudflat areas during the construction and long-term operation of the berthing facilities. Because of the lack of significant impacts, no additional mitigation measures are proposed.

3.6 Marine Biology

Biological surveys of the marine environment in the project areas were conducted in September of 1998 by S. L. Coles and R.E. De Felice of the Bishop Museum's Department of Natural Sciences. These surveys were incorporated into the *Aquatic Habitat and Water Quality Impact Assessment Report* which was prepared by AECOS, Inc. in conjunction with this EIS (Appendix D). The information presented in this section is based on these surveys and the assessment report.

3.6.1 Existing Conditions

In contrast to the distribution of the terrestrial biota in the project area, Honolulu Harbor contains a much more diverse marine biological community than Keehi Lagoon.

Overall, there were a total of 82 different species observed in the marine waters at the proposed project sites within Honolulu Harbor. These species were comprised of a wide variety of marine life including corals, sponges, alga, nematodes, crustaceans, and fish species. The macroalga (*Mesophyllum mesomorphum*); eight invertebrate taxa (sponges *Mycale cecilia, Hyatella intestinalis*; barnacle *Chthamalus proteus*; ectoprocts *Amahtia distans* and *Diaperoecia* sp.; ascidans *Phallusia nigra* and *Bottryllus spp.*) occurred at every site. All of these except the macroalga and the ectoproct Diaperoecia sp. are known or suspected nonindigenous species introduced from areas outside of Hawaii (Coles, et. al., 1999).

A total of 45 different species were recorded at the Pier 2 site. Twelve species of fish were noted under and around the pier and five species were unique to the site, including *Parapeneus multifasciatus, Chaetodin miliaris, Forciper flavissimus, Thalosomma duperry*, and *Canthigaster jactator* (Ibid.) It is of interest to note that a previous study of marine organisms in the same vicinity (conducted at Pier 1) recorded 29 species of fish and only 8 invertebrates and one macroalga (AECOS, 1988). These differences from the present results are for the most part due to the fact that Pier 1 is closer to the channel entrance where more reef fishes are likely to be present.

The marine community at Pier 15 was the most diverse of the sites surveyed. A total of 47 taxa were found consisting of 4 macroalga, 35 invertebrates and 8 fish species. Sponges, represented by 14 different species, are most abundant at this site (Coles, et. al., 1999). No coral occurred at the site, and decreasing numbers of invertebrate coverage on the pier pilings going toward the Nuuanu Stream mouth suggest the limiting effect of stream outflow on the marine community.

Pier 12 which is located farther from the Nuuanu Stream Mouth (approximately 500 yards) supports a high coverage of reef corals. Only 7 coral species were recorded at this site *(Porites compressa, Porites lobata, Montipora patula, Montipora verucosa, Pocillopora damicornis, Carijoa riisei, Zoanthus pacificus)* but they encrusted the walls of the dock and other hard surfaces down to 5 meter depths resulting in up to 50% coverage of available surfaces (Coles, et. al., 1999).

Pier 16 is located approximately 100 yards from the mouth of Nuuanu Stream. A total of only 21 invertebrates and 3 fish species were found at the site, the fewest number of taxa of all the sites surveyed (Ibid). These results are not surprising considering the proximity to the Nuuanu Stream Mouth. Surfaces at the site showed signs of heavy sedimentation, with silt adhering even to the horizontal surfaces of the pier pilings.

An in-water survey was not conducted at Piers 24-29 because of its interior location within the harbor and the fact that the proposed improvements will not involve any work specifically in the water. The marine biota in this area is generally similar to that described for Pier 15, consisting of fouling biota on vertical piles and a generally sparse community of assorted fishes. Pier locations this far into the harbor show a lesser diversity of organisms compared with piling-associated biota closer to the harbor entrance (Guinther, et. al., 1999).

The marine community in Keehi Lagoon is substantially less diverse than those found at the Honolulu Harbor sites. There were only 27 total species observed in the area of the proposed layberth site. There were 21 macroinvertebrates species found, 11 of which were sponges including, *Suberites zeteki* and *Tedania sp.* which occurred only at this site. The only coral present was *Leptastrea purpurea*. Six species of fish were observed among the rocks along the shoreline and included the stripey (*Microanthus strigatus*) and the surgeon fish (*Acanthrus nigorus*).

3.6.2 Potential Impacts

In contrast to the terrestrial biota, marine life at the project sites is both diverse and abundant. The waters within Honolulu Harbor and Keehi Lagoon contain complex benthic communities which may experience some project-related impacts. It is unlikely that the proposed projects would result in any significant, long-term impacts on the resident marine biota. The potential impacts to the marine biological communities would be the short-term increase in turbidity and sedimentation rates resulting from construction activities.

Construction activities at Pier 2 and Piers 24-29 require no dredging and no work specifically within the water. Consequently, these proposed projects should cause little or no disturbance of sediments. Any sediments that might be resuspended into the water column by construction activities would be fine to medium sands. These sands would settle out rapidly with minimal effect on the marine organisms growing primarily on the vertical surfaces of pier pilings. Additionally, the Pier 2 site is situated relatively close to the channel opening. This area has increased circulation which would rapidly dissipate any construction related turbidity.

Though pile driving activities will be required, it is unlikely that lay berth construction in Keehi Lagoon will cause substantial impact on the marine communities in the area. As mentioned earlier, this area had the fewest number of species of any of the sites, and the organisms found were primarily intertidal organisms which can withstand high levels of sedimentation. Furthermore, any construction related, re-suspended sediments and turbidity are likely to be rapidly dissipated as a result of the high level of water circulation generated by wind-driven turbulence.

Construction of the proposed finger piers at Piers 12 - 16 will also require the installation of piles which may result in some suspension of silt, sedimentation, and elevated turbidity levels. The area most likely to show an impact from these activities is the coral community and associated organisms that are in the vicinity of Pier 12. However, these corals appear to be adapted to relatively high levels of turbidity and sedimentation. They have withstood previous construction activities, a high volume of vessel activity, and other stresses that have occurred in this area of the Harbor over the past decade (including the construction of Piers 16 and 17), maintaining a high level of coral coverage by a variety of species (Guinther, et. al., 1999).

The sessile marine biota in the vicinity of Piers 12 - 16 are already limited and are composed primarily of organisms adapted to a sedimentary or turbid environment. Any benthic organisms disturbed or displaced are likely to be replaced by rapid resettlement on existing and new surfaces provided by the construction. Fish communities disrupted by construction activities may leave the area temporarily and return when conditions are more favorable (Ibid).

3.6.3 Proposed Mitigation Measures

Significant impacts to the marine biota are not anticipated. However, the minor impacts expected to occur as a result of construction activities can be mitigated by employing measures to reduce the suspension of silt and sedimentation. These mitigation measures are discussed further in section 3.9.3.

3.7 <u>Threatened and Endangered Species</u>

3.7.1 Existing Conditions

The project areas within Honolulu Harbor are not utilized or inhabited by any rare, threatened, or endangered species as listed by the U.S. Fish and Wildlife Service (1996). Previous disturbance of harbor lands and ongoing industrial and commercial activities at the harbor do not provide a conducive habitat for threatened or endangered species.

The endangered Hawaiian stilt or 'ae'o (*Himantopus mexicanus knudseni)* is a North American subspecies. They are found on all major islands except Lanai or Kahoolawe and often feed in shallow freshwater, brackish, or saltwater areas other than those in which they nest. As previously discussed, the tidal mudflats in Keehi Lagoon are such an area utilized by the Hawaiian stilt and other migratory shorebird species. The approximate island-wide stilt population has been estimated to be between 1,200 - 1,500 birds and have varied widely in the past (Scott et al., 1989).

In recent years, there has been a significant decline in the numbers of Hawaiian stilts in Keehi Lagoon. This decline in numbers can be attributed mostly to the construction of the Hawaii International Airport Reef Runway which has resulted in increased air traffic and flight paths over these important sand and mudflat areas used by these birds for feeding (Guinther, et.al., 1999).

The Green Sea Turtle (*Chelonia mydas*) which is listed as a threatened species is rarely observed in Keehi Lagoon. A 1989 survey of sea turtles at Keehi Lagoon found that sea turtles rarely enter the lagoon waters because of the silty, mud-type bottom and the turbid water column (Noda, E.K., 1989). Furthermore, turtles that do frequent the area are most often found away from the proposed project area swimming in the vicinity of the triangular reef flat remnant in the lagoon's center.

The U.S. Fish and Wildlife Service was consulted to determine the location and extent of environmentally sensitive areas. The mudflats are located within the triangular reef flat remnant located approximately 1,100 feet off the lagoon's southern and eastern shores (Figures 2-14 and 2-15). It has also been established that there are no critical breeding habitats within the proposed project areas.

3.7.2 Potential Impacts

The existing mud flats in Keehi Lagoon will not be affected by the proposed project. They are located a considerable distance (approx. 1,100 feet) from the proposed project site and will not be adversely impacted by construction activities. No significant long-term adverse impacts on the Hawaiian stilts or the Green Sea Turtle is anticipated because the proposed project would not affect the existing mudflat areas.

3.7.3 Proposed Mitigation Measures

Mitigative measures are not necessary as there are no impacts anticipated which would adversely affect the Hawaiian stilts found in Keehi Lagoon.*OSRV* Mudflat areas will be totally avoided during both the construction stages and long-term operation of these facilities.

3.8 Alien Species

3.8.1 Existing Conditions

Hawaii's geographic isolation and island setting have resulted in the uniqueness and diversity of its native flora and fauna. This isolated evolution has also resulted in a very fragile ecosystem and has produced native Hawaiian species highly vulnerable to human disturbances and invasions of introduced species. In contrast, most alien flora and fauna evolved in continental ecosystems where competition has produced aggressive species with highly successful survival strategies. However, most of Hawaii's native flora and fauna are unable to compete with these survival strategies resulting in their demise.

Alien species are a continual threat to Hawaii's fragile ecosystems, and the remainder of this section attempts to address potential project-related impacts on the marine environment as a result of alien species introductions.

3.8.2 Potential Impacts

Harbors, like other port facilities, have the potential to introduce alien pest species into Hawaii. In harbor areas, the threat of alien species introduced into Hawaii's coastal waters is always present. Non-indigenous marine organisms can enter harbor waters by being attached to the bottom of ships' hulls (hull-growth) or by being released during a ships' ballast water discharge operations.

A ships' ballast water functions to increase the vessel's manageability and safety and to control its draft, trim (for maximum sailing efficiency), and stability. Ballast water is taken in and discharged by vessels at varying rates and volumes depending on external (weather and sea conditions) and internal (cargo type, vessel design, and load quantity) conditions under which a vessel is sailing.

Ballast water is carried by many types of vessels and is held in a variety of tanks or holds. Ballast capacity can range from several cubic meters in small fishing boats to hundreds of thousands of cubic meters in large cargo carriers. Large tankers can carry an excess of 200,000 m^3 of ballast water and have ballasting discharge rates as high as 15,000 to 20,000 m^3/hour (NRC, 1996). Discharged ballast water often contains marine organisms and sediment which has accumulated in ballast tanks.

The potential diversity of marine biota which can be transported in ballast water is vast. The maximum size range of organisms capable of being taken into a ship depends upon the method of ballasting and the size of the intake screens. Virtually all organisms less than 1cm in size that are adjacent to the vessel –

either swimming naturally, stirred up from bottom sediments, or rubbed off harbor pilings -- could be ballasted into the vessel. Such organisms include viruses, bacteria, protozoa, fungi, algae, plants, zooplankton, and fish.

Studies have shown that a wide variety of alien species populations in United States coastal waters are the result of shipborne introductions via ballast water discharge. San Francisco Bay is now home to several species of cepopods indigenous to China and Japan, and areas of New England now have jellyfish species from the Black Sea and mollusks from Eurasia in their waters. Locally, the goby species *Mugiligobius parvus* which is indigenous to the Philippines has established itself in Hawaii's coastal waters (NRC, 1996)

Among the plants transported, phytoplankton, especially diatoms and dinoflagellates, have been found to be particularly common in ballast water (Carlton, et al., 1993). Ciguatera toxin is a poison caused by the nonindigenous marine dinoflagellate, *Gambierdiscus toxicus*, which is found in association with certain red and brown algae. *G. toxicus* poisons fish (through ingestion of algae or herbivorous fish) and can cause poisoning in humans when contaminated fish are consumed.

Ciguatera fish poisoning has been reported more frequently in recent years because there is an increase in knowledge and awareness of fish poisoning, and there is an increase in *G. toxicus* that come from the discharge of contaminated ballast water (Parsons, Brinkerhoff, 1995). In some coastal areas, construction activities have been linked, albeit tenuously, to the increase in the presence of ciguatera toxin in marine organisms (HOMRC, 1991).

The project areas in Honolulu Harbor and Keehi Lagoon are characterized by several physical limitations which are not conducive to the proliferation of *G. toxicus*. These limitations include: high turbidity levels, water temperatures below 25° C, and the influx of groundwater (Parsons, Brinkerhoff, 1995). As a result of these limitations, it is unlikely that ciguatera poses a serious threat as either an invasive species or a human health risk.

To a lesser degree, nonindigenous organisms can also be transported and released into Hawaiian coastal waters attached to the hulls of ships. Organisms found in hull-growth include microscopic invertebrates, barnacles, algae, mollusks, and crustaceans. The loosening and release of hull-growth into receiving waters can occur from natural ocean currents, draft of the vessel, or from rubbing against harbor pilings.

Hull-growth is not anticipated to be a major contributor to alien species introduction because relative to ballast water discharge, the amount of organisms contained in hull-growth is minimal, and most vessels adhere to regularly scheduled hull cleaning activities as a part of their preventive maintenance program.

3.8.3 Proposed Mitigation Measures

The release of nonindigenous marine species, whether from ballast water discharge or hull-growth, into a new coastal environment does not necessarily constitute their successful introduction. An alien species must have the ability to form established populations to complete a successful introduction. Limiting the number of a given species in ballast water would reduce the chances of the successful establishment of reproducing populations in receiving waters.

Regulatory Measures

At the present time, there are no enforceable laws which regulate ballast water discharge. Concerted efforts are being undertaken by both international organizations and individual governments to establish regulatory mechanisms to monitor ballast water discharge. The main purpose of these efforts is to establish universal regulations which are enforceable in both international and national waters.

An Executive Order was recently signed to coordinate a federal strategy addressing the environmental and economic threats of foreign marine organisms being discharged into U.S. waters. The order creates an Invasive Species Council that is mandated to develop a comprehensive plan to minimize the economic, ecological, and human health impacts of invasive species and to determine further steps to prevent future introductions (HOISN, 1999).

The United Nations - International Maritime Organization (IMO) is a specialized international body devoted exclusively to maritime matters. As part of the continuing efforts to regulate ballast water, the IMO recently developed a draft annex to the International Convention on the Prevention of Pollution from Ships titled, "Regulations for the Control and Management of Ships' Ballast Water and Sediments to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens" (HOISN, 1998).

Until such time that enforceable ballast water regulations are established and promulgated, ships entering Honolulu Harbor should, when practicable, comply with the existing "voluntary ballast water guidelines" established by the IMO. These guidelines are intended to assist governments and appropriate authorities, ship masters, operators, owners, and port authorities in minimizing the risk of introducing harmful aquatic organisms, pathogens, and associated sediments from ships' ballast water while protecting ships' safety (IMO, 1996).

Particular attention should be given to the "Ships' Operational Procedures" contained in the IMO guidelines. This section outlines specific precautionary practices and ballast water management options. Specific procedures which would reduce the release of alien species include:

- Minimizing the uptake of harmful aquatic organisms, pathogens, and sediments - Avoidance of loading ballast in very shallow waters where propellers stir up sediments and in the darkness when bottom-dwelling organisms may rise up in the water column.

- Removing ballast sediment on a timely basis - Routine cleaning of ballast tanks should, when practicable, be carried out in mid-ocean and in accordance with the provisions of the ships' ballast water management plan.

- Avoidance of unnecessary ballast water discharge - Care should be taken to avoid unnecessary discharge of ballast water that has been taken up in another port.

- Practicing of sound ballast water management options - *This includes*, when practicable, deep water/open ocean ballast water exchange, non-release or minimal release of ballast water, discharge to reception facilities, use of emergent and new technologies and treatments.

<u>Technological Measures</u>

Once ballast water has been loaded on board, the ideal mechanism for preventing subsequent introductions of nonindigenous aquatic species is to kill or remove the organisms prior to discharging ballast water overboard. This could be achieved by utilizing onboard chemical, physical, biological, or mechanical treatment technologies. There are numerous promising treatment technologies emerging, a few of which are listed below (IMO, 1996):

- Filtration Systems
- Oxidizing and nonoxidizing biocides
- Thermal techniques
- Electric pulse and pulse plasma techniques
- Ultra violet treatment
- Acoustic systems
- Magnetic Fields
- Deoxygenation
- Biological techniques

Each of the above technologies, whether utilized individually or in combination, would achieve the goal of neutralizing potentially harmful alien species in an environmentally safe manner before they are discharged into receiving waters.

As discussed in sections 2.3 and 2.5, Hawaii is primarily an import state receiving almost all of its goods through Honolulu Harbor. Cargo ships entering the harbor are usually carrying a full cargo load with only minimal amounts of ballast water (as opposed to an empty ship which would need to fill its ballast tanks to capacity to stabilize the vessel). Consequently, cargo ships in Honolulu Harbor do not discharge but rather take in ballast water prior to port departure. This practice further reduces the risk of alien species introduction via ballast water discharge.

In summary, the proposed projects will increase the number of vessels arriving in the Honolulu Harbor. However, the potential for alien species introductions resulting from ballast water discharge is considered to be low.

3.9 Coastal and Ground Waters

An assessment of the extant aquatic habitat and water quality in Honolulu Harbor and Keehi Lagoon was conducted in conjunction with this EIS (Appendix D). This section is based mainly on that assessment.

3.9.1 Existing Conditions

The project area is located over two aquifers. The overlying caprock aquifer is nonpotable and is not considered ecologically important. The general direction of groundwater flow is assumed to be seaward towards the harbor. The water table is approximately at sea level this close to the shore and fluctuates with the tide.

The underlying aquifer is currently used for drinking water, pumped from deep wells inland of the project site. This aquifer is basal, meaning its underside is in contact with seawater. The direction of groundwater flow under the site is not known but is presumed to be in a seaward direction. This aquifer is protected from surface contamination at the project area up to 900 feet of the overlying caprock layer (Mink and Lau, 1990).

In the State of Hawaii marine waters are divided into Class AA and Class A waters. In accordance with Chapter 11-54-06 HAR, the objective of Class AA waters is to preserve them "in their natural Pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality of any human-caused source or actions." The objective of Class A waters is to ensure that their use for recreational and aesthetic enjoyment is protected. The waters of the Honolulu-Kapalama—Keehi Complex are designated Class A waters. Water quality standards for Class A waters are summarized in Table 3 - 1 below.

Table 3 -1
State of Hawaii Water Quality Standards For Class A Waters

Parameter	Geometric Mean Concentration (Not to exceed)	Value not to be exceeded >10% of the time	Value not to be exceeded >2% of the time
Total Nitrogen (TN)	150.0	250.0	350.0
Ammonia			

(NH_3)	3.5	8.5	15.0
Nitrate + Nitrite ($NO_3 + NO_2$)	5.0	14.0	25.0
Total Phosphorus (TP)	20.0	40.0	60.0
Chlorophyll α (Chl. α)	0.50	1.50	3.00
Turbidity	0.4	1.0	1.5
Dissolved Oxygen (DO)	Levels may not decrease below 75% saturation.		

Note: All parameter values are expressed in micrograms/liter (μg /l) except for Turbidity which is measured in Nephlometric Turbidity Units (NTU), and Dissolved Oxygen which is expressed as % saturation.

The project area extends between the marine waters of the Honolulu Harbor, Kapalama Basin, and Keehi Lagoon. This area is referred to as the Honolulu-Kapalama-Keehi Complex. The marine waters of the Honolulu-Kapalama-Keehi Complex serve as receiving waters for runoff, drainage, and seepage from major residential, commercial, and industrial land use areas of the city. Four major streams drain into the Honolulu-Kapalama-Keehi Complex. Honolulu Harbor and Kapalama Basin receive drainage from the Nu'uanu Stream which discharges into the harbor at 15 and 16 and the Kapalama Stream which discharges near Pier 38. Keehi Lagoon receives stream flow from the Kalihi and Moanalua Streams.

Water quality in the Honolulu-Kapalama-Keehi Complex is in a constant state of flux, being influenced by numerous factors which include: storm runoff, wind conditions, tidal state, and even the movements of large ships which can cause resuspension of sediments into the water column as they pass by. A major contributor to the dynamic state of the Honolulu-Kapalama-Keehi Complex can be attributed to storm runoff. During an average storm event, the Kapalama Basin – Honolulu Harbor area receives approximately 66 million gallons per day (mgd) and Keehi Lagoon receives approximately 110 mgd (Guinther, et. al., 1999).

A summary of existing water quality data for the Honolulu-Kapalama-Keehi Complex is presented in Table 3 - 2. The data presented was compiled from various scientific studies and Department of Health monitoring station data (Gunither, et.al., 1999).

Table 3 - 2
Existing Water Quality Data for the
Honolulu-Kapalama-Keehi Complex

Location	TN (μg /l)	NH_3 (μg /l)	NO_3+NO_2 (μg /l)	TP (μg /l)	Chl. α (μg /l)	Turbidity (NTU)	DO (% saturation)

Honolulu Harbor	124	**6.8**	4.3	20	0.36	**0.7**	85
Kapalama Basin	137	**5.1**	2.2	**31**	0.26	**1.9**	95
Keehi Lagoon	**167**	**3.7**	1.8	**22**	0.32	**2.7**	95

Note: Bolded figures indicate that the mean (or geometric mean) values of the State water quality criteria were exceeded.

In comparison with State water quality standards, Keehi Lagoon exceeded the four criteria (turbidity, NH_3, TN, and TP), and Honolulu Harbor exceeded two (turbidity and NH_3). These data are not surprising considering the Honolulu-Kapalama-Keehi Complex serves as a settling area for terrestrial runoff. It is unlikely that any management practice, short of the diversion of runoff, will help these waters meet the State's criteria for turbidity and certain nutrients. However, it should be noted that both DO saturation levels and Chlorophyll α concentrations are well within the State's criteria. These two parameters represent the culmination of a number of factors influencing water quality and are more appropriate indicators of the health of a specific aquatic environment than either nutrients or turbidity. (Gunither, et.al., 1999).

3.9.2 Potential Impacts

The proposed project is not anticipated to impact the ground water underlying the area. The width and thickness of the caprock layer (800 to 900 feet) suggests that the basal potable water supply will be relatively unaffected by the proposed modifications along the coastline.

Coastal water quality may be impacted by construction activities associated with the proposed projects. Some suspension of silt, sedimentation, and elevated turbidity during construction activities could occur. However, as previously discussed in section 3.6.2, it is unlikely that construction activities will have significant adverse impacts on the marine communities within the Honolulu-Kapalama-Keehi Complex.

3.9.3 Proposed Mitigation Measures

In accordance with HAR 11-55, the proposed harbor improvements will require NPDES permit approvals from DOH. The NPDES permit application will require development of a Best Management Practices Plan (BMPP). The BMPP, which will be developed prior to construction activities, will identify the most effective erosion, sedimentation, and turbidity control measures to reduce the amount of soil and sediment accumulation in the coastal waters as a result of construction activities.

Unknown factors such as pile driver size and type, construction equipment to be used, construction site staging areas, etc. would determine the most effective BMP's in mitigating construction related impacts on coastal waters. Mitigation measures may include, but not be limited to, the on-site utilization of the following BMP technologies:

- Silt Curtains – To limit and contain the suspension of fine sediments from activities associated with piling installation.
- Drainage Swales - To convey on-site runoff while limiting erosion.
- Storm Drain Inlet Protection – Filtering measures placed around inlets and drains to trap sediment, preventing it from entering inlets and receiving waters.
- Sediment Traps – To retain site runoff and allow suspended sediments to settle out.
- Soil Stabilization– Practices designed to prevent the loss of disturbed or exposed soil areas through the use of vegetation and/or geotextiles.

Specific BMP's for the proposed actions will be determined during the design and construction phases and incorporated into the BMPP.

3.10 Traffic and Circulation

The proposed improvements associated with the 2020 Master Plan are located within a large area between Keehi Lagoon in the west and Pier 2 and Kewalo Basin in the east. Coordination with the State Department of Transportation was initiated to define the study area and establish key roadway intersections for analysis. A traffic impact analysis was subsequently conducted to evaluate potential traffic impacts associated with implementation of the proposed harbor projects (Rowell, 1999). The information in this section is based upon the findings of this study.

3.10.1 Existing Conditions

There are three major roads that provide access to the proposed project areas: Nimitz Highway, Ala Moana Boulevard, and Lagoon Drive. Nimitz Highway provides access to the proposed project sites within Honolulu Harbor, and Lagoon Drive provides access to proposed project site within Keehi Lagoon. Nimitz Highway is an east-west arterial bordering the entire Honolulu Harbor area along its northern perimeter and provides access to all piers in the harbor. From downtown Honolulu, Nimitz Highway extends westward to Hickam Air Force Base. At the downtown terminus of the highway, Nimitz Highway converts to Ala Moana Boulevard, which extends eastward into Waikiki. At the Hickam terminus, Nimitz Highway ends and feeds two off-ramps. One ramp enters the H-1 Freeway and the other connects with Kamehameha Highway.

Lagoon Drive intersects Nimitz Highway underneath the eastern portion of the H1 viaduct. North of Nimitz Highway, Lagoon Drive converts to Puuloa Road which eventually merges with Salt Lake Boulevard. South of Nimitz Highway, Lagoon Drive extends along the western shore of Keehi Lagoon and at its southern-most terminus ends at Honolulu International Airport.

There are several smaller roads adjacent to the project area which intersect these major roadways and provide vehicular access to the project sites. Key intersecting roads analyzed were South Street, Punchbowl Street, Pacific Street, and Channel Street. Table 3 - 3 summarizes the existing characteristic of the study roadways.

Table 3 -3
Traffic Characteristics
At Study Roadways[a]

Roadway	Direction	Speed Limit	Average Daily Traffic (ADT)[b]
Ala Moana Boulevard	Eastbound	35 mph	40,100
	Westbound	35 mph	38,000
South Street	Northbound	25 mph	4,340
	Southbound	25 mph	3,790
Channel Street	Eastbound	10 mph	1,350
	Westbound	10 mph	1,350
Punchbowl Street	Southbound	25 mph	9,780
Nimitz Highway	Eastbound	35 mph	40,100
	Westbound	35 mph	38,000
Pacific Street	Northbound	25 mph	3,200
	Southbound	25 mph	1,400

a All figures obtained from Hawaii Dept. of Transportation Surveys (12/11/95, 7/31/97) except for Channel Street (Estimated from traffic counts)
b Average Daily Traffic volumes are expressed in terms of Vehicles Per Day (VPD)

As mentioned in section 2.6.1 HCDA is proposing the extension of Ilalo Street to function as a connecting roadway between Ward Avenue and Punchbowl Street. The development schedule for Ilalo Street improvements will be staggered, occurring in four phases. Phase 1 (extension of Ward Avenue to Ilalo Street), Phase 2 (widening of Ilalo Street), Phase 3 (extension of South Street to Ilalo Street) and Phase 4 (extension of Punchbowl Street to Ilalo Street) (HCDA, 1999a).

Phase 1 was recently initiated in March of this year and is scheduled to take about 15 months to complete (HCDA, 1999c). The schedule for the remaining phases have not yet been finalized. Design work for Phase 4 is on hold pending the final design plans for the proposed Pier 2 cruise ship terminal (HCDA, 1999b). During the design stages of the Pier 2 cruise terminal, DOT-HAR will closely coordinate their efforts with those of HCDA.

The section of Ilalo Street adjacent to Pier 2 (Phase 4) was assumed to be constructed concurrently with the Pier 2 cruise ship terminal. Part of Ilalo Street roadway improvements involve the demolition of Channel Street and the traffic signal at the intersection of Channel Street and Ala Moana Blvd. For the purposes of this EIS, all analyses for the year 2003 traffic forecasts assumed that the Ilalo Street connector would be in place.

3.10.2 Potential Impacts

Project Related Impacts

Traffic related impacts of a proposed project generally involve the determination of project-generated traffic during the A.M. and P.M. weekday commuter peak period and the determination of the levels-of-service (LOS) at affected roadway intersections subsequent to implementation of the project. Traffic surveys were performed in July and August 1998 to establish baseline conditions to estimate future traffic volumes. None of the four proposed projects have established trip generation rates or equations in the standard references. Therefore, the methodology used in conducting each of the proposed project's trip generation analysis is described separately. The methodology and calculations for these analyses are presented in Appendix F.

Pier 2 Cruise Terminal

Trip generation analysis was performed for both interisland and foreign cruise ship operations. Interisland cruise ship calculations were based on 850 passengers and 335 crew members. Foreign cruise ship calculations were performed for average-sized (1,000 passenger/460 crew) and maximum-sized (2,000 passenger/800 crew) vessels. These figures were provided by cruise ship industry operators and assume 100% capacity.

Traffic surveys indicate that interisland cruise ship arrivals have much greater traffic impacts than their departures. This is because passenger disembarkation is concentrated within a short period after arrival of the cruise ship. During passenger embarkation, passengers arrive and board the cruise ship over an extended period of time throughout the afternoon.

All interisland cruises are currently scheduled to arrive on Saturday mornings and depart Saturday evenings. Therefore, interisland cruise ship operations have no impacts on the weekday A.M. or P.M. commuter peak periods. Future interisland cruises are anticipated to continue operating on the same weekend schedule. In contrast, foreign cruise ships schedules do occur during the weekdays and their arrival may be concurrent with the A.M. or P.M. commuter peak periods.

The typical interisland cruise ship arrival would generate129 vehicular trips during the heaviest disembarkation period following the ship's arrival. A maximum-sized, foreign cruise ship will generate 415 vehicular trips during the heaviest disembarkation period following the ship's arrival (Rowell, 1999). Summaries of trip generation calculations for interisland and foreign cruise ships are presented in Tables 3 - 4 and 3 - 5 respectively.

Table 3 - 4
Summary of Vehicular Trip Generation Rates for Interisland Cruise Ships

Direction	Trips Generated	Trips per 100 Passengers
Inbound	78	9.18
Outbound	51	6.00
TOTAL	129	15.18

Table 3 - 5
Summary of Vehicular Trip Generation Rates for Foreign Cruise Ships

Cruise Ship Arrival	Trips Generated (Average-sized Ship)	Trips Generated (Maximum-sized Ship)	Trips per 100 Passengers
Inbound	95	190	9.50
Outbound	113	225	11.25
TOTAL	208	415	20.75
Cruise Ship Departure	**Trips Generated (Average-sized Ship)**	**Trips Generated (Maximum-sized Ship)**	**Trips per 100 Passengers**
Inbound	34	68	3.38
Outbound	33	65	3.25
TOTAL	67	133	6.63

Based upon the trip generation analyses and the maximum berthing capacity of the proposed Pier 2 Terminal (one maximum-sized and one medium-size vessel), it was possible to establish a worst-case condition for traffic generated by cruise ship operations. Three scenarios depicting the arrival of cruise ships were evaluated to determine a worst-case traffic generation scenario (Table 3 - 6) . As shown, the worst-case scenario would occur when a maximum-size cruise ship and an interisland cruise ship arrive at the proposed terminal concurrently.

Table 3 - 6
Trip Generation for Cruise Ship Arrival Scenarios

No.	Scenario	Trips Generated Inbound	Trips Generated Outbound	Total
1	1 Maximum-Sized Cruise Ship	190	225	415
2	2 Interisland Cruise Ships	156	102	258
	1 Maximum-Sized Cruise Ship			

3	Plus 1 Interisland Cruise Ship	268	276	544

Piers 12 – 16 Finger Piers

The proposed finger pier construction will serve to accommodate additional commercial fishing vessels and provide additional berthing space. Fishing boat activities at the existing facilities and at Kewalo Basin indicate that fishing boat operators depart well before the AM peak commuter period and return during the mid-afternoon. Therefore, these operations will not impact the peak commuter periods in the project area.

Pier 24 – 29 Excursion Vessel Terminal

In order to establish trip generation rates for this proposed project, a traffic survey was conducted at Kewalo Basin because commercial excursion vessel operations presently operate out of this port. The survey concluded that there are 1.11 inbound vehicle trips and 0.90 outbound vehicle trips generated per daily boat operation which translates into 160 inbound and 130 outbound total vehicle trips generated.

Keehi Lagoon Lay Berths

This proposed project is intended to provide approximately 13 lay berths to accommodate fishing boats waiting for repairs or scheduled departures. Based upon several factors including average crew size, berth occupancy, and vehicle types accessing the berths, it was estimated that the proposed project would generate approximately 35 inbound and 35 outbound vehicle trips. All vehicles would use Lagoon Drive to access the lay berths.

Table 3 - 7 presents the overall summary of total trips generated by each of the proposed projects both individually and combined.

Table 3 - 7
Trip Generation Summary

Location and Project	Trips Generated Inbound	Trips Generated Outbound	Total
Pier 2 Cruise Ship Terminal	268	276	544
Piers 12 – 24 Finger Piers	Minimal generation of traffic		
Piers 24 – 29 Excursion Vessel Terminal	160	130	290
Keehi Lagoon Lay Berth Facilities	35	35	70
TOTAL	463	441	904

Using the traffic generation data, a Level-of Service (LOS) analysis was performed. LOS is a qualitative measure to describe the flow or operational characteristics of traffic as perceived by the level of congestion or delays experienced by motorists. There are six grades of LOS measured from "A" to "F". In general, LOS A is considered best, representing free-flow conditions with no congestion. LOS F is considered worst, representing severe congestion with stop-and-go conditions. LOS grades A through F and associated time delays are summarized in Table 3 - 8 below.

Table 3 - 8
Level-of Service Descriptions and Time Delays

Level-of-Service	Description	Time Delay (in seconds)
A,B	Uncongested operations; free-flow of traffic. Motorists have free movement within traffic stream.	< 15.0
C	Light congestion; occurrence of occasional backups on critical approaches	15.1 – 25.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait more than one cycle during short periods. No long standing lines form.	25.1 – 40.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur.	40.1 – 60.0
F	Total breakdown with stop-and-go traffic conditions	> 60.0

The LOS analysis was based upon the "worst-case" traffic conditions both without and with the proposed project. Worst-case conditions were estimated by super-imposing the maximum hourly traffic volume generated by the proposed projects on traffic volumes generated during the peak commuter periods. The results of the traffic impact analysis are summarized in Table 3 - 9.

Table 3 - 9
Traffic Impact Analysis Summary
(Measured in Level-of-Service)

Intersection	Existing (1998) Weekday PM	2003 w/o Project Weekday PM	2003 w/Project Weekday PM	Existing (1998) Saturday Peak	2003 w/o Project Saturday Peak	2003 w/Project Saturday Peak
Ala Moana Bl. at South Street	C	C	C	B	B	B
Ala Moana Bl. at Channel St.	B	B	N/A[c]	A	A	N/A[c]
Ala Moana Bl. at	B	D	D	B	B	C

Punchbowl St.						
Nimitz Hwy. at Pacific St.[a]	B	B	B	N/A[d]	N/A[d]	N/A[d]
Nimitz Hwy. at Pacific St.[b]	B	B	B	N/A[d]	N/A[d]	N/A[d]

[a] Measurements taken for the eastbound lanes of Nimitz Highway
[b] Measurements taken for the westbound lanes of Nimitz Highway
[c] LOS measurements are not applicable because this intersection will be demolished during the construction of the final section of the Ilalo Street extension.
[d] LOS measurements are not applicable for these intersections because they would not be affected by the weekend operations at the proposed Pier 2 Cruise Terminal.

The results of the LOS analysis indicate that only two intersections are predicted to operate at a LOS C and a LOS D (South St. at Ala Moana Blvd. and Punchbowl St. at Ala Moana Blvd. respectively). It should be noted that the LOS C and LOS D grades at these intersections are predicted with or without implementation of the proposed projects.

Construction Related Impacts

Construction related traffic impacts are not expected to be significant as construction activities will take place in areas removed from adjacent roadways. However, activities requiring the use of motor vehicles such as tractors, dump trucks, backhoes, cement mixers, front loaders, and graders may result in temporary short-term traffic congestion in the adjacent street network when entering and exiting the site.

3.10.3 Proposed Mitigation Measures

The results of the LOS analysis of future conditions with and without the proposed projects indicate that they will have minimal impacts on traffic operations during the weekday PM commuter peak period and will have no significant impacts of Saturday traffic conditions. In summary, traffic generated by the proposed projects is localized and will not be a significant contributor to regional traffic nor will they have significant long-term cumulative impacts on the environment.

Although they are not necessary, the following measures can be employed to further mitigate the minimal traffic impacts which may occur as a result of the proposed projects.

- Limiting the operation of construction vehicles to off peak hours would reduce traffic congestion in the adjacent street network

- Interisland cruise ship operations should continue to operate on the current schedule with arrivals and departures scheduled during Saturday mornings and evenings, respectively.

- A shuttle bus operation between Pier 2 and adjacent shopping areas might be considered for a period of several hours before the departure of a large cruise ship to reduce the pedestrian activity and associated impacts on traffic flow at the adjacent intersections. A schedule of one shuttle bus every 10 to 15 minutes would have a minimal impact on traffic operations but would enhance pedestrian movement and safety. This operation would best be provided by the cruise operator.

- *During the design phase of the proposed projects, potential site tenants and users will be consulted to determine specific off-street parking and loading area requirements.*

3.11 <u>Utilities</u>

3.11.1 Existing conditions

The Honolulu Harbor area and its immediate vicinity is heavily industrialized and is served by a variety of public services and utilities including fire and police protection services, water supply, wastewater collection, telephone, electricity, gas, and drainage. The City and County of Honolulu provides fire, sewer, and water services. Hawaiian Electric Company (HECO) provides electrical services through overhead lines and underground conduits. Telephone services are provided by GTE Hawaiian Tel.

<u>Water Supply</u>

The projects sites are currently served by a network of Board of Water Supply (BWS) mains ranging in size from 4" to 16" diameters. The project areas have several existing domestic water meters which will service the proposed projects. A summary of the existing water supply systems to the project areas is discussed below.

Pier 2 is serviced by a 6" line which runs underneath and parallel to the Pier 2 shoreside apron. This 6" line is connected to a larger 8" water line at the northern end of the Pier 2 site, which in turn is connected to the 12' water main running along Ala Moana Boulevard. Water service to ships berthed at Pier 2 is provided by a series of 2 1/2" water laterals located in utility hatches in the pier. The Pier 2 site is serviced by two 6" compound water meters and two 8" detector check water meters.

The Pier 12 - 16 area is serviced by a series of 6" and 8" lateral lines which also connect to the 12" water main running along Ala Moana Boulevard. Piers 12 - 16 are serviced by a series of smaller meters including two 3" compound meters, one 2" meter, and a 1 1/4" meter.

Piers 24 - 29 are serviced by three main water lines: a 6" water line along Pier 26, a 4" water line along Pier 27, and another 6" line which runs along Piers 28 and 29. These three lines connect to a single 6" main which eventually connects to the 16" water main underneath Nimitz Highway. The project area is serviced by one 4" compound meter and two smaller 3/4" meters.

The project site for the proposed layberths at Keehi Lagoon is presently vacant, undeveloped land and does not have any existing utilities on site. There is a fully developed network of water lines in the Keehi Lagoon/Lagoon Drive vicinity which currently provides water to the commercial and industrial operations adjacent to the proposed project site. The project area would require the installation of a lateral water line which would connect to the existing 12" water main along Lagoon Drive. The Board of Water Supply has indicated that there is an existing 8" turbine water meter which would service the project area.

Sewers and Drainage

Existing sewer systems at Pier 2 and Piers 12 - 16 areas are fully developed, consisting of various service laterals connected to the major 34" relief sewerline which runs along Ala Moana Boulevard. The 34" sewer main collects and delivers sewage flows from downtown Honolulu to the Ala Moana Wastewater Pump Station at Keawe Street. From there the sewage is conveyed via a 78" force main to the City and County Sand Island Wastewater Treatment Plant where it undergoes treatment and disposal.

Onsite lateral structures include lateral manholes, chimneys, stubouts, and connectors. The Pier 2 and Piers 12 - 16 areas also have on-site sewer analysis nodes which may include but are not limited to modeling, lateral, test site, and map tile nodes.

There are only limited sewer system facilities at the Pier 24 -29 area and, as mentioned in section 2.6.3, upgrades may be required. There are no existing sewer facilities at the proposed layberth and *OSRV* project sites.

Drainage on the project sites and existing roadways is collected in drain inlets which outlet directly into the Honolulu Harbor and Kapalama Basin. Sheet flow within the project areas runs off-site toward these two receiving waters as well. The Keehi Lagoon project site is undeveloped and does not have an existing drainage system.

Energy and Communications

All of the proposed project sites except the lay berth site at Keehi Lagoon are provided with electrical and telephone services by HECO and GTE Hawaiian Tel respectively. Most of the existing structures on the project sites are old and in poor condition and at their time of construction were not designed with energy efficiency standards in mind.

3.11.2 Potential Impacts

Water Supply

The potable water demand for the proposed project areas will increase as a result of the proposed Harbor improvements. The increase in water demand will result mainly from the proposed Pier 2 cruise terminal and the excursion vessel terminal at Piers 24 -29. The proposed projects at Piers 12 -16 and at Keehi Lagoon are small, non-service oriented operations requiring only minimal usage of water for day-to-day activities. The existing water supply system along Lagoon Drive would have to be extended to the proposed shoreside *OSRV* and layberth facilities.

Sewers and Drainage

Sewer upgrades will be required at the Pier 2 and Piers 24 - 29 project sites. These upgrades would be minor in scope consisting primarily of lateral main connections to existing sewer systems, main diameter upgrades, and required appurtenant lateral structures. Onsite drainage systems will need to be upgraded accordingly to accommodate the new project designs and site layouts. *Additionally, proposed sewer improvements at Pier 2 will be made in conjunction with the Kakaako Community Development District Area Sewerage Master Plan.*

The proposed improvements and operations at Piers 12 –16 will be small in scale requiring minimal services. Nonetheless, any proposed sewer improvements at the site will be contingent upon the upcoming Nimitz Highway Reconstructed Sewer Project (Auahi Street to Hotel Street), tentatively scheduled for completion in September 2000 (Appendix A DPP letter dated 8/24/99)

The limited paving of areas at the lay berth project site in Keehi Lagoon would result in increased sheet flow and surface run off. However, as discussed in section 3.3.2, the area to be paved over is relatively small (approximately *58,000* ft^2) and would only minimally increase the volume of surface runoff.

Energy and Communication

All of the proposed project sites will be equipped with telephone communication systems. These systems will not affect the existing communication systems in the project areas. The operation of the proposed projects will result in the increased consumption of electricity. The increase in electrical consumption is expected to be minimal and not significantly higher than present electrical usage at the existing project site facilities.

Fire Protection

The proposed projects will allow Honolulu Harbor to accommodate more cargo, fishing, and cruise vessels. The increase in vessels and overall operations could possibly increase the potential for fires. The proximity of the project sites to the downtown Honolulu area and Honolulu International Airport make them very accessible to the numerous existing fire stations in the surrounding area. This accessibility will result in shortened response times, and no adverse impacts to the Fire Department are anticipated.

3.11.3 Proposed Mitigation Measures

Water Supply

The BWS has indicated that the existing water supply system is currently adequate to accommodate the proposed Honolulu Harbor and Keehi Lagoon improvement projects. Additionally, after water demands have been established during the design phase, DOT-HAR will be required to obtain a water allocation from the State Department of Land and Natural Resources. The availability of water will be confirmed when the building permit application is submitted to the BWS for review and approval.

Proposed buildings and landscapes at the project sites will be designed with water saving considerations in mind. The water conservation methods which could be considered during the design phase of the proposed projects may include but are not limited to:

- Installation of water efficient fixtures
- Low-volume flush toilets and urinals
- Automatic Faucets for sinks and lavatories
- Appropriate landscape plant selection to limit water uptake
- Irrigation with non-potable or reclaimed water

Sewer and Drainage

The increased runoff resulting from newly paved areas at the proposed Keehi Lagoon project sites is not expected to have significant adverse impacts. However, a Drainage Master Plan will be prepared during the design phase of the proposed projects to ensure that the future storm drainage systems are properly sized.

Energy and Communications

Proposed project buildings, activities, and site grounds will be designed with energy saving considerations in mind. Energy usage at the proposed project sites will be designed in accordance with Chapter 33 (State Environmental Policy) and chapter 226 (State Planning Act) of the Hawaii Revised Statutes. Section 226-18(4) which establishes the promotion of cost-effective energy conservation through the adoption of energy efficient practices and technologies will be given particular attention. At the county level, the energy conservation regulations in chapter 16 article 5 of the City and County Building Code shall also be complied with. *Additionally, during the design phase, a "Hawaiian sense of place" will be incorporated into the facilities through architectural design and natural ventilation.*

The energy conservation methods which could be considered during the design phase of the proposed projects may include, but are not limited to:

- Maximum cooling load through the use of site shading, orientation, and use of naturally ventilated areas
- Use of high efficiency indoor and outdoor lamps and lighting
- Maximum integration of day lighting in building design
- Design mechanical systems to comply with the Honolulu Energy Code and to exceed its energy conserving requirements
- Conformance with HECO's New Construction Demand-Side Management Program to potentially qualify for energy conservation rebates and incentives.

<u>Fire Protection</u>

All future harbor structures and cargo handling activities must conform to existing fire codes. Additional fire hydrants and sprinkler systems will be installed when warranted at the appropriate project sites. All on-site fire protection requirements and procedures will be closely coordinated with the Fire Prevention Bureau of the City and County of Honolulu Fire Department.

In summary, all of the existing utilities and public services are expected to be sufficient. No significant adverse impacts to existing utilities and public services are expected, and no additional mitigation measures are anticipated to be necessary.

3.12 <u>Solid and Hazardous Waste</u>

3.12.1 Existing Conditions

<u>Solid Waste</u>

Solid residential waste in the area surrounding the project site is collected by the City and County of Honolulu Refuse Collection and Disposal Division (RCDD) and is transported to the Keehi Transfer Station. The waste is then transported to the Honolulu Program of Waste Energy Recovery (H-POWER) facility at Campbell Industrial Park where it is converted to electricity.

Solid commercial and industrial wastes generated at Honolulu Harbor are collected by private waste collection companies. Solid waste is usually transported directly to the Waimanalo Gulch Landfill (if it contains no combustible materials) or to Oahu's H-POWER facility (if combustible materials are present).

The disposal of solid waste generated by U.S. registered cruise ships is not regulated by the United States Department of Agriculture (USDA). Foreign cruise ship solid waste is inspected by the USDA prior to its disposal at a U.S. port. At Honolulu Harbor the solid waste generated by both U.S. and foreign cruise vessels is transported to the H-POWER facility for incineration. For economic reasons, most foreign cruise ships dispose of their trash during their call to Oahu.

<u>Hazardous Waste</u>

The entire project area is located within the confines of a heavily industrialized harbor of a major U.S. city. The diversity of industrial operations involving the use of hazardous materials, and the extended period of time over which these operations have been performed, have resulted in the contamination of soil and groundwater in portions of Honolulu Harbor.

A comprehensive Phase I Environmental Assessment (PIEA) was recently conducted for the Honolulu Harbor, Iwilei Unit to assess potential environmental contamination of DOT-HAR properties by hazardous wastes. The study identified petroleum contamination of soils, heavy metal contamination, and free product (i.e., petroleum product that floats on top of groundwater). Additionally, soil and groundwater contamination exceeding DOH cleanup guidelines for metals (arsenic, chromium, lead, and zinc), BTEX (benzene1 toluene, ethylbenzene, and xylenes), and PAHs (polycyclic aromatic hydrocarbons) also exist within the project area (Earth Tech, 1997).

Leaks from underground, petroleum fuel pipelines appear to be the most widespread source of contamination identified in Honolulu Harbor by the PIEA. Many of these leaks occurred beneath what is now Nimitz Highway and are likely to have resulted in contamination of DOT-HAR properties in the project areas and other adjoining properties. Other sources of contamination have included petroleum storage and transfer operations and maintenance activities on boats and land-use equipment.

The PIEA identified information confirming past releases of hazardous substances that have resulted in the contamination of soil and/or groundwater at Piers 19 - 21, 32, 34, 22 - 29, and 35 - 38. The contamination at Piers 22 - 29, and 35 - 38 have been confirmed to exist in concentrations exceeding DOH action levels (Earth Tech, 1997).

Several of the buildings in the project area were constructed prior to the establishment of existing environmental regulations prohibiting the use of hazardous materials such as asbestos and lead-based paints. Existing structures known to contain lead-based paints and/or asbestos containing materials are located at Piers 2, 18, 19, 21 - 29, and 32 (Earth Tech, 1996)

3.12.2 Potential Impacts

Solid Waste

With the proposed increase in commercial maritime operations, additional solid waste will be generated. Of the projects being proposed, activities associated the Pier 2 Cruise terminal operations would generate the largest quantity of municipal solid waste. This waste would be disposed and incinerated at the H-POWER facility.

Construction activities would require land clearing, demolition of existing structures, excavation, drilling, and pile driving operations. These activities would generate *construction and demolition* (C & D) waste consisting of wooden beams, asphalt, concrete, glass, brick, metal, soil, vegetation, and other miscellaneous building and landscaping materials. The only landfill on Oahu which accepts C & D solid waste is the PVT Nanakuli C & D Land Fill.

Hazardous Waste

As a result of the hazardous substances (asbestos and lead-based paints) present in buildings to be demolished, demolition could result in the release and spreading of such contaminants into the environment. Excavation equipment could damage or rupture remnant underground storage tanks or fuel lines and, in removing sheet piling, could allow existing contaminated groundwater to migrate to new areas of the project area.

Excavation and demolition may also uncover floating product or release flammable vapors. Any exposure to a nearby ignition source, such as a cigarette, sparking steel tool, or combustion engine, could potentially result in a fire or explosion.

Potential adverse impacts to construction personnel include possible exposure to both known and unknown hazardous materials and wastes present in existing structures or the surrounding environment. Additionally, physical hazards associated with construction activities such as heat stress, personal injury, noise, and heavy machinery also exist.

3.12.3 Proposed Mitigation Measures

Solid Waste

Overall, the proposed project will increase the amount of solid waste generated at Honolulu Harbor. However, it is not expected to adversely impact solid waste disposal capacities. The Keehi Transfer Station and the H-POWER facility have capacities of 500 tons/day and 2000 tons/day respectively. According to RCDD, these facilities would be able to accommodate the additional solid waste generated by the proposed projects. Additionally, RCDD indicated that they are presently proposing to expand the capacity of the Waimanalo Gulch Landfill thereby allowing it to continue accepting solid waste for an additional 15 years (CCH, 1998).

Furthermore, many foreign cruise operators have already equipped or are planning to equip their vessels with on-board incinerators. Interisland cruise ship operators have not yet begun such upgrades but are planning to do the same. On-board incinerators would reduce the amount of solid waste generated by cruise ships and would allow them to hold larger quantities of solid waste aboard the vessel for longer periods of time.

Potential impacts to the PVT Nanakuli C&D Land Fill can be minimized through recycling efforts and the resultant diversion of C&D generated waste. C&D recovery operations have been very successful and produce diversion rates as high as 24%. Between July 1997 and June 1998 State and county construction operations generated 23,232 tons of C&D solid waste. Through recycling efforts 5,573 tons were recovered and kept from disposal at the PVT Nanakuli C & D Land Fill (Island Demo, 1999).

During the design and construction phases of the proposed improvements, consideration will be given to the development and implementation of a C&D recycling plan. A recycling program would effectively recover building materials which could contain potentially hazardous substances (such as batteries, mercury containing thermostats, asbestos, liquid wastes, oils, paints, solvents, refrigerant fluids, tires and liquid filled transformers) and prevent them from being disposed of in an unlined landfill. *The C&D recycling plan would also consider the designation of Harbors property and infrastructure development for industries such as reuse, recycling, and remanufacturing that depend heavily on interisland, interstate, and international shipping.*

Hazardous Waste

All known utilities and underground pipelines will be identified by the demolition and construction contractor and subsequently disconnected or removed prior to site work. All fuel storage tanks, hazardous materials (including asbestos building material and lead-based paint), and transformers (potential sources for polychlorinated biphenyls [PCBs) present in structures planned for demolition, will be managed in accordance with measures agreed upon by DOH. These measures may include the removal, on-site stabilization, and if feasible recycling of hazardous materials to avoid the potential for release into the environment.

Site construction and demolition will be performed in accordance with a site-specific Health and Safety Plan. The plan will identify safe working conditions for construction in areas of known flammable products and/or vapor contamination. Safety measures will include proper techniques for monitoring the presence of flammable vapors in the air, response protocol, personal protective equipment, use of allowable tools, and mechanical measures, as appropriate.

Areas where explosive levels of soil gas have been observed (i.e. Piers 24 – 29) are presently equipped with vapor collection systems. These systems monitor soil gas concentration and effectively reduce safety hazards posed by subsurface explosive gas generation.

The existing regional petroleum contamination will be addressed during the project design and construction phases and incorporated into contract and bid documents. The design and construction phases will be completed in compliance with Department of Health (DOH) *Guidance on Construction Activities Encountering Area-Wide Petroleum Contaminated Soils* (DOH Guidance) and other applicable Federal and State laws and regulations.

The contractor shall be responsible for taking the safety, contamination management, and documentation actions required by the DOH Guidance on Construction Activities. Compliance with the DOH Guidance involves the protection of workers and public health and safety; immediate notification of the DOH, documentation of the locations of contaminated areas, and proper management of contaminated excavated materials.

It is expected that most of the excavated materials will be returned to trenches and safely covered on-site. However, if some contaminated materials cannot remain on-site, they will be sampled, analyzed, and appropriately disposed of at DOH-approved facilities. Transport of the materials will also comply with State and Federal regulations regarding the transport of hazardous or petroleum contaminated materials. It is expected that a minimal amount of material will be removed from the property. Disposal of the materials will also comply with all State requirements and site-specific permits at the disposal site.

Normal operations at the proposed project sites would not expose the public or site workers to hazardous substances. Tenants on the site will be required to inform workers, through regular training sessions and use of operational manuals, about standard procedures for use of all equipment, especially equipment which may contain or use hazardous materials. Training will identify procedures to follow in the event of equipment malfunction or other emergency. Thus, no significant long-term impacts associated with exposure to hazardous materials are anticipated.

A site-specific Health and Safety Plan will be prepared prior to construction. The contractor is required to comply with all conditions of the Health and Safety Plan, which will ensure that workers will not be exposed to unacceptable safety risks. Compliance with the site-specific Health and Safety Plan, DOH Regulations, and other permit requirements, as described above, will assure that no significant impacts from hazardous materials or site contamination will occur during construction activities or facility operations.

3.13 Noise Quality

The impacts of sound on the environment are determined by several factors including, sound level (loudness), the duration of exposure to the noise, the frequencies involved, and the variation or fluctuations in noise levels during exposure. Loudness is measured in units called decibels (dB). Since the human ear is unable to perceive all sound frequencies equally, noise levels are adjusted *to correspond to human hearing. This adjusted unit is known as the A-weighted* decibel, or dBA.

The noise descriptor currently used by federal agencies to assess environmental noise is the Day-Night Average Sound Level (DNL or Ldn). This descriptor incorporates a 24 hour average of instantaneous dBA levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the DNL descriptor is 24 hours. Sound levels which occur during the nighttime hours of 10:00 PM and 7:00 AM are increased by 10 dB prior to computing the 24-hour average by the DNL descriptor.

A value of 65 DNL or lower is considered to be an acceptable exterior noise level for residential receptors. This standard is applied nationally including the state of Hawaii. Table 3 - 10 presents current federal noise standards and acceptability criteria for residential land uses that are present within the general environs of the Oahu harbor areas and which may be affected by noise from harbor activities.

Table 3 - 10
Exterior Noise Exposure Classification
(Residential Land Use)

Noise Exposure Class	**Day-Night Sound Level**	**Equivalent Sound Level**	**Federal (1) Standard**
Minimal Exposure	Not Exceeding 55DNL	Not Exceeding 55Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 Ldn But not above 65DNL	Above 55 Ldn But not above 65Leq	Acceptable (2)
Significant	Above 65 DNL But not above	Above 55 Leq But not above	Normally

Exposure	75DNL	65Ldn	Unacceptable
Severe Exposure	Above 75 DNL	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) Federal Highways Administration (FHWA) uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.

A noise study was conducted by Y. Ebisu and Associates to evaluate potential noise impacts associated with implementation of the proposed projects (Ebisu, 1999). This study evaluated the potential noise impacts resulting from future roadway traffic, proposed land-use operations, and construction activities. Information in this section is based upon the findings of this study.

3.13.1 Existing Conditions

The overall existing DNL levels in the vicinity of the project sites generally range from 60 to 70 DNL and are influenced by surf noise, motor vehicle traffic, aircraft, and harbor vessels and equipment. These estimates of existing background ambient noise levels are based on noise measurements taken at Piers 2, 11, 12, and 25 during the month of December 1998 (Ebisu, 1999).

Noise related to harbor operations include on-site motor vehicles, fixed mechanical equipment, and ocean vessels activities. The noise generated from harbor operations are for the most part not radiated beyond the harbor property boundaries. The exception to this is the noise radiated by boat whistles and horns. Whistles and horns of the excursion vessels operating out of Kewalo Basin and Pier 5 were measured at approximately 90 dB at 250 feet distance, and the horns of large cruise ships were measured at 85 dB at 1,000 feet distance (Ebisu, 1999).

Traffic noise levels in the project vicinity are considered to be in the "Significant Exposure, Normally Unacceptable" category for noise sensitive land-uses at the lots which front Nimitz Highway and Ala Moana Boulevard. For commercial and industrial uses, existing traffic noise levels fall under the "Compatible and Marginally Compatible" categories. Residual traffic noise levels typically remain steady (ranging between 55 to 60 dB) during the daylight hours of 7:00 AM – 6:00 PM and decline to their lowest levels (between 45 to 50 dB) at 4:00 AM the next morning (Ebisu, 1999).

Traffic noise calculations for the existing conditions as well as noise predictions for the year 2003 following completion of the proposed developments were performed using the Federal Highway Administration Noise Prediction Model (FHWA, 1998).

3.13.2 Potential Impacts

<u>Traffic Related Noise</u>

As discussed in section 3.10, the proposed projects will have minimal or no significant traffic impacts and in some cases will improve traffic conditions. The traffic volume in the project vicinity is expected to increase with or without the proposed projects. Similarly, traffic noise levels in the project area are expected to increase as well.

Future traffic noise level increases resulting from the proposed projects were calculated for key roadway locations in the project vicinity. The hourly Equivalent Sound Level (Leq) is expected to increase an average of 2.1 dB and at certain locations will decrease an average of .35 dB. A comparison of existing noise levels and projected noise levels after project implementation is shown in Table 3-11.

Table 3 - 11
Existing and Future Traffic Noise Levels Along Roadways in the Project Area

	Hourly Equivalent Sound Level in dB[1]	
Location	**Existing (1998)**	**Future (2003 w/Projects)**
Ala Moana Blvd. West of Punchbowl	66.7	67.7
Ala Moana Blvd. East of Punchbowl	66.5	67.0
Ala Moana Blvd. West of South St.	66.4	67.0
Ala Moana Blvd. East of South St.	66.1	66.7
Punchbowl Street	58.4	58.7
Channel Street	42.4	56.7
South Street (Mauka of Ala Moana	57.6	58.1
South Street (Makai of Ala Moana	52.5	55.2
Nimitz Highway (North) at Pacific St.	66.9	67.7
Nimitz Highway (South) at Pacific St.	69.2	68.9
Pacific Street (Mauka)	53.9	53.5
Pacific Street (Middle)	56.2	56.6
Pacific Street (Makai)	42.4	44.6

[1] – During the PM peak hour and at 100 ft. setback distance from roadway centerline.

Traffic noise level increases for most of the project area will result mainly from non-project traffic. Project-related traffic noise levels will minimally contribute to future traffic noise levels at only three roadway locations in the project area (Nimitz Highway (South) at Pacific St., Pacific Street, and Channel/Ilalo Streets). Table 3 - 12 shows the increases in traffic noise levels resulting from both non-project and project-related traffic.

Table 3 - 12
Calculations of Project-Related and Non-Project Traffic Noise Contributions

	Noise Level Increase in DNL	
Location	**Non-Project Traffic**	**Project-Related Traffic**
Ala Moana Blvd. West of Punchbowl	0.6	0.3
Ala Moana Blvd. East of Punchbowl	0.5	0.5
Ala Moana Blvd. West of South St.	0.5	0.4
Ala Moana Blvd. East of South St.	0.5	0.3
Punchbowl Street	0.3	0.0
Channel/Ilalo Streets	0.1	4.8
South Street (Mauka of Ala Moana	0.5	0.1
South Street (Makai of Ala Moana	2.9	3.4
Nimitz Highway (North) at Pacific St.	0.5	0.3
Nimitz Highway (South) at Pacific St.	0.3	0.4
Pacific Street (Mauka)	0.2	0.1
Pacific Street (Middle)	0.2	1.0
Pacific Street (Makai)	0.2	2.6

Construction Related Noise

Unavoidable but temporary noise impacts may occur during the construction of the proposed harbor improvement projects. The quality of the acoustic environment may be degraded to unacceptable levels during periods of construction because noise from construction activities are predicted to be audible at adjoining properties.

Construction related noise will be generated by both on-site equipment i.e. pumps, generators, compressors, jack hammers, rock drills, demolition equipment, and power tools) and vehicles (i.e. trucks, front loaders, backhoes, tractors, graders, pavers, concrete mixers, etc.).

Construction-related noise impacts are not anticipated at the Lagoon Drive Lay Berths or the Excursion Vessel Passenger terminal at Piers 24 – 29 project sites because these two sites are in excess of 2,000 feet from the noise sensitive receptors. The noise sensitive properties anticipated to experience the highest noise levels during construction activities are the residential condominiums across from Piers 12 – 16 (Harbor Village, Marin Tower, and Harbor Court) and those in the vicinity of Pier 2 (Waterfront Towers Condominiums).

The Harbor Court, Marin Tower, and Harbor Village Condominium Units are expected to experience construction-related noise levels ranging from 60 to 75 decibels. The Waterfront Towers Condominiums may experience some increase in noise due to construction activities at Pier 2. However, construction activities will typically be at least 1,000 feet from the condominiums, and construction noise levels will be barely audible or inaudible.

Pile driving will be necessary to implant concrete piles during the construction of the finger piers at Piers 12 – 16 and the layberths at Keehi Lagoon. Pile driving activities are not anticipated to be necessary for the proposed projects at Pier 2 and Piers 24-29.

Pile driving operations at project sites are anticipated to generate noise levels ranging from 80 dB at 1,000 ft distance to 90 dB at 250 ft distance without mitigation measures. Indoors, typical pile driving noise levels range from approximately 70 to 80 dB for naturally ventilated structures and 58 to 68 dB for air conditioned structures (Ebisu, 1999)

In addition to noise generated by pile driving activities, pile driving induces ground vibrations which have the potential to cause structural and architectural damage to existing structures. Pile driving ground vibrations are measured in peak particle (or ground) velocity (PPV) in units of inches/second. The criteria most commonly used in measuring structural damage induced by pile driving activities is a 2.0 inches/second limit derived from work from the U.S. Bureau of Mines (Ebisu, 1999). A more conservative limit of 0.2 inches/second is also used and was suggested for planning purposes on the proposed harbor projects because of the repetitive nature of pile driving activities which can increase the risks of damage to adjacent structures.

The intensity of vibration of pile driving activities can be expressed in units known as scaled energy distance factor (SEDF). The SEDF can be converted to measurable distances between the pile driver tip and a receptor to determine PPV levels. SEDF and PPV levels for pile driving activities vary depending upon substrate type and the size of the pile driver used. When pile driving operations must penetrate through coral layers, vibration levels at a receptor (adjacent structure) may exceed the 0.2 inches/second vibration damage criteria, particularly if the receptor is supported by the common coral layer. Actual PPV levels at the receptor are dependent upon both the distance from the pile driver and the size of the pile driver.

Future Harbor Operations

Harbor vehicles such as heavy trucks, forklifts, sweepers, buses, and ships which will conduct maintenance activities and transport materials and personnel to and from harbor projects are potential sources of noise. Mechanical equipment such as emergency electrical generators, air conditioning cooling towers, air-conditioning compressors, exhaust fans, and other ventilation systems will be the primary fixed on-site noise sources expected to be located at the harbor project sites.

3.13.3 Proposed Mitigation Measures

Traffic Related Noise

Traffic noise levels in the immediate vicinity of the proposed projects are predicted to increase by less than 1.0 dB on the high volume roadways (i.e. Nimitz Highway and Ala Moana Boulevard) (Table 3.13-2). These predicted traffic noise level increases are considered to be very small and not significant. Predicted noise levels along the low volume roadways (Channel Street and South Street makai of Ala Moana Blvd. and along Pacific Street makai of Nimitz Highway) are relatively large at 2.6 to 4.8 dB (Table 3.13-3). However, these noise level increases along the low volume roadways are attributable to the low Base Year traffic noise levels, and future traffic noise levels are predicted to remain at less than 60 DNL at 100 ft. setback distance (Ebisu, 1999).

Overall, the risk of adverse traffic noise impacts resulting from the proposed improvements are considered to be very low. Future increases in traffic noise levels will be very small and insignificant and will not require traffic noise mitigation measures.

Construction Related Noise

Mitigation of construction noise to inaudible levels may not be practical in all cases due to the intensity of construction noise sources (80 to 90+ dB at 50 ft distance), and the exterior nature of the work (earth moving, pile driving, trenching, concrete pouring, hammering, etc.). However, the following mitigation measures should be implemented if determined to be feasible.

- The use of properly muffled construction equipment should be required
- If possible, heavy equipment and portable diesel engines and generators should be located at least 400 – 500 feet from residences.

- If feasible, the use of pre-drilling techniques, vibratory pile driving equipment, and bored and cast-in-situ piles to reduce the number of blows and impact noise from pile driving operations.
- The adherence to State Department of Health regulations controlling construction noise limits and construction curfew times. Under DOH permit procedures, construction activities are permitted weekdays between the hours of 7:00 AM – 6:00 PM, and on Saturdays between 9:00 AM – 6:00 PM.

Future Harbor Operations

Exterior noise levels as high as 75 DNL are generally considered acceptable for commercial, industrial, and other non-noise sensitive land uses. The Oahu harbor project areas include proposed land uses and activities which fall within the commercial and industrial categories. These proposed land uses and activities are not considered to be noise sensitive, and risks of adverse noise impacts within the proposed project areas is considered to be small.

Noise generated by harbor vehicles and fixed on-site mechanical equipment must comply with existing State DOH vehicular noise limits and property line noise limits (Hawaii Administrative Rules Title 11 – Chapters 42 and 46 respectively). Noise from these sources will be difficult to hear at the closest noise sensitive receptors if the noise radiated beyond the harbor property boundaries are at or below the residual background ambient noise levels (approximately 50to 55 dB) which are controlled by roadway traffic along Nimitz Highway and Ala Moana Boulevard (Ebisu, 1999).

Boat whistles and horns from excursion vessels at Piers 24 – 29 and cruise vessels at Pier 2 should not cause excessive noise due to the relatively large distances to the nearest residential condominiums (2,000 ft. and 1,500 ft. respectively). Predicted levels should be less than 75 dB which are similar to levels associated with street traffic noise. The relocation of large cruise ships from Pier 11 to Pier 2 should significantly reduce noise levels at the Harbor Court Condominiums. Additionally, horns are intermittent in nature and are usually sounded prior to sailing or during safety drills. Because of their low frequency characteristics, the horns of large ships are not considered to interfere with speech communication.

3.14 Air Quality

Ambient air pollution concentrations are regulated by both federal (Section 40, Part 50 CFR) and State (Hawaii Revised Statutes Chapter 11-59) Ambient Air Quality Standards (AAQS). Some of the State AAQS (CO, NO_2, and O_3) are more stringent than the federal standards but are allowed to be exceeded once per year. Another difference between State and federal AAQS is that the former is given in terms of a single standard while the latter is divided into primary and secondary standards.

The State AAQS are intended to "protect public health and welfare and to prevent the significant deterioration of air quality" (State of Hawaii, 1993). The primary federal AAQS are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, animals, wildlife, man-made materials, visibility climate and economic values (40 CFR, Part 50).

Table 3 - 13 summarizes both the federal and State AAQS. Each regulated air pollutant has the potential to adversely impact human health or to produce environmental degradation when present in sufficiently high concentrations for prolonged periods of time. Additionally, the State Air-Pollution Control Regulations also prohibit visible emissions at the property line of fugitive dust from concentration activities (State of Hawaii, 1993a).

Table 3 - 13
Summary of State of Hawaii and Federal Ambient Air Quality Standards[a]

Pollutant	Sampling Period	National AAQS Primary	National AAQS Secondary	State of Hawaii AAQS
Particulate Matter[b]	Annual	50	50	50
	24 hours	150	150	150
Sulfur Dioxide	Annual	80	--	80
	24 hours	365	--	365
	3 hours	--	1,300	1,300
Nitrogen Dioxide	Annual	100	--	70
Carbon Monoxide	8 hour	10	--	5
	1 hour	40	--	10
Ozone	1 hour	235	--	100
Hydrogen Sulfide	1 hour	--	--	35
Lead	Quarterly	1.5	--	1.5

[a] All standards represent the maximum allowable concentrations and are expressed in micrograms per cubic meter ($\mu g/m^3$) except CO in milligrams per cubic meter (mg/m^3)
[b] Particles are less than or equal to 10 microns aerodynamic diameter.

A detailed air quality study was conducted to assess the potential adverse impacts of the proposed harbor improvements on the air quality in the project area (Morrow, 1999). The information presented in this section is based primarily on that study.

3.14.1 Existing Conditions

The State Department of Health (DOH) maintains a limited network of air monitoring stations around the state to gather data on the pollutants listed in

Table 3-13. The DOH air monitoring stations nearest to the project area are located at the DOH building on the corner of Punchbowl and Beretania Streets and on Sand Island. The most recent published air quality data from these station is presented in Table 3 - 14 below.

Table 3 - 14

State Department of Health Air Quality Data at Project Area Monitoring Stations 1996

Pollutant	Concentration (µg/m^3)
Particulate Matter (PM_{10})	
24-hour (max)	28
Annual	14
Sulfur dioxide (SO_2)	
3-hour (max)	73
24-hour (max)	18
Annual	3
Carbon monoxide (CO)	
1-hour (max)	4.6
8=hour (max)	2.1
Annual	0.9
Ozone (O_3)	
1-hour (max)	92
Annual	27
Lead (Pb)	
Quarterly (max)	0.0
Annual	0.0

Notes: 1. CO, PM_{10}, SO_2, and Pb are from the DOH building monitoring station
2. O_3 data are from the Sand Island monitoring station
3. CO concentrations are in milligrams per cubic meter (mg/m^3)

Air quality in the vicinity of the project site is primarily affected by vehicular emissions and industrial and commercial harbor operations. Among the various air pollutants for which State and National standards have been established, carbon monoxide levels are the primary concern in areas near heavy traffic flow and where fossil fuels are burned for industrial purposes.

Carbon Monoxide sampling was conducted in December 1998 during the A.M and P.M peak traffic hours at key intersections serving the project area. The results of this sampling episode are summarized in Table 3 - 15. The data presented clearly demonstrate that CO concentrations are highly variable depending mainly upon factors such wind speed, wind direction, and traffic volumes.

Table 3 - 15
Onsite Carbon Monoxide Concentrations at Key Intersections in the Project Area

Intersection Analyzed	Date	Time	Wind Speed	Wind Direction	CO Concentration ((mg/m^3)
Ala Moana Blvd. at South Street	12/11/98 12/10/98	A.M P.M.	2.6 mph 4.3 mph	Northeast Northeast	2.1 1.9
Ala Moana Blvd. at Channel Street	12/9/98 12/8/98	A.M P.M	1.1mph 1.9 mph	North Southeast	1.6 1.6
Nimitz Highway at Pacific Street	12/8/98 12/7/98	A.M P.M	2.2 mph 2.6 mph	Northeast North	3.7 1.3

3.14.2 Potential Impacts

In the short-term, air quality will be impacted primarily by construction activities at the project sites. Construction vehicular activity will increase automotive pollutant concentrations at the project sites and adjacent streets. Construction activities will generate fugitive dust emissions resulting in an increase of particulate matter (PM_{10}) levels in the project area.

Particulate matter emissions resulting from construction activities were estimated for the proposed Pier 24 – 29 Excursion Vessel Terminal. Calculations of PM_{10} generation at this project site represents a worst-case 24-hour period concentration because it encompasses the greatest land area (15.4 acres). The resultant calculations indicate that construction activities at the Pier 24-29 project site generate PM_{10} concentration levels of 43 ug/m3, a level which is well below the 150 ug/m3 standard (Morrow, 1999).

In addition to the onsite impacts from construction activities, there will also be off site impacts due to the operation of concrete and asphalt batching plants necessary for construction. These plants will also contribute to PM_{10} emissions as well as other gaseous pollutants.

Automotive emission factors for carbon monoxide (CO) were generated for the calendar year 1999 and 2003 with and without the proposed projects. CO generation was calculated for both 1-hour and 8-hour concentration levels during peak traffic hours using the EPA's MOBILE-5B - Mobile Sources Emissions Model (U.S. EPA, 1996a).

The results of the modeling effort are presented in Table 3 - 16 which shows the maximum CO concentrations in mg/m^3 for each scenario evaluated. The results suggest that at all locations and under all conditions of meteorology and traffic throughout the year, both 1-hour and 8-hour federal AAQS would be met. At the Ala Moana/Punchbowl intersection there appears to be a possible exceedance of the more stringent State 1-hour and 8-hour AAQS. However, it should be noted that the predicted exceedances at this heavily congested intersection are already occurring under existing conditions and the number of exceedances does not change in the future even *with* the proposed projects.

Table 3 - 16
Predicted Maximum 1-Hour and 8-Hour Carbon Monoxide Concentrations (mg/m^3)

Intersection	Period	1999	2003 w/o Project	2003 w/Project
Ala Moana Blvd. at South Street	1-Hr. (A..M.) 1-Hr. (P.M.) 8-Hour	5.7 5.3 3.3	5.7 5.2 3.4	5.7 5.3 3.5
Ala Moana Blvd. at Channel Street	1-Hr. (A..M.) 1-Hr. (P.M.) 8-Hour	7.4 4.7 3.4	8.3 4.1 3.6	4.4 4.1 2.6
Ala Moana Blvd. at Punchbowl Street	1-Hr. (A..M.) 1-Hr. (P.M.) 8-Hour	10.4 8.9 5.3	10.1 8.8 5.3	10.4 8.9 5.7
Nimitz Highway at Pacific Street	1-Hr. (A..M.) 1-Hr. (P.M.) 8-Hour	4.8 4.3 2.6	5.1 4.5 2.8	5.3 4.7 3.0

The 400 stall parking lot area associated with the proposed Pier 2 Cruise Ship Passenger Terminal is not expected to contribute significantly to the overall CO concentration levels in the area due to the relatively small number and intermittent cruise ship arrivals and departures throughout the year in contrast to a municipal parking facility which would be actively used on a daily basis.

It should also be noted that peak traffic activity associated with cruise ship arrivals and departures does not normally coincide with peak traffic hours on the adjoining street network. This further reduces potential CO impacts on air quality since such impact is largely a function of traffic congestion.

3.14.3 Proposed Mitigation Measures

The proposed project will have short-term construction-related impacts on air quality, including the generation of dust and emissions from construction vehicles, equipment, and commuting construction workers. In the long-term, increased traffic volumes in the vicinity of the project site will contribute minimally to ambient CO concentration levels.

During the construction period fugitive dust control measures should be implemented to reduce the amount of particulate matter emissions. On-site dust control can be accomplished through frequent watering of unpaved roadways and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50% (U.S. EPA, 1996b). To further minimize fugitive dust emissions, the paving and/or landscaping of bare earth areas should be implemented as soon as practicable.

The off-site concrete and asphalt batching plants must be permitted by the DOH Clean Air Branch pursuant to state regulations (State of Hawaii, 1993b). Issuance of the necessary permits is contingent upon the ability of the batching plants to continuously comply with both emissions and ambient air quality standards.

The proposed project's impact on air quality in the vicinity of major intersections serving the project area will be minimal and will not threaten or contribute to violations of the national AAQS. The State AAQS may be exceeded two or three times per year at the Punchbowl/Ala Moana intersection. If these exceedences were to actually occur, they would amount to a mere 0.023 – 0.034% of the hours in a year (Morrow , 1999). The project will contribute minimally to the overall CO levels which are already approaching and possibly exceeding the State's AAQS at the Punchbowl Street – Ala Moana intersection.

Mitigation measures for future CO emissions will not be necessary as emission levels associated with the proposed action will be minimal. However, a mitigation measure to reduce vehicle generated CO emissions could be implemented by limiting construction vehicle activity to off-peak hours. This restriction would lower traffic congestion, which in turn, would reduce vehicle emissions and CO concentration levels.

4.0 SOCIAL ENVIRONMENT: EXISTING CONDITIONS, IMPACTS AND MITIGATION MEASURES

4.1 Archaeological, Historic, and Cultural Resources

This section addresses the archaeological, historic, and cultural characteristics of the areas within Honolulu Harbor and Keehi Lagoon that could potentially be affected by the proposed improvements. An archaeological study was performed in conjunction with this EIS and the contents of this section is based primarily on the findings of that study (Appendix E).

History

The Honolulu Harbor and its vicinity are rich in culture and history. Honolulu Harbor is a located in a naturally protected bay and the literal translation of its name is "sheltered harbor". The harbor entrance was called Mamala after "the shark woman that lived near the entrance of the harbor" (Pukui, et al. 1973; 1976).

The growth of Honolulu Harbor can be attributed to three distinct periods in Hawaiian history. The sandalwood trade during the late 1700's, whaling operations during the early 1800's, and the sugar trade which began in the mi-1800's and continued on into the 1900's.

The sandalwood or 'iliahi (Santalum elipticum) trade which dominated trade in the islands during the 1790's started the shipping industry and the birth of Honolulu Harbor as a major port. Prior to the discovery of sandalwood in Hawaii, ships would layover to replenish supplies for their journey between the Pacific Northwest and China. After its discovery, ships came from as far away as Boston to take part in the trade.

Since much of the sandalwood trees were situated on royal lands, King Kamehameha I administered great control over sandalwood harvesting and trading. However, after his death in 1819 his heirs found it difficult to maintain control and the over harvesting of sandalwood began. The over harvesting resulted not only in environmental impacts (deforestation), but it took its toll on the Hawaiian people who began to neglect their lo'i (taro fields), resulting in a minor famine (Cleghorn, et al. 1999). Eventually, the over harvesting resulted in depletion of sandalwood trees and the demise of the trade.

During the decline of the sandalwood trade in the 1820's, more whaling vessels utilized Honolulu Harbor as a rest stop for the ships to refit and replenish supplies for their long journeys. At the peak of whaling operations, Honolulu Harbor was inundated with vessels. Some historical accounts have claimed that there were as many as 100 whaling ships anchored in the harbor at one time (Cleghorn, et al. 1999).

The sugar trade replaced whaling as the primary activity at Honolulu Harbor during the Civil War when northern states could no longer obtain their sugar from the South. It was the boom in the sugar industry and resultant exports which led to major improvements and rapid expansion of Honolulu Harbor. Improvements have continued over the years as wharfage was expanded and the harbor was dredged, resulting in the overall increase of waterfront acreage to its present state.

Cultural Resources

Today, recreational fishing is not permitted in the Honolulu Harbor. However, during consultation with the State Office of Hawaiian Affairs concerns were expressed over effects of the proposed project on Native Hawaiian gathering rights, specifically *konohiki* fishing rights. This section attempts to address these concerns.

It can be safely assumed that prior to western contact the coastal waters of the harbor and its vicinity were used by Native Hawaiian fisherman. The Native Hawaiian fisherman would have been practicing *konohiki* fishing rights under the ancient land tenure system of old Hawaii. Ancient land practices divided the islands into large districts called moku which were governed by a high chief. *Moku* were divided into smaller divisions called *ahupua'a* which were administered by chiefs of lesser rank known as *alii ahupua'a*.

The *ahupua'a* was a "self-sustaining" strip of land running from the mountains to the sea which yielded the varied food products of the mountains, the cultivated land, and the sea. The *konohiki* were the land agents who managed these lands for the *ali'i ahupua'a*. It is largely with the *ahupua'a* that *konohiki* fishing rights became associated. *Konohiki* fisheries were nearshore fisheries (between the shoreline and reef) which at one time comprised much of Oahu's coastal waters (Kosaki, 1954). Figure 4 - 1 depicts the former locations and names of Oahu's *konohiki* fisheries.

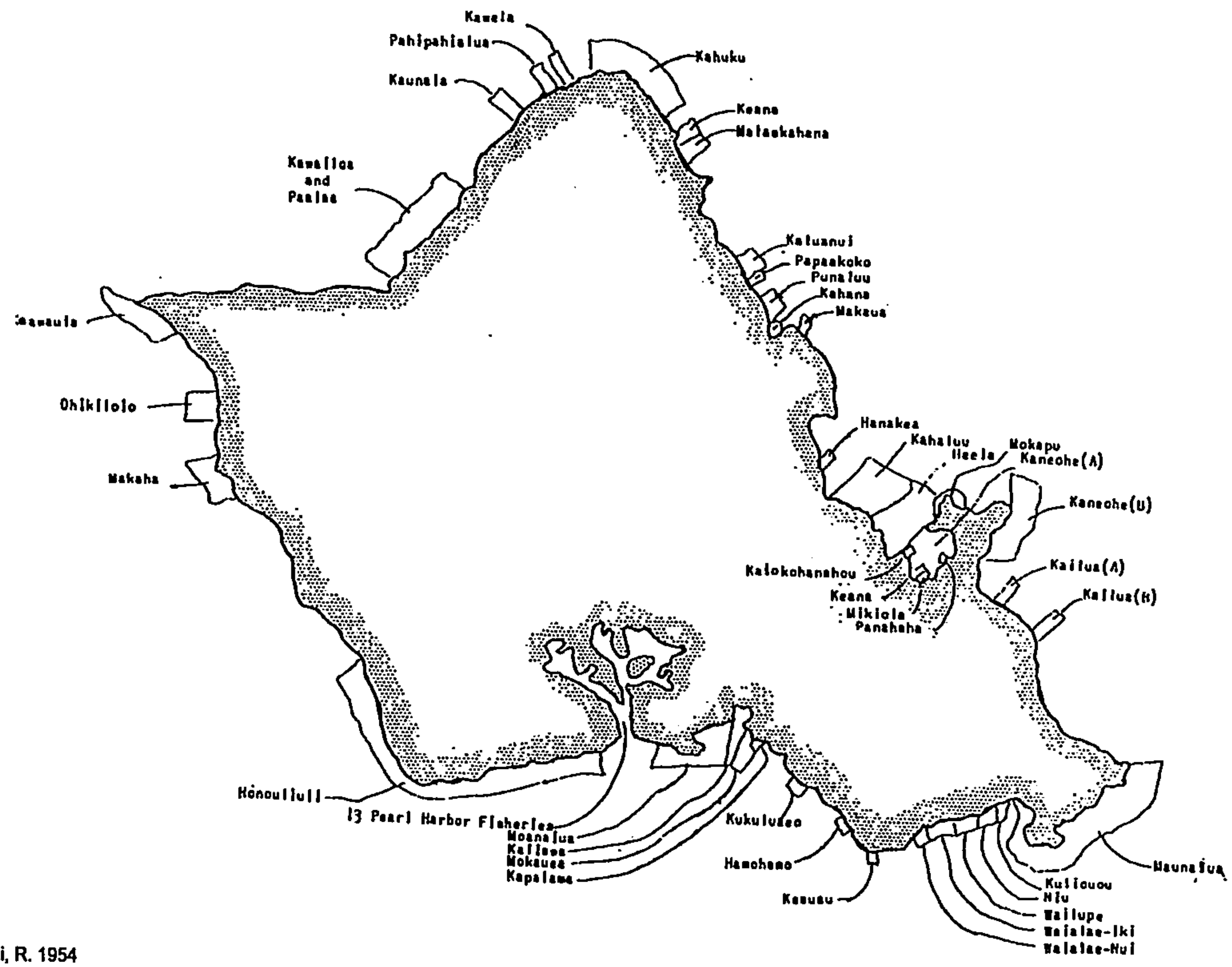
Today, *konohiki* fishing rights are no longer practiced in Hawaii's coastal waters. The Hawai'i Organic Act of 1900 severely restricted *konohiki* fishing rights by eliminating "private" fishery rights in the islands. However, there is ongoing debate over the interpretation of the Organic Act and the viability and effect of *konohiki* fishing rights on modern activities involving nearshore fisheries (MacKenzie, 1991).

4.1.1 Existing Conditions

<u>Archaeological and Historic Sites</u>

The project area is situated on recently created land formed by numerous dredging and filling operations. The lands are extensively urbanized making the presence of archaeological sites unlikely. Historical records indicate that there are no archaeological sites within the project areas. The State Department of Land and Natural Resources Historic Preservation Office has confirmed that there are no known archaeological sites at the proposed project areas.

It should be noted that in 1997 human remains were inadvertently discovered at Pier 40 during the excavation of a utility trench. The remains were located in a small crevice between ridges of coral bedrock. Such a location is not typical of a traditional burial site and State Historic Preservation archaeologists believe that those remains were of a person who died at the spot (possibly fishing) and was not necessarily buried there (Cleghorn, et al. 1999).



Source: Kosaki, R. 1954

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTERPLAN IMMEDIATE PHASE	**Figure 4 – 1** **Former Konohiki Fisheries on Oahu**	Prepared for: State of Hawaii, Department of Transportation, Harbors Division Prepared by: Wil Chee – Planning, Inc.

Only one traditional site, the Pakaka Heiau, is known to have previously existed within the immediate area of the project sites. The Pakaka Heiau was known to exist at the base of what is now Fort Street, but it has long been destroyed. Two significant Historic sites are recorded in immediate area of the project sites. These are the Aloha Tower Complex and the Falls of Clyde.

The Aloha Tower Complex was constructed between 1921 and 1926. The land that the tower sits on was filled with timber and coral blocks from the old Honolulu Fort. Construction of the tower itself was begun in 1924 by C.W. Winstedt and the National Construction Co. Closed to the public during WWII, Aloha Tower was reopened in 1947. It is designated as State Site 50-80-14-9929, and is listed on the National Register of Historic Places (NRHP).

The Falls of Clyde, presently located at Pier 7, is the only four-masted, fully-rigged iron hulled ship left in the world. The vessel was constructed in great Britain in 1878 by Russell and Company. It was built for general trade between Great Britain and India. The ship was first sold to American owners in 1893. Restored and re-opened to the public in 1968, The Falls of Clyde is listed on the NRHP (Ibid.).

4.1.2 Potential Impacts

<u>Archaeological and Historic Sites</u>

Adverse impacts are not anticipated as no archaeological or cultural remains should be present within the proposed project areas. In the unlikely event that any are identified, they would most probably have been brought in with the fill and are not in-situ. The original coastline around the turn of the century was located farther inland along the airport and harbor areas. Thus, any cultural remains that were once present along the coast will be situated inland of Nimitz Highway rather than along the current harbor edge (Cleghorn, et al. 1999).

The two identified significant Historic sites, Aloha Tower Complex and the Falls of Clyde, are located outside of the proposed project areas and will not be adversely impacted by construction activities or future operations at the project sites.

Several existing structures on the project sites are scheduled for demolition for the implementation of the proposed projects. Some of these buildings are over 50 years old, making them potentially eligible for listing on NRHP. A property may be listed in the NRHP if it meets a specific set of criteria as defined in 36 CFR Section 60.4. The significance criteria are summarized below:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
(b) That are associated with the lives of persons significant in our past; or
(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
(d) That have yielded, or may be likely to yield, information important in prehistory or history.

A detailed examination of all existing structures at the project sites was conducted, and it was found that most of the buildings were in either in extremely poor condition or had been extensively altered thereby compromising their original integrity. Based on the above criteria the Archaeological Study determined that none of the structures at the project sites qualify as historically significant. *Close consultation was maintained with the State Historic Preservation Office (SHPO) during the course of the Archaeological Study and SHPO has concurred with the determination that the demolition of the identified structures, and the project will have no impact on cultural resources (See Appendix E).*

<u>Cultural Resources</u>

As mentioned earlier in this section, there is ongoing debate over the interpretation of the Organic Act and the viability and effect of *konohiki* fishing rights on modern activities involving nearshore fisheries.

Many legal experts and scholars have attempted to address the issue of Native Hawaiian rights in a regulated fishery. Various solutions involving preferential rights to Native Hawaiians have been explored including: rationing permits to achieve quotas, establishing special use areas, auctioning of parcels or permits, and assigning points for Native Hawaiian fishermen (Anders, 1987). However, the status of Native Hawaiian fishing rights remains an unresolved issue.

Since private fishing activities are not permitted within Honolulu Harbor, the proposed projects will have no impacts on native Hawaiian fishing rights. It is not known at this time whether or not the proposed projects will have adverse or beneficial impacts on Native or *konohiki* fishing rights in the future. It is beyond the scope and not the intent of this EIS to provide a solution to the status of *konohiki* fishing rights in Hawaii's coastal waters. The resolution of this controversial issue would be best accomplished within legal and political arenas.

4.1.3 Proposed Mitigation Measures

Based upon the findings of the Archaeological Study, archaeological monitoring will not be necessary during construction activities. However, in the unlikely event cultural artifacts or human remains are inadvertently encountered during construction activities, all operations in vicinity of the discovery will immediately cease. The discovery and surrounding area will be secured and protected from further damage. The State Historic Preservation Division shall be notified of the discovery, and immediate consultation with the Oahu Island Burial Council shall be sought before commencement of construction activities.

4.2 Aesthetic and Recreational Considerations

4.2.1 Existing Conditions

Honolulu Harbor has an industrial appearance. Visual resources within the proposed project area are typical of commercial port settings (i.e. piers, paved areas, heavy equipment, warehouses, passenger and cargo terminals, etc.). Many of the existing structures on the project sites are quite old, in poor condition, and in varying states of disrepair.

The proposed project sites within the Honolulu Harbor are not open to public or recreational boating access and is limited to commercial and industrial harbor uses. The Keehi Lagoon Canoe Complex is located approximately 1.5 miles to the north of the proposed layberth and *OSRV* sites. In addition to the canoe complex, there are several other recreational areas in Keehi Lagoon (section 2.5) all of which are located outside of the proposed project area. Recreational areas located within five miles of the project site include Ala Moana Beach Park, Sand Island State Recreation Area, and the Kakaako Waterfront State Recreation Area.

4.2.2 Potential Impacts

The construction and operation of the proposed improvements are not expected to have an adverse impact on existing view sheds because the existing harbor already has an industrial appearance. The proposed projects call for the demolition or refurbishing of existing pier structures and the construction of new buildings. These buildings will become a visible part of the harbor landscape, but they will, for the most part, be replacing existing structures of similar size.

Recreational activities will not be impacted by the proposed projects because the existing recreational facilities are considerable distances away from the project sites. Furthermore. The areas directly adjacent to the proposed project sites are areas where public recreational activities are not permitted.

4.2.3 Proposed Mitigation Measures

Impacts on visual resources by the proposed project are not anticipated to be significant. The proposed projects and their associated operations would be consistent with the existing maritime industrial setting in the harbor area. Many of the existing structures, such as the Pier 2 Shed and the Pier 24 shed, will be replaced by new and more aesthetically pleasing structures.

Since Honolulu Harbor can be considered the "Gateway to Hawaii," it is important to recognize the unique physical and cultural setting of the islands during project design. Hawaii's unique architecture has contributed to the islands' sense of place and image as a tropical paradise. For this reason, the "Hawaiian Sense of Place" should be considered during the architectural design phases of proposed project buildings. Use of Hawaiian architectural designs which stress features like natural ventilation, open spaces, landscaped gardens, columns, and lanais would further serve to create an aesthetically pleasing Harbor landscape.

4.3 Socio-Economic Conditions

4.3.1 Existing Conditions

Population

The Island of Oahu is the commercial, cultural, and social center of Hawaii. Consequently, Oahu Island and the urban Honolulu area have the highest resident population in the state. As of July 1, 1997, Oahu's resident population was 869,857, 45 percent of whom lived in the urban Honolulu area. The resident population for the island of Oahu is projected to reach 1,050,000 by the year 2020 (DBEDT, 1997).

The residential areas nearest the project site are the Kakaako, Downtown, Kalihi-Palama, and Airport neighborhoods. In 1990 these neighborhoods had resident populations of 10,934, 11,752, 40,147, and 26,734 respectively. The median annual household income in the Kalihi-Palama and neighboring downtown area averaged just over $25,000 in 1990 compared to Oahu's median annual income of $40,581.14 (Ibid.)

Tourism accounts for approximately one-quarter of the gross state product and one third of total employment. In 1997 visitor expenditures exceeded $10 Billion, and the number of visitors to Hawaii reached 6,876,140 (Ibid.). In the past three years the number of visitors to Hawaii has leveled off but is still expected to grow in the future.

Currently, the only developed tourist facilities within Honolulu Harbor are at Piers 8 and 9 where the Aloha Tower retail development attracts residents and visitors. Piers 10 and 11 serve as Oahu's cruise ship terminal with over 14,500 overseas passenger arrivals in 1994. Other important tourist, recreational, and retail facilities in the project vicinity include Restaurant Row, Dole Cannery Mall, Historic Chinatown, Iolani Palace, Ala Moana Shopping Center, and Ala Moana Beach Park.

Ceded Lands

When Hawaii became a State in 1959, the disposition of former Crown and Government lands (ceded lands) were established in section 5 of the Admission Act. Section 5(f) of the Admission Act provides that these lands and the income and proceeds derived from them are to be *held in trust* by the State of Hawaii. Submerged lands in the State of Hawaii are a part of the ceded lands trust.

Therefore, any parcels within the project area identified as ceded lands, although administered by the State Department of Transportation - Harbors Division, are not "owned" by the State but rather "held in trust" by the State.

Consultation with the Office of Hawaiian affairs was initiated to determine whether any ceded lands were located within the project areas at either Keehi Lagoon or Honolulu Harbor. Only five parcels (located at Piers 18-23 and 24-29) within the projects areas were listed in the ceded lands inventory. However, it should be noted that an accurate and complete ceded lands inventory does not yet exist. Efforts are currently ongoing to create such an inventory.

Section 5 (f) of the Admissions Act states that ceded lands are to be utilized for the following five purposes:

- The support of the public schools and other public educational institutions
- The betterment of the conditions of Native Hawaiians
- The development of farm and home ownership
- The making of public improvements
- The provision of lands for public use

Differing legal interpretations of section 5 of the Admissions Act have clouded the issue of what actions meet the above criteria. As a result, what would be considered an "appropriate use" of ceded lands has become a highly subjective, politicized, controversial, and as yet, unresolved issue.

The Office of Hawaiian Affairs along with various Native Hawaiian organizations are involved in ongoing negotiations with the State in an attempt to reach a settlement on the ceded lands controversy. It is beyond the scope and not the intent of this EIS to provide a solution to the ceded lands debate. The resolution of this controversial issue would be best accomplished within legal and political arenas.

4.3.2 Potential Impacts

The economic importance of harbor development and improvement is best illustrated when looking at potential adverse impacts associated with imposing restraints upon such activities.

Preliminary findings from an input/output model developed for DOT-HAR suggest that the negative impacts of curtailed harbor industry growth are substantial. The study found that by limiting harbor development and improvements by just 1% per year less than the estimated 2% annual increase in the real value of the Gross State Product through the year 2020 would result in the following adverse impacts:

- Sales and employment of the major harbor industries would realize only 76.6 percent of their potential;
- Hawaii's Gross State Product would be 2.1 percent lower; and
- Estimated statewide employment would be reduced by 0.5 percent.

Overall, constraints on harbor development that limit annual harbor industry growth to 1 percent would impact the State's economy by a combined loss of $11.7 billion through 2020 (HDOT, 1997).

For the reasons stated above, the economic impacts associated with the implementation of the proposed Honolulu Harbor and Keehi Lagoon improvements are, for the most part, beneficial.

In the short-term, construction expenditures will have an overall beneficial impact on the local construction industry, and construction activities will benefit the community indirectly through the creation of jobs.

In the long-term, harbor operations are expected to have positive economic impacts as well. The expanded harbor operations will stimulate direct maritime expenditures, create port-related jobs, and develop new businesses in the Honolulu Harbor area. Harbor operations will require support businesses to supply ships, handle cargo, and provide other services.

The commercial fishing industry and tourism industry should also experience beneficial economic impacts as a result of the proposed projects. Both of these industries will experience increased activity and growth as a result of the new and expanded facilities.

Overall, implementation of the proposed projects and resultant harbor expansion will stimulate harbor-related business enterprises and increase local employment. The combined increased business activities in the commercial shipping, fishing and tourism industries will result in increased state tax revenues, in the form of excise, individual, and corporate taxes.

4.3.3 Proposed Mitigation Measures

There are no adverse socio-economic impacts anticipated. Therefore, mitigation measures have not been proposed.

5.0 RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

5.1 Federal Land Use Plans and Policies

Land use policies, plans, and controls administered by the Federal government which affect the proposed action are described in the following sections.

5.1.1 Clean Water Act

The Clean Water Act (CWA), Section 404, defines requirements for discharges of dredged or fill materials in waters of the United States" and sets limits on such discharges. Permit approval is through the U.S. Army Corps of Engineers (USACE). The "Excavation Rule" was established jointly by USACE and the U.S. Environmental Protection Agency (EPA) (33 CFR 323.2 of 25 August 1993) to also regulate removal of material from waters of the United States. Up until recently, the "incidental fallback" accompanying dredging activities was considered to be "discharge" under Section 404. However, Section 404 no longer regulates excavation activities and now regulates discharge and fill only.

Although dredging activities will not be required for the proposed projects, it should be noted that according to 33 CFR 232.2 (d)(3)(ii), a Section 404 permit would not required for any incidental movement of dredged material occurring during normal dredging operations, defined as dredging for navigation in navigable waters of the United States.

The USACE will be consulted to provide a jurisdictional determination regarding the applicability of Section 404 to the proposed project. It was determined that a section 404 Permit will be required for the proposed actions at Piers 12- 16 and at Keehi Lagoon, because "in filling" during piling operations would be considered a discharge of fill material in the water.

5.1.2 Section 401 CWA Water Quality Certification

Under the Federal CWA and Hawaii Revised Statutes (HRS) Chapter 342D, and associated Hawaii Administrative Rules (HAR) 11-54, a WQC is required for activities when proposed construction or operation may result in discharges to State waters. In Hawaii, the Department of Health (DOH) is the agency with authority for project review and issuance of the WQC.

Since it has been determined that the proposed action will result in the discharge fill materials requiring a CWA Section 404 permit, a CWA Section 401 Water Quality Certification (WQC) will also be required.

5.1.3 Section 402 CWA NPDES Permit

Discharges of point sources of pollutants into surface waters of the U.S. are regulated under the National Pollutant Discharge Elimination System (NPDES) program, pursuant to CWA, Section 402. In Hawaii, the DOH administers the NPDES program under HAR 11-55.

NPDES permits are available under General or Individual categories. General permits are available for activities that meet specific criteria, such as construction-related storm water discharges, hydrotesting, and construction dewatering. The Individual Permit has greater flexibility, but involves a longer process, which includes Public Notice of permit application.

Separate Notices of Intent (NOIs) are required for NPDES General Permit coverage for hydrotesting, dewatering, or discharges to surface waters of construction-related storm water from sites equal to or greater than 5 acres in size. Discharge of dewatering effluent associated with dredged sediment would require NPDFS permit coverage as well. The NOI submitted with the NPDES permit application requires development of a Best Management Practices plan, in accordance with HAR 11-55. Discharges for storm water associated with construction activity, hydrotesting, and dewatering under the proposed project will require NPDES permit approvals from DOH.

A NPDES permit will be required for the proposed Harbor improvements.

5.1.4 Rivers and Harbors Act

The Rivers and Harbors Act (RHA), Section 10, requires the issuance of a USACE permit for any activity that obstructs or alters navigable waters of the U.S., or modifies the course, location, condition, or capacity of any port, harbor or refuge, or enclosure within the limits of any breakwater or of the channel of any navigable water. The USACE was consulted and has confirmed that a permit under Section 10, Rivers and Harbors Act, will be required for the proposed action.

5.1.5 Marine Protection, Research, and Sanctuaries Act

Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) (33 U.S.C. 1413) authorizes the USACE to issue permits for the transportation of dredged material for the purpose of dumping in ocean waters. Section 103 prohibits disposal activities that would unreasonably degrade or endanger human health or the marine environment.

The EPA and USACE have joint authority for regulating ocean disposal of dredged material and for managing ocean dredged material disposal sites (ODMDS) in the Hawaiian Islands. Under the MPRSA, Section 103, the USACE in coordination with the EPA has the authority to issue permits for ocean dumping. A USACE permit under Section 103 will not be required for the proposed action.

5.1.6 Endangered Species Act and Marine Mammal Protection Act

The Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972 require that actions not jeopardize the continued existence of endangered or threatened marine and terrestrial plant and animal species. *The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over certain federally listed endangered and threatened species that occur in terrestrial and marine environments. The National Marine Fisheries Service (NMFS) has jurisdiction over marine mammals and fishes. The two agencies share responsibility for listed (threatened or endangered) sea turtles.*

As discussed in section 3.6, it is not anticipated that there will be any significant impacts to T&E marine and non-marine species as a result of the proposed project. However, protected marine species and waterbirds are known to frequent areas of Keehi Lagoon in the vicinity of the layberth project site. Therefore, close coordination and consultation with the US Fish and Wildlife Service and the National Marine Fisheries Service will be maintained during project planning and construction.

5.1.7 National Historic Preservation Act

Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations (36 CFR 800), are intended to provide for the protection and use of historic properties for the benefit of the public. The State Department of Land and Natural Resources - Historic Preservation Division (SH PD), oversees the historic preservation compliance process. The SHPD determines whether any historic sites exist and their historical significance.

There are several historic structures (over 50 years old) within the project site. Some of these structures are scheduled to be demolished for the proposed improvements. As mentioned in section 4.1, the archaeological investigation report determined that there were no significant historic structures on the project sites. Should the State Historic Preservation Division determine otherwise, then appropriate mitigation and preservation measures will be developed.

5.1.8 Native American Graves Protection and Repatriation Act

The proposed project will be conducted in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA). NAGPRA, which was passed into law in 1990, is intended to protect Native American (including native Hawaiian) burial sites. NAGPRA sets guidelines for the removal and subsequent repatriation of human remains and associated burial objects on Federal, Indian, and native Hawaiian lands.

NAGPRA requires consultation with native Hawaiian organizations, including the Office of Hawaiian Affairs, Hui Malama I Na Kupuna '0 Hawaii Nei, and the Oahu Burial Council (and the State Historic Preservation Division, DLNR) if Hawaiian burials are encountered. As explained in section 4.1, it is unlikely that any human burials exist within the project site area. However, should human remains be encountered, the above NAGPRA requirements will be met.

5.2 State Land Use Plans and Policies

5.2.1 Hawaii State Plan (HRS 226)

The Hawaii State Plan, Chapter 226, HRS (1995) was developed to serve as a guide for the future growth of the State of Hawaii. The State Plan identifies goals, objectives, policies, and priorities for the development and growth of the State. It provides a basis for prioritizing and allocating the states limited resources, including public funds, services, human resources, land, energy, water. The State Plan establishes a system for the formulation and program coordination of State and County plans, policies, programs, projects, and regulatory activities and facilitates the integration of all major State and county activities.

The proposed action is consistent with the objectives and policies of the Hawaii State Plan. Specifically, the proposed action will increase and diversify the State's economic base through upgrading facilities for the tourist, commercial fishing, shipping industries. Described below are sections of the State Plan's overall theme, goals, objectives, and policies, that relate to the proposed action.

Part I - Goals, Objectives, and Policies

SEC. 226-8 Objectives and policies for the economy - visitor industry.

b)(1) Support and assist in the promotion of Hawaii's visitor attractions.

SEC. 226-10 Objective and policies for the economy - potential growth activities.

(a) Planning for the State's economy with regard to potential growth activities shall be directed towards achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawaii's economic base.

(b) To achieve the potential growth activity objective, it shall be the policy of this State to:

Facilitate investment and employment in economic activities that have the potential for growth such as diversified agriculture, aquaculture, apparel and textile manufacturing, film and television production, and energy and marine-related industries.

(5) Promote Hawaii's geographic, environmental, social, and technological advantages to attract new economic activities into the State.

(7) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.

<u>SEC. 226-11 Objectives and policies for the physical environment land-based, shoreline, and marine resources.</u>

(a) Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:

(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.

(2) Effective protection of Hawaii's unique and fragile environmental resources.

(b) To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:

(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.

(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.

(3) Take into account the physical attributes of areas when planning and designing activities and facilities.

(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.

(8) Pursue compatible relationships among activities, facilities, and natural resources.

(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

SEC. 226-17 Objectives and Policies for Facility Systems - Transportation

4) Provide for improved accessibility to shipping, docking, and storage facilities.

6) Encourage transportation systems that serve to accommodate present and future development needs of communities.

8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment of storage needs.

9) Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification.

SEC. 226-103 Economic priority guidelines.

(a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy:

(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.

(A)(iv) Reinvest in the local economy.

(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawaii's small-scale producers, manufacturers, and distributors.

10 (b)(4) Encourage visitor industry practices of activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources.

5.2.2 Honolulu Waterfront Master Plan

The Honolulu Waterfront Master Plan (HWMP) represents a comprehensive, long range vision for the Honolulu waterfront area. The HWMP directly addresses major planning issues concerning public access and use of the waterfront, long-term integrity of commercial maritime operations, plan implementation, relocation needs, and financial feasibility.

The 2020 Plan and the proposed IP projects support the overall objectives of the HWMP by:

- Identifying and articulating a long-range vision for the Honolulu Waterfront that is fiscally responsible but also innovative, challenging, and responsive to the current and future needs of Hawaii's residents.
- Assuring a logical, orderly and achievable phasing of improvements in a manner that minimizes social, environmental, and economic disruption.
- Maximizes public benefits associated with the improvement of the significant State-owned lands located within the waterfront planning area.

5.2.3 Keehi Lagoon Recreation Plan

The Keehi Lagoon Recreation Plan outlines a number of objectives which emphasize the growth of ocean recreation and business development with in the Keehi Lagoon. The objectives set forth in the Keehi Lagoon Recreation Plan are designed to meet the following needs:

- Construction of additional berths
- Maritime Industry Support Lands
- Active Ocean Recreation Areas
- Shoreline Fishing Areas, Waterfront Greenbelts, Picnic Areas and Walkways

The Keehi Lagoon Recreation Plan specifically identifies additional berths required for small recreational vessels and larger boats used for ocean racing and commercial purposes (incl. commercial fishing craft).

5.2.4 State Functional Plans

State Functional Plans are the primary guidelines for implementing the Hawaii State Plan. In contrast to the Hawaii State Plan which establishes long-term objectives, the State Functional Plans serve to establish objectives for shorter-term actions. Described below are specific sections of State Functional Plans which contain overall themes, goals, objectives, and policies, that relate to the proposed action.

<u>State Transportation Functional Plan</u>

<u>Objective 1A</u>: Expansion of the transportation system.

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

    As public facilities, with public accommodations, the final designs for the proposed excursion and cruise vessel terminals (at Piers 24 - 29 and Pier 2 respectively), will be required to comply with Titles II and III of the Americans with Disabilities Act of 1990 (ADA). Sections with particular significance to the proposed projects are following sections which address specific areas. Section 226 (New Facilities), section 227 (Alterations of existing Facilities), and section 303 (New Construction and Alterations in Public Accommodations and Commercial Facilities).

Objective 1D: Identify reserve and acquire land for future transportation improvements.

State Conservation Lands Functional Plan

The objective of the State Conservation Lands Functional Plan is to provide for a management program allowing for judicious use of the State's natural resources balanced with the need to protect these resources to varying degrees. Objectives and policies that would be met by the completion of the proposed projects are presented below.

Objective IIE: Promotion and marketing of appropriate natural resources designated for commercial development.

Policy IIE(4): Assist the fishing industry to develop new markets and improve production and processing of fishery products.

5.2.5 State Land Use Law (HRS 205)

The State of Hawaii classifies all land into four districts: Urban, Conservation, Agricultural, and Rural. Changes to the boundaries of any conservation district and other districts greater than 15 acres must be approved by the State Land Use Commission. Changes to boundaries of districts other than conservation districts of less than 15 acres can be approved by the county land use authority.

The proposed action would involve activity on two land classes - Urban and Conservation. Land uses within the Urban District are regulated by the City and County of Honolulu through the Land Use Ordinance. The State Department of Land and Natural Resources regulates land uses in the Conservation Districts.

The proposed projects are located within the Urban District, and the proposed facilities are permissible within this State land use district. The waters of Honolulu Harbor and Keehi Lagoon are located within the State Conservation District which is administered by the State Board of Land and Natural Resources. The Harbors Division has an existing Conservation District Use Permit from the BLNR for any maritime construction activities in the harbor which would allow construction of the proposed projects to proceed.

5.2.6 Coastal Zone Management Program (Special Management Areas)

The Coastal Zone Management Act of 1972 (P.L. 92-583) is administered in Hawaii by the State Office of Planning of the Department of Business, Economic Development, and Tourism and affects projects that require Federal permits, including USACE permits (State of Hawaii, 1985). The objectives and policies of the Hawaii Coastal Zone Management (CZM) as set forth in Chapter 205A Hawaii Revised Statutes are to provide recreational resources; protect historic, scenic, and coastal ecosystem resources; provide economic uses; reduce coastal hazards; and manage development in the coastal zone.

Chapter 205A outlines controls and policies for development within an area along the shoreline referred to as the Special Management Area (SMA). SMA policies are administered at the county level. Only the proposed cruise ship terminal at Pier 2 and the layberth facilities at Keehi Lagoon fall within the SMA boundary.

Although the proposed Keehi Lagoon project site is located within the SMA, DOT-HAR is exempt from the County SMA requirements. DOT-HAR's authority over the planning, construction, operation, and maintenance of harbor facilities does not require county approval for such projects.

The proposed Pier 2 Cruise Terminal Facility is situated within the Kakaako Community Development District. Community Development Districts are administered at the State level and are not subject to City and County rules and regulations. As such, SMA permits and shoreline setback variances will be required for the development of proposed structures at the Pier 2 site. These permit applications will be administered at the State level through the Office of Planning pursuant to Section 206E-8.5 of the Hawaii Revise Statutes.

Environmental concerns are also addressed through the CZM consistency review process. The entire Island of Oahu is within the coastal zone area affected by the CZM Act. A CZM consistency determination of 'no effects' is required under the CZM program and is being sought from the State Office of Planning.

5.3 <u>County Land Use Plans and Policies</u>

5.3.1 General Plan for the City and County of Honolulu

The General Plan establishes the City and County of Honolulu's long-term objectives and policies. These objectives tend to be broad in scope; land use policies in subsequent Development Plans provide more specific policies to achieve the General Plan objectives. General Plan objectives and policies that relate to the proposed actions at Honolulu Harbor and *Kalaeloa* Barbers Point Harbor are summarized below.

<u>Transportation and Utilities</u>

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 13: Facilitate the development of a second deep-water harbor to relieve congestion in Honolulu Harbor.

Economic Activity:

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

Policy 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu residents.

Objective D: To make full use of the economic resources of the sea.

Policy 1: Assist the fishing industry to maintain its viability.

Policy 2: Encourage the development of aquaculture, ocean research, and other Ocean-related industries.

Physical Development and Urban Design:

Objective A: To coordinate 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, Aiea, and Pearl City as the island's primary urban center.

Policy 8: Foster the development of Honolulu's waterfront as the State's major port and maritime center, as a people-oriented mixed use area, and as a major recreation area.

Policy 10: Establish a review process to evaluate the design of major development projects.

Objective C: To develop a secondary urban center in Ewa with its nucleus in the Kapolei area.

Policy 3: Encourage the continuing development of Barbers Point as a major industrial center.

Policy 5: Cooperate with the State and federal governments in the development of a deep water harbor at Barbers Point.

5.3.2 Development Plan for the City and County of Honolulu

Pursuant to Chapter 226, HRS, each County within the State of Hawaii is mandated to carry out the Hawaii State Plan through the adoption and use of a County General Plan. Development Plans (DPs) have been established to provide land use controls designed to implement the objectives and policies of these General Plans and to provide guidance for more specific zoning and density regulations.

The *Oahu DP's* consist of two main sections: the Common Provisions that are common to all of Oahu's DPs, and the Special Provisionsvary depending upon the location of the area of concern. The DPs are relatively detailed guidelines for physical development on Oahu. The site of the proposed action is on land designated as Public Facilities. The proposed action is consistent with this land-use designation.

The development plans for both Ewa and the Primary Urban Center (PUC) have recently been updated or are in the process of being updated. The proposed Honolulu and *Kalaeloa* Barbers Point Harbor improvements are *consistent with* and support the updated development plans, objectives, and policies. *In particular, the proposed cruise ship and excursion vessel terminals are consistent with the City's development plans supporting the long-range vision of developing a "City on the Water".*

The existing PUC DP policies address uses near airports and harbors (policy D.2.1). Development Plan Special Provisions provide some policy guidance for uses in the vicinity of the airport and for the design treatment of the Nimitz Highway corridor. However, the DP provides no policies concerning long-term plans for airport and harbor facilities.

The proposed DP policy changes (policy D.2.3) would:

> "Allow a broader mix of industrial and commercial uses near Honolulu Harbor and Honolulu International Airport, adding retail and office uses that are compatible with harbor and airport operations and existing light industrial uses." (CCH, 1999)

The proposed *Kalaeloa* Barbers Point Harbor improvements support the general policies, planning principles, and guidelines for development of industrial centers and industrial uses in Ewa. Additionally, the proposed *Kalaeloa* Barbers Point Harbor improvements follow the coastal environment guidelines in section 3.7.3.3 of the Ewa DP.

The Ewa Development Plan update states:

> "Barbers Point Industrial Area includes Campbell Industrial Park, Barbers Point Deep Draft harbor, Kenai Industrial Park, and Kapolei Business Park. It should continue to grow as one of Oahu and the State's most important industrial areas. It is the site of the State's largest heavy industrial area (Campbell Industrial Park) and an important industrial harbor and fuel transfer point." (CCH, 1997)

5.3.3 County Land Use Ordinances and Zoning

The proposed project area is located *within I-2 Intensive Industrial, I-3 Waterfront Industrial, P-I Restricted Preservation, and IMX-1 Industrial Commercial Mixed Use* designations. All improvements within these districts are subject to review by City and County Department of Planning and Permitting (formerly the Department of Land Utilization).

It should be noted that pursuant to Chapter 266-2, Hawaii Revised Statutes, all harbor improvements, including any maritime facilities constructed by the State Department of Transportation, are exempted from City and County zoning regulations. Nonetheless, the proposed actions are a permitted use within these zones and are in accordance with the Land Use Ordinance of the City and County of Honolulu.

6.0 ALTERNATIVES TO THE PROPOSED ACTION

6.1 No Action

The no action alternative would mean the existing operations at Honolulu Harbor would remain unchanged. Traffic congestion within Honolulu Harbor would not be alleviated. Existing vacant land areas and poorly maintained harbor facilities would remain underutilized and undeveloped. With this alternative, there would not be additional piers, storage yards, or passenger facilities to accommodate the anticipated growth of the State's tourism, commercial fishing, and shipping industries.

The no action alternative has been rejected from further consideration because; i) the goals of the 2020 PLAN would not be achieved, and ii) State and county development policies would not be implemented.

6.2 Alternative Locations

Alternative locations for the proposed action were not considered. No other sites on Oahu would provide an economical feasible alternative for the proposed actions. The 2020 PLAN outlines a systematic approach for the improvement and development of Oahu's commercial harbors. The only other commercial harbor on Oahu in addition to the proposed project sites is Kewalo Basin. Kewalo Basin is not a feasible alternative as it would be unable to meet the needs of the proposed IP projects in terms of location, existing facilities, infrastructure, and economical considerations.

7.0 PERMITS AND APPROVALS REQUIRED

A list of applicable permits and approvals which may be required for the proposed action are outlined below.

Permit/Approval	Administering Agency
Rivers Harbors Act Section 10 Permit	U.S. Army Corps of Engineers
Department of the Army Section 404 Permit	U.S. Army Corps of Engineers
Section 401 Water Quality Certification	State Department of Health
Coastal Zone Management Consistency Certification	Office of State Planning
Special Management Area Permit	Office of State Planning
Shoreline Setback Variance	Office of State Planning
HCDA Development Permit (for Pier 2)	Hawaii Community Development Authority
National Pollution Discharge Elimination System (NPDES)	State Department of Health
Noise Variance	State Department of Health
Permit for Air Emissions	State Department of Health
Water Use Permit	State Department of Land and Natural Resources
Environmental Review (Chapter 343, HRS)	Office of Environmental Quality Control

In accordance with Chapter 266-2(b) HRS, DOT-HAR is exempt from county approvals for commercial harbor construction activities. Therefore, the following regulatory requirements are not applicable.

- Special Management Area Permit (For Pier 2 see section 5.2.6)
- Grading, Grubbing, and Stockpiling Permit
- Compliance with City and County Zoning

8.0 ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED PROJECTS

During the construction phase of the proposed improvements, resources such as fossil fuels and construction materials such as concrete, steel, asphalt, wood, and rock would be irrevocably committed. In addition to the fuels and construction materials involved, approximately $30 million will be committed to the proposed improvement projects. Labor would be required for construction, planning, engineering design, landscaping, purchasing, and services. Once used the labor is irretrievable. However, labor effort is also monetarily compensated, thereby supporting the State's economy.

9.0 PARTIES CONSULTED DURING PREPARATION OF THE EISPN AND DRAFT EIS

The State Department of Transportation - Harbors Division determined that the proposed project may have a significant impact on the environment and that the preparation of an EIS was required. Notice of this determination was published in the February 23, 1999 edition of The Environmental Notice, commencing a 30-day public review period which ended March 25, 1999. The Draft Environmental Impact Statement (DEIS) was published in the July 8, 1999 edition of The Environmental Notice, commencing a 45-day public review period which ended on August 23, 1999.

A copy of the Environmental Impact Statement Preparation Notice (EISPN) and/or DEIS was mailed to agencies and organizations believed to have an interest in the project. The list of recipients is provided below.

A total of 28 agencies, organizations, or individuals provided written comments on the EISPN and/or DEIS. The parties who responded to the EISPN are identified by an asterisk (*), and parties who responded to the DEIS are identified by a pound symbol (#). Both comments on the EISPN and DEIS have been reproduced in Appendix A, along with response letters to the comments.

Federal Agencies:

US Fish and Wildlife Service *#
US National Marine Fisheries Service
US Army Corps of Engineers, Pacific Ocean Division *US Coast Guard
US Geological Survey – Water Resources Division

State Agencies:

Office of Environmental Quality Control
Department of Accounting and General Services #
Department of Business Economic Development and Tourism (Planning Office) *
Department of Business Economic Development and Tourism (Energy, Resources, & Technology Division) #
Department of Health (Environmental Management Branch) #
Department of Health (Clean Water Branch)
Department of Health (Clean Air Branch)
Department of Land and Natural Resources (Office of Conservation & Environmental Affairs) *
Department of Land and Natural Resources (Commission on Water Resources Management)
Department of Land and Natural Resources (Aquatic Resources Division) #

Department of Land and Natural Resources (State Historic Preservation) *
Department of Transportation – Statewide Planning Office *
Office of Hawaiian Affairs *#
UH Environmental Center
UH Water Resources Research Center

City and County of Honolulu Agencies

Board of Water Supply *#
Department of Design and Construction (formerly Building Dept.)
Department of Planning and Permitting (formerly DLU)
Dept. of Planning & Permitting (Coastal Lands Branch) *#
Dept. of Parks and Recreation
Planning Department
Department of Facility Maintenance *#
Dept of Transportation Services *#
Department of Environmental Services *#
Downtown Neighborhood Board No. 13
Kakaako/Ala Moana Neighborhood Board No. 11
Kalihi/Palama Neighborhood Board No. 15

Other Agencies, Organizations and Individuals:

Sierra Club, Hawaii Chapter
Aala Ship Service
Oceanic Global Trading
Norko Marine Agency
Sealand Shipping
Young Brothers
Sause Brothers, Inc. #
Matson Cargo
Honolulu Agency
Gasco
Native Hawaiian Legal Corporation *
Architects Hawaii
Environment Hawaii
Keehi Boat Club (Various members) *

Councilman John Yoshimura
Eugene Dashiell
Chris Welch
Nancy E. Murphy #

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11.0 APPENDICES

Appendix A – EISPN and DEIS Comment Letters
Appendix B – Acoustic Study
Appendix C – Air Quality Study
Appendix D – Aquatic Habitat and Water Quality Impact Assessment
Appendix E – Archaeological Report and SHPO Letter (dated July 23, 1999)
Appendix F – Traffic Impacts Analysis Report

EISPN Comment Letters and Responses

11

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

In reply refer to: KBF

APR - 2 1999

Mr. Glen Soma
State of Hawaii
Department of Transportation
Harbors Division
79 South Nimitz Highway
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice (EISPN) for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase, Oahu Island, Hawaii

Dear Mr. Soma:

The U.S. Fish and Wildlife Service (Service) has reviewed the above referenced notice. The EISPN was prepared by Wil Chee-Planning, Inc., for the project sponsor, the State of Hawaii, Department of Transportation, Harbors Division (DOT-HD). The proposed project involves the enhancement of commercial port facilities at Honolulu Harbor and Keehi Lagoon. Proposed projects at Honolulu Harbor involve the construction of a cruise passenger terminal at Pier 2, finger piers at Piers 12 - 16, and an excursion vessel terminal at Piers 24 - 29. Lay berth facilities are proposed for Keehi Lagoon. The proposed berthing facilities would accomodate vessels on a year-round basis, including the Petroleum Oil and Lubricating (POL) emergency response vessels. Construction-related activities (e.g. piling installation) will occur in the marine environment for each of the proposed projects. The Service offers the following comments for your consideration.

The Service recommends that the Draft Environmental Impact Statement (DEIS) discuss the ecological impacts of the proposed Honolulu Harbor and Keehi Lagoon modifications for each of the alternatives under consideration. Particular attention should be given to addressing potential impacts to endangered and threatened species, coral-reef ecosystems, wetlands, migratory birds, and rare native species.

On March 24, 1999, the Service met with representatives of the DOT-HD and their consultant, AECOS, to discuss potential project-related impacts associated with the proposed berthing facilities at Keehi Lagoon. The Service explained that the mudflats at Keehi Lagoon, which are exposed during low-tide conditions, provide loafing and foraging habitat for migratory shorebirds such as the wandering tattler or ʻUlili (*Heteroscelus incanus*), sanderling or Hunakai (*Calidris alba*), and the ruddy turnstone or ʻAkekeke (*Arenaria interpres*). Additionally, the mudflats provide a staging area where each shorebird species congregates with their own kind prior to flying off as a flock during migrations to northern breeding sites. In order to secure habitat protection for the above species, we recommend that the project design avoid the mudflats of Keehi Lagoon during the construction and long-term operation of the berthing facilities.

Another concern is the suspension of fine sediments from activities associated with piling installation. Suspended sediments can abrade and smother coral and algae in the nearshore environment. The Service recommends that Best Management Practices be incorporated into the project to minimize the project-related degradation of water quality and impacts to fish and wildlife resources and habitats, including coral-reef ecosystems. These measures should be fully described in the DEIS.

Finally, the Service is concerned that the introduction of marine alien species, by increased vessel traffic at Keehi Lagoon and Honolulu Harbor, may impact nearshore marine ecosystems by displacing Hawaiian marine species. Introduced species represent a major threat to the perpetuation of native marine plants and animals. The DEIS should include a detailed discussion of how the control of marine alien species introductions will be accomplished within the anticipated increase in vessel traffic within the lagoon and harbor. The Service also recommends that the Hawaii Division of Aquatic Resources (DAR) be contacted regarding the prevention of marine alien species introductions to the State of Hawaii.

The Service appreciates the opportunity to comment on the EISPN. If you have questions regarding these comments, please contact Fish and Wildlife Biologist Kevin Foster (808/541-3441).

Sincerely,

Barbara A. Maxfield, Acting
for Robert P. Smith
Pacific Islands Manager

cc: R.Stook, Wil Chee
NMFS-PAO, Honolulu

April 21, 1999

Robert P. Smith, Pacific Islands Manager
U.S. Fish and Wildlife Service - Pacific Islands Ecoregion
300 Ala Moana Blvd. Room 3-122
Box 50088
Honolulu, Hawaii 96850

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Smith:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the United States Fish and Wildlife Service letter to the HDOT-HAR dated April 2, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your first comment recommends that the DEIS discuss the ecological impacts of the proposed projects on endangered and threatened species, coral-reef ecosystems, wetlands, migratory birds and rare native species. The DEIS will fully explore potential ecological impacts of the proposed projects on the natural environment in the area. Additionally, biological and water quality studies are being prepared in conjunction with the DEIS to comprehensively address this issue.

Your second comment explained the importance of the Keehi Lagoon tidal mudflats to several species of migratory shorebirds. Further, it recommended that the project design avoid these mudflats during construction and long-term operation of the berthing facilities. The current conceptual plans for the proposed layberths at Keehi Lagoon have their location outside of any tidal mudflat areas. The forthcoming DEIS will discuss all potential project-related impacts associated with the proposed berthing facilities and will indicate that impacts to these mudflats must be given careful consideration during project design and construction phases.

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants

NMSA Center
1000 Bycroft Street
Suite # 920
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1051

Your final two comments expressed your concerns regarding the suspension of sediments associated with piling activities and the introduction of marine alien species due to increased vessel traffic. The DEIS will incorporate Best Management Practices and mitigative measures to address the minimization of potential project degradation of water quality and marine ecosystems. Coordination with the Hawaii Division of Aquatic Resources has been initiated to address the prevention of marine alien species introduction into the State of Hawaii.

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

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

REPLY TO ATTENTION OF

March 15, 1999

Civil Works Branch

Mr. Richard Stook
Environmental Planner
Wil Chee Planning, Incorporated
1400 Rycroft Street, Suite 928
Honolulu, Hawaii 96814

Dear Mr. Stook:

Thank you for the opportunity to review and comment on the Environmental Impact Statement Preparation Notice (EISPN) for the Oahu Commercial Harbors 2020 Master Plan. The following comments are provided in accordance with U.S Army Corps of Engineers, Honolulu District authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. Based on the information provided, a DA permit will be required for the project. For further information, please contact Mr. William Lennan of our Regulatory Section staff at 438-9258 (extension 13) and refer to file number 990000220.

b. The flood hazard information provided on page 31 of the EISPN is correct.

Sincerely,

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

April 20, 1999

Paul Mizue, P.E., Chief, Civil Works Branch
U.S. Army Engineer District,
Honolulu Building 230
Fort Shafter, Hawaii 96858-5440

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Mizue:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the U.S. Army Corps of Engineers (USACE) letter to the HDOT-HAR dated March 15, 1999. . The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your first comment indicated that Department of the Army Permits would be required for the proposed project. This is correct. The proposed project will require a USACE permit under Section 10, Rivers and Harbors Act, and may require a Section 404 permit if filling activities are required. All necessary USACE permits will be obtained prior to any construction activities.

Your second comment confirms that the flood hazard information on page 31 of the EISPN is correct. Thank you for confirming the accuracy of this information.

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
HMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
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DIRECTOR, OFFICE OF PLANNING

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING
235 South Beretania Street, 6th Flr., Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Tel.: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-8047

April 23, 1999

Mr. Richard Stook
Environmental Planner
Wil Chee - Planning, Inc.
HMSA Center
1400 Rycroft Street, Suite 928
Honolulu, Hawaii 96814

Dear Mr. Stook:

Subject: Environmental Impact Statement Preparation Notice for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase

We have reviewed the proposal to construct a cruise passenger terminal at Pier 2, finger piers at Piers 12-16, excursion vessel terminal at Piers 24-29, and lay berth facilities in Keehi Lagoon. We have the following comments related to the Special Management Area (SMA) and general energy concerns.

Please note that the site of the proposed cruise passenger terminal at Pier 2 is within a designated community development district. As such, SMA permits for development and shoreline setback variances for structures are administered directly by us pursuant to Section 206E-8.5, Hawaii Revised Statutes (HRS). These corrections should be made to pages 46 and 49 of your report.

We understand that this and subsequent phases of the project (along Piers 2-29 and along Lagoon Drive in Keehi Lagoon) which implement the Harbors 2020 Master Plan will not impact petroleum storage facilities. We also acknowledge and support the planned improvements of fuel lines for vessel bunkering and the additional berthing facility with associated support buildings for petroleum, oil and lubricants, emergency spill and cleanup response vessels.

The environmental impact statement should address the requirements in State laws for evaluating energy impacts. For example, the requirements of Chapter 33, HRS (State Environmental Policy) and Chapter 226 (Hawaii State Planning Act) should be addressed. In particular, Section 226-18(c)(4) establishes as a State objective the promotion of cost-effective energy conservation through the adoption of energy-efficient practices and technologies.

In addition, the project's relationship with the State Energy Functional Plan should be discussed in the environmental impact statement. The discussion should clarify how energy-efficient practices and technologies would be employed. The Hawaiian Electric Company, Inc., should be consulted for information on rebates and incentives that are available for energy conservation measures under its New Construction Demand-side Management Program. In addition, there are also the requirements of the Honolulu Energy Code.

Since the master plan also calls for the construction of passenger terminals, we suggest that the project reflect a "Hawaiian sense of place." This can be accomplished by an innovative architectural design incorporating natural ventilation. We are enclosing a copy of <u>Hawaiian Design-Strategies for Energy Efficient Architecture</u> which presents design strategies to achieve energy efficiency.

Prior to demolition, a recycling plan for harbor structures should be considered so that the benefits of reuse and recycle can be realized. There may also be recycling opportunities during and after construction.

Provisions for recycling such as collection systems and space fort recycling bins should be considered and addressed in the environmental impact statement.

If there are any questions, please contact Christina Meller at 587-2845 regarding the SMA and John Tantlinger at 587-3805 about the energy comments.

Sincerely,

David W. Blane
Director
Office of Planning

Enclosure

May 5, 1999

David W. Blane, Director
Office of Planning
P.O. Box 2359
Honolulu, Hawaii 96804

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Blane:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Office of Planning letter dated April 23, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued sometime this summer.

Your first comment pointed out that the proposed development at Pier 2 will be subject to SMA permits and shoreline setback variances. We understand that these permits would not be administered through the City and County of Honolulu. Instead, they would be administered directly through your office as the site is located within the Kakaako Community Development District. These corrections will be incorporated into the DEIS. Thank you for clarifying this issue.

Your second comment expressed concern over the energy impacts of the proposed projects. The DEIS will evaluate and discuss the relationship of the proposed projects to relevant energy-related laws and policies. The laws and policies mentioned in your letter (incl. Chapters 33 and 226 HRS, State Energy Functional Plan, Honolulu energy Code, and HECO's New Construction Demand-side Management Program) will be included in this discussion.

Your third comment suggested that the proposed passenger terminal buildings reflect a "Hawaiian sense of place". We would like to point out that at the present time the proposed projects are in their conceptual stages. Detailed architectural design of the proposed structures will be determined during the design phase of the project.

WIL CHEE - PLANNING, INC.
Land Use Planners and
Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite #928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

During the design phase full consideration will be given to both energy efficiency and the conformance of building design with a "Hawaiian sense of place". We very much appreciate your forwarding a copy of Hawaiian Design-Strategies for Energy Efficient Architecture for our use as a reference.

Your final comment suggested that the DEIS consider the benefits of recycling demolished building materials. HDOT-HAR recognizes the importance of waste recycling efforts and fully supports the minimization of demolition-derived wastes through such efforts. The DEIS shall examine and discuss potential recycling opportunities for waste materials associated with the demolition of harbor structures.

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

APR -5 1999

Ref: PS:EH

Mr. Richard Stook
Environmental Planner
Wil Chee-Planning Inc.
HMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814

Dear Mr. Stook:

Subject: Environmental Impact Statement Preparation Notice for the Oahu Commercial Harbors 2020 Master Plan-Immediate Phase

We have reviewed the subject document and offer the following comment for your consideration.

Engineering Branch:

Please coordinate water requirements for proposed Immediate Phase (IP) projects with the Land Division, Engineering Branch.

We are currently working on the Water Master Plan for State Projects, Oahu (WMPSPO) and the State Water Projects Plan (SWPP), and need to include the IP projects requiring water in both the WMPSPO and SWPP.

Thank you for the opportunity to comment on this project.

Very truly yours,

Dean Uchida,
Administrator

c.c. Engineering Branch

April 20, 1999

Dean Uchida, Administrator
State Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Uchida:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Land and Natural Resources letter to the HDOT-HAR dated April 5, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your only comment requested that water requirements for the proposed Immediate Phase projects be coordinated with your agency's Land Division – Engineering Branch. You also informed us that your agency is currently working on the Water Master Plan for State Projects (WMPSPO) and the State Water Projects Plan (SWPP) which would need to include the IP projects water requirements.

The proposed IP projects are presently in their conceptual stages. Projected water requirements will be developed during the design phase of the project. At that time, the water requirements for the proposed projects will be coordinated with the Land Division, Engineering Branch for your inclusion in the WMSPO and SWPP.

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
HMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

TIMOTHY E. JOHNS, CHAIRPERSON
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LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

March 29, 1999

Richard Stook, Planner
Wil Chee Planning Inc.
1400 Rycroft Street, Suite 928
Honolulu, Hawaii 96814

LOG NO: 23142
DOC NO: 9903EJ12

Dear Mr. Stook:

SUBJECT: Chapter 6E-8 Historic Preservation Review - EISPN For the Oahu Commercial Harbors 2020 Master Plan Immediate Phase - Environmental Impact Statement
Honolulu, Kona, O'ahu
TMK: various

Thank you for the opportunity to comment on the EISPN for the proposed improvements to Honolulu Harbor as part of the Oahu Commercial Harbors 2020 Master Plan, Immediate Phase. Four projects are being fully examined in the upcoming EIS, while other components of the Master Plan are exempt from the EIS review or have already undergone separate environmental reviews. The four projects included in the Immediate Phase and under current review are:

1. Construction of a cruise passenger terminal at Pier 2
2. Construction of finger piers at Piers 12 - 16
3. Construction of an excursion vessel terminal at Piers 24 - 29
4. Construction of lay berth facilities in Keehi Lagoon, along Lagoon Drive.

We previously commented to Wil Chee Planning, during the pre-EISPN phase (Log. 22157, September 1, 1999), that no known archaeological sites are located within the four project areas. We also stated that we believed that the four projects would have "no effect" on archaeological sites because these areas have been in-filled to enlarge the shoreline during the original development of Honolulu harbor.

We also requested that the EIS identify if there are any structures over 50 years old within the proposed plans, and evaluate if they meet the criteria to be eligible for listing on the National Register of Historic Places. If eligible structures are present, the EIS must identify what "effect," if any, the project may have on these structures.

The EISPN, in Section, 3.8 states that several historic buildings (over 50 years old) exist within the proposed project area, and that it is not anticipated that any of the structures would be eligible for listing on the National Register of Historic Places. It appears that this evaluation has not yet been conducted. We request this evaluation be coordinated with the State Historic Preservation Division for review and acceptance.

If you have any questions regarding archaeological determinations please call Elaine Jourdane at 692-8027, or for any questions regarding the pier structures call Carol Ogata at 692-8032.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

EJ:jk

c: Dean Uchida, Administrator, DLNR/Land Division

April 21, 1999

Don Hibbard, Administrator
State Historic Preservation Office
Department of Land and Natural Resources
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Hibbard:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the State Historic Preservation Division letter to the HDOT-HAR dated March 29, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your comments were regarding the existence of historic structures within the project area. You expressed concern over the possible presence of structures which may be eligible for listing on the National Register of Historic Places and that the DEIS identify what "effect" if any, the project may have on these structures. Finally, you requested that evaluation of these structures be coordinated with your office for review and acceptance.

As indicated in the EISPN there are several structures within the project area which are over 50 years old. Effects of the proposed projects on these structures will be fully discussed in the DEIS. Additionally, an archaeological report is being prepared in conjunction with the DEIS. This report will evaluate all structures within the project area for historic significance. Upon its completion, a copy of the archaeological report will be forwarded to your office for evaluation, review, and concurrence.

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

March 10, 1999

Mr. Richard Stook
Environmental Planner
Will Chee – Planning, Inc.
1400 Rycroft Street, Suite # 928
Honolulu, Hawai'i 96814

EIS#217

Re: Environmental Impact Statement Preparation Notice for the Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.

Dear Mr. Stook:

Thank you for the opportunity to review the preparation notice for the Oahu Commercial Harbors 2020 Master Plan – Immediate Phase (EISPN). As described in the notice, the State Department of Transportation, Harbors Division (DOT-HAR) anticipates the construction of three improvements to Honolulu Harbor and one improvement project at Ke'ehi Lagoon. These include:

1. Construction of a cruise passenger terminal at Pier 2
2. Construction of finger piers at Piers 1-16
3. Construction of an excursion vessel terminal at Piers 24-29
4. Construction of lay berth facilities in Ke'ehi Lagoon.

In a letter dated August 20, 1999 to DOT-HAR, the Office of Hawaiian Affairs (OHA) offered various areas of concern for the anticipated EIS. Many of the issues listed in that letter have been included in the preparation notice. However, we remain concerned that gathering rights, such as konohiki fishing, are not included in the EISPN. It can be safely assumed that Native Hawaiian gathering and fishing occurred along the Honolulu waterfront. In order to address these gathering rights, we strongly suggest that you prepare a cultural impact statement and included it in the EIS.

We further suggest that the Hawaiian cultural expert(s) chosen to work on the statement be person(s) recognized within the Hawaiian community for his/her cultural expertise. We caution that the concerns of the community will not be addressed if the cultural impact statement contains information and analysis provided solely by a person whose knowledge of Hawaiian

culture is limited to a study of archaeology or anthropology. If we can be of any assistance with this study, please contact us.

In addition, we would like the EIS to include the cumulative effects of the four above-detailed projects, the "exempt" projects described in the EISPN and the harbor projects for which separate environmental documents have been completed.

Again, thank you for the opportunity to review the EISPN. If we can be of any other help, please contact EIS Planner, Lynn Lee at 594-1936.

Sincerely,

Colin Kippen

Colin Kippen
Deputy Administrator

C. Sebastian Aloot

C. Sebastian Aloot
Land and Natural Resources Division Officer

cc: Board of Trustees

April 20, 1999

C. Sebastian Aloot
Land and Natural Resources Division Officer
Office of Hawaiian Affairs
711 Kapiolani Blvd., Suite 500
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Aloot:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Office of Hawaiian Affairs letter to the HDOT-HAR dated March 10, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your first comment expressed concerns over Native Hawaiian Gathering Rights and suggested the preparation of a separate cultural impact statement to be included in the DEIS. Although a separate cultural impact statement is not being prepared there are several other technical studies being conducted in conjunction with the EIS.

Among these technical studies will be an archaeological report which will address the presence of historic, archaeological, and cultural sites within the project area. In addition to the archaeological report, the forthcoming DEIS will assess potential cultural impacts of the proposed project on the Native Hawaiian people.

Your second comment requested that the cumulative effects of all the immediate phase projects be included in the DEIS. The DEIS will fully explore both potential adverse and beneficial impacts (incl. direct, indirect, and cumulative impacts) of the proposed immediate phase projects.

WR CHEE - PLANNING, INC
Land Use Planners and
Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

State of Hawaii
Department of Transportation
MEMORANDUM

STP 99.008
STP 8.9065

TO: HAR-EP

DATE: APRIL 30, 1999

FROM: STP (Julia M. Tsumoto) Dean S. Nakagawa

SUBJECT: EISPN FOR THE OAHU COMMERCIAL HARBORS 2020 MASTER PLAN IMMEDIATE PHASE

Thank you for the additional time to review the subject EISPN.

We note that the Immediate Phase (IP) demolition and construction activities for the general cargo yard at Piers 19-20 are exempt from the EIS review process. Are we correct to assume that this includes the interim improvements for the ferry and passenger ship terminals? In light of the federal funding for the interim ferry improvements at Pier 19 and the current efforts related to ferry operations, should there be some mention of the anticipated ferry operations and/or improvements?

Also, it may be advantageous to revisit your 2020 master plan and selectively edit portions of your plan to generally describe your plans in regard to ferry operations.

Thank you for the opportunity to comment on the EISPN. Please call Dean Nakagawa at 587-1845 should you have any questions on our comments.

DN:km

c: STP(DN)

May 10, 1999

Julia Tsumoto, State Transportation Planner
State Department of Transportation
Statewide Planning Office
600 Kapiolani Blvd., Room 306
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase. Response to the Environmental Impact Statement (EISPN)

Dear Ms. Tsumoto:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the State Transportation Planning Office memo to the HDOT-HAR dated April 30, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued this summer.

You are correct in your assumption that the interim improvements for the ferry and passenger ship terminals at Piers 19-20 are exempt from the environmental review process. The State Office of Environmental Quality Control has confirmed with HDOT-HAR that the subject project qualifies as being exempt in accordance with the Chapter 343 Hawaii revised Statutes. The ferry terminal will be further discussed in the upcoming DEIS.

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
HMSA Center
1400 Rycroft Street
Suite #928
Honolulu, Hawaii 96814
Phone 808-955-5088
Fax 808-942-7351

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

COPY

March 31, 1999

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Harbors Division

Dear Mr. Hayashida:

Subject: Your Transmittal of the Environmental Impact Statement Preparation Notice for the Oahu <u>Commercial Harbors 2020 Master Plan - Immediate Phase</u>

Thank you for the opportunity to review and comment on the Environmental Impact Statement Preparation Notice (EISPN) for the Oahu Commercial Harbors 2020 Master Plan.

We have the following comments on the EISPN:

1. There are existing water services to the following harbor locations:

   a. Cruise Passenger Terminal at Pier 2:

Prem ID #	Meter Size
1132715	6-inch compound meter
1132716	6-inch compound meter
1132717	Two 8-inch detector check meters
1132718	Two 8-inch detector check meters

   b. Finger Piers at Piers 12 through 16:

Prem ID #	Meter Size
1132707	3-inch compound meter
1132708	2-inch meter
1132709	3-inch compound meter
1132711	Ordered off
1132712	1½-inch meter

   c. Excursion Vessel Terminal at Piers 24 through 29:

Prem ID #	Meter Size
1115981	3/4-inch meter
1115982	3/4-inch meter
1115977	4-inch compound meter

   d. Lay Berths along Lagoon Drive at Keehi Lagoon:

Prem ID #	Meter Size
1091359	8-inch turbine meter

   Prem ID #1132711 was ordered off on November 6, 1998.

2. The existing water system is presently adequate to accommodate the proposed harbor improvements.

3. The commercial harbors 2020 master plan should indicate the project's projected potable water demand to ensure sufficient source capacity is planned. The applicant will be required to obtain a water allocation from the Department of Land and Natural Resources.

4. The availability of water will be confirmed when the building permit application is submitted for our review and approval. When water is made available, the applicant will be required to pay our Water System Facilities Charges for transmission and daily storage.

5. The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

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

7. Board of Water Supply approved Reduced Pressure Principle Backflow Prevention Assemblies will be required to be installed after all domestic water meters serving the proposed harbor improvements.

8. We reserve further comment until we review the Draft Environmental Impact Statements.

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

Very truly yours,

CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Richard Stook, Wil Chee Planning, Inc.

April 20, 1999

Clifford Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase. Response to the Environmental Impact Statement (EISPN)

Dear Mr. Jamile:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Board of Water Supply (BWS) letter to the HDOT-HAR dated March 31, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your first two comments identified the existing water services to the proposed project area and indicated that the existing water system is adequate to accommodate the proposed harbor improvements. Thank you for providing us with this information.

The remainder of your comments requested that potable water demands and water availability be confirmed and approved by appropriate agencies. The proposed projects are presently in their conceptual stages. Projected water demand will be determined during the design and construction phases of the project.

During these project phases HDOT-HAR will obtain all necessary permits and approvals which may be required. Required permits and approvals may include but not be limited to water allocation from the Department of Land and Natural Resources, submittal of building permits and construction drawings for BWS approval, payment of Water System Facilities Charges, compliance with on-site fire protection requirements, and installation of BWS approved backflow prevention assemblies at appropriate water meters.

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
HMSA Center
1400 Kapiolani Street
Suite # 528
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

Letter to Clifford Jamile
April 20, 1999 – Page 2

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

DEPARTMENT OF PLANNING AND PERMITTING
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

March 25, 1999

1999/CLOG-1372(ASK)

Mr. Glenn Soma
Harbors Division
Department of Transportation
State of Hawaii
79 South Nimitz Highway
Honolulu, Hawaii 96813

Dear Mr. Soma:

Environmental Impact Statement Preparation Notice (EISPN)
Oahu Commercial Harbors 2020 Master Plan

We have reviewed the above-referenced document and offer the following comments:

The City Administration supports efforts to allow our county to achieve its full potential. We recognize that modern and adequate port facilities are essential to advancing toward this goal. It is the City's vision to free up the Nimitz waterfront for economic redevelopment, and to make Honolulu a true waterfront city. To accomplish this, the Mayor has proposed re-routing traffic off Nimitz Highway onto a new Sand Island Parkway and a tunnel under Honolulu Harbor.

The draft EIS should indicate how the Oahu Commercial Harbors 2020 Master Plan Immediate Phase is consistent with this vision.

Development Plans

Proposed facilities are within either the Ewa or Primary Urban Center (PUC) Development Plan Area. The City is currently revising its Development Plans (DPs). This is not reflected in the description of the DPs on page 48 of the EISPN. These revisions provide substantial changes from the format of previous DPs. The City has already officially adopted the revised DPs for Ewa (enclosed), and a revised plan for the PUC is under preparation and should be available for public review soon.

The draft Environmental Impact Statement (EIS) should examine how the Oahu Commercial Harbors 2020 Master Plan Immediate Phase will be supportive of the DPs for Ewa and the

Mr. Glenn Soma
Page 2
March 25, 1999

PUC, and if mitigation measures need to be undertaken because the Master Plan conflicts with the DPs.

It is likely that the proposed developments at Barbers Point Harbor are consistent with the Ewa DP's vision, policies and guidelines, but specific discussions should be provided in the draft EIS to confirm this. The EISPN did not provide sufficient details to make such an assessment.

We expect that the City will soon adopt proposed revisions to the PUC DP. The draft EIS should look at the degree to which the Master Plan pertaining to the Honolulu Harbor area is compatible with both the policies in the existing DP and the visions and policies being considered for the revised DP for the area. We have enclosed a copy of the Policy Evaluation Report for your reference.

Zoning

The EISPN does not correctly identify the zoning districts of the project area. We recommend that the draft EIS contain zoning maps showing the project locations.

The draft EIS should indicate if any work is proposed within the shoreline area as defined in Section 205-A-41 HRS.

Should you have any questions regarding the above, please contact Ardis Shaw-Kim of our staff at 527-5349.

Very truly yours,

JAN NAOE SULLIVAN
Director of Planning and Permitting

JNS:am
Encls.

√cc: Mr. Richard Stook, Wil Chee - Planning, Inc.

posse doc no. 3232
A:2020.ask

April 21, 1999

Jan Sullivan, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7^{th} Floor
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Sullivan:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Planning and Permitting letter to the HDOT-HAR dated March 25, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your first set of comments concerned the compatibility of the proposed projects with the Development Plans for both the Primary Urban Center (PUC) and the Ewa areas. Additionally, you pointed out that the City is currently in the process of revising these development plans.

The forthcoming DEIS will contain a section evaluating the relationship of the proposed projects to existing policies and plans, including the revised Ewa and PUC Development Plans. This section will examine the degree to which the proposed Master Plan Immediate Phase projects are compatible with the existing and revised City and County Development Plans.

Your final two comments concerned zoning issues. Thank you for pointing out that the zoning designations in the EISPN were incorrect. These designations have been corrected. Additionally, the DEIS will include zoning maps showing the project locations and indicate if any work is proposed within the shoreline area as defined in Section 205-A-41 HRS.

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants

NMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

Letter to Jan Sullivan
April 21 1999 – Page 2

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA • 711 KAPIOLANI BOULEVARD, SUITE 1200 • HONOLULU, HAWAII 96813
PHONE: (808) 523-4529 • FAX: (808) 523-4730

JEREMY HARRIS
MAYOR

CHERYL D. SOON
DIRECTOR

JOSEPH M. MAGALDI, JR.
DEPUTY DIRECTOR

May 19, 1999

TPD2/99-00977R
TPD3/99-01610R

Mr. Glenn Soma
Harbors Division
Department of Transportation
79 S. Nimitz Highway
Honolulu, Hawaii 96813

Dear Mr. Soma:

Subject: Oahu Commercial Harbors 2020 Master Plan Immediate Phase

In response to the February 23, 1999 letter from Wil Chee - Planning, Inc., the environmental impact statement (EIS) preparation notice for the subject project was reviewed. The following comments are the result of this review:

1. This department is presently preparing a draft EIS for the Primary Corridor Transportation Project. This project proposes transportation improvements in the primary transportation corridor of Oahu to implement the Islandwide Mobility Concept Plan. One of the improvements being proposed is a Sand Island Bypass Road which includes a tunnel from Sand Island with a portal in the vicinity of the proposed cruise passenger terminal at Pier 2. Another proposed improvement would transform a portion of Nimitz Highway into a parkway. While coordination of this project with your department has already been initiated, it is essential that it be continued. We look forward to working together on both projects.

2. The proposed project should provide adequate off-street parking and loading areas, thereby minimizing the project's impacts on the surrounding roadway network.

3. The EIS should discuss how the development will address compliance issues related to the Americans with Disabilities Act of 1990 (ADA). As a public facility and a facility with public accommodations, the proposed harbor facilities must comply with Titles II and III of the ADA.

Mr. Glenn Soma
Page 2
May 19, 1999

4. Section 4.3.2 on Page 48 of the EIS Preparation Notice discusses the Development Plans (DPs) for the City and County of Honolulu. These DPs have been updated or are in the process of being updated. The City's Department of Planning and Permitting should be contacted to obtain current information regarding these DPs.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at 527-6976.

Sincerely,

Cheryl D. Soon

CHERYL D. SOON
Director

cc: Wil Chee - Planning, Inc.

May 26, 1999

Cheryl Soon, Director
Department of Transportation Services
711 Kapiolani Blvd., Suite 1200
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Ms. Soon:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Transportation Services letter dated May 19, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued sometime this summer.

Your first comment informed us of your preparation of the Primary Corridor Transportation Project (PCTP) EIS. We acknowledge the preparation of the PCTP EIS by your office, and HDOT-HAR is in agreement that interagency coordination should continue during the planning stages of both the PCTP and the Oahu Commercial Harbors 2020 Master Plan.

Your second comment expressed concern over adequate parking facilities. A traffic impact analysis report is being prepared for the EIS and will address traffic related impacts including off-street parking and loading areas.

Your third comment suggested that the proposed buildings should be in compliance with the Americans with Disabilities Act of 1990 (ADA). We would like to point out that at the present time the proposed projects are in their conceptual stages. Detailed architectural design of the proposed structures will be determined during the design phase of the project. During that stage all applicable requirements of the ADA shall be fully addressed and complied with.

Lastly, the Department of Planning and permitting has been contacted, and any updates to the City and Counties Development Plans will be discussed in the DEIS.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite # 323
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-342-[illegible]

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 527-4663 • FAX: (808) 527-4675

JEREMY HARRIS
Mayor

KENNETH E. SPRAGUE, P.E., Ph.D.
Director

CHERYL K. OKUMA-SEPE, ESQ.
Deputy Director

MAR 0 9 1999

ENV 99-34

Mr. Tom Fujikawa, Chief
Harbors Division
Department of Transportation
State of Hawaii
9 South Nimitz Highway
Honolulu, Hawaii 96813

Attention: Mr. Glenn Soma

Dear Mr. Fujikawa:

Subject: Environmental Impact Statement Preparation Notice
Oahu Commerical Harbors 2020 Master Plan Improvements
TMK: Various

We have reviewed the subject document and have no comments to offer at this time.

Should you have any questions, please contact Alex Ho, Environmental Engineer at 523-4150.

Sincerely,

CHERYL K. OKUMA-SEPE
KENNETH E. SPRAGUE
Director

cc: Wil Chee - Planning, Inc. (Richard Stook)

April 20, 1999

Dr. Kenneth E. Sprague, Director
Department of Environmental Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Sprague:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Environmental Services letter to the HDOT-HAR dated March 9, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

We acknowledge that you have reviewed the EISPN and have no comments to offer at this time.

We appreciate your agency's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC
Land Use Planners and
Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

February 23, 1999

Dr. Jonathan Shimada, Director
Department of Facility Maintenance
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice for the Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.

Dear Mr. Shimada:

Enclosed, please find a copy of the above-referenced EISPN for your review. The EISPN addresses proposed improvements by the Hawaii State Department of Transportation – Harbors Division (HDOT-HAR) to facilities at Honolulu Harbor and Keehi Lagoon as part of their Oahu Commercial Harbors 2020 Master Plan.

We would appreciate any comments and/or questions you may have with regard to the proposed actions. Please submit your comments to HDOT-HAR with a copy to our office.

Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

February 26, 1999
We do not have any comments. If you have any questions, please call Laverne Higa at 527-6246. No further submission to our office is required.

Ross S. Sasamura
Acting Director and Chief Engineer
Department of Facility Maintenance

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
HMSA Center
1400 Rycroft Street
Suite # 528
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

April 20, 1999

Ross S. Sasamura
Acting Director and Chief Engineer
Department of Facility Maintenance
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase. Response to the Environmental Impact Statement (EISPN)

Dear Mr. Sasamura:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Facility Maintenance letter to the HDOT-HAR dated February 26, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

We acknowledge that you have no comments to offer at this time and that no further submission to your office is required.

Once again, we appreciate your agency's response to the EISPN. Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
HMSA Center
1400 Rycroft Street
Suite # 528
Honolulu, Hawaii 96814
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NATIVE HAWAIIAN LEGAL CORPORATION
1164 BISHOP STREET • SUITE 1205 • HONOLULU, HAWAII 96813 • TELEPHONE (808) 521-2302 • FAX (808) 537-4268

SEND COPIES TO APPROPRIATE PARTIES

February 25, 1999

'99 FEB 26 P1:51

Governor, State of Hawaii
c/o Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Department of Transportation, Harbors Division
79 South Nimitz Highway
Honolulu, Hawaii 96813

(ATTN: Glenn Soma)

Wil Chee Planning, Inc.
1400 Rycroft Street, Suite 928
Honolulu, Hawaii 96814

(ATTN: Richard Stook)

Re: Environmental Impact Statement Preparation Notice for Oahu Commercial Harbors 2020 Master Plan

Gentlemen:

I am writing on behalf of Anna Marie Kahunahana-Castro-Howell and Letty T.K. Omura in response to the notice of the EIS Preparation Notice for the Oahu Commercial Harbors 2020 Master Plan published in the Feb. 23, 1999, issue of The Environmental Notice.

To the extent the proposed EIS will address matters relating to the Barbers Point Deep Draft Harbor, my clients request that that document fully address the concerns identified in my January 6, 1999, and January 7, 1999, letters (including attachments thereto) sent in response to the EISPN for DOT's proposed Barbers Point Harbor Modifications, copies of which are attached hereto. In particular, I believe the new proposed EIS should fully address issues relating to historic preservation (including but not limited to the reinitiation of consultation under § 106 of the National Historic Preservation Act) and the protection of animal and plant species listed under the federal and Hawaii Endangered Species Acts.

I also request that a copy of the draft EIS be sent to this office for review when that document is made available for public review and comment.

Thank you for this opportunity to comment on this EISPN.

Very truly yours,

Carl C. Christensen
Staff Attorney

Encls.

cc: Clients

April 21, 1999

Carl C. Christensen, Staff Attorney
Native Hawaiian Legal Corporation
1164 Bishop Street
Suite 1205
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase. Response to the Environmental Impact Statement (EISPN)

Dear Mr. Christensen:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Native Hawaiian Legal Corporation letter to the HDOT-HAR dated February 25, 1999. The Draft Environmental Impact Statement (DEIS) is expected to be issued in June.

Your comment requested that the DEIS address matters relating to the Barbers Point Deep Draft Harbor. Specifically, that the DEIS address the concerns identified in your January 6, 1999 and January 7, 1999 letters sent in response to the EISPN for DOT's proposed Barbers Point Harbor Modifications. Your concerns included potential impacts on and/or from disposal of dredged materials, construction methods (blasting), noise, ciguatera, groundwater, water quality, marine life, threatened and endangered species, and archaeological and historical resources (incl. reinitiation of consultation under section 106 of the National Historic Preservation Act).

As indicated in the Oahu Commercial Harbors 2020 Master Plan – Immediate Phase EISPN the Barbers Point Deep Draft Harbor modification projects will be incorporated into the forthcoming DEIS by reference. The Draft Supplemental Environmental Impact Statement (DSEIS) for the Barbers Point Harbor Modifications is currently in the process of being prepared by Parsons Brinkerhoff Quade and Douglas, Inc. (PBQD).

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

Clyde Shimizu of PBQD recently informed me that they are presently awaiting the completion of three additional technical studies (Feasibility Study, Waterways Experimental Study, and Alternative Disposal Study) being prepared for their forthcoming DSEIS. These studies will provide additional information upon which to base determinations regarding potential impacts associated with the proposed Barbers Point Harbor modifications. We will be coordinating our efforts with those of PBQD in order to adequately address the concerns identified in your January 6, 1999 and January 7, 1999 letters.

We appreciate your organization's interest in the environmental review process and response to the EISPN. Your agency will receive a copy of the DEIS when it becomes available.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

March 9, 1999

SEND COPIES TO
APPROPRIATE PARTIES

'99 MAR 23 P2:48

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

Dear Sirs:

Subject: Berthing Facilities Along Keehi Lagoon Drive

I recently read where the Transportation department is seeking public comments for the harbor plan. More specifically, the intent of using Keehi Lagoon shore side for lay berthing facilities for boats, barges and impounded vessels. I have serious concerns in this regard.

Keehi Lagoon is home to some 800 vessels which includes the Keehi Small Boat Harbor (a state facility), Keehi Marine Center, with a dry dock repair facility, and La Mariana Sailing Club (both private marinas), the Marine Education Training Center, launch ramp facilities, and the canoe facility. It is also home to approximately 200 people, possibly more, who live on their boats.

Keehi Lagoon is also a major recreational area encompassing 4 commercial jet ski operations, a seaplane operation, and a dive operation. It also lies in the airport traffic area of the Honolulu International Airport.

Throughout the years, various barges, work boats and pure junk had been left in the harbor. Some of the submerged barges and junk had been on the bottom for more than 15 years. This had always been an eyesore for everyone especially the tourists as they got their first look at Hawaii from the airplane windows as they landed.

Keehi Lagoon was among five shores cited as being of most concern in a study by the National Oceanic and Atmospheric Administration. The study monitored 14 elements and compounds. The trace elements under study were arsenic, cadmium, copper, mercury, nickel, lead, selenium and zinc, all of which can be harmful to humans and sea life in high concentrations. The organic compounds under study were DDT, chlordane, dieldrin (all pesticides), butyltin (a paint additive), PCB (an electrical industry chemical) and PAH (a widespread byproduct of industrial and oil pollution). In high concentrations, many of these compounds can cause cancer and genetic mutations or can interfere with reproduction.

It was a democratic state government process that created the law and rules governing the clean-up operations at Keehi Lagoon. These rules were initiated by the state legislature, went through public hearings, were discussed at numerous harbor advisory committee and other public informational meetings, and came down to the Boating Division for implementation. As a result, a slow and methodical process was implemented and put into operation.

Vast amounts of time and energies have been exhausted in the process, which has taken years to accomplish. In addition to the more than 600 derelict vessels/contrivances that were disposed of, the North Lagoon had abandoned ships, abandoned 110' barges, sunken 110' barges, a multitude of machine parts, barrels, cable and trash parts, that lined the harbor's floor. The U. S. Navy became involved and has been for the last three years.

In this major undertaking, tremendous amounts of research had to be undertaken. Dealing with the removal of asbestos insulation on a 96' vessel prior to relocation and disposal. The search and recovery of submerged, hazardous materials effort was joined by the Division of Boating and Recreation state employees, the Federal Bureau of Investigation, the U. S. Coast Guard, the Department of Health, and the Environmental Protection Agency. Ongoing investigations revealed cans of sulfuric and phosphoric acid (acids are considered hazardous waste under the federal Resource Conservation and Recovery Act (RCRA) which regulates hazardous waste. The Office of Hazard Evaluation and Emergency Response determined that an imminent and substantial hazard to human health and the environment existed.

Hazardous substances observed were Xylene, Dolphinite bedding compound (containing pentachlorophenol, large quantities of epoxy paints (two part), resin, lubricating oil, and cleaning compounds containing Glycol ethers and solvents. There was also waste insecticide and unknown debris, automotive artillery grease, aircraft oil lubricant, a scooter, and a sedan to name a few.

Each step taken created another caveat. Procedures for applications, instructions, preparation forms had to be established, requirements and documentation for ocean disposal had to be researched and established. Numerous meetings with the Environmental Protection Agency, the land division, and the U. S. Coast Guard. Once the path was established on how to proceed, then procedures were set in motion to follow the detailed requirements prior to obtaining the authorization for permits and/or disposals.

The reporting burden included time for reviewing the instructions, gathering data, completing and reviewing the various questionnaires required.

An article that appeared in the Star Bulletin editorial in 1994 stated that the clean-up of Keehi lagoon was one of the top achievements of the Waihee Administration. This same clean-up at Keehi Lagoon brought over $600,000 in Federal EPA super fund monies to address the environmental issues, Hawaii's largest single super funded clean-up project. It also more than doubled the responsibilities of the state employees working at Keehi at the time.

With the efforts of the U. S. Navy, the north lagoon was cleared of undesirable sights and hazards that have plagued Keehi Lagoon for years. In this past year alone, they accomplished the loading and testing of numerous pieces of salvage and diving equipment, developed a salvage plan to conduct topside and underwater cutting in conjunction with heavy lifting equipment to salvage the scrap metal, salvaged various miscellaneous pieces of scrapmetal weight up to ten tons, salvaged two scrap barges weighing in excess of three hundred tons.

I am not against change and believe additional marinas and additional commercial activities can work alongside the recreational aspects of the lagoon. I understand the refurbishment of Kewalo Basin and the construction of the new Fishing Village, but we cannot use Keehi Lagoon as a dumping ground for the state as it was used by entrepreneurs that had gone bust. Millions of dollars, countless man-hours have been invested in our lagoon. We must not sacrifice our environment or values at any cost. We must not allow Keehi Lagoon to be used as a means to move a long existing problem from one location to another. We must do what is right.

Now, as you sail around Keehi Lagoon, you will see it as a far better, safer, cleaner and more attractive recreational facility. Just last evening a boater reported a young sea turtle within 10' of a vessel (this was unheard of), we have manta rays that come to visit, various types of fish are now congregating around the piers; even some coral is beginning to return. We also have the sailboat races on Wednesday evenings. Given the proper resources and a watchful eye, we will be able to maintain the lagoon in a fashion the state intended it to be.

Sincerely,

Eric P. Schladermundt
Slip 334, Keehi SBH.

SEND COPIES TO APPROPRIATE PARTIES

March 12, 1999

Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu. HI 96813

'99 MAR 22 A

Dear Sirs:

As members of the Keehi Boat Club located in Keehi Lagoon, we are concerned with the intention of using Keehi Lagoon shore side for lay berthing and dead storage of impounded, derelict, and abandoned vessels.

Throughout the years, numerous boats, barges, junk, and hazardous materials had been left to rot, pollute, and destroy our harbor. When the state was charged with the task of cleaning up the lagoon, we as members of the club attended many harbor advisory committee and public information meetings. We became a part of the slow and methodical cleanup process.

Numerous articles appeared in the 'Star Bulletin' and the Honolulu Advertiser' concerning the cleanup operations in Keehi. We read about our state employees and their time and energies spent in this endeavor; we read about the hazardous wastes that were dumped and the investigations involved; and we read about the U.S. Navy's major contributions. Now, we are able to see it as a far better, safer, cleaner and more attractive recreational facility.

We believe in the best interests of the community, but we must not allow economic growth to destroy our environment. There is never an easy solution; but there is a right one. We are asking that you do the right thing - don't use our lagoon for the wrong reasons. Don't bring impounded, derelict, and abandoned vessels to Keehi Lagoon.

Respectfully,

J. W. Bullock
Signature

J. W. Bullock
Print Name

Address

14 ...
City, state and zip code
Hon 96822

There were a total of 19 copies of the March 9, 1999 form letter received by DOT – Harbors Division. The names of three of the signatories were illegible. The names of the remaining 16 Keehi Boat Club Members who submitted signed copies of this form letter are listed below:

Eric P. Schadler
J.R. Poole
Dave Salle
Charles Mench
Curtis W. Collins
James P. Leville
Russell S. Chimaka
Martin Lemke
James H. Moody
Harry & Mary Abbott
Dori Conroy
Robert Young
Nancy E. Murphy
Robert Bear
Margret & Kenneth Rachar
Mineo Inuzuka

There were a total of 24 copies of the March 12, 1999 form letter received by DOT – Harbors Division. The name of one signatory was illegible. The names of the remaining 23 Keehi Boat Club Members who submitted signed copies of this form letter are listed below:

William Fujikawa
Stanley Kon
E. Choy
Beverlee Baldwin
S. Dalde
Lionel A. Muller
Ben Maher
Marie Muller
Janet Kushima
Carmen Sylvester
Karen Monday
Darrell Oka
Susan Crenshaw
Nancy Iwamoto
J. W. Bullock
Arlene L. Cabrinha
Del Sylvester
Bryan Ikehara
William Souza
Phyllis F. Souza
Kay K. Kon
Winona Shito
Steve Iwamoto

The concerns expressed in both of the preceding form letters are addressed in the following response letter addressed to Mr. Jack Bullock, President - Keehi Boat Club.

April 29, 1999

Jack Bullock, President
Keehi Boat Club
4 Sand Island Access Road
Honolulu, Hawaii 96819

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Environmental Impact Statement (EISPN)

Dear Mr. Bullock:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Keehi Boat Club comment letters which were forwarded to HDOT-HAR by the Office of Environmental Quality Control on March 29, 1999. A total of forty-three Ke'ehi Boat Club members submitted comments expressing concerns about the proposed lay berthing facilities along Lagoon Drive.

The forty-three individual comment letters submitted by the Ke'ehi Boat Club members were submitted as two form letters. The two letters expressed similar concerns, and this letter is written in response to those concerns.

The form letters expressed concerns over past and potential future dumping practices of i) abandoned vessels and ii) miscellaneous garbage and hazardous materials into Ke'ehi Lagoon. DOT-HAR understands these concerns and is aware of the past practices of illegal dumping which continued for many years and required extensive clean up efforts to restore the lagoon to its present condition.

Specific concerns expressed in the comment letters were:

- The use of Ke'ehi Lagoon shore side for lay berthing and dead storage of impounded, derelict, and abandoned vessels.
- Illegal dumping of hazardous materials and garbage into Ke'ehi Lagoon

WIL CHEE - PLANNING, INC
Land Use Planners and
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1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

- The use of Ke'ehi Lagoon as a dumping ground for the State of Hawaii
- The preservation of Ke'ehi Lagoon as a safe, clean, and attractive recreational facility.

The proposed layberths will be used primarily for the temporary docking of fully operational fishing vessels which are not in use. To a lesser degree, the layberths will also be utilized for the storage of impounded vessels.

It is a common misperception that an "impounded" vessel is synonymous with an "abandoned" vessel. This is not the case. Vessels which are impounded are held until such time it is determined that the vessel's owner(s) is unable to meet due restitution. Only after it has been determined that the owner(s) is unable to meet due restitution would the vessel be considered abandoned.

DOT-HAR is required to follow a specific set of procedures when disposing of abandoned vessels. Abandoned vessels must be thoroughly cleaned, prepared, weighted, and sunken in offshore areas where they would subsequently function as artificial reefs. The vessels are usually placed in sandy offshore areas where there is no existing natural reef.

Disposal of abandoned vessels is a carefully monitored process requiring close coordination with both federal and state agencies. Coordination with the United States Coast Guard and the State Department of Health is required during the cleaning, preparation, weighting, and certification of the vessel(s). Coordination with the State Department of Land and Natural Resources is required in determining a suitable offshore location for the vessel(s). This mechanism of inter-agency coordination and approvals ensures the timely removal and environmentally sound disposal of abandoned vessels.

DOT-HAR shares your concerns regarding potential illegal dumping of garbage and hazardous materials into Ke'ehi Lagoon. Therefore, DOT-HAR believes in taking a proactive approach in the prevention of illegal dumping practices.

The Harbor Patrol is an enforcement branch of DOT-HAR which patrols the waters of Honolulu Harbor and Ke'ehi Lagoon. Harbor Patrol officers are highly mobile utilizing both wheeled vehicles and motorized boats. This mobility allows officers to effectively cover large areas of Honolulu Harbor and Ke'ehi Lagoon and serve as a deterrent to illegal dumping practices. Additionally, the close proximity of the proposed layberths to the DOT-Airport Division fire station (located directly to the south-west of the site), and DOT-Airport's patrol units would further deter illegal dumping practices within Ke'ehi Lagoon.

Parties engaging in illegal dumping activities would also be subject to legal action. Various laws at the county (Revised Ordinances Sect. 29-4.1 – 29-4.9), state (HRS Sect. 128D1-6 – 128D1-11), and federal (42 U.S.C. Sect. 9601-9675) levels address the issue of illegal dumping of both garbage (litter) and hazardous wastes. These laws are designed to provide an enforcement authority, defining responsible parties, holding parties "liable" for their actions, and subjecting them to applicable civil and criminal penalties.

DOT-HAR would like to reiterate that they do not conduct or condone illegal dumping activities of any sort in Hawaii's coastal waters. Your club members and the surrounding community can be assured that Ke'ehi Lagoon will not become a "dumping ground" for garbage and hazardous materials. DOT-HAR prohibits, and actively prevents the illegal dumping of wastes within waters under their jurisdiction.

In closing, we emphasize that DOT-HAR fully recognizes and intends to preserve the unique resources which Ke'ehi Lagoon provides the citizens of Hawaii. To this end, harbor development projects such as the proposed layberths are meant to improve the recreational, educational, commercial, and industrial infrastructure of the state while also preserving the quality of the environment.

We appreciate all of the Ke'ehi Boat Club members who responded to the EISPN and expressed an interest in Hawaii's coastal environment, and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR
KEEHI BOAT CLUB MEMBERS:

Eric P. Schadler	J.R. Poole	Dave Salle
Charles Mench	Curtis W. Collins	James P. Leville
Russell S. Chimaka	Martin Lemke	James H. Moody
Harry & Mary Abbott	Dori Conroy	Robert Young
Nancy E. Murphy	Robert Bear	Margret & Kenneth Rachar
Mineo Inuzuka	William Fujikawa	Stanley Kon
E. Choy	Beverlee Baldwin	S. Dakle
Lionel A. Muller	Ben Maher	Marie Muller
Janet Kushima	Carmen Sylvester	Karen Monday
Darrell Oka	Susan Crenshaw	Nancy Iwamoto
J. W. Bullock	Arlene L. Cabrinha	Del Sylvester
Bryan Ikehara	William Souza	Phyllis F. Souza
Kay K. Kon	Winona Shito	Steve Iwamoto

DEIS Comment Letters
and
Responses

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

SEP 3 1999

In reply refer to: KBF

Richard Stook
Wil Chee - Planning, Inc.
HMSA Center
1400 Rycroft Street
Suite, # 928
Honolulu, Hawaii 96814

Re: Draft Environmental Impact Statement for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase

Dear: Mr. Stook,

The U.S. Fish and Wildlife Service (Service) has reviewed the above referenced Draft Environmental Impact Statement (DEIS). The proposed action is sponsored by the Hawaii Department of Transportation, Harbors Division (HDOT-HAR). The HDOT-HAR has developed the Oahu Commercial Harbors 2020 Master Plan (2020 Plan) to address needs at Honolulu Harbor, Kewalo Basin, Keehi Lagoon and Barbers Point Harbor. The 2020 Plan includes several proposed projects, of which some are exempt from the EIS review process and some have already had separate environmental documents prepared for them. The Service offers the following comments for your consideration.

The DEIS examines four major projects at Honolulu Harbor and Keehi Lagoon. The proposed projects include the construction of a cruise passenger terminal at Pier 2, finger piers at Piers 12 - 16, and an excursion vessel terminal at Piers 24 - 29 in Honolulu Harbor; and lay berth facilities in Keehi Lagoon. The proposed action involves the expansion of existing piers and construction of new piers; demolition of existing structures and construction of new terminal buildings, with lighting, sewers, drainage, and other features; and construction of lay berths to accommodate fishing vessels, barges, and other craft and fuel facilities to support emergency response vessels.

GENERAL COMMENTS

In general, the Service believes that the DEIS adequately describes the proposed action and the primary fish and wildlife resources located at the proposed project site. The Service believes that among the alternatives considered in the DEIS, the preferred alternative is the action least likely to impact fish and wildlife resources. Potential impacts to fish and wildlife resources have been adequately addressed in the DEIS, and the mitigation that is proposed is adequate to minimize anticipated unavoidable impacts to fish and wildlife resources.

SPECIFIC COMMENTS

Page 43: Section 3.5.1 Keehi Lagoon

In paragraph four, the DEIS mentions that the following shorebirds use the mudflats at Keehi Lagoon: wandering tattler or ulili (*Heteroscelus incanus*), sanderling or hunakai (*Calidris alba*), and ruddy turnstone or akekeke (*Arenaria interpres*). Since these species are considered to be Federal trust resources, protected by the Federal government under international agreements (Migratory Bird Conventions) that underlie the Migratory Bird Treaty Act, we recommend that the following sentence be included in this paragraph of the DEIS: "Migratory shorebirds such as the wandering tattler or ulili (*Heteroscelus incanus*), the sanderling or hunakai (*Calidris alba*), the ruddy turnstone or akekeke (*Arenaria interpres*), and the Pacific golden-plover or Kolea (*Pluvialis fulva*) are known to occur at the mudflats at Keehi Lagoon, and these species are afforded protection under the Migratory Bird Treaty Act (16 USCS §703)."

Page 45: Section 3.6.1 Existing Conditions

In paragraph three, the DEIS states that only seven coral species were recorded at this site (*Porites compressa, P. lobata, Montipora patula, M. verucosa*) but..." The Service recommends that all seven species be identified in this section of the DEIS.

Page 94: Section 5.1.6 Endangered Species Act and Marine Mammal Protection Act

In paragraph one, the DEIS reads " The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over endangered and threatened terrestrial flora and terrestrial fauna, and birds." We recommend that this sentence read: " The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over certain federally listed endangered and threatened species that occur in terrestrial and aquatic environments."

SUMMARY

The Service believes that among the alternatives currently under consideration, the preferred alternative identified in the DEIS is the action least likely to impact fish and wildlife resources. We also believe that the mitigation proposed in the DEIS is adequate to minimize unavoidable impacts to fish and wildlife resources anticipated to result from implementation of the proposed project.

The Service appreciates the opportunity to comment on the DEIS, and we look forward to receiving a copy of the Final EIS when it is available. If you have any questions concerning our comments, please contact Fish and Wildlife Biologist Kevin Foster by telephone at (808/541-3441) or by facsimile transmission at (808/541-3470).

Sincerely,

Barbara A. Maxfield, Acting

for Robert P. Smith
Pacific Islands Manager

cc: NMFS-PAO, Honolulu
EPA-Region IX, Honolulu
DLNR, Hawaii
DAR, Hawaii
CZMP, Hawaii
CWB, Hawaii

WB CHEE · PLANNING, INC

September 14, 1999

Robert P. Smith, Pacific Islands Manager
U.S. Fish and Wildlife Service - Pacific Islands Ecoregion
300 Ala Moana Blvd. Room 3-122
Box 50088
Honolulu, Hawaii 96850

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Draft Environmental Impact Statement (DEIS)

Dear Mr. Smith:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the United States Fish and Wildlife Service letter to the HDOT-HAR dated September 3, 1999.

We acknowledge your general comment that the preferred alternative is the action least likely to impact fish and wildlife resources...and the mitigation that is proposed is adequate to minimize anticipated unavoidable impacts to fish and wildlife resources.

For ease of reference, we have responded to your specific comments in the order they appear in your letter.

Page 43: Section 3.5.1 Keehi Lagoon

As per your recommendation this section has been modified to incorporate the following sentence: "The ulili (*Heteroscelus incanus*), sanderling or hunakai (*Calidris alba*), the ruddy turnstone or akekeke (*Arenaria interpres*), and the Pacific golden-plover or Kolea (*Pluvialis fulva*) are all migratory bird species afforded protection under the Migratory Bird Treaty Act (16 USCS section 703)."

Page 45: Section 3.6.1 Existing Conditions

As per your recommendation this section has been modified to identify each of the seven coral species recorded at the Pier 12 site. The seven species are: *Porites compressa, Porites lobata, Montipora patula, Montipora verrucosa, Pocillopora damicornis, Carijoa riisei, and Zoanthus pacificus.*

Page 94: Section 5.1.6 Endangered Species Act and Marine Mammal Protection Act

As per your recommendation this section has been modified. The sentence "The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over endangered and threatened

Letter to Robert Smith
September 14, 1999 – Page 2

terrestrial flora and terrestrial fauna, and birds" has been rewritten to read as follows: "The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over certain federally listed endangered and threatened species that occur in terrestrial and marine environments".

We trust that our responses adequately address your comments. We thank you for your comment letter, interest in the project, and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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

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

August 24, 1999

95-113D/epo

(11)

Mr. Glenn Soma
Harbors Division
Department of Transportation
State of Hawaii
79 South Nimitz Highway
Honolulu, Hawaii 96813-4898

Dear Mr. Soma:

Subject: Draft Environmental Impact Statement (DEIS)
Oahu Commercial Harbors 2020 Master Plan - Immediate Phase (Phase I)

Thank you for allowing us to review and comment on the subject document. We do not have any comments to offer at this time, as our previous questions have been adequately addressed.

Sincerely,

GARY GILL
Deputy Director for
Environmental Health

c: Wil Chee - Planning, Inc.

WIL CHEE - PLANNING, INC.

September 14, 1999

Mr. Gary Gill, Deputy Director for Environmental Health
Hawaii State Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Draft Environmental Impact Statement (DEIS)

Dear Mr. Gill:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Health letter to the HDOT-HAR dated August 24, 1999.

We acknowledge your comment that your office does not have any comments to offer as your previous questions have been adequately addressed.

We thank you for your letter, interest in the project, and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

Land Use Planners and Environmental Consultants
HMSA Center • 1400 Rycroft Street • Suite 928 • Honolulu, Hawaii 96814 • Phone 808-955-6088 • Fax 808-942-1451 • E-Mail wcp@aloha.net

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R/3 08. 0146

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810

LETTER NO. (P) 1548.

AUG 2 3 11 27 AM '99
HARBORS DIVISION

JUL 30 1999

TO: Mr. Thomas Fujikawa, Administrator
Harbors Division
Department of Transportation

SUBJECT: Oahu Commercial Harbors 2020 Master Plan
Draft Environmental Impact Statement

Thank you for the opportunity to review the subject document. The proposed project will have no impact on our facilities. Therefore, we have no comments to offer.

If there are any questions, please have your staff contact Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

GORDON MATSUOKA
Public Works Administrator

RY:jk
c: Wil Chee - Planning, Inc.

August 3, 1999

Gordon Matsuoka, Public Works Administrator
State Department of Accounting and General Services
1151 Punchbowl Street, Suite #426
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase. Draft Environmental Impact Statement (DEIS) Comment Letter

Dear Mr. Matsuoka:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Accounting and General Services comment letter dated July 30, 1999.

We acknowledge that the proposed project will have no impact on your facilities and you have no comments to offer at this time.

Once again, we appreciate your agency's response to the DEIS. Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
NMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM
ENERGY, RESOURCES, AND TECHNOLOGY DIVISION
235 South Beretania St., 5th Flr., Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804
Tel.: (808) 587-380
Fax: (808) 586-253

August 25, 1999

Post-it® brand fax transmittal memo 7671

To Richard Stook	From Gail
Co. Wil. Chee Plng.	Co. OHCI/ERT
Dept.	Phone # 587-3802
Fax # 942-1851	Fax # -3820

Mr. Thomas Fujikawa
Administrator
Harbors Division
Department of Transportation
79 N. Nimitz Highway
Honolulu, HI 96817

Subject: Draft Environmental Impact Statement (DEIS) for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase

Dear Mr. Fujikawa:

We have reviewed the DEIS for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase and appreciate the incorporation of considerations for energy efficient practices and technologies and construction and demolition recycling. We would recommend the following comments addressed to: (1) State energy conservation goals, and (2) recycling and recycled-content products for your consideration:

(1) Energy conservation goals. In addition to the incorporation of energy efficient design, practices, and technologies, we would like to reiterate that in the design phase, the passenger terminal project should reflect a "Hawaiian sense of place" which can be accomplished through innovative master planning, architectural design and natural ventilation.

(2) Recycling and recycled-content products. Consider designating Harbors property and infrastructure development for industries such as reuse, recycling, and remanufacturing that depend heavily on interisland, interstate, and international shipping.

We would also like to reiterate, the following measures that would divert significant amounts of material from the landfill, conserve resources, and contribute to the recycling, remanufacturing, and reuse industries in Hawaii:

Mr. Thomas Fujikawa
Page 2
August 23, 1999

- Prior to demolition, evaluate deconstruction opportunities:
  - Develop job-site recycling plan for the deconstruction of existing Harbors structures; and
  - Reuse and recycle as much deconstruction and demolition waste as possible.
- During construction and operations, consider inclusion of recycling and recycled-content products:
  - Develop job-site recycling plan for the construction of the Harbor projects, and reuse and recycle as much construction waste as possible;
  - Incorporate provisions for recycling into the built projects such as collection systems and space for recycling bins;
  - Specify and use products with recycled-content such as: steel, concrete aggregate fill, asphalt paving, drywall, carpet and glass tile; and
  - Specify and use locally produced recycled-content products such as recycled plastic lumber and recreational and parking products.

If you have any questions, please contact Carilyn Shon at 587-3810.

Very truly yours,

Maurice H. Kaya
Energy, Resources, and Technology
Program Administrator

c: Richard Stook
Wil Chee - Planning, Inc.

WIL CHEE - PLANNING, INC.

September 3, 1999

Mr. Maurice Kaya, Administrator
Energy Resources and Technology Division
Department of Business Economic Development and Tourism
P.O. Box 2359
Honolulu, Hawaii 96804

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
<u>Response to the Draft Environmental Impact Statement (DEIS)</u>

Dear Mr. Kaya:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the DBEDT – Energy, Resources, and Technology Division's letter to the HDOT-HAR dated August 23, 1999.

We acknowledge your appreciation of the DEIS' incorporation of considerations for energy efficient practices and construction and demolition recycling. HDOT-HAR views energy conservation and waste minimization as an integral part of sustainable development of its properties.

In response to your first comment relating to energy conservation we have added the consideration of a "Hawaiian sense of place" into section 3.11.3. We agree that a "Hawaiian sense of place" is an important design aspect and it has also been addressed in section 4.2.3.

Your second comment suggests the consideration of designating Harbors property and infrastructure development for reuse, recycling, and remanufacturing industries. Section 3.12.3 has been revised to incorporate your suggestion.

Your final comment reiterates specific measures that would "divert significant amounts of material from the landfill, conserve resources, and contribute to the recycling, remanufacturing, and reuse industries in Hawaii".

Section 3.12.3 addresses the development of a construction and demolition recycling plan and diversion of wastes from landfills. Pre-demolition deconstruction opportunities and the use of specific recycled and recycled-content products would be determined during the development of an on-site construction and demolition recycling plan.

Letter to Maurice Kaya
September 3, 1999 – Page 2

We trust that our responses adequately address your comments. We thank you for your interest in the project and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

August 30, 1999

LD-NAV
Ref.: DEIS2020.RCM

PSF/99-250

Mr. Richard Stook, Planner
Wil Chee - Planning, Inc
Land Use Planners and
Environmental Consultants
HMSA Center
1400 Rycroft Street Suite 928
Honolulu, Hawaii 96814

Dear Mr. Stook:

Subject: Review Draft Environmental Impact (DEIS) Statement for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase

Thank you for the opportunity to review the Oahu Commercial Harbors 2020 Master Plan.

Attached herewith are copies of our Division of Aquatic Resources and Land Division Engineering Branch comments on the subject matter.

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

Very truly yours,

DEAN Y. UCHIDA
Administrator

c: Oahu District Land Office

Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

August 11, 1999

TO: Dean Uchida, Administrator
Division of Land Management

FROM: William Devick, Administrator
Division of Aquatic Resources

SUBJECT: Request for Comments on DEIS for the Oahu Commercial Harbors 2020 Master Plan Immediate Phase, File No. 99-250

In September of 1998, DAR received a request for comments on the initial scoping for the Pre-assessment Consultation for the Environmental Impact Statement Preparation Notice (EISPN). At that time, the project was still in its initial stages and we advised the consulting firm, Wil Chee Planning, Inc. of the specific concerns and issues DAR normally has with projects like the one that was being proposed.

After almost a year, the DEIS is currently being circulated for review and comments. Our concerns and comments are offered below.

Description:

DOT-HAR developed the Oahu Commercial Harbors 2020 Master Plan (2020 Plan), to function as a conceptual master plan that characterizes Honolulu, Kewalo Basin and Barbers Point Harbors as dependent harbors. The 2020 Plan functions as a long-range guide for the development and enhancement of these three commercial ports. To implement the 2020 Plan DOT-HAR must accomplish a series of improvements at Honolulu Harbor. The improvements need to be initiated by 2003 and have been designated as Immediate Phase (IP) projects in the DEIS.

Four major IP projects are proposed. These are construction of: 1) a cruise passenger terminal at Pier 2, 2) finger piers at Piers 12-16, 3) an excursion vessel terminal at Piers 24-29, and 4) lay berth facilities at Keehi Lagoon (along Lagoon Drive). The DEIS examines each of the projects for its potential direct, indirect and cumulative impacts upon the environment.

There are also four IP projects that are exempt from the EIS review process. These projects are the 1) renovation and reconstruction of harbor facilities at Piers 5-7, 2) demolition and construction activities for the general cargo yard and construction of a ferry terminal at Piers 19-20, 3) extension of exisitng fuel lines at Piers 28-29 for bunkering purposes, and 4) demolition and construction activities for the neo bulk cargo yard at Piers 31-34.

Finally, there are four IP projects that have been incorporated into the DEIS by reference. These four projects are the : 1) Domestic Commercial Fishing Village At Piers 38-38, 2) Inter-Island Cargo Yard Imporvements at Piers 9-40, 3) Barbers Point Deep Draft Harbor Expansion Improvements, and 4) Barbers Point Harbor Perimeter Lighting project.

Biological surveys of the marine environment in the proposed project areas were conducted in September, 1998 by S.L. Coles and R.E. De Felice of the Bishop Museum's Department of Natural Sciences. These surveys were incorporated in the *Aquatic Habitat and Water Quality Impact Assessment Report* prepared by AECOS, Inc. in conjunction with this DEIS.

The DEIS reports that the marine biological community of Honolulu Harbor is much more diverse than Keehi Lagoon. Surveys were conducted in the waters of Honolulu Harbor at Pier 12, Pier 15, and Pier 16.

No in-water surveys were conducted at Piers 24-29 for two major reasons: 1) their interior location and 2) the proposed improvements would not involve work in the water. The consultant states that the marine biota in this area is similar to that of Pier 15, which is reported to be basically fouling biota on vertical piles and a few fish species.

It is the opinion of the consultant that there will be some project-related impacts, but that they are not likely to result in any significant long-term effects on the marine environment. Instead, project related impacts on the resident marine biota are likely to be short-term disturbances such as an increase in turbidity and sedimentation rates which result from construction activities.

Additionally, if sediments are resuspended in the water column by construction activities, these sediments will fall into the fine to medium sands category. The sands settle out rapidly and would have minimal effect on the marine organisms growing on the vertical surfaces of the pier pilings near Pier 2, which is near the channel opening. Water circulation is good in this location and should help dissipate any turbidity resulting from construction activities.

Pile driving activites will occur during certain phases of the proposed project and are another concern. Installation of piles are proposed for the lay berth and finger piers. The area most likely to show an impact from the pile driving activities is the coral community and asssociated organisms in the vicinity of Pier 12. The consultant states that the corals in this area appear to have adapted to relatively high levels of turbidity and sedimentation and that they have withstood previous construction activities and other stresses occurring in this area over the past decade. The consultant notes that the sessile marine biota in the vicinity of Piers 12-16 are already limited and are composed primarily of organisms adapted to a sedimentary or turbid environment. The report states that any benthic organisms that are disturbed or displaced will likely be replaced by rapid resettlement on new surfaces provided as a result of the construction. Fish communities that may be disrupted or temporarily driven out can return when conditions are more favorable.

Comments:

The consultant states that no SIGNIFICANT impacts to the marine biota are anticipated as a result of the proposed project. Any impacts resulting from construction activities are expected to be minor ones, which the consultant feels can be mitigated by employing various measures to reduce suspended silt and sediments.

DAR is encouraged that the consultant acknowledged the issues and concerns presented during the pre-assessment consultation process and attempts to address them in the DEIS. The biological surveys conducted for this DEIS were timely (conducted in September, 1998) and comprehensive (provided an inventory of the marine biota present at each site). Additionally, information describing construction activities proposed for each site was provided, along with favorable conditions present at the site which would facilitate in mitigating any impacts.

The DEIS states that the proposed harbor improvements will require NPDES permit approvals from DOH. The NPDES permit application will require development of a Best Management Practices Plan (BMPP). This plan will be developed prior to construction activities, will identify the most effective erosion, sedimentation, and turbidity control measures to reduce the amount of soil and sediment accumulation in the coastal waters as a result of proposed construction activities. Unknown factors such as pile driver size and type, construction equipment to be used, construction site staging areas, etc., are necessary for determining the most effective BMPP for mitigating construction related impacts on coastal waters. Mitigation measures may include, but are not limited to, the on-site utilization of the following BMP technologies: 1) silt curtains, 2) drainage swales, 3) storm drain inlet protection, 4) sediment traps, and 5) soil stabilization. The specific BMP's for the proposed actions will be determined during the design and construction phases and incorporated into the BMPP.

Finally, DAR requests the opportunity to review and comment on the BMPP for the above proposed project when it has been completed.

ENGINEERING BRANCH

COMMENTS

We confirm that the proposed project sites, except for the Keehi Lagoon site, according to FEMA Community Panel Number 150001 0115 C are located in Zone X. This is an area determined to be outside 500-year flood plain. The Keehi Lagoon site is located in Zone D. This is an area in which flood hazards are undetermined.

The EIS should include water demands for the proposed project. Also, please clarify if water will be provided by an existing BWS meter.

For your information, if there is as an increase in water demands (gpd) for the project site, then a water allocation from the Engineering Branch (EB) is required to obtain a building permit and/or water meter. Please provide the water demands (gpd) and water demand calculations to EB, Land Division. The water demands will be included in Water Master plan for Oahu being prepared by Fukunaga and Associates for the Department of Land and Natural Resources.

Also, please provide us a copy of the final EIS for our files.

WIL CHEE - PLANNING, INC.

September 20, 1999

Dean Y. Uchida, Administrator
State Department of Land and Natural Resources – Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Draft Environmental Impact Statement (DEIS)

Dear Mr. Uchida:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Land and Natural Resources (DLNR) letter to the HDOT-HAR dated August 30, 1999. Your letter contained specific comments from DLNR's Division of Aquatic Resources Division (DAR) and Land Division Engineering Branch (LDEB).

We acknowledge and appreciate DAR's general comment expressing approval of the DEIS sections pertaining to biological resources and coastal and ground waters. As per DAR's request, they will be forwarded a copy of the Best Management Practices Plan for review and comment when it becomes available.

We acknowledge LDEB's confirmation that the entire project site, with the exception of Keehi Lagoon, is designated as being outside the 500-year flood plain. The project site located at Keehi Lagoon is designated as being in an undetermined flood hazard area.

Sections 3.11.1 and 3.11.2 address existing utilities (including water meters) which could service the project areas. Additionally, the sections indicate that at the present time precise water demand figures are not yet available. However, the BWS has indicated that the existing water supply system is currently adequate to accommodate the proposed Honolulu Harbor and Keehi Lagoon improvement projects. After water demands have been established during the design phase, DOT-HAR will be required to obtain a water allocation from the State Department of Land and Natural Resources. The availability of water will be confirmed when the building permit application is submitted to the BWS for review and approval.

We acknowledge your comment that if there is an increase in water demands for the project site, a water allocation from LDEB will be required to obtain a building permit and/or water meter. When available, water demand calculations will be provided to LDEB for inclusion in the Water Master Plan for Oahu being prepared by DLNR.

Land Use Planners and Environmental Consultants
HMSA Center • 1400 Kapiolani Street • Suite # 928 • Honolulu, Hawaii 96814 • Phone 808-955-6088 • Fax 808-942-1851 • E-Mail wcp@aloha.net

We trust that our responses adequately address your comments. As requested, a copy of the Final EIS will be forwarded to LDEB when it becomes available.

We thank you for your comment letter, interest in the project, and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

August 9, 1999

EIS #217

Mr. Richard Stook, Environmental Planner
Wil Chee – Planning, Inc.
1400 Rycroft Street, Suite 928
Honolulu, Hawai'i 06814

Re: Draft Environmental Impact Statement for the O'ahu Commercial Harbors Master Plan – Immediate Phase.

Dear Mr. Stook:

Thank you for the opportunity to review the draft Environmental Impact Statement (DEIS) for the O'ahu Commercial Harbors Master Plan – Immediate Phase. The State Department of Transportation, Harbors Division (DOT-HAR) anticipates the construction of a cruise passenger terminal at Pier 2, finger piers at Piers 1-16, and excursion vessel terminals at Piers 24-29. Improvements planned for Ke'ehi Lagoon include the construction of lay berth facilities. The Office of Hawaiian Affairs has the following comments.

Generally, the DEIS is well done. However, there are two areas of concern. The first is contained in Section 3.8.3. That section discusses mitigation measures for alien species that might be introduced to Honolulu Harbor from ballast tank discharge and hull growths. Our concern is that these mitigation measures rely on voluntary compliance. There appears to be no mandatory or explicit measures that would accomplish the mitigation goals. Thus the affects of ballast tank discharge and hull growth contamination remain unmitigated.

The second concern is that the cumulative effects of the 2020 Master Plan have not been included in the DEIS although the effects of the Immediate Phase appears to include the effects from projects which are exempt from the environmental process. The final EIS should include some discussion of the likely effects of the 2020 Master Plan.

If you have any questions, please call Lynn Lee, Policy Analyst, at 594-1936.

Sincerely,

Colin Kippen
Deputy Administrator

C. Sebastian Aloot
Director, Hawaiian Rights Division

cc: Board of Trustees

WIL CHEE – PLANNING, INC.

September 3, 1999

C. Sebastian Aloot
Land and Natural Resources Division Officer
Office of Hawaiian Affairs
711 Kapiolani Blvd., Suite 500
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Draft Environmental Impact Statement (DEIS)

Dear Mr. Aloot:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Office of Hawaiian Affairs letter to the HDOT-HAR dated August 9, 1999.

Your first comment expressed concern over the introduction of alien species into Honolulu Harbor from ballast tank discharge. You are correct in your assessment that at the present time "there are no mandatory or explicit measures" governing ballast tank discharge.

Section 3.8.3 of the DEIS, acknowledges that at the present time, there are no enforceable laws which regulate ballast water discharge. However, concerted efforts are currently being undertaken by both international organizations and individual governments to establish regulatory mechanisms to monitor ballast water discharge. The main purpose of these efforts is to establish universal mandatory regulations that are enforceable in both international and national waters.

Additionally, the U.S. Coast Guard recently developed a "Ballast Water Program" (July 14, 1999) which outlines mandatory reporting requirements designed to work in conjunction with the existing IMO Voluntary Guidelines. The mandatory guidelines outlined in the Ballast Water Program require vessels entering U.S. Ports to record and report detailed ballast water-related information to the U.S. Coast Guard. The development of these mandatory U.S. Coast Guard regulations is an example of the progress being made as a result of on-going domestic and international efforts to establish mandatory guidelines designed to prevent and control the spread of aquatic nuisance species via ballast water discharge.

Your second concern addresses the "likely effects" of the overall Oahu Commercial Harbors 2020 Master Plan. The 2020 Master Plan is a long-range document which

Letter to C. Sebastian Aloot
September 3, 1999 – Page 2

proposes conceptual improvements to Oahu Commercial Harbors over a 20 year period. Due to the long-range nature of the 2020 Master Plan, proposed harbor improvements are being addressed in phases. This EIS addresses only the immediate phase projects (proposed improvements through the year 2003). During the implementation of subsequent phase projects (years 2004 – 2020) potential project-related impacts will be thoroughly addressed in separate environmental impact studies.

We trust that our responses adequately address your comments. We thank you for your interest in the project and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

COPY

July 22, 1999

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Harbors Division

Dear Mr. Hayashida:

Subject: Your Transmittal of the Draft Environmental Impact Statement
for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement (EIS) for the Oahu Commercial Harbors 2020 Master Plan.

Our comments of March 31, 1999 on the EIS Preparation Notice are still applicable and included in Appendix A of the Draft EIS.

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

Very truly yours,

CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Richard Stook, Wil Chee Planning, Inc.

Pure Water ... our greatest need – use it wisely

August 3, 1999

Clifford Jamile, Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase,
Draft Environmental Impact Statement (DEIS) Comment Letter

Dear Mr. Jamile:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Board of Water Supply (BWS) comment letter dated July 22, 1999.

We acknowledge that your comments of March 31, 1999 on the EIS Preparation Notice are still applicable to the DEIS. We have reiterated our responses to your EIS Preparation Notice comments below.

Your first two comments identified the existing water services to the proposed project area and indicated that the existing water system is adequate to accommodate the proposed harbor improvements. Thank you for providing us with this information.

The remainder of your comments requested that potable water demands and water availability be confirmed and approved by appropriate agencies. The proposed projects are presently in their conceptual stages. Projected water demand will be determined during the design and construction phases of the project.

During these project phases HDOT-HAR will obtain all necessary permits and approvals which may be required. Required permits and approvals may include but not be limited to water allocation from the Department of Land and Natural Resources, submittal of building permits and construction drawings for BWS approval, payment of Water System Facilities Charges, compliance with on-site fire protection requirements, and installation of BWS approved backflow prevention assemblies at appropriate water meters.

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite #928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

Letter to Clifford Jamile
August 3, 1999 – Page 2

We appreciate your agency's interest in the environmental review process and response to the DEIS. Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 527-[illegible] • FAX: (808) 527-[illegible]

JEREMY HARRIS
Mayor

KENNETH E. SPRAGUE, P.E., Ph.D.
Director

BARRY FUKUNAGA
Deputy Director

JUL 28 1999

ENV 99-83

Mr. Richard Stook
Environmental Planner
Wil Chee - Planning, Inc.
HMSA Center
1400 Rycroft Street
Suite #928
Honolulu, HI 96814

Dear Mr. Stook:

Subject: Draft Environmental Impact Statement (DEIS)
Oahu Commercial Harbors 2020 Master Plan
TMK: Various

We have reviewed the subject DEIS and have the following comment:

Please coordinate construction schedule with our Division of Environmental Quality to avoid schedule conflict since we frequently conduct nearshore and shoreline water quality monitoring activities in Honolulu Harbor and Keehi Lagoon areas.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Sincerely,

KENNETH E. SPRAGUE
Director

August 3, 1999

Dr. Kenneth E. Sprague, Director
Department of Environmental Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase,
Draft Environmental Impact Statement (DEIS) Comment Letter

Dear Dr. Sprague:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Environmental Services comment letter dated July 28, 1999.

We acknowledge that your agency conducts regularly scheduled water quality monitoring activities in the Honolulu Harbor and Keehi Lagoon areas. In order to avoid possible scheduling conflicts during construction activities, construction schedules for the proposed harbor improvements will be coordinated with your Division of Environmental Quality.

We appreciate your agency's interest in the environmental review process and response to the DEIS. Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and
Environmental Consultants

HMSA Center
1400 Rycroft Street
Suite #928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1551

RECEIVED
DEPARTMENT OF
FACILITY MAINTENANCE

'99

July 6, 1999

From:

Dr. Jonathan Shimada, Director
Department of Facility Maintenance
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement for the Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.

Dear Mr. Shimada:

Enclosed, please find a copy of the above-referenced draft EIS for your review. The draft EIS addresses proposed improvements by the Hawaii State Department of Transportation – Harbors Division (HDOT-HAR) to facilities at Honolulu Harbor and Keehi Lagoon as part of their Oahu Commercial Harbors 2020 Master Plan.

We would appreciate any comments you may have regarding the proposed actions. Please submit your comments to HDOT-HAR with a copy to our office by August 23, 1999.

To:

Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

July 9, 1999
We do not have any comments. If you have any questions, please call Laverne Higa at 527-6246.

Ross S. Sasamura
Director and Chief Engineer
Department of Facility Maintenance

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
NMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

FROM-DEPARTMENT OF FACILITY MAINTENANCE

August 3, 1999

Ross S. Sasamura
Director and Chief Engineer
Department of Facility Maintenance
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Draft Environmental Impact Statement (DEIS) Comment Letter

Dear Mr. Sasamura:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Facility Maintenance comment letter dated July 9, 1999.

We acknowledge that you have no comments to offer at this time and that no further submission to your office is required.

Once again, we appreciate your agency's response to the DEIS. Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
NMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

JEREMY HARRIS, MAYOR

CHERYL D. SOON, DIRECTOR

JOSEPH M. MAGALDI JR., DEPUTY DIRECTOR

August 26, 1999

TPD99-00510

Mr. Thomas Fujikawa, Administrator
Harbors Division
Department of Transportation
State of Hawaii
79 South Nimitz Highway
Honolulu, Hawaii 96813

Dear Mr. Fujikawa:

Subject: Oahu Commercial Harbors 2020 Master Plan - Immediate Phase

In response to the July 6, 1999 letter from Wil Chee - Planning, Inc., the draft environmental impact statement (EIS) for the subject project was reviewed. The draft EIS should include a discussion regarding the adequacy of the off-street loading and parking facilities for each of the proposed immediate phase improvements.

Previously, in response to the EIS preparation notice, this department commented that adequate off-street parking and loading areas should be provided for the project. The EIS traffic impact analysis report includes a brief discussion on the transportation and parking facilities that would be appropriate to serve the Pier 2 cruise passenger terminal. However, this discussion should also be included in the EIS to justify the proposed off-street loading and parking facilities. Similar analyses should be added for the other harbor improvements that are being examined in the EIS.

Should you have any questions regarding this matter, please contact Faith Miyamoto of the Transportation Planning Division at 527-6976.

Sincerely,

CHERYL D. SOON
Director

cc: Office of Environmental Quality Control
Wil Chee - Planning, Inc.

BENJAMIN J. CAYETANO, GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION

KAZU HAYASHIDA, DIRECTOR

DEPUTY DIRECTORS
BRIAN K. MINAAI
GLENN M. OKIMOTO

IN REPLY REFER TO:
HAR-EP
6980.00

September 9, 1999

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
Pacific Park Plaza
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Oahu Commercial Harbors 2020 Master Plan Environmental Impact Statement

Thank you for your correspondence of August 26, 1999, requesting that adequate off-street parking and loading areas be provided for our projects.

We will consult the potential tenants and users of our projects for their off-street parking and loading area requirements during the development planning stage of our projects. We understand the limitations of on-street parking in the areas surrounding Honolulu Harbor and will make every attempt to accommodate the requisite space within our properties.

Please call Mr. Glenn Soma, at 587-2503, if there are any questions.

Very truly yours,

Thomas T. Fujikawa
Harbors Administrator

c: Richard Stook, Wil Chee - Planning, Inc.✓

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE (808) 523-4414 • FAX (808) 527-6743

JEREMY HARRIS
MAYOR

JAN NAOE SULLIVAN
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

August 24, 1999

1999/CLOG-4443(ASK)
'99 EA Comments Various Zones

Mr. Glen Soma
Harbors Division
Department of Transportation
State of Hawaii
79 South Nimitz Highway
Honolulu, Hawaii 96813

Dear Mr. Soma:

Draft Environmental Impact Statement (DEIS) For
<u>Oahu Commercial Harbors 2020 Master Plan, Immediate Phase</u>

We have reviewed the above document and offer the following comments:

<u>Zoning</u>

- The Draft EIS does not correctly identify the zoning districts of the project area.
- Page 5, County Zoning, should read I-2 Intensive Industrial District, I-3 Waterfront Industrial District, and IMX-1 Industrial-Commercial Mixed Use District. Section 5.3.3, County Land Use Ordinances and Zoning, should also be amended to note these zoning districts.
- Tax Map Key parcel 2-1-1: 42 is zoned P-1 Restricted Preservation District, as are all parcels located in the State Conservation District.
- Some parcels are in the Kakaako Community Development District, and are therefore not subject to county zoning and have no county zoning designation(s).
- The map shown in Figure 2-3 does not show the specific zoning district as designated by the Land Use Ordinance. We recommend that the final EIS contain zoning maps showing the project location.

<u>General Plan</u>

- The proposed projects for Honolulu Harbor and the Barbers Point Deep Draft Harbor support the General Plan objectives and policies relating to the "full development of the primary urban center; and the continued development of Barbers Point as a major industrial center".

<u>Development Plan</u>

- The proposed project supports the City's objectives and policies for the current Primary Urban Center and Ewa Development Plan (DP). Additionally, the proposed cruise ship and excursion vessel terminals support one of the City's long-range vision elements - "The City on the Water" intended to draw people to the waterfront. The final EIS should discuss how these two projects can be coordinated with the City's efforts to create an intermodal transportation system including public transit, walking and bicycling to link such activities on the waterfront to activity nodes mauka of Nimitz Highway.
- <u>Sec. 2.6.1. Cruise Passenger Terminal at Pier 2</u>: The proposed two-story height and mauka-makai orientation of the long-axis of the planned terminal complex building is consistent with the City's vision for the redevelopment of the Honolulu Waterfront, as is the proposed system of internal roadways (Reference, Primary Urban Center Development Plan Public Review Draft, July 1999).
- <u>Sec. 2.6.3. Excursion Vessel Terminal</u>: The proposed single-story height and planned landscaping and "maritime theme garden" are also consistent with the City's vision for the redevelopment of the Honolulu Waterfront (Reference, Primary Urban Center Development Plan Public Review Draft, July 1999).
- <u>Sec. 4.2.3. Aesthetic and Recreational Considerations, Proposed Mitigation Measures</u>: We generally support the proposed mitigation measure to require that new structures connote a "Hawaiian sense of place."
- <u>Section 5.3.2. Development Plan for the City and County of Honolulu</u>: The second paragraph refers to an "Oahu DP." There is no "Oahu DP"; rather, the project site is affected by the Ewa DP (Barbers Point Deep Draft Harbor) and Primary Urban Center (PUC) DP (Honolulu Harbor). Further, the Ewa DP has been revised and no longer contains common and special provisions. The existing PUC DP does; however, it is currently being revised, and the revised PUC DP also will not consist of common and special provisions. Rather, the format of the revised DPs is to contain policies, principals and guidelines expressing the "vision" for the area which is to be implemented through other development and investment decisions.
- Regarding the third paragraph of Section 5.3.2, we would normally refer to a proposal as being "consistent" with the relevant DP rather than being "in conformance with" these plans

Mr. Glen Sonu
Page 3
August 24, 1999

- Barbers Point Deep Draft Harbor is actually designated as Industrial on the Ewa DP as a "commercial harbor."

Wastewater Infrastructure

- The sewer improvements for the two passenger vessel terminal building with a design vessel capacity of two thousand passengers at pier 2 should be made in conjunction with the Kakaako Community Development District Makai Area Sewerage Master Plan.
- At Piers 24 through 29, a commercial excursion vessel passenger terminal will be constructed to accommodate excursion and tour operations.
- The municipal sewer system is not available for the layberths and Petroleum Oil and Lubricating emergency response vessel facility along Lagoon Drive at Keehi Lagoon.
- Improvements to increase facilities at finger piers 12 through 16 will not be allowed at this time because the municipal sewer system is inadequate to accommodate additional flows. A project to relieve the existing sewer lines, the Nimitz Highway Reconstructed Sewer (Auahi Street to Hotel Street), is tentatively scheduled for completion in September 2000. Improvements will be considered after this sewer project is completed.
- These statements shall not be construed as confirmation of sewage capacity reservation. Sewer capacity reservation is contingent on submittal and approval of a Sewer Connection Application form.

Should you have any questions regarding the above, please contact Ardis Shaw-Kim of our staff at 527-5349.

Very truly yours,

JAN NAOE SULLIVAN
Director of Planning and Permitting

JNS:am

cc: Hawaii Community Development Authority
√Richard Stook, Wil Chee - Planning, Inc.

posse doc no. 6709

WIL CHEE - PLANNING, INC.

September 19, 1999

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

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Draft Environmental Impact Statement (DEIS)

Dear Ms. Sullivan:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for the Department of Planning and Permitting letter to the HDOT-HAR dated August 24, 1999.

For ease of reference, we have responded to your specific comments in the order they appear in your letter.

Zoning

- Thank you for clarifying the county zoning designations within the project area. The DEIS identified the zoning as: Industrial District, Waterfront Industrial District, and Mixed Use Zone - Industrial District. The zoning designations in sections 1.0 and 5.3.3 (pages 5 and 104 respectively) will be changed to read "I-2 Intensive Industrial District, I-3 Waterfront Industrial District, and IMX Industrial-Commercial Mixed Use District".
- You are correct in identifying Tax Map Key parcel 2-1-1:42 as being zoned P-1 Restricted Preservation District. The correct zoning designation of the subject parcel was an oversight during the DEIS preparation. The FEIS will correctly identify the subject parcel as being P-1 Restricted Preservation District.
- You are correct in stating that some parcels (within the project area) are in the Kakaako Community Development District (KCDD) and are not subject to county zoning designations. Section 5.2.6 of the DEIS indicates that the "proposed Pier 2 Cruise Terminal is situated within the KCDD...administered at the State level and is not subject to City and County rules and regulations".

- The map shown in Figure 2-3 in the DEIS was based upon information contained on the City and County of Honolulu Digital Map Data CD-ROM. The map will be revised to reflect the zoning districts shown in the City and County of Honolulu, Department of Planning and Permitting Zoning Map No. 5 (Kalihi – Nuuanu).

General Plan

- We acknowledge and concur with your comment that, "The proposed projects for Honolulu Harbor and Barbers Point Deep Draft Harbor support the General Plan objectives and policies relating to the full development of the primary urban center; and the continued development of Barbers Point as a major industrial center".

Development Plan

- We acknowledge and concur with your comment that, "the proposed project supports the City's objectives and policies for the current Primary Urban Center and Ewa Development Plan", and that the "proposed cruise ship and excursion vessel terminals support one of the City's long-range vision elements – "The City on the Water" intended to draw people to the waterfront". Additionally, section 5.3.2 of the FEIS will be modified to reiterate the fact that proposed cruise ship and excursion vessel terminals are compatible with the City's development plans.

- Section 2.6.1, Cruise Passenger Terminal at Pier 2 - As per your suggestion, this section of the FEIS will be modified to incorporate the following text: "The proposed two-story height and mauka-makai orientation of the long-axis of the planned terminal complex building is consistent with the City's vision for the redevelopment of the Honolulu Waterfront, as is the proposed system of internal roadways".

- Section 2.6.3, Excursion Vessel Terminal - As per your suggestion, this section of the FEIS will be modified to incorporate the following text: "The proposed single-story height and planned landscaping and "maritime theme garden" are consistent with the City's vision for the redevelopment of the Honolulu Waterfront."

- Section 4.2.3, Aesthetic and Recreational Considerations, Proposed Mitigation Measures - We acknowledge your comment in support of the proposed mitigation measure which addresses the consideration of a "Hawaiian sense of place" during the design stages of the proposed projects.

- Section 5.3.2, Development Plan (DP) for the City and County of Honolulu – We thank you for pointing out that there is no "Oahu DP". The second paragraph of this section should have read "the Oahu DP's consist of" rather than "the Oahu DP consists of". This correction shall be made and incorporated into the FEIS. The remainder of the section correctly addresses the DP's as separate plans. Additionally,

the section further discusses the recent revisions to both the Primary Urban Center and Ewa Development Plans including their revised format containing general policies, planning principles, and guidelines.

- Section 5.3.2 (third paragraph) – Per your suggestion, the descriptive term "in conformance with" shall be changed to "consistent with".

Wastewater Infrastructure

- Section 3.11.2 of the FEIS will indicate that the proposed sewer improvements at Pier 2 should be made in conjunction with the Kakaako Community Development District Area Sewerage Master Plan.

- Your comment that the a municipal sewer system is not available for the layberths and POL facility along Lagoon Drive is correct. The existing and proposed wastewater improvements necessary for this project area have been addressed in sections 3.11.2 and 3.11.2 of the DEIS.

- Section 3.11.2 of the DEIS states that the proposed operations at Piers 12-16 will be "small, non-service oriented operations". Proposed sewer improvements for the proposed project will be minor. However, the FEIS will indicate that any proposed sewer improvements will be contingent upon the upcoming Nimitz Highway Reconstructed Sewer Project (Auahi Street to Hotel Street), tentatively scheduled for completion in September 2000.

- We acknowledge that statements in your comment letter shall not be construed as "confirmation of sewage capacity reservations". Final sewer capacity reservations will be contingent upon the submittal and approval of a Sewer Connection Application from.

We trust that our responses adequately address your comments. We thank you for your comment letter, interest in the project, and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

SAUSE BROS., INC.

PIER 20 • HONOLULU, HAWAII 96817 • TELEPHONE (808) 521-5082
FAX (808) 533-4109

July 19, 1999

Mr. Glenn Soma
STATE OF HAWAII
Harbors Division
79 S. Nimitz Highway
Honolulu, HI 96813

Subject: Oahu Commercial Harbors 2020 Master Plan
Draft Environmental Impact Statement

Dear Mr. Soma:

The Excursion Vessel Terminal's proposed location at Pier 24-29, Honolulu Harbor, is positioned between the industrial operations of Hawaiian Tug & Barge, Hawaiian Flour Mills and the Chevron Shipping Company. The land is contaminated by petroleum products with occasional vapor releases, seepages and explosions. We believe the visual impacts of the surrounding industrial operations and the potential for hazardous materials exposures restrict the viability of this site to industrial operations and therefore offer to relocate our neobulk cargo operations from Piers 2, 19 and 20 to areas within Piers 24-29.

The Excursion Vessel Terminal would be best located at Piers 19-20, where the ferry terminal and the alternate cruise passenger terminal are being planned. This area of the harbor faces the eye-pleasing designs of the downtown waterfront architecture and Aloha Tower Marketplace and is buffered from Nimitz Highway's traffic by the fishing boats berthed at Piers 16-18.

With Sause Bros.' relocation to areas within Piers 24-29, the excursion ferry and cruise passenger operations could have exclusive rights to Piers 19-20, eliminating the safety hazards of mixed cargo and passenger activities. Commercial maritime passenger

SAUSE BROS., INC.

operations would then be concentrated in the eastern portion of Honolulu Harbor (Piers 2 through 20). Maritime industrial operations would occupy Fort Armstrong and the western portions of Honolulu Harbor.

Thank you for your consideration.

Very truly yours,

SAUSE BROS., INC.

Douglas Won

Douglas Won
Vice President

Cc: Wil Chee Planning, Inc.
HMSA Center
1400 Rycroft Street, Suite 928
Honolulu, HI 96814

August 3, 1999

Douglas Won, Vice President
Sause Bros., Inc.
Pier 20
Honolulu, Hawaii 96817

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Draft Environmental Impact Statement (DEIS) Comment Letter

Dear Mr. Won:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for your comment letter dated July 19, 1999.

Your comment letter suggested that the location of the proposed Excursion Vessel Terminal be relocated from Piers 24-29 to Piers 19-20. We acknowledge your suggestion and admit it has merit. The Final EIS will include the option of switching the Excursion Vessel Terminal at Piers 24-29 with the General Cargo Yard at Piers 19-20.

The cumulative environmental impacts will not be affected by the switch of the operations as they are in the same general area. Traffic, air, marine biology, noise, archaeological, etc. impacts will not increase with the change.

We appreciate your company's interest in the environmental review process and response to the DEIS. Thank you for your time and cooperation.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

WIL CHEE - PLANNING, INC.
Land Use Planners and Environmental Consultants
KMSA Center
1400 Rycroft Street
Suite # 928
Honolulu, Hawaii 96814
Phone 808-955-6088
Fax 808-942-1851

August 20, 1999

Attention: Glenn Soma
Dept. of Transportation, Harbors Division
79 South Nimitz Highway
Honolulu, HI 96813

Dear Sir:

Subject: Berthing Facilities Along Keehi Lagoon Drive

After reading an Environmental Notice in February concerning the lay berthing facilities along Lagoon Drive for foreign and domestic fishing boats, barges and impounded vessels. I felt compelled to respond. On March 11, 1999, I submitted my concerns in writing. Several people from the Keehi boating community also responded in writing.

On July 23, 1999, I read another Environment Notice concerning Oahu Commercial Harbors 2020 Master Plan involving the construction of lay berth facilities in Keehi Lagoon to accommodate foreign and domestic commercial fishing vessels, barges, and other vessels, and the construction of a berthing facility for Honolulu Harbor's two emergency spill-response vessels.

Once again, due to my concern of using Keehi Lagoon shore side for lay berthing and dead storage of impounded, derelict, and abandoned vessels, I wish to share my concerns with you.

First, I am an employee of the State of Hawaii; however, the contents and philosophy of this letter is that of an environmentalist and boater. I care deeply about what happens to our state and am passionately involved in the boating community. We are the state's guardian and it is our duty to cherish, nurture, and protect her.

Keehi Lagoon is home to some 800 vessels which includes the Keehi Small Boat Harbor (a state facility), Keehi Marine Center, with a dry dock repair facility, and La Mariana Sailing Club (both private marinas), the Marine Education Training Center, launch ramp facilities, and the canoe facility. It is also home to approximately 200 people, possibly more, who live on their boats.

Keehi Lagoon is also a major recreational area encompassing 4 commercial jet ski operations, a seaplane operation, and a dive operation. It also lies in the airport traffic area of the Honolulu International Airport.

Throughout the years, various barges, work boats and pure junk had been left in the harbor. Some of the submerged barges and junk had been on the bottom for more than 15 years. This had always been an eyesore for everyone especially the tourists as they got their first look at Hawaii from the airplane windows as they landed.

Keehi Lagoon was among five shores cited as being of most concern in a study by the National Oceanic and Atmospheric Administration. The study monitored 14 elements and compounds. The trace elements under study were arsenic, cadmium, copper, mercury, nickel, lead, selenium and zinc, all of which can be harmful to humans and sea life in high concentrations. The organic compounds under study were DDT, chlordane, dieldrin (all pesticides), butyltin (a paint additive), PCB (an electrical industry chemical) and PAH (a widespread byproduct of industrial and oil pollution). In high concentrations, many of these compounds can cause cancer and genetic mutations or can interfere with reproduction.

It was a democratic state government process that created the law and rules governing the clean-up operations at Keehi Lagoon. These rules were initiated by the state legislature, went through public hearings, were discussed at numerous harbor advisory committee and other public informational meetings, and came down to the Boating Division for implementation. As a result, a slow and methodical process was implemented and put into operation.

Vast amounts of time and energies have been exhausted in the process, which has taken years to accomplish. In addition to the more than 600 derelict vessels/contrivances that were disposed of, the North Lagoon had abandoned ships, abandoned 110' barges, sunken 110' barges, a multitude of machine parts, barrels, cable and trash parts, that lined the harbor's floor. The U. S. Navy became involved and has been for the last three years.

In this major undertaking, tremendous amounts of research had to be undertaken. Dealing with the removal of asbestos insulation on a 96' vessel prior to relocation and disposal. The search and recovery of submerged, hazardous materials effort was joined by the Division of Boating and Recreation state employees, the Federal Bureau of Investigation, the U. S. Coast Guard, the Department of Health, and the Environmental Protection Agency. Ongoing investigations revealed cans of sulfuric and phosphoric acid (acids are considered hazardous waste under The Federal Resource Conservation and Recovery Act (RCRA) which regulates hazardous waste. The Office of Hazard Evaluation and Emergency Response determined that an imminent and substantial hazard to human health and the environment existed.

Hazardous substances observed were Xylene, Dolphinite bedding compound (containing pentachlorophenol, large quantities of epoxy paints (two part), resin, lubricating oil, and cleaning compounds containing Glycol ethers and solvents. There was also waste insecticide and unknown debris, automotive artillery grease, aircraft oil lubricant, a scooter, and a sedan to name a few.

Each step taken created another caveat. Procedures for applications, instructions, preparation forms had to be established, requirements and documentation for ocean disposal had to be researched and established. Numerous meetings with the Environmental Protection Agency, the land division, and the U. S. Coast Guard. Once the path was established on how to proceed, then procedures were set in motion to follow the detailed requirements prior to obtaining the authorization for permits and/or disposals. The reporting burden included time for reviewing the instructions, gathering data, completing and reviewing the various questionnaires required.

An article that appeared in the Star Bulletin editorial in 1994 stated that the clean-up of Keehi lagoon was one of the top achievements of the Waihee Administration. This same clean-up at Keehi Lagoon brought over $600,000 in Federal EPA super fund monies to address the environmental issues, Hawaii's largest single super funded clean-up project. It also more than doubled the responsibilities of the state employees working at Keehi at the time.

With the efforts of the U. S. Navy, the north lagoon was cleared of undesirable sights and hazards that have plagued Keehi Lagoon for years. In this past year alone, they accomplished the loading and testing of numerous pieces of salvage and diving equipment, developed a salvage plan to conduct topside and underwater cutting in conjunction with heavy lifting equipment to salvage the scrap metal, salvaged various miscellaneous pieces of scrapmetal weight up to ten tons, salvaged two scrap barges weighing in excess of three hundred tons.

We are not against change and believe additional marinas and additional commercial activities can work alongside the recreational aspects of the lagoon. We understand the refurbishment of Kewalo Basin and the construction of the new Fishing Village, but we cannot use Keehi Lagoon as a dumping ground for the state as it was used by entrepreneurs that had gone bust. Millions of dollars, countless man-hours have been invested in our lagoon. We must not sacrifice our environment or values at any cost. We must not allow Keehi Lagoon to be used as a means to move a long existing problem from one location to another. We must do what is right.

Now, as you sail around Keehi Lagoon, you will see it as a far better, safer, cleaner and more attractive recreational facility. We have boaters reporting young sea turtles in the lagoon (this was unheard of), we have manta rays that come to visit, various types of fish are now congregating around the piers; even some coral is beginning to return. We also have the sailboat races on Wednesday evenings. Given the proper resources and a watchful eye, we will be able to maintain the lagoon in a fashion the state as well as mother nature intended it to be.

Respectfully submitted,

Nancy E. Murphy

Nancy E. Murphy
5122 Likini Street, #716
Honolulu, HI 96818

cc: Governor, State of Hawaii
Office of Environmental Quality Control
Wil Chee Planning, Inc.

WIL CHEE - PLANNING, INC.

September 3, 1999

Nancy E. Murphy
3122 Likini Street, #716
Honolulu, Hawaii 96818

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Draft Environmental Impact Statement (DEIS)

Dear Ms. Murphy:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for your comment letter to the HDOT-HAR dated August 20, 1999. Your comments primarily expressed concern about the proposed lay berthing facilities along Lagoon Drive.

Your letter expressed concern over past and potential future dumping practices of i) abandoned vessels and ii) miscellaneous garbage and hazardous materials into Ke'ehi Lagoon. DOT-HAR understands these concerns and is aware of the past practices of illegal dumping which continued for many years and required extensive clean up efforts to restore the lagoon to its present condition.

Specific concerns expressed in your comment letter were:

- The use of Ke'ehi Lagoon shore side for lay berthing and dead storage of impounded, derelict, and abandoned vessels.
- Illegal dumping of hazardous materials and garbage into Ke'ehi Lagoon
- The use of Ke'ehi Lagoon as a dumping ground for the State of Hawaii
- The preservation of Ke'ehi Lagoon as a safe, clean, and attractive recreational facility.

The proposed layberths will be used primarily for the temporary docking of fully operational fishing vessels which are not in use. To a lesser degree, the layberths will also be utilized for the storage of impounded vessels. A detailed description of the proposed improvements in along Lagoon Drive have been presented in section 2.6.4 of the DEIS.

Land Use Planners and Environmental Consultants
[illegible] Center • 1400 [illegible] Street • Suite • [illegible] • Honolulu, Hawaii 96814 • Phone [illegible] • Fax [illegible] • E-Mail [illegible]

It is a common misperception that an "impounded" vessel is synonymous with an "abandoned" vessel. This is not the case. Vessels which are impounded are held until such time it is determined that the vessel's owner(s) is unable to meet due restitution. Only after it has been determined that the owner(s) is unable to meet due restitution would the vessel be considered abandoned.

DOT-HAR is required to follow a specific set of procedures when disposing of abandoned vessels. Abandoned vessels must be thoroughly cleaned, prepared, weighted, and sunken in offshore areas where they would subsequently function as artificial reefs. The vessels are usually placed in sandy offshore areas where there is no existing natural reef.

Disposal of abandoned vessels is a carefully monitored process requiring close coordination with both federal and state agencies. Coordination with the United States Coast Guard and the State Department of Health is required during the cleaning, preparation, weighting, and certification of the vessel(s). Coordination with the State Department of Land and Natural Resources is required in determining a suitable offshore location for the vessel(s). This mechanism of inter-agency coordination and approvals ensures the timely removal and environmentally sound disposal of abandoned vessels.

DOT-HAR shares your concerns regarding potential illegal dumping of garbage and hazardous materials into Ke'ehi Lagoon. Therefore, DOT-HAR believes in taking a proactive approach in the prevention of illegal dumping practices.

The Harbor Patrol is an enforcement branch of DOT-HAR which patrols the waters of Honolulu Harbor and Ke'ehi Lagoon. Harbor Patrol officers are highly mobile utilizing both wheeled vehicles and motorized boats. This mobility allows officers to effectively cover large areas of Honolulu Harbor and Ke'ehi Lagoon and serve as a deterrent to illegal dumping practices. Additionally, the close proximity of the proposed layberths to the DOT-Airport Division fire station (located directly to the south-west of the site), and DOT-Airport's patrol units would further deter illegal dumping practices within Ke'ehi Lagoon.

Parties engaging in illegal dumping activities would also be subject to legal action. Various laws at the county (Revised Ordinances Sect. 29-4.1 – 29-4.9), state (HRS Sect. 128D1-6 – 128D1-11), and federal (42 U.S.C. Sect. 9601-9675) levels address the issue of illegal dumping of both garbage (litter) and hazardous wastes. These laws are

designed to provide an enforcement authority, defining responsible parties, holding parties "liable" for their actions, and subjecting them to applicable civil and criminal penalties.

CORRECTION

THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY

SEE FRAME(S) IMMEDIATELY FOLLOWING

WIL CHEE - PLANNING, INC.

September 3, 1999

Nancy E. Murphy
5122 Likini Street, #716
Honolulu, Hawaii 96818

Subject: Oahu Commercial Harbors 2020 Master Plan – Immediate Phase.
Response to the Draft Environmental Impact Statement (DEIS)

Dear Ms. Murphy:

On behalf of the Hawaii Department of Transportation – Harbors Division (HDOT-HAR), we thank you for your comment letter to the HDOT-HAR dated August 20, 1999. Your comments primarily expressed concern about the proposed lay berthing facilities along Lagoon Drive.

Your letter expressed concern over past and potential future dumping practices of i) abandoned vessels and ii) miscellaneous garbage and hazardous materials into Ke'ehi Lagoon. DOT-HAR understands these concerns and is aware of the past practices of illegal dumping which continued for many years and required extensive clean up efforts to restore the lagoon to its present condition.

Specific concerns expressed in your comment letter were:

- The use of Ke'ehi Lagoon shore side for lay berthing and dead storage of impounded, derelict, and abandoned vessels.
- Illegal dumping of hazardous materials and garbage into Ke'ehi Lagoon
- The use of Ke'ehi Lagoon as a dumping ground for the State of Hawaii
- The preservation of Ke'ehi Lagoon as a safe, clean, and attractive recreational facility.

The proposed layberths will be used primarily for the temporary docking of fully operational fishing vessels which are not in use. To a lesser degree, the layberths will also be utilized for the storage of impounded vessels. A detailed description of the proposed improvements in along Lagoon Drive have been presented in section 2.6.4 of the DEIS.

It is a common misperception that an "impounded" vessel is synonymous with an "abandoned" vessel. This is not the case. Vessels which are impounded are held until such time it is determined that the vessel's owner(s) is unable to meet due restitution. Only after it has been determined that the owner(s) is unable to meet due restitution would the vessel be considered abandoned.

DOT-HAR is required to follow a specific set of procedures when disposing of abandoned vessels. Abandoned vessels must be thoroughly cleaned, prepared, weighted, and sunken in offshore areas where they would subsequently function as artificial reefs. The vessels are usually placed in sandy offshore areas where there is no existing natural reef.

Disposal of abandoned vessels is a carefully monitored process requiring close coordination with both federal and state agencies. Coordination with the United States Coast Guard and the State Department of Health is required during the cleaning, preparation, weighting, and certification of the vessel(s). Coordination with the State Department of Land and Natural Resources is required in determining a suitable offshore location for the vessel(s). This mechanism of inter-agency coordination and approvals ensures the timely removal and environmentally sound disposal of abandoned vessels.

DOT-HAR shares your concerns regarding potential illegal dumping of garbage and hazardous materials into Ke'ehi Lagoon. Therefore, DOT-HAR believes in taking a proactive approach in the prevention of illegal dumping practices.

The Harbor Patrol is an enforcement branch of DOT-HAR which patrols the waters of Honolulu Harbor and Ke'ehi Lagoon. Harbor Patrol officers are highly mobile utilizing both wheeled vehicles and motorized boats. This mobility allows officers to effectively cover large areas of Honolulu Harbor and Ke'ehi Lagoon and serve as a deterrent to illegal dumping practices. Additionally, the close proximity of the proposed layberths to the DOT-Airport Division fire station (located directly to the south-west of the site), and DOT-Airport's patrol units would further deter illegal dumping practices within Ke'ehi Lagoon.

Parties engaging in illegal dumping activities would also be subject to legal action. Various laws at the county (Revised Ordinances Sect. 29-4.1 – 29-4.9), state (HRS Sect. 128D1-6 – 128D1-11), and federal (42 U.S.C. Sect. 9601-9675) levels address the issue of illegal dumping of both garbage (litter) and hazardous wastes. These laws are

designed to provide an enforcement authority, defining responsible parties, holding parties "liable" for their actions, and subjecting them to applicable civil and criminal penalties.

DOT-HAR would like to reiterate that they do not conduct or condone illegal dumping activities of any sort in Hawaii's coastal waters. Your club members and the surrounding community can be assured that Ke'ehi Lagoon will not become a "dumping ground" for garbage and hazardous materials. DOT-HAR prohibits, and actively prevents the illegal dumping of wastes within waters under their jurisdiction.

In closing, we emphasize that DOT-HAR fully recognizes and intends to preserve the unique resources which Ke'ehi Lagoon provides the citizens of Hawaii. To this end, harbor development projects such as the proposed layberths are meant to improve the recreational, educational, commercial, and industrial infrastructure of the state while also preserving the quality of the environment.

Thank you very much for your comments on the DEIS, your interest in Hawaii's coastal environment, and the environmental review process.

Sincerely,

Richard Stook
Environmental Planner

cc. Glenn Soma, HDOT-HAR

APPENDIX B
Acoustic Study

ACOUSTIC STUDY FOR THE OAHU COMMERCIAL HARBORS 2020 MASTER PLAN, IMMEDIATE PHASE

HONOLULU, HAWAII

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MAY 1999

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CHAPTER I. SUMMARY

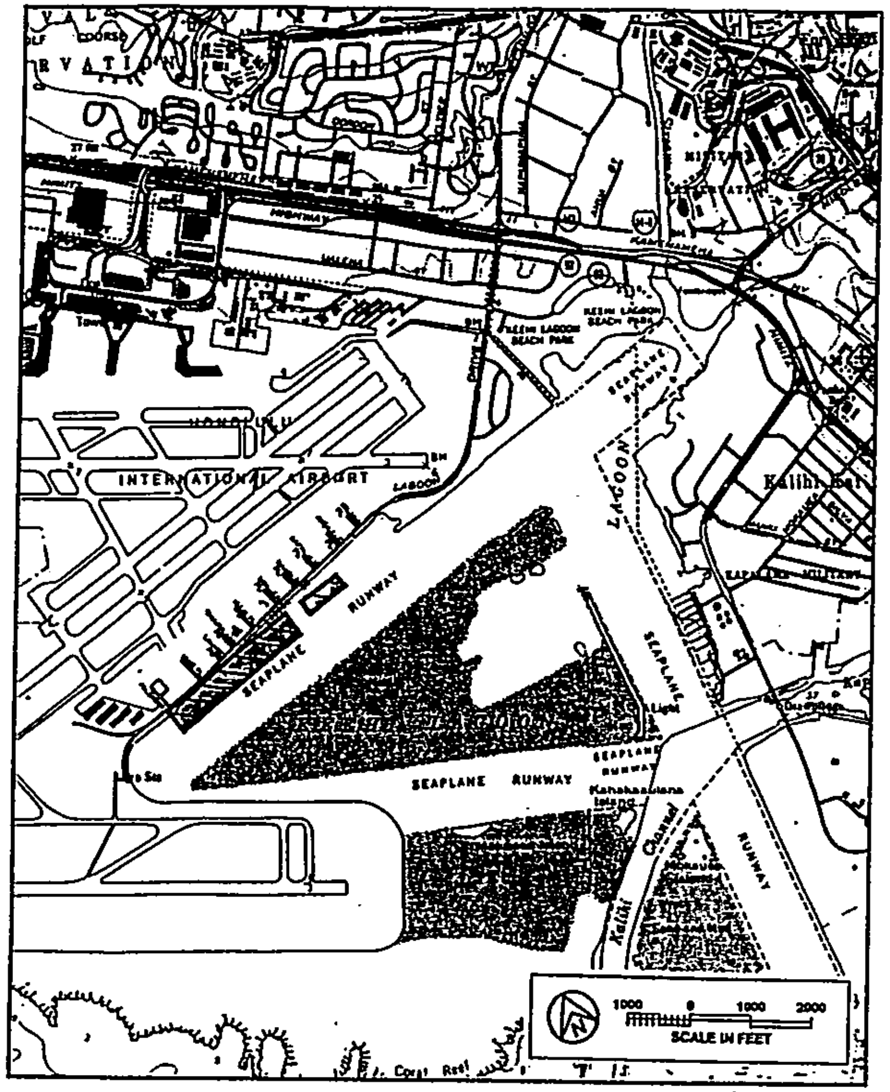
This noise study describes the potential noise impacts associated with implementation of the Oahu Commercial Harbors 2020 Master Plan, Immediate Phase. The specific projects included in this study were:

- The Construction of Lay-Berths Along Lagoon Drive in Keehi Lagoon for Commercial Fishing and Oil Response Vessels;
- Reconstruction and Expansion of Piers 12 to 16 To Accommodate More Domestic Fishing Vessels;
- Construction of An Excursion Vessel Passenger Terminal at Piers 24 to 29; and
- Construction of a Two-Ship, Cruise Vessel Terminal at Pier 2.

Figures 1 through 5 depict the locations of these four projects. The existing and future traffic noise levels in the vicinity of two of the four proposed harbor projects were evaluated for their potential noise impacts. The increases in traffic noise levels attributable to the project are predicted to be less than 1.0 DNL along Nimitz Highway and Ala Moana Boulevard. Although future traffic noise levels along these high volume roadways are predicted to remain above the FHA/HUD standard of 65 DNL along the lots fronting these roadways, the proposed harbor projects should not contribute significantly (0.5 DNL or less) to future traffic noise levels along the high volume roadways.

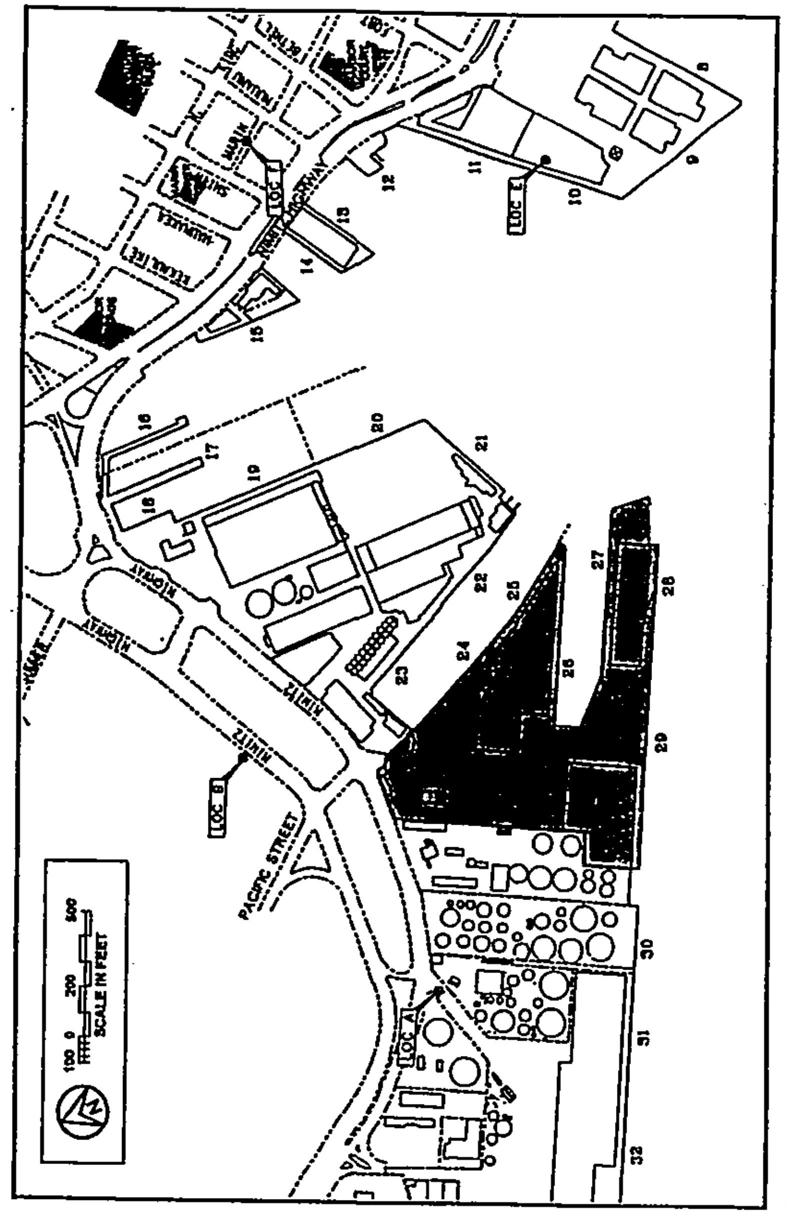
Although projected noise level increases of 2.6 to 4.8 DNL are predicted along the low volume roadways makai of Nimitz Highway and Ala Moana Boulevard (Channel, Ilalo, South, and Pacific Streets) at the project sites, the future traffic noise levels associated with these roadways are expected to remain relatively low and less than 60 DNL at 100 feet distance from their centerlines. Because no significant traffic noise impacts are expected from the two harbor projects examined, traffic noise mitigation measures should not be required.

Other noise sources emanating from the site, such as from fixed mechanical equipment, heavy truck and buses, mobile harbor equipment and vessels, and ship whistles and horns, have the potential for being audible at adjoining properties or at nearby residential condominiums. Noise mitigation measures designed to limit the noise levels from these sources to the State DOH limits (where applicable) are recommended for minimizing risks of adverse noise impacts from these sources. The available buffer distances between the harbor noise sources and existing residential condominiums are relatively large, such that risks of adverse noise impacts from these sources are considered to be low.



PROJECT LOCATION MAP – NEW LAY–BERTHS AT KEEHI LAGOON ALONG LAGOON DRIVE

FIGURE 1



PROJECT LOCATION MAP – NEW EXCURSION VESSEL PASSENGER TERMINALS AT PIERS 24 TO 29

FIGURE 2

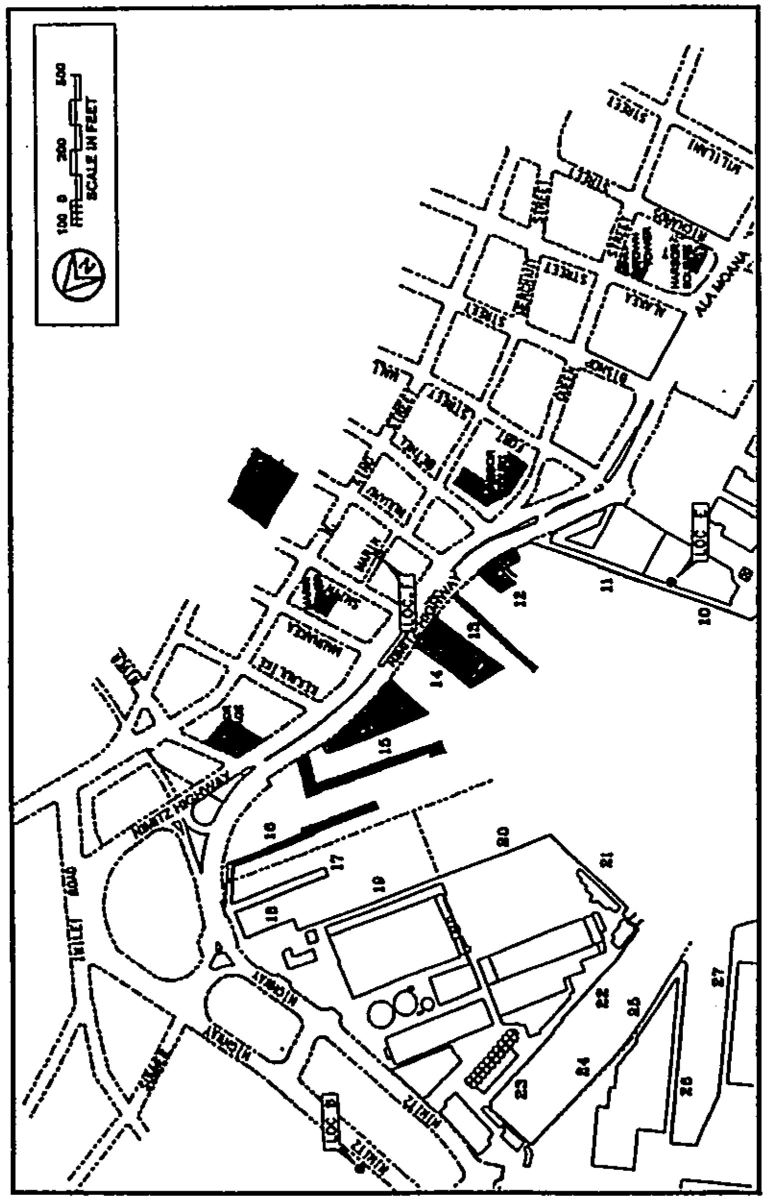


FIGURE 3

PROJECT LOCATION MAP — RECONSTRUCTION AND EXPANSION OF PIERS 12 TO 16

Unavoidable, but temporary, noise impacts may occur during the construction period. Because noise from construction activities are predicted to be audible at adjoining properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to minimize noise and vibration during the site and foundation work at the harbor project sites are recommended. Mitigation measures to reduce construction noise to inaudible levels may not be practical in all cases. Compliance with State Department of Health (DOH) noise regulations and applicable construction curfew periods are recommended to minimize construction noise impacts.

CHAPTER II. PURPOSE

The overall objective of this study was to describe the potential noise impacts associated with implementation of the Oahu Commercial Harbors 2020 Master Plan, Immediate Phase, and to provide noise mitigation measures as required. The specific projects included in this study were:

- The Construction of Lay-Berths Along Lagoon Drive in Keehi Lagoon for Commercial Fishing and Oil Response Vessels;
- Reconstruction and Expansion of Piers 12 to 16 To Accommodate Domestic Fishing Vessels;
- Construction of An Excursion Vessel Passenger Terminal at Piers 24 to 29; and
- Construction of a Two-Ship, Cruise Vessel Terminal at Pier 2.

The additional objectives of this study were to describe the existing and future noise environment in the vicinity of the proposed Oahu harbor projects. Traffic noise level increases and impacts associated with the Cruise Vessel Terminal (Pier 2) and Excursion Vessel Passenger Terminal (Piers 24 to 29) projects were to be determined within the project site as well as along the public roadways expected to service the project traffic. A specific objective was to determine future traffic noise level increases associated with both project and non-project traffic, and the potential noise impacts associated with these increases. Recommendations for minimizing these noise impacts were also to be provided as required.

Assessments of future noise impacts from the proposed harbor activities and from temporary construction activities at the project sites were also included in the noise study objectives. It was assumed that the facility would be acoustically designed to comply with local noise regulations, and that automobiles, buses, and trucks traveling to and from the harbor project sites would also comply with local vehicular noise limits. Compliance with local noise regulations should minimize risks of adverse noise impacts from mechanical and vehicular noise sources. Therefore, evaluations of special noise mitigation measures associated with potential vehicular and mechanical equipment noise emissions from the project site were not included in this study.

Noise impacts during construction of the planned improvements, which could involve pile driving operations, were also to be evaluated. In addition, potential traffic noise level increases and impacts associated with project traffic along the roadways servicing the four harbor projects were assessed. Assessments of possible future impacts from harbor vessel and equipment noise sources were also included as noise study objectives. Recommendations for minimizing identified noise impacts were also to be provided as required.

CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies to assess environmental noise is the Day-Night Average Sound Level (DNL or Ldn). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the DNL descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. A more complete list of noise descriptors is provided in Appendix B to this report.

Table 1, derived from Reference 1, presents current federal noise standards and acceptability criteria for residential land uses, which are present within the general environs of the Oahu harbor areas and which may be affected by noise from harbor related activities. Land use compatibility guidelines for various levels of environmental noise as measured by the DNL descriptor system are shown in Figure 6. In general, the recommended noise levels for residences are lower than those for commercial and industrial uses. In the Oahu harbor areas where the four project sites are located, existing DNL levels generally range from 60 to 70 DNL, and are influenced by surf noise, motor vehicle traffic, aircraft, and harbor vessels and equipment. These estimates of existing background ambient noise levels were based on noise measurements obtained at Piers 2, 11, 12, and 25 during the month of December 1998.

For the purposes of determining noise acceptability for funding assistance from federal agencies [Federal Housing Administration/Housing and Urban Development (FHA/HUD) and the Veterans' Administration (VA)], an exterior noise level of 65 DNL or lower is considered acceptable. This standard is applied nationally (Reference 2), including Hawaii. Because of the predominant use of naturally ventilated dwellings on Oahu, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 DNL does not eliminate all risks of noise impacts. Because of these factors, and as recommended in Reference 3, a lower level of 55 DNL is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 DNL, government agencies such as FHA/HUD and VA have selected 65 DNL as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 DNL are generally considered acceptable. Exceptions to this occur when naturally ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 DNL. The Oahu harbor project areas include proposed land uses and activities which fall within the commercial and industrial categories. These proposed land uses and activities are not considered to be noise sensitive, and risks of adverse noise impacts within the harbor areas are considered to be small.

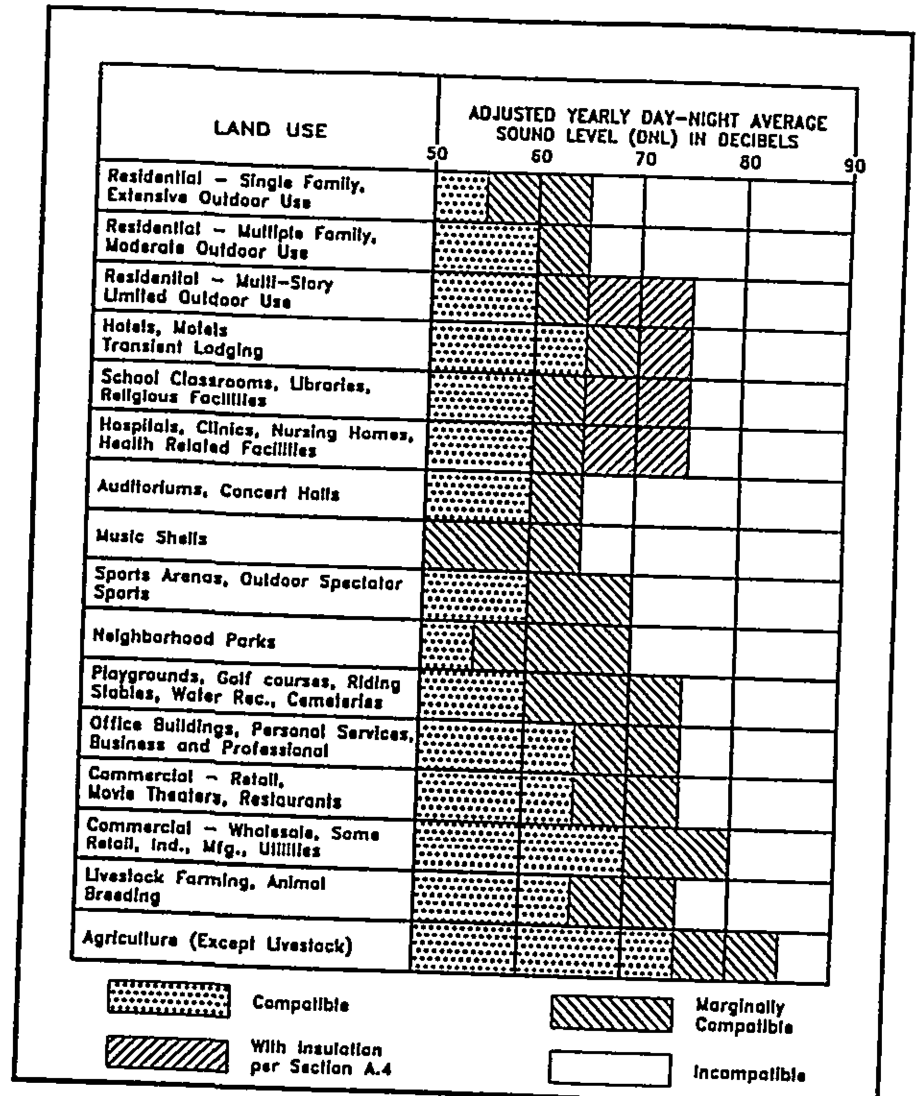
TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION (RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY-NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL (1) STANDARD
Minimal Exposure	Not Exceeding 55 Ldn	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 Ldn But Not Above 65 Ldn	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 Ldn But Not Above 75 Ldn	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 Ldn	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.



LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY-NIGHT AVERAGE SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED.
(Source: American National Standards Institute S12.9-1998/Part 5)

FIGURE 5

In Hawaii, the State Department of Health (DOH) regulates noise from motor vehicles (see Reference 4), from stationary mechanical equipment (see Reference 5), and from construction activities (see Reference 5). The noise from ships and small water craft are not regulated by the DOH. State DOH noise regulations concerning stationary mechanical equipment are expressed in maximum allowable property line noise limits rather than DNL (see Reference 5). For agricultural or industrial lands, the allowable limits are 70 dBA for daytime and nighttime periods along the property boundaries. The daytime period is defined to be from 7:00 am to 10:00 pm, and the nighttime period is considered to be the remaining hours by the DOH rules. For properties zoned for apartment, hotel, or business uses, the applicable DOH property line noise limits are 60 and 50 dBA during the daytime and nighttime periods, respectively. For single family residences, public and open spaces, and preservation zoned lands, the daytime and nighttime DOH limits are 55 and 45 dBA, respectively. Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for residential, commercial, and agricultural/industrial lands equate to approximately 55, 60, and 76 DNL, respectively. In general, the lower noise limits would only apply to harbor lands which abut lands zoned for activities other than industrial or agricultural uses.

It should be noted that the noise compatibility guidelines and relationships to the DNL noise descriptor may not be applicable to impulsive noise sources. The use of penalty factors (such as adding 10 dB to measured sound levels or the use of C-Weighting filters) have been proposed. However, the relationships between levels of impulsive noise sources and land use compatibility have not been as firmly established as have the relationships for non-impulsive sources. The State DOH limits for impulsive sounds which exceed 120 impulses in any 20 minute period are 10 dB above the limits for non-impulsive sounds. If impulsive sounds do not exceed 120 impulses in any 20 minute time period, there are no regulatory limits on their sound levels under the State DOH regulations.

CHAPTER IV. GENERAL STUDY METHODOLOGY

Existing traffic noise levels were measured at three locations in the project environs to provide a basis for developing the project's traffic noise contributions along the public roadways which will service the proposed harbor projects at Pier 2 and Piers 24 to 29: Ala Moana Boulevard, Nimitz Highway, Pacific Street, Channel Street, and South Street. The locations of the measurement sites (Sites "A" thru "C") are shown in Figures 2 through 5. Noise measurements were performed during the month of December 1998, and were performed prior to and during the PM peak traffic hour.

The noise measurement results, and their comparisons with computer model predictions of existing traffic noise levels are summarized in Table 2. The results of the noise measurements were also compared with calculations of existing traffic noise levels to validate the computer model used. Traffic noise calculations for the existing conditions as well as noise predictions for the year 2003 following completion of the proposed development were performed using the Federal Highway Administration (FHWA) Noise Prediction Model (Reference 6). Traffic data entered into the noise prediction model were: hourly traffic volumes, average vehicle speeds, and estimates of traffic mix. The traffic assignments for the project (Reference 7) and Hawaii State Department of Transportation (HDOT) traffic counts on Ala Moana Boulevard and Nimitz Highway (References 8 and 9) were the primary sources of data inputs to the model. For existing and future traffic without the project, it was assumed that the PM peak hour Leq(h) [Equivalent Sound Level] was 0.5 to 1.5 dB less than the 24-hour DNL. This assumption was based on computations of the hourly Leq and 24-hour DNL of traffic noise along Nimitz Highway and Ala Moana Boulevard (see Figures 7 through 9). Traffic noise levels for existing and future conditions in the project environs were developed for the worst case conditions of a high-rise receptor without the benefit of shielding effects. The projected increases in traffic noise levels attributable to project-related traffic were calculated, and noise impact risks evaluated. The relative contributions of non-project and project-related traffic to the total noise levels were also calculated, and an evaluation of possible traffic noise impacts was made.

The possibility of adverse noise impacts from planned harbor activities were also evaluated. Measured sound levels of harbor equipment, ship music and public address announcements, ship horns, and ship machinery were obtained at Sites "D" through "F" where shown in Figures 2 through 5. Predicted sound levels from these on-site activities at the nearest noise sensitive receptor locations were compared with the noise limits of the State Department of Health (DOH) noise regulation (Reference 5). Additionally, noise levels from on-site construction activities were also estimated to assess the risks of adverse noise impacts at the neighboring noise sensitive properties due to short-term construction activities.

TABLE 2

TRAFFIC NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	--Hourly Traffic Volume-- AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A. 65 FT from the center-line of Nimitz Hwy. (12/9/98)	1457 TO 1555	45	2,263	85	44	71.8	71.9
B. 56 FT from the center-line of Nimitz Hwy. (12/9/98)	1600 TO 1655	43	2,828	56	14	68.9	68.9
C. 111 FT from the center-line of Ala Moana Blvd. (12/10/98)	1435 TO 1600	37	4,878	124	124	67.0	66.9
C. 111 FT from the center-line of Ala Moana Blvd. (12/10/98)	1600 TO 1651	37	5,555	94	50	65.5	65.9

FIGURE 6

HOURLY VARIATIONS OF TRAFFIC NOISE AT 100 FT SETBACK DISTANCE FROM THE CENTERLINE OF NIMITZ HIGHWAY (WESTBOUND) AT PACIFIC STREET (APRIL 15 – 18, 1991)

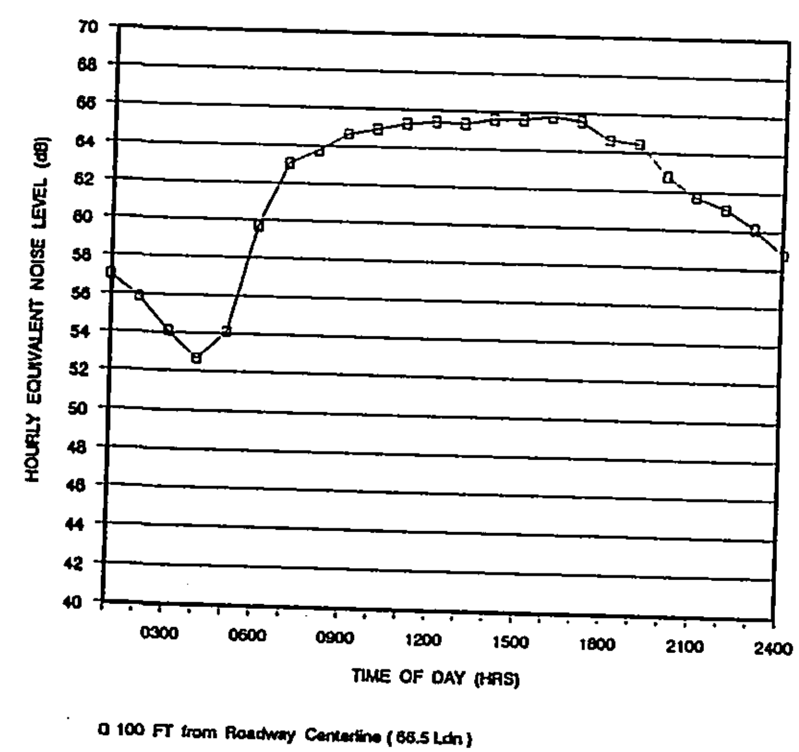


FIGURE 7

HOURLY VARIATIONS OF TRAFFIC NOISE AT 100 FT SETBACK DISTANCE FROM THE CENTERLINE OF NIMITZ HIGHWAY (EASTBOUND) AT PACIFIC STREET (APRIL 15 – 18, 1991)

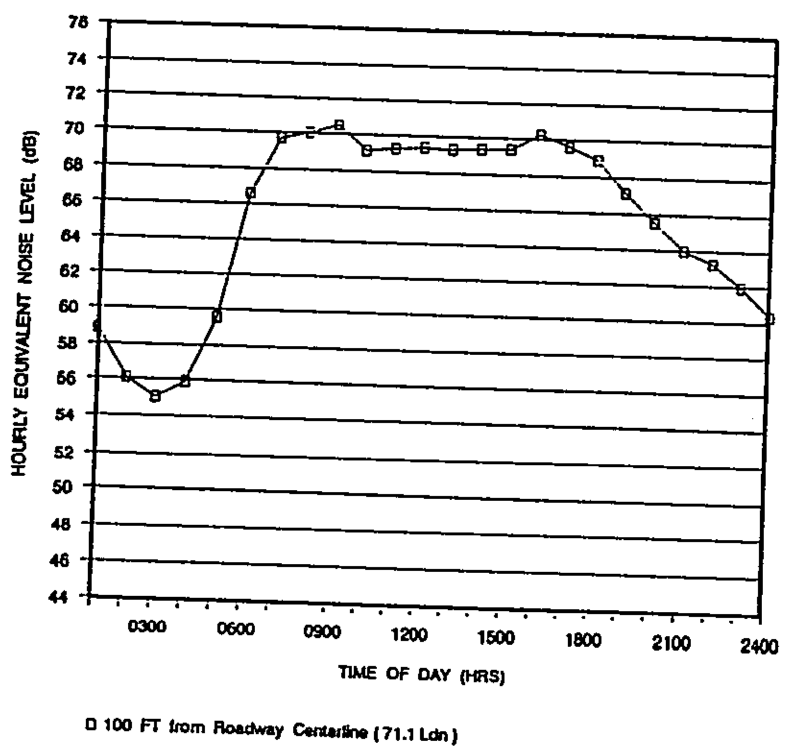
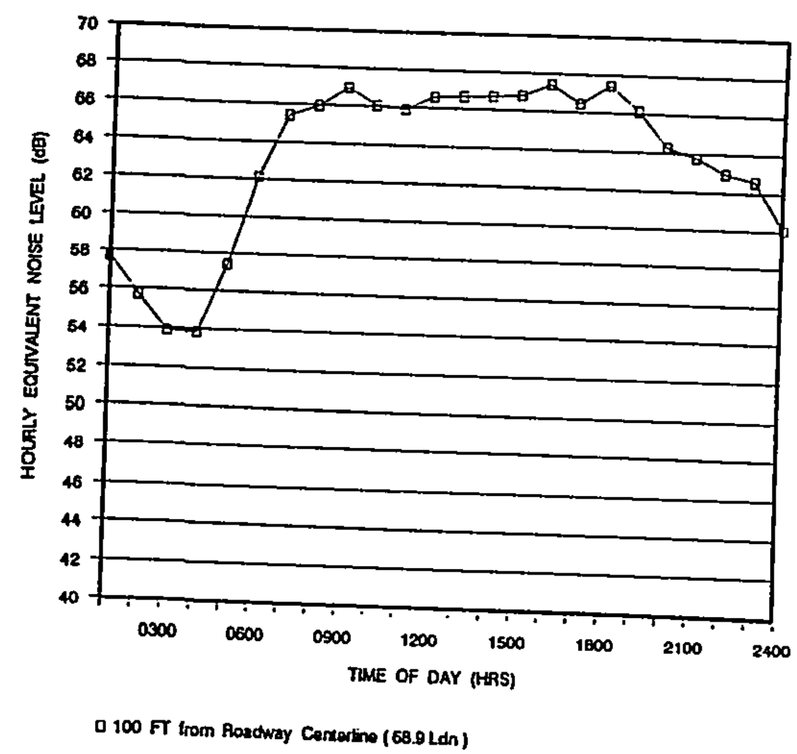


FIGURE 8

HOURLY VARIATIONS OF TRAFFIC NOISE AT 100 FT SETBACK DISTANCE FROM THE CENTERLINE OF ALA MOANA BOULEVARD WEST OF SOUTH STREET (MAY 17 – 18, 1995)



CHAPTER V. EXISTING NOISE ENVIRONMENT

The existing traffic noise levels in the project environs are in the "Significant Exposure, Normally Unacceptable" category for noise sensitive activities at the lots which front Nimitz Highway and Ala Moana Boulevard. For commercial and industrial uses, existing traffic noise levels along these roadways are in the "Compatible" and "Marginally Compatible" categories. Traffic noise levels along the Right-of-Way of a roadway generally represent the worst case (or highest) levels due to the proximity of the Right-of-Way to the noise sources.

Calculations of existing traffic noise levels during the PM peak traffic hour at 100 feet from the centerlines of the various roadways are presented in Table 3. The hourly Leq (or Equivalent Sound Level) contribution from each street section in the project environs was calculated for comparison with forecast traffic noise levels with and without the project. In Table 3, existing peak hour traffic volumes (in VPH, or vehicles per hour) during 1998 are compared with forecast conditions with the project in CY 2003. The existing and forecast mixes and hourly noise contributions from the automobile (AUTO), medium truck (MT) and heavy vehicle (HT) traffic components are shown in the tables. The existing setback distances from the roadways' centerlines to their associated 65, 70, and 75 DNL contours were also calculated as shown in Table 4. The contour line setback distances do not take into account noise shielding effects or the additive contributions of traffic noise from intersecting street sections. However, as indicated previously, the setback distances to the 65 DNL (of FHA/HUD noise standard) contour lines are very large for the high volume streets in the project environs.

Existing background ambient noise levels at noise sensitive receptor locations closest to the harbor projects are controlled by traffic noise. Average traffic noise levels in the project environs typically remain steady during the daylight hours from 7:00 AM and through the evening hours until 6:00 PM. After 6:00 PM, average traffic noise levels decline to their lowest levels at 4:00 AM the next morning. The residual (or minimum) background noise level during the daytime hours is approximately 55 to 60 dB, and declines to a value between 45 and 50 dB during the quietest hour near 4:00 AM. This pattern of relatively high traffic noise levels during the daytime followed by a declining period to 4:00 AM is characteristic of Honolulu, and is depicted in Figures 7 through 9.

TABLE 3

COMPARISONS OF EXISTING (CY 1998) AND FUTURE (CY 2003) TRAFFIC NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PM PEAK HOUR AND 100 FT FROM ROADWAY CENTERLINE)

LOCATION	SPEED (MPH)	VPH	**** HOURLY LEQ IN dB **** AUTO	MT	HT	ALL VEH
EXISTING (CY 1998) PM PEAK HR. TRAFFIC:						
Ala Moana Blvd. West of Punchbowl	37	5,699	61.2	55.9	58.4	66.7
Ala Moana Blvd. East of Punchbowl	37	5,400	61.0	55.6	58.2	66.5
Ala Moana Blvd. West of South	37	5,395	61.0	55.6	58.2	66.4
Ala Moana Blvd. East of South	37	4,989	60.6	55.3	57.9	66.1
Punchbowl Street	35	831	56.7	50.1	51.2	58.4
Channel Street	15	131	34.5	31.9	41.1	42.4
South Street (Mauka of Ala Moana)	35	691	55.9	49.3	50.4	57.6
South Street (Makai of Ala Moana)	35	115	47.9	43.8	49.6	52.5
Nimitz Highway (North) At Pacific	43	2,898	63.5	57.9	59.9	66.9
Nimitz Highway (South) At Pacific	45	2,715	66.0	60.3	62.1	69.2
Pacific Street (Mauka)	30	392	50.8	45.9	49.3	53.9
Pacific Street (Middle)	30	428	51.1	47.2	53.6	56.2
Pacific Street (Makai)	15	132	34.6	31.9	41.1	42.4
FUTURE (WITH PROJECT, CY 2003) PM PEAK HR. TRAFFIC:						
Ala Moana Blvd. West of Punchbowl	37	7,134	62.2	56.8	59.4	67.7
Ala Moana Blvd. East of Punchbowl	37	6,114	61.5	56.2	58.7	67.0
Ala Moana Blvd. West of South	37	6,112	61.5	56.2	58.7	67.0
Ala Moana Blvd. East of South	37	5,670	61.2	55.8	58.4	66.7
Punchbowl Street	35	881	56.9	50.4	51.4	58.7
Ilalo Street	25	839	51.0	47.4	54.6	56.7
South Street (Mauka of Ala Moana)	35	766	56.3	49.8	50.8	58.1
South Street (Makai of Ala Moana)	35	216	50.7	46.5	52.3	55.2
Nimitz Highway (North) At Pacific	43	3,508	64.3	58.7	60.7	67.7
Nimitz Highway (South) At Pacific	45	3,153	65.6	59.9	61.7	68.9
Pacific Street (Mauka)	30	361	50.5	45.5	48.9	53.5
Pacific Street (Middle)	30	475	51.6	47.7	54.1	56.6
Pacific Street (Makai)	15	219	36.8	34.1	43.3	44.6

Notes:

The following assumed traffic mix of autos, medium trucks, and heavy vehicles were used:

1. For Nimitz Hwy. and Ala Moana Blvd.: 97.0% autos, 2.0% medium trucks, and 1.0% heavy
2. For Channel St., Ilalo St., South St. (Makai), Pacific St. (Middle & Makai): 95.0% autos, 2.5% medium trucks, and 2.5% heavy trucks and buses.
3. For All Other Roadways: 98.0% autos, 1.5% medium trucks, and 0.5% heavy trucks and buses.

TABLE 4

EXISTING AND CY 2003 DISTANCES TO 65, 70, AND 75 DNL CONTOURS

STREET SECTION	65 DNL SETBACK (FT) EXISTING	65 DNL SETBACK (FT) CY 2003	70 DNL SETBACK (FT) EXISTING	70 DNL SETBACK (FT) CY 2003	75 DNL SETBACK (FT) EXISTING	75 DNL SETBACK (FT) CY 2003
Ala Moana Blvd. West of Punchbowl	202	250	69	83	35	38
Ala Moana Blvd. East of Punchbowl	192	218	66	73	34	35
Ala Moana Blvd. West of South	192	218	66	73	34	35
Ala Moana Blvd. East of South	177	203	62	68	33	35
Punchbowl Street	31	33	<20	<20	<10	<10
Channel / Ilalo Streets	<20	21	<20	<20	<10	<10
South Street (Mauka of Ala Moana)	26	29	<20	<20	<10	<10
South Street (Makai of Ala Moana)	<20	<20	<20	<20	<10	<10
Nimitz Highway (North) At Pacific	206	258	78	84	39	31
Nimitz Highway (South) At Pacific	345	338	121	110	52	39
Pacific Street (Mauka)	<20	<20	<20	<20	<20	<20
Pacific Street (Middle)	<20	<20	<20	<20	<20	<20
Pacific Street (Makai)	<20	<20	<20	<20	<10	<10

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See TABLE 3 for traffic volume, speed, and mix assumptions.
(3) Setback distances are for unobstructed line-of-sight conditions.
(4) Hard ground conditions assumed along all roadways.
(5) Along Nimitz Highway and Pacific Street, DNL = PM Peak Hour Leq + 1.0.
(6) Along Ala Moana Blvd., Punchbowl, South, Channel, and Ilalo Streets, DNL = PM Peak Hour Leq + 1.5.

CHAPTER VI. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The future traffic noise levels in the immediate vicinity of the Piers 24 to 29 Project and the Pier 2 Project during CY 2003 were evaluated for the No Build and Build Alternatives. The same methodology that was used to calculate the Base Year noise levels was also used to calculate the year 2003 noise levels. Under both the No Build and Build Alternatives, average vehicle speeds and traffic mix were assumed to be identical to the Base Year values.

Table 3 presents the CY 2003 traffic volumes, speeds, mixes, and noise levels for the Build Alternative during the PM peak hour along the roadways which are expected to service to two harbor projects. The traffic volumes for Scheme 2 of the Pier 2 Project was included in Table 3, so as to include the larger noise level increases along Channel Street and South Street makai of Ala Moana Boulevard. The increases in setback distances to the 65, 70 and 75 DNL contours from CY 1998 to CY 2003 are shown in Table 4. Traffic noise levels in the immediate vicinity of the project are predicted to increase by less than 1.0 dB on the high volume roadways (Nimitz Highway and Ala Moana Boulevard) between CY 1998 and CY 2003 as a result of project and non-project traffic volume increases. Table 5 presents the predicted increases in future traffic noise levels associated with project and non-project traffic. The predicted increases in traffic noise levels along Ala Moana Boulevard or Nimitz Highway are considered to be very small and not significant. This is due to the very high ratios of non-project to project traffic volumes along these two roadways. Predicted increases in traffic noise levels along Channel Street and South Street makai of Ala Moana Boulevard and along Pacific Street makai of Nimitz Highway are relatively large (2.6 to 4.8 dB), but that is attributable to the very low Base Year traffic noise levels along these low volume roadways. Future traffic noise levels along the low volume roadways makai of Nimitz Highway and Ala Moana Boulevard are predicted to remain at less than 60 DNL at 100 feet setback distance.

Risks of adverse traffic noise impacts attributable to the two harbor projects along Ala Moana Boulevard and Nimitz Highway are considered to be very low. The future increases in traffic noise levels will be very small and difficult to measure. For this reason, traffic noise mitigation measures should not be required for these two harbor projects.

TABLE 5

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (CY 2003)

STREET SECTION	NOISE LEVEL INCREASE (DNL) DUE TO: NON-PROJECT TRAFFIC	PROJECT TRAFFIC
Ala Moana Blvd. West of Punchbowl	0.6	0.3
Ala Moana Blvd. East of Punchbowl	0.5	0.5
Ala Moana Blvd. West of South	0.5	0.4
Ala Moana Blvd. East of South	0.5	0.3
Punchbowl Street	0.3	0.0
Channel / Ilalo Streets	0.1	4.8
South Street (Mauka of Ala Moana)	0.5	0.1
South Street (Makai of Ala Moana)	2.9	3.4
Nimitz Highway (North) At Pacific	0.5	0.3
Nimitz Highway (South) At Pacific	0.3	0.4
Pacific Street (Mauka)	0.2	0.1
Pacific Street (Middle)	0.2	1.0
Pacific Street (Makai)	0.2	2.6

CHAPTER VII. OTHER NON-TRAFFIC NOISE CONSIDERATIONS

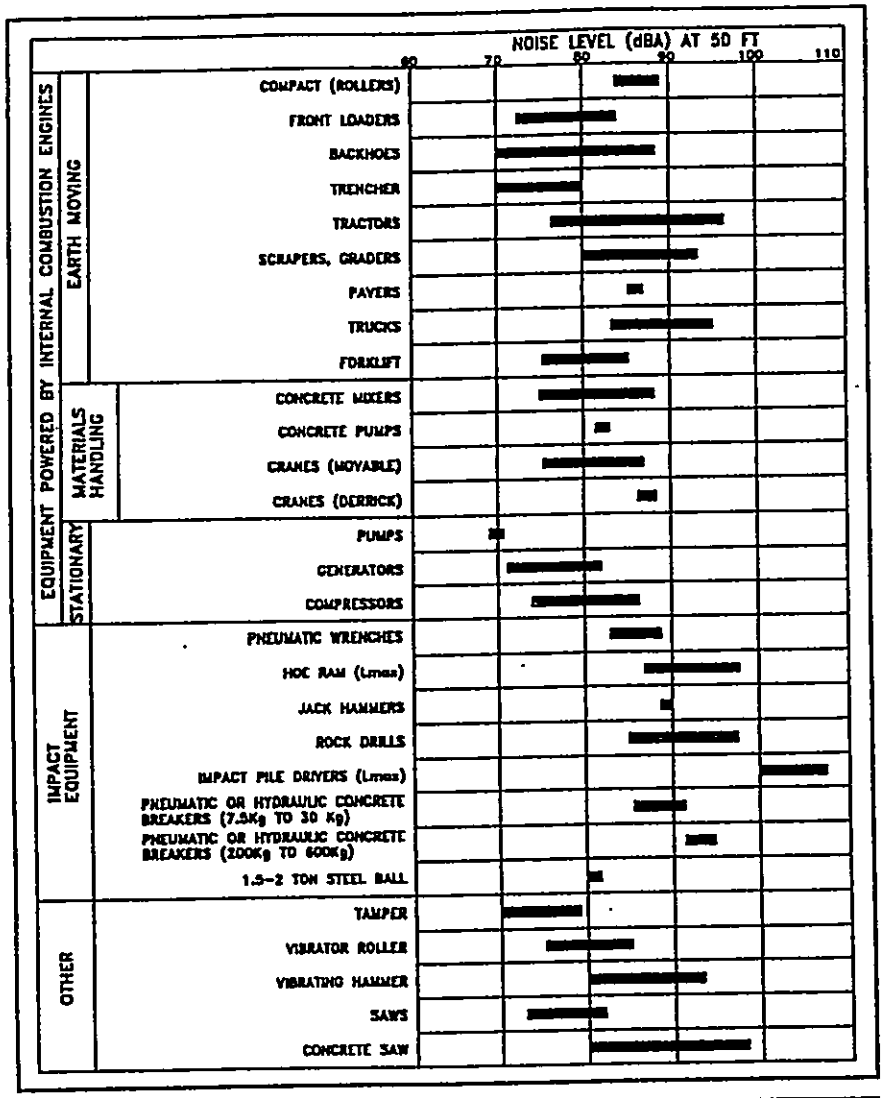
Construction Noise. Audible construction noise will be unavoidable during the construction of the planned harbor improvement projects. Typical levels of noise during the noisier phases of construction activity (excluding pile driving activity) are shown in Figures 10 and 11. The impulsive noise levels of impact pile drivers are approximately 15 dB higher than the levels shown in Figure 11, while the intermittent noise levels of vibratory pile drivers are at the upper end of the noise level ranges depicted in the figure.

Noise impacts are not anticipated during construction of the Lagoon Drive Lay Berths or the Excursion Vessel Passenger Terminal at Piers 24 to 29 since these two projects are relatively far (in excess of 2,000 feet) from the nearest noise sensitive receptors. The noise sensitive properties which are predicted to experience the highest noise levels during construction of the proposed harbor projects are the residential condominiums across Nimitz Highway from Piers 12 to 16. At these condominimum units (Harbor Village, Marin Tower and Harbor Court), construction noise levels are predicted to range from 75 dB during close-in construction of the harbor improvements, to less than 60 dB during distant construction activities. During impact pile driving operations at the Piers 12 to 16 project sites, maximum noise levels of 90 dB at 250 FT distance, decreasing to 80 dB at 1,000 FT distance can be expected without mitigation measures. Indoors, typical levels of pile driving noise within naturally ventilated and air conditioned structures are approximately 10 and 22 dB less, respectively, than the outdoor levels listed above.

During construction of the Cruise Vessel Terminal at Pier 2, noise sensitive receptors at the Waterfront Towers Condominium may experience some increase in noise due to construction. Pile driving operations are not expected to occur during construction of the Pier 2 improvements. The construction activities will typically be at least 1,000 feet from the condominiums, and construction noise levels should be barely audible or inaudible.

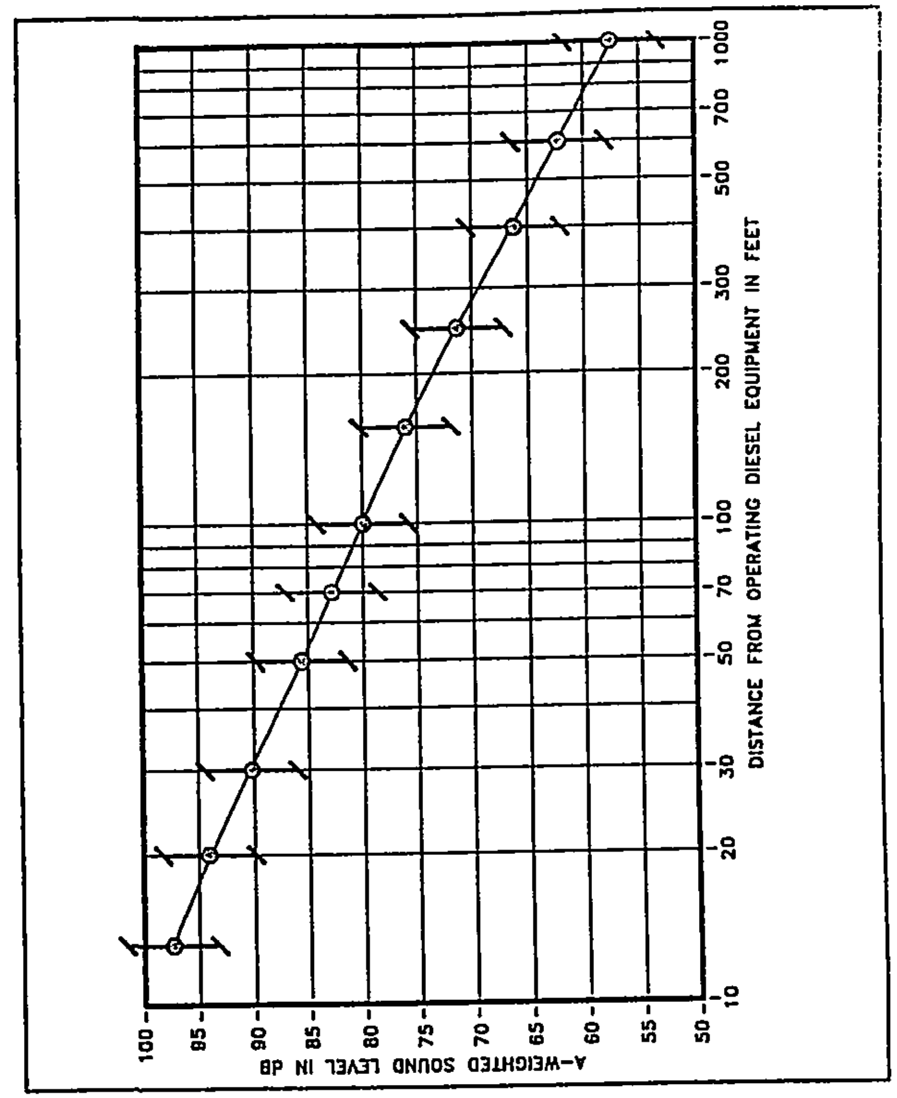
Mitigation of construction noise to inaudible levels may not be practical in all cases due to the intensity of construction noise sources (80 to 90+ dB at 50 FT distance), and due to the exterior nature of the work (pile driving, earth moving, trenching, concrete pouring, hammering, etc.). However, the following noise mitigation measures should be implemented if determined to be feasible:

- The use of properly muffled construction equipment should be required on the job site. Heavy equipment and portable diesel engines and generators should be located at least 400 to 500 FT from residences, if possible.
- Reduction of pile driving noise may be possible, if soil conditions allow, through the use of vibratory pile driving equipment rather than impact pile drivers.



RANGES OF CONSTRUCTION EQUIPMENT NOISE LEVELS

FIGURE 9



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 10

- Pre-drilling may reduce the number of blows required to drive a pile to refusal, but is not expected to significantly reduce pile driving noise levels, particularly at refusal. The use of bored-and cast-in-situ piles can reduce the high level impact noise associated with driven piles by 25 to 30 dB. However, the implementation of these mitigation measures may not be feasible for the specific conditions of the harbor project.

- The incorporation of State Department of Health construction noise limits and curfew times during the construction phases of this project is another noise mitigation measure which is normally used. Table 6 depicts the allowed hours of construction under the DOH permit procedures.

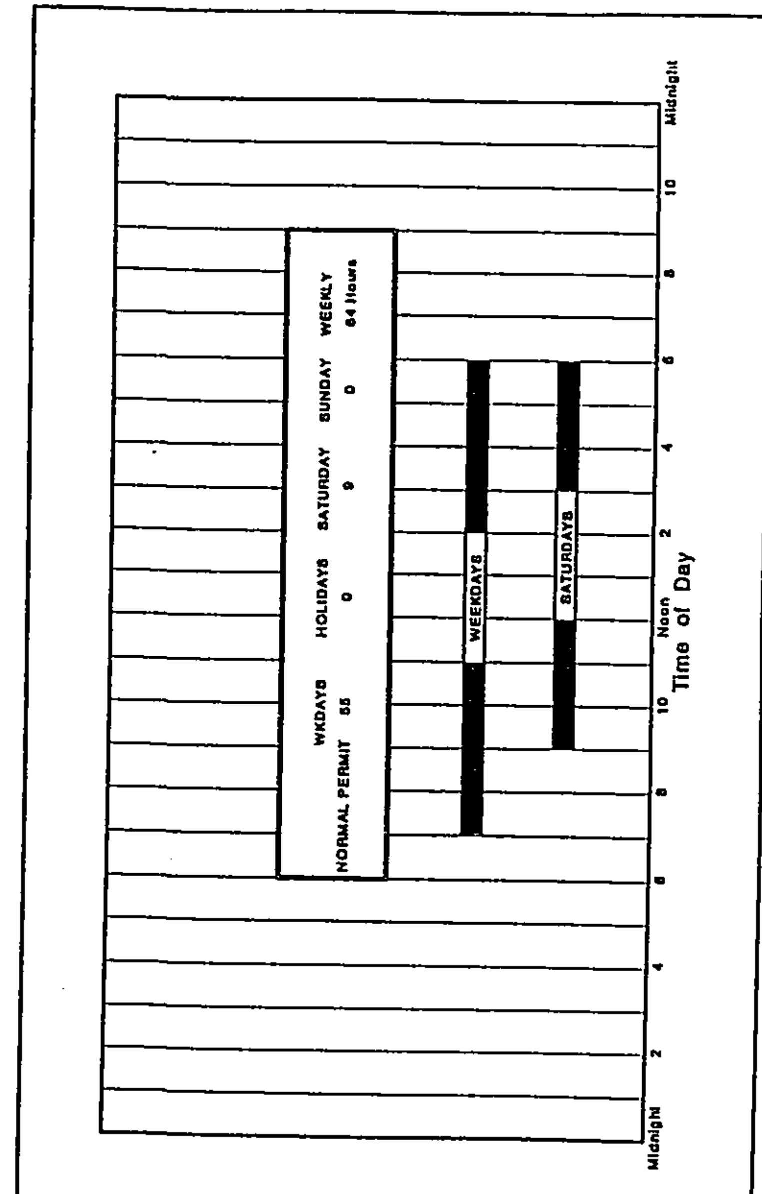
On-Site Vehicles and Fixed Mechanical Equipment. Harbor vehicles, such as heavy trucks, forklifts, sweepers, and the ships which utilize the harbors are potential sources of noise from the various harbor projects. Heavy trucks and buses which transport materials and personnel to and from the harbor projects must comply with the existing State DOH vehicular noise limits (Reference 4). The noise levels of forklifts, sweepers, and ships are not regulated. New mechanical equipment such as emergency electrical generators, air conditioning cooling towers, air conditioning compressors, exhaust fans, and other ventilating fans are the primary fixed on-site noise sources expected to be located at the harbor project sites. Noise from these fixed mechanical equipment are regulated by the State DOH property line noise limits (Reference 5). Noise from vehicles or fixed mechanical equipment will be difficult to hear at the closest noise sensitive receptors if the noise radiated beyond the harbor property boundaries are at or below the residual background ambient noise levels of approximately 50 to 55 dB, which are controlled by roadway traffic along Nimitz Highway and Ala Moana Boulevard.

Typical noise levels of mobile harbor equipment are between 65 to 85 dB at 100 feet distance. However, the loudest noise source associated with harbor activities are the boat whistles and horns. Whistles and horns of the excursion vessels operating out of Kewalo Basin and Pier 5 were measured at approximately 90 dB at 250 feet distance. The horns of the large cruise ships were measured at Location F at 85 dB at 1,000 feet distance. The horns are intermittent, and are typically sounded prior to sailing or during safety drills. Because of their low frequency characteristics, the horns of the large ships do not interfere with speech communication, but may startle nearby residents.

The location of excursion vessels at Piers 24 to 29 should not cause excessive noise from boat whistles or horns due to the relatively large distances (2,000 feet) to the nearest residential condominiums. Predicted noise levels should be less than 75 dB, which are similar to levels associated with street traffic noise. The relocation of the large cruise ships from Pier 11 to Pier 2 should significantly reduce noise levels at the Harbor Court Condominiums. Condominium units at Waterpark Towers and within Kakaako may experience more frequent ship horn signals. Larger buffer distances to

TABLE 6

AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE



residential condominiums of approximately 1,500 feet are available from Pier 2, which should minimize potential noise impacts from the ship horn signals. It should also be noted that use of Pier 2 by large ships is not a new use, but a continuing use. Special noise mitigation measures should not be required for the Piers 24 to 29 or Pier 2 harbor projects, primarily due to their relatively large buffer distances from their nearest noise sensitive neighbors. Adherence to existing State DOH vehicular and property line noise limits, as well as existing construction noise permit and curfew periods should be adequate to minimize potential noise impacts from these harbor projects.

Vibration from Pile Driving. Pile driving will probably be necessary to implant sheet and concrete piles at the harbor project sites. Induced ground vibrations from these pile driving operations have the potential to cause architectural and structural damage to structures.

Ground vibrations generated during pile driving operations are generally described in terms of peak particle (or ground) velocity in units of inches/second. The human being is very sensitive to ground vibrations, which are perceptible at relatively low particle velocities of 0.01 to 0.04 inches/second. Damage to structures, however, occur at even higher levels of vibration as indicated in Table 7. The most commonly used damage criteria for structures is the 2.0 inches/second limit derived from work by the U.S. Bureau of Mines. A more conservative limit of 0.2 inches/ second is also used, and is suggested for planning purposes on this project because of the repetitive nature of pile driving operations which can increase risks of damage due to fatiguing, and particularly if structures are adjacent to pile driving activities.

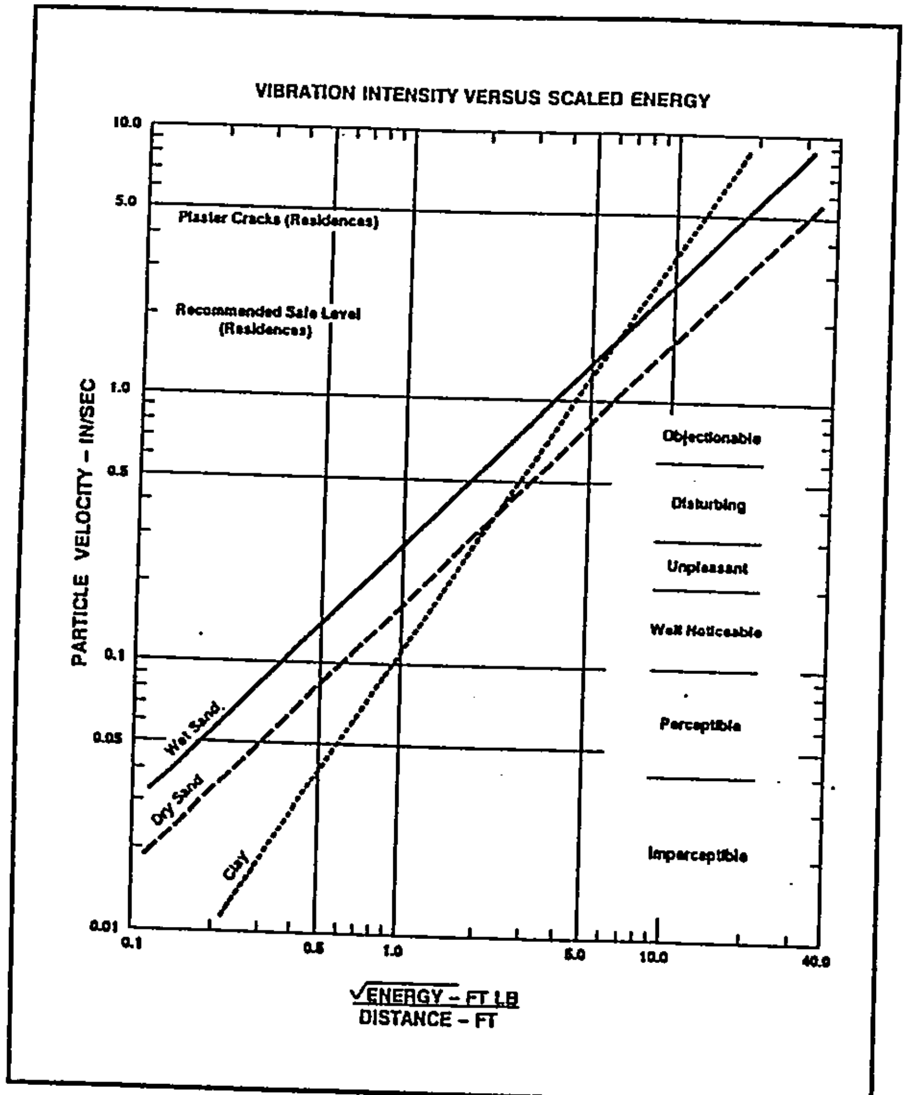
Based on measured vibration levels during pile driving operations under various soil conditions and at various distances, estimates of ground vibration levels vs. distance from the pile driver have been made for various soil conditions and for various energy ratings of the pile drivers. Figure 12, which was extracted from Reference 10, may be used to predict vibration levels for the soil conditions indicated. When coral layers must be penetrated, vibration levels can be expected to be higher than those shown in Figure 12, particularly if the adjacent structures are supported by the common coral layer. From Figure 12, and for wet sand soil conditions, the 0.2 inches/second vibration damage criteria will be exceeded at a scaled energy distance factor of approximately 0.7. The scaled energy distance factor is equal to the square root of the energy (in foot-pounds) per blow of the hammer divided by the distance (in feet) between the pile tip and the monitoring location. For a 30,000 foot-pound pile driver, a scaled energy distance of 0.7 equates to a separation distance of 247 feet. Under clay soil conditions, and using the prediction procedures contained in Figure 12, a shorter separation distance of 115 feet is required to not exceed the 0.2 inches/second criteria when using a 30,000 foot-pound pile driver. It should be noted that 0.2 inches/second vibration levels were measured from a 22,400 foot-pound pile driver at even shorter separation distances of approximately 30 feet in sandy, layered

TABLE 7

SUMMARY OF BUILDING DAMAGE CRITERIA

PEAK GROUND VELOCITY (mm/sec)	PEAK GROUND VELOCITY (in/sec)	COMMENT
193.04	7.6	Major damage to buildings (mean of data).
137.72	5.4	Minor damage to buildings (mean of data).
101.16	4.0	'Engineer structures' safe from damage.
50.8	2.0	Safe from damage limit (probability of damage <5%).
		No structural damage.
33.02	1.3	Threshold of risk of 'architectural' damage for houses.
25.4	1.0	No data showing damage to structures for vibration <1 in./sec.
15.24	0.6	No risk of 'architectural' damage to normal buildings.
10.16	0.4	Threshold of damage in older homes.
5.08	0.2	Statistically significant percentage of structures may experience minor damage (including earthquake, nuclear event, and blast data for old and new structures).
		No 'architectural' damage.
3.81	0.5 to 0.15	Upper limits for ruins and ancient monuments.
1.0	0.04	Vertical vibration clearly perceptible to humans.
0.32	0.01	Vertical vibration just perceptible to humans.

Source: "State-of-the-Art Review: Prediction and Control of Groundborne Noise and Vibration from Rail Transit Trains"; U.S. Department of Transportation; December 1983.



MINIMUM VIBRATION INTENSITIES EXPECTED FROM PILE DRIVING

FIGURE 11

soil (Reference 11). The measurement data reported in Reference 11 are significantly lower than the vibration levels predicted by the methodology of Reference 10.

As indicated above, predictions of peak ground vibration levels vs. scaled energy distance factor from the driven pile are not precise, with initial uncertainty factor for a given location in the order of 10:1. For this reason, it is standard practice to employ seismograph monitoring of ground vibrations during pile driving operations with a 3-axis geophone or accelerometer. If pile drivers of approximately 30,000 foot-pounds or larger ratings are anticipated to be used on the job site, and the initial vibration predictions indicate that there is some risk of exceeding the 0.2 inches/second vibration damage criteria at nearby structures, then monitoring during pile driving operations is warranted. Monitoring alone, however, may not be a practical mitigation measure unless there are alternative pile driving methods or foundation plans which can be employed if the damage criteria is exceeded. For these reasons, the following preventative measures are recommended for implementation during the planning and design phases of the harbor projects:

- In addition to the normal planning and design concerns regarding potential damage due to settling and heaving during construction, consideration should also be given to risks of damage due to vibration from pile driving. A damage criteria of 0.2 inches/second should be initially used in conjunction with the vibration prediction method of Reference 10 to identify the potential damage risk distances to the driven piles.

- If predicted vibration levels from pile driving exceed 0.2 inches/second at nearby buildings, and predicted levels cannot be reduced by sizing of the pile driver or through the use of alternate types of piles (bored or non-displacement types), test piles should be driven and its vibrations monitored and recorded. The monitoring of the test piles should be designed to measure the expected peak, 3-axis vibration levels at the historic buildings. The results of the monitoring, in addition to the specific types of adjacent structures, should be used to define the empirical distance from the driven pile to the damage risk location, and to reevaluate the risks of structural damage to the adjacent structures during actual construction.

- If predicted vibration levels from pile driving exceed 2.0 inches/second at the adjacent buildings, the use of alternate types of piles should be considered for implementation during the design phase.

APPENDIX A. REFERENCES

(1) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.

(2) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.

(3) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety;" Environmental Protection Agency (EPA 550/9-74-004); March 1974.

(4) "Title 11, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu;" Hawaii State Department of Health; October 24, 1981.

(5) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

(6) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998.

(7) Draft "Traffic Impact Analysis Report - Honolulu 10/28/98 Harbor 2020 Master Plan;" Phillip Rowell and Associates; August 1998.

(8) 24-Hour Traffic Counts, Station 327, Nimitz Highway at Pacific Street; April 15-18, 1991; Hawaii State Department of Transportation.

(9) 24-Hour Traffic Counts, Station 513, Ala Moana Boulevard at South Street; May 17-18, 1995; Hawaii State Department of Transportation.

(10) Wiss, John F., Janney, Elstner and Assoc.; "Damage of Pile Driving Vibration;" Highway Research Record, Number 155.

(11) Gutowski, T.G., Wittig, L.E., and Dym, C.L.; "Some Aspects of the Ground Vibration Problem;" Noise Control Engineering; May-June 1978.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$. Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE(1) A-WEIGHTING	OTHER(2) WEIGHTING	UNWEIGHTED
1. Sound (Pressure)(3) Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level (4) Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

AIR QUALITY IMPACT REPORT (AQIR)

Oahu Commercial Harbors 2020 Master Plan EIS
Immediate Phase Projects

23 March 1999

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1. INTRODUCTION

The Harbors Division of the State Department of Transportation is proposing a number of improvement projects in the Honolulu Harbor area (Figure 1) as part of its 2020 Master Plan[1]. Specifically, the following proposed actions have triggered a requirement for environmental impact analysis and review:

- construction of a cruise ship passenger terminal at Pier 2
- construction of finger piers at Piers 12 - 16
- construction of an excursion vessel terminal at Piers 24 - 29
- construction of lay berth facilities in Keehi Lagoon along Lagoon Drive

The purpose of this report is to assess the short and long-term impacts of the proposed actions on local air quality. The actions when taken together can be considered an "indirect source" of air pollution as defined in the federal Clean Air Act[2] since their primary association with air quality is an inherent attraction for mobile sources, i.e., motor vehicles. Much of the focus of this analysis, therefore, is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for existing (1999) and future (2003) conditions with and without the proposed development.

During construction of the various buildings and facilities air pollutant emissions will also be generated onsite and offsite due to vehicular movement, site preparation, concrete and asphalt batching, and general dust-generating construction activities. These impacts have also been addressed.

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 1.[3,4] Note that Hawaii's standards are not divided into primary and secondary standards as are the federal standards.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [5].

Some of Hawaii's standards (CO, NO_2, and O_3) are clearly more stringent than their federal counterparts but, like their federal counterparts, may be exceeded once per year. It should also be noted that in November 1993, the Governor signed amendments to Chapter 59, Ambient Air Quality Standards [4], adopting the federal standard for particulate matter equal to or less than 10 microns in diameter (PM_{10}). Since measurement data in Hawaii indicate that PM_{10} comprises about 50% of total

FIGURE 1

PROJECT LOCATION

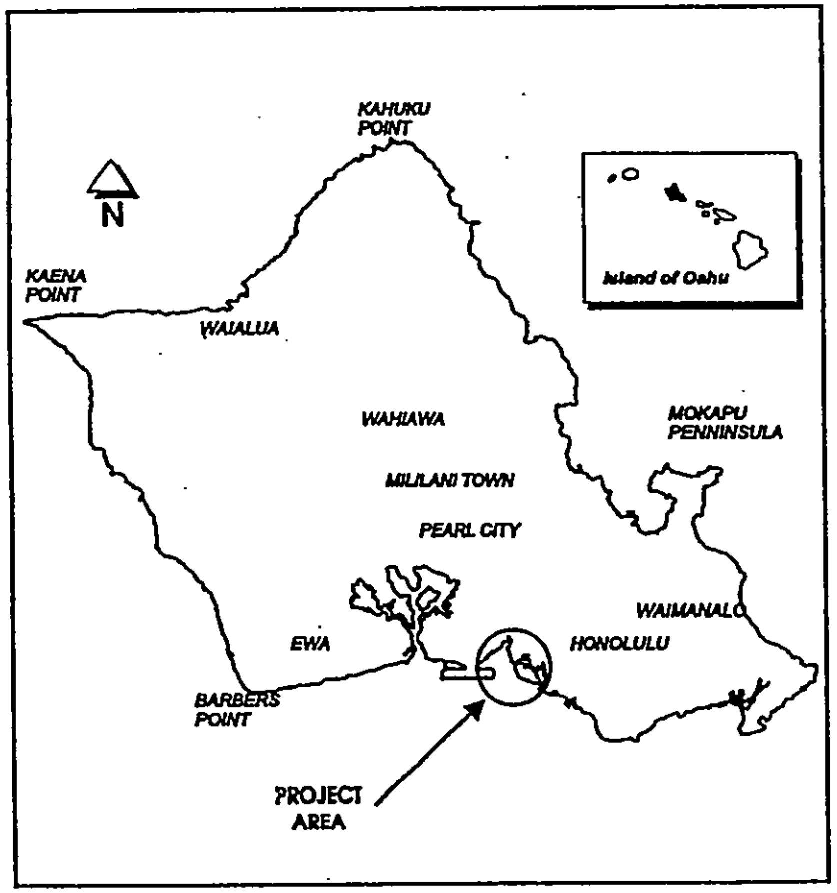


TABLE 1

SUMMARY OF STATE OF HAWAII AND FEDERAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	NAAQS PRIMARY	NAAQS SECONDARY	STATE STANDARDS
PM_{10}	Annual	50	50	50
	24-hr	150	150	150
SO_2	Annual	80	—	80
	24-hr	365	—	365
	3-hr	—	1,300	1,300
NO_2	Annual	100	—	70
CO	8-hr	10	—	5
	1-hr	40	—	10
O_3	1-hr	235	—	100
H_2S	1-hr	—	—	35
Pb	Calendar Quarter	1.5	—	1.5

KEY:
PM_{10} - particulate matter < 10 microns
SO_2 - sulfur dioxide
NO_2 - nitrogen dioxide
CO - carbon monoxide
O_3 - ozone
H_2S - hydrogen sulfide
Pb - lead

All concentrations in micrograms per cubic meter ($\mu g/m^3$) except CO in milligrams per cubic meter (mg/m^3).

particulate matter (TSP), the adoption of that federal standard with a numerical value equal to the original state TSP standard of 150 mg/m^3 represented a substantial relaxation of the standard (approximately doubling it). In the case of the automotive pollutants [carbon monoxide (CO), nitrogen dioxide (NO_2), and ozone (O_3)], there are only primary standards.

Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January 1983 [6].

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings[3]. The latest review resulted in an EPA proposal to tighten the ozone standard from 235 to 160 micrograms/cubic meter (ug/m^3) and also implement $PM_{2.5}$ standards for particulate matter [7]. The carbon monoxide (CO), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) standards have been reviewed in the past, but no new standards have been proposed.

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [8]. There simply can be no visible emissions from fugitive dust sources.

3. EXISTING AIR QUALITY

3.1 General. The state Department of Health (DOH) maintains a limited network of air monitoring stations around the state to gather data on the following regulated pollutants:

- particulate matter ≤ 10 microns (PM_{10})
- total suspended particulate matter (TSP)
- sulfur dioxide (SO_2)
- nitrogen dioxide (NO_2)
- carbon monoxide (CO)
- ozone (O_3)
- lead (Pb)

In the case of PM_{10}, measurements are made on a 24-hour basis to correspond with the averaging period specified in state and federal standards. Samples are collected once every six days in accordance with U.S. Environmental Protection Agency (EPA) guidelines. Carbon monoxide, sulfur dioxide, and ozone, however, are measured on a continuous basis due to their short-term (1- and 3-, and 8-hour) standards. Nitrogen dioxide is measured with continuous instruments and averaged over a full year to correspond to its annual standards. Lead concentrations are determined from particulate matter (TSP) samples.

3.2 Department of Health Monitoring. The DOH monitoring stations nearest to the project area are located at the DOH building on the corner of Punchbowl and Beretania Streets and on Sand Island. A summary of the most recent published air quality data from those stations is presented in Table 2.

TABLE 2

AIR QUALITY DATA
DEPARTMENT OF HEALTH MONITORING SITES
1996

Pollutant	Concentration (µg/m^3)
Particulate matter ≤ 10 microns (PM_{10}) 24-hr (max)	28
Annual	14
Sulfur dioxide (SO_2) 3-hr (max)	73
24-hr (max)	18
Annual	3
Carbon monoxide (CO) 1-hr (max)	4.6
8-hr (max)	2.1
Annual	0.9
Ozone (O_3) 1-hr (max)	92
Annual	27
Lead (Pb) Quarterly (max)	0.0
Annual	0.0

Notes: 1. CO, TSP, SO_2, and Pb are from the DOH building.
2. O_3 data are from the Sand Island site.
3. CO concentrations in milligrams per cubic meter (mg/m^3)

3.3 Onsite Carbon Monoxide Sampling. In conjunction with this project, air sampling was conducted in December 1998 in the vicinity of key intersections serving the project area. A continuous carbon monoxide (CO) instrument was set up and operated during the a.m. and p.m. peak traffic hours. An anemometer and vane were also installed to record onsite surface winds during the air sampling. A simultaneous manual count of traffic was performed. The variability of each of the parameters measured during the peak hours is clearly seen in Figures 2 - 7.

Weather conditions during the morning peak hour at South Street on 11 December 1998 were characterized by partly cloudy skies and light northeasterly trade winds averaging 2.6 mph. Total traffic along Ala Moana Boulevard fronting the project site was about 93% of the a.m. peak hour volume reported for that street segment in the traffic consultant's report on existing conditions [9]. CO concentrations measured were low, averaging only 2.1 mg/m^3 due in part to the distance of the sampling site from the street (about 30 meters).

On the afternoon of 10 December 1998 at South Street, the northeasterly winds were of slightly greater velocity than they had been in the morning, averaging 4.3 mph. Skies were again partly cloudy. The CO level was lower than the a.m., averaging 1.9 mg/m^3, due primarily to the doubled wind speed since traffic volume was about 15% greater.

At Channel Street on 9 December 1998, the morning weather conditions consisted of light (1.1 mph) northerly winds, overcast skies, and occasional light showers. CO levels were also low averaging 1.6 mg/m^3, due primarily to the northerly winds which did carry vehicle emissions directly toward the sampling site. During the afternoon peak hour at this site on 8 December 1998, winds were light (1.9 mph) and variable between southeasterly and southwesterly resulting again in a low CO level of 1.6 mg/m^3.

During the morning peak hour at Pacific Street on 8 December 1998, weather conditions were mostly cloudy with northeasterly trade winds averaging 2.2 mph. The sampling site was approximately 10 meters from the eastbound lanes of Nimitz Highway, and CO concentrations averaged 3.7 mg/m^3. Afternoon conditions at this site on 7 December 1998 were also overcast but the winds were mostly northerly at 2.6 mph and the traffic volume was about 31% less than in the morning resulting in an average CO level of 1.3 mg/m^3.

4. CLIMATE AND METEOROLOGY

4.1 Temperature and Rainfall. Temperatures in the project area are expected to be similar to those found elsewhere in Hawaii. The nearest long-term weather station operated by the National Weather Service is located at the Honolulu International Airport. In an annual summary for that station, the National Climatic Center has summarized Honolulu's temperature regime as follows:

> *Hawaii's equable temperatures are associated with the small seasonal variation in the amount of energy received from the sun and the tempering effect of the surrounding ocean. The range of temperatures averages only 7 degrees between the warmest months*

FIGURE 2

A.M. PEAK HOUR CONDITIONS
ALA MOANA BOULEVARD AT SOUTH STREET
11 DECEMBER 1998

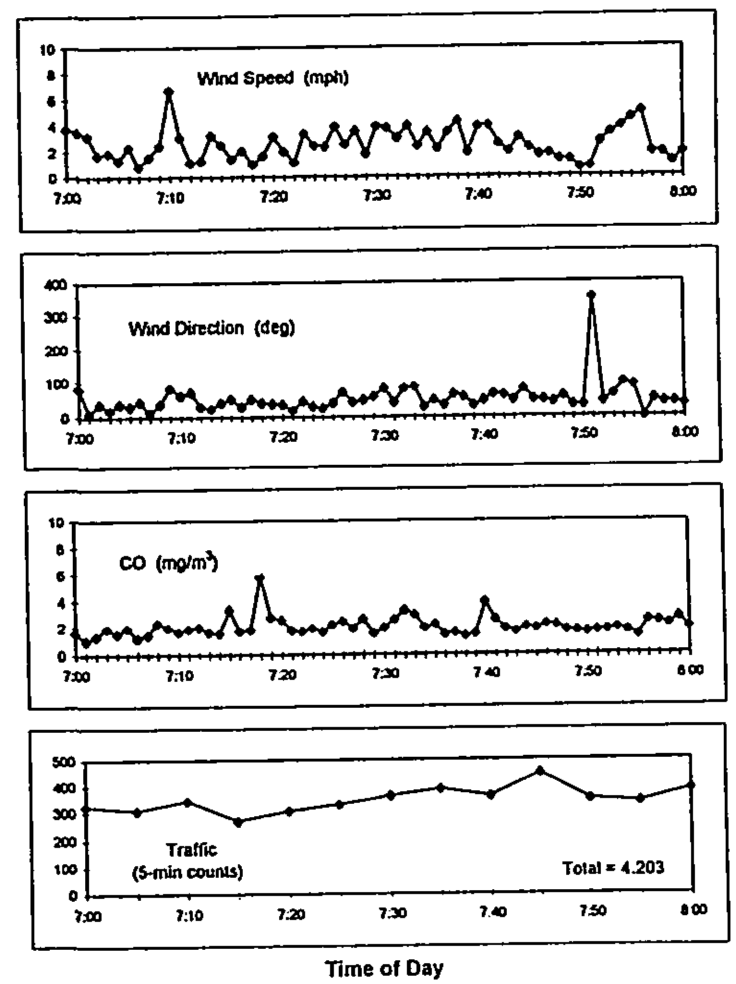


FIGURE 3

P.M. PEAK HOUR CONDITIONS
ALA MOANA BOULEVARD AT SOUTH STREET
10 DECEMBER 1998

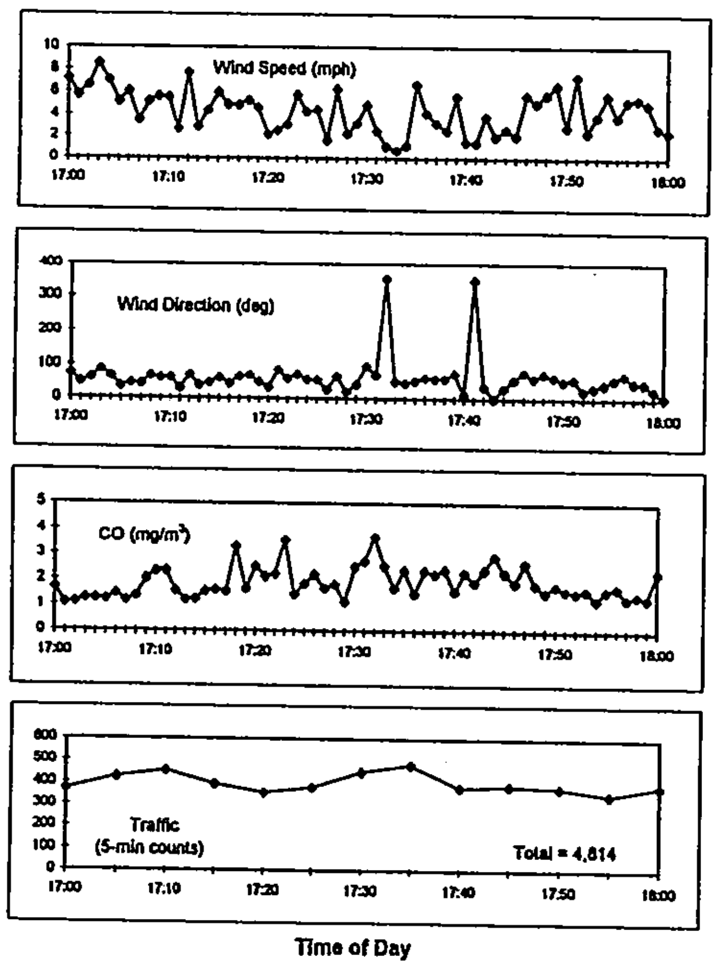


FIGURE 4

A.M. PEAK HOUR CONDITIONS
ALA MOANA BOULEVARD AT CHANNEL STREET
9 DECEMBER 1998

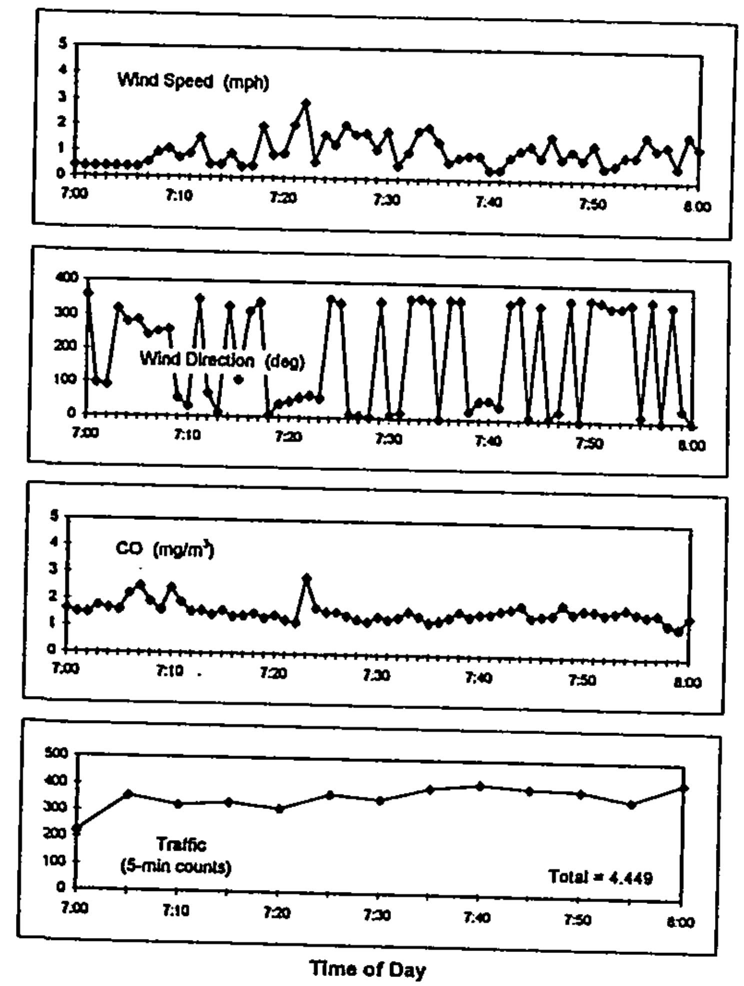


FIGURE 5

P.M. PEAK HOUR CONDITIONS
ALA MOANA BOULEVARD AT CHANNEL STREET
8 DECEMBER 1998

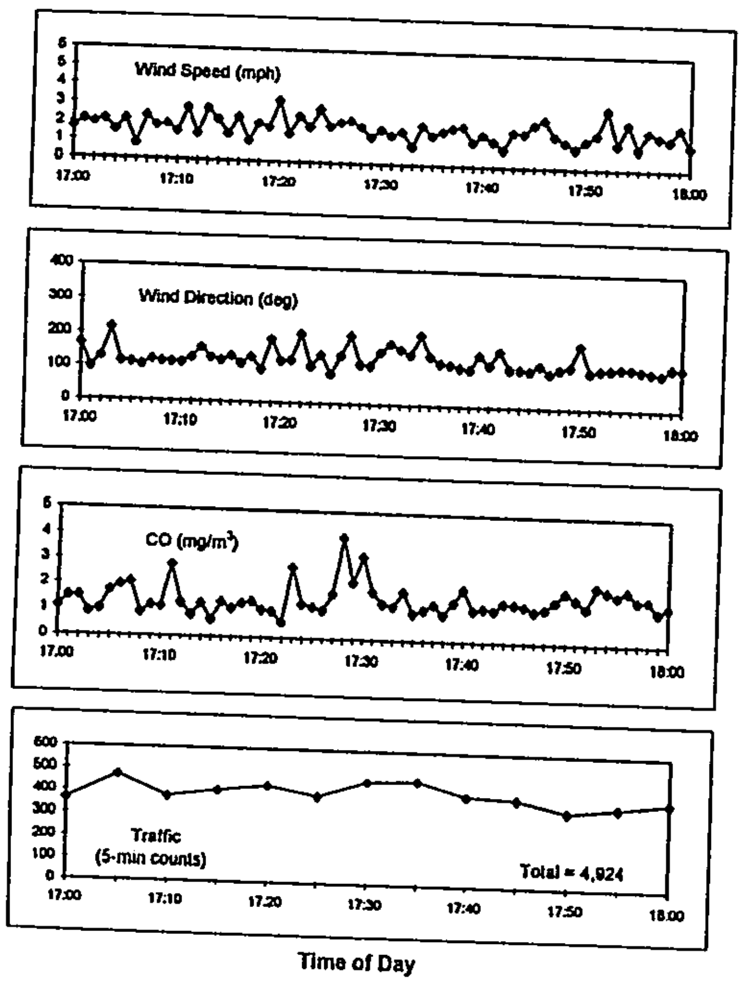


FIGURE 6

A.M. PEAK HOUR CONDITIONS
NIMITZ HIGHWAY AT PACIFIC STREET
8 DECEMBER 1998

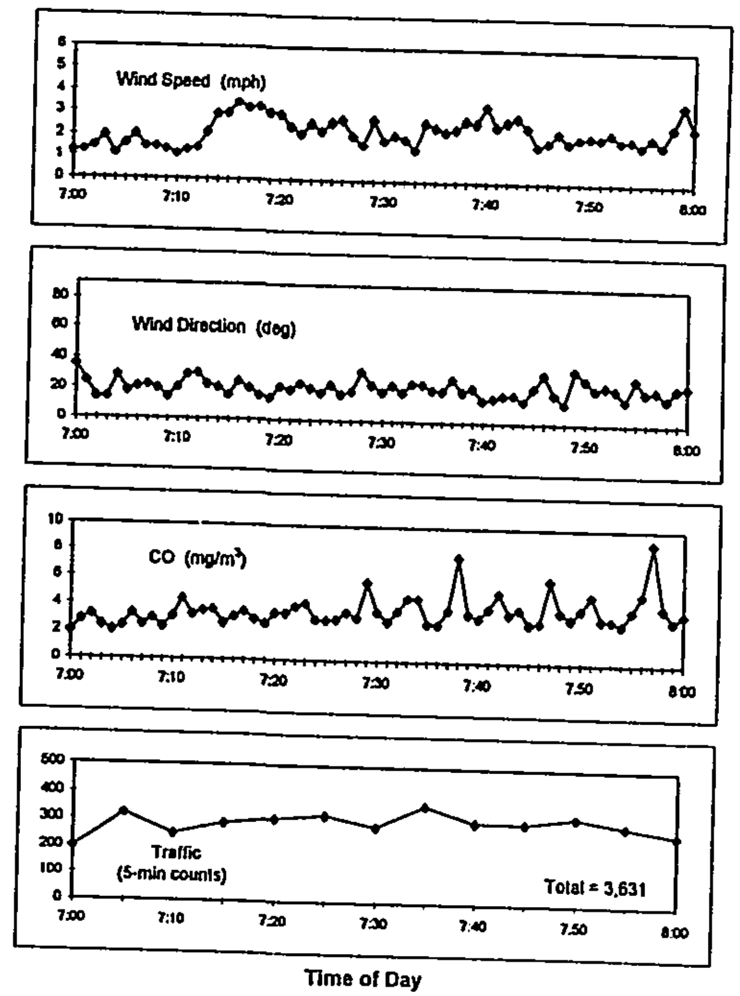
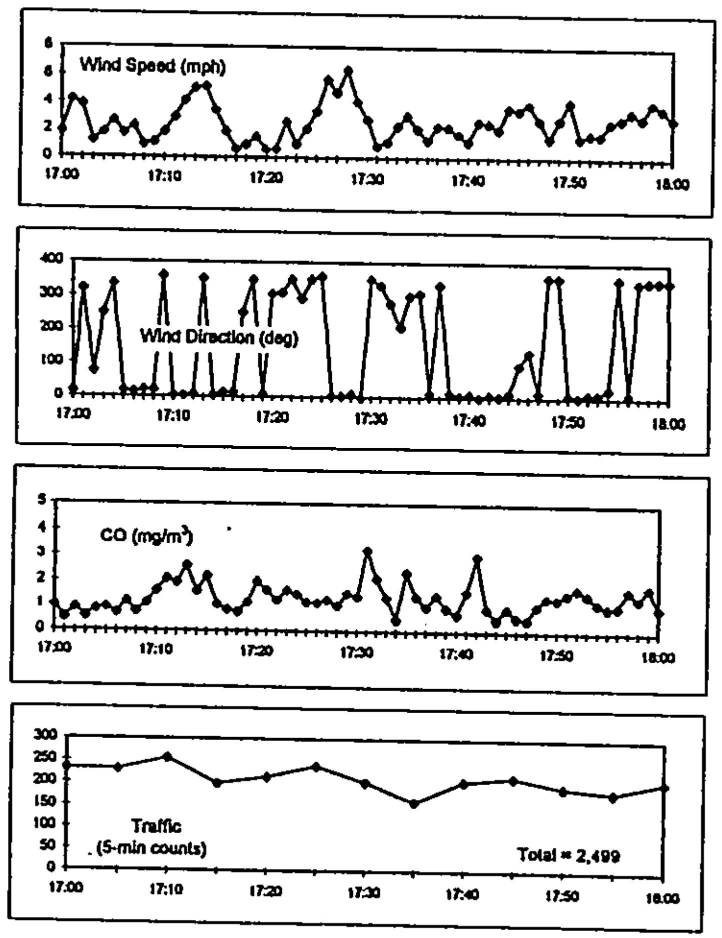


FIGURE 7

P.M. PEAK HOUR CONDITIONS
NIMITZ HIGHWAY AT PACIFIC STREET
7 DECEMBER 1998



(August and September) and the coolest months (January and February) and about 12 degrees between day and night.Daily maximums run from the high 70's in winter to the mid-80's in summer, and daily minimums from the mid-60's to the low 70's. However, the Honolulu Airport area has recorded as high as 93 degrees and as low as 53 [10].

Historical data from the National Weather Service at Honolulu International Airport indicate that annual rainfall on the leeward side of Oahu averages 22.0 inches [11]. In accordance with Thornwaite's scheme for climatic classification, the area would therefore be considered semi-arid with a precipitation - evaporation (P/E) Index of 28.9 [12].

4.2 Surface Winds. Meteorological data records were reviewed from the Honolulu International Airport and Hickam Air Force Base. The annual prevalence of northeast trade winds is clearly shown in Table 3. A closer examination of the data, however, indicates that low velocities (less than 10 mph) occur frequently and that the "normal" northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring. It is during these times that Honolulu generally experiences elevated pollutant levels. This seasonal difference in wind conditions can be easily contrasted by comparing August and January wind roses (Figures 8 and 9). Of particular interest from an air pollution standpoint were the stability wind roses prepared for Hickam Air Force Base [13]. These data indicated that stable conditions, i.e., Pasquill-Gifford stability categories E and F [14], occur about 28% of the time on an annual basis and 36% of the time during the peak winter month (January). It is under such conditions that the greatest potential for air pollutant buildup from groundlevel sources, e.g., motor vehicles, exists.

5. SHORT-TERM IMPACTS

5.1 Onsite Impacts. The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along the existing streets as well as on the project site itself. Since many segments of Ala Moana Boulevard are currently operating at a level of service (LOS) "D" during peak traffic hours [9], additional construction vehicle traffic during those hours would aggravate that situation and lengthen delays.

Site preparation will create particulate emissions as will construction of the building itself. Construction vehicles movement onsite will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/ evaporation (P/E) index of 50 [12,15]. Applied to the project with the largest acreage, i.e., the Excursion Vessel Terminal (15.4 acres), that rate would equate to 18.5 tons per month of construction activity, 0.92 tons per day based on a 5-day work-week, and 15 pounds per hour per acre based on an 8-hour work-day

The semi-arid local climate (P/E Index = 28.9) suggests a greater potential for fugitive dust emissions than estimated using EPA's P/E Index of 50. With the following "worst case" adjustment for climate, the revised emission rate becomes:

$$50/26.9 \times 18.5 = 32.0 \text{ T/mo or } 25.9 \text{ lb/hr per acre}$$

TABLE 3

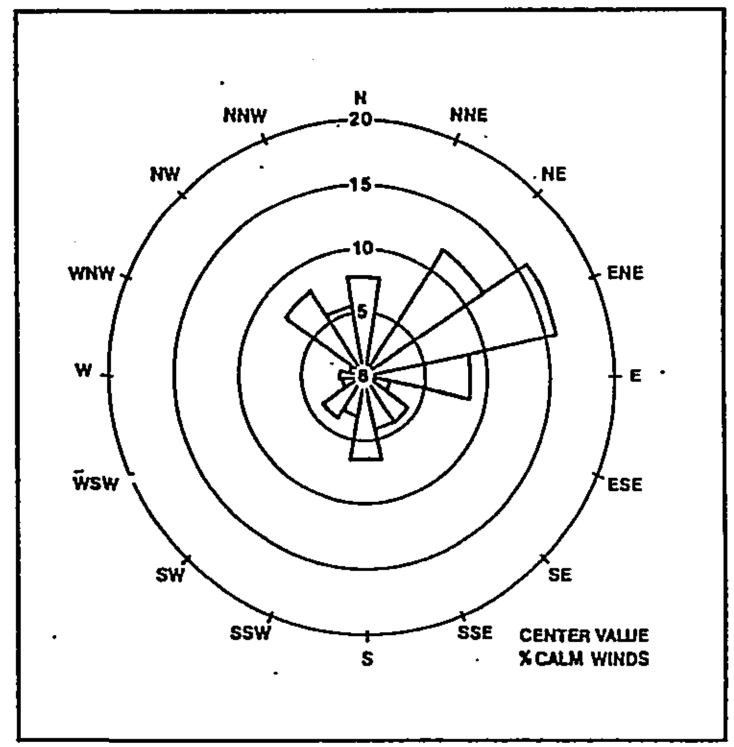
ANNUAL JOINT FREQUENCY DISTRIBUTION
OF WIND SPEED AND DIRECTION
HONOLULU INTERNATIONAL AIRPORT

	Wind Speed (m/sec)						
Dir (deg)	≤ 3.1	≤ 4.5	≤ 5.8	≤ 7.2	≤ 8.5	>/= 8.5	All
10	0.0065	0.0038	0.0023	0.0016	0.0009	0.0001	0.0151
20	0.0082	0.0041	0.0025	0.0023	0.0011	0.0001	0.0183
30	0.0100	0.0061	0.0051	0.0038	0.0028	0.0007	0.0286
40	0.0188	0.0157	0.0258	0.0222	0.0174	0.0040	0.1039
50	0.0268	0.0290	0.0449	0.0385	0.0307	0.0054	0.1752
60	0.0344	0.0289	0.0436	0.0273	0.0238	0.0041	0.1621
70	0.0250	0.0181	0.0197	0.0122	0.0096	0.0009	0.0855
80	0.0113	0.0081	0.0065	0.0039	0.0009	0.0003	0.0310
90	0.0073	0.0049	0.0040	0.0009	0.0008	0.0000	0.0179
100	0.0031	0.0016	0.0014	0.0006	0.0002	0.0000	0.0068
110	0.0027	0.0019	0.0010	0.0007	0.0005	0.0001	0.0069
120	0.0027	0.0013	0.0019	0.0009	0.0003	0.0003	0.0075
130	0.0022	0.0032	0.0018	0.0015	0.0007	0.0002	0.0096
140	0.0034	0.0033	0.0039	0.0018	0.0011	0.0006	0.0141
150	0.0022	0.0030	0.0019	0.0003	0.0002	0.0005	0.0081
160	0.0024	0.0033	0.0023	0.0010	0.0005	0.0000	0.0094
170	0.0031	0.0048	0.0023	0.0007	0.0003	0.0000	0.0109
180	0.0055	0.0042	0.0018	0.0008	0.0005	0.0000	0.0128
190	0.0065	0.0038	0.0013	0.0002	0.0000	0.0000	0.0117
200	0.0057	0.0032	0.0011	0.0001	0.0000	0.0000	0.0101
210	0.0076	0.0038	0.0016	0.0001	0.0000	0.0000	0.0131
220	0.0083	0.0077	0.0016	0.0001	0.0001	0.0000	0.0179
230	0.0076	0.0049	0.0014	0.0001	0.0001	0.0000	0.0141
240	0.0042	0.0016	0.0013	0.0000	0.0000	0.0000	0.0071
250	0.0040	0.0010	0.0003	0.0000	0.0000	0.0000	0.0054
260	0.0064	0.0023	0.0005	0.0000	0.0000	0.0000	0.0091
270	0.0065	0.0010	0.0005	0.0002	0.0000	0.0000	0.0082
280	0.0099	0.0005	0.0002	0.0000	0.0000	0.0000	0.0106
290	0.0123	0.0003	0.0002	0.0001	0.0000	0.0000	0.0130
300	0.0167	0.0018	0.0011	0.0000	0.0000	0.0000	0.0197
310	0.0235	0.0022	0.0015	0.0001	0.0000	0.0000	0.0272
320	0.0200	0.0022	0.0013	0.0006	0.0001	0.0000	0.0241
330	0.0121	0.0023	0.0011	0.0005	0.0000	0.0000	0.0159
340	0.0094	0.0010	0.0003	0.0001	0.0000	0.0000	0.0109
350	0.0082	0.0025	0.0018	0.0002	0.0000	0.0000	0.0125
360	0.0093	0.0027	0.0022	0.0006	0.0005	0.0001	0.0154
All	$\boxed{0.3537}$	0.1898	0.1917	0.1240	0.0932	0.0174	0.9698
						Calms:	0.0302

SOURCE: National Weather Service, 1992

FIGURE 8

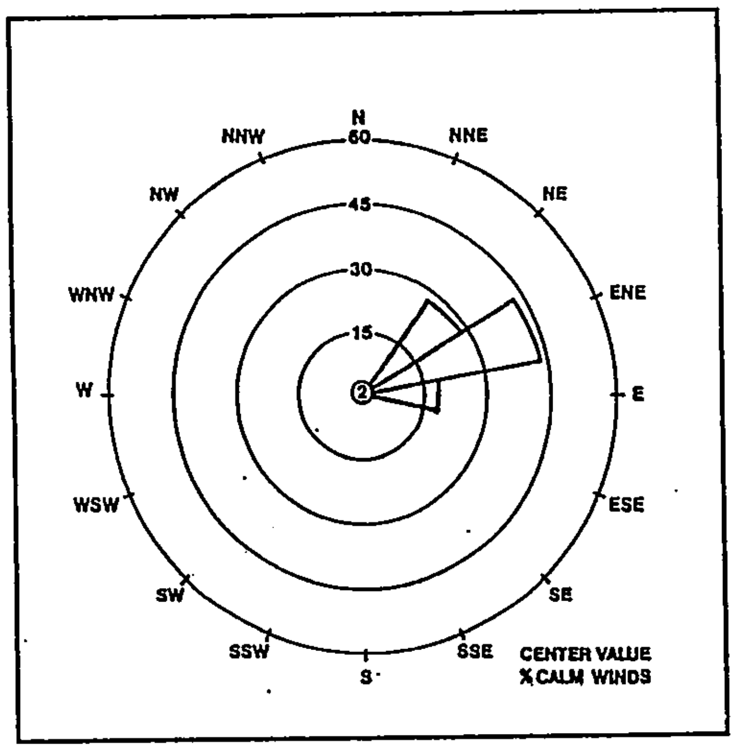
JANUARY WIND ROSE
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service
Historical Records, 1940-57

FIGURE 9

AUGUST WIND ROSE
HONOLULU INTERNATIONAL AIRPORT



SOURCE: National Weather Service
Historical Records, 1940-57

Using this adjusted emission rate, the EPA guideline dispersion model, ISC3 [16,17], and one year of Honolulu meteorological data preprocessed for modeling use [18], an analysis was conducted to estimate particulate matter (PM_{10}) impacts in the area surrounding the construction site. Eight-hour concentrations were computed, mathematically combined with the maximum 24-hour concentration reported at the DOH monitoring station (Table 2), and then compared with the State and Federal 24-hour standards (Table 1). The result indicated a *worst-case* concentration of 43 $\mu g/m^3$, a level well below the 150 $\mu g/m^3$ standard.

5.2 Offsite Impacts. In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt batching plants needed for construction. Such plants routinely emit particulate matter and other gaseous pollutants. It is too early, however, to identify the specific facilities that will be providing these materials and thus the discussion of air quality impacts is necessarily generic. The batch plants which will be producing the concrete for foundations, curbing, etc. and the asphalt for roadways must be permitted by the Department of Health Clean Air Branch pursuant to state regulations [5]. In order to obtain these permits they must demonstrate their ability to continuously comply with both emission [5] and ambient air quality [4] standards. Under the recently promulgated federal Title V operating permit requirements[19], now incorporated in Hawaii's rules [5], air pollution sources must regularly attest to their compliance with all applicable requirements.

6. MOBILE SOURCE IMPACTS

6.1 Mobile Source Activity. The traffic impact analysis [9] prepared for the proposed project served as the primary basis for this mobile source impact analysis. Existing peak-hour traffic volumes and projections for 2003 for the principal intersections serving the project area were provided in that report. This analysis focused on those same Ala Moana Boulevard/Nimitz Highway intersections, i.e., South Street, Channel Street, Punchbowl Street and Pacific Street. The traffic study along with State DOT Highways Division 24-hour traffic counts permitted development of 24-hour traffic scenarios for each intersection. Existing conditions at the intersections are depicted in Figures 10 - 13.

6.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar years 1999 and 2003 using the Mobile Source Emissions Model (MOBILE-5B) [20]. To localize the emission factors as much as possible, the March 1992 age distribution for registered vehicles in the City & County of Honolulu [21] was used in lieu of national statistics. That same age distribution was the basis for the distribution of vehicle miles traveled as well.

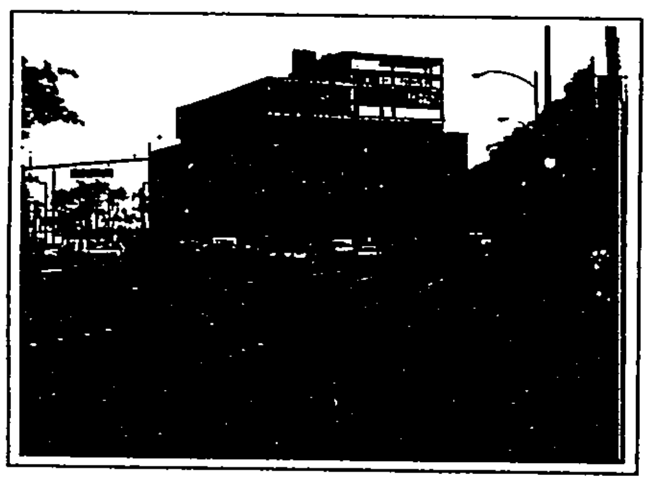
6.3 Modeling Methodology. Due to the present state-of-the-art in air quality modeling, analyses such as this generally focus on estimating concentrations of non-reactive pollutants. For projects involving mobile sources as the principal source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (ca. 1 month)[22], and it comprises the largest fraction of automotive emissions.

A version of the EPA guideline model CAL3QHC [16,23,24] designed for refined analysis was employed to estimate near-intersection carbon monoxide concentrations. One year of preprocessed [18] Honolulu

FIGURE 10

EXISTING SITE CONDITIONS
ALA MOANA BOULEVARD AT SOUTH STREET

South Street
(facing southwest)

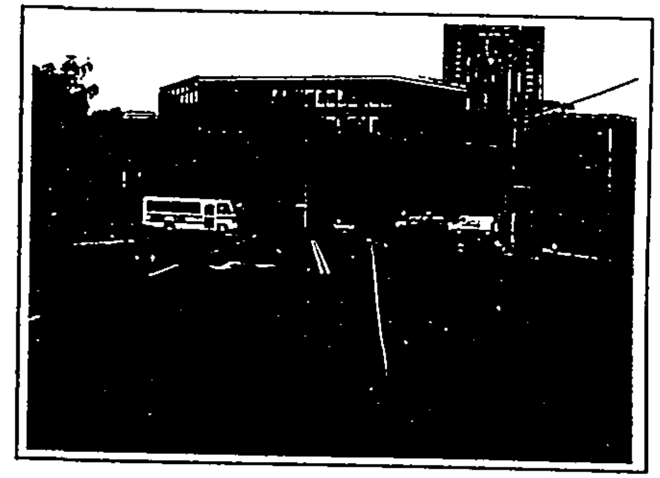


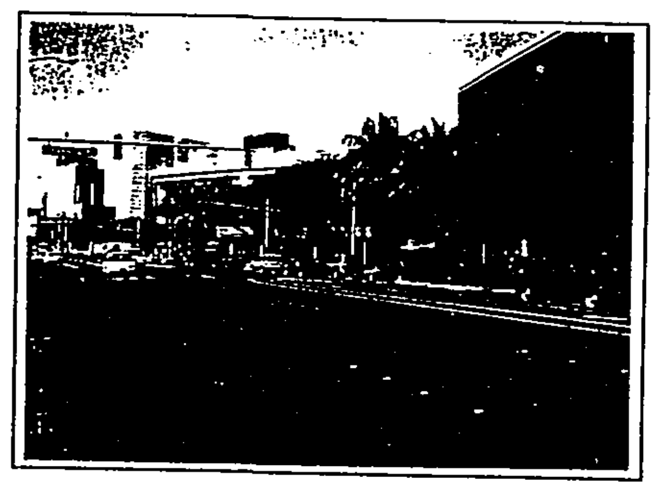
Ala Moana Boulevard
(facing south)

FIGURE 11

EXISTING SITE CONDITIONS
ALA MOANA BOULEVARD AT CHANNEL STREET

Channel Street
(facing east)

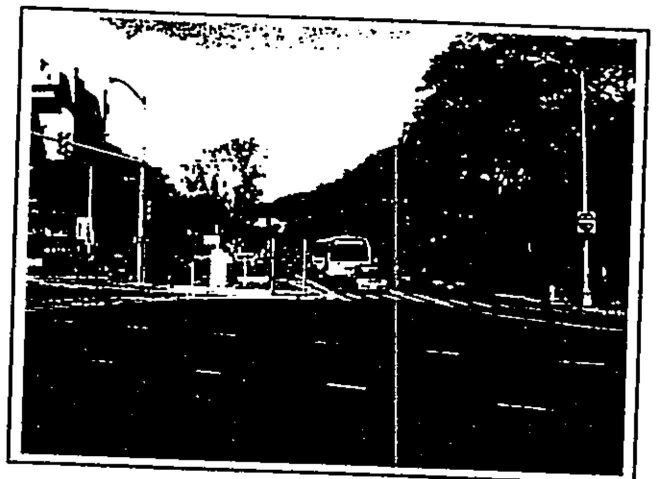




Ala Moana Boulevard
(facing north)

FIGURE 12

EXISTING SITE CONDITIONS
ALA MOANA BOULEVARD AT PUNCHBOWL STREET

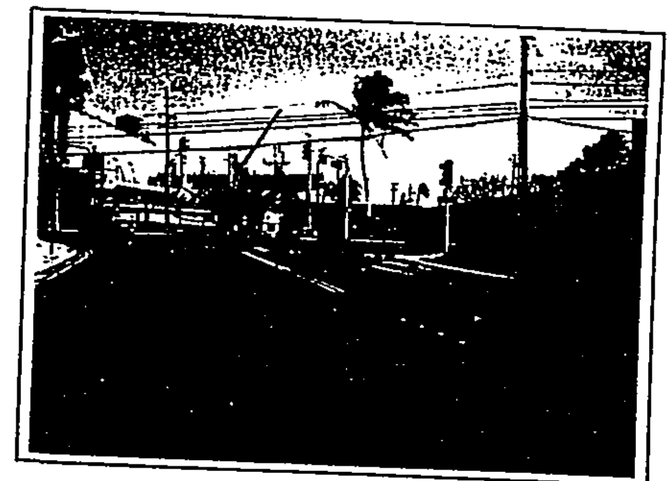


South Street
entering Ala Moana Blvd
(facing northwest)

Ala Moana Boulevard
(facing south)

FIGURE 13

EXISTING SITE CONDITIONS
NIMITZ HIGHWAY AT PACIFIC STREET



Pacific Street
(facing south)

Nimitz Highway
(west-bound lanes
facing east)

meteorological data was used as model input. An array of 20 to 40 receptor sites at 10 meters from the road edge were entered in the model. Because the area is urban, a background CO concentration of 1.0 milligrams per cubic meter (mg/m^3) was assumed. This refined model, referred to as CALQHC3R, is capable of computing maximum 1-hour and 8-hour concentrations at each receptor location based on the full year of hourly meteorological and traffic data input.

6.4 Results: 1-Hour Concentrations. The results of this modeling are presented in Figures 14 - 17. Each figure depicts the locations of the receptor sites around the respective intersections. Maximum estimated concentrations in milligrams per cubic meter (mg/m^3) for each of the evaluated scenarios are also presented along with the particular receptor location at which they were predicted.

The results suggest that, under all conditions of meteorology and traffic throughout the year, both the federal and state 1-hour CO standards would be met at most receptor locations in close proximity (10 meters) to the intersection. Only during the a.m. peak hour at a few receptors in the southeast corner of the Punchbowl intersection did there appear to be a possible exceedance of the State 1-hour standard. There were 2 - 4 exceedances per year at these receptors. Beyond 10 meters the standards appear to be met at all locations. It should also be noted that the predicted exceedances appear to be already occurring under existing conditions and the number of exceedances does not change in the future even with the proposed project. The differences in maximum 1-hour CO concentrations under the "existing", "without project" and "with project" scenarios were so small as to be insignificant.

6.5 Results: 8-Hour Concentrations. The 8-hour results, also presented in Figures 14 - 17, are similar to the 1-hour findings. The federal standard is met at all locations, but there appears to be a possibility of exceedance of the state standard in the same southeast corner of the Punchbowl intersection cited above. Beyond 10 meters there appears to be little chance of exceeding even the stringent state standard.

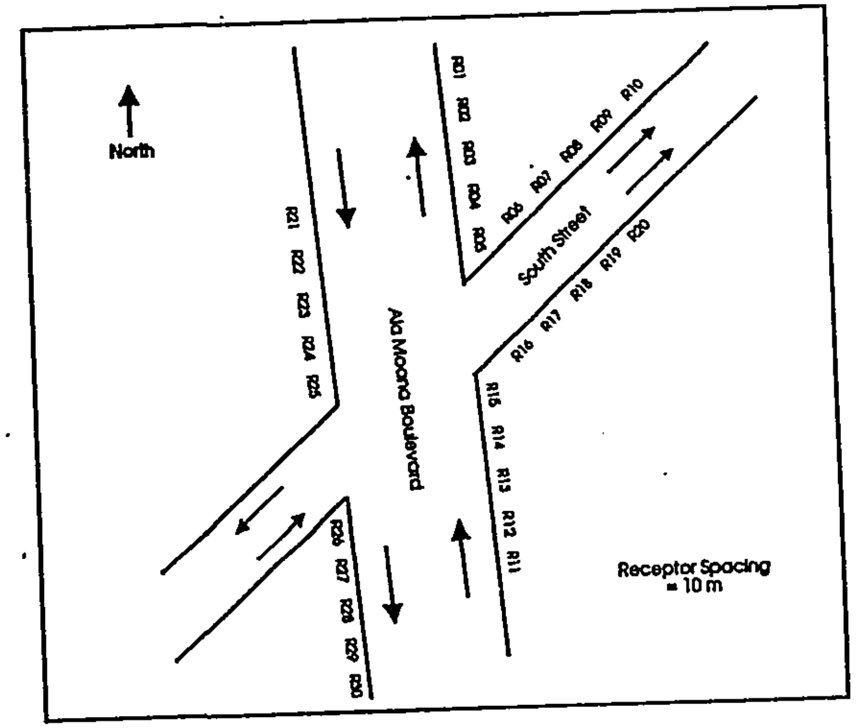
6.6 Parking Facility. The two parking lots (400 stalls total) associated with the proposed Cruise Ship Passenger Terminal are not expected to contribute significantly to overall air quality in the area due to the relatively small number and intermittent arrivals and departures of cruise ships throughout the year in contrast to a normal municipal parking facility which is likely to be actively used on a daily basis. Also, as noted in the traffic report[9], peak traffic activity associated with ship arrivals/departures does not normally coincide with peak traffic hours on the adjoining street network, thereby limiting its impact on air quality since such impact is largely a function of traffic congestion.

7. DISCUSSION, CONCLUSIONS AND MITIGATION

7.1 Short-Term Impacts. Since, as noted above, the project area is considered semi-arid by Thornwaite's classification system, there is an increased potential for fugitive dust. It will be very important to employ adequate dust control measures during the construction period. Dust control could be accomplished through frequent watering of unpaved roadways and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%[15]. The soonest possible landscaping of completed areas will also help.

FIGURE 14

ESTIMATES OF MAXIMUM 1- AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS
Ala Moana Boulevard at South Street
Peak Traffic Hours
1999 - 2003

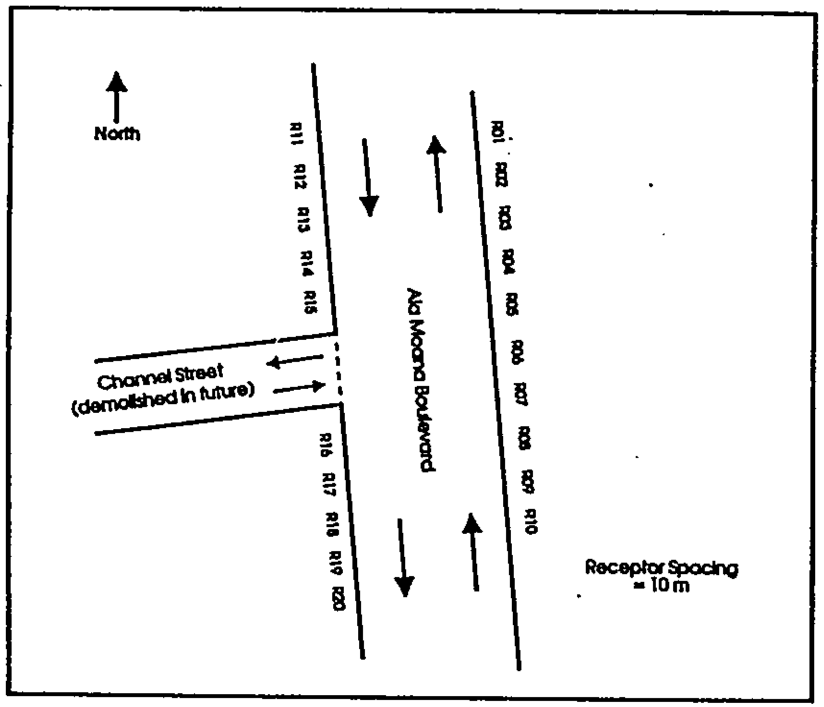


HIGHEST OF SECOND HIGHEST CONCENTRATIONS
(mg/m^3)

Period	1999	2003 w/o project	2003 w/project	Receptors
A.M.	5.7	5.7	5.7	R16
P.M.	5.3	5.2	5.3	R05
8-Hr	3.3	3.4	3.5	R05

FIGURE 15

ESTIMATES OF MAXIMUM 1- AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS
Ala Moana Boulevard at Channel Street
Peak Traffic Hours
1999 - 2003

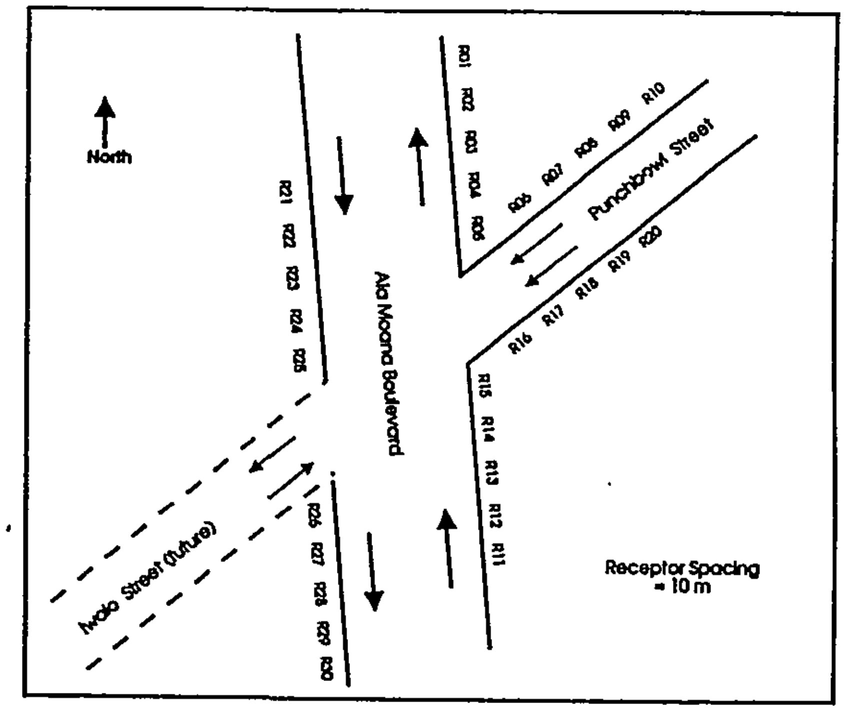


HIGHEST OF SECOND HIGHEST CONCENTRATIONS
(mg/m^3)

Period	1999	2003 w/o project	2003 w/project	Receptors
A.M.	7.4	8.3	4.4	R16,R10
P.M.	4.7	4.1	4.1	R15,R5,R16
8-Hr	3.4	3.6	2.6	R16,R8

FIGURE 16

ESTIMATES OF MAXIMUM 1- AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS
Ala Moana Boulevard at Punchbowl Street
Peak Traffic Hours
1999 - 2003

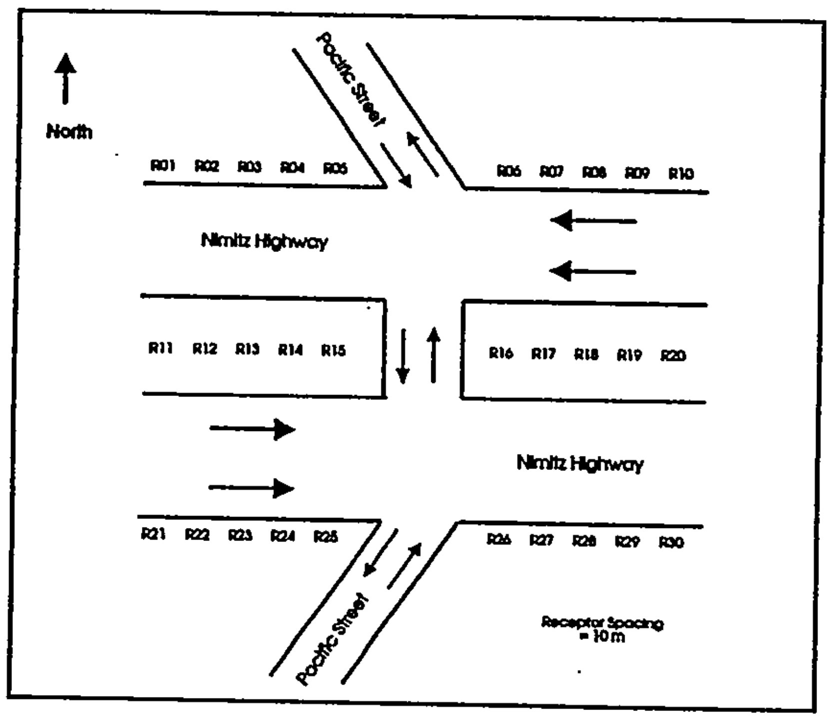


HIGHEST OF SECOND HIGHEST CONCENTRATIONS
(mg/m^3)

Period	1999	2003 w/o project	2003 w/project	Receptors
A.M.	10.4	10.1	10.4	R16,R15
P.M.	8.9	8.8	8.9	R5,R10
8-Hr	5.3	5.3	5.7	R05

FIGURE 17

ESTIMATES OF MAXIMUM 1- AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS
Nimitz Highway at Pacific Street
Peak Traffic Hours
1999 - 2003



HIGHEST OF SECOND HIGHEST CONCENTRATIONS
(mg/m³)

Period	1999	2003 w/o project	2003 w/project	Receptors
A.M.	4.8	5.1	5.3	R16
P.M.	4.3	4.5	4.7	R15,R14
8-Hr	2.6	2.8	3.0	R06,R07

If construction vehicle activity is limited to off-peak hours, then its effects of lowering average speeds, reducing level of services (LOS), and increasing vehicle emissions can be greatly diminished.

7.2 Mobile Source Impacts. As noted in Section 6, both federal and state carbon monoxide standards are generally met during the a.m. and p.m. peak traffic hours which represent the *worst case* hours of the day. Only during the a.m. peak hour within 10 meters of the street at a few locations in the southeast corner of the Punchbowl intersection were exceedances predicted. The two to three predicted exceedances per year at any one of these receptor locations, if actually occurring, would amount to 0.023 - 0.034% of the hours in a year. At all locations beyond 10 meters from the Punchbowl intersection and at all receptors at the other intersections the standards are predicted to be met during the 8,760 hours of the year.

7.3 Conclusions. The following conclusions may be drawn from the foregoing analysis:

- While there will be short-term construction-related impacts on air quality, they can be adequately mitigated to prevent violations of standards or air pollution control rules.
- The project's impact on air quality in the vicinity of major intersections serving the project area will be minimal and will not threaten or contribute to violations of national ambient air quality standards (NAAQS).
- The project will contribute minimally to the overall growth in traffic which is already causing carbon monoxide (CO) levels to approach and possibly exceed the state's 1-hour CO standard in close proximity to the Punchbowl Street - Ala Moana Boulevard intersection during two or three hours per year.
- The state's 8-hour CO standard may also be exceeded on those same two or three days when the 1-hour standard is exceeded, but the proposed project will not aggravate those exceedances.

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Aquatic Habitat and Water Quality Impact Assessment for the Oahu Commercial Harbors 2020 Master Plan EIS

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A review of existing aquatic habitat and water quality, and impacts assessment for the Oahu Commercial Harbors 2020 Master Plan EIS[1]

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Introduction

This report provides a description of extant aquatic (marine and brackish water) habitat and water quality in Honolulu Harbor and adjacent Ke'ehi Lagoon for the *Oahu Commercial Harbors 2020 Master Plan, Immediate Phase EIS*. The report provides a review of past biological and water quality surveys conducted in the project areas. This technical support document is one of several prepared for the EIS.

Honolulu Harbor originally was developed over a century ago along a channel through the reef created by Nu'uanu Stream. Dredging over the years gradually increased the size and depth of the harbor basin and entrance channel (Honolulu or Fort Armstrong Channel). Dredged fill was used to create fast land, particularly on the seaward reef at Sand Island (formerly Anuenue Island). The Kapalama Basin, also once a natural break in the reef, was eventually joined to the Honolulu Basin by dredging a channel between them. The expansion of fill areas across the inner reef flats to the south and west resulted in a harbor with generally poor circulation and attendant water quality problems (Cox and Gordon, 1970). In 1960, the western entrance channel (Kalihi Channel) was opened to Kapalama Basin, substantially improving circulation within the latter basin and Honolulu Harbor as a whole. Circulation appears to have benefited still further with changes to the bathymetry made in Ke'ehi Lagoon by the Reef Runway Project (Noda, 1979; *AECOS*, 1991).

[1] Report prepared for Wil Chee — Planning, Inc. for the "Environmental Impact Statement for the Oahu Commercial Harbors 2020 Master Plan, Immediate Phase, Oahu Island, Hawaii" This report will become part of the public record.

Honolulu Harbor is the primary commercial harbor for ship traffic in and out of Hawai'i. Sand Island borders it to the south and extensive commercial and industrial areas occur on all sides. Honolulu Harbor is classified as a Class A embayment by the State of Hawaii, Department of Health (HAR, §11-54; DOH, 1992).

Ke'ehi Lagoon was once a large, shallow reef flat west of Honolulu Harbor that was part of the fringing reef all along the south coast of O'ahu. The Kalihi Channel was a natural, narrow break in the reef margin that provided an outlet for brackish water from Kalihi and Moanalua Streams. Lands surrounding Ke'ehi Lagoon are part of the Honolulu coastal plain (Stearns, 1966) and are primarily composed of marine sediments. The shoreline of Ke'ehi Lagoon itself has undergone extensive and repeated modifications so that none of the original natural shoreline now exists. Prior to the 1940s the lagoon could be characterized as generally not navigable tidal flats surrounded by ancient fishponds built by the native population. Because the shallow fringing reef to seaward created calm conditions closer to shore, three large seaplane runways were dredged out of the shallow, back reef area. These have been enlarged on occasion, and the spoil used for nearby land fill and shoreline modification. The channels remain the most conspicuous physical modifications to the lagoon, and their influence on water circulation patterns and flushing, and consequently on water quality, is substantial . The central portion of the lagoon, inside the triangular area created by the seaplane runways, includes some shallow tidal flat, although most of this area has been used as a borrow (source of fill material). Most of the remaining reef flat is found seaward of the seaplane channels.

Opening of a western entrance channel into Honolulu Harbor required dredging a channel through the reef across the mouth of Ke'ehi Lagoon. Later, construction of the Reef Runway resulted in significant alterations to the seaward boundary of Ke'ehi Lagoon. Ahua Point essentially no longer exists. A large portion of the fringing reef adjacent to the point was covered, borrow areas established, and a circulation channel dredged past the eastern end of the new runway and through the reef. Circulation in Ke'ehi Lagoon was greatly improved with the construction of the Reef Runway (Noda, 1979). At about the same time, sewage discharge from the nearshore waters of Sand Island was diverted offshore greatly enhancing the water quality conditions in Honolulu Harbor, Kapalama Basin and Ke'ehi Lagoon.

Ke'ehi Lagoon is a major marine thoroughfare for both commercial and recreational boat traffic, and is home for many live-aboard boats. The lagoon is heavily used for fishing, crabbing and recreational water sports. Ke'ehi Lagoon is bordered by major industrial areas and marina facilities, as well as by the Honolulu International Airport, which lies along the northern and western side of the lagoon. Ke'ehi Lagoon is classified as a Class A embayment (HAR §11-54; DOH 1992).

The Watersheds

Honolulu Harbor receives stream flow from Nu'uanu Stream which is joined by Pauoa and Waiolani Streams before flowing into the main harbor basin between Piers 15 and 16. The Nu'uanu watershed encompasses about 6,557 acres (10.24 mi²) and is divided nearly equally into conservation and urban land uses (GDSI, 1994) (Table 1).

Table 1. Watershed characteristics for major streams draining into the Ke'ehi - Kapalama - Honolulu Harbor complex (after GDSI, 1994).

	Stream				
	Nu'uanu	Kapalama	Kalihi	Moanalua	Ke'ehi
drainage area (acres)	6,557	2140	3,976	6,778	1,578
drainage area (sq. mi.)	10.24	3.34	6.20	10.59	2.46
% agricultural	0	0	0	0	0
% conservation	51	15	61	65	19
% urban	49	85	39	35	81
% rural	0	0	0	0	0

The Kapalama watershed, which is drained by Kapalama Stream, is about a third of the size of the Honolulu Harbor watershed. Conservation lands comprise about 320 acres and the remainder is given to urban land use (about 1820 acres).

Conservation lands make up about 45 percent of the combined Kapalama Basin - Honolulu Harbor watersheds. Housing and public facilities account for about 40 percent of the coverage and industrial/commercial property located in and around the harbor areas make up somewhat less than 10 percent of the watershed. (Freeman, 1993; Stevenson et al., 1995).

Ke'ehi Lagoon receives drainage from three watersheds: Kalihi, Moanalua and Ke'ehi. The Kalihi watershed comprises about 3,679 acres and includes Kalihi Stream which flows into the head-end of Ke'ehi Lagoon. The Moanalua watershed is approximately 6,778 acres in size and includes three streams; Manaiki and Kahauiki Streams which flow into Moanalua Stream which empties into the northernmost section of Ke'ehi Lagoon near Kalihi Stream. All three streams in the Moanalua watershed are intermittent. The combined Kalihi/Moanalua watershed area is comprised principally of conservation lands (50 percent), residential and public facilities (30 percent) and commercial/industrial property (20 percent). The Ke'ehi watershed is about 1,578 acres in area and includes no streams. There is, however, a major drainage canal discharging into the northwest section of Ke'ehi Lagoon.

This watershed includes the airport industrial/commercial area (about 81 percent) and 19 percent conservation land.

Flushing and Circulation

Water flow in Honolulu Harbor is governed principally by tidal exchange, although very few actual measurements have been made in the harbor. The Water Quality Program for Oahu study (Dillingham Environmental Co., 1971) established a station in Kapalama Channel between the Kapalama and Honolulu Basins which showed tidal reversal in the current, moderate velocities (maximum of 0.3 kts), and net transport toward Ke'ehi Lagoon. Circulation in the main basin was studied by Nishioka (1971) who found that on a flooding tide water entered the basin from the Kapalama Channel and from deeper layers through the Honolulu Channel. There is significant surface flow in the direction of the wind vector. Thus, during typical trade wind conditions, surface waters would tend to move out of the harbor during both flooding and ebbing tides. On an ebbing tide both surface and deeper layers moved seaward through Honolulu Channel.

The present situation is complicated by the fact that the western channel (Kalihi Channel) connects with Ke'ehi Lagoon. Since construction of the Reef Runway to the west, the flushing volume of the lagoon exceeds (by a factor of 3.5 to 5.5) the volume attributable to simple tidal exchange. Honolulu Harbor participates in this enhanced flushing (Noda, 1979). Thus, during typical Trade Wind conditions subsurface water flows into Honolulu Harbor through both ship channels on a flooding tide and flows out through these channels on an ebbing tide (Bathen, 1978). However, during periods of light and variable winds (e.g., kona conditions), the relationship between the tide and flow direction are reversed for Kalihi Channel in the area of the bascule bridge. In other words, net flow is out of the harbor to the west during the flooding tide and into the Kapalama Basin on an ebbing tide (Noda, 1979). Maximum velocity measured by Noda near the bascule bridge was 0.9 ft/sec (0.5 kts.).

In Ke'ehi Lagoon, during typical trade wind conditions and a flooding tide, the net flows are into the lagoon through Kalihi Channel and out through Honolulu Harbor (Table 2). Other inputs include those through Circulation Channel "B" near the end of the Reef Runway and the waterski channel west of Sand Island. A Trade Wind ebbing tide reverses many, but not all, of the above. The dominant net transport is through the ewa seaplane runway and out of the lagoon through Circulation Channel "B". Water flows into Ke'ehi Lagoon from Kapalama Basin and out through Kalihi Channel. Some input still occurs through the waterski channel. Surface flow (to a depth of up to 3 meters) is in the direction of the wind vector with speeds up to 0.45

ft/sec (0.25 kts) (Noda, 1978). Thus, during Trade Wind conditions, surface flow will be out of the lagoon into Mamala Bay on both rising and ebbing tides.

Table 2. Water volume flow into or out of Ke'ehi Lagoon (10^7 ft^3) during trade wind conditions (after Noda, 1979)

Location	Flood Tide				Ebb Tide				Complete Tidal Cycle			
	into	out	net		into	out	net		into	out	net	
Kalihi Channel	9.64	0	in	9.64	0	3.38	out	3.38	9.64	3.38	in	6.26
Circulation Channel "B"	4.76	0.61	in	4.15	0	9.98	out	9.98	4.76	10.59	out	5.83
Kapalama Basin	0	10.81	out	10.81	7.09	2.67	in	4.42	7.09	13.48	out	6.39
Ski Channel	5.27	0	in	5.27	2.61	1.26	in	1.35	7.88	1.26	in	6.62
TOTAL	19.67	11.42	in	8.25	9.7	17.29	out	7.59	29.37	28.71	in	0.66

During calm, or light to variable wind conditions, a large flow enters Ke'ehi Lagoon from Kapalama Basin and a large flow exits Circulation Channel "B" (Table 3). Water flows out Kalihi Channel and in through the waterski channel. An ebbing tide during kona conditions produces a large flow into Kapalama Basin. Water moves in through the Kalihi and waterski channels and out through Channel "B".

Table 3. Water volume flow into or out of Ke'ehi Lagoon (10^7 ft^3) during light and variable wind conditions.

Location	Flood Tide				Ebb Tide				Complete Tidal Cycle			
	into	out	net		into	out	net		into	out	net	
Kalihi Channel	2.13	3.62	out	1.49	9.63	0	in	9.63	11.76	3.62	in	8.14
Circulation Channel "B"	0	12.06	out	12.06	0	4.67	out	4.67	0	16.73	out	16.73
Kapalama Basin	17.14	0	in	17.14	0	22.61	out	22.61	17.14	22.61	out	5.47
Ski Channel	5.95	0	in	5.95	9.8	0	in	9.80	15.75	0	in	15.75
TOTAL	25.22	15.68	in	9.54	19.43	27.28	out	7.85	44.65	42.96	in	1.69

Based on estimates by Stevenson et al (1995) and Noda (1978), the volumes of Honolulu Harbor and Kapalama Basin (assuming an average depth of 35 ft.) are calculated to be on the order of 6.4 x 10^8 ft^3 and 3.2 x 10^8 ft^3 respectively. The volume of Ke'ehi Lagoon is estimated by to be roughly 5.8 x 10^8 ft^3. During Trades and light to variable wind conditions, average tidal flushing volumes in Ke'ehi Lagoon were determined by Noda (1978) to be about 2.9 x 10^8 ft^3 and 4.3 10^8 ft^3 respectively. This means that the turnover rate in Ke'ehi lagoon is about one day (2 tidal cycles) during Trade Wind conditions and less than one day during light to variable wind conditions. Based upon tidal flows between Ke'ehi Lagoon and Kapalama Basin (Table 2 and 3), we can estimate that the volume of Kapalama Basin is replaced in less than 1.5 days (about 2.3 tidal cycles) during Trade Wind conditions and in less than one day (about 1.4 tidal cycles) during light to variable wind conditions. Because of a lack of flow data for Honolulu Channel, it is not possible to make a realistic estimate of volume turnover for Honolulu Harbor. However, considering the strong tidal flows into Kapalama Basin on the western end, it seems likely that turnover will, at most, be a matter of a few days. Buske and McCain (1972) estimated flushing time of Honolulu Harbor at 6 hours from thermal studies for the Honolulu Generating Station.

The Basins

Honolulu Harbor receives inflow from Nu'uanu Stream and its tributaries which enters the Harbor between Piers 15 and 16. Baseline flow from Nu'uanu Stream is about 2.3 mgd (3.6 cfs) based upon analysis of stream flow data (USGS, 1999). The average storm event flow is on the order of 49.9 mgd. Flood flow can be substantial during periods of high rainfall over Honolulu and the watershed behind Honolulu - peak discharge in 1981, for example, was 252 mgd at the 650 ft. elevation USGS stream gage. At such times a brackish surface plume forms in the harbor that is driven seaward through the ship channels during typical trade wind conditions. Nu'uanu Stream is a significant source of sediment and nutrient inputs to Honolulu Harbor.

Kapalama Stream flows into Kapalama Basin near Pier 38. Baseline flow is estimated at about 1.1 mgd (1.7 cfs) with an average storm event flow of about 16.6 mgd. This stream is also a primary source of sediment and nutrient inputs into Kapalama Basin.

Historically, water quality in Honolulu Harbor and Kapalama Basin has generally been regarded as poor (c.f. Cox & Gordon, 1971). This is not surprising considering the potential sources of pollution. The two watersheds which drain into these basins through Nu'uanu Stream and Kapalama Canal encompass major developed areas of the city of Honolulu. Honolulu Harbor is the principal commercial port for the Hawaiian Islands, and aside from the comings and goings of large ships, the waterfront surrounding these basins, Kapalama Canal, and the lower reaches of Nu'uanu Stream all receive discharges and runoff from major industrial and urban areas of the city. Honolulu Harbor waters near Pier 7 are also used for cooling purposes at the Hawaiian Electric Company Honolulu Generating Station. Prior to construction of the deep sewage outfall off Sand Island, sewage contamination of nearshore waters undoubtedly influenced the waters of both Honolulu Harbor and

Kapalama Basin under certain oceanographic conditions (Laevastu, Avery, and Cox, 1964). Most of the point discharges historically entering Honolulu Harbor have now been diverted to the new Sand Island Treatment Plant (DOH, 1982).

A water quality sampling station in the Harbor at the mouth of Nu'uanu Stream showed that water temperature, nutrient concentrations and pH met State Water Quality standards for Class B waters in 1970-71. However, dissolved oxygen, salinity, secchi depth, and total coliform levels did not (DPW, 1971). A study by Ultramar (1968) noted low levels of dissolved oxygen in violation of water quality standards at this location, although fecal coliform, pH, and total phosphorus were all within the limits set by the standards at the time. Enhanced flushing of Ke'ehi Lagoon and Kapalama Basin after completion of the Reef Runway project, along with diversion of the Sand Island sewage effluent into deep water offshore, have all likely had a positive impact on water quality in the project areas. As a general indication of water quality, *AECOS* (1979) compared mean extinction coefficients (a measure of water column clarity) from before construction of the Reef Runway (data from Oceanic Institute, 1970 reported in R. M. Towill, 1976) of 0.72/m with a mean post-construction value of 0.39/m. The difference indicated a considerable improvement in mean water column clarity in Kapalama Basin after construction of the Reef Runway.

The State of Hawaii, Department of Health samples Honolulu Harbor waters on an irregular basis, except microbiological testing which is done monthly near the bascule bridge in Kapalama Channel. Total and fecal coliform levels (DOH, 1978, 1981) measured here and elsewhere off Sand Island showed a dramatic decrease in 1977 apparently reflecting diversion of the Honolulu Sewage Treatment Plant effluent to the deeper offshore waters.

Cooling water for the Honolulu Generating Station is taken from the Honolulu Basin north of Pier 7 and discharged into the Harbor south of Pier 7. The thermal effluent normally moves toward the southwest across the main basin and surface water temperature elevation is reduced below 0.8 C° within 460 meters of the discharge (Buske and McCain, 1972). Harbor waters are sometimes oily on the surface, and substantial contamination by non-volatile hydrocarbons was noted in sediment samples collected in November 1982 (*AECOS*, 1982a), particularly those from the stations around piers 12A and 12B.

Ke'ehi Lagoon receives inputs from Moanalua and Kalihi Stream systems. Moanalua Steam and its tributaries (Manaiki and Kahauiki Streams) are interrupted[1] streams with significant flow only during freshet events. The average storm related input

[1] Interrupted streams are perennial streams in which flow is continuous only in specific segments, usually at higher elevations where rainfall is more reliable.

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from Moanalua Stream is estimated at around 69 mgd. Kalihi Stream, on the other hand, is a perennial stream with a continuous baseline input to Ke'ehi Lagoon of about 2.1 mgd (3.2 cfs) and an average storm runoff volume of about 31.4 mgd.

Prior to the dredging of the seaplane lanes during the 1940s, the lagoon was essentially a broad, shallow reef flat. Water quality on the reef flat was probably very good prior to western-style development on the watershed and gradual obliteration of the ancient fishponds along the shore. Nutrients and fine sediments washed in from the watershed would have been largely captured by coastal wetlands or (during freshet flows) directed out to sea through channels in the reef opposite stream mouths. Studies in the late 1960s (Ultramar, 1968) and early 1970s (Cox & Gordon, 1970; Dillingham, 1971) identified water quality problems in Ke'ehi Lagoon that were possibly related to effluent from the Sand Island Sewage Treatment Plant and to terrestrial runoff. By that time, all coastal wetlands and fishponds had been obliterated. Dredged channels encouraged accumulation of fine organic-rich sediments in the lagoon.

Diversion of the Sand Island Sewage Treatment Plant effluents from the nearshore waters off Sand Island to the present deep ocean site (240 feet deep) nearly two miles offshore in November of 1976 has resulted in improved water quality conditions in the Honolulu-Kapalama-Ke'ehi basin complex. Similarly, the completion of the Reef Runway project in 1976 significantly improved circulation in Ke'ehi Lagoon and in the western end of Kapalama Basin. This resulted in a noted improvement in water quality (*AECOS*, 1979).

Present Water Quality Conditions

Water quality conditions in the study area have changed over the years (as noted above) as the result of various alterations to the physical environment. These changes have generally resulted in a steady decline in water quality for the marine environment, somewhat reversed by improving circulation in the basins and by moving sewage discharges to deeper, offshore waters more recently. Water quality data since these most recent changes are scarce for the study area, as few major environmental changes have taken place here since the construction of the Reef Runway and diversion of the Sand Island sewage effluent in the mid 1970s. We consider that "present" water quality includes any representative data available since 1976.

The marine waters of the Honolulu-Kapalama-Ke'ehi complex serve as the receiving waters for runoff, drainage, and seepage from some 21,000 acres of watershed (GDSI, 1994), much of which is in residential and commercial/industrial land use. The natural function of these drainage basins is to serve a settling and initial mixing

basin for land-derived materials. As such, these embayments would not be expected to demonstrate pristine water quality conditions which characterize embayments such as Hanauma Bay that are little influenced by terrestrial inputs and have unrestricted circulation with open coastal waters.

Water quality in these basins are constantly in a state of flux, being influenced by numerous factors which include: storm runoff, wind conditions, tidal state, and even the movements of large ships which can cause resuspension of sediments into the water column as they pass by. A major storm event will cause a temporary decrease in both salinity and temperature near stream mouths and the formation of plumes (often visible because of high turbidity/TSS levels) that spread out over much of the surface area of a basin. Strong winds can resuspend sediments and nutrients into the water column, while tidal flushing is greatly enhanced during light or variable wind conditions (Noda, 1978). Changes in water quality due to these perturbations may be substantial and reflect the dynamic nature of water quality in these basins. The intent of the results presented below, and generalizations derived therefrom, is to provide as accurate a representation of the average water quality conditions in these basins as possible based on the limited data available for this task.

Honolulu Harbor, Kapalama Basin and Ke'ehi Lagoon are all designated in HAR §11-54-06 (DOH, 1992) as Class A embayments. These water quality standards are summarized in Table 4.

The State standards for embayments are divided into "wet" and "dry" categories depending upon the influx of freshwater (see footnotes Table 4). Based upon estimated stream flows and basin volumes, we can compute the average number of days per year that each basin will qualify as a wet or dry embayment (Table 5). The percent of time that Honolulu Harbor and Kapalama Basin fit the "wet" embayment category is very low (5 percent or less). Even Ke'ehi Lagoon only qualifies as a "wet" embayment about 13 percent of the time. Therefore, in the discussion that follows, we will use the "dry" embayment State criteria as the standard for comparison with existing data.

Table 4. State of Hawaii water quality criteria for embayments (HAR §11-54-06)(DOH, 1992).

Parameter	Geometric Mean value not to exceed this value	Value not to be exceeded more than 10% of the time	Value not to be exceeded more than 2% of the time
Total Nitrogen	200.0	350.0	500.0
(µg N/l)	150.0	250.0	350.0
Ammonia	6.0	13.0	20.0

(µg N/l)	3.5	8.5	15.0
Nitrate + Nitrite (µg N/l)	8.0 5.0	20.0 14.0	35.0 25.0
Total Phosphorus (µg P/l)	25.0 20.0	60.0 40.0	75.0 60.0
Chlorophyll a (µg/l)	1.50 0.50	4.50 1.50	8.50 3.00
Turbidity (ntu)	1.5 0.4	3.0 1.0	5.0 1.5

Two values: upper, "wet" criteria apply when the average fresh water inflow from the land equals or exceeds one percent of the embayment volume per day; lower, "dry" criteria apply when the average fresh water inflow from the land is less than one percent of the embayment volume per day.

Other "standards":

- pH units shall not deviate more than 0.5 units from a value of 8.1, except at coastal locations where and when freshwater from stream, stormdrain or groundwater discharge may depress the pH to a minimum level of 7.0.
- Dissolved oxygen shall not decrease below 75% saturation.
- Temperature shall not vary more than 1 C° from ambient conditions.
- Salinity shall not vary more than 10% from natural or seasonal changes considering hydrologic input and oceanographic factors.

A synopsis of water quality data is presented in Table 6. It has been compiled from various studies (*AECOS*, 1979, 1982a, 1982b, 1991, 1995; OI Consultants, 1986; Oceanit Labs, 1992) in the study area plus several DOH monitoring stations (STORET, 1993). (See Appendix __ for data details). Data from a station located in the open coastal waters of Mamala Bay off the Reef Runway (*AECOS*, 1979) is included in this table for comparative purposes.

Table 5. Estimates of "wet" and "dry" conditions in the Honolulu-Kapalama-Ke`ehi basin complex.

	Ke`ehi Lagoon	Kapalama Basin	Honolulu Harbor
1% basin volume (million gallons)	32.2	23.9	47.9
"wet embayment"			

rain days > 1% volume	47	11	17
% of time	13	3	5
"dry embayment"			
rain days < 1% volume	318	354	348
% of time	87	97	95

Table 6. A summary of water quality data (1977 – present) for the Honolulu Harbor – Ke`ehi Lagoon complex.

Location		Salinity (‰)	Temp (°C)	DO (% sat)	Turbidity (ntu)	NO_3+NO_2 (µg/l)	NH_4 (µg/l)	TN (µg/l)	TP (µg/l)	Chl a (µg/l)
Ke`ehi Lagoon	mean	33.7	25.4	86	2.7	1.8	[illegible] 3.7	167	22	0.32
	stdev	3.2	1.6	10	1.2-6.6	0.8-6.7	1.4-9.7	102-272	11-47	0.13-0.77
	n	292	213	209	204	47	47	180	180	47
Kapalama Basin	mean	34.6	25.7	85	[illegible] 1.9	2.2	[illegible] 6.1	137	[illegible] 41	0.28
	stdev	0.6	1.5	9	1.3-2.9	1.0-4.8	2.6-10.3	97-193	16-50	0.08-0.84
	n	38	37	36	19	19	17	19	19	19
Honolulu Harbor	mean	34.9	25.9	85	[illegible] 0.7	4.3	[illegible] 9.8	124	20	0.36
	stdev	0.3	0.8	21	0.3-1.5	2.0-9.0	3.2-14	101-153	13-32	0.14-0.92
	n	17	13	17	24	21	10	21	21	21
Mamala Bay	mean	34.8	26.1	98	0.3	3.6	3.1	101	32	0.05
	stdev	0.2	0.8	3	0.1-0.6	1.3-9.7	1.6-6.2	81-128	20-50	0.02-0.11
	n	13	13	12	13	13	13	13	13	13

Grayed areas indicate that mean for geometric mean values of State water quality criteria were exceeded.

In general, freshwater inputs appear to exert more influence on salinity in Ke`ehi Lagoon than in the other two basins. This makes sense as Ke`ehi Lagoon (which is about one-half the combined volume of Kapalama Basin + Honolulu Harbor) receives about 110 mgd in runoff during an average storm event, while the Kapalama Basin - Honolulu Harbor area receives only about 66 mgd during a similar event.

The cooler average temperatures in Ke`ehi Lagoon are somewhat unexpected and may result from higher levels of fresh water input into this basin; fresh water inputs typically being several degrees cooler than ambient coastal waters in this area. Another possibility is the influx of deeper, cooler water through Kalihi Channel. The differential could also simply represent a bias in the data used. A seasonal cycle in temperature occurs in these waters and these data are presented without regard to time of year sampled.

Dissolved oxygen (DO) saturation levels are notably lower in Honolulu Harbor in comparison with surrounding marine waters, but are still well within the State water quality criterion (Table 4). Increased residence time in the Harbor, coupled with limited fetch in this area, which would restrict turbulence and mixing, may contribute to the lower DO saturation levels. That DO saturation levels in Kapalama Basin are not similarly depressed may, in part, be explained by significant inputs from Ke'ehi Lagoon during flooding tides. Also, the only water quality data available for Kapalama Basin was from a station located near the bascule bridge which is significantly influenced by Ke'ehi Lagoon.

Turbidity levels form a gradient of decreasing concentration from Ke'ehi Lagoon to Honolulu Harbor. This may well be related to higher runoff levels into Ke'ehi Lagoon coupled with the relatively shallow nature of much of Ke'ehi Lagoon which allows for resuspension of shallow sediments during typical trade wind conditions.

The distribution of nitrogen products in the various basins presents an interesting situation. Total nitrogen (TN) decreases from Ke'ehi Lagoon towards Honolulu Harbor and probably results from the greater input of fresh water into Ke'ehi Lagoon. The inorganic forms (nitrate + nitrite and ammonia) both show a reverse trend; i.e., decreasing in concentration from Honolulu Harbor. Note also that ammonia levels are consistently higher than nitrate + nitrite levels in all the basins, but are lower in the open coastal waters of Mamala Bay. Since ammonia is rapidly oxidized to nitrate + nitrite in the presence of oxygen, it seems likely that reactive organic nitrogen in all three basins is actively being broken down into inorganic compounds; first into ammonia and then into nitrate + nitrite. The amounts of ammonia and nitrate + nitrite that accumulate in a basin may be roughly proportional to the basin turnover rates; i.e., higher concentrations in Honolulu Harbor and lower levels in Ke'ehi Lagoon.

The distribution of total phosphorus (TP) and chlorophyll α in the Ke'ehi Lagoon / Honolulu Harbor complex display no distinct trends at this macro-scale level. Phosphorus patterns in aquatic environments are often a puzzle as this chemical tends to sorb onto particulate matter, such as TSS and especially colloidal matter (turbidity), and may then settle into the bottom. This often results in patchy and peculiar distributions in the water column. Note, for example, that the mean TP level at the Mamala Bay station is higher than that in any of the three basins. The concentration of chlorophyll α, on the other hand, is notably higher in the basins than in the coastal waters as would be expected since the turnover rate of plant nutrients and shallow nature of these basins provides a more optimal environment for phytoplankton growth.

In comparison with the State water quality standards, Ke'ehi Lagoon exceeded the most criteria – those for turbidity, ammonia, TN and TP; and Honolulu Harbor the

least –those for turbidity and ammonia (Table 5). Interestingly, the coastal water station in Mamala Bay also did not meet certain State criteria (turbidity, nitrate + nitrite, ammonia and TP). Because this complex of basins serves as a settling area for terrestrial runoff, it is unlikely that any management practice, short of the diversion of runoff, will help these waters meet the State's criteria for turbidity and certain nutrients. At the same time, it is encouraging to note that both DO saturation levels and chlorophyll α concentrations are, in fact, well within the State's criteria. These two parameters represent the culmination of a number of factors influencing water quality and, therefore, are more appropriate indicators of the health of a specific aquatic environment than either nutrients or turbidity.

Water quality data are available for several different sectors of Ke'ehi Lagoon (Table 7). The north Ke'ehi Lagoon sector is located at the mouths of Moanalua and Kalihi Streams. It is a shallow, restricted area due to sediment deposits from stream inputs and demonstrates the poorest water quality conditions in the Lagoon. The southwestern Ke'ehi Lagoon station is located at the southwest corner in the old seaplane channel behind the east end of the Reef Runway. The stations making up eastern Ke'ehi Lagoon were mostly situated in the area where the seaplane channels, Kapalama Channel, and Kalihi Ship Channel all come together, although one station (DOH Station #165) was located midway down the seaplane channel (also known as the "waterski channel") off Sand Island. Circulation Channel "B" is located at the end of the Reef Runway and is a major passageway connecting inner Ke'ehi Lagoon with Mamala Bay. The Mamala Bay station located midway along the Reef Runway is included here for comparative purposes.

Noda (1978) has demonstrated that there is significant surface flow in Ke'ehi Lagoon in the direction of the prevailing winds at speeds up to 14 cm sec^{-1} and up to a depth of about 3 meters. Thus, surface waters in the northern section of the Lagoon, during typical trade wind conditions, are pushed along the seaplane channel parallel to the airport and towards the station in the southwest sector of Ke'ehi Lagoon. Even at an average speed of 6 cm sec^{-1}, these waters could travel over 5 kilometers (3 miles) in a single day. This movement of the surface waters is very important to the water quality of the Lagoon; especially during significant storm events as fresh water runoff into the Lagoon fans out as a thin plume on top of the more dense marine waters. This lens of relatively fresh (but water quality poor) water would then be pushed towards Mamala Bay during trade wind conditions and at fairly rapid rate. Certainly, there is mixing of these surface waters with depth during this process and much of the suspended particulate load will settle out in the Lagoon. Nevertheless, because of the high tidal flushing rates in Ke'ehi Lagoon (see Flushing above), the entire volume of the Lagoon is potentially exchanged with Mamala Bay (and Kapalama Basin) water each day.

Table 7. Water quality conditions in Ke`ehi Lagoon.

Location		Salinity (‰)	Temp (°C)	DO (% sat)	Turbidity (ntu)	NO_3+NO_2 (ug/l)	NH_4 (ug/l)	TN (ug/l)	TP (ug/l)	Chl a (ug/l)
North	mean	32.6	26.1	81	4.8	2.6	6.6	184	30	0.83
Ke`ehi	stdev	4.7	1.5	12	2.5 - 8.6	0.7 - 8.1	2.7 - 11	117 - 332	18 - 54	0.20 - 1.30
Lagoon	count	84	49	48	84	13	13	86	86	13
Southwest	mean	34.7	26.3	87	2.1	1.3	3.3	126	38	0.27
Ke`ehi	stdev	0.3	1.1	4	1.7 - 2.8	0.5 - 3.5	1.5 - 7.6	104 - 153	24 - 60	0.13 - 0.56
Lagoon	count	13	13	12	13	13	13	13	13	13
East	mean	34.1	24.8	95	2.0			146	11	
Ke`ehi	stdev	2.0	1.5	10	1.0 - 3.8			96 - 223	7 - 17	
Lagoon	count	181	137	137	180			84	84	
Circulation Channel "B"	mean	34.8	26.3	99	1.8	2.2	3.3	114	25	0.20
	stdev	0.4	1.1	5	1.4 - 2.5	1.0 - 4.9	1.5 - 7.3	90 - 131	18 - 84	0.09 - 0.44
	count	13	13	12	13	13	13	13	13	13
Mamala Bay		34.8	26.1	88	0.3	2.8	2.1	101	33	0.05
		0.2	0.0	3	0.1 - 0.8	1.3 - 8.7	1.8 - 8.2	81 - 129	20 - 50	0.02 - 0.11
		13	13	12	13	13	13	13	13	13

Grayed areas indicate that mean (or geometric mean) values of State water quality criteria were exceeded.

A general improvement in water quality can be seen moving from the northern part of Ke`ehi Lagoon to either the west or east parts of the basin (Table 7). Since the eastern section of the Lagoon exchanges considerable volumes of water with Kapalama Basin (Table 2 and 3), the changes in water quality there are less noteworthy than those in the western section where exchange with Mamala Bay is facilitated by Circulation Channel "B". Yet, with the exception of turbidity and chlorophyll α, there is a striking similarity between water quality at the Mamala Bay station and in all sections of Ke`ehi Lagoon, except the northernmost sector. It is concluded that water quality conditions in most of the Lagoon are good and this is principally due to the efficient flushing characteristics of this basin (Noda, 1978).

Water quality measurements in Kapalama Basin have mostly been made at a station located near the bascule bridge. To our knowledge only 2 individual samples have been taken in Kapalama Basin proper and in the connection between this basin and Honolulu Harbor during the past twenty years. Water quality data in Honolulu Harbor has been mostly restricted to the pier areas on the mauka side of the Harbor with a few samples having been collected in pier areas on the Sand Island side of the Harbor. Fortunately, a few samples have also been taken in the Honolulu Channel area. These data are presented in Table 8 together with the Mamala Bay station data.

Table 8. Water quality characteristics of Kapalama Basin and Honolulu Harbor.

Location		Salinity (‰)	Temp (°C)	DO (% sat)	Turbidity (ntu)	NO_3+NO_2 (ug/l)	NH_4 (ug/l)	TN (ug/l)	TP (ug/l)	Chl a (ug/l)
Kapalama Basin	mean	34.6	25.7	86	1.9	2.2	6.1	137	30	0.26
	stdev	0.81	1.5	9	1.2 - 2.8	1.0 - 4.8	2.6 - 10	97 - 193	16 - 60	0.08 - 0.84
	count	38	37	36	19	19	17	19	19	19
Honolulu Harbor	mean	35.0	25.7	77	0.9	4.8	6.8	131	23	0.40
	stdev	0.4	0.3	20	0.5 - 1.7	2.1 - 11	3.2 - 14	107 - 191	15 - 36	0.1 - 1.15
	count	17	6	12	19	16	10	16	16	16
Honolulu Channel	mean	34.8	25.4	91	0.3	3.0		102	13	0.24
	stdev	0.1	0.2	20	0.2 – 0.6	2.3 – 4.0		100 – 103	12 - 14	0.18 - 0.23
	count	5	5	5	5	5		5	5	5
Mamala Bay	mean	34.8	26.1	88	0.3	[illegible]	[illegible]	101	32	0.05
	stdev	0.2	0.0	3	0.1 - 0.8	1.3 - 8.7	1.8 - 8.2	81 - 129	20 - 50	0.02 - 0.11
	count	13	13	12	13	13	13	13	13	13

Grayed areas indicate that mean (or geometric mean) values of State water quality criteria were exceeded.

Circulation in the Kapalama-Honolulu Harbor complex is probably somewhat less complex compared with that in Ke`ehi Lagoon as there are only two points of egress; one from Kapalama Channel into Ke`ehi Lagoon and the other through Honolulu Channel into Mamala Bay. It can be assumed that surface flow will be driven by prevailing wind conditions in a manner similar to Ke`ehi Lagoon (see above). Deeper waters enter through both Kapalama Channel and Honolulu Channel on flooding tides and reverse on ebbing tides during trade wind conditions (Bathen, 1978; Noda, 1978). During light wind, or kona conditions, this pattern is reversed (Table 2 and 3) in Kapalama Channel with water flowing into Ke`ehi Lagoon during the flood tide and into Kapalama Basin during the ebbing tide (Noda, 1978). It is presumed that tidal flows through Honolulu Channel during kona conditions do not reverse, but continue to flow into the Harbor on the flood tide and out during the ebbing tide. However, these flows may be noticeably stronger than during typical trade wind conditions.

It can be assumed that the poorest water quality occurs in the vicinity of the mouth of Kapalama Stream in Kapalama Basin and at the mouth of Nu`uanu Stream in Honolulu Harbor and this is substantiated from older studies in the area (Dillingham, 1971). Water quality then likely improves as it moves towards one of the two exits from these basins. Mean turbidity levels are highest in Kapalama Basin and are likely influenced by tidal exchange with Ke`ehi Lagoon (see Table 7 above).

Turbidity levels are lower in Honolulu Harbor and decrease progressively through Honolulu Channel and into Mamala Bay. The somewhat lower mean salinity level in Kapalama Basin may also be influenced by tidal exchange with Ke`ehi Lagoon. DO saturation levels in Honolulu Harbor are notably lower than the surrounding areas (but still in compliance with State criteria). This fact, coupled with higher inorganic nitrogen levels, increased chlorophyll α levels, and slightly enhanced salinity levels may well be indicative of a longer residence time (i.e., lower turnover time) for waters in Honolulu Harbor. A longer residence time would allow for greater evaporation in the basin (i.e., higher salinity), more time for the breakdown of organic nitrogen to inorganic compounds and growth of phytoplankton (i.e., increase in chlorophyll α concentrations). A longer residence time would also allow time for the settling out of more particulate matter, resulting in lower turbidity levels.

Biological Habitats

No marine areas of comparable size in Hawai`i have seen greater alteration of the natural environment than the fringing reef flat along Oahu's south coast from Ahua Point to Fort Armstrong — the area now comprising Honolulu Harbor, Sand Island, Ke`ehi Lagoon, and the Honolulu International Airport. Within this area, most of the original shallow reef platform has been either dredged or filled. The shoreline has been extended seaward and mostly replaced with bulkhead, pier, or revetment structures. Mauka of the reef, extensive fishponds and wetlands have disappeared under landfill. This part of O`ahu serves as the center of sea and air transport in and out of the Hawaiian Islands, and the lowlands and created fast land along the coast are developed in light industrial, commercial, and industrial storage facilities.

Existing marine biological communities in Honolulu Harbor and Ke`ehi Lagoon, surveyed for this document, are described in an attached report by S. L. Coles and R. E. DeFelice, entitled ***Biological Surveys in Honolulu Harbor relating to the Oahu Commercial Harbors 2020 Master Plan EIS***. Conclusions from their report are expanded upon here.

It is unlikely that the proposed modifications in Honolulu Harbor and Ke`ehi Lagoon would have any significant, long-lasting impact on the resident marine biota. Construction activities at Pier 2 would require no dredging and should cause little or no disturbance of sediments. Any sediments that might be resuspended into the water column by construction activity would be fine to medium sands which settle out rapidly with minimal affect on the marine organisms which are growing primarily on the vertical surfaces of pier pilings. Since this site is relatively close to the channel opening, circulation can be assumed to be good and any construction related turbidity would rapidly dissipate.

Construction of new finger piers in the vicinity of Piers 12-16 will not entail dredging. Some suspension of silt, sedimentation, and elevated turbidity during construction activities could occur. However, the sessile marine biota in the area are already limited in both abundance and diversity, and are composed primarily of organisms adapted to or favored by a sedimentary and turbid environment. Any benthic organisms disturbed or displaced at Piers 12-16 are likely to be replaced by rapid resettlement following construction, and the total community will be increased by settlements on any new surfaces provided by the construction. Disturbed fishes may leave the area temporarily and return when conditions are more favorable.

The area most likely to show an impact from these activities is the coral community and associated organisms that are in the vicinity of Pier 12. However, these corals appear to be adapted to relatively high levels of turbidity and sedimentation, and have withstood previous construction activities and other stresses that have occurred in this area of the harbor, maintaining a high level of coral coverage by a variety of species. No change was discernable from the descriptions of this coral community by *AECOS* (1982) and Oceanit (1990), in spite of the considerable development that has gone on in this section of the harbor in the last decade, including construction of Piers 16 and 17 (R. M. Towill Corp. 1982).

Improvements described for Piers 24-29 are not expected to require any work specifically in the water. Rather, all work will proceed on the existing docks above the water line. The biota in this area is generally similar to that described for Pier 15, consisting of fouling biota on vertical piles and generally sparse community of associated fishes. Stations this far into the harbor show the lesser diversity of organisms compared with piling-associated biota closer to the harbor entrance.

Construction of lay berths along Lagoon Drive at the shore of Ke`ehi Lagoon will require mostly shoreline construction to improve access to piers and driving of piles to support those piers. No dredging is required for this project. However, again it would be unlikely that any reasonable activity will cause a substantial impact on the marine communities in this area. This area had the fewest taxa found of any of the sites, and the organisms that were found were primarily intertidal mollusks, a barnacle and sponges which can withstand high levels of sedimentation. Moreover, water movement and turbidity in the area are generally high because of wind driven turbulence. Therefore any construction related re-suspended sediments and turbidity are likely to be rapidly dissipated, and resident organisms that may be impacted by these activities are adapted to withstand sedimentation-related stress.

Within the harbor, there would appear to be no rare, threatened, or endangered species as listed by USFWS (1996). Further, habitats present are not those which would be important to any listed species. The same may be said for the Ke`ehi Lagoon lay berth site. However, several species of water birds are known from the reef flat remnant in Ke'ehi Lagoon south (across the channel) from the lay berth location (see below).

Avifauna

Tidal flats and scattered shoreline areas around Ke'ehi Lagoon are used by a variety of shorebirds, including wading Hawaiian stilt (*Himantopus mexicanus knudseni*), a species listed as endangered by the Federal government (USFWS, 1996). One report (OI Consultants, 1989) describes Ke'ehi Lagoon as one of the most-studied marine habitats for migrant birds in the Hawaiian Islands. The results of several studies (Berger & Walker, 1976; Walker , 1978; Berger, 1987, 1988) have demonstrated a significant decline in the numbers of wintering migrant shorebirds and Hawaiian stilt after completion of the HIA Reef Runway. Walker (1978) attributed the decline in numbers to the increase in air traffic and flight paths directed over important sand and mud flats used for feeding by these birds.

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ATTACHMENT

Biological Surveys in Honolulu Harbor

Relating to the Oahu Commercial Harbors 2020 Master Plan

Immediate Phase EIS

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Summary

Biological surveys were conducted in the vicinity of Honolulu Harbor's Piers 2, 12, 15 and 16 and along the shoreline near Lagoon Drive at Keehi Lagoon, and results were compared with previous surveys in these areas. Total taxa of algae, invertebrates and fishes observed at each site ranged from 27 to 47, comparable to previous surveys in the harbor. In Honolulu Harbor fishes were more diverse at Pier 2 while invertebrates were more diverse at Pier 15. Lower numbers of taxa of both fishes and invertebrates were found at Pier 16 and along Lagoon Drive. The composition of the Pier 2 biota suggested a strong influence of oceanic water from the harbor entrance, while the Pier 15 and 16 communities showed the effects of Nuuanu Stream outflow. The Pier 12 benthic community was dominated by reef corals as previously reported, surprising for an area located so far into the harbor. Both the Pier 16 and Keehi Lagoon sites appeared to be stressed by high sedimentation and turbidity, and their benthic communities were composed of species adapted to these conditions.

It is unlikely that the proposed modification of the harbor will impart a substantial negative impact to the biotic communities resident in the vicinities of the construction activities. If dredging is conducted, it will be confined to the Pier 15-16 and Lagoon Drive areas where the biota are already presently exposed to at least periodic increases in sedimentation and turbidity. Based on the similarity of present conditions to those of earlier studies, no long lasting negative impacts have resulted from similar previous construction activities in Honolulu Harbor.

Introduction

Honolulu Harbor is the principal port serving the Hawaiian Islands and has been so since the early 19th century. The port has grown substantially from its beginnings as a sheltered anchorage in the natural embayment formed by the outflow of Nuuanu Stream through the nearshore coral reef. Landmarks along the way of the development of Honolulu Harbor have been the deepening and widening of the main channel in 1892 (Anon. 1892), dredging of the Kapalama Channel to connect with the Kapalama Basin in 1917, further widening of channels and basins in 1935 and 1946 (Rush 1957), and the opening of the Kalihi channel in 1962 to give two entrances to the harbor (Wilson Okamoto & Assoc. 1968). Construction and modification of piers and jetties in the Harbor have been part of this development process since 1825, when a ship's hull was sunk to form a pier at the foot of Nuuanu Avenue, at the site of the present Pier 12 (Rush 1957)

As part of the continued development of the harbor, the Harbors Division, Hawaii State Department of Transportation, is considering modification or construction of piers in Honolulu Harbor and Keehi Lagoon. Three sites may involve work that could impact the marine environment and resident marine communities. These sites are the Pier 2 Cruise Passenger terminal along the main entrance channel, Piers 12 to 17 at the mouth of Nuuanu Stream, and lay berths to be constructed along Lagoon Drive on the northwestern side of Keehi Lagoon. The condition of the marine communities present in these areas was evaluated in the present study to provide information about the potential impact of piling construction that may occur as a part of harbor development.

Site Descriptions

The characteristics of the areas sampled (Figures 1 and 2) are as follows:

Pier 2. This site is located at Diamond Head Terminal, along the east side of the main channel to Honolulu Harbor, about 1000 m from the channel entrance. In the early days of Honolulu Harbor, sailing ships were pulled into the harbor against the prevailing winds by ox teams walking along the reef that existed in this area before the channel was widened (Stewart 1936). Pier 2 was the site of the first drydock and marine railway constructed in Honolulu Harbor and the Hawaiian Islands, completed in 1883 (Anon. 1883, 1906). Construction of a pier at this site was completed in 1922 and the pier was used for unloading lumber, coal and freight (Board of Engineers 1936). Improvements were made in 1947, which included construction of a new terminal that was later combined with adjoining property to make up the present Diamond Head Terminal, first used in 1954 (Stroup 1959).

Pier 2 presently consists of a large cement docking area that is supported on cement posts about two feet square in cross section. The pier extends out about 10 m from the shoreline and bottom depth ranges from about 1.5 m next to the shore to 10 m at the pier's edge. The bottom is coarse to fine white sand mixed with coral rubble, and water clarity is relatively high, reflecting the closeness of this site to the mouth of the entrance channel and the influence of oceanic water.

Pier 12. This is the site of the first pier that was made in Honolulu Harbor in 1825 by sinking a ship's hull at the foot of Nuuanu Avenue and building a dock around the hull (Rush 1957). This pier is shown in an 1847 map (Metcalf 1847) as part of the government wharf that existed west of the Honolulu Fort. The fort was torn down in 1857 and its materials were used in filling the nearshore reef and subtidal area which make up the present Aloha Tower area, formerly known as the Esplanade (Anon. 1938; Judd 1975). Pier 12 was built in 1907 (Wilson, Okamoto & Assoc. 1968) and is no longer present, but a small area suitable for docking small boats exists at the former site. The perimeter of this dock is made up of cut coral blocks, stated in Oceanit (1990) to be taken from the Honolulu Fort, but this is unverified. The blocks extend down to about 6 m depth in a mixed silt-rubble bottom which has abundant trash such as wire, old appliances and fishing lines. Despite generally poor water clarity in this area, live reef corals are common to abundant on the coral blocks on both sides of the pier, right up to and including pilings supporting Nimitz Highway.

Pier 15. A rudimentary pier at this site was replaced in 1883 by a more permanent structure, (Anon. 1950) which was used through the early decades of this century for loading interisland freight and passengers. Much of Pier 15 was eliminated when Nimitz

Highway was constructed in 1952 (Rush, 1957). The present pier is made of wood which sits on cement posts of about 0.75 m in diameter in depths from 8 m at the piers edge to 1.5 m at the shore side of the pier, about 10 m from its edge. The bottom is fine sand and silt with abundant benthic holes that may indicate the presence of alpheid shrimps (*Alpheus mackayi*) or other benthic burrowers. Water clarity is low and decreases going toward Nimitz Highway and the mouth of Nuuanu Stream, which discharges into the harbor about 100 m from the Ewa end of this pier.

Pier 18. This pier was reconstructed in about 1984 on the site of a pier that had been demolished in the 1950s. Piers 16 and 17 are the most recently constructed in Honolulu Harbor and were built to provide increased berthing space for Oahu's commercial fishing fleet. Pier 18 extends into the harbor from the twiel curve along Nimitz Highway and lies about 100 m directly downstream of the discharge of Nuuanu Stream. It is supported on 0. 5 m diameter cylindrical posts rising out of 4.2 m water depth. The bottom is soft, muddy silt littered with old tires and other trash. Water at the site is quite turbid because of runoff from Nuuanu Stream, and sedimentation is apparently high, as indicated by shoaling of the area from a dredged depth of 5.5 m when the pier was constructed (R. M. Towill 1982).

Lagoon Drive. The Keehi Lagoon seaplane runways were dredged in 1941-44 to a depth of 3.3 m from mud flats and fossil reef offshore of the John Rodgers (Honolulu) airport (Harvey et al. 1971). Unfortunately, limited circulation of water through the runways resulted in stagnation and poor water quality that was somewhat relieved by circulation channels that were dredged as part of the construction of the Honolulu Airport Reef Runway in the early 1970s (Environmental Consultants 1979). The area sampled along Lagoon Drive is on the site of a former mooring basin for seaplanes that was dredged as part of the original Seaplane Runway "A", but had become partially filled in by sediment deposits and mangrove growth by the time of reef runway construction. At that time the entire mooring basin was filled to align with the remainder of the shore and the shoreline was lined with boulders to limit erosion.

The sampling site is at about the middle of the northwest side of the former Seaplane Runway "A" channel. The boulders aligning the channel extend from above the high water mark to about 0.5 m depth and sit on a gently sloping hard substratum littered with oyster shells, which slopes gradually down to a flat bottom at 2-3 m that is covered with fine silt. The area is over three km downwind of the Kalihi-Moanalua Stream mouth and is subject to substantial wind driven waves during trade wind conditions that produce considerable water turbulence and turbidity from wave stirred sediments.

Methods

The benthos and fish faunas at Piers 2, 12 and 15 were surveyed on 18 September 1998; Pier 16 and the Lagoon Drive-Keehi Lagoon site on 22 September, 1998. Using Scuba, two investigators experienced in identifying Honolulu Harbor organisms dived for approximately 45 minutes at each site and noted the fishes and benthic invertebrates that were present. Organisms identified on site were noted on underwater paper and samples were scraped from pier surfaces, preserved in 70% alchohol and returned to the laboratory for identification. Photographs were taken of representative organisms using a Nikonos camera with a 28 mm lens and closup attachment with framer. Surveys along the dock covered approximately 100 m along the dock to the rear of the dock and all depths down to the base of the dock pilings.

Results

The taxa of macroalgae, macroinvertebrates and fishes noted at each site are listed in Table 1, and the total numbers of each taxonomic group found in this and previous studies for these sites are shown in Table 2. General descriptions of the biotic communities at each site are as follows.

Pier 2. Benthic algae and invertebrates, mostly sponges and corals, sparsely populated the pier pilings at this site. Ten species of sponges were found, which included two undescribed new species of *Dysidea*, one undescribed new species of *Toxiclona* and one new genus of the family Chalinidae. Five coral species occurred along with two other cnidarians, the introduced hydroid *Halocordyle disticha* (Goldfuss, 1820) (Plate 2) and the introduced octocoral *Carijoa risei* (Duchassaing & Michelotti 1860) (Plate 1). All of the sponges and corals were small, seldom more than a few cm in their largest dimension. The other dominant organism on the pier pilings was the red algae *Mesophyllum* cf. *mesomorphum* (Foslie) Adey, which was common in shallow areas near the edge of the pier where light was sufficient.

The upper intertidal zone was dominated by abundant *Chthamalus proteus* Dando & Southward, 1980, a barnacle that has recently been introduced to Hawaii (Southward et al. 1998), and by small oysters (*Ostrea* sp.). Three molluscs occurred only at this station: the black and blue nudibranch *Tamja morosa*, the pearl oyster *Pinctada margaritifera* (Linneaus 1758) and the thorny oyster *Spondylus ?tenebrosus* Reeve, 1856. The mucus-feeding worm *Chaetopterus* sp. was also seen only at this station.

A total of 31 taxa of invertebrates and two species of algae were recorded at Pier 2. Twelve fish species were noted under and around the pier and five species were unique to this site, including *Parapeneus multifasciatus* Quoy & Gaimard, 1824, *Chaetodon miliaris* Quoy & Gaimard, 1824, *Forcipe flavissimus* Jordan & McGregor, 1898, *Thalosomma duperrey* (Quoy & Gaimard, 1824) and *Canthigaster jactator* (Jenkins, 1901).

The only previous study of marine organisms in this vicinity was closer to the channel entrance at Pier 1 (AECOS 1988, Table 2) and recorded 29 taxa of fishes but only 8 invertebrates and one macroalgae. These differences from present results can be partly explained by the fact that no sponges were identified in the earlier study, and that Pier 1 is closer to the channel entrance where more reef fishes were likely to be present. Both studies showed a pronounced presence of reef corals, again probably due, in part, to the proximity of both piers to channel entrance and oceanic conditions.

Pier 12. Despite its location well within Honolulu Harbor only 500 m of the mouth of Nuuanu Stream, this location supports a high coverage of reef corals that has been previously noted (AECOS 1982, Oceanit 1990). Six hard and one soft coral species were found (Table 1) and coverage was high, especially by *Porites compressa* Dana, 1846 (Plate 4), *Porites lobata* Dana, 1846, *Montipora patula* Verrill, 1864 and *Montipora verrucosa* (Lamarck, 1816) (Plate 3) which encrust the walls of the dock and other hard surfaces down to 5 m depth. Total coverage ranges up to 50% of available surfaces. Other cnidarian species were found at this site: the hard coral *Pocillopora damicornis* Linnaeus, 1758, the octocoral *Carijoa risei*, the hydroids *Halocordyle disticha* and *Thyroscyphus fruticosus* (Esper, 1793) and the zoanthid *Zoanthus pacificus* Walsh and Bowers, 1971.

Because of the dominance of available space by corals at this site other taxa were less abundant but still present. Eight sponge species were found, including *Dictyodendrilla* sp., which was recorded only at this site. The large fan worm *Sabellastarte sanctijosephi* Gravier, 1906 (Plate 3) was prominent, along with the ectoprocts *Amathia distans* Busk, 1866, *Schizoporella errata* (Waters, 1878) (Plate 6) and *Diaperoecia* sp. Plates 2 and 5). Two echinoderms, *Actinopyga mauritiana* Selenka, 1867 and *Tripneustes gratilla* (Linnaeus, 1758), commonly occurring on coral reefs, were found only at this station. A total of one alga species, 29 invertebrate and nine fish species were recorded at the site. The fishes included two species of chaetodontids (*Chaetodon unimaculatus* Bloch, 1788, and *C. trifasciatus* Mungo Park, 1797), common on coral reefs, were found only at this site.

These results are very similar to those found by AECOS (1982) in a survey of the dock areas from Pier 12 to Pier 15, where two macroalgae, 28 invertebrates and 13 fishes were recorded. However these previous results included microinvertebrates sorted from sediment samples, with one taxa each of nematodes, oligochaetes and pycnogonids, five taxa of polychaetes and two crustaceans. The other principal difference between findings of the two studies was that no sponges were identified on the 1982 study.

Pier 15 The community at this site was the most diverse of any on the study, with a total of 47 taxa found, composed of 4 macroalgae, 35 invertebrates and eight fishes. Sponges had the greatest representation at this site with 14 taxa found, including two genrera (*Leucetta* sp. and *Callyspongia* sp.) and one species (*Aplysilla sulfurea* Schulze, 1878) found only here. No corals occurred and the only cnidarians were the hydroids *Halocordyle disticha* and *Thyroscyphus fruticosus* and the octocoral *Carijoa nisei*. The serpulid worm *Salmacina dysteri* Huxley, 1855 was found only at this site, along with the fanworm *Sabellastarte sanctijosephi*. The barnacle *Chthamalus proteus* was abundant in the intertidal, and the banded shrimp *Stenopus hispidus* Rathbun, 1906 was found here as well as at Pier 12. More molluscs were found here than at any other site, including *Littoraria scabra* (Linnaeus, 1758), *Hipponix* sp., *Dendostrea sandvichensis* Sowerby, 1871, *Ostrea* sp. and *Isognomon californicum* (Conrad, 1837), which is abundant on at the mouth of Nuuanu Stream, suggesting an influence of fresh water discharge at the Pier 15 site. Other invertebrate taxa common at this site were ectoprocts (*Amathia distans*, *Bugula dentata* and *Diaperoecia* sp.) and ascidians (*Phallusia nigra* Savigny, 1816 and *Botryllus* sp.). The four species of algae included the introduced *Acanthophora spicifera* (Vahl) Boergesen found only at this site and *Ulva* sp., indicative of fresh water influence. It was also noted that invertebrate coverage on the pier's pilings became more sparse going toward the Nuuanu Sream mouth, suggesting the limitation of stream outflow on the marine community. Eight fish taxa were noted at the site, including three species (*Sphyeana barracuda* [Walbaum, 1792], *Neoniphon sammara* [Forsskal, 1775] and *Apogon kallopterus* Bleeker, 1856) that were noted only at this site.

Pier 16. This site is about 100 m from the mouth of Nuuanu Stream and had the fewest taxa of invertebrates and fish of any site surveyed. Surfaces at the site showed pronounced effects of sedimentation, with silt adhering even to horizontal surfaces of pier pilings. Although three taxa of macroalgae were recorded, including the brackish-water tolerant *Ulva* sp., only 21 invertebrate and three fish taxa were found. The dominant groups were sponges with eight taxa and ectoprocts with four taxa, all of which are considered tolerant of relatively high levels of sedimentation and turbidity. The two taxa of ascidians (*Phallusia nigra* and *Botryllus* sp.) were also more abundant here than at any other site, suggesting selection for filter feeding, sedimentation tolerant organisms. The three fish species found included the boxfish *Ostacion meleagris* (Jenkins, 1901), the puffer *Arothron hispidus* (Linnaeus, 1758) and a school of about 20 *Papio* (*Caranx melampygus* [Cuvier, 1833]).

Viewing the Honolulu Harbor sites overall, one macroalga (*Mesophyllum mesomorphum*) and eight invertebrate taxa (sponges *Mycale cecilia* [de Laubenfels, 1936] and *Hyatella intestinalis* [Lamarck, 1816]; hydroid *Halocrdyle disticha*; barnacle *Chthamalus proteus*; ectoprocts *Amathia distans* and *Diaperoecia* sp.; ascidians *Phallusia nigra* and *Bottryllus* spp.) occurred at every site. All of these except the alga and the ectoproct *Diaperoecia* sp. are known or suspected nonindigenous species introduced from areas outside of Hawaii (Carlton and Eldredge, in prep) and are also commonly found in Pearl Harbor (Coles et al 1997, ms submitted).

Lagoon Drive. The substantially different environmental conditions that prevail at this site compared to the Honolulu Harbor sites are reflected by the resident marine community.

Only 21 macoinvertebrates and six fishes were noted. Many of the invertebrates inhabit the intertidal, such as the gastropods *Littoraria scabra* (Linnaeus, 1758), *Nodolittorina picta* (Philippi, 1846) and *Nerita picea* (Recluz, 1841) and the introduced barnacle *Chthamalus proteus*, which virtually covered rocks in the high intertidal zone. Most of the remaining invertebrates were sponges, which, with eleven taxa, had the second highest number of any site surveyed, and sponges were the only invertebrate commonly found in the subtidal. Three taxa, *Dysidea* sp. 1, *Suberites zeteki* (de Laubenfels, 1936. And *Tedania* sp. occurred only at this site. The only coral found was *Leptastrea purpurea* Dana, 1846, and the fan worm *Sabellastarte sanctijosephi* was also present. Six species of fish were observed among the rocks along the shoreline, including the stripey *Microcanthus strigatus* Cuvier & Valenciennes, 1831 and the surgeonfish *Acanthurs nigrorus* Valenciennes, 1835, which were not observed at any other site.

Anticipated Impact of Proposed Project

It is unlikely that the proposed modifications in Honolulu Harbor and Keehi Lagoon would have a significant long lasting impact on the resident marine biota. Construction activities at Pier 2 would require no dredging and should cause little or no disturbance of sediments. Any sediments that might be suspended into the water column by construction activity would be fine to medium sands which would rapidly settle out with minimal affect on the marine organisms which are growing primarily on the vertical surfaces of pier pilings. Since this site is relatively close to the channel opening, circulation can be assumed to be good and any construction related turbidity would rapidly dissipate.

Construction of new finger piers in the vicinity of Piers 12-16 will not entail dredging. Some suspension of silt, sedimentation, and elevated turbidity during construction activities could occur. However, the sessile marine biota in the area are already limited in both abundance and diversity, and are composed primarily of organisms adapted to or favored by a sedimentary and turbid environment. Any benthic organisms disturbed or displaced at Piers 12-16 are likely to be replaced by rapid resettlement following construction activities, and the total community will be increased by settlements on any new surfaces provided by the construction. Disturbed fishes may leave the area temporarily and return when conditions are more favorable.

The area most likely to show an impact from these activities is the coral community and associated organisms that are in the vicinity of Pier 12. However, these corals appear to be adapted to relatively high levels of turbidity and sedimentation, and have withstood previous construction activities and other stresses that have occurred in this area of the harbor, maintaining a high level of coral coverage by a variety of species. No change was discernable from the descriptions of this coral community by AECOS (1982) and Oceanit (1990), in spite of the considerable development that has gone on in this section of the harbor in the last decade, including construction of Piers 16 and 17 (R. M. Towill Corp. 1982).

Construction of lay berths along Lagoon Drive in Keehi Lagoon will require mostly shoreline construction to improve access to piers and driving piles to support those piers. No dredging is required for this project. However, again it would be unlikely that any reasonable activity will cause a substantial impact on the marine communities in this area. This area had the fewest taxa found of any of the sites, and the organisms that were found were primarily intertidal molluscs, a barnacle and sponges which can withstand high levels of sedimentation. Moreover, water movement and turbidity in the area are generally high because of wind driven turbulence. Therefore any construction related re-suspended sediments and turbidity are likely to be rapidly dissipated, and resident organisms that may be impacted by these activities are adapted to withstand sedimentation-related stress.

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Table 1. Marine organisms observed on Honolulu Harbor and Keehi Lagoon Surveys

Phylum/ Order	Family	Genus	Species	Author Date	Pier 2	Pier 12	Pier 15	Pier 16	Lagoon Drive
Chlorophyta	Ulvaceae	*Ulva*	*fasciata*	Forsskal	1		1	1	
Phaeophyta	Ectocarpaceae	*Lobophora*	*variegata*	(Lamouroux) Womersly	1		1	1	
Rhodophyta	Corallinaceae	*Mesophyllum*	*?mesomorphum*	(Foslie) Adey	1	1	1	1	
	Rhodomelaceae	*Acanthophora*	*spicifera*	(Vahl) Boergesen			1		
Porifera	Leucettidae	*Leucetta*	sp.				1		
	Callyspongiidae	*Callyspongia*	sp.				1		
	Chalinidae	*Chalinidae*	n.g., n. sp.						
		Gelliodes	*fibrosa*	(Wilson, 1925)			1	1	1
		Sigmadocia	*caerulea*	Hechtel, 1965				1	1
		Toxiclona	n. sp.					1	1
	Darwinellidae	*Aplysilla*	*sulfurea*	Schulze, 1878			1		1
	Desmacellidae	*Biemna*	*fistulosa*	Topsent, 1897	1	1	1	1	1
	Dictyodendrillidae	*Dictyodendrilla*	sp.			1			
	Dysideidae	*Dysidea*	n. sp. 1		1		1		
		Dysidea	n. sp. 2						
		Dysidea	*arenaria*	Bergquist, 1965	1		1		1
		Dysidea	*avara*	(Schmidt, 1862)	1		1		
	Microcionidae	*Clathria*	sp.		1				
	Mycalidae	*Mycale*	*cecilia*	(de Laubenfels, 1936)	1	1	1	1	
		Mycale	*armata*	Thiele, 1903		1	1	1	1
		Neofolitispa	*ungiculata*	(Dendy, 1921)	1	1			1
		Zygomycale	*parishi*	(Bowerbank, 1875)			1	1	
		Iotrochota	*protea*	(de Laubenfels, 1950)	1	1	1		
	Raspailiidae	*Echinodictyum*	*asperum*	Ridley and Dendy, 1886	1	1	1		1
	Spongiidae	*Hyattella*	*intestinalis*	(Lamarck, 1814)	1	1	1	1	
	Suberitidae	*Suberites*	*zeteki*	(de Laubenfels, 1936)					1
	Tedaniidae	*Tedania*	sp.						1
Hydrozoa	Pennariidae	*Halocordyle*	*disticha*	(Goldfuss, 1820)	1	1	1	1	
Hydrozoa	Sertulariidae	*Thyroscyphus*	*fruticosus*	(Esper, 1793)		1	1		
Anthozoa	Telestidae	*Carijoa*	*riisei*	(Duchassaing & Michelotti 1860)	1	1	1	1	
Anthozoa	Zoanthidae	*Zoanthus*	*pacificus*	Walsh & Bowers, 1971		1			
	Pocilloporidae	*Pocillopora*	*damicornis*	Linnaeus, 1758		1			
	Acroporidae	*Montipora*	*patula*	Verrill, 1864	1	1			
			verrucosa	(Lamarck, 1816)		1			
	Poritidae	*Porites*	*compressa*	Dana, 1846		1			
		Porites	*lobata*	Dana, 1846	1	1			
	Faviidae	*Cyphastrea*	*ocellina*	Dana, 1846	1				
	Agariciidae	*Pavona*	*varians*	Verrill, 1864	1				
	Faviidae	*Leptastrea*	*purpurea*	Dana, 1846	1	1			
Polychaeta	Chaetopteridae	*Chaetopterus*	sp.						1
	Sabellidae	*Sabellastarte*	*sanctijosephi*	Gravier, 1906	1				
	Serpulidae	*Salmacina*	*dysteri*	Huxley, 1855	1	1	1	1	1
Crustacea	Cirripedia	*Balanus*	sp.		1	1	1	1	1
		Chthamalus	*proteus*	Dando & Southward, 1980					1
	Stenopodidae	*Stenopus*	*hispidus*	Rathbun, 1906		1	1		
Gastropoda	Neritidae	*Nerita*	*picea*	(Recluz, 1841)					1
	Littorinidae	*Littoraria*	*scabra*	(Linnaeus, 1758))		1			1
		Nodilittorina	*picta*	(Philippi, 1846)					1
	Hipponicidae	*Hipponix*	sp.			1			
	Siphonariidae	*Siphonaria*	*normalis*	Gould, 1848		1			
Nudibranchia	Polyceridae	*Tamja*	*morosa*			1			
Bivalvia	Pteriidae	*Pinctada*	*margaritifera*	(Linnaeus, 1758)	1	1			

Table 1 (cont.)

Phylum/ Order	Family	Genus	Species	Author Date	Pier 2	Pier 12	Pier 15	Pier 16	Lagoon Drive
Bivalvia	Spondylidae	*Spondylus*	*tenebrosus?*	Reeve, 1856	1				
	Chamidae	*Chama*	*pacifica*	Broderip, 1835				1	
	Isognomonidae	*Isognomon*	*californicum*	(Conrad, 1837)			1		1
	Ostreidae	*Dendostrea*	*sandvichensis*	Sowerby, 1871			1	1	
		Ostrea	sp.		1	1	1	1	1
Ectoprocta	Gymnolaemata	*Amathia*	*distans*	Busk, 1886	1	1	1	1	
		Bugula	*dentata*	(Lamouroux, 1816)	1		1	1	
		Schizoporella	*errata*	(Waters, 1878)	1	1		1	1
	Stenolaemata	*Diaperoecia*	sp.		1	1	1	1	
Echinoidea	Diadematidae	*Diadema*	*paucispinum*	Agassiz, 1863	1		1		
Echinoidea	Toxopneustidae	*Tripneustes*	*gratilla*	(Linnaeus, 1758)		1			
Holothuroidea	Holothuriidae	*Actinopyga*	*mauritiana*	Selenka, 1867		1			
Urochordata	(Ascidacea)	*Phallusia*	*nigra*	Savigny, 1816	1	1	1	1	1
		Botryllus	spp.		1	1	1	1	1
Osteichthyes	Sphyraenidae	*Sphyraena*	*barracuda*	(Walbaum, 1792)					
	Holocentridae	*Myripristis*	sp.				1		
		Neoniphon	*sammara*	(Forsskal, 1775)		1	1		
	Aulostomidae	*Aulostomus*	*chinensis*	(Linnaeus, 1766)			1		
	Kuhliidae	*Kuhlia*	*sandvicensis*	(Steindachner, 1876)	1				
	Apogonidae	*Apogon*	*kallopterus*	Bleeker, 1858		1			
	Carangidae	*Caranx*	*melampygus*	(Cuvier, 1833)			1		
	Mullidae	*Parupeneus*	*multifasciatus*	Quoy & Gaimard, 1824				1	
	Scorpididae	*Microcanthus*	*strigatus*	Cuvier & Valenciennes, 1831	1				
	Chaetodontidae	*Chaetodon*	*miliaris*	Quoy & Gaimard, 1824					1
		Chaetodon	*unimaculatus*	Bloch, 1788	1				
		Chaetodon	*trifasciatus*	Mungo Park, 1797		1			
		Chaetodon	*lunula*	(Lacepede, 1802)		1			
		Chaetodon	*auriga*	Forsskal, 1775		1	1		1
		Forcipiger	*flavissimus*	Jordan & McGregor, 1898					1
	Pomacentridae	*Abudefduf*	*abdominalis*	(Quoy & Gaimard, 1824)	1				
		Dascyllus	*albisella*	Gill, 1862	1		1		
	Labridae	*Thalassoma*	*duperrey*	(Quoy & Gaimard, 1824)	1	1	1		
	Acanthuridae	*Acanthurus*	*xanthopterus*	Valenciennes, 1835	1				
		Acanthurus	*triostegus*	(Linnaeus, 1758)	1	1	1		
		Acanthurus	*nigrorus*	Valenciennes, 1835					1
		Zebrasoma	*flavescens*	(Bennett, 1828)					1
	Zanclidae	*Zanclus*	*cornutus*	(Linnaeus, 1758)	1	1			1
	Ostraciontidae	*Ostracion*	*meleagris*	(Jenkins, 1901)	1	1	1		
	Tetraodontidae	*Arothron*	*hispidus*	(Linnaeus, 1758)	1			1	
		Canthigaster	*jactator*	(Jenkins, 1901)	1			1	

Table 2. Summary of taxonomic groups found at study sites by present (1998) and previous studies (AECOS 1982, 1988). (s) designates taxa identified from sediment samples (AECOS 1982).

	Location						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Macroalgae	1	2	2	1	4	3	0
Sponges	0	10	0	6	14	8	11
Cnidaria	6	7	9	10	3	2	1
Nematoda	0	0	1(s)	0	0	0	0
Oligochaeata	0	0	1(s)	0	0	0	0
Polychaeta	0	2	6(5s)	2	2	1	1
Pycnogonida	0	0	1(s)	0	0	0	0
Crustacea	0	1	4(2s)	2	2	1	0
Molluscs	1	4	4	1	7	3	5
Ectoprocts	1	4	0	3	3	4	1
Echinoderms	1	1	0	2	0	0	0
Ascidians	0	2	0	2	2	2	2
Total Invertebrates	9	31	28	29	35	21	21
Fishes	29	12	13	9	8	3	6
Total Taxa	39	45	43	39	47	27	27

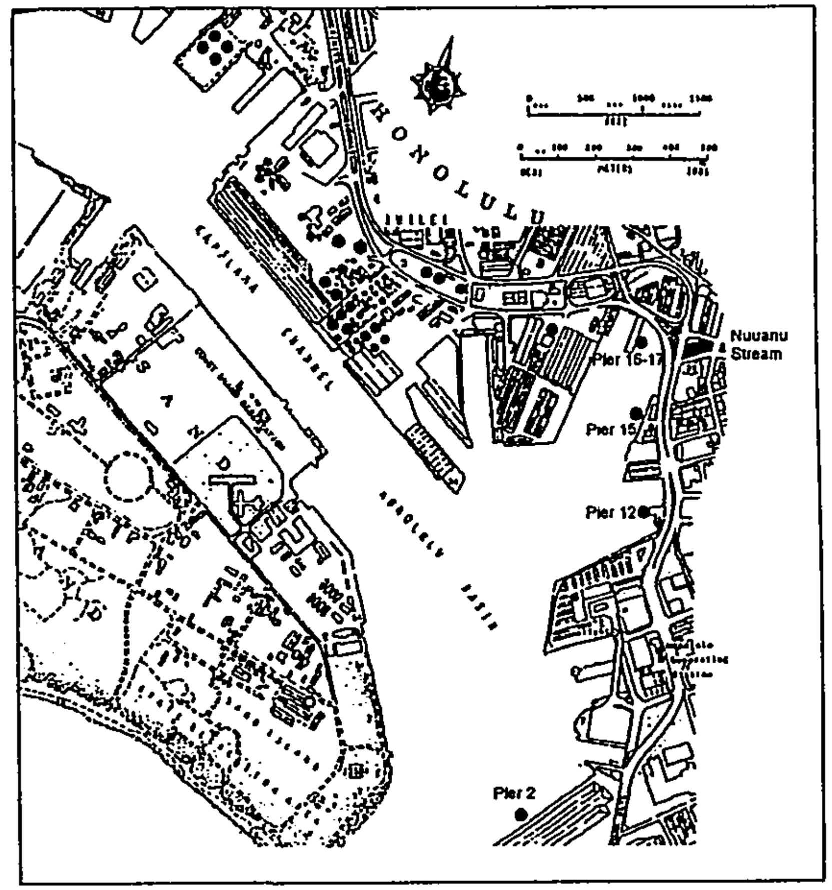


Figure 1. Honolulu Harbor sampling locations

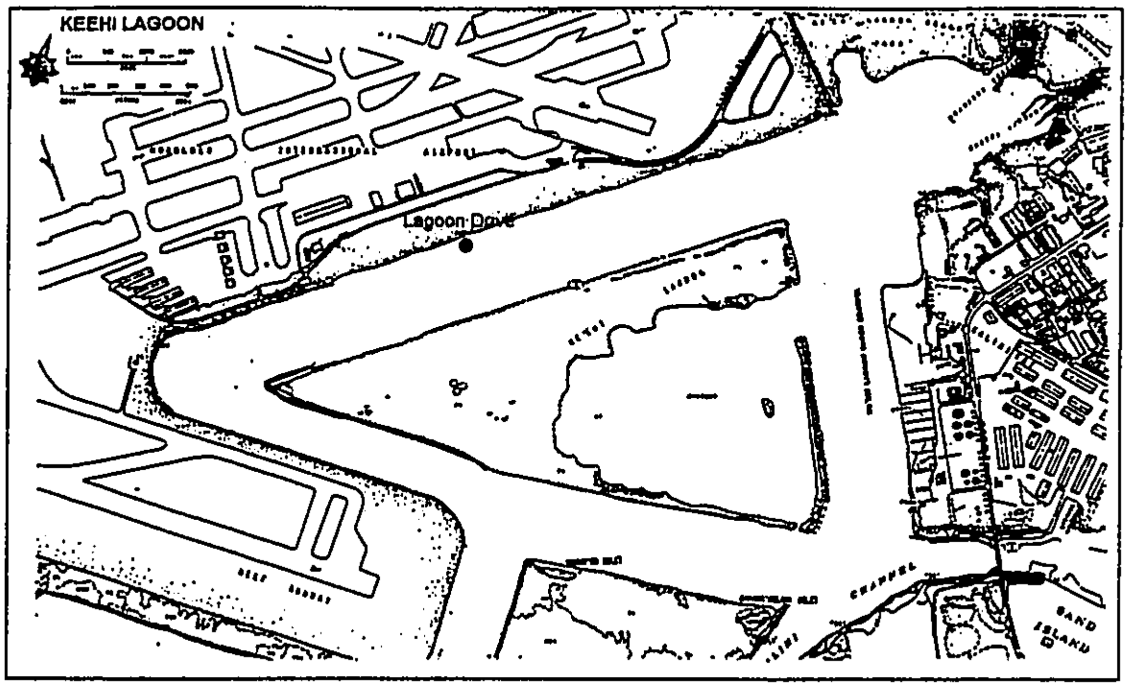


Figure 2. Keehi Lagoon sampling location

Color Plates 1 through 6

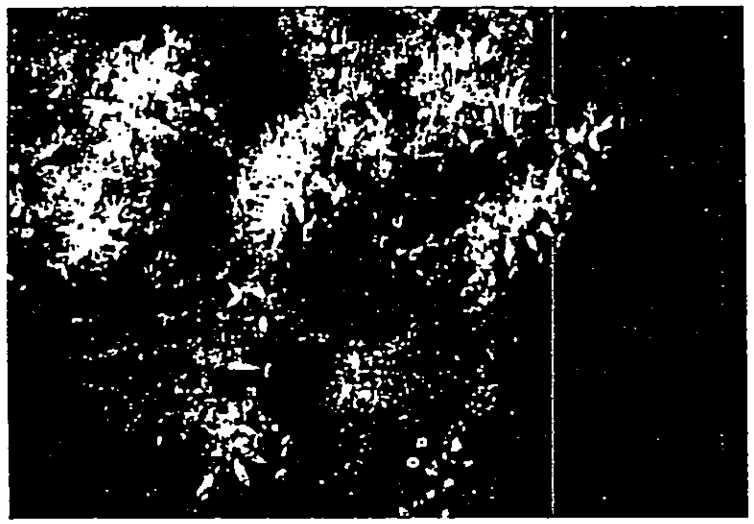


Plate 1. Introduced octocoral, *Carijoa riisei* at Pier 2.

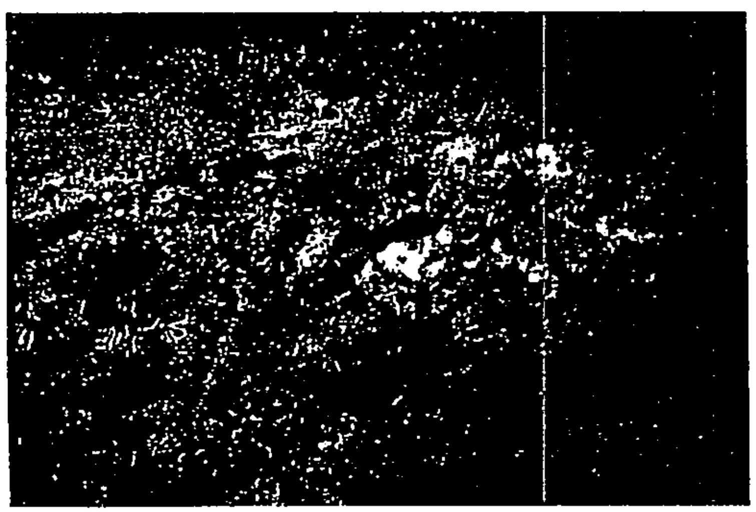


Plate 2. Pier 2 dock piling with red sponge *Mycale* sp., hydrozoan *Halocordyle disticha* (black branches with white polyps), and brown arborescent bryozoan *Diaperoecia* sp.

Plate 3 Fanworm *Sabellastarte sanctijosephi* growing from hard coral *Montipora verrucosa* at Pier 12.

Plate 4. Hard coral *Porites compressa* at Pier 12.

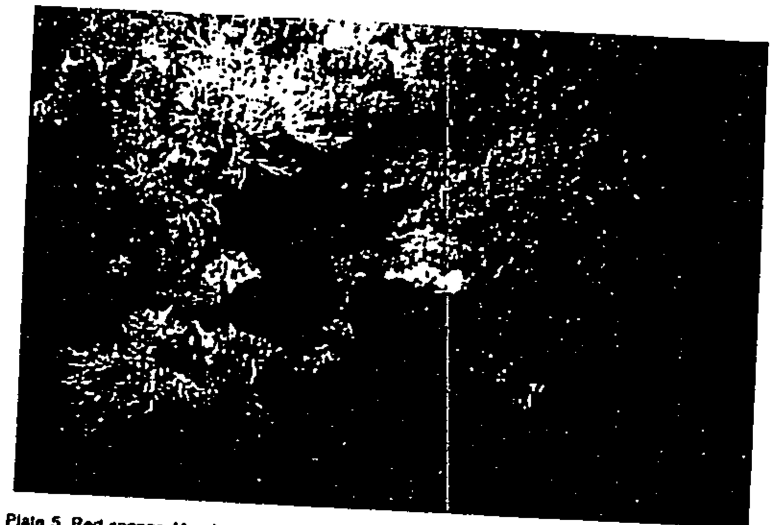


Plate 5. Red sponge *Mycale cecilia*, arborescent brown bryozoan *Diaperoecia* sp, and tunicate *Phallusia nigra* at Pier 16.

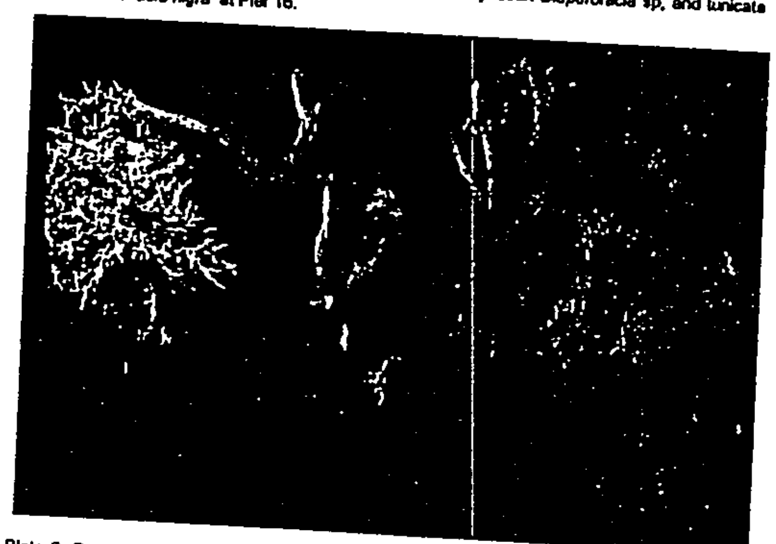
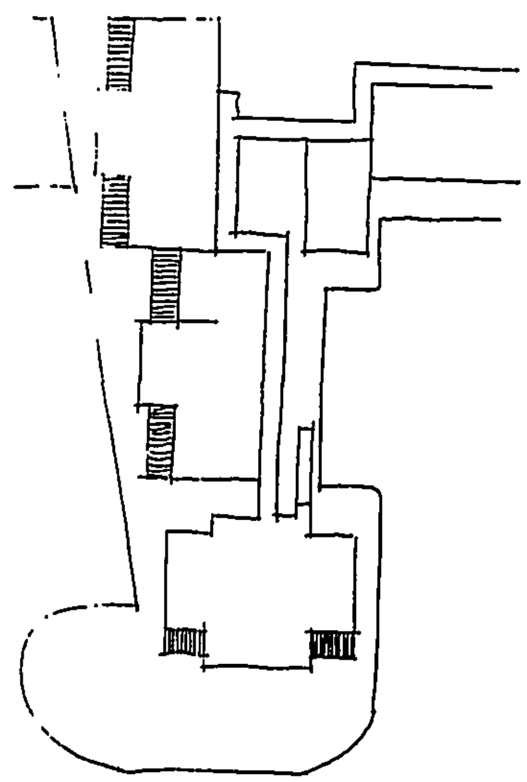


Plate 6. Grey soft bryozoan *Amathia distans* growing on branch end of bryozoan *Schizoporella errata* at Pier 16.



Archaeological Report

ARCHAEOLOGICAL REPORT FOR THE OAHU COMMERCIAL HARBORS 2020 MASTER PLAN - IMMEDIATE PHASE ENVIRONMENTAL IMPACT STATEMENT

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ABSTRACT

At the request of Wil Chee-Planning, Inc., Pacific Legacy, Inc., conducted archaeological investigations for the Oahu Commercial Harbors 2020 Master Plan - Immediate Phase Environmental Impact Statement. The purpose of the project was to determine the presence/absence of any potentially significant cultural resources that may be present within the project area.

A document and literature search and an archaeological surface survey were conducted, and concluded that no significant cultural deposits are present within the project area. The entire project area is situated on recently created land, formed by numerous dredging and filling operations. The probability of uncovering any subsurface *in situ* cultural remains within the project area is extremely remote and improbable.

The proposed improvements to the project area will result in the demolition of 17 structures. These structures are associated with the shipping industry and range from warehouses and cargo sheds to office space and restrooms. Of the 17 structures, ten are older than 50 years (Pier 18 shed, Pier 19 shed, Pier 22 Warehouse's #6 and #8, Pier 24 shed, Pier 25 shed, Pier 26 shed, Pier 27 and 28 shed, Pier 29 shed, and Pier 32 shed) and are potentially eligible for inclusion to the National Register of Historic Places (NRHP). However, a majority of these structures have undergone various improvements over the years and are generally in poor condition. Records detailing their construction and structural improvements are presented, and they have been photographed and recorded. As a result, none of the structures are recommended for NRHP inclusion and no further work is recommended.

The dredging activities planned for Piers 16 and 24 would not impact any cultural remains. No intact cultural resources are present within the harbor itself. Likewise for the area along Lagoon Drive where the proposed Lay Berths' are planned. The area is filled land and no archaeological deposits have been documented. With the exception of a recently constructed building no other structures are present. No further work is recommended.

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1.0 INTRODUCTION

At the request of Wil Chee-Planning, Inc., Pacific Legacy, Inc., conducted archaeological investigations for the O'ahu Commercial Harbor 2020 Master Plan - Immediate Phase Environmental Impact Statement. Specifically, the investigations consisted of archival research (archaeological reports, historic maps, documentary texts, and land court documents), and archaeological surveys. The purposes of this project are to determine the presence/absence of any potentially significant cultural resources within the area of Honolulu Harbor and determine whether any of these resources may be impacted by the proposed harbor improvements.

Honolulu Harbor and its surrounding area is rich in history and culture. The harbor has served as the main point of entry for goods and people arriving from around the world since the early post contact period (after 1778) until today. Although people may now arrive in Hawai'i by other means, Honolulu Harbor and its ocean-going vessels still serve to supply Hawai'i with 98.6% of its imported goods and products (Oahu Commercial Harbors 1997).

1.1 SCOPE OF WORK

The following scope of work (SOW) guided our investigations and provided a framework for the field investigations. The following work tasks were undertaken:

1) conduct an archaeological background and literature search, summarizing the history and land use of the Honolulu Harbor area,

2) conduct limited archaeological field investigations of the subject property(s),

3) evaluate structures scheduled for demolition based upon National Register of Historic Places (NRHP) criteria, and

4) prepare a clear and concise report for inclusion in the Environmental Impact Statement.

The structures discussed in this report were evaluated based upon the National Historic Preservation Act of 1966 (as amended). Any structures meeting the criteria may be determined eligible for inclusion to the National Register of Historic Places (NRHP).

1.2 PROJECT LOCATION

The project area is located in the Kona District of the island of O'ahu, in downtown Honolulu (Figure 1).

The project area, from Pier 2 to Pier 15, is within the State Historic Downtown and Chinatown Districts. The area of the proposed development is itself broken into three areas. The first area (Piers 2 through 29) is bounded to the north by Nimitz Highway, to the south by Honolulu Harbor proper, to the east by Fort Armstrong, and to the west by Chevron and Shell Oil Co. Property.

The second area (Pier 32) is bounded by the Hawaiian Cement property to the north, Chevron and Shell to the east, and the Harbor to the south and west. The last area (Lagoon Drive) is located adjacent to the Honolulu International Airport and is bounded by the airport to the north and west, various car dealerships to the east and Ke'ehi Lagoon to the south. The entire project area extends through the *ahupua'a* of: Pauoa, Nu'uanu, Kapalama, Kalihi, Kahauiki, and Moanalua. The following table (Table 1) provides the Tax Map Key (TMK) designations for various portions of the project.

TABLE 1. TAX MAP KEY LISTINGS FOR THE PROJECT AREA.

Project Location	Tax Map Key Numbers
Pier 2	2-1-15: 29, 30
Piers 12 through 16	2-1-01: 42, 45, 56
Piers 18 through 23	1-5-39: 18, 21, 22, 26, 28, 29, 30, 34, 35, 40, 48, 59, 60, 61
Piers 24 through 29	1-5-38: 7, 8, 9, 15, 16, 18, 19, 20, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40, 42, 43, 44, 45, 48, 49, 50, 51, 52, 53
Pier 32	1-5-36: 9
Lagoon Drive	1-1-76: 01 1-1-72: 27, 28, 30, 33, 36, 39, 42, 45, 49, 51 1-1-70: 1, 3, 4, 5, 6, 7, 33, 42

1.3 ENVIRONMENT

Geologically, Honolulu Harbor was created by the continual flow of freshwater flowing from Nu'uanu Valley into the ocean. The freshwater restricted the growth of coral forming a basin, the start of the harbor. Also forming were channels that cut through the coral reef. In this area sand eventually began to accumulate, forming what would later become Sand Island (Oahu Commercial Harbors 1997).

Elevation at the Harbor's area is between sea level and approximately five feet above mean sea level (amsl). Rainfall within the project area is approximately 10 inches per year with the driest months being June through August (Armstrong 1983). Temperature in the area ranges from 60 degrees to 89 degrees with the warmest temperatures occurring from July to August (Armstrong 1983). Vegetation within the area is primarily located along roadways, Pier 2, and Lagoon Drive, and was observed to consist mainly of ornamental shower trees (*Cassia spp.*), coconut trees (*cocos nucifera*), wedelia ground cover (*wedelia trilobata*), *koa haole* (*Leucaena glauca*), and various grasses and weeds (Neal 1965).

Foote et al. (1972) describes soils within the project area as being entirely fill land (Figures 2 and 3). Fill land consists of "areas filled with material from dredging, excavation from adjacent uplands, garbage, and bagasse and slurry from sugar mills" (Foote et al. 1972:31). This type of land is commonly used for urban development, housing, airports, and industrial uses.

An analysis of historic maps and sequences of aerial photographs by Eric Komori at the SHPD has resulted in the map presented in Figure 4. This map shows the configuration of the previous shoreline at ca. AD 1900. This figure clearly shows that most of the project area is on recently created land. The only exception is a small area near pier 40 (see Section 4.3 for further information about this portion of the project area).

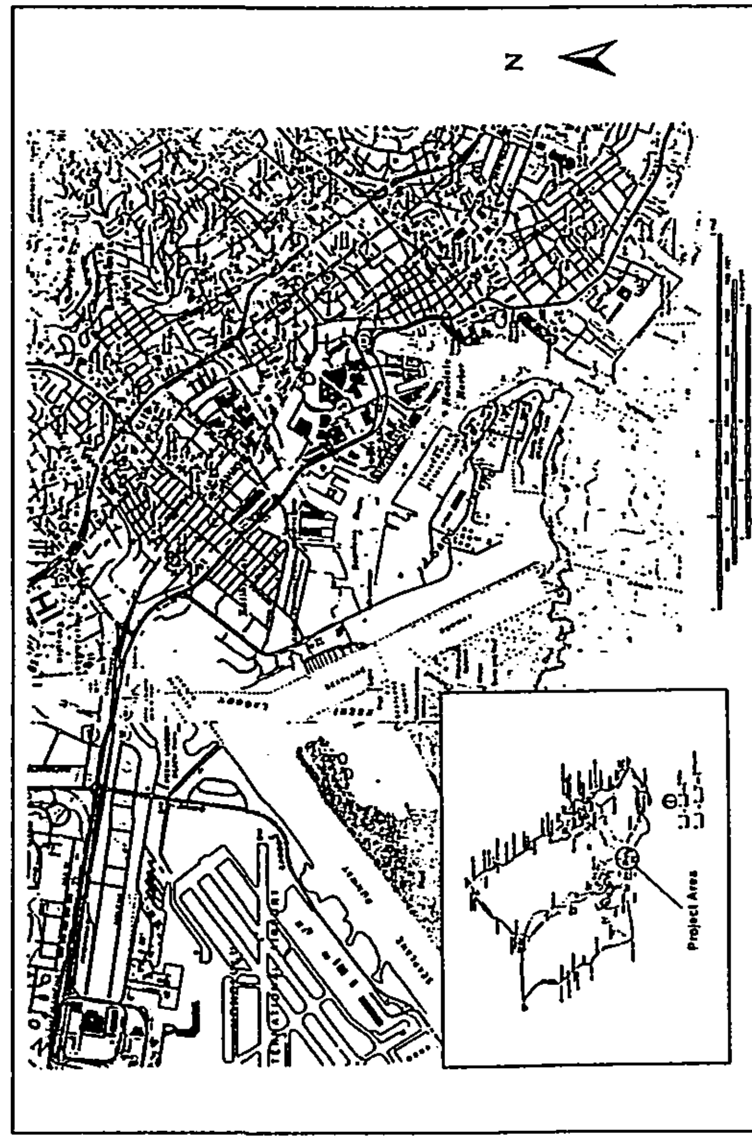

Figure 1. Location of Honolulu Harbor (USGS Honolulu and Pearl Harbor 1983 Quadrangle Maps)

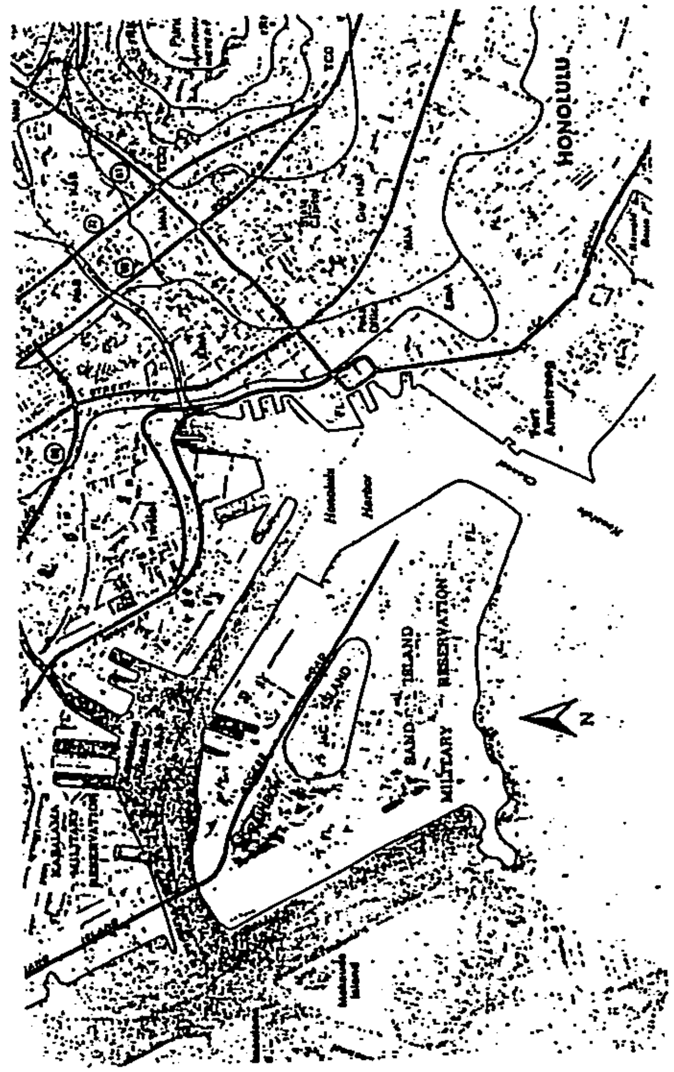

Figure 2. Map of Honolulu Harbor area illustrating soil types (note: FL = Fill Land) (from Foote et al. 1972: map 62).

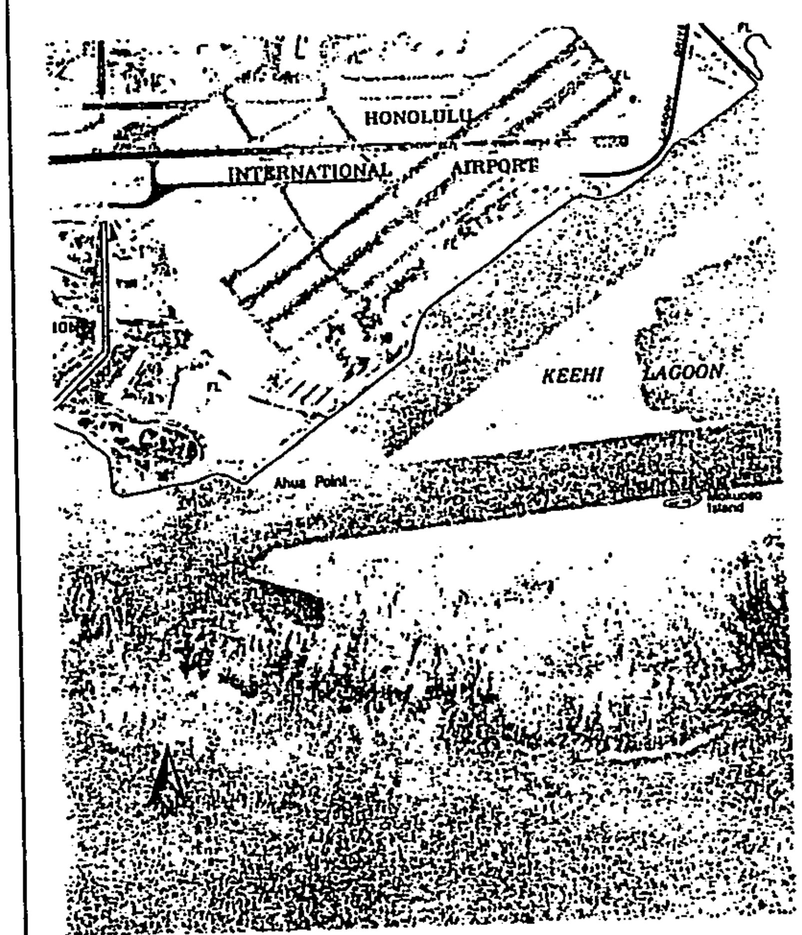

Figure 3. Map illustrating soil types along Lagoon Drive (note: FL = Fill Land) (from Foote et al. 1972: map 55).

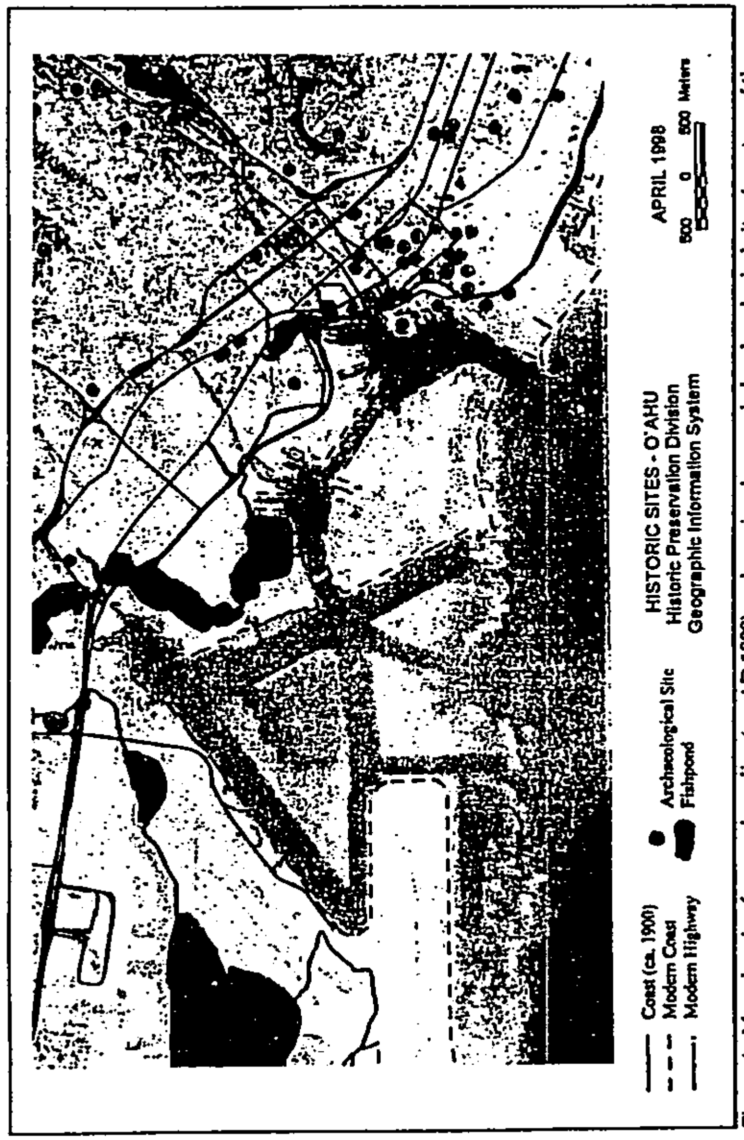

Figure 4. Map showing former shore line (ca. AD 1900) and previously recorded archaeological sites (courtesy of the State Historic Preservation Division, April 1998).

2.0 METHODOLOGY

Personnel for the project was Paul Cleghorn, Ph. D., who served as Principal Investigator and main point of contact and James McIntosh, B.A. who conducted the historical background and literature search.

Archival research consisting of background and literature searches was conducted at the State Historic Preservation Division's library, the State of Hawai'i Main Library, the Department of Land and Natural Resources Survey Office, Bureau of Conveyances, State of Hawai'i Archives, Hawaiian Historical Society, and the State Department of Transportation, Harbors Division offices.

Reports detailing previous archaeological studies both within and adjacent to the current project area were reviewed. Landownership, as illustrated by Land Commission Awards and Executive Orders, was researched. Other historical sources were reviewed in order to provide a brief summary of the history and land use of the general area.

Two field visits were conducted (October 1 and 9, 1998) to examine the the project area for any surface archaeological sites that may have been present. Since the entire project area is situated on filled land, none were anticipated. Structures proposed for demolition were investigated, recorded (35 mm-black and white film), and evaluated for potential NRHP consideration.

3.0 HISTORIC BACKGROUND

Included below is a brief and general history of Honolulu Harbor and the Downtown District as they relate to each other. Honolulu Harbor and its surrounding area has served as both the reason for and the benefactor of Oahu's growth. The business district of Honolulu continued to grow with the influx of vessels entering Hawai'i. The deep water harbor that was initially recognized by early explorers was a major reason Hawai'i was chosen as a rest stop for fur traders, whalers, and merchants from all nations. Over time, the harbor has grown from a one slip dock to over fifty piers that control nearly all the goods and products moving in and out of Hawai'i.

3.1 DOCUMENT AND LITERATURE SEARCH

Honolulu Harbor has often been translated to mean "fair haven" or "protected bay." Pukui and Elbert (1973:74) translate Honolulu as literally meaning: "sheltered harbor."

Honolulu Harbor and its surrounding area has had several other names. The area from the harbor inland to Hotel Street and between Alakea and Nu'uanu Streets was referred to as Kou, "said to be named for the executive officer (*ilāmuku*) of Chief Kakuhihewa of O'ahu" (Pukui et al. 1976:117-118). The area was a favorite "rendevous for *kōnane* (checkers)," (Pukui and Elbert 1973:154). This name was used until the 1800's.

The harbor entrance was called Mamala. It is named for "the shark woman that lived near the entrance of Honolulu Harbor" (Pukui et al. 1976: 144).

There is some confusion as to when the first westerner actually entered Honolulu Harbor. Captain William Brown of the *Butterworth* has often been credited as the first westerner to enter the harbor in November of 1794 (Krauss 1987). Although he is the first westerner to discover and map the harbor, he was not the first to enter it. That honor is afforded to the schooner *Jackall* (tender to the *Butterworth*), who first entered Honolulu Harbor on January 1, 1795 (Damon, 1857: 22).

The growth of Honolulu Harbor can be attributed to several periods in Hawaiian history. The sandalwood or *'iliahi* (*Santalum ellipticum*) trade that dominated activities in Hawai'i during the 1790's started the shipping industry. Prior to the discovery of sandalwood in Hawaii, ships would layover to replenish supplies for their journey between the Pacific Northwest and China. With the discovery of sandalwood, ships came from as far away as Boston to take part in the trade.

The trade of sandalwood would prove to be a boom to Hawaii and the recently born United States. At the height of the trade (1810 to 1820) ships came to Hawai'i carrying

furs from the Pacific Northwest. After adding Hawaiian sandalwood to their holds, they proceeded to China (Wagner 1996: 65). The sandalwood was favored by the Chinese for use as incense and small furniture. In exchange, the ships brought back silk, tea, spices and money.

Kamehemeha I administered great control over sandalwood harvesting and trading. Since much of the trees were on royal land, he had no problem enforcing his authority. However, after his death in 1819, his heirs found it difficult to maintain control. They bought western goods at inflated prices and paid for them with unharvested sandalwood. Soon the harvesting took a toll on the population of Hawai'i. People began to neglect their *lo'i* (taro fields) resulting in a small famine (Wagner 1996: 68).

Sandalwood harvesting is credited for much of the deforestation on Hawai'i and O'ahu (Cuddihy and Stone 1990: 38-39). Demand for sandalwood was so great that even today small groves are difficult to find (Neal 1965:326).

During the 1820's as the sandalwood trade began to slow more and more whaling vessels began to appear at Honolulu Harbor. The port became a rest stop for the ships to refit and replenish supplies during their long journey. Some of these ships stayed out at sea for four years (Daws 1974). About this time, the harbor began to feel the squeeze from the great numbers of whaling ships, "some reports claim 100 ships anchored in the harbor at one time" (Smith and Rosendahl 1990: Appendix).

In 1816, Governor Alexander Baranov of the Russian-American Co., began construction on a blockhouse that would serve as a trading post near the entrance of the harbor (Judd 1975 in Smith and Rosendahl 1990:11). Kalanimoku, who was sent to investigate by King Kamehameha I scared off the Russians.

Soon after, Kalanimoku and his men began construction of a fort which would protect the harbor. The walls of the fort were constructed of coral blocks that were obtained from the nearby reef. Soil and rubble served to fill in the rest of the walls. The entrance of the fort faced, what is today Fort Street, and was secured by a heavy wooded gate. It measured 340 feet long and 300 feet wide, its walls were 12 feet high and 20 feet thick at the base.

An interesting element regarding the fort was discovered. A drawing on file at the State Archives (Located in Volume 1, 1778-1816 Catalogue books, Neg. #17,723) by Louis Choris, a painter on the ship *Rurick*, captained by Otto Von Kotzebue, which arrived in Hawaii in 1816, shows a view of the Port of Honolulu. In the foreground are nine *hale* (houses) next to the fort and in the harbor are eight ships and six canoes. But what makes this drawing so interesting is that the fort is already completed (in the same year that construction supposedly started), and flying upside down in the fort is the Hawaiian flag. In modern times, when a nation's flag is flying upside down, it is a symbol of a nation in distress. Whether the flag was actually that way or Choris mistakenly depicted it that way is not known. But it is an interesting point none-the-less.

Around 1857, the walls of the fort were torn down and used as fill for the expanding waterfront. "Between 1857 and 1870, twenty-two acres of reef and tideland between Fort and Alakea Streets were filled in from harbor dredging to form the 'Esplanade' " (Oahu Commercial Harbors 1997: IV-4).

In March of 1857, an article appeared in The Friend, a local newspaper devoted to maritime life. This excerpt provides a glimpse of what the waterfront was like at this time. It is clear that the intent of the article was to lobby support for the growth and improvements of the harbor and its facilities.

> The Harbor is a deep basin in the coral reef...The bottom is deep, stiff mud-the best of holding ground. Vessels at anchor in the harbor are perfectly secure at all times of the year...About one-third of the basin or harbor proper, at the north end is filled with mud-a deposit from the Nuuanu Valley stream. This can be converted at pleasure into a harbor for ships by dredging...There are five good wharves, at which vessels of 1500 tons can discharge or take on cargo. These wharves furnish about six hundred feet wharfage front... This wharf is so easy of access, that any sailing directions for it are almost superfluous.
>
> The population of Honolulu is somewhat fluctuating; during the fall and winter season it is as high as 10,000 to 12,000, caused by the influx of seamen and also natives from the other islands of the group. At other seasons of the year it may be as low as 7,000 to 8,000. There are four ship chandlery stores, about twenty importing houses, and from fifty to sixty retail stores, twelve hotels, nine or ten physicians, and five printing offices.
>
> Before closing our remarks on the harbor of Honolulu, perhaps we ought to allude to its wants. A LIGHT-HOUSE [sic] ought to be erected forthwith at the entrance of the harbor. The necessities of our commerce demand this improvement. The fearful disasters and losses near the mouth of the harbor for the past few years, and all for the want of one, call loudly for such a safeguard.
>
> But a much more felt is a marine railway for repairing ship. We are surprised that no attempt to construct a railway has ever been carried out here...the arrival of a large number of vessels, one-fifth of which come into this port for repairs. The present mode of repairing vessels is very expensive, while the repairing of the hull of large steamers at this port is almost impracticable at present...it would be a fortune to any person or company who undertook it with practical knowledge of the subject (Damon 1857).

During the American Civil War, the northern half of the United States was cut off from

sugar normally supplied by the southern states. Hawaii's sugar became a valuable commodity to the north (Daws 1974: 174). Sugar prices soared and Hawai'i experienced a rapid increase in sugar production. Ships carrying sugar exports increased, which led to various improvements to Honolulu Harbor.

With the increasing need for wharfage and evolution of larger ships Honolulu Harbor continued its growth. Dredging around the harbor proceeded while the dredged material was deposited around the shoreline of Honolulu and Kapalama, increasing waterfront acreage.

3.2 LAND COMMISSION AWARDS

Three Land Commission Awards (LCA) were awarded in the current project area. Information regarding each is detailed in Table 2.

Under the Hawaii Revised Statutes, §171-11, the governor is permitted to set aside public lands for public use or purposes. The lands can be set aside to any department of the State, City and County or to the United States. This is done by the signing of the Executive Order (EO). The control of land around the harbor was set aside to the Department of Transportation, Harbors Division (DOT Harbors) by the signing of five EO's listed in Table 3. Under the EO, DOT Harbors has full legal juristiction to the land and can enforce laws and administrative rules of action on the property.

TABLE 2. LAND COMMISSION AWARDS IN THE PROJECT AREA.

Parcel Area	LCA Number	Awardee	Year	Royal Patent Number
Pier 2	1328	Kahaukomo	1853	7350
Pier 1-16	7713:49	V. Kamamalu	1852	7834
	11225	Kekualoa	1854	1879 1/2

TABLE 3. LAND TRANSFERRED BY EXECUTIVE ORDERS IN THE PROJECT AREA.

Parcel Area	Executive Order	Year	Purpose
Pier 2	1081	August 24, 1944	harbor related
	2278	May 24, 1966	container yard; harbor support
Pier 1-16	3542	April 20, 1992	harbor and wharfage operations
Piers 18-29	2903	April 29, 1978	maritime and maritime related use
Lagoon Drive	3202	June 8, 1983	airport and harbor related uses

4.0 PREVIOUS ARCHAEOLOGY

A review of available literature from the State Historic Preservation Division (SHPD), indicated that no archaeological projects have been undertaken and no archaeological sites have been recorded within the project area. In fact, only one traditional site (Pakaka Heiau) was known to exist in the immediate area. Likewise, Sterling and Summers' (1978) compendium of archaeological studies did not identify any sites within the vicinity. Much of the archaeological studies that have taken place in downtown Honolulu have focused on Hawaiian sites from the transitional period of post-contact to the historic times. Two significant Historic sites are recorded within the immediate area of Honolulu Harbor. They are the Aloha Tower Complex and the Falls of Clyde.

4.1 TRADITIONAL SITES

The only traditional site previously located in the area was Pakaka Heiau. The *heiau* (temple) was known to exist behind the fort at the base of what is today Fort Street (McAllister 1933:81). McAllister makes mention of Pakaka but it was destroyed prior to his time.

Westervelt writes that Pakaka Heiau:

> . . .was standing on the western side of the foot of Fort Street long after the fort was built for which the street was named. It was just below the fort. Pakaka was owned by Kinau. It was. . . built before the time of Kakuhihewa. In this temple the school of the priests of Oahu had its headquarters for centuries. The walls of the temple were adorned all around with heads of men offered in sacrifice. (Westervelt 1915:8).

Kamakau writes:

> Pakaka was an ancient temple, a Waihau pookena. It was built by Kamaunuihalakaipo the chief. Kuhooneenuu was the god.
>
> Iolena and popoulu bananas hung in front of the female idols of the paehumu, and maoli bananas in front of the male idols at the altar (lele) inside the paehumu, which was of lama.
>
> At the back of the male images is the anuu, 24 feet high, 18 feet wide, covered with oloa, standing on North side of the house, and also the opu its height and width similar to anuu, but this was laid with kapa aeokahaloa, resembling the Maeloa kapa. The small lama branches at top are like hair standing on end. The

opu stands on the south side of the house facing the images and the anuu, the space between the altar and the opu is well paved. In the middle of the space is... the house. The house is covered with dry...leaves (and made like the Hale o keawe) and is called Hale o Lono, made of lama wood, here the young chiefs stay. Two other houses called Hale Hui and Hale o Kaili were also enclosed. The former was for the collective gods, the other was for Kaili. Two lama posts were crossed at the entrance gate, before entering which one must divest himself of his clothing.

Hale ai puupuu (Mua house?) Was where the chief and others were in which was the fireplace (umu) (Kamakau in McAllister 1933: 81).

4.2 HISTORIC SITES

The Aloha Tower Complex was constructed between 1921 and 1926 (Records on file at the State Historic Preservation Division). The land that the tower sits on was filled with timber and coral blocks from the old Honolulu Fort. Construction of the tower itself was begun in 1924 by C.W. Winstedt and the National Construction Co. (Smith and Rosendahl 1990:19). Closed to the public during WWII, Aloha Tower was reopened in 1947. It is designated as State Site 50-80-14-9929, and is listed on the NRHP.

The Falls of Clyde, presently located at Pier 7, is the only four-masted, fully-rigged iron hulled ship left in the world. The vessel was constructed in great Britain in 1878 by Russell and Company (Records on file at the State Historic Preservation Division). It was built for general trade between Great Britain and India. The ship was first sold to American owners in 1893. Restored and re-opened to the public in 1968, The Falls of Clyde is listed on the NRHP.

4.3 PREVIOUS STUDIES

Beginning in 1991, the Bishop Museum's Department of Anthropology-Applied Research Group conducted an archaeological inventory survey (Hurst and Allen 1992) and later, data recovery (Lebo 1997) for the Harbor Court redevelopment project located at the intersection of Queen Street and Nimitz Highway, *mauka* of Honolulu Harbor. The excavation uncovered a total of 53 features (18 during the inventory survey and 35 during data recovery) in the project area. Features included a mixture of both prehistoric Native Hawaiian features and historic Euro-American features. A majority of the features were associated with the commercial use of the property (wall remnants, metal piping, trash pit, concrete flooring) during the early and late historic period.

In 1992, James Landrum, also from the Applied Research Group, Bishop Museum, conducted emergency data recovery procedures at the River-Nimitz Redevelopment project. During the course of the project "seven features with varying cultural and temporal origins" (Landrum 1992:i) were identified. The significance of this site may

not necessarily be the findings but more importantly the context in which they were found. The project area was located within a wet-site environment (a shallow marsh-like environment) that preserved the remains of a pre-historic period, traditional Hawaiian burial, with probable associated mortuary artifacts (braided cordage, and matted *pandanus* fibers).

Also in 1992, International Archaeological Research Institute, Inc., conducted archaeological monitoring, inventory survey, and data recovery for the Marin Tower property, (Site 50-80-14-4494), in downtown Honolulu (Goodwin et al. 1996). An initial survey by the Applied Research Group (Hurst and Cleghorn 1990) concluded that the area would likely have significant archaeological resources. This presumption would prove to be correct. Indeed, the excavations at the Marin Tower property (named for Don Francisco de Paula Marin, whose family occupied the property from 1810 to ca. 1850) uncovered a plethora of data that is unmatched in historic Hawaiian archaeology. Goodwin was able to trace the land use at the property through seven major periods, from a pre-contact, limited human occupation to the current revitalization of the subject property. Ten "research blocks" were formed to aid in the organization during the data recovery phase. Blocks I and II were known to contain human remains thus they received the highest priority. A total of nine individuals within six distinct features were recovered in Block I. "There are three adult females aged 35 or older; two adult males under 50 years of age; a teenager, one young child, and two infants" (Goodwin et al. 1996: 85). These individuals were interred in coffins constructed with iron nails. All were of Hawaiian descent, that were likely buried after 1778. Artifacts recovered during excavations included: Chinese porcelain, various stoneware, whole and broken glass bottles, copper, bone and wood buttons, iron nails, figurines, charcoal chunks and flecking, basalt flakes, a basalt adze, *'ili'ili* paving, volcanic glass and chert fragments, coral chunks and blocks, and midden including: marine shell, turtle, numerous birds and fish, dog, pig, and cattle faunal.

Between 1992 to 1995, Archaeological Consultants of Hawaii, conducted an archaeological inventory survey (Kennedy et al. 1993) and data recovery for the Kekaulike Revitalization Project in the Historic Chinatown District of Honolulu (Riley et al. 1995). Two sites were identified during the inventory survey. A total 55 features were identified data recovery. Radiocarbon dates from these dated initial use of the area "between ca. A.D. 1386 and 1700, and continued into the nineteenth century" (Riley et al. 1995: 4). Excavations relocated a historic fishpond (Site 50-80-14-4587) that existed to ca. 1852. The pond once contained a single *mākāhā* and *'auwai* (Riley et al. 1995:42). Features identified during data recovery include: a possible Hawaiian stone platform, postholes, and metal pipes. Numerous historic artifacts were recovered along with traditional Hawaiian artifacts. The traditional artifacts included six basalt adzes, numerous adze blanks, a traditional ring poi pounder, a possible stirrup poi pounder (previously only found on Kaua'i), two metal fishhooks, six cowry shell lures (*Cyprea sp.*), four stone octopus lure sinkers, six *'ulu maika*, and various faunal remains (bird, cat, rat, and dog).

In 1993, Paul H. Rosendahl Inc., conducted an archaeological inventory survey at the Nuuanu Court Project site located on the corner of Nu'uanu Avenue and Nimitz Highway (Dunn and Rosendahl 1993). Test excavations uncovered a single cultural layer that extended throughout the project area. The cultural layer was designated as site "50-80-14-2456, a large cultural deposit initially identified at the Ka'ahumanu Parking Structure Redevelopment/Harbor Court Project site" [PHRI report pending] (Dunn and Rosendahl 1993: ii). This layer was reported to be from the late prehistoric to early historic period of Hawaiian history. Identified within the layer were marine shell, non-human bone, charcoal, cut non-human bone, basalt flakes, along with several features such as postholes, pipe trenches and basin-shaped pits.

In 1994, International Archaeological Research Institute, Inc., conducted an archaeological inventory survey for the Kekaulike Diamond Head block in downtown Honolulu (Goodwin 1997). A total of 105 subsurface features were identified during the excavation of 21 test trenches, these included a disturbed human burial, fire pits, glass and concrete casings, etc. Goodwin (1997) determined that significant archaeological resources were present at Kekaulike with the deposits likely ranging from the Pre-Contact Period (before 1778) to the Early Chinatown Period (1850-1900). The site was assessed to be significant under both National Register of Historic Places and State of Hawaii critera.

In 1997, James Moore of Archaeological Consultants of the Pacific, Inc., performed emergency recovery procedures on an inadvertent find of human remains near Pier 40 (Moore 1997). The remains were discovered during the excavation of a utility trench and consisted of both disturbed and *in situ* human remains. The burial was, "placed in a small crevice between ridges of coral bedrock" (Moore 1997: 1). Among the remains recovered were fragile pieces of the cranium, mandible, and teeth. Information regarding the remains is limited since only a letter report has been submitted to SHPD. However, State Archaeologist, Elaine Jourdane who conducted a field visit to the site, believes that the remains are of a person who died at that spot (while possibly fishing) and was not necessarily buried there (personal communication with James McIntosh, 10/15/98).

5.0 RESULTS

No traditional Hawaiian archaeological sites were found during the course of the current investigations. This result is not surprising given the geomorphological nature of the project area. The project area consists of recently created fill land and is extensively urbanized. The project area is an active commercial harbor, with buildings, structures, and facilities associated with maritime transportation of goods and materials.

The State Department of Transportation, Harbors Division informed us that 17 structures in the project area are being considered for demolition and replacement. A listing of these 17 structures with information on their use, date of construction, improvements, and condition is presented in Table 4. Descriptions and plan view maps of these structures, compiled by the State Department of Transportation, Harbors Division, are presented in Appendix A. Photographs of these structures, taken during the current project are presented in Appendix B.

The 17 structures that are slated for demolition and replacement are primarily metal structures with some use of hollow tile and concrete in their construction. The oldest structures are two warehouses on Pier 22 that are 70 years old, and the newest structures are the Pier 19 office and comfort station that were constructed in 1955.

Of the 17 structures slated for demolition, three are less than 50 years old (Pier 2 Shed, Pier 19 Office and Pier 19 Comfort Station). Ten were constructed over 50 years ago (Pier 18, Shed 19 Shed, Pier 22 Warehouses 6 and 8, Pier 24 Shed, Pier 25 Shed, Pier 26 Shed, Pier 27 and 28 Shed, Pier 29 Shed and Pier 32 Shed). The four remaining structures (Pier 21 Machine Shop, Pier 21 Carpenter Shop, Pier 23 shed and Pier 24 hi-lift maintenance shop) have unknown dates of construction.

Of the ten structures that are over 50 years old, only three structures have had no renovations or improvements (Pier 18 Shed, Pier 25 Shed, and Pier 29 Shed). The Sheds on Piers 18 and 29 are in poor condition and appear unsafe.

The following are summary descriptions of the 17 structures slated for demolition, organized by their pier locations (Figure 5):

Pier 2:
The Pier 2 Shed is the only structure east of Aloha Tower scheduled for demolition. It was built in 1953 and has been extensively modified.

TABLE 4. EVALUATION OF STRUCTURES SCHEDULED FOR DEMOLITION.

Building Location	Building Use	Date of Construction	Renovations/ Improvements	Structural Condition
Pier 2	shed	1953	extensive	good
Pier 18	shed	1947	roof/siding	fair
Pier 19	shed	1924	extensive	fair
Pier 19	office	1955	various	fair
Pier 19	comfort station	1955	unknown	fair
Pier 21	machine shop	unknown	unknown	fair
Pier 21	carpenter shop	unknown	unknown	fair
Pier 22	warehouse #6	1928	steel frame extended	poor
Pier 22	warehouse #8	1928	replaced roof	poor
Pier 23	shed	unknown	unknown	fair
Pier 24	shed	1936	shed extended; twice	poor
Pier 24	hi-lift maintenance shop	unknown	unknown	poor
Pier 25	shed	1923	none	poor
Pier 26	shed	1923	roofing	poor
Pier 27 and 28	shed	1938	shed reduced on Ewa end	poor
Pier 29	shed	1942	none	poor
Pier 32	shed	1938	unknown	fair

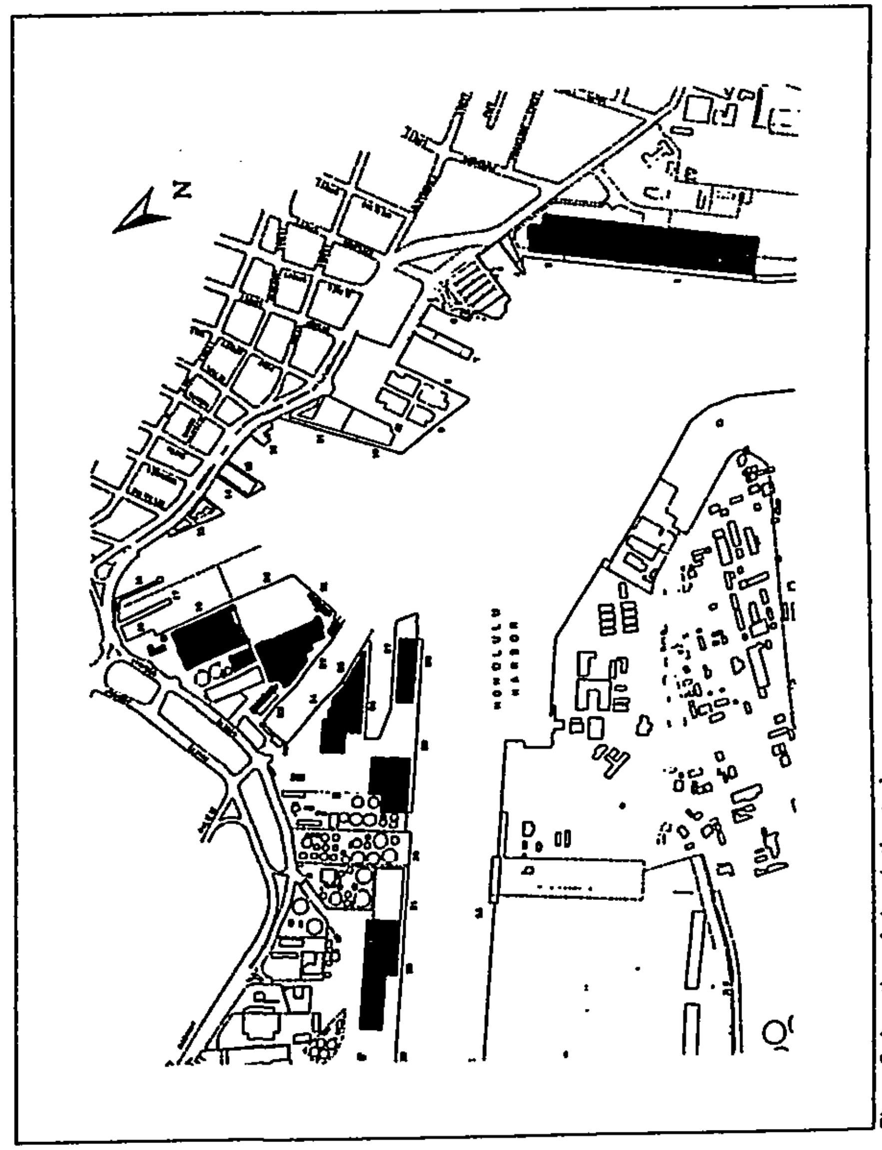

Figure 5. Location of piers in the study area.

Piers 18-29:
Between Piers 18 and 29, 15 structures are proposed for demolition. Two of these (Pier 19 Office and Pier 19 Comfort Station) were constructed after 1948. Four of the structures (Pier 21 Machine Shop, Pier 21 Carpenter Shop, Pier 23 Shed and Pier 24 Hi-Lift Maintenance Shop) have unknown dates of construction.

Nine structures were constructed prior to 1948 (Pier 18 Shed, Pier 19 Shed, Pier 22 Warehouses 6 and 8, Pier 24 Shed, Pier 25 Shed, Pier 26 Shed, Pier 27 and 28 Shed, Pier 29 Shed) and are thus over 50 years old. Of these, seven have had various improvements and modification done over the years (Pier 18 Shed, Pier 19 Shed, Pier 22 Warehouses 6 and 8, Pier 24 Shed, Pier 26 Shed, Pier 27 and 28 Shed) which have altered their construction and appearance.

Only two structures have had no renovations or improvements and thus retain their original integrity (Pier 25 Shed, and Pier 29 Shed). However, these structures are in extremely poor condition.

Pier 32:
The Pier 32 Shed is connected to the Pier 31 Shed forming a single continuous structure fronting Piers 31 and 32. The Pier 32 Shed was built in 1938, but has undergone several improvements to its main structure and doors.

6.0 HISTORIC SIGNIFICANCE ASSESSMENTS

The National Historic Preservation Act of 1966 (as amended) authorizes the Secretary of Interior to expand and maintain a National Register of Historic Places (NRHP) that contains a listing of districts, sites, buildings, structures and objects significant in American history, architecture, archaeology, engineering and culture. A property may be listed in the NRHP if it meets criteria for evaluation defined at 36 CFR §60.4:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and
>
> (a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) That are associated with the lives of persons significant in our past; or
>
> (c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) That have yielded, or may be likely to yield, information important in prehistory or history.

None of the structures in the project area appear to be significant based on the above criteria.

While the Pier 2 shed is located within the Downtown District, which is listed on the NRHP, we do not think that this structure is a contributing property. The Pier 2 shed was built within the last 50 years and has undergone extensive renovations so that its original integrity is compromised.

An argument could be possibly constructed that some of the structures to be affected are significant for their informational content (Criterion d). However, the data that have been recorded and presented in this report (see especially Appendices A and B) adequately document these structures and there appear to be no further potentially significant information remaining. Hence even if one were to argue that these structures were significant for their informational content, sufficient information has been recorded, during the course of the current investigations.

7.0 DISCUSSION AND RECOMMENDATIONS

The current project has consisted of archival research and surface archaeological survey of the area in Honolulu Harbor and its environs. It has been shown that Honolulu Harbor has had a long and rich history. It was important during the period of sandalwood trade and later during the whaling period. By the mid-1800s the Harbor and the adjacent community of Honolulu was a bustling area of commerce. Honolulu and its Harbor continue to be the commercial center for the State of Hawai'i.

The historic structures that are planned to be demolished have been recorded and documented. They have been shown to be not significant and can be demolished without any further study.

Archival research has shown that most of the shoreline surrounding Honolulu Harbor is composed of recently created land. This land was created by depositing fill materials such as dredge material, excavation material from upland areas, garbage, etc. This geomorphological situation resulted in predicting that no traditional Hawaiian sites would be found in the project area. The surface survey substantiated this prediction. No surface traditional Hawaiian archaeological sites were found or are present in the project area.

It is interesting, however, that previous archaeological investigations conducted in the vicinity of Pier 40 recovered apparently *in situ* human remains (Moore 1997). A closer examination of the reconstructed shoreline map (Figure 4) shows that traditional fishponds existed immediately to the west of Pier 40. It seems highly likely that the reconstructed plotting of the fishponds is slightly erroneous and that the fishponds may have actually extended as far east as Pier 40 or even to the mouth of Kapalama Stream. Although Pier 40 is outside of the current project area, it is relevant within the overall scheme of Honolulu Harbor. Therefore, it is recommended that if future developments or improvements are proposed for the area west of Pier 39, that archaeological testing be conducted in an attempt to identify the extent of the fishponds or other cultural deposits.

Within the rest of the project area, no cultural remains should be present. If any are identified, however, they would have likely been brought in with the fill and are not *in situ*. It has been shown that the original coastline around the turn of the century was located farther inland along the Airport and Harbor areas. Thus, any cultural remains that were once present along the coast, will be situated inland of Nimitz Highway, rather than along the current Harbor edge.

Dredging activities are not anticipated for any of the 2020 Master Plan Immediate Phase projects. However, routine maintenance dredging activities involving the removal of accumulated sediment and dead coral may be undertaken in the areas of Piers 16 and 24. These dredging activities would not impact any cultural resources, as no intact cultural remains should be present within the harbor itself. No further archaeological investigations are recommended in these areas.

The area along Lagoon Drive where the proposed Lay Berths' will be constructed is entirely filled land (see Figures 3-5). No archaeological remains have been identified in the area and it is doubtful that any subsurface deposits are present. The harbor itself, the lagoon portion, has been previously dredged. A recently constructed structure (a commercial sea plane operation) is present in the middle of Lagoon Drive, on the water. No other structures are present and no further work is recommended.

In conclusion, the proposed Immediate Phase projects will have no impact on cultural resources, and no further archaeological work is recommended.

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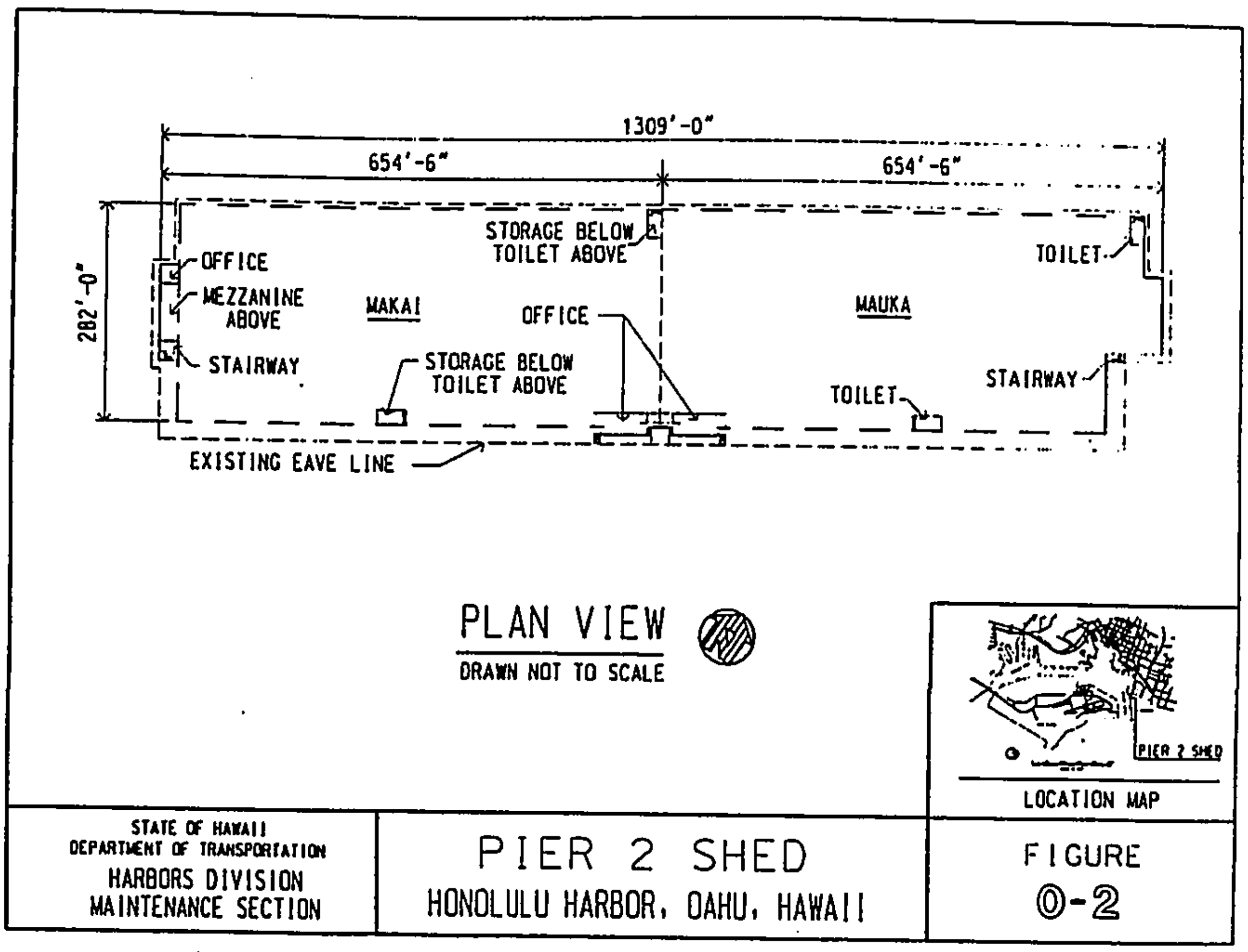
APPENDIX A

DESCRIPTIONS AND MAPS OF HARBOR STRUCTURES

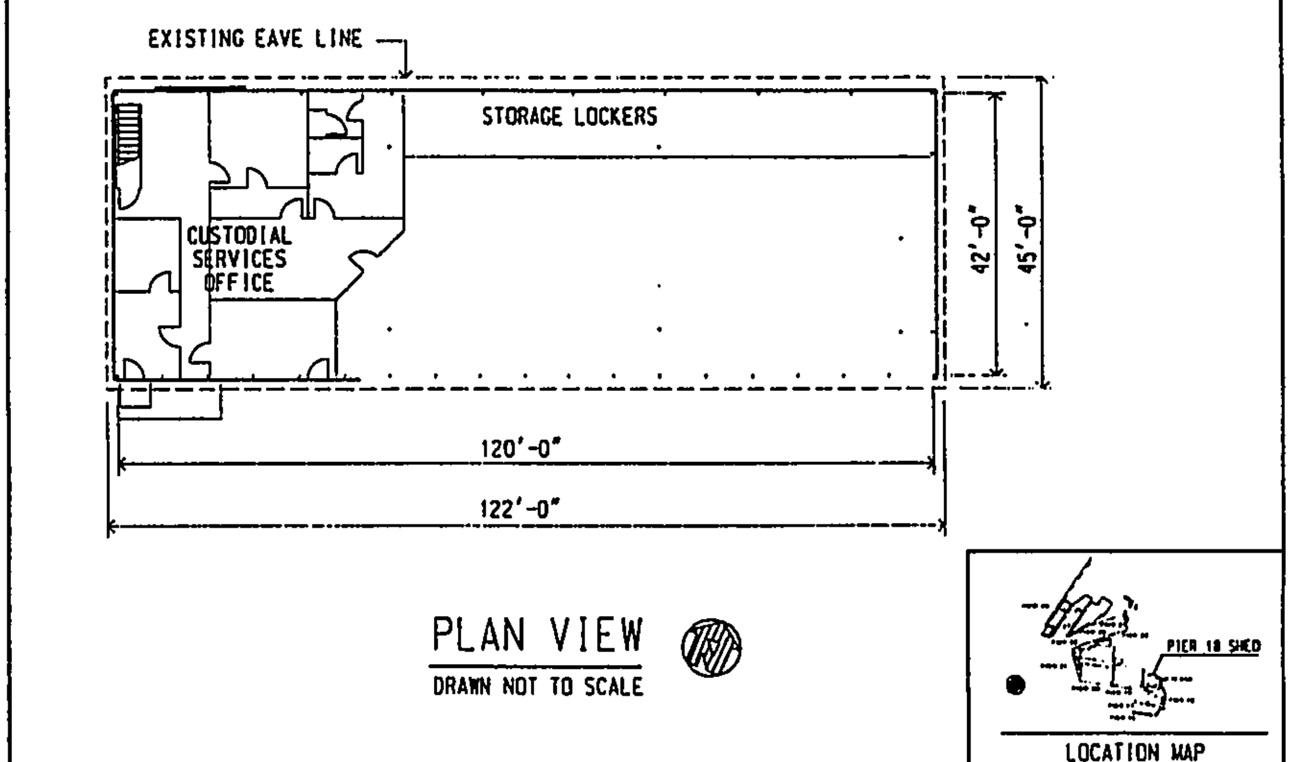


HONOLULU HARBOR - PIER 2 SHED

Location or Address:	Honolulu Harbor, Honolulu, Hawaii
Date of original construction:	1953
H.C. Job No. of original construction:	821
Original floor area (sq. ft.):	184,569
Approximate floor area size (sq. ft.):	654.5' x 282'
No. of floors:	1, plus mezzanine
Date of major renovation and description:	Extended 654.5' x 282'
New floor area (sq. ft.):	369,138
Roof area (sq. ft.):	369,138
Approximate roof area size (sq. ft.):	1309' x 282'
Present use of building:	Office, storage area
Type of construction:	
Asbestos survey:	Survey-no
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 2 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL. DATE	COST	REMARKS
PAINTING:				
INTERIOR	1606	05/30/86	$215,920.00	Makai half
ROOFING:				
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				



PLAN VIEW
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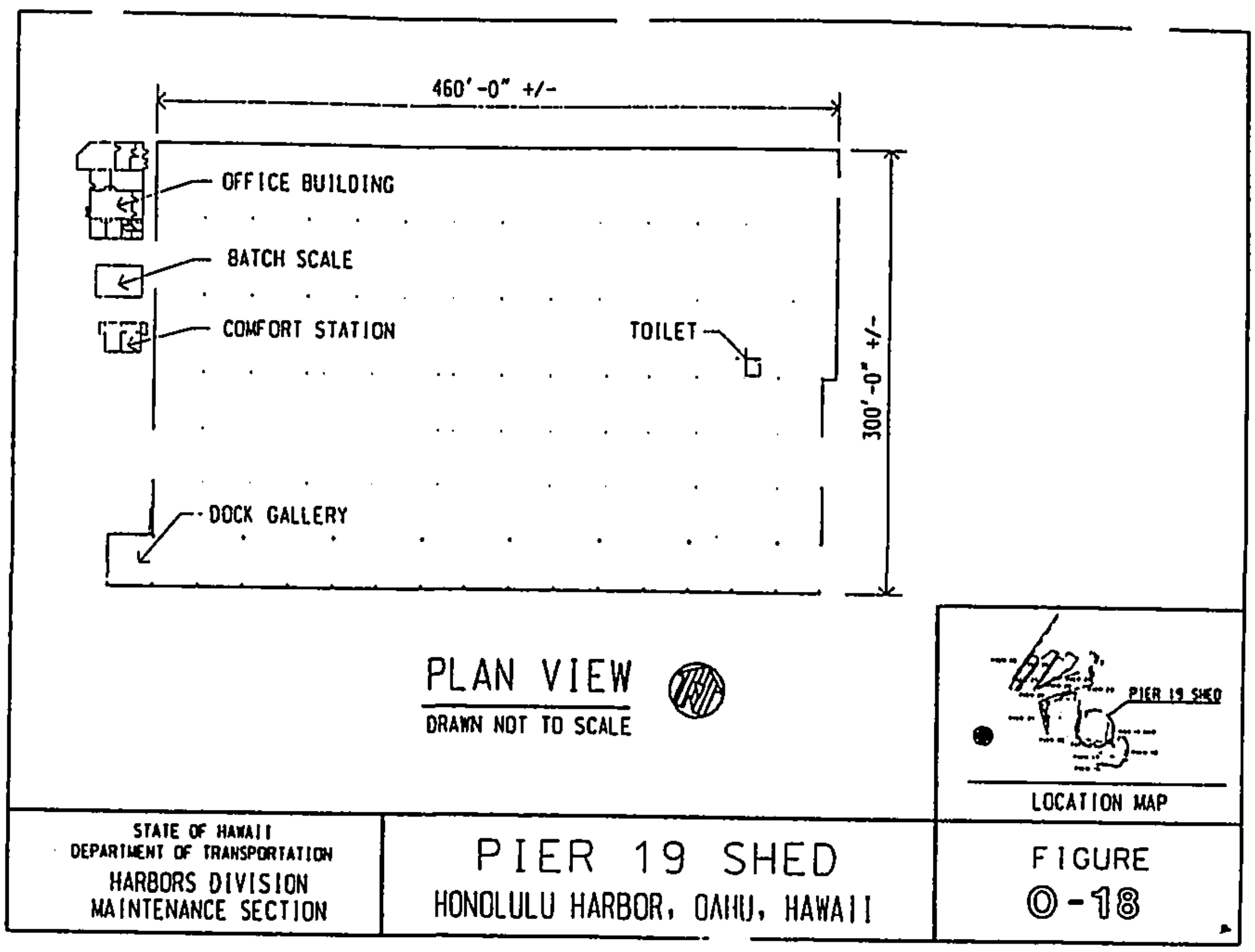
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION MAINTENANCE SECTION	PIER 18 SHED HONOLULU HARBOR, OAHU, HAWAII	FIGURE O-17

HONOLULU HARBOR - PIER 18 SHED

Location or Address:	Pier 18, Honolulu, Hawaii
Date of original construction:	1947
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	5,040/5,200
Approximate floor area size (sq. ft.):	120' x 42'
No. of floors:	1
Date of major renovation and description:	None
New floor area (sq. ft.):	
Roof area (sq. ft.):	5,490
Approximate roof area size (sq. ft.):	122' x 45'
Present use of building:	Commercial fishing support area. Harbors Division Oil & Water Office
Type of construction:	Steel frame, corrugated metal siding, corrugated aluminum roofing, A.C. floor Office area: wood structure
Asbestos survey:	Survey-yes, 4/96, positive
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 18 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL. DATE	COST	REMARKS
PAINTING:				
ROOFING:				
REPLACE ROOFING & SIDING	1889	10/27/95	$83,282	
SIDING:				
ELECTRICAL:				
ELECTRICAL REPAIRS	1099	?		PO#54885 Replacing feeder cable w/new conductors
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				

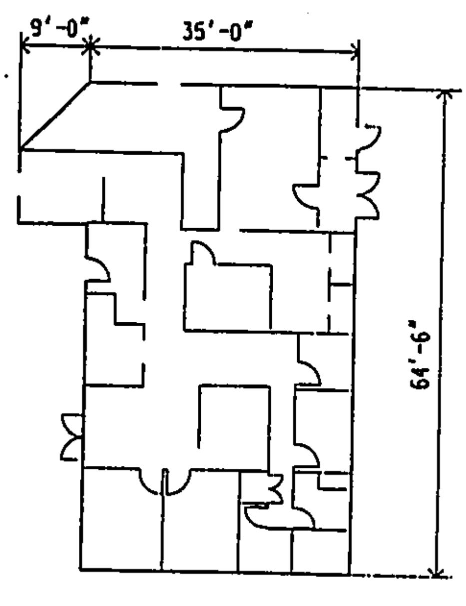


HONOLULU HARBOR - PIER 19 SHED

Location or Address:	Pier 19, Honolulu, Hawaii
Date of original construction:	1924
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	Unknown
Approximate floor area size (sq. ft.):	460' x 300'
No. of floors:	1
Date of major renovation and description:	1954, 1956, 1960 - Extent of work unknown 1982 - Roof truss replaced at half of shed; Various reroofing
New floor area (sq. ft.):	122,820 (not including easement area - 267' x 460')
Roof area (sq. ft.):	138,000
Approximate roof area size (sq. ft.):	460' x 300'
Present use of building:	Cargo handling
Type of construction:	Steel frame, corrugated metal siding & roof, A.C. floor. CMU comfort station in shed
Asbestos survey:	Survey-yes, 4/96, negative
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 19 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL. DATE	COST	REMARKS
PAINTING:				
REPAINT EXTERIOR	1565	07/25/84	$11,000	PO#60701112
ROOFING:				
REPAIR ROOF & GUTTERS	1740	05/29/91	$453,483	Replacing existing roof & gutter systems; replacement of existing wooden trusses & purlins; painting existing steel purlins & framing members; furnishing & installing a new sheet metal roofing; sheet metal gutters, leader boxes, downspouts, & gutter screens
	1378	?		
REPAIR GUTTERS	1714	02/28/90	$21,871	Removing & disposing of sections of existing sheet metal gutters & downspout leaders
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				
REPAIRS TO INTERIOR FRAMING	1337	05/26/78	$30,000	Repair damaged portion of beams, truss members & braces, & bottom lateral bracings
WOODEN TRUSS REPAIRS	1310	02/23/77	$2,833	PO#627601



PLAN VIEW

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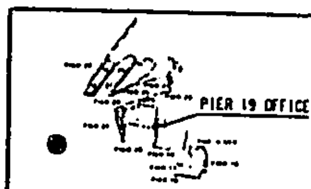


LOCATION MAP

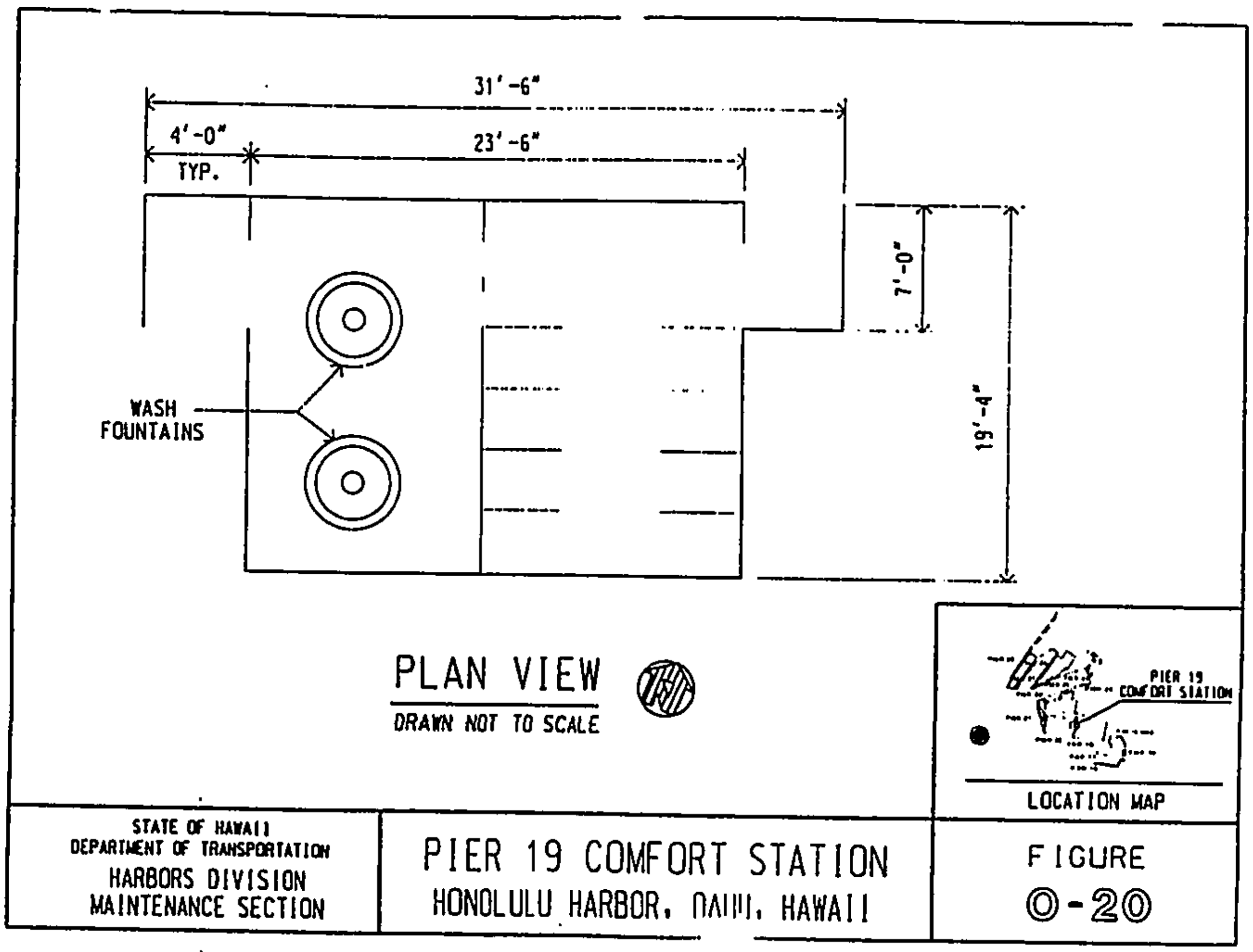
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION MAINTENANCE SECTION	PIER 19 OFFICE HONOLULU HARBOR, OAHU, HAWAII	FIGURE O-19

HONOLULU HARBOR - PIER 19 OFFICE

Location or Address:	Pier 19, Honolulu, Hawaii
Date of original construction:	1955
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	2,258
Approximate floor area size (sq. ft.):	64.5' x 35'
No. of floors:	1
Date of major renovation and description:	Unknown. Various interior modifications.
New floor area (sq. ft.):	2,258
Roof area (sq. ft.):	2,258
Approximate roof area size (sq. ft.):	64.5' x 35'
Present use of building:	Food concession, barge company office
Type of construction:	CMU walls, steel roof trusses, corrugated metal roofing, concrete floor
Asbestos survey:	Survey-yes, 4/96, positive
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 19 OFFICE

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				

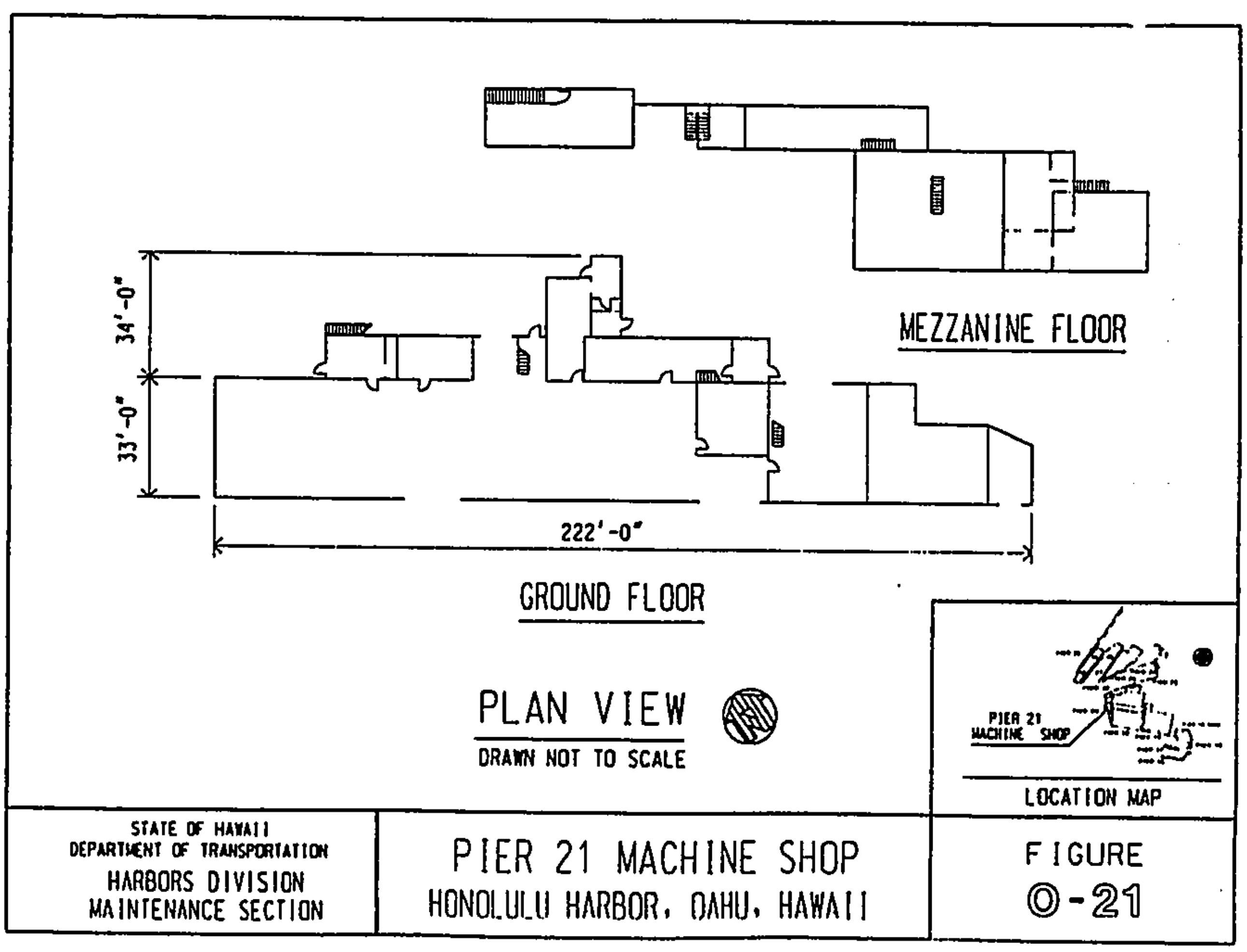


HONOLULU HARBOR - PIER 19 COMFORT STATION

Location or Address:	Pier 19, Honolulu, Hawaii
Date of original construction:	1955
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	453
Approximate floor area size (sq. ft.):	23.5' x 19.3'
No. of floors:	1
Date of major renovation and description:	Unknown
New floor area (sq. ft.):	
Roof area (sq. ft.):	453
Approximate roof area size (sq. ft.):	23.5' x 19.3'
Present use of building:	Bathroom
Type of construction:	CMU wall, steel roof truss, corrugated metal roof, concrete floor
Asbestos survey:	Survey-yes, 6/93, negative
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, negative

HONOLULU HARBOR - PIER 19 COMFORT STATION

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				

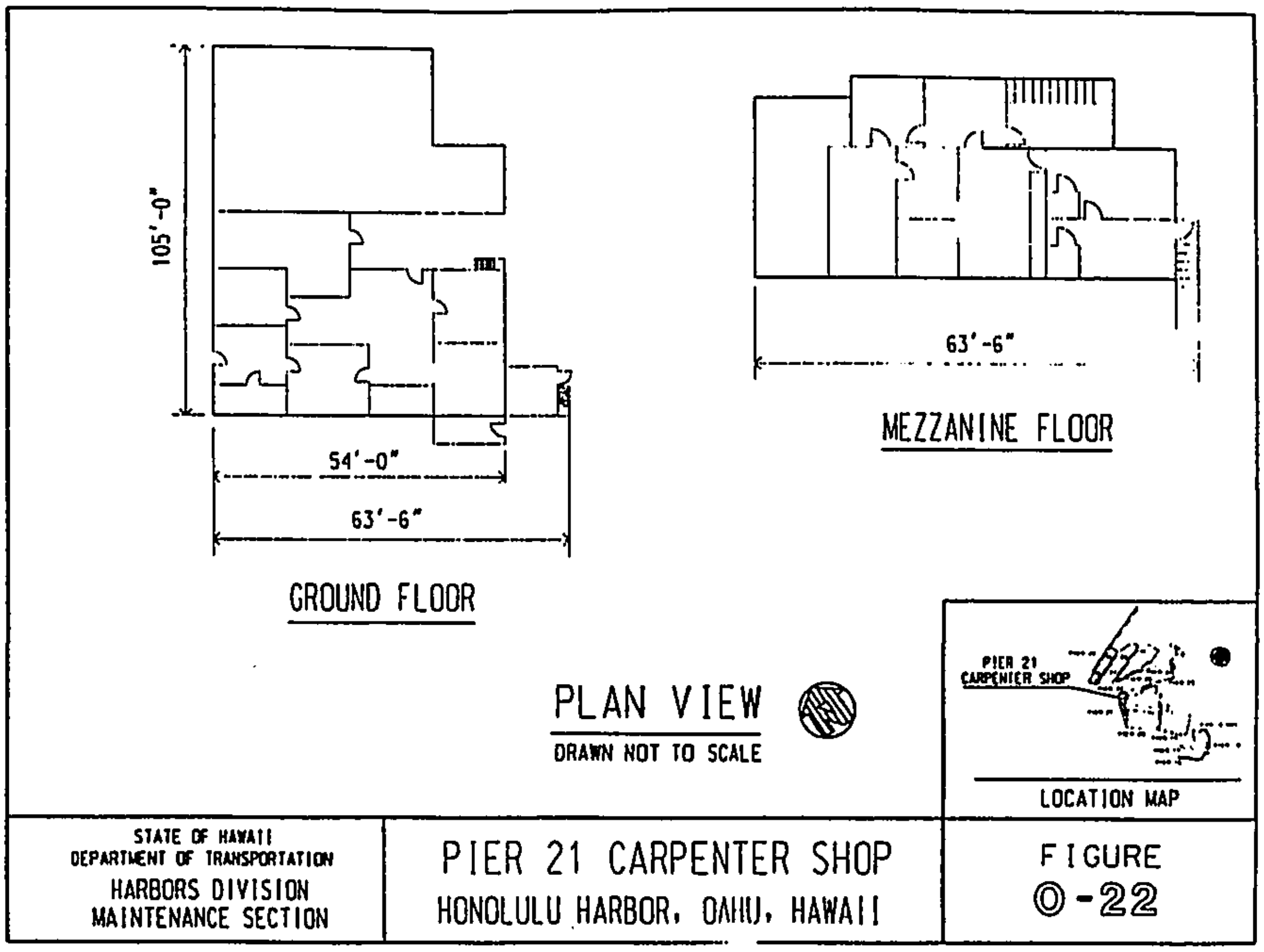


HONOLULU HARBOR - PIER 21 MACHINE SHOP

Location or Address:	Pier 21, Honolulu, Hawaii
Date of original construction:	
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	Unknown
Approximate floor area size (sq. ft.):	222' x varies
No. of floors:	2, including mezzanine
Date of major renovation and description:	Unknown. None after 1967
New floor area (sq. ft.):	8,964 1st floor. 4,160 mezzanine
Roof area (sq. ft.):	8,964
Approximate roof area size (sq. ft.):	222' x varies
Present use of building:	1st flr.: tug repair; mezzanine: cafeteria & office
Type of construction:	Steel frame, corrugated metal siding & roof, A.C. ground floor. Corr. Transite siding on mezzanine
Asbestos survey:	Survey-yes, 4/96, negative
Asbestos abatement:	Abatement-yes, 10/87
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 21 MACHINE SHOP

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				

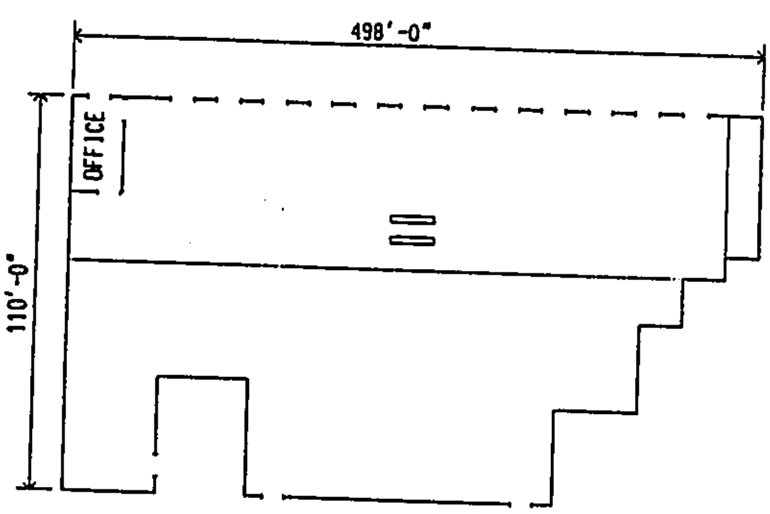


HONOLULU HARBOR - PIER 21 CARPENTER SHOP

Location or Address:	Honolulu Harbor, Honolulu, Hawaii
Date of original construction:	
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	5,670
Approximate floor area size (sq. ft.):	105' x 54'
No. of floors:	1, plus mezzanine
Date of major renovation and description:	
New floor area (sq. ft.):	
Roof area (sq. ft.):	4,942
Approximate roof area size (sq. ft.):	105' x 54'
Present use of building:	Offices, storage and work area
Type of construction:	Corrugated sheetmetal siding & roofing, concrete floor, wooden trusses
Asbestos survey:	Survey-yes, 8/87, positive
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 21 CARPENTER SHOP

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				



PLAN VIEW
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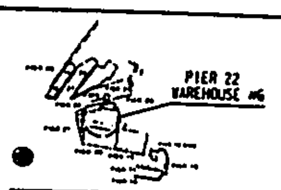


LOCATION MAP

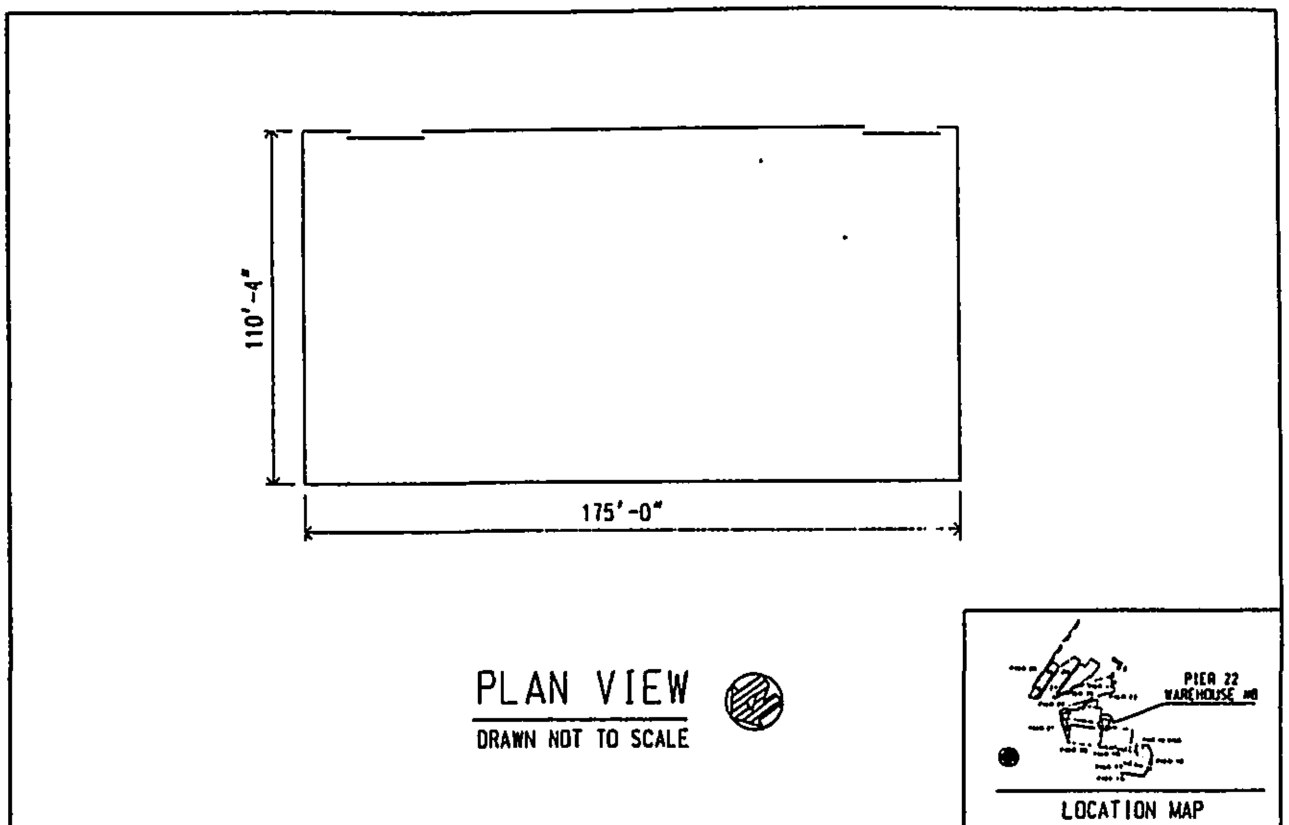
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION MAINTENANCE SECTION	PIER 22 WAREHOUSE #6 HONOLULU HARBOR, OAHU, HAWAII	FIGURE O-23

HONOLULU HARBOR - PIER 22 WAREHOUSE #6

Location or Address:	Pier 20, Honolulu, Hawaii
Date of original construction:	1928
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	54,780
Approximate floor area size (sq. ft.):	498' x 110'
No. of floors:	1
Date of major renovation and description:	1953 - Added 3 bays of steel framed shed, 49,955 sq. ft.. Small metal shed added at makai end of shed 1958 - Added trapezoidal shaped steel frame extension to shed, on Ewa side, 27, 280 sq. ft..
New floor area (sq. ft.):	132,089/54,853
Roof area (sq. ft.):	54,780
Approximate roof area (sq. ft.):	498' x 110'
Present use of building:	Cargo storage and warehouse
Type of construction:	1928 section: concrete columns, CMU walls, steel roof, A.C. floor. 1953 section: steel frame, corrugated steel siding & roof, A.C. floor. 1958 section: same as 1953. Extensive trailer office complex in shed addition
Asbestos survey:	Survey-yes, 4/96, positive
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 22 WAREHOUSE #6

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
REPAINT EXTERIOR	1777	11/05/91	$18,585	
	1494	08/24/82	$14,995.00	PO#612115
ROOFING:				
REPLACEMENT OF GUTTERS	1487	07/21/83	$37,237.42	
	1359	12/05/79	$30,092.03	
GUTTER REPAIRS	1312	02/10/77	$2,747.00	PO#627531
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
PAINTING & INSPECTING FIRE SPRINKLER SYSTEM	1211	02/20/76	$7,995	New side
REPLACING FIRE SPRINKLER SYSTEM	1178	06/30/75	$6,000	Old side
REPAIRING FIRE SPRINKLER SYSTEM	1177	06/30/75	$46,000	New side
OTHERS:				



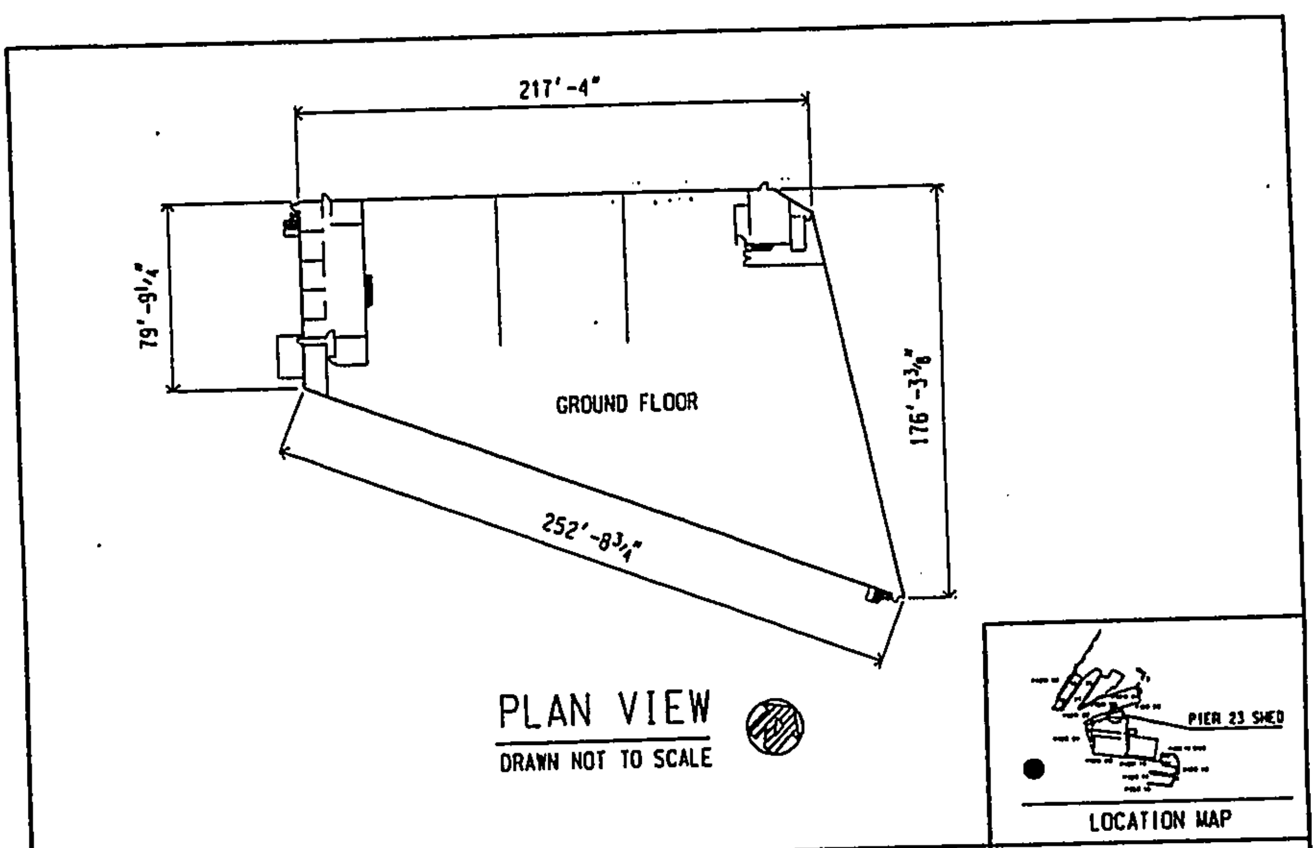
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION MAINTENANCE SECTION	PIER 22 WAREHOUSE #8 HONOLULU HARBOR, OAHU, HAWAII	FIGURE O-24

HONOLULU HARBOR - PIER 22 WAREHOUSE #8

Location or Address:	Pier 19, Honolulu, Hawaii
Date of original construction:	1928
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	19,308
Approximate floor area size (sq. ft.):	110.3' x 175'
No. of floors:	1
Date of major renovation and description:	Unknown before 1967 1986 - replaced roofing
New floor area (sq. ft.):	19,308
Roof area (sq. ft.):	19,308
Approximate roof area size (sq. ft.):	175' x 110.3'
Present use of building:	Cargo storage
Type of construction:	Steel frame, corrugated metal siding & roof, A.C. floor
Asbestos survey:	Survey-yes, 4/96, negative
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 22 WAREHOUSE #8

COMPLETED PROJECTS:	H.C. NO.	COMPL. DATE	COST	REMARKS
PAINTING:				
ROOFING: REPAIR ROOF	1625	02/26/87	$177,194.43	Remove & dispose existing corrugated sheet metal roofing; modifying existing roof trusses; installing new pre-finished corrugated steel roofing
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER: REPAIRING FIRE SPRINKLER SYSTEM	1154	12/28/73	$3,317	PO#601908
OTHERS: REPAIRS	1504	01/17/84	$75,567.09	Gutter replacement, repair laps & eaves; coating entire roof w/asphalt base aluminum coating; painting interior structural steel surfaces; removing & replacing 1150 sq. ft. of damaged siding; repair 2 pairs of exterior sheet metal siding doors



PLAN VIEW
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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION MAINTENANCE SECTION	PIER 23 SHED HONOLULU HARBOR, OAHU, HAWAII	FIGURE O-25

HONOLULU HARBOR - PIER 23 SHED

Location or Address:	Honolulu Harbor, Honolulu, Hawaii
Date of original construction:	
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	
Approximate floor area size (sq. ft.):	217' x varies
No. of floors:	1, plus mezzanine
Date of major renovation and description:	
New floor area (sq. ft.):	32,578
Roof area (sq. ft.):	32,578
Approximate roof area size (sq. ft.):	217' x varies
Present use of building:	Offices, storage area
Type of construction:	A.C. floor, A.C. over reinforced concrete roof, concrete footings
Asbestos survey:	Survey-yes, 6/93, positive
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 23 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
EXTERIOR	1844	12/06/93	$29,796.00	Exterior surfaces of walls, parapets, stairs, piping, conduits, canopy, trim, ramp, and stanchions.
ROOFING:				
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				

PLAN VIEW

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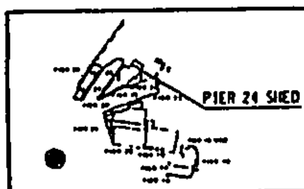

LOCATION MAP

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION
MAINTENANCE SECTION

PIER 24 SHED
HONOLULU HARBOR, OAHU, HAWAII

FIGURE
O-27

HONOLULU HARBOR - PIER 24 SHED

Location or Address:	Pier 24, Honolulu, Hawaii
Date of original construction:	1936
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	38,000
Approximate floor area size (sq. ft.):	183.75' x 520'
No. of floors:	1
Date of major renovation and description:	1939 - Shed addition, 49, 363 sq. ft. 1953 - Shed addition, 28,240 sq. ft.
New floor area (sq. ft.):	115,603/75,760
Roof area (sq. ft.):	75,760
Approximate roof area size (sq. ft.):	
Present use of building:	Barge and container maintenance
Type of construction:	Reinforced concrete columns & beams, corrugated metal siding, wooden roof with built up roofing, A.C. floor
Asbestos survey:	Survey-yes, 4/96, negative
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 24 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
REPLACE ROOFING	1607	11/26/91	$721,412.80	Replaced on Pier Sheds 24-26
GUTTER REPAIRS	1536	04/19/84	$54,338	
REPAIRS	1446	09/15/80	$15,655.64	Repaired with Pier Shed 25 Repaired damaged part of roof
REPLACEMENT OF GUTTERS AND DOWNSPOUTS	1112	12/23/71	$2,979	PO#54214
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				

PLAN VIEW

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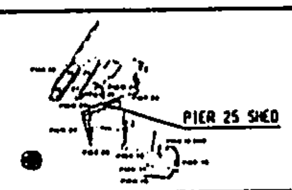

LOCATION MAP

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION
MAINTENANCE SECTION

PIER 25 SHED
HONOLULU HARBOR, OAHU, HAWAII

FIGURE
0-31

HONOLULU HARBOR - PIER 25 SHED

Location or Address:	Pier 25, Honolulu, Hawaii
Date of original construction:	1923
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	18,560
Approximate floor area size (sq. ft.):	
No. of floors:	1
Date of major renovation and description:	None
New floor area (sq. ft.):	
Roof area (sq. ft.):	18,560
Approximate roof area size (sq. ft.):	
Present use of building:	Barge and container maintenance
Type of construction:	Reinforced concrete columns & beams, corrugated metal siding, wooden roof with built up roofing, A.C. floor
Asbestos survey:	Survey-yes, 4/96, negative
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 25 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:	1607	11/26/91	$721,412.80	Replaced on Pier Sheds 24-26
REPLACE ROOFING	1446	09/15/80	$15,655.64	Repaired damaged portion of roof along with Pier Shed 24
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRES SPRINKLER:				
OTHERS:				

PLAN VIEW

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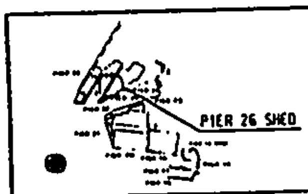


LOCATION MAP

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION
MAINTENANCE SECTION

PIER 26 SHED
HONOLULU HARBOR, OAHU, HAWAII

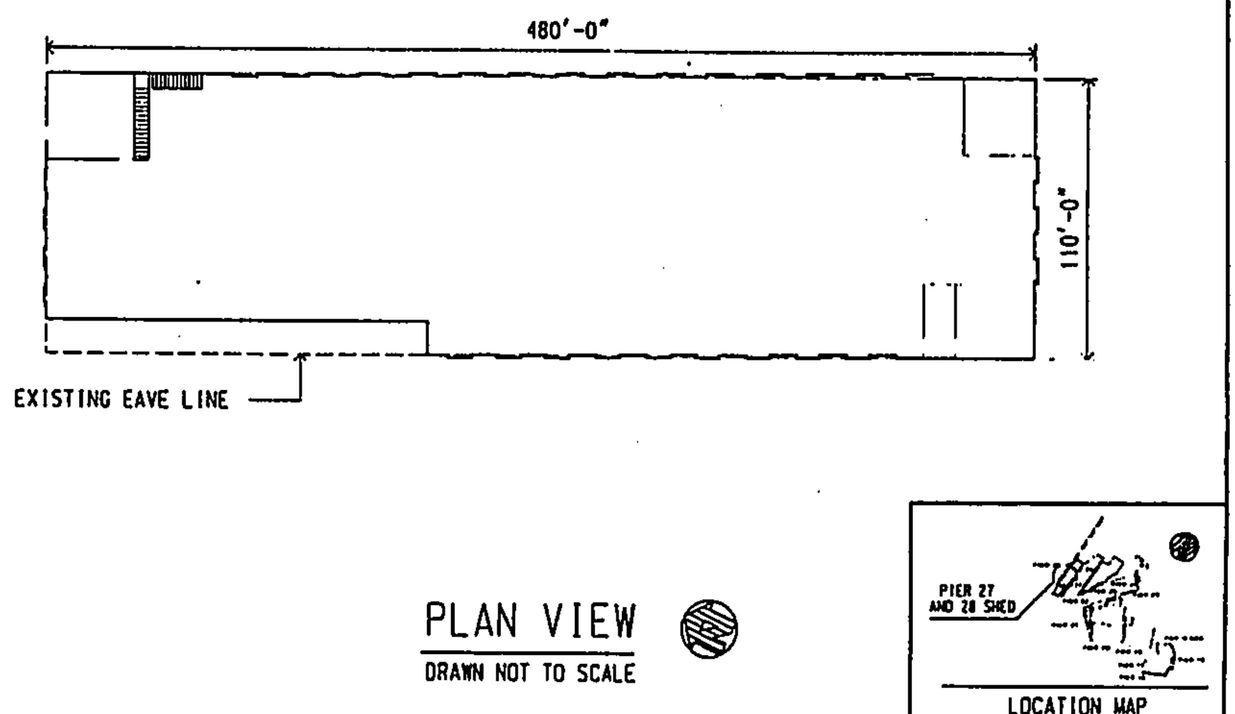
FIGURE
O-32

HONOLULU HARBOR - PIER 26 SHED

Location or Address:	Pier 26, Honolulu, Hawaii
Date of original construction:	1923
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	35,000
Approximate floor area size (sq. ft.):	608' x varies
No. of floors:	1
Date of major renovation and description:	None. Various roofing
New floor area (sq. ft.):	
Roof area (sq. ft.):	35,000
Approximate roof area size (sq. ft.):	608' x varies
Present use of building:	Interisland cargo handling
Type of construction:	Reinforced concrete columns & beams, corrugated metal siding, wooden roof with built up roofing, A.C. floor
Asbestos survey:	Survey-yes, 4/96, negative
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR -PIER 26 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
REPAINT INTERIOR	1775	01/29/92	$169,370	
ROOFING:				
COAT SHED ROOF	1572	11/21/84		
REPLACE ROOFING	1607	11/26/91	$721,412.80	Replaced on Pier Sheds 24-26
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				
DRAINAGE SYSTEM	1697	11/09/88	$36,634.60	



PLAN VIEW
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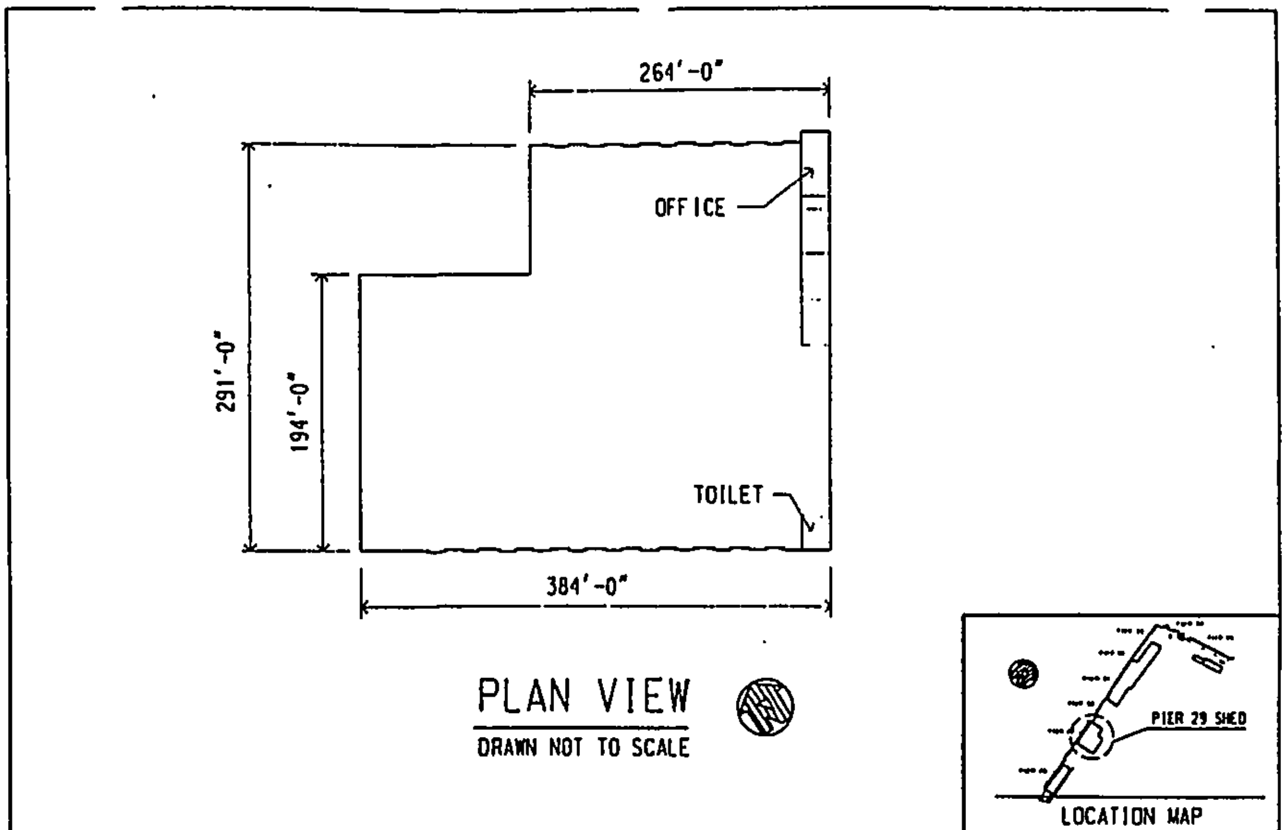
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION MAINTENANCE SECTION	PIER 27 & 28 SHED HONOLULU HARBOR, OAHU, HAWAII	FIGURE O-33

HONOLULU HARBOR - PIER 27 & 28 SHED

Location or Address:	Pier 27-28, Honolulu, Hawaii
Date of original construction:	1938
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	64,320
Approximate floor area size (sq. ft.):	480' x 110'
No. of floors:	1
Date of major renovation and description:	Date unknown - reduced width of shed at Ewa end
New floor area (sq. ft.):	61,609
Roof area (sq. ft.):	61,609
Approximate roof area size (sq. ft.):	480' x 110'
Present use of building:	Interisland cargo handling
Type of construction:	Steel frame, corrugated steel roofing, some corrugated steel siding, A.C. floor
Asbestos survey done:	Survey-yes, 6/93, positive
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 27 & 28 SHED

COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
REPAIR ROOF DRAINS	1871	09/08/95	$38,328	
ROOF REPAIRS	1564	10/26/84		Treat corrugated sheet metal roofing, eave, & monitor siding surfaces & sheet metal gutter surfaces w/ phosphoric acid metal treatment; repair all end laps & corroded sections of corrugated sheet metal roofing along mauka eave line, repair holes, coat w/asphalt base aluminum coating; Replace 24 wire flass window panes & recaulk windows along truss lines 2, 4, 6, 8, 10, 12, 14, 16, 18, & 20
REPLACE DRAIN SYSTEM	1415	11/19/81	$44,116	
SIDING:				
ELECTRICAL:				
REPLACE LIGHTING SYSTEM	1616	10/17/86	$73,000	
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				



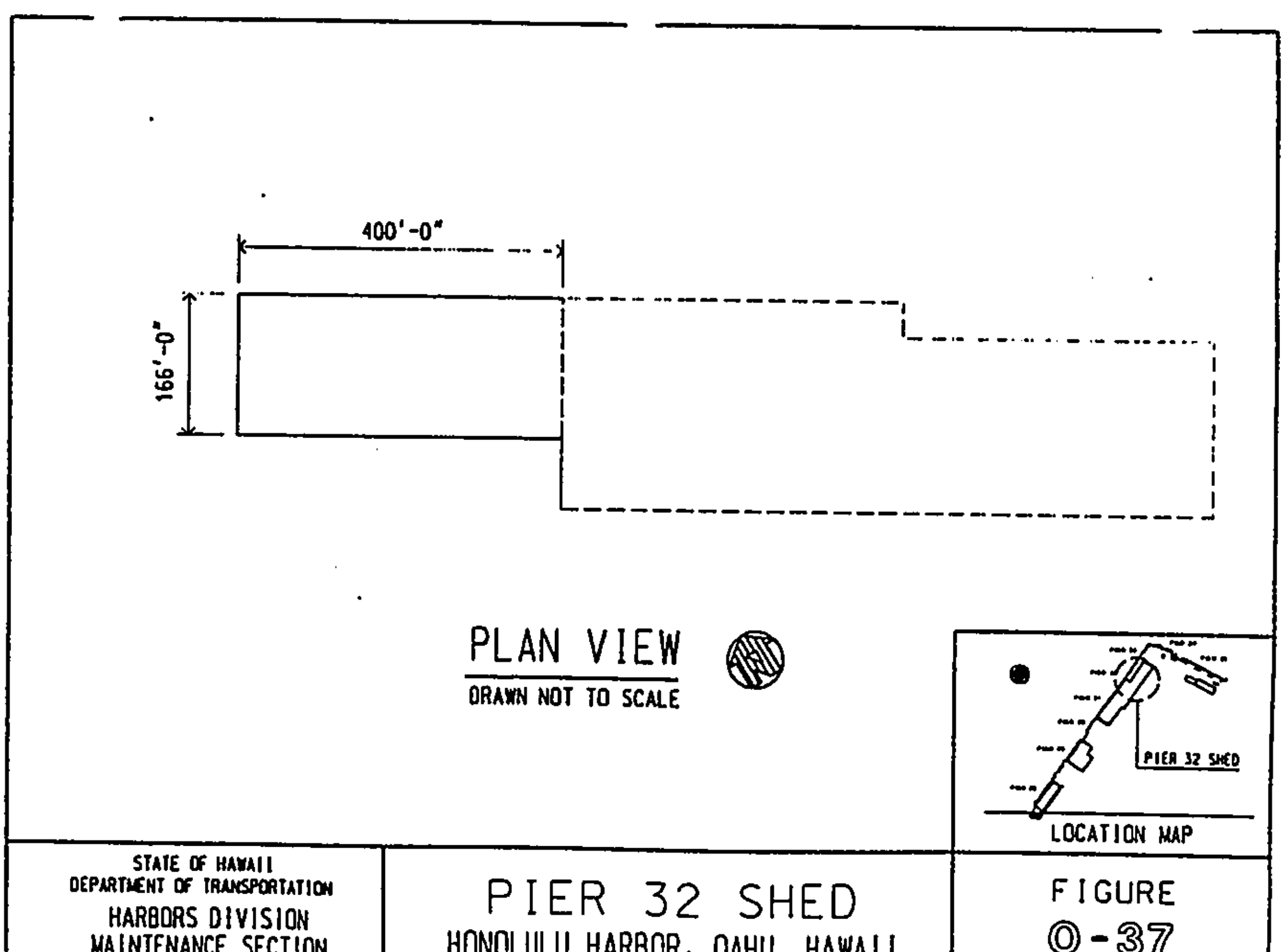
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HARBORS DIVISION MAINTENANCE SECTION	PIER 29 SHED HONOLULU HARBOR, OAHU, HAWAII	FIGURE O-34

HONOLULU HARBOR - PIER 29 SHED

Location or Address:	Pier 29, Honolulu, Hawaii
Date of original construction:	1942
H.C. Job No. of original construction:	1421
Original floor area (sq. ft.):	103,000
Approximate floor area size (sq. ft.):	384' x 291'
No. of floors:	1
Date of major renovation and description:	None
New floor area (sq. ft.):	
Roof area (sq. ft.):	103,000
Approximate roof area size (sq. ft.):	384' x 291'
Present use of building:	Interisland cargo handling
Type of construction:	Steel frame, corrugated steel roofing & siding, A.C. floor. Office area: wood construction
Asbestos survey:	Survey-yes, 6/93, positive
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 29 SHED

COMPLETED PROJECTS:	H C NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
ROOF REPLACEMENT	1562	06/05/85	$159,917	Replace whole roof w/ corrugated steel roof panels
REROOFING PORTION	1478	05/05/83	$169,151.73	Remove existing damaged corrugated sheet metal roof panels & installing new corrugated sheet metal roofing & fasteners (roofs sloping mauka)
ROOF REPAIRS	1356	11/19/81	$29,958.80	Remove existing damaged corrugated sheet metal roof panels & install new corrugated sheet metal roofing & fasteners; patching corrugated metal roofing
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
FIRE SPRINKLER:				
OTHERS:				



HONOLULU HARBOR - PIER 32 SHED

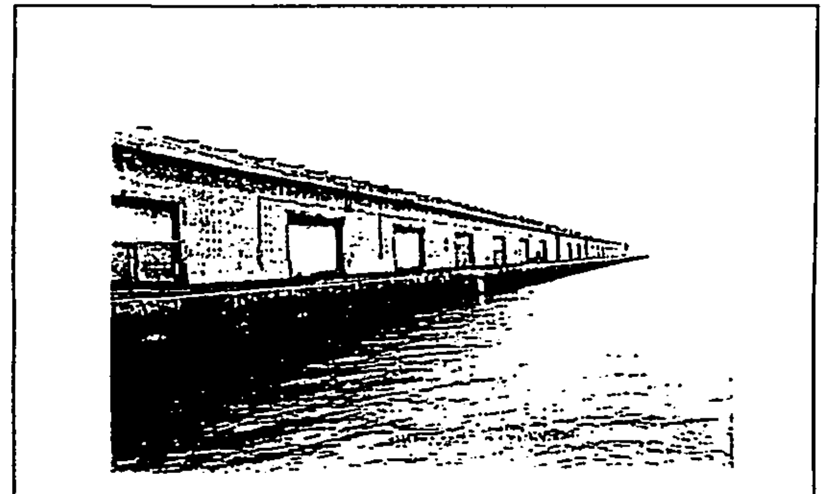
Location or Address:	Honolulu Harbor, Honolulu, Hawaii
Date of original construction:	1938
H C. Job No. of original construction:	1421
Original floor area (sq. ft.):	66,400
Approximate floor area size (sq. ft.):	400' x 166'
No. of floors:	1
Date of major renovation and description:	
New floor area (sq. ft.):	
Roof area (sq ft.):	66,400
Approximate roof area size (sq. ft.):	400' x 166'
Present use of building:	Cargo area
Type of construction:	Steel trusses, support columns, joists, metal siding
Asbestos survey:	Survey-yes, 4/96, negative
Asbestos abatement:	Abatement-no
Lead paint survey:	Survey-yes, 4/96, positive

HONOLULU HARBOR - PIER 32 SHED

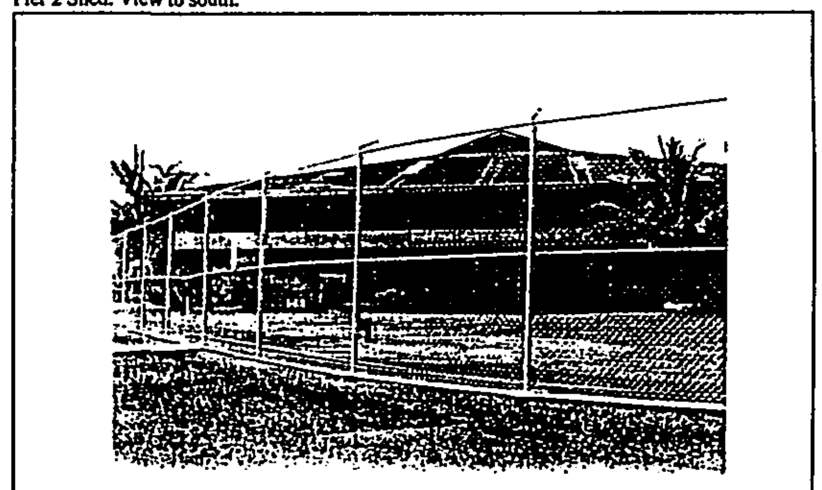
COMPLETED PROJECTS:	H.C. NO.	COMPL DATE	COST	REMARKS
PAINTING:				
ROOFING:				
GUTTER REPAIRS	1597	01/17/86	$88,568	Piers 31A-32 Shed
REPLACE GUTTERS & CANOPY	1581	06/21/85	$110,326	Piers 31-32 Shed
SIDING:				
ELECTRICAL:				
ROLL-UP DOORS:				
REPAIR ROLL-UP DOORS	1831	01/28/94	$70,290.06	Piers 31-32 Shed Doors H, I, V
FIRE SPRINKLER:				
REPLACING SPRINKLER HEADS	1210	02/16/76	$33,947	Piers 31A-33 Shed
OTHERS:				

APPENDIX B

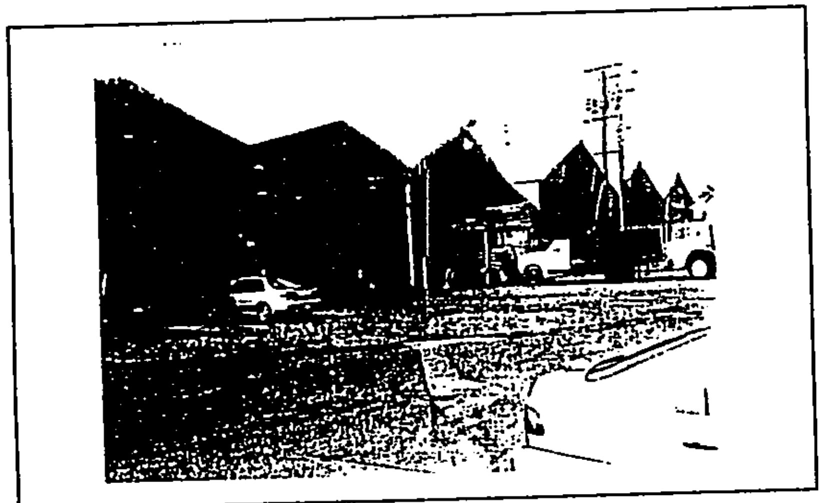
BUILDING PHOTOS



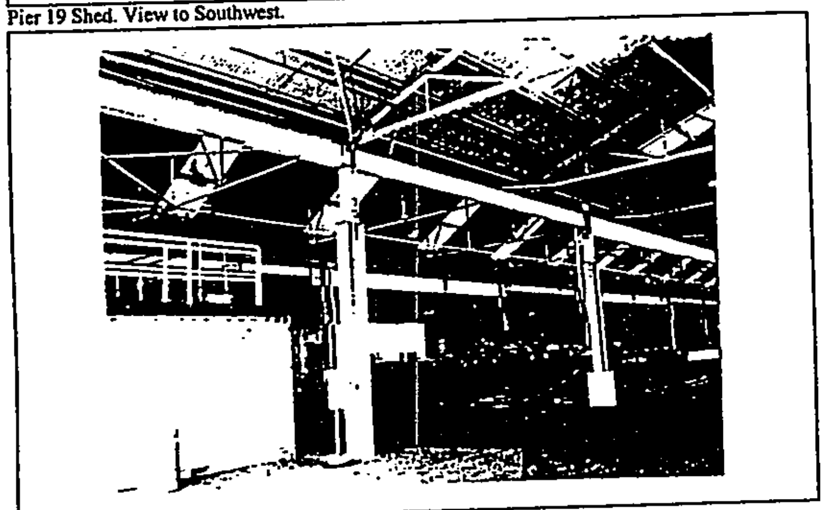
Pier 2 Shed. View to south.



Pier 2 Shed. Office space at north end of shed.



Pier 19 Shed. View to Southwest.



Pier 19 Shed, Interior. View to west.

Pier 21, Machine Shop. View to Southeast.

Pier 21, Carpenter Shop. View to Southwest.

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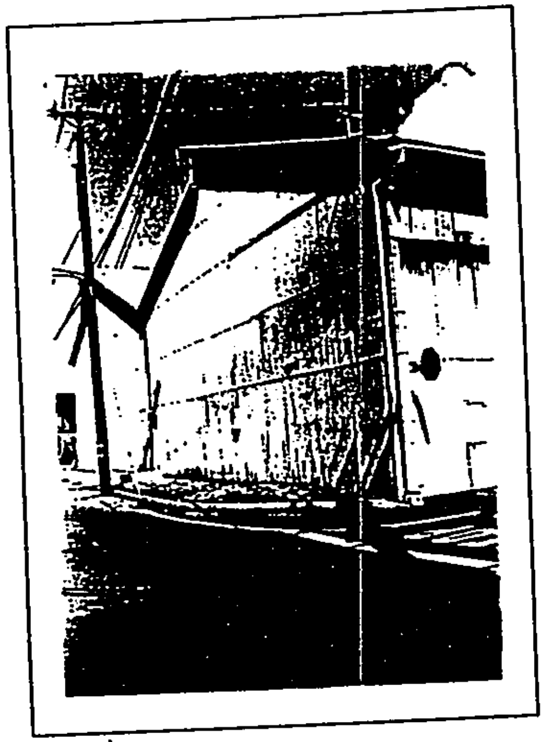
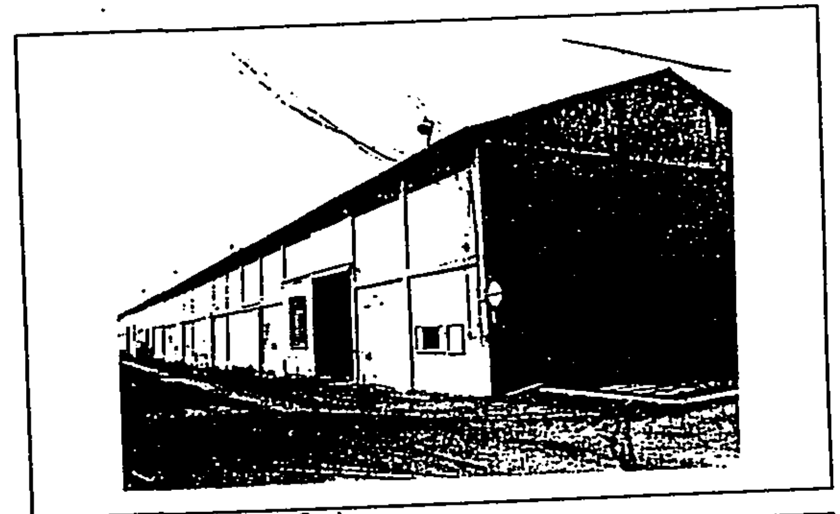
Archaeological Investigations
March 1999



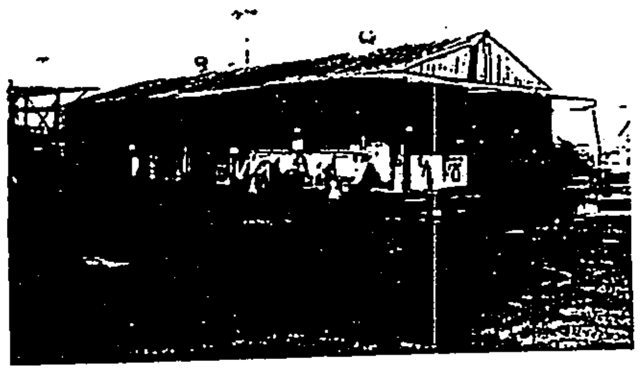
Pier 22, Warehouse #8. View to Northwest.



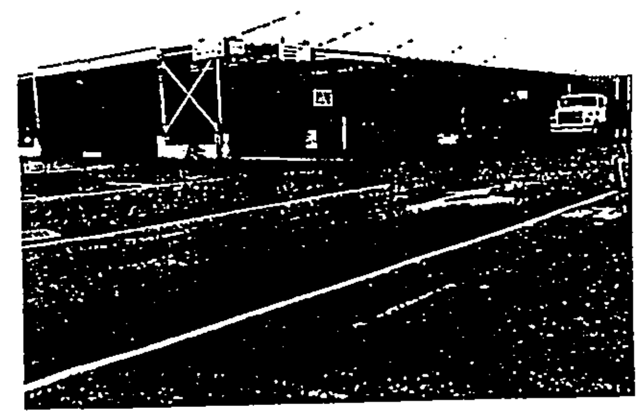
Pier 22, Warehouse #6. View to South.

Pier 23 Shed on left and Warehouse #6 to the right. View to North.

O'ahu Commercial Harbors
Archaeological Investigations
March 1999

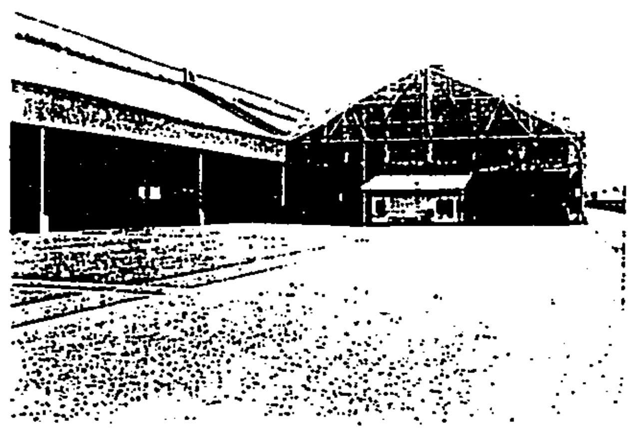


Pier 24, Hi-Lift Maintenance Shop.



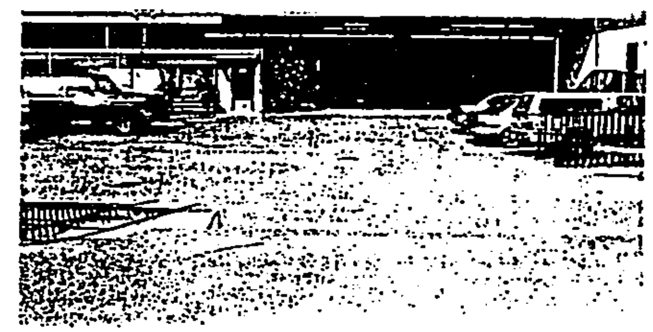
Pier 24 Shed. View to Southwest.

Pier 24 Shed, Interior. View to Southwest.

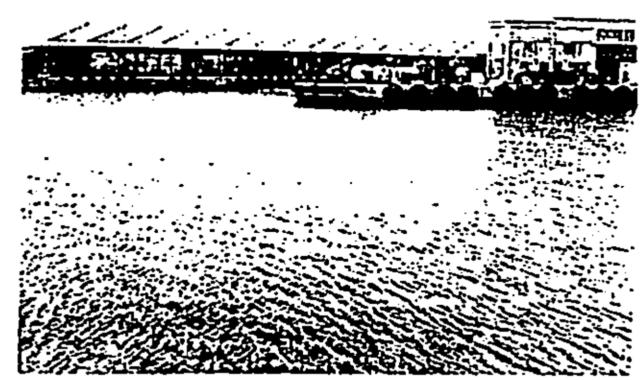


Pier 32 Shed on left, Pier 31 Shed on right. View to East.

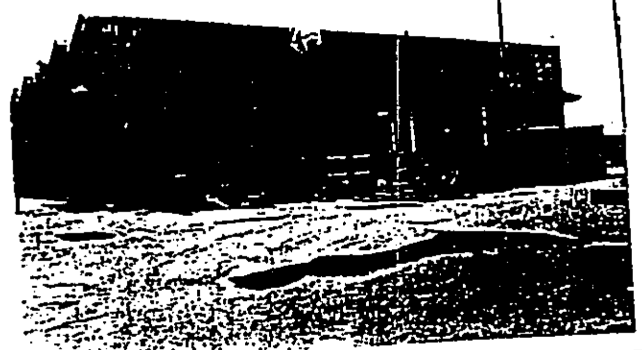
Pier 32 Shed on right. View to South.



Pier 18 Shed and Office Space. View to West.

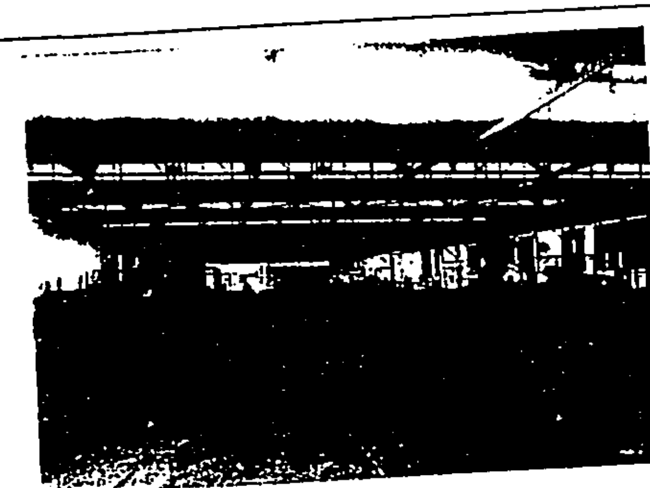


Pier 27 Shed in background, Pier 25 and 26 in foreground. View to Southwest.

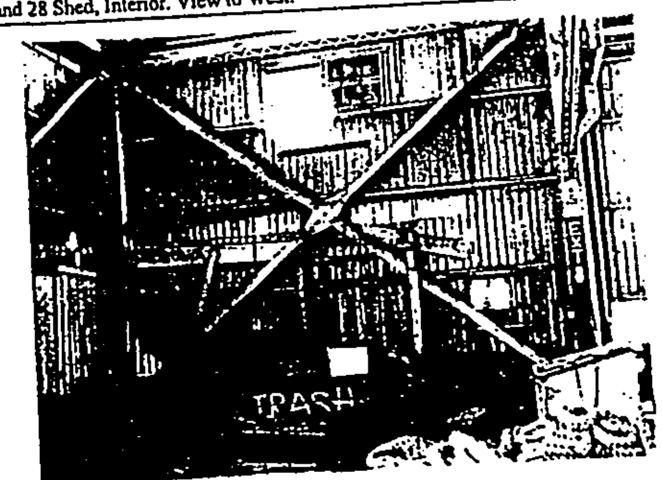


Pier 27 and 28 Shed. View to East.

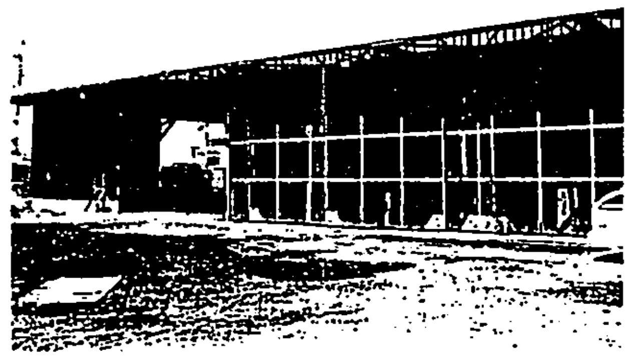
Pier 27 side of Shed. View to West.



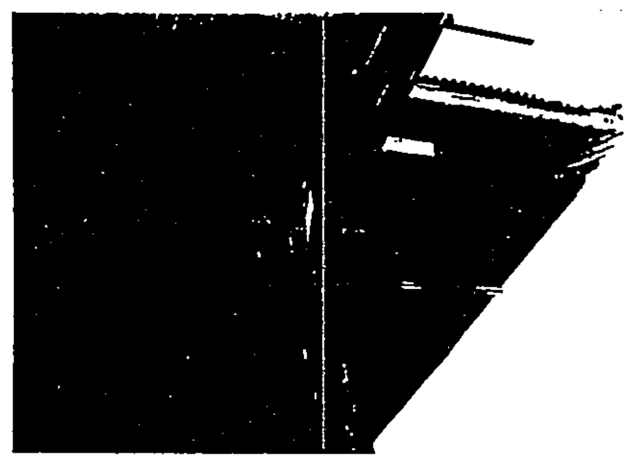
Pier 27 and 28 Shed, Interior. View to West.



Pier 27 and 28 Shed, Interior. View to South.

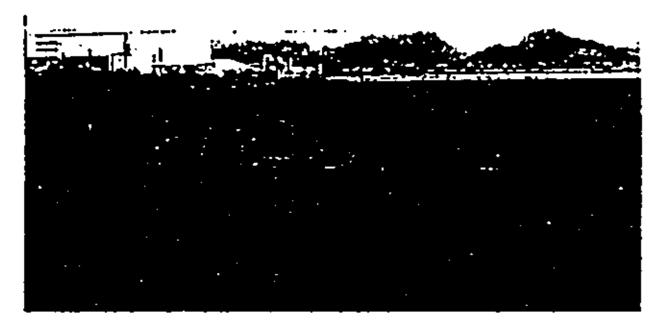


Pier 27 and 28 Shed, East end. View to Southwest.



Close-up view of Pier 27 and 28 Shed roof supports.

Pier 29 Shed. View to West.



Lagoon Drive/Keehi Lagoon. Approximate location for proposed Lay Berths'. View to North.

Letter from State Historic Preservation Office
(Dated July 23, 1999)

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

July 23, 1999

Richard Stook
Environmental Planner
Wil Chee Planning, Inc.
HMSA Center
1400 Rycroft Street, Suite #928
Honolulu, Hawaii 96814

LOG NO: 23824
DOC NO: 9907co12
Architecture

Dear Mr. Stook:

SUBJECT: **Archaeological Report for the Oahu Commercial Harbors 2020 Master Plan Immediate Phase Environmental Impact Statement TMK various parcels on 2-1-15, 2-1-01, 1-5-39, 38 & 36, 1-17 Honolulu, Oahu**

Thank you for the letter dated May 14, 1999, regarding the Archaeological Report for Oahu Commercial Harbors 2020 Master Plan. The following includes our comments on the report.

The project location and area should be clarified, Figure 1 should indicate the boundary of the project location. Clarify that the structures identified are the only structures over 50 years old and there are no structures over 50 years old in the Lagoon Drive project area. Plan view drawings of Pier 24, 25, & 26 are missing. Plan view of Pier 32 could include Pier 31, if plan is clearly labeled. We request that original black & white photographs be submitted to our office for archival purposes.

We believe that Pier 2 & 3, is good example of 1950's industrial architecture. Although the structure is not 50 years old, we believe that it should be photographically documented, prior to demolition. We believe that this would be prudent, as the structures are nearing 50 years of age and if reuse in the redevelopment is not considered.

With the above comments incorporated, we concur with the determination that the demolition of the identified structures, and the project will have no impact on cultural resources. There remains the possibility that historic sites, including human burials, will be discovered during routine construction activities. Should this be the case, all work in the vicinity must stop and the Historic Preservation Division must be contacted at 692-8015.

Thank you for the opportunity to comment. Should you have any comments please contact Carol Ogata at 692-8032.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

CO:jk

TRAFFIC IMPACT ANALYSIS REPORT

OAHU COMMERCIAL HARBORS 2020 MASTER PLAN IMMEDIATE PHASE

IN HONOLULU, OAHU, HAWAII

Prepared For

WIL CHEE PLANNING, INC.

Honolulu, Hawai'i

Phillip Rowell and Associates
47-273 'D' Hui Iwa Street
Kaneohe, Hawai'i 96744
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May 2, 1999

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Executive Summary

Phillip Rowell and Associates has been retained by Wil Chee Planning, Inc. to perform a traffic impact analysis for the immediate phase of the Honolulu Harbor 2020 Master Plan[1]. The immediate phase includes improvements and modifications at Piers 2, Piers 12 through 16, Piers 24 through 29 and Keehi Lagoon, which are described in this chapter.

There are four projects which are summarized in Table ES-1.

Table ES-1 Summary of Proposed Development[(1)]

Location	Proposed Uses
Pier 2	New cruise ship terminal serving both interisland and foreign/domestic cruise ships.
Piers 12 - 16	Commercial fishing facilities.
Piers 24 - 29	Excursion cruise boat docking facilities including scuba, snorkeling, parasailing and dinner cruises. Uses will be comparable to existing operations at Kewalo Basin.
Keehi Lagoon	Lay Berths

Notes:
(1) Oahu Commercial Harbors 2020 Master Plan (May 1997) and discussion with HDOT-Harbors staff.

[1] State of Hawaii Department of Transportation Harbors Division, Oahu *Commercial Harbors 2020 Master Plan*, May 1997

Trip Generation Analysis of Proposed Projects

The total trips generated by the proposed projects is summarized in Table ES-2. Only the excursion activities proposed for Piers 24 through 29 will coincide with the PM peak commuter period. Cruise ship operations proposed for Pier 2 will operate with scheduled arrivals and departures to occur during outside the AM and PM peak commute periods. The impacts of a large cruise ship arrival and an interisland cruise ship arrival occurring concurrently during the PM weekday afternoon peak hour traffic represent the worst-case and thus was the scenario analyzed.

Table ES-2 Trip Generation Summary

Location and Project	Weekday PM Peak[1] In	Weekday PM Peak[1] Out	Weekday PM Peak[1] Total	Saturday Peak[1] In	Saturday Peak[1] Out	Saturday Peak[1] Total
Pier 2 Cruise Ship Terminal	268	276	544	268	276	544
Piers 12 - 24 Fishing Boat Berths		Minimal			Minimal	
Piers 24 - 29 Excursion Vessel Berths	160	130	290	160	130	290
Keehi Lagoon Lay Berths	35	35	70	35	35	70
Totals	463	441	904	463	441	904

Notes:
(1) Peak hour refers to the greater peak hour of the adjacent street or the generator.

Project Related Traffic Impacts

The impact of project related traffic is estimated by comparing the LOS analysis of cumulative plus project to cumulative (without project conditions) The methodology and assumptions used for this analysis are as follows:

1. The LOS analysis was performed for "worst-case" conditions, which is defined as the peak hourly traffic volume generated by the project (peak hour of the generator) superimposed on the peak commute period of the adjacent street network. This represents a "worst-case" condition since the peak hours can be slightly different in a real case condition.

2. The LOS analysis was performed using the operations method described in the 1998 Edition of the *Highway Capacity Manual*.

3. The LOS analysis was performed for weekday afternoon and Saturday morning "worse-case" traffic conditions for cumulative and cumulative plus project conditions.

4. For 2003 cumulative (without project) conditions, Ilalo Street will be in place. It was determined during the analysis of future background conditions that the shared westbound left turn and through lane at South Street and Punchbowl Street would not function because of the heavy eastbound through traffic. Westbound left turns are currently not allowed at these intersection because of width and sight distance restrictions and should not be allowed in the future. Future traffic assignments were adjusted to prohibit left turns consistent with existing conditions.

5. The section of Ilalo Street adjacent to Pier 2 was assumed to be constructed concurrently with the new passenger cruise ship terminal. Part of the construction of this roadway improvement is the demolition of Channel Street and the traffic signal at the intersection of Channel Street and Ala

Moana Boulevard.

The results of the level-of-service analysis are tabulated in Table ES-3 and ES-4.

Table ES-3 Results of Level-of-Service Analysis - 2003 Weekday PM Peak Hour[6]

Intersection and Movement	Cumulative V/C[7]	Cumulative Delay[8]	Cumulative LOS[9]	Cumulative Plus Project Weekday PM V/C	Cumulative Plus Project Weekday PM Delay	Cumulative Plus Project Weekday PM LOS	Changes V/C	Changes Delay
Ala Moana Bl. at South Street	0.924	17.2	C	0.938	17.8	C	0.014	0.6
Eastbound Left	0.976	73.1	F	0.950	67.1	F	-0.026	-6.0
Eastbound Thru & Right	0.797	6.4	B	0.814	6.8	B	0.017	0.4
Westbound Thru & Right	0.915	18.4	C	0.942	20.4	C	0.027	2.0
Northbound Left & Thru	0.764	44.0	E	0.764	44.0	E	0.000	0.0
Northbound Right	0.111	30.1	D	0.111	30.1	D	0.000	0.0
Southbound Left & Thru	0.913	71.6	F	0.913	71.6	F	0.000	0.0
Southbound Right	0.818	45.9	E	0.818	45.9	E	0.000	0.0
Ala Moana Bl. at Channel St.	0.758	8.6	B	Demolished				
Eastbound Thru & Right	0.877	10.8	B					
Westbound Left	0.126	37.9	D					
Westbound Thru	0.789	5.0	A					
Northbound Left	0.367	32.2	D					
Northbound Right	0.423	32.9	D					
Ala Moana Bl. at Punchbowl St.	0.869	28.7	D	0.926	32.2	D	0.057	3.5
Eastbound Thru	0.962	22.5	C	0.983	27.0	D	0.021	4.5
Eastbound Right	0.167	7.5	B	0.349	3.1	A	0.182	-4.4
Westbound Thru	1.011	31.4	D	1.020	35.0	D	0.009	3.6
Northbound Left	0.304	32.2	D	0.600	41.1	E	0.296	8.9
Northbound Left & Right	0.214	31.7	D	0.483	40.1	E	0.269	8.4
Southbound Left	0.636	37.2	D	0.636	43.2	E	0.000	6.0
Southbound Thru & Left	0.714	39.8	D	0.714	45.9	E	0.000	6.1
Southbound Right	0.904	49.4	E	0.904	55.7	E	0.000	6.3
Nimitz Hwy (EB) at Pacific St.	0.706	8.0	B	0.679	10.3	B	-0.027	2.3
Eastbound Right, Thru & Left	0.655	4.9	A	0.786	9.0	B	0.131	4.1
Northbound Thru	0.381	24.0	C	0.095	18.3	C	-0.286	-5.7
Northbound Right	0.117	22.4	C	0.305	19.6	C	0.188	-2.8
Southbound Left	0.896	51.8	E	0.425	20.7	C	-0.471	-31.1
Southbound Thru	0.059	22.2	C	0.290	19.5	C	0.231	-2.7
Nimitz Hwy (WB) at Pacific St.	0.789	10.2	B	0.837	13.4	B	0.048	3.2
Westbound Left, Thru & Right	0.752	5.9	B	0.910	12.2	B	0.158	6.3
Northbound Left	0.762	39.8	D	0.408	20.7	C	-0.354	-19.1
Northbound Thru	0.923	47.0	E	0.665	24.1	C	-0.258	-22.9
Southbound Thru	0.392	24.1	C	0.278	19.4	C	-0.114	-4.7

NOTES:
6. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
7. V/C denotes ratio of volume to capacity. See Appendices B for calculations.
8. Delay is in seconds per vehicle.
9. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Table 4 for definitions.

Table ES-4 Results of Level-of-Service Analysis - 2003 Saturday Peak Hour[1]

Intersection and Movement	Cumulative			Cumulative Plus Project				
				Saturday Peak			Changes	
	V/C[2]	Delay[3]	LOS[4]	V/C	Delay	LOS	V/C	Delay
Ala Moana Bl. at South Street	0.405	7.8	B	0.414	7.9	B	0.009	0.1
Eastbound Left	0.251	33.0	D	0.251	33.0	D	0	0.0
Eastbound Thru & Right	0.435	3.3	A	0.467	3.4	A	0.032	0.1
Westbound Thru & Right	0.507	9.8	B	0.535	10.1	B	0.028	0.3
Northbound Left & Thru	0.176	30.5	D	0.176	30.5	D	0	0.0
Northbound Right	0.049	29.7	D	0.049	29.7	D	0	0.0
Southbound Left & Thru	0.186	30.5	D	0.186	30.5	D	0	0.0
Southbound Right	0.091	30.0	D	0.091	30.0	D	0	0.0
Ala Moana Bl. at Channel St.	0.373	3.9	A	Demolished				
Eastbound Thru & Right	0.469	4.9	A					
Westbound Left	0.073	37.7	D					
Westbound Thru	0.396	2.5	A					
Northbound Left	0.025	30.2	D					
Northbound Right	0.018	30.1	D					
Ala Moana Bl. at Punchbowl St.	0.417	14.3	B	0.539	15.6	C	0.122	1.3
Eastbound Thru	0.536	12.1	B	0.555	12.3	B	0.019	0.2
Eastbound Right	0.055	2.4	A	0.258	2.9	A	0.203	0.5
Westbound Thru	0.552	12.2	B	0.582	12.6	B	0.03	0.4
Northbound Left	0.124	29.6	D	0.583	33.4	D	0.459	3.8
Northbound Left & Right	0.185	30.0	D	0.586	34.6	D	0.403	4.6
Southbound Left	0.238	30.3	D	0.359	31.3	D	0.121	1.0
Southbound Thru & Left	0.228	30.3	D	0.330	31.0	D	0.102	0.7
Southbound Right	0.144	29.8	D	0.120	29.6	D	-0.024	-0.2
Nimitz Hwy (EB) at Pacific St.	Not Analyzed			Not Analyzed				
Eastbound Right, Thru & Left								
Northbound Thru								
Northbound Right								
Southbound Left								
Southbound Thru								
Nimitz Hwy (WB) at Pacific St.	Not Analyzed			Not Analyzed				
Westbound Left, Thru & Right								
Northbound Left								
Northbound Thru								
Southbound Thru								

NOTES
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. V/C denotes ratio of volume to capacity. See Appendices B for calculations.
3. Delay is in seconds per vehicle.
4. LOS denotes Level-of-Service calculated using the operations method described in Highway Capacity Manual. LOS is based on delay. See Table 4 for definitions.

The results of the LOS analysis of cumulative plus project conditions versus cumulative without project conditions indicate that:

1. The proposed projects will have minimal impacts on traffic operations at the adjacent intersections during the weekday PM peak commute period (worst-case conditions) and no significant impacts on Saturday conditions. The proposed projects will not have significant impacts on the adjacent intersections that warrant mitigation.

2. Traffic generated by the projects studied in this report is localized in nature and will not have a significant regional impact warranting implementation of mitigation measures.

3. Interisland cruise ship operations should continue to operate on the current schedule, which is to have arrivals and departures scheduled during Saturday morning and evenings, respectively.

4. A shuttle bus operation between Pier 2 and adjacent shopping areas should be considered for a period of several hours before the departure of a large cruise ship to reduce the pedestrian activity and associated impacts on traffic flow at the adjacent intersections. A schedule of one bus every 10 to 15 minutes would have a minimal impact of traffic operations but would enhance pedestrian safety. This operation would best be provided by the cruise operator.

Construction Impacts

Traffic impacts of construction activities are short term. The following guidelines should be followed:

1. Construction activities should be located off-street unless not practical. Such an area would be construction at Pier 12 through 16 where there is not off-street area for staging immediately adjacent to the site.

2. Lane closures should be coordinated with Hawaii Department of Transportation and City and County of Honolulu Department of Transportation Services.

1. INTRODUCTION

Phillip Rowell and Associates has been retained by Wil Chee Planning, Inc. to perform a traffic impact analysis for the immediate phase of the Honolulu Harbor 2020 Master Plan[2]. The immediate phase includes improvements and modifications at Piers 2, Piers 12 through 16, Piers 24 through 29 and Keehi Lagoon, which are described in this chapter.

The following report has been prepared to describe the traffic characteristics and of the proposed project and likely impacts to the adjacent roadway network. This introductory chapter discusses the location of the project, the proposed development, and the study methodology.

Project Location and Description

The location of the proposed projects are shown on Figure 1. There are four projects which are summarized in Table 1.

[2] State of Hawaii Department of Transportation Harbors Division, Oahu Commercial Harbors 2020 Master Plan, May 1997

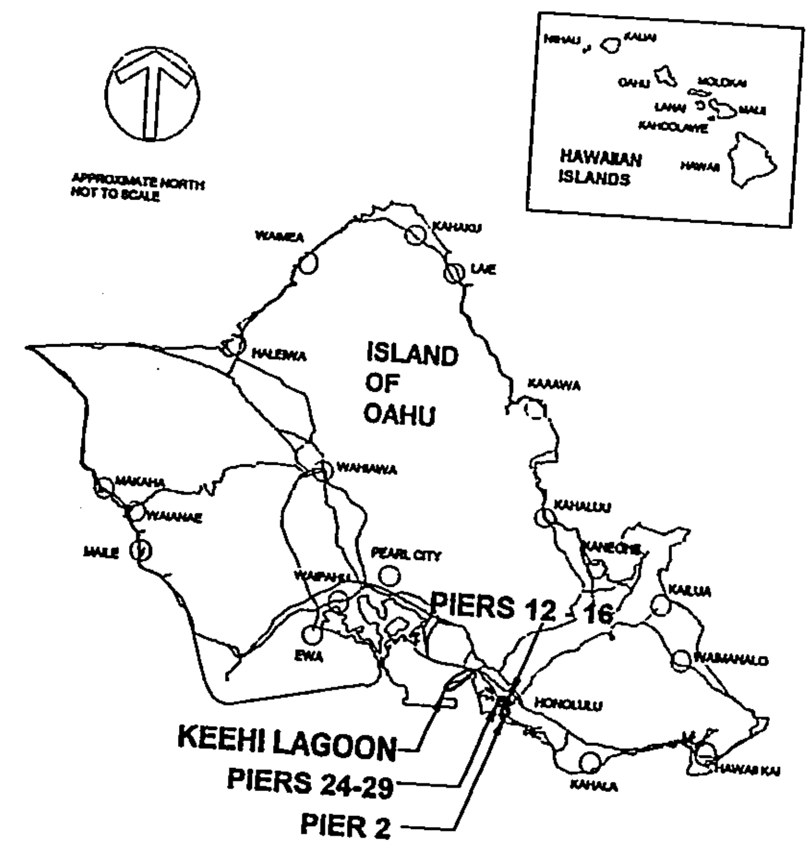


Figure 1
PROJECT LOCATION MAP

Table 1 Summary of Proposed Development[3]

Location	Proposed Uses
Pier 2	New cruise ship terminal serving both interisland and foreign/domestic cruise ships.
Piers 12 - 16	Commercial fishing and lay berthing facilities.
Piers 24 - 29	Excursion cruise boat docking facilities including scuba, snorkeling, parasailing and dinner cruises. Uses will be comparable to existing operations at Kewalo Basin.
Keehi Lagoon	Lay Berths

Notes:
(3) Oahu Commercial Harbors 2020 Master Plan (May 1997) and discussion with HDOT-Harbors staff.

Purpose and Objectives

The purpose of the proposed traffic impact study is:

1. To determine the traffic related impacts of the Oahu Commercial Harbors 2020 Master Plan,
2. To identify improvements to the adjacent roadway network to accommodate increased traffic generated by the project at an acceptable level-of-service, and
3. To identify potential measures to mitigate the project's adverse traffic impacts.

Study Methodology and Order of Presentation

In order to conduct this traffic study, a number of tasks were performed. These tasks are discussed in the following paragraphs.

1. *Define Projects and Scope of Work*

The first task performed was to define the various projects to be analyzed relative to location and type of proposed uses. A preliminary trip generation analysis was performed to estimate the order of magnitude of the trips generated by the various projects in order to establish the intersections that would be impacted and the time periods that should be analyzed to estimate the traffic impacts. The preliminary trip generation analysis was submitted to the Highways Division of the Department of Transportation (HDOT-Highways) to establish the criteria for the analysis, study area, intersections and the time periods (weekday, Saturday, peak hours) to be analyzed.

2. *Analyze Existing Traffic Conditions*

Existing traffic volumes at the study intersections were determined from traffic counts performed during July and August, 1997. Intersection configurations and traffic control information were also collected in the field at the time of the traffic counts. Other data collected included bus stop locations, bus routes, speed limits and traffic signal phasing.

The methodology for signalized and unsignalized intersections described in the 1994 *Highway Capacity Manual* (HCM) [3] was used to determine the level-of-service (LOS) at the study intersections. Existing traffic conditions, the LOS concept and the results of the LOS analysis for existing conditions is presented in Chapter 2.

3. *Estimate and Analyze Cumulative Traffic Projections*

Cumulative traffic conditions are defined as future background traffic conditions without the proposed project. The year 2003 was established as the design year. In general, the process involved the expansion of existing traffic volumes by the appropriate growth factor plus the addition of traffic generated by potential development adjacent to the project sites. Traffic studies for related projects were obtained and the relevant traffic data extracted where possible. A description of the process and relevant projects used to estimate 2003 cumulative traffic volumes is presented in Chapter 3.

4. *Estimate Project-Related Traffic Characteristics*

The next step in the traffic analysis was to estimate the peak-hour traffic that would be generated by the proposed development. The typical method is to use standard trip generation rates provided by the Institute of Transportation Engineers. However, there are no data for the types of facilities proposed nor would trip generation rates from a standard reference reflect the unique traffic characteristics in Honolulu. Therefore, it was decided that a series of traffic generation studies specific to the proposed uses would be performed. These surveys resulted in traffic generation rates that were applied to the proposed projects. The results of these surveys and the calculation of project related traffic is presented in Chapter 4. Detailed discussion of the traffic generation surveys is presented in the appendices.

[3] *Highway Capacity Manual*, Institute of Transportation Engineers, Washington, D.C., 1998

These trips were distributed based on the available approach and departure routes. The project-related traffic was then superimposed on 2003 cumulative traffic volumes at the subject intersections. The HCM methodology was used again to conduct a LOS analysis for cumulative plus project conditions. The results of this analysis were compared to 2003 cumulative conditions to determine the impacts of this project. The 2003 cumulative plus project traffic projections are presented in Chapter 4.

5. *Analysis of Project-Related Traffic Impacts*

The project-related traffic impacts were determined by comparing 2003 cumulative plus project to 2003 cumulative LOS calculations. The analysis of the project-related impacts and the conclusions of the analyses are presented in Chapter 5.

A flow chart of the above tasks is shown as Figure 2.

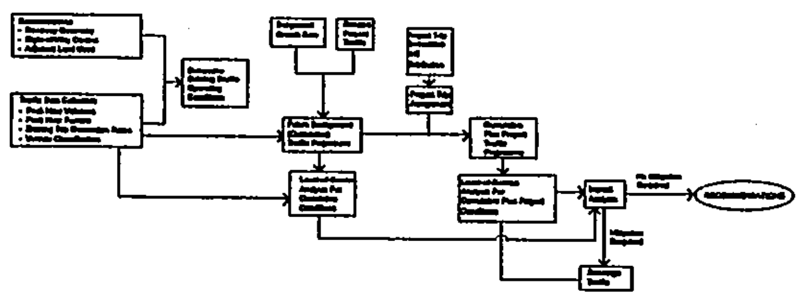


Figure 2

WORK PROGRAM FLOW CHART

Study Area and Study Intersections

Improvements associated with the Master Plan are located between Keehi Lagoon on the west and Kewalo and Pier 2 on the east. At the outset of the traffic study, it was decided that input from Hawaii Department of Transportation (HDOT) would be desirable to define the study area. However, before any input could be solicited, it was necessary to perform a preliminary trip generation analysis of the proposed projects to establish the magnitude of the potential traffic impacts.

The results on these meetings and discussion were:

1. The intersections along Ala Moana Boulevard between South Street and Punchbowl Street would be analyzed for the weekday afternoon peak commute period (between 4 PM and 6 PM) to establish the worst-case conditions and during the peak Saturday morning commute period (between 7 AM and 9 AM) because this is the time period that interisland cruise ship arrive at the current cruise ship terminal.

2. The entrance to Piers 24 through 26 would be analyzed for the weekday afternoon peak commute period (4 PM to 6 PM) because this would represent the worst-case condition and the traffic generation characteristics for the proposed excursion vessel operations are the same for weekdays and weekends.

3. Traffic generation surveys would be performed for the existing cruise ship and excursion vessel operations to rates for the new facilities.

2. ANALYSIS OF EXISTING CONDITIONS

This chapter presents the existing traffic conditions on the roadways adjacent to the proposed projects. The level-of-service concept (LOS) and the results of the LOS analysis for existing conditions is also presented. The purpose of this analysis is to establish the base conditions for the determination of the impacts of the project which are described in a subsequent chapter.

Description of Existing Streets and Intersection Controls

The intersections analyzed and existing lane configurations are shown on Figures 3 and 4. These intersections were selected based on a preliminary trip generation analysis to determine the magnitude and location of trips generated by the proposed improvements. Photographs of the roadways adjacent to the shopping center are presented as Appendix A.

Ala Moana Boulevard. Ala Moana Boulevard is an east-west major arterial linking downtown Honolulu with Waikiki. The section studied in this project is between Punchbowl Street and South Street. This section has three lanes in each direction and left turn storage lanes at South Street and Channel Street. The posted speed limit along Ala Moana Boulevard is 35 miles per hour (both directions). The eastbound average daily traffic (ADT) is 40,100 vpd (vehicles per day) and the westbound ADT is 38,000 vpd.

South Street. South Street is a four-lane, north-south arterial between Ala Moana Boulevard and King Street. The intersection of South Street at Ala Moana Boulevard is signalized with a leading left turn phase for eastbound to northbound left turns. The northbound and southbound ADT's are 4,340 vpd and 3,790 vpd, respectively.

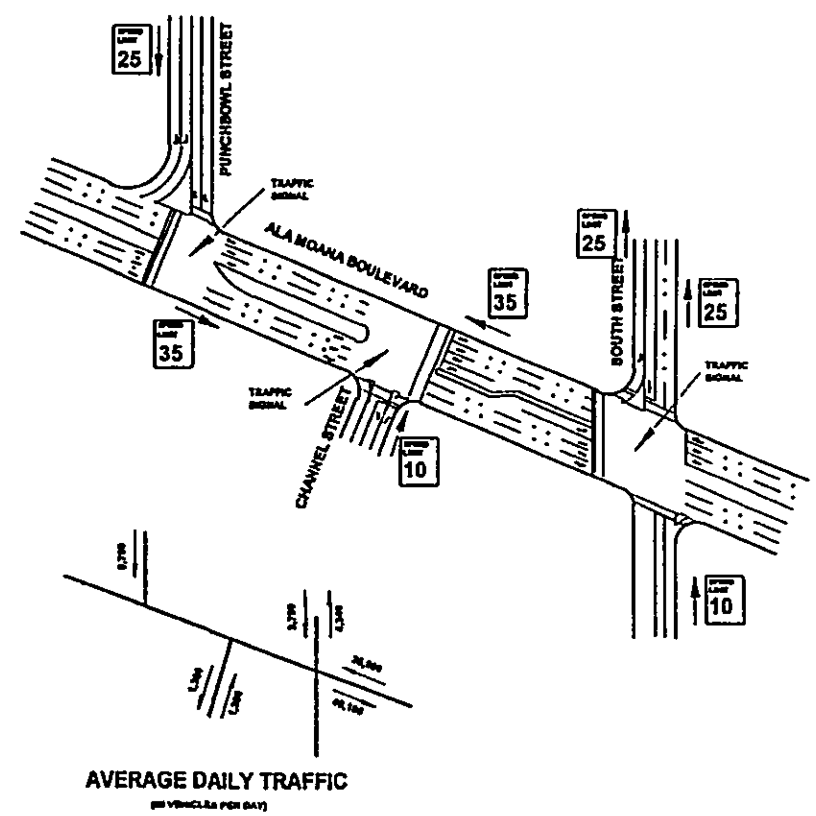
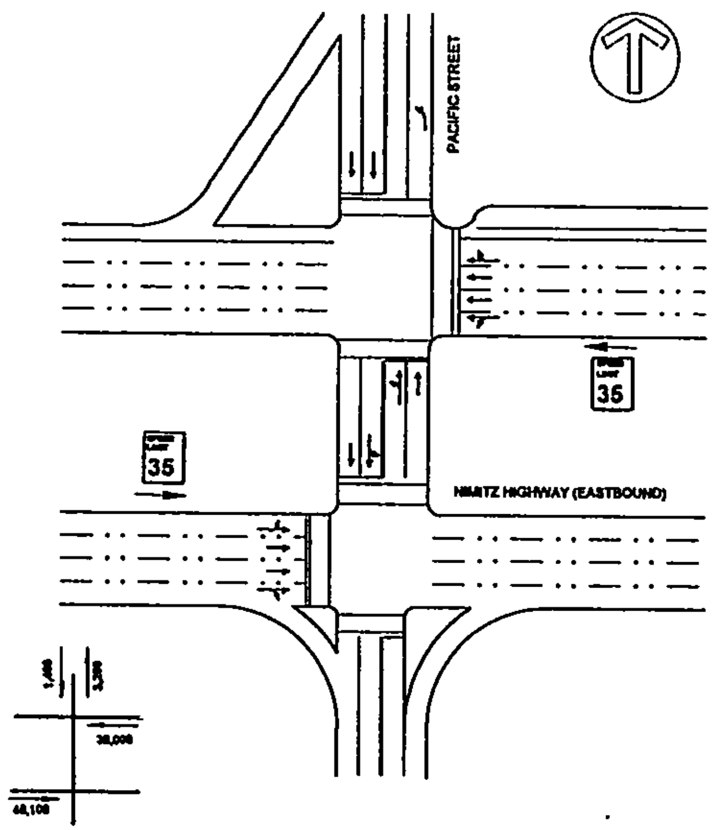


Figure 3

EXISTING ROADWAY CONDITIONS - PIER 2 AREA



AVERAGE DAILY TRAFFIC
(IN VEHICLES PER DAY)

Figure 4
EXISTING ROADWAY CONDITIONS ENTRANCE TO PIERS 24 THROUGH 26

Channel Street. Channel Street is a short roadway south of Ala Moana Boulevard providing access to the Foreign Trade Zone at Piers 1 and 2. The roadway has two lanes in each direction. The ADT is 1,350 vpd in each direction. The intersection of Channel Street at Ala Moana Boulevard is signalized.

Punchbowl Street. Punchbowl Street is a southbound arterial between Beretania Street to the north and Ala Moana Boulevard to the south. The southbound approach to Ala Moana Boulevard has two left-turn lanes and two right-turn lanes. The ADT is approximately 9,780 vpd. The Punchbowl Street/Ala Moana Boulevard is signalized.

Nimitz Highway. Nimitz Highway is an east-west arterial linking Honolulu with Honolulu International Airport. The section under study includes the approaches to Pacific Street which provide access to Piers 24 through 26. The posted speed limit is 35 mph in both directions. The eastbound ADT is 40,100 vpd and the westbound ADT is 38,000 vpd.

Pacific Street. Pacific Street is a north-south two-lane roadway intersecting Nimitz Highway in the vicinity of Piers 24 through 26. The ADT is approximately 3,200 vpd northbound and 1,400 vpd southbound. There were no speed limit signs posted. The speed limit was assumed to be 25 mph for the following calculations. The intersection with Nimitz Highway is signalized.

Traffic characteristics of these roadways are summarized in Table 2.

Table 2 Traffic Characteristics of Study Roadways

Roadway & Direction		Posted Speed	Average Daily Traffic
Ala Moana Boulevard			
	Eastbound	35 mph	40,100
	Westbound	35 mph	38,000
South Street			
	Northbound	25 mph	4,340
	Southbound	25 mph	3,790
Channel Street			
	Northbound	10 mph	1,350
	Southbound	10 mph	1,350
Punchbowl Street			
	Southbound	25 mph	9,780
Nimitz Highway			
	Eastbound	35 mph	40,100
	Westbound	35 mph	38,000
Pacific Street (North of Nimitz Highway)			
	Northbound	25 mph	3,200
	Southbound	25 mph	1,400

NOTES:
(1) Hawaii Department of Transportation. Date of Survey: Monday, December 11, 1995.
(2) Hawaii Department of Transportation. Date of Survey: July 21, 1997.
(3) Estimated from traffic counts.
(4) Counts were performed upon relocation of Young Brothers' operation from Piers 24-29 to Piers 39-40.

Existing Peak Hour Traffic Volumes

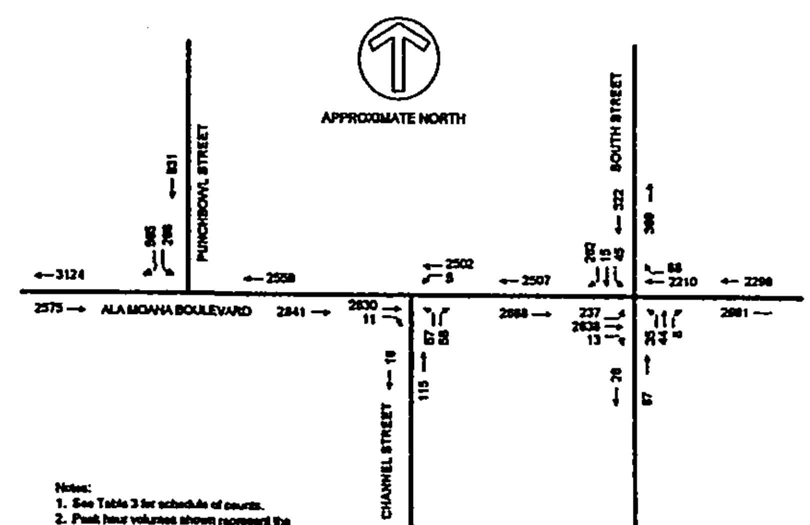
Traffic counts for this project were performed in July and August 1998. The schedule for the traffic counts is shown in Table 3. Traffic counts were performed during the weekday afternoon to include the AM and PM peak commute period of the street intersections, which would be the "worst-case" condition.

Table 3 Traffic Count Schedule

Intersection	Weekday	Weekend
Ala Moana Bl. at South St.	Monday, October 19, 1998	Saturday, October 17, 1998
Ala Moana Bl. at Channel St.	Monday, October 19, 1998	Saturday, November 14, 1998
Ala Moana Bl. at Punchbowl St.	Monday, October 19, 1998	Saturday, September 26, 1998
Nimitz Hwy. at Pacific St. North	Friday, July 24, 1998	Not Counted
Nimitz Hwy at Pacific St. South	Thursday, July 23, 1998	Not Counted

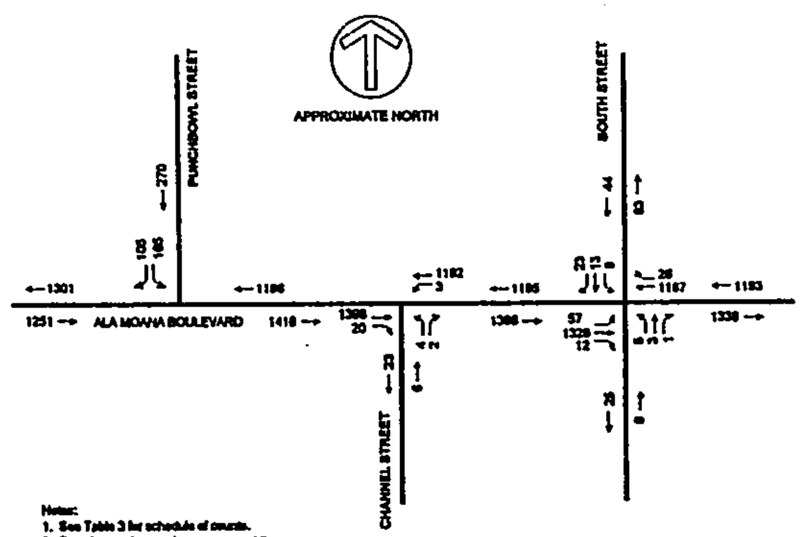
Notes:
(1) Weekday counts were conducted from 6 AM to 9 AM and 3 PM to 6 PM. Saturday counts were conducted from 7 AM to 9 AM.

The peak hour traffic volumes at the study intersections serving the project are shown in Figures 5, 6 and 7 for Pier 2 and Piers 24 through 26, respectively. The volumes shown are the peak hourly volumes of each traffic movement at the study intersections and represent the peak hourly volumes along the adjacent streets. The sum of these movements will be slightly higher than the conditions in the field. This will result in a "worst-case" scenario since it represents a condition in which the peak conditions of all traffic movements occur simultaneously.



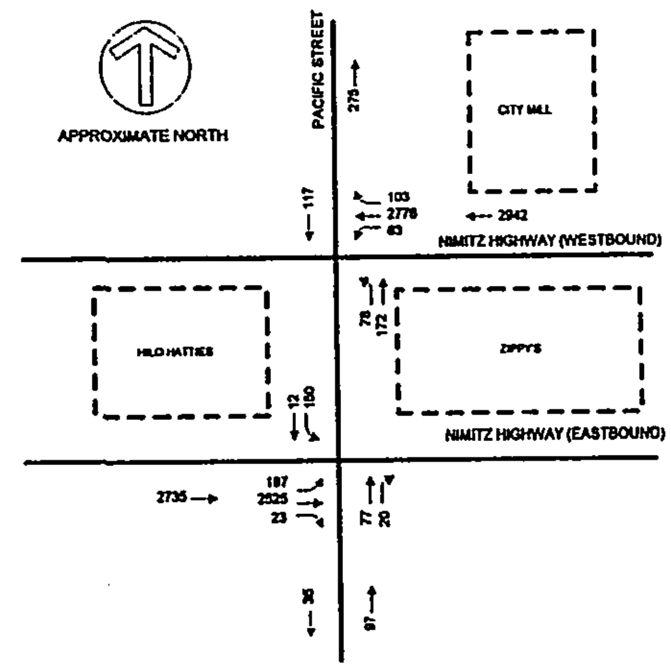
Notes:
1. See Table 3 for schedule of counts.
2. Peak hour volumes shown represent the "worst-case" condition, which is the peak hourly volume of each movement at the study intersections.

Figure 5
EXISTING PM PEAK HOUR TRAFFIC VOLUMES AT PIER 2



Notes:
1. See Table 3 for schedule of counts.
2. Peak hour volumes shown represent the "worst-case" condition, which is the peak hourly volume of each movement at the study intersections.

Figure 6
EXISTING SATURDAY PEAK HOUR TRAFFIC VOLUMES AT PIER 2



Notes:
1. See Table 3 for schedule of counts.
2. Peak hour volumes shown represent the "worst-case" condition, which is the peak hourly volume of each movement at the study intersections.

Figure 7
EXISTING PM PEAK HOUR TRAFFIC VOLUMES AT PIERS 24 THROUGH 26

Level-of-Service Concept

Signalized Intersections

The planning method described in the *1994 Highway Capacity Manual* (HCM) was used to analyze the operating efficiency of the signalized intersections adjacent to the study site. This method involves the calculation of a volume-to-capacity (V/C) ratio which is related to a level-of-service. A maximum intersection capacity based on the number of phases was used for the V/C calculations.

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 4. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 4 Level-of-Service Definitions for Signalized Intersections(1)

Level of Service	Interpretation	Volume-to-Capacity Ratio(2)	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<15.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	15.1-25.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	25.1-40.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	40.1-60.0
F	Total breakdown with stop-and-go operation	>1.001	>60.0

Notes:
(1) Source: *Highway Capacity Manual*, 1994.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity

Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 5 summarizes the definitions for level-of-service and the corresponding delay. A subsequent calculation to determine an overall LOS was made, and these results are presented in tables to summarize traffic conditions using parameters similar to those used for signalized intersections.

Table 5 Level-of-Service Definitions for Unsignalized Intersections(1)

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	>5
B	Short traffic delays	5.1 to 10.0
C	Average traffic delays	10.1 to 20.0
D	Long traffic delays	20.1 to 30.0
E	Very long traffic delays	30.1 to 45.0
F	See note (2) below	>45.1

Notes:
(1) Source: *Highway Capacity Manual*, 1994.
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

Level-of-Service Analysis of Existing Conditions

The results of the Level-of-Service analysis for the signalized intersections are shown in Table 6. The calculations are presented in Attachment B.

Table 6 Results of Level-of-Service Analysis for Existing Conditions

Intersection and Movement	PM Peak Hour			Saturday Peak Hour		
	V/C(1)	Delay	LOS(2)	V/C	Delay	LOS
Ala Moana Bl. at South Street	0.893	18.3	C	0.381	7.8	B
Eastbound Left	1.093	115.9	F	0.324	34.5	D
Eastbound Thru & Right	0.739	6.1	B	0.362	3.5	A
Westbound Thru & Right	0.790	13.9	B	0.421	9.1	B
Northbound Left & Thru	0.379	31.1	D	0.054	28.7	D
Northbound Right	0.051	28.7	D	0.013	28.5	D
Southbound Left & Thru	0.454	32.1	D	0.169	29.4	D
Southbound Right	1.060	101.7	F	0.198	29.6	D
Ala Moana Bl. at Channel St.	0.710	7.4	B	0.344	3.8	A
Eastbound Thru & Right	0.818	8.8	B	0.434	4.7	A
Westbound Left	0.128	37.9	D	0.042	37.7	D
Westbound Thru	0.669	3.9	A	0.319	2.3	A
Northbound Left	0.380	32.2	D	0.029	30.2	D
Northbound Right	0.419	32.8	D	0.018	30.1	D
Ala Moana Bl. at Punchbowl St.	0.346	6.8	B	0.346	6.8	B
Eastbound Thru	0.378	4.5	A	0.378	4.5	A
Westbound Thru	0.362	4.4	A	0.362	4.4	A
Southbound Left	0.242	28.4	D	0.242	28.4	D
Southbound Right	0.212	28.1	D	0.212	28.1	D
Nimitz Highway (Eastbound) at Pacific St.(3)	0.655	7.2	B	NOT ANALYZED		
Westbound Right, Thru & Left	0.611	4.6	A			
Northbound Thru	0.362	23.9	C			
Northbound Right	0.114	22.4	C			
Southbound Left	0.818	40.8	E			
Southbound Thru	0.054	22.1	C			
Nimitz Highway (Westbound) at Pacific St.(3)	0.728	9.8	B	NOT ANALYZED		
Westbound Left, Thru & Right	0.672	5.0	A			
Northbound Left	0.891	33.8	D			
Northbound Thru	0.923	47.0	E			
Southbound Thru	0.373	24.0	C			

NOTES:
(1) V/C denotes ratio of volume to capacity. See Appendices B for calculations.
(2) LOS denotes Level-of-Service calculated using the operations method described in Highway Capacity Manual. LOS is based on delay
(3) Conditions shown represent LOS before relocation of Young Brothers' operations from Piers [illegible] to Piers [illegible]

3. PROJECTED CUMULATIVE TRAFFIC CONDITIONS

The purpose of this chapter is to discuss the assumptions and data used to estimate 2003 cumulative traffic conditions. Cumulative traffic conditions are defined as the traffic conditions resulting from background growth and related projects, not including the proposed project under study. Comparison of cumulative traffic conditions to cumulative plus project conditions defines the traffic impacts of the project.

Cumulative traffic projections are calculated by adding estimated traffic growth to existing traffic volumes. Traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project. Each of these components are discussed separately.

Background Growth Rate

The background growth rate in the study area was estimated from traffic projection provided in the *Traffic Analysis for Kakaako Makai Area Plan* prepared by Kaku Associates in 1998 for the Hawaii Community Development Authority (HCDA) Makai Area Plan. The study provided 2020 traffic projections generated from developments adjacent to the study area. The study estimated that the regional background growth rate would be 1% per year through 2020. However, the growth rate was reduced to 0.5% to account for the traffic generated by the Kakaako Area Master Plan.

For the current study, the 1% background growth rate was used for areas other than Kakaako. For the area adjacent to Pier 2, the growth rate of 0.5% per year was used to be consistent with the Kakaako Makai traffic study. The traffic generated by the Kakaako Master Plan was considered a related project to be consistent with the projections provided in the *Kakaako Makai Area Plan*. This is discussed further in the following section.

Related Projects

There are two categories of related projects. The first is development projects, including projects associated with the Oahu Commercial Harbors 2020 Master Plan. Where possible, the traffic studies for these projects were obtained and the project related traffic data was extracted for the traffic study. Most these studies did not contain any information relative to Saturday traffic conditions. Any data not provided by the project's traffic study had to be calculated for the Harbors traffic study to be complete. For those projects which did not have a traffic study, the necessary information required to generate, distribute and assign project related traffic was extracted from the traffic study and the necessary calculation performed.

The second category of related projects is roadway improvement projects. As with redevelopment projects, traffic studies were obtained when possible. For the others, the assumptions used to adjust traffic projects are discussed.

The roadway improvement projects were the Ilalo Street improvements, which includes a connection to Punchbowl Street on the west and to Ward Avenue on the east.

The related projects are listed in Table 7. This list was compiled during development of the scope for the Oahu Commercial Harbors 2020 Master Plan EIS and, therefore, had to be addressed in this traffic study. Shown are the projects and the source of the required traffic data. In addition to the data shown in the table, assumptions had to be made in order to estimate the traffic generated by the related project. The specific assumptions for each of the related projects is discussed in the following paragraphs.

Table 7 Related Projects

Number	Project	Source of Background Traffic Data
1	Honolulu International Airport Expansion	Traffic generated by the project included in background growth rate
2	Honolulu Trolley System	Additional information needed from City and County.
3	Kuhio Beach Improvement	Traffic generated by the project included in background growth rate
4	Waipio Peninsula Recreation Park	Traffic generated by the project included in background growth rate
5	Barbers Point Deep Water Expansion and Related Improvements [b]	Traffic generated by the project included in background growth rate
6	Mother Waldron Park Master Plan Revision	Traffic generated by the project included in background growth rate
7	A'ala Park Renovation and Expansion	Traffic generated by the project included in background growth rate
8	Sand Island Development	Traffic generated by the project included in background growth rate
9	Aloha Tower	Traffic projections taken from project's traffic study.
10	Kakaako Community Development Plan	Traffic projections taken from project's traffic study.
11	Kakaako Makai Area Plan (includes Ilalo Street extensions)	Traffic projections taken from project's traffic study.
12	Bank of Hawaii Annex Tower	Traffic projections taken from project's traffic study.
13	General Cargo Yard at Piers 19-20 [a]	Traffic estimated, distributed and assigned.
14	Piers 31-34 Neobulk Cargo [a]	Traffic estimated, distributed and assigned.
15	Excursion Vessel Accommodations at Piers 5-7 [a]	Traffic estimated, distributed and assigned.
16	Domestic Fishing Village at Piers 36-38 [a]	Traffic estimated, distributed and assigned
17	Inter-Island Cargo Yard at Piers 39-40 [a]	Traffic estimated, distributed and assigned
18	Maritime Office Building at Piers 10-11 [a]	Traffic estimated, distributed and assigned
19	Bike Plan Hawaii	Will not have any impact on traffic projections but is considered in developing and analyzing intersection geometry.

Notes:
(a) Projects exempt from EIS process but will be identified in the EIS.
(b) Projects whose EA's/EIS's will be incorporated by reference.

Related Projects

1. *Honolulu International Airport Expansion.* Additional traffic along Nimitz Highway and Ala Moana Boulevard as result of the expansion of the Honolulu International Airport (HIA) was considered part of the regional growth factors. This would be consistent with the Kakaako Master Plan and the Kakaako Makai Area Plan traffic studies.

2. Honolulu Trolley System. This project is still under development. At this stage, the routing and scheduling for the system has not been developed so that the potential impacts can be established. However, since the purpose of such a project is to increase the use of public transportation, any impact of the project would be to reduce the number of private automobiles within the study. Since the information available is so limited, no consideration at this time would be a conservative approach.

3. *Kuhio Beach Improvement.* Additional traffic from this project was considered part of the regional growth rate.

4. *Waipio Peninsula Recreation Park.* Considered part of the regional growth.

5. *Barber's Point Deep Water Expansion and Related Improvements.* The traffic study for this project was obtained and reviewed. The estimated traffic generated was calculated from the graphics in the report since no trip generation calculations were provided. The morning and afternoon peak hour traffic volumes generated were estimated to be 530 and 230 vehicles per hour, respectively. Since this is a relatively small amount of traffic and Barber's Point is 20 miles from the study areas, traffic would dissipate over the roadway system such that any resulting traffic would be minimal. Therefore, any traffic generated by this project was considered part of the regional growth.

6. *Mother Waldron Park Master Plan Revision.* No traffic impacts at the study intersections are anticipated. Any traffic increases would be part of regional growth.

7. *A'ala Park Renovation and Expansion.* No traffic impacts are anticipated at the study intersections.

8. *Sand Island Development.* No traffic study was available nor was a description of the proposed project from which to estimate future traffic. Therefore, any traffic increases at the study intersections as a result of this project was considered part of the regional growth. This would be consistent with the assumptions in the *Kakaako Makai Area Plan Traffic Study.*

9. *Aloha Tower.* The traffic studies for the overall Aloha Tower project and the Waterfront portion of the project were obtained. Since, the Waterfront portion is completed and occupied, traffic from this project would be included in the existing traffic counts. There is no timetable for development of the remaining phases of the Aloha Tower project, so it is reasonable to assume that there will not be any additional development of Aloha Tower before the 2003 design year for the Harbors Master Plan traffic study. In conclusion, it was assumed that no additional traffic would be generated through the study intersections within the study period.

10. *Kakaako Community Development Plan.* Traffic generated by this project was calculated from data provided in the *Kakaako Makai Area Traffic Study.* Since the design year was 2020, traffic from this project was prorated from 1998 to 2020 to estimate 2003 conditions.

11. *Kakaako Makai Area Plan.* The traffic from this project was obtained from the *Kakaako Makai Area Traffic Study* and prorated as with the Kakaako Community Development Plan. An important aspect of this study was the recommendation to link Ilalo Street with Punchbowl Street and Ward Avenue.

12. *Bank of Hawaii Annex Tower.* This project is a proposed office building along the north side of Nimitz Highway between Nuuanu Avenue and Smith Street and will generate traffic along Nimitz Highway and Ala Moana Boulevard. Traffic projections generated by this project were obtained from the *Traffic Impact Analysis Report for the Bank of Hawaii Annex Tower.*

13. *General Cargo Yard at Piers 19 through 20.* Traffic generated by this project was estimated from standard trip generation rates provided by the Institute of Transportation Engineers, distributed and assigned to the study intersections.

14. *Piers 31-34 Neobulk Cargo Facility.* Traffic from this project was also generated, distributed and assigned as with the previous project.

15. *Excursion Vessel Accommodations at Piers 5-7.* Traffic generated by this project was estimated using trip generation rates for excursion vessel activities determined from studies performed as part of the Harbors Traffic Study. These surveys are discussed in the following chapter since the studies were performed to determine trip generation rates for part of the proposed study.

16. *Domestic Fishing Village at Piers 36 through 18.* This project will generate minimal traffic during the peak commuter hours (7 AM to 9 AM and 4 PM to 6 PM). Therefore, any peak commute period traffic generated by this project was considered part of the regional growth.

17. *Inter-Island Cargo Yard at Piers 39 through 40.* Traffic projections were estimated using standard ITE rates. The trips were then distributed and assigned to the study intersections.

18. *Maritime Office Building at Piers 10 & 11.* Traffic generated by an office building was estimated using ITE trip generation rates, distributed and assigned to the study intersections. The calculations were based on an office building of 271,580 square feet. This is the area used for an office building in the Aloha Tower traffic study.

19. *Bike Plan Hawaii.* This project will have no impact on traffic volumes at the study intersections. However, the recommendations were considered the evaluation of the intersection geometry. This means that any recommendations would provide sufficient width for bike lanes and crosswalks. Traffic signal phasing would provide phasing for bicycle as well as pedestrian crossings.

2003 Cumulative Traffic Projections

Traffic projections for 2003 cumulative (without project) conditions were calculated by expanding existing traffic volumes by the appropriate growth rate and adding the peak hour traffic from the related project. This procedure assumes that the peak hour of each related project coincides with the peak commuter period of the adjacent street network. In reality, there may be a slight difference in the peak hour for each component. The assumption that all peak hours coincide results in conservative peak hourly volume estimates, representing the "worst-case" scenario.

The HCDA advised that work would commence on the Ilalo Street Improvements described in the *Traffic Analysis for Kakaako Makai Area Plan* in the Spring of 1999. Therefore, traffic projections for cumulative conditions reflect the improvements recommended in the *Kakaako Makai Area Plan Traffic Study.* The

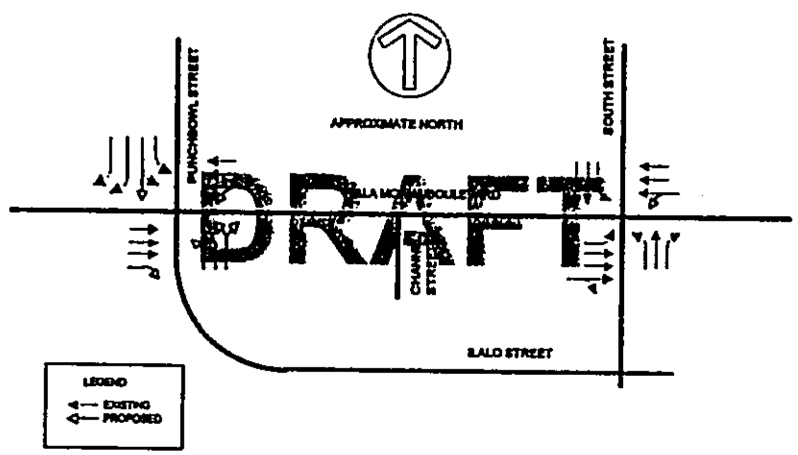
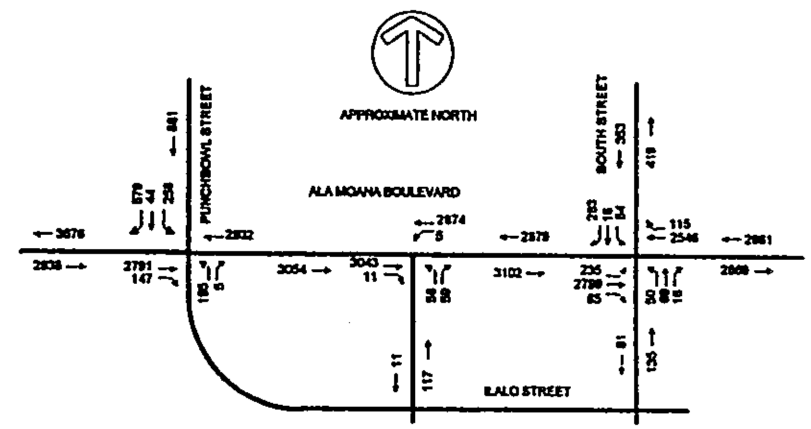


Figure 8
LANE CONFIGURATIONS FOR
PUNCHBOWL STREET-ILALO STREET CONNECTOR

applicable improvements include a connection between Punchbowl Street and Ilalo Street (referred to as the Punchbowl Street/Ilalo Street Connector), installation of westbound to southbound left turns at South Street and Punchbowl Street, and provision for southbound through traffic at the intersection of Punchbowl Street at Ala Moana Boulevard. These street improvements are shown in Figure 8.

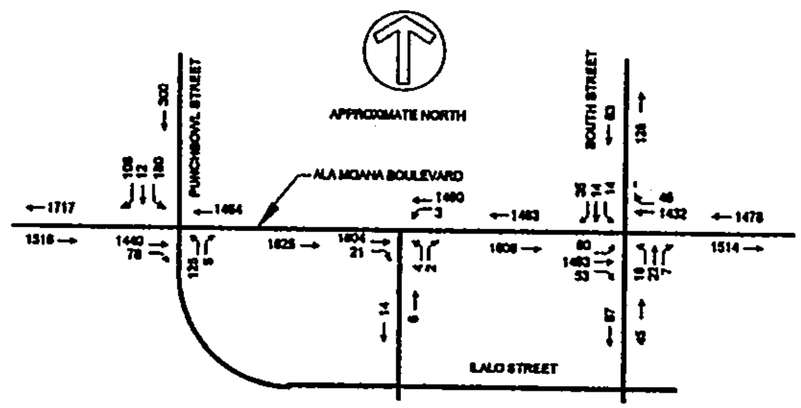
The resulting 2003 cumulative peak hour traffic projections are shown in Figures 9, 10 and 11. The volumes shown represent the 2003 cumulative peak hourly traffic volumes at the study intersections and is the sum of the peak commute period traffic of the street and the peak hour of each related project.

The analysis of cumulative peak hour conditions determined that the westbound to southbound left turns would create a "de facto" left turn lane because of the heavy opposing traffic volumes, resulting in only two westbound through lanes at these intersections. The calculated V/C ratios were greater than 2.0 and delays could not be calculated. In conclusion, in order to calculate delays and LOS's, the left turns had to be removed. This is reflected in the volumes shown.



*EXISTING ROADWAY NETWORK
WITH ILALO STREET/PUNCHBOWL STREET CONNECTOR*

Figure 9
CUMULATIVE PM PEAK HOUR
TRAFFIC VOLUMES AT PIER 2



EXISTING ROADWAY NETWORK
WITH ILALO STREET/PUNCHBOWL STREET CONNECTOR

Figure 10
CUMULATIVE SATURDAY PEAK HOUR TRAFFIC VOLUMES AT PIER 2

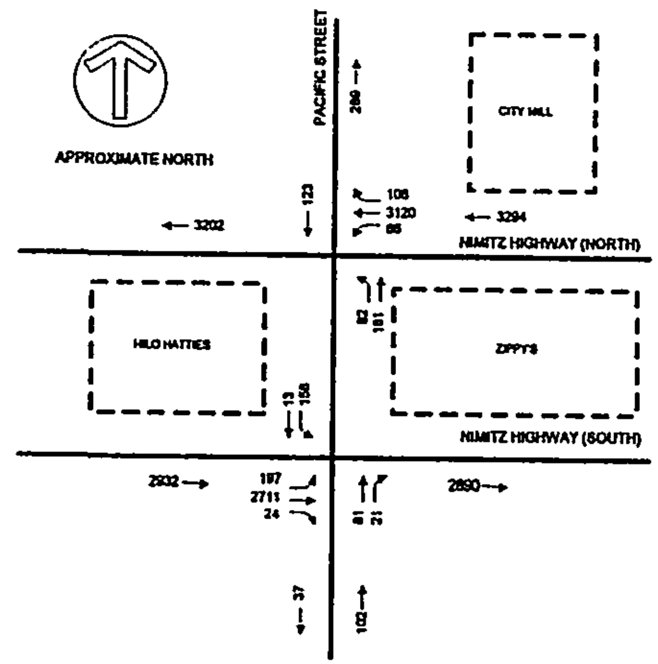


Figure 11
CUMULATIVE WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES AT PIERS 24 THROUGH 26

4. PROJECT-RELATED TRAFFIC CONDITIONS

This chapter discusses the methodology used to identify the traffic-related impacts of the proposed project. Generally, the process involves the determination of weekday peak-hour trips that would be generated by the proposed project, distribution and assignment of these trips on the approach and departure routes, and finally, determination of the levels-of-service at affected intersections and driveways subsequent to implementation of the project. The proposed project under study consists of four separate projects with different trip generation characteristics. Further, none of the proposed uses have established trip generation rates of equations in the standard references. Therefore, the methodology used to estimate the trip generation characteristics and the results of the trip generation analysis of each of the proposed uses is described separately.

Pier 2

The development proposed for Pier 2 consists of constructing a new terminal to be used by interisland, foreign, and domestic cruise ships. No standard trip generation rates or equations were identified through a review of trip generation literature. Also, it is well known that the activities occurring in the harbor area are unique. Therefore, it was determined that a trip generation study specific to the Honolulu Harbor would be the most reliable approach to estimate future trips generated by the proposed project.

Separate trip generation analyses were performed for interisland and domestic/foreign cruise ships. Each is discussed separately.

Interisland Cruises

The characteristics of the interisland cruise ship were determined from interviews with and data provided by the operators. The characteristics that impact traffic generation are:

1. The capacity of an interisland cruise ship is 850 passengers and the cruises are typically full, that is 100% occupancy.
2. Approximately 30% of the passengers are part of an organized tour group that provides transportation between the cruise ship terminal and Waikiki. The remaining passengers are referred to as Free Independent Travelers (FIT's).
3. The average number of employees per cruise is 335.
4. All interisland cruises are currently scheduled to arrive on Saturday morning and depart on Saturday evening. Therefore, interisland cruise ship operations have no impacts on weekday peak hour traffic conditions along the adjacent streets. Based on discussions with HDOT-Harbors, future interisland cruises will have the same schedule.

A survey of the traffic generated by an interisland cruise ship operation was performed on Saturday, September 5, 1998. The purpose of the survey was to determine the amount of vehicular traffic (including service vehicles) generated by the arrival of an interisland cruise ship and relate the number of vehicular trips to the number of passengers on the cruise ship. It was determined during the surveys that a cruise ship arrival would have much greater traffic impacts than a cruise ship departure because passengers arrive throughout the afternoon whereas passenger departures are concentrated within a short period after arrival of the cruise ship. The survey methodology and results are presented in Appendix C. The survey results are summarized in Table 8.

Table 8 Results of Interisland Cruise Ship Traffic Survey[1]

Direction	Trips per Hour[2]	Trips per 100 Passengers[3]
Inbound	78	9.18
Outbound	51	6.00
Total	129	15.18

NOTES:
(1) Survey was performed on Saturday, September 5, 1998. See Appendix E for details of survey methodology.
(2) Trips shown are the peak hourly volume of each class of vehicle serving the cruise ship. See Appendix C.
(3) Trip rate shown is based on 850 passengers which assumes the cruise ship was 100% occupied as indicated by the cruise ship operator.

Foreign Cruises

A survey of the traffic associated with the arrival and departure of a foreign cruise ship was performed to establish trip generation rates as with the interisland cruise ship operations. The survey methodology and calculations are presented in Appendix D. The survey determined that the peak hourly volume of traffic generated by the cruise ship operations occurs during the cruise ship arrival, during which there are 20.75 vehicular trips per 100 passengers, 9.50 inbound plus 11.25 outbound. This is the peak hourly volume rate of traffic associated with the cruise ship and may or may not be concurrent with the peak hour of the adjacent street.

The number of trips generated by foreign cruises were calculated using a similar methodology as for interisland cruises. Calculations were performed for an average and maximum sized cruise vessels. These data were determined for cruise ships that are scheduled for arrivals at Honolulu Harbor. Table 9 is a listing of ships currently scheduled for Honolulu along with the passenger capacity and number of crew for each ship. The average sized cruise ship has a capacity for 1,000 passengers with an average sized crew of 460. The largest cruise ship operating to and from Honolulu Harbor has a capacity of 2,000 passengers with a crew of 800. The traffic generated by average and maximum sized cruise ships is estimated in Table 10.

Table 9 Foreign Cruise Ships Using Honolulu Harbor

Operator	Vessel	Capacity[1] (Passengers)	Crew[1]
Norton Lili Hawaii	Crystal Harmony	960	545
	Crystal Symphony	960	545
	Asuka	400	270
	Delphin	460	260
Trans Marine	Crown Princess	1,600	700
	Island Princess	700	300
	Sky Princess	1,200	600
	Regal Princess	1,600	700
	Arcadia	1,600	600
	Oriana	1,700	700
Waldron Steamship	Silver Cloud	296	185
	Norwegian Star	850	380
	Norwegian Dynasty	800	300
	Norwegian Wind	1,800	700
	Rotterdam	1,400	644
	Legend of the Seas	1,804	732
	Silver Wind	296	185
	Statendam	1,264	588
	Arkona	480	243
	Jubilee	1,488	670
	Rhapsody of the Seas	2,000	765
	Vision of the Seas	1,800	730
Lavino Shipping	Paul Gaugin	320	250
	Deutschland	620	250
	Astor	650	250
	Vistafjord	750	400
	Queen Elizabeth II	1,200	800
	Maxim Gorky	650	350
	Royal Viking Sun	750	450
	Pacific Venus	720	180
	Albatross	Not Available	
	Average Vessel Size	1,000	460
	Maximum Vessel Size	2,000	800

Notes:
(1) Data shown was provided by the individual operators.

Table 10 Trip Generation Calculations for Foreign Cruise Ships

	Trips per 100 Passengers[1]	Trips Generated By Cruise Ship for: 1,000 Passengers	2,000 passengers
Cruise Ship Arrival			
Inbound	9.5	95	190
Outbound	11.25	113	225
Total	20.75	208	415
Cruise Ship Departure			
Inbound	3.38	34	68
Outbound	3.25	33	65
Total	6.63	67	133

Note:
(1) See Appendix D for calculations.

Conclusions

The trip generation analysis of interisland and foreign cruise operations results in the following conclusions:

1. The typical interisland cruise ship arrival will generate approximately 129 trips vehicular trips during the peak hour following arrival of the cruise ship. This peak hourly volume may or may not coincide with the peak hour of the adjacent street.

2. A foreign cruise ship with a capacity of 2,000 passengers will generate 415 vehicular trips during the peak hour after arrival of the ship.

3. The traffic generated by cruise ship operations was estimated for three scenarios to establish the worst-case condition. The calculations are shown in Table 11. As shown, the worst-case occurs when a larger cruise ship and an interisland cruise ship arrive concurrently. In this scenario, there would be a total of 544 trips generated, 268 inbound and 276 outbound.

Table 11 Trip Generation for Cruise Ship Arrival Scenarios

No.	Scenario	Inbound	Outbound	Total
1	1 Large Foreign Cruise Ship	190	225	415
2	2 Interisland Cruise Ships	156	102	258
3	1 Large Foreign Cruise Ship Plus 1 Interisland Cruise Ship	268	276	544

4. The transportation and parking facilities should be designed to accommodate approximately 900 vehicles. Since it is not often that two cruise ships would arrive simultaneously, planning to accommodate the arrival of a single large cruise ship would provide capacity to accommodate other scenarios with a margin of safety.

5. There would be little or no traffic generated by the cruise ship arrivals and departures during weekday peak commute periods. However, the adjacent intersections should be analyzed to determine impacts during the peak period of the generator even though this period will not be the peak hour of the adjacent street.

Piers 12 through 16

Piers 12 through 18 will be reconstructed to accommodate additional commercial fishing and temporary berthing facilities. Fishing boat activities at the current facility and at Kewalo Basin indicate that fishing boats depart well before the traffic peak hour begins and return to the harbor during the mid-afternoon. Thus, these operations will not generate any peak hour traffic and therefore will not impact peak hour traffic conditions along Nimitz Highway.

Piers 24 through 29

The assumptions used to calculate the trips generated by an excursion vessel terminal at Piers 24 through 29 are :

1. The new facility will replace the existing Young Brothers operation, which has been relocated to Piers 39-40.

2. The three piers will provide 1600 linear feet for docking.

3. Based of data provided by HDOT-Harbors, the average length required to accommodate an excursion boat is 200 feet. This means that the new facility will accommodate 8 boats.

4. The excursion vehicles will operate from 9 AM to 4 PM with dinner cruises departing after 5 PM. Thus, each boat will make 8 excursion operations and one dinner cruise per day for a total of 9 two way operations per day per boat, or 18 operations per day per boat.

The number of landside vehicular trips is based on counts performed at Kewalo Basin. The total number of vehicles entering Kewalo Basin was counted and compared to the number of boat operations, both scheduled and actual. During this survey, the vehicles were classified so that the number of buses and shuttle buses could be estimated. The survey concluded that during the afternoon peak hour, there are 1.11 inbound vehicle trips and 0.90 outbound vehicle trips per daily boat operation. The survey data is presented in Appendix E. Therefore, the peak hour trips generated by the proposed development at Piers 24 through 29 is estimated as follows:

8 boats x 18 operations/day/boat x 1.11 trips per operation = 160 Inbound vehicle trips

8 boats x 18 operations/day/boat x 0.90 trips per operation = 130 Outbound vehicle trips

Keehi Lagoon

Keehi Lagoon is to be developed to provide approximately 13 lay berths. Lay berths are defined as berthing facilities to accommodate boats waiting for repairs or scheduled departures. Discussions with HDOT-Harbors indicated that traffic generated by the lay berths should be calculated using the following assumptions:

1. The average crew size will be between 6 and 8 persons. Seven was used for the calculations.
2. The maximum number of berths that could be occupied within one hour is 10.
3. Vehicles or taxicabs would be used to shuttle sailors to local destinations, including HIA. The average number of persons per vehicle would be 2.0.

Using these assumptions, the estimated number of vehicles that would be generated is 35 round trips (35 inbound and 35 outbound. All of this traffic would use Lagoon Drive.

Summary

The total trips generated by the proposed projects is summarized in Table 12. Only the excursion activities proposed for Piers 24 through 29 could impact traffic during the afternoon peak commuter period. Cruise ship operations proposed for Pier 2 will operate with scheduled arrivals and departures to occur outside the peak commuter periods. The impacts of a large cruise ship arrival and an interisland cruise ship arrival occurring concurrently represent the worst-case and thus was the scenario analyzed.

Table 12 Trip Generation Summary

	Weekday PM Peak(1)			Saturday Peak(1)		
Location and Project	In	Out	Total	In	Out	Total
Pier 2 Cruise Ship Terminal	268	276	544	268	276	544
Piers 12 - 24 Fishing Boat Berths		Minimal			Minimal	
Piers 24 - 26 Excursion Vessel Berths	160	130	290	160	130	290
Keehi Lagoon Lay Berths	35	35	70	35	35	70
Totals	463	441	904	463	441	904

Notes:
(1) Peak hour refers to the greater peak hour of the commuter period or the generator.

Trip Distribution and Assignment

The project-related trips were distributed along the anticipated approach routes to the project site. This information was obtained from previously conducted traffic studies in the area, which have been generally accepted by the reviewing agencies, traffic surveys and familiarity with cruise ship and excursion vessel operations. All these studies confirmed that traffic generated by the cruise ship operations would primarily shuttle passengers between the cruise ship terminal and HIA. Traffic generated by the excursion vessel operations would shuttle passengers between the excursion vessel berths and Waikiki since it primarily serves tourists.

Using the trip generation and trip distribution previously discussed, project-related traffic was assigned to the various traffic movements at the intersections studied.

2003 Cumulative Plus Project Peak Hour Traffic Volumes

Future traffic volumes with the proposed projects were determined by superimposing the project-generated traffic on the 2003 cumulative traffic volumes presented in Chapter 3. The resulting "worst-case" peak hour traffic volumes for 2003 cumulative plus project are shown on Figures 12 and 13.

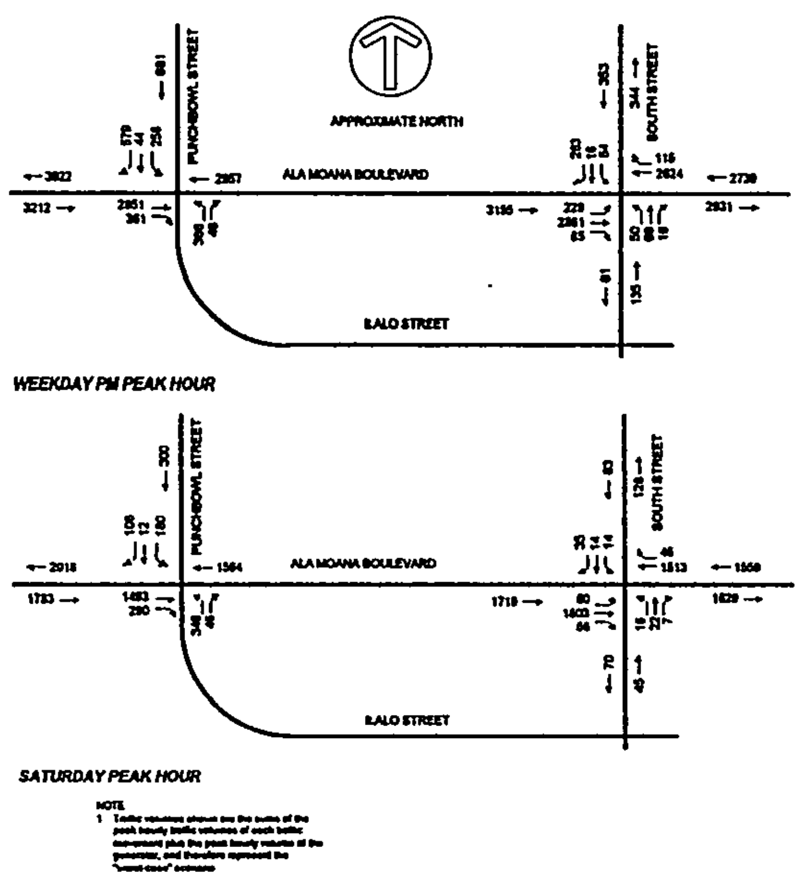


Figure 12
CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES AT PIER 2

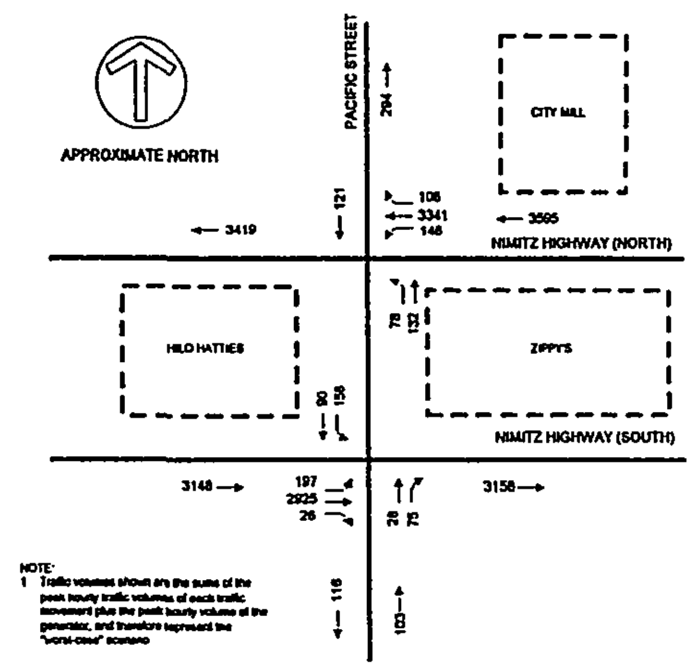


Figure 13
CUMULATIVE PLUS PROJECT PM PEAK HOUR TRAFFIC VOLUMES AT PIERS 24 THROUGH 26

5. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to present the results of the level-of-service analysis, which identifies the project-related impacts. Each of the various scenarios is discussed separately. In addition, any mitigation measures necessary and feasible are identified and other access, egress and circulation issues are discussed.

Definition of Significant Traffic Impacts

Criteria for determining if a project has a significant traffic impact for which mitigation measures must be investigated have been established based on traffic impact study guidelines used in other traffic studies. Generally, the criteria are as follows: If the level-of-service (LOS) without the project is E or F and the volume/capacity (V/C) ratio changes less than 0.020, the project's traffic impacts are considered insignificant. However, if the V/C ratio change is greater than 0.020, then mitigation measures which will reduce the V/C ratio change to less than 0.020 must be identified. If the LOS with the project is D or better, then no mitigation measures need to be identified.

Project Related Traffic Impacts and Mitigation Measures

The impact of project related traffic is estimated by comparing the LOS analysis of cumulative plus project to cumulative (without project conditions) The methodology and assumptions used for this analysis are as follows:

1. The LOS analysis was performed for "worst-case" conditions, which is defined as the peak hourly traffic volume generated by the project (peak hour of the generator) superimposed on the peak hourly traffic volume during the peak commuter period of the adjacent street network. This represents a "worst-case" condition since the peak hours may not coincide in a real case condition.

2. The LOS analysis was performed using the operations method described in the 1998 Edition of the *Highway Capacity Manual*.

3. The LOS analysis was performed for weekday afternoon and Saturday morning "worse-case" traffic conditions for cumulative and cumulative plus project conditions.

4. For 2003 cumulative (without project) conditions, Ilalo Street will be in place. It was determined during the analysis of future background conditions that the shared westbound left turn and through lane at South Street and Punchbowl Street would not function because of the heavy eastbound through traffic. Westbound left turns are currently not allowed at these intersection because of width and sight distance restrictions and should not be allowed in the future. Future traffic assignments were adjusted to prohibit left turns consistent with existing conditions.

5. The section of Ilalo Street adjacent to Pier 2 was assumed to be constructed concurrently with the new passenger cruise ship terminal. Part of the construction of this roadway improvement is the demolition of Channel Street and the traffic signal at the intersection of Channel Street and Ala Moana Boulevard.

The results of the level-of-service analysis are tabulated in Table 12 and 13 and summarized for the study intersections as follows:

Ala Moana Boulevard at South Street

The analysis concluded that overall the intersection will operate at LOS C during the afternoon. However, the eastbound left will operate at LOS F without and with the project. The V/C ratio and the delay is actually less with the project than without the project because traffic associated with the foreign trade zone has been diverted. Thus, the proposed project will improve this condition slightly.

The northbound left and through movements and all the southbound approach movements will operated at LOS E or F without the project. These movements are not impacted by the proposed project

For Saturday conditions, the impacts are insignificant

Ala Moana Boulevard at Channel Street

This intersection will operate at LOS D during cumulative (without project) conditions. The intersection will be demolished during the construction of the final section of Ilalo Street and therefore was not analyzed for cumulative plus project conditions.

Table 13 Results of Level-of-Service Analysis - 2003 Weekday PM Peak Hour [1]

	Cumulative			Cumulative Plus Project				
				Weekday PM			Changes	
Intersection and Movement	V/C[2]	Delay[3]	LOS[4]	V/C	Delay	LOS	V/C	Delay
Ala Moana Bl. at South Street	0.924	17.2	C	0.938	17.8	C	0.014	0.6
Eastbound Left	0.976	73.1	F	0.950	67.1	F	-0.026	-6.0
Eastbound Thru & Right	0.797	6.4	B	0.814	6.8	B	0.017	0.4
Westbound Thru & Right	0.915	18.4	C	0.942	20.4	C	0.027	2.0
Northbound Left & Thru	0.784	44.0	E	0.784	44.0	E	0.000	0.0
Northbound Right	0.111	30.1	D	0.111	30.1	D	0.000	0.0
Southbound Left & Thru	0.913	71.6	F	0.913	71.8	F	0.000	0.0
Southbound Right	0.818	45.9	E	0.818	45.9	E	0.000	0.0
Ala Moana Bl. at Channel St.	0.758	8.6	B	Demolished				
Eastbound Thru & Right	0.877	10.6	B					
Westbound Left	0.126	37.9	D					
Westbound Thru	0.769	5.0	A					
Northbound Left	0.367	32.2	D					
Northbound Right	0.423	32.9	D					
Ala Moana Bl. at Punchbowl St.	0.869	28.7	D	0.926	32.2	D	0.057	3.5
Eastbound Thru	0.962	22.5	C	0.983	27.0	D	0.021	4.5
Eastbound Right	0.167	7.6	B	0.349	3.1	A	0.182	-4.4
Westbound Thru	1.011	31.4	D	1.020	35.0	D	0.009	3.6
Northbound Left	0.304	32.2	D	0.600	41.1	E	0.296	8.9
Northbound Left & Right	0.214	31.7	D	0.483	40.1	E	0.269	8.4
Southbound Left	0.636	37.2	D	0.636	43.2	E	0.000	6.0
Southbound Thru & Left	0.714	39.8	D	0.714	45.9	E	0.000	6.1
Southbound Right	0.904	49.4	E	0.904	55.7	E	0.000	6.3
Nimitz Hwy (EB) at Pacific St.	0.706	8.0	B	0.679	10.3	B	-0.027	2.3
Eastbound Right, Thru & Left	0.655	4.9	A	0.786	9.0	B	0.131	4.1
Northbound Thru	0.381	24.0	C	0.095	18.3	C	-0.286	-5.7
Northbound Right	0.117	22.4	C	0.305	19.6	C	0.188	-2.8
Southbound Left	0.896	51.8	E	0.425	20.7	C	-0.471	-31.1
Southbound Thru	0.059	22.2	C	0.290	19.5	C	0.231	-2.7
Nimitz Hwy (WB) at Pacific St.	0.789	10.2	B	0.837	13.4	B	0.048	3.2
Westbound Left, Thru & Right	0.752	5.9	B	0.910	12.2	B	0.158	6.3
Northbound Left	0.762	39.8	D	0.408	20.7	C	-0.354	-19.1
Northbound Thru	0.923	47.0	E	0.665	24.1	C	-0.258	-22.9
Southbound Thru	0.392	24.1	C	0.278	19.4	C	-0.114	-4.7

NOTES
1 Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator
2 V/C denotes ratio of volume to capacity. See Appendices B for calculations.
3 Delay is in seconds per vehicle
4 LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Table 4 for definitions.

Table 13 Results of Level-of-Service Analysis - 2003 Saturday Peak Hour[1]

	Cumulative			Cumulative Plus Project				
				Saturday Peak			Changes	
Intersection and Movement	V/C[2]	Delay[3]	LOS[4]	V/C	Delay	LOS	V/C	Delay
Ala Moana Bl. at South Street	0.405	7.8	B	0.414	7.9	B	0.009	0.1
Eastbound Left	0.251	33.0	D	0.251	33.0	D	0	0.0
Eastbound Thru & Right	0.435	3.3	A	0.467	3.4	A	0.032	0.1
Westbound Thru & Right	0.507	9.8	B	0.535	10.1	B	0.028	0.3
Northbound Left & Thru	0.176	30.5	D	0.176	30.5	D	0	0.0
Northbound Right	0.049	29.7	D	0.049	29.7	D	0	0.0
Southbound Left & Thru	0.186	30.5	D	0.186	30.5	D	0	0.0
Southbound Right	0.091	30.0	D	0.091	30.0	D	0	0.0
Ala Moana Bl. at Channel St.	0.373	3.9	A	Demolished				
Eastbound Thru & Right	0.469	4.9	A					
Westbound Left	0.073	37.7	D					
Westbound Thru	0.396	2.5	A					
Northbound Left	0.025	30.2	D					
Northbound Right	0.018	30.1	D					
Ala Moana Bl. at Punchbowl St.	0.417	14.3	B	0.539	15.6	C	0.122	1.3
Eastbound Thru	0.536	12.1	B	0.555	12.3	B	0.019	0.2
Eastbound Right	0.055	2.4	A	0.258	2.9	A	0.203	0.5
Westbound Thru	0.552	12.2	B	0.582	12.6	B	0.03	0.4
Northbound Left	0.124	29.6	D	0.583	33.4	D	0.459	3.8
Northbound Left & Right	0.185	30.0	D	0.588	34.6	D	0.403	4.6
Southbound Left	0.238	30.3	D	0.359	31.3	D	0.121	1.0
Southbound Thru & Left	0.228	30.3	D	0.330	31.0	D	0.102	0.7
Southbound Right	0.144	29.8	D	0.120	29.6	D	-0.024	-0.2
Nimitz Hwy (EB) at Pacific St.	Not Analyzed			Not Analyzed				
Eastbound Right, Thru & Left								
Northbound Thru								
Northbound Right								
Southbound Left								
Southbound Thru								
Nimitz Hwy (WB) at Pacific St.	Not Analyzed			Not Analyzed				
Westbound Left, Thru & Right								
Northbound Left								
Northbound Thru								
Southbound Thru								

NOTES
1 Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator
2 V/C denotes ratio of volume to capacity. See Appendices B for calculations.
3 Delay is in seconds per vehicle
4 LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay. See Table 4 for definitions.

Ala Moana Boulevard at Punchbowl

Overall the intersection will operate at LOS D during afternoon condition without or with the project. Several movements will operate at LOS E based on delay because of the traffic signal timing and the relatively low volume of traffic compared to the other movements at the intersection. However, the V/C ratios are low, indicating a LOS of D or better. No improvements are recommended since the V/C ratio is low.

The intersection will operate at LOS D or better during Saturday conditions.

Nimitz Highway At Pacific Street

This intersection will operate at LOS C or better during afternoon conditions with the project. This is an improvement versus conditions without the project.

Conclusions

The results of the LOS analysis of cumulative plus project conditions versus cumulative without project conditions indicate that:

1. The proposed projects will have minimal impacts on traffic operations at the adjacent intersections during the weekday afternoon commuter period (worst-case conditions) and no significant impacts on Saturday conditions. The proposed projects will not have a significant impact of the adjacent intersections requiring mitigation.
2. Traffic generated by the projects studied in this report is localized and will not have a significant regional impact requiring implementation of mitigation measures.
3. Interisland cruise ship operations should continue to operate on the current schedule, which is to have arrivals and departures scheduled during Saturday morning and evenings, respectively.
4. A shuttle bus operation between Pier 2 and adjacent shopping areas should be considered for a period of several hours before the departure of a large cruise ship to reduce the pedestrian activity and associated impacts on traffic flow at the adjacent intersections. A schedule of one bus every 10 to 15 minutes would have a minimal impact of traffic operations but would enhance pedestrian safety. This operation would best be provided by the cruise operator.

Construction Impacts

Traffic impacts of construction activities are short term. The following guidelines should be followed:

1. Construction activities should be located off-street unless not practical. Such an area would be construction at Pier 12 through 16 where there is not off-street area for staging immediately adjacent to the site.
2. Lane closures should be coordinated with Hawaii Department of Transportation and City and County of Honolulu Department of Transportation Services.

x . *Honolulu Harbor 2020 Master Plan*

6. GLOSSARY OF TERMS

At the outset of this project, there was concerned relative to the precise definition of "peak hour" traffic. Therefore, the following definitions of the peak hour terms used in the preceding study is provided:

1. *Peak Hour of the Intersection* - The peak hour of the intersections analyzed in this report is the peak hourly volume of each individual traffic movement at the intersection. The sum of each peak is higher than the peak of the sum of each movement because rarely does the peak of each movement occur concurrently.
2. *Peak Commuter Period* - This peak hour refers to the peak hourly volume that typically occurs during the morning or afternoon peak commute period. The morning peak commute period is typically between 7 AM and 9 AM; the afternoon peak is typically between 3:30 PM and 6:00 PM.
3. *Peak Hour of Generator* - The peak hour of the generator refers to the peak hourly volume of traffic generator and may, may not, coincide with the peak hour of the adjacent street. For instance, the peak hour of an office building will coincide with the peak hour of the adjacent street because the traffic stream is largely commuters. A school, on the other hand, will have a mid afternoon peak at the end of the school day, but does not generate enough traffic to create volume as high as those that occur during the peak commute period.
4. *Worst-Case Peak Hour Traffic Volume* - The worst-case peak hour traffic volume is calculated for the cumulative plus project condition and assumes that the peak hour of the generator of a project coincides with the peak hour of the adjacent street. This volume is the is the sum of the peak hourly traffic volume of each movement at the adjacent intersections during the AM, PM or Saturday commuter periods and the peak hourly volume of the proposed project or generator.

APPENDIX A

PHOTOGRAPHS OF STUDY INTERSECTIONS

Figure A-1 Looking south along South Street toward intersection with Ala Moana Boulevard.

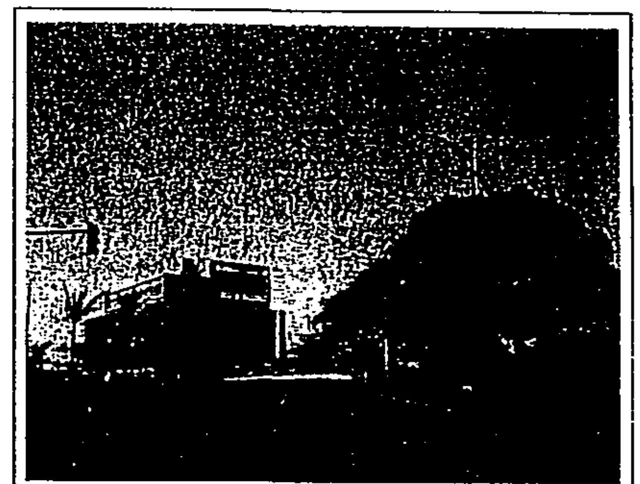


Figure A-2 Looking east along Ala Moana Boulevard toward intersection with South Street.

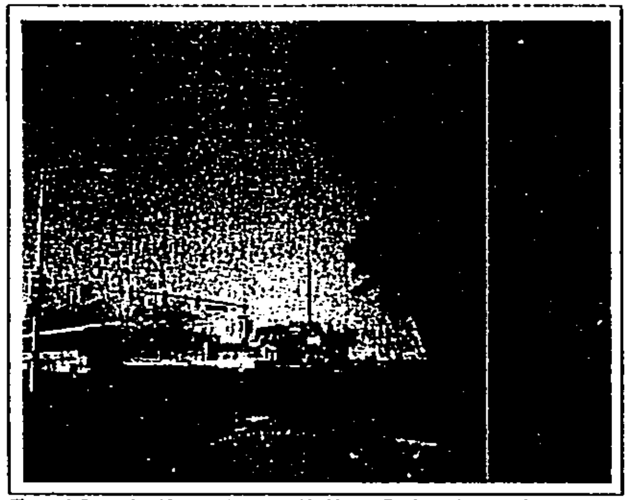


Figure A-3 Looking south across Ala Moana Boulevard at northbound approach of South Street at Ala Moana Boulevard.

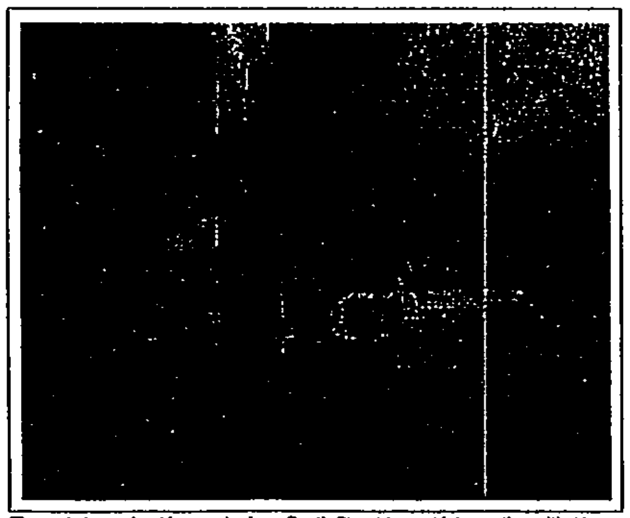


Figure A-4 Looking north along South Street toward intersection with Ala Moana Boulevard.

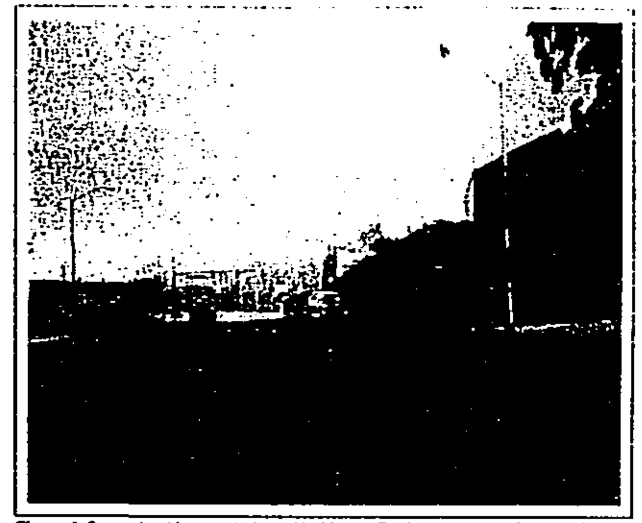


Figure A-5 Looking west along Ala Moana Boulevard toward intersection with Channel Street.

Figure A-6 Looking east along Ala Moana Boulevard toward intersection with Channel Street.

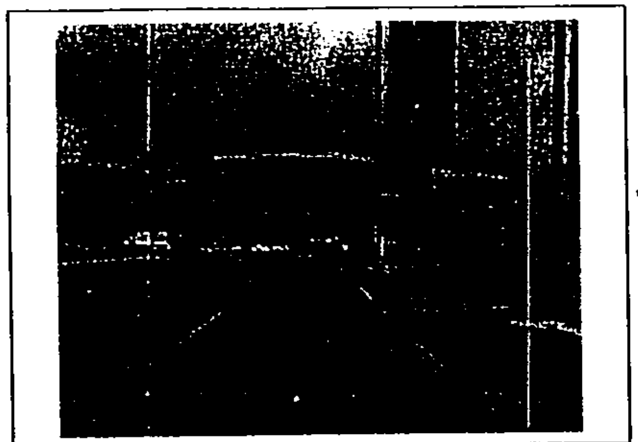


Figure A-7 Looking north along Channel Street toward intersection with Ala Moana Boulevard.

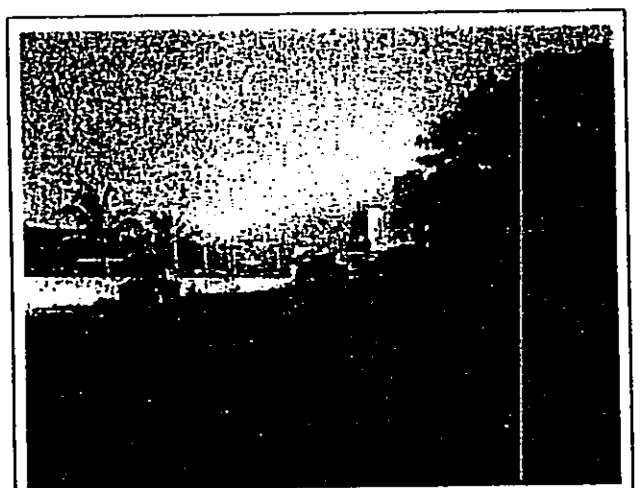


Figure A-8 Looking west along Ala Moana Boulevard toward Punchbowl Street.

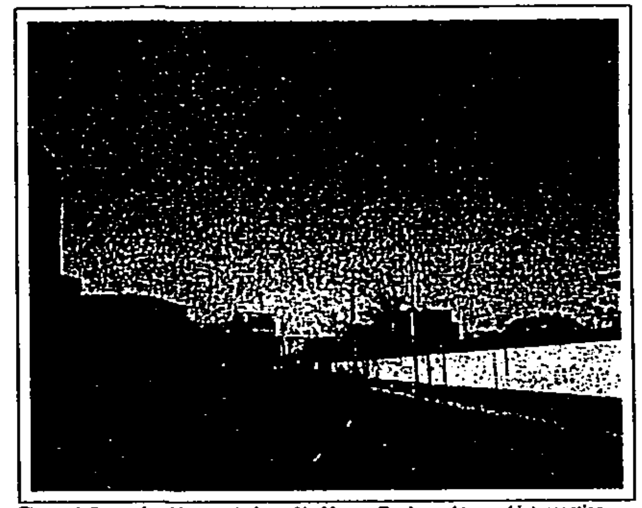


Figure A-9 Looking east along Ala Moana Boulevard toward intersection with Punchbowl Street.

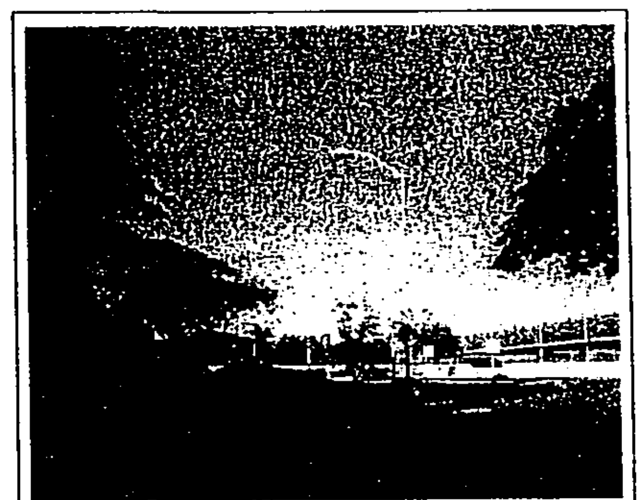


Figure A-10 Looking south along Punchbowl Street toward intersection with Ala Moana Boulevard

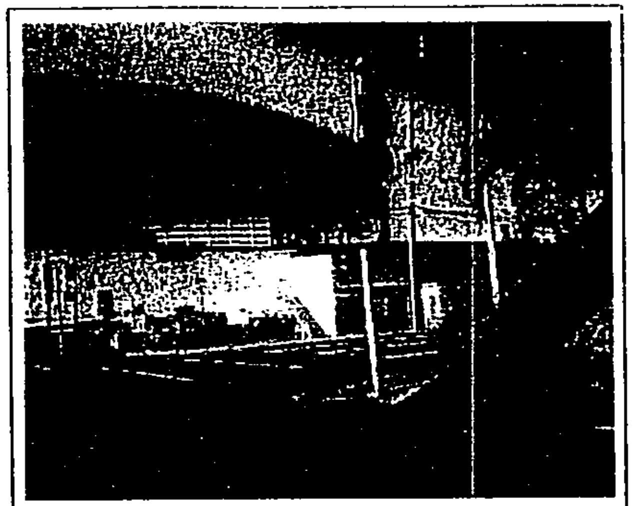


Figure A-11 Looking at eastbound approach on Nimitz Highway at Pacific Street.

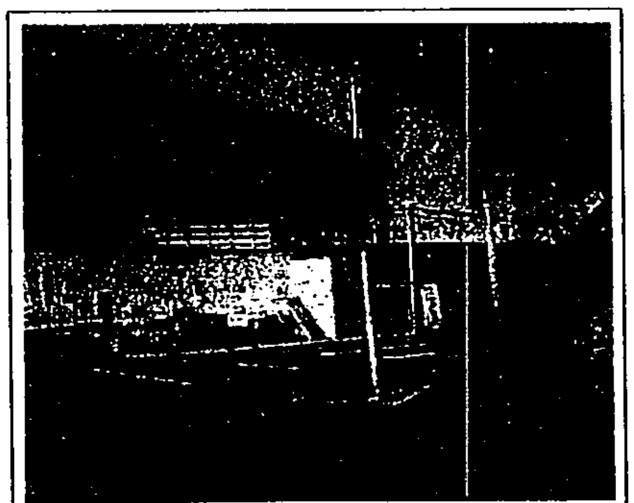


Figure A-12 Looking south along Pacific Street toward intersection with esatbound Nimitz Highway.

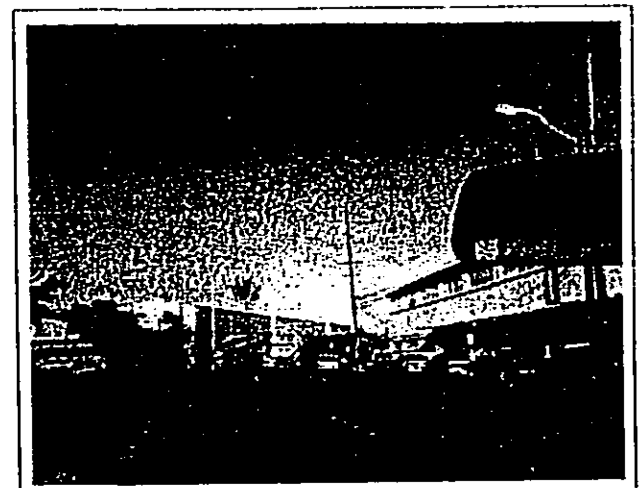


Figure A-13 Looking west along Nimitz Highway toward Pacific Street.

Figure A-14 Looking south along Pacific Street toward westbound Nimitz Highway.

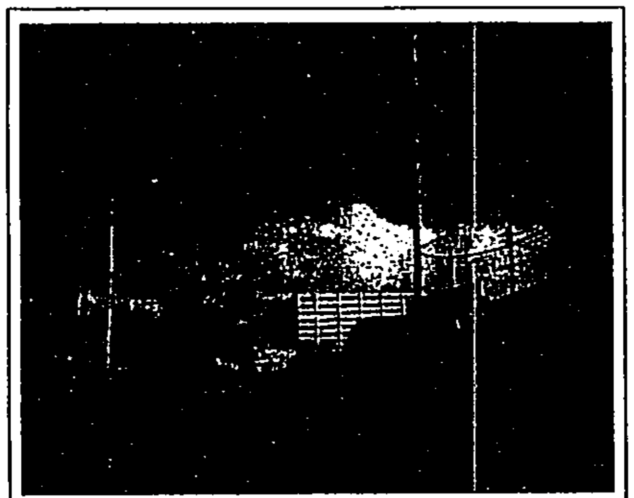


Figure A-15 Looking north along Pacific Street toward westbound Nimitz Highway.

APPENDIX B

LEVEL-OF-SERVICE CALCULATIONS

Table B-1 Index of Level-of-Service Calculations

No	N-S Street	E-W Street	Condition	Roadway	Time	File Name	Fig	Page No.
1	South St.	Ala Moana Blvd.	Existing	Existing	PM	1PMEX	5	2
			Existing	Existing	Sat	1SATEX	6	3
			Cumulative	w/ Ilalo St. Ext.	PM	1PMCUMB	9	4
			Cumulative	w/ Ilalo St. Ext	Sat	1SACUMB	10	5
			With Project	w/ Ilalo St. Ext.	PM	1PMPLANE	14	6
			With Project	w/ Ilalo St. Ext	Sat	1SAPLANF	14	7
2	Channel St.	Ala Moana Blvd.	Existing	Existing	PM	2PMEX	5	8
			Existing	Existing	Sat	2SATEX	6	9
			Cumulative	w/ Ilalo St. Ext.	PM	2PMCUMB	9	10
			Cumulative	w/ Ilalo St. Ext	Sat	2SACUMB	10	11
			With Project	w/ Ilalo St. Ext.	PM	NOT ANALYZED		
			With Project	w/ Ilalo St. Ext.	Sat	NOT ANALYZED		
3	Punchbowl St.	Ala Moana Blvd.	Existing	Existing	PM	3PMEX	5	12
			Existing	Existing	Sat	3SATEX	6	13
			Cumulative	w/ Ilalo St. Ext.	PM	3PMCUMB	9	14
			Cumulative	w/ Ilalo St. Ext	Sat	3SACUMB	10	15
			With Project	w/ Ilalo St. Ext.	PM	3PMPLANE	14	16
			With Project	w/ Ilalo St. Ext.	Sat	3SAPLANF	14	17
4	Pacific St.	Nimitz Highway (EB)	Existing	Existing	PM	4PMEX	7	18
			Cumulative	Existing	PM	4PMCUM	11	19
			With Project	Existing	PM	4PMPROJ	25	20
5	Pacific St.	Nimitz Highway (WB)	Existing	Existing	PM	5PMEX	7	21
			Cumulative	Existing	PM	5PMCUM	11	22
			With Project	Existing	PM	5PMPROJ	15	23


```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                         Phillip Rowell And Associates
=============================================================================
Streets: (E-W) Ala Moana Bl.                   (N-S) South St.
Analyst: PJR                                   File Name: 1PMEX.HC9
Area Type: Other                               11-13-98
Comment: Existing Weekday PM Conditions
=============================================================================
              |   Eastbound    |   Westbound    |   Northbound   |   Southbound   |
              | L    T    R    | L    T    R    | L    T    R    | L    T    R    |
              |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes     | 1    3  < 0    | 0    3  < 0    | 0  > 1    1    | 0  > 1    1
Volumes       | 237 2638  13|      2210   88|  35   44    8|  45   15  262
Lane W (ft)   |12.0 12.0     |      12.0     |      12.0 12.0|      12.0 12.0
RTOR Vols     |            0|              0|              0|              0
Lost Time     |3.00 3.00 3.00|      3.00 3.00|3.00 3.00 3.00|3.00 3.00 3.00
-----------------------------------------------------------------------------
                                Signal Operations
Phase Combination 1    2    3    4 |                5    6    7    8
EB  Left          *                |NB  Left        *
    Thru          *    *           |    Thru        *
    Right         *    *           |    Right       *
    Peds          *    *           |    Peds
WB  Left                           |SB  Left        *
    Thru               *           |    Thru        *
    Right              *           |    Right       *
    Peds               *           |    Peds        *
NB  Right                          |EB  Right
SB  Right                          |WB  Right
Green          21.0A 82.0A         |Green    26.0A
Yellow/AR       0.0   3.0          |Yellow/AR 3.0
Cycle Length: 135 secs  Phase combination order: #1 #2 #5
-----------------------------------------------------------------------------
                    Intersection Performance Summary
      Lane   Group:  Adj Sat   v/c     g/C                   Approach:
      Mvmts   Cap     Flow    Ratio   Ratio   Delay  LOS   Delay  LOS
      -----  ----   -------   -----   -----   -----  ---   -----  ---
EB    L       241     1805    1.093   0.133   115.9   F     14.6   B
      TR     4258     5581    0.739   0.763     6.1   B
WB    TR     3374     5555    0.790   0.607    13.9   B     13.9   B
NB    LT      295     1533    0.379   0.193    31.1   D     30.8   D
      R       311     1615    0.051   0.193    28.7   D
SB    LT      236     1223    0.454   0.193    32.1   D     84.9   F
      R       311     1615    1.080   0.193   101.7   F
                Intersection Delay =  19.3 sec/veh Intersection LOS = C
Lost Time/Cycle, L =   9.0 sec   Critical v/c(x)    = 0.893
-----------------------------------------------------------------------------
```

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g          03-01-1999
                   Phillip Rowell And Associates
========================================================================
Streets: (E-W) Ala Moana Bl.              (N-S) South St.
Analyst: PJR                              File Name: 1SATEX.HC9
Area Type: Other                          11-13-98
Comment: Existing Saturday Conditions
========================================================================
             |  Eastbound   |  Westbound   |  Northbound  |  Southbound
             | L    T    R  | L    T    R  | L    T    R  | L    T    R
             |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes    | 1    3  < 0  | 0    3  < 0  | 0  > 1    1  | 0  > 1    1
Volumes      |  57 1329   12|     1167   26|   5    3    1|   8   13   23
Lane W (ft)  |12.0 12.0     |     12.0     |     12.0 12.0|     12.0 12.0
RTOR Vols    |             0|             0|             0|             0
Lost Time    |3.00 3.00 3.00|     3.00 3.00|3.00 3.00 3.00|3.00 3.00 3.00
------------------------------------------------------------------------
                              Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB   Left         *                |NB  Left      *
     Thru         *    *           |    Thru      *
     Right        *    *           |    Right     *
     Peds         *    *           |    Peds
WB   Left                          |SB  Left      *
     Thru              *           |    Thru      *
     Right             *           |    Right     *
     Peds              *           |    Peds      *
NB   Right                         |EB  Right
SB   Right                         |WB  Right
Green         21.0A 82.0A          |Green    26.0A
Yellow/AR      0.0   3.0           |Yellow/AR 3.0
Cycle Length: 135 secs  Phase combination order: #1 #2 #5
------------------------------------------------------------------------
                  Intersection Performance Summary
      Lane  Group:  Adj Sat    v/c     g/C                  Approach:
      Mvmts  Cap     Flow     Ratio   Ratio   Delay  LOS   Delay   LOS
      -----  ----   -------   -----   -----   -----  ---   -----   ---
EB    L       241    1805     0.324   0.133    34.5   D     4.9     A
      TR     4250    5571     0.382   0.763     3.5   A
WB    TR     3383    5570     0.421   0.607     9.1   B     9.1     B
NB    LT      335    1742     0.054   0.193    28.7   D    28.7     D
      R       311    1615     0.013   0.193    28.5   D
SB    LT      349    1812     0.169   0.193    29.4   D    29.5     D
      R       311    1615     0.196   0.193    29.6   D
                Intersection Delay =    7.8 sec/veh Intersection LOS = B
Lost Time/Cycle, L =    9.0 sec    Critical v/c(x)     = 0.361
------------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g          03-01-1999
                   Phillip Rowell And Associates
========================================================================
Streets: (E-W) Ala Moana Bl.              (N-S) South St.
Analyst: PJR                              File Name: 1PMCUMB.HC9
Area Type: Other                          11-13-98
Comment: Cumulative Weekday PM Conditions
========================================================================
             |  Eastbound   |  Westbound   |  Northbound  |  Southbound
             | L    T    R  | L    T    R  | L    T    R  | L    T    R
             |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes    | 1    3  < 0  | 0    3  < 0  | 0  > 1    1  | 0  > 1    1
Volumes      | 235 2799   65|     2546  115|  50   69   16|  54   16  283
Lane W (ft)  |12.0 12.0     |     12.0     |     12.0 12.0|     12.0 12.0
RTOR Vols    |             0|             0|             0|           100
Lost Time    |3.00 3.00 3.00|     3.00 3.00|3.00 3.00 3.00|3.00 3.00 3.00
------------------------------------------------------------------------
                              Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB   Left         *                |NB  Left      *
     Thru         *    *           |    Thru      *
     Right        *    *           |    Right     *
     Peds         *    *           |    Peds
WB   Left                          |SB  Left      *
     Thru              *           |    Thru      *
     Right             *           |    Right     *
     Peds              *           |    Peds      *
NB   Right                         |EB  Right
SB   Right                         |WB  Right
Green         23.0A 82.0A          |Green    24.0A
Yellow/AR      0.0   3.0           |Yellow/AR 3.0
Cycle Length: 135 secs  Phase combination order: #1 #2 #5
------------------------------------------------------------------------
                  Intersection Performance Summary
      Lane  Group:  Adj Sat    v/c     g/C                  Approach:
      Mvmts  Cap     Flow     Ratio   Ratio   Delay  LOS   Delay   LOS
      -----  ----   -------   -----   -----   -----  ---   -----   ---
EB    L       267    1805     0.976   0.148    73.1   F    11.1     B
      TR     4321    5556     0.797   0.778     6.4   B
WB    TR     3372    5551     0.915   0.607    18.4   C    18.4     C
NB    LT      220    1237     0.764   0.178    44.0   E    41.7     E
      R       287    1615     0.111   0.178    30.1   D
SB    LT      136     764     0.913   0.178    71.6   F    54.8     E
      R       287    1615     0.818   0.178    45.9   E
                Intersection Delay =   17.2 sec/veh Intersection LOS = C
Lost Time/Cycle, L =    9.0 sec    Critical v/c(x)     = 0.924
------------------------------------------------------------------------
```

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g       03-01-1999
                    Phillip Rowell And Associates
=========================================================================
Streets: (E-W) Ala Moana Bl.              (N-S) South St.
Analyst: PJR                              File Name: 1SACUMB.HC9
Area Type: Other                          11-13-98
Comment: Cumulative Saturday, With Ilalo Street Extension
=========================================================================
             |  Eastbound    |  Westbound    |  Northbound   |  Southbound
             | L    T    R   | L    T    R   | L    T    R   | L    T    R
             |---- ---- ---- |---- ---- ---- |---- ---- ---- |---- ---- ----
No. Lanes    | 1    3  < 0   | 0    3  < 0   | 0  > 1    1   | 0  > 1    1
Volumes      |  60 1493   53 |     1432   46 |  16   22    7 |  14   14   35
Lane W (ft)  |12.0 12.0      |     12.0      |     12.0 12.0 |     12.0 12.0
RTOR Vols    |             0 |             0 |             0 |            15
Lost Time    |3.00 3.00 3.00 |     3.00 3.00 |3.00 3.00 3.00 |3.00 3.00 3.00
-------------------------------------------------------------------------
                          Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB  Left          *                |NB  Left      *
    Thru          *    *           |    Thru      *
    Right         *    *           |    Right     *
    Peds          *    *           |    Peds
WB  Left                           |SB  Left      *
    Thru               *           |    Thru      *
    Right              *           |    Right     *
    Peds               *           |    Peds      *
NB  Right                          |EB  Right
SB  Right                          |WB  Right
Green          23.0A 82.0A         |Green     24.0A
Yellow/AR       0.0   3.0          |Yellow/AR 3.0
Cycle Length: 135 secs  Phase combination order: #1 #2 #5
-------------------------------------------------------------------------
                 Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                   Approach:
     Mvmts    Cap     Flow    Ratio   Ratio   Delay  LOS   Delay  LOS
     -----   ----   -------   -----   -----   -----  ---   -----  ---
EB   L        267     1805    0.251   0.148    33.0   D      4.3   A
     TR      4309     5540    0.435   0.778     3.3   A
WB   TR      3378     5561    0.507   0.607     9.8   B      9.8   B
NB   LT       308     1730    0.176   0.178    30.5   D     30.3   D
     R        287     1615    0.049   0.178    29.7   D
SB   LT       312     1758    0.186   0.178    30.5   D     30.3   D
     R        287     1615    0.091   0.178    30.0   D
           Intersection Delay =   7.8 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   9.0 sec   Critical v/c(x)     = 0.405
-------------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g       03-02-1999
                    Phillip Rowell And Associates
=========================================================================
Streets: (E-W) Ala Moana Bl.              (N-S) South St.
Analyst: PJR                              File Name: 1PMPLANE.HC9
Area Type: Other                          11-13-98
Comment: Cumulative Plus Project PM Weekday, w/ Ilalo St. Ext
=========================================================================
             |  Eastbound    |  Westbound    |  Northbound   |  Southbound
             | L    T    R   | L    T    R   | L    T    R   | L    T    R
             |---- ---- ---- |---- ---- ---- |---- ---- ---- |---- ---- ----
No. Lanes    | 1    3  < 0   | 0    3  < 0   | 0  > 1    1   | 0  > 1    1
Volumes      | 229 2861   65 |     2624  115 |  50   69   16 |  54   16  283
PHF or PK15  |0.90 0.93 0.54 |     0.95 0.92 |0.73 0.69 0.50 |0.66 0.38 0.78
Lane W (ft)  |12.0 12.0      |     12.0      |     12.0 12.0 |     12.0 12.0
Grade        |       0       |       0       |       0       |       0
% Heavy Veh  |   0    2    2 |       2    0 |   0    0    0 |   0    0    0
Parking      |N         N    |N         N    |N         N    |N         N
Bus Stops    |             0 |             0 |             0 |             0
Con. Peds    |             0 |             0 |             0 |             0
Ped Button   |(Y/N) N        |(Y/N) N        |(Y/N) N        |(Y/N) N
Arr Type     |   3    3      |       3       |       3    3 |       3    3
RTOR Vols    |             0 |             0 |             0 |           100
Lost Time    |3.00 3.00 3.00 |     3.00 3.00 |3.00 3.00 3.00 |3.00 3.00 3.00
Prop. Share  |               |               |               |
Prop. Prot.  |               |               |               |
-------------------------------------------------------------------------
                          Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB  Left          *                |NB  Left      *
    Thru          *    *           |    Thru      *
    Right         *    *           |    Right     *
    Peds          *    *           |    Peds
WB  Left                           |SB  Left      *
    Thru               *           |    Thru      *
    Right              *           |    Right     *
    Peds               *           |    Peds      *
NB  Right                          |EB  Right
SB  Right                          |WB  Right
Green          23.0A 82.0A         |Green     24.0A
Yellow/AR       0.0   3.0          |Yellow/AR 3.0
Cycle Length: 135 secs  Phase combination order: #1 #2 #5
-------------------------------------------------------------------------
                 Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                   Approach:
     Mvmts    Cap     Flow    Ratio   Ratio   Delay  LOS   Delay  LOS
     -----   ----   -------   -----   -----   -----  ---   -----  ---
EB   L        267     1805    0.950   0.148    67.0   F     10.8   B
     TR      4322     5557    0.814   0.778     6.8   B
WB   TR      3372     5552    0.942   0.607    20.4   C     20.4   C
NB   LT       220     1237    0.764   0.178    44.0   E     41.7   E
     R        287     1615    0.111   0.178    30.1   D
SB   LT       136      764    0.913   0.178    71.6   F     54.8   E
     R        287     1615    0.818   0.178    45.9   E
           Intersection Delay =  17.8 sec/veh Intersection LOS = C
Lost Time/Cycle, L =   9.0 sec   Critical v/c(x)     = 0.938
-------------------------------------------------------------------------
```

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-02-1999
                  Phillip Rowell And Associates
=======================================================================
Streets: (E-W) Ala Moana Bl.              (N-S) South St.
Analyst: PJR                              File Name: 1SAPLANF.HC9
Area Type: Other                          11-13-98
Comment: Cumulative Plus Project Saturday, w/ Ilalo St. Ext
=======================================================================
             |   Eastbound    |   Westbound    |   Northbound   |   Southbound
             | L    T    R    | L    T    R    | L    T    R    | L    T    R
             |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes    | 1    3  < 0  | 0    3  < 0  | 0  > 1    1  | 0  > 1    1
Volumes      |   60 1603   56|      1513   46|   16   22    7|   14   14   35
PHF or PK15|0.90 0.93 0.54|     0.95 0.92|0.73 0.69 0.50|0.66 0.38 0.78
Lane W (ft)|12.0 12.0     |     12.0     |     12.0 12.0|     12.0 12.0
Grade        |       0      |       0      |       0      |       0
% Heavy Veh|    0    2    2|         2    0|    0    0    0|    0    0    0
Parking      |N       N     |N       N     |N       N     |N       N
Bus Stops    |              0|              0|              0|              0
Con. Peds    |              0|              0|              0|              0
Ped Button   |(Y/N) N       |(Y/N) N       |(Y/N) N       |(Y/N) N
Arr Type     |    3    3    |         3    |         3    3|         3    3
RTOR Vols    |              0|              0|              0|             15
Lost Time    |3.00 3.00 3.00|     3.00 3.00|3.00 3.00 3.00|3.00 3.00 3.00
Prop. Share|               |               |               |
Prop. Prot.|               |               |               |
-----------------------------------------------------------------------
                        Signal Operations
Phase Combination 1     2     3     4 |                5     6     7     8
EB  Left          *                   |NB  Left        *
    Thru          *     *             |    Thru        *
    Right         *     *             |    Right       *
    Peds          *     *             |    Peds
WB  Left                              |SB  Left        *
    Thru                *             |    Thru        *
    Right               *             |    Right       *
    Peds                *             |    Peds        *
NB  Right                             |EB  Right
SB  Right                             |WB  Right
Green           23.0A 82.0A           |Green    24.0A
Yellow/AR        0.0   3.0            |Yellow/AR 3.0
Cycle Length: 135 secs  Phase combination order: #1 #2 #5
-----------------------------------------------------------------------
                 Intersection Performance Summary
     Lane  Group:  Adj Sat    v/c     g/C                    Approach:
     Mvmts   Cap     Flow    Ratio   Ratio   Delay   LOS   Delay   LOS
     -----  ----   -------   -----   -----   -----   ---   -----   ---
EB   L       267     1805    0.251   0.148    33.0    D     4.4     A
     TR     4310     5541    0.467   0.778     3.4    A
WB   TR     3379     5563    0.535   0.607    10.1    B    10.1     B
NB   LT      308     1730    0.176   0.178    30.5    D    30.3     D
     R       287     1615    0.049   0.178    29.7    D
SB   LT      313     1758    0.186   0.178    30.5    D    30.3     D
     R       287     1615    0.091   0.178    30.0    D
               Intersection Delay =   7.9 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   6.0 sec   Critical v/c(x)     = 0.414
-----------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                  Phillip Rowell And Associates
=======================================================================
Streets: (E-W) Ala Moana Bl.              (N-S) Channel St.
Analyst: PJR                              File Name: 2PMEX.HC9
Area Type: Other                          11-13-98
Comment: Existing Weekday PM Conditions
=======================================================================
             |   Eastbound    |   Westbound    |   Northbound   |   Southbound
             | L    T    R    | L    T    R    | L    T    R    | L    T    R
             |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes    | 0    3  < 0  | 1    3    0  | 1    0    1  | 0    0    0
Volumes      |      2830   11|    5 2502     |   57        58|
Lane W (ft)|      12.0     |12.0 12.0     |12.0      12.0|
RTOR Vols    |              0|              0|              0|
Lost Time    |      3.00 3.00|3.00 3.00     |3.00      3.00|
-----------------------------------------------------------------------
                        Signal Operations
Phase Combination 1     2     3     4 |                5     6     7     8
EB  Left                              |NB  Left        *
    Thru                *             |    Thru
    Right               *             |    Right       *
    Peds                *             |    Peds        *
WB  Left          *                   |SB  Left
    Thru          *     *             |    Thru
    Right                             |    Right
    Peds                              |    Peds
NB  Right                             |EB  Right
SB  Right                             |WB  Right
Green           10.0A 94.0A           |Green    20.0A
Yellow/AR        0.0   3.0            |Yellow/AR 3.0
Cycle Length: 130 secs  Phase combination order: #1 #2 #5
-----------------------------------------------------------------------
                 Intersection Performance Summary
     Lane  Group:  Adj Sat    v/c     g/C                    Approach:
     Mvmts   Cap     Flow    Ratio   Ratio   Delay   LOS   Delay   LOS
     -----  ----   -------   -----   -----   -----   ---   -----   ---
EB   TR     4038     5584    0.816   0.723     8.8    B     8.8     B
WB   L        95     1770    0.126   0.054    37.9    D     4.0     A
     T      4470     5588    0.669   0.800     3.9    A
NB   L       278     1805    0.360   0.154    32.2    D    32.5     D
     R       248     1615    0.419   0.154    32.8    D
               Intersection Delay =   7.4 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   9.0 sec   Critical v/c(x)     = 0.710
-----------------------------------------------------------------------
```

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                 Phillip Rowell And Associates
========================================================================
Streets: (E-W) Ala Moana Bl.               (N-S) Channel St.
Analyst: PJR                               File Name: 25ATEX.HC9
Area Type: Other                           11-13-98
Comment: Existing Saturday Conditions
========================================================================
           |  Eastbound   |  Westbound   |  Northbound  |  Southbound
           | L    T    R  | L    T    R  | L    T    R  | L    T    R
           |----  ----  ----|----  ----  ----|----  ----  ----|----  ----  ----
No. Lanes  | 0    3 <  0  | 1    3    0  | 1    0    1  | 0    0    0
Volumes    |    1396   20 |   3 1192     |    4      2  |
Lane W (ft)|    12.0      |12.0 12.0     |12.0     12.0 |
RTOR Vols  |            0 |            0 |            0 |
Lost Time  |    3.00 3.00 |3.00 3.00     |3.00     3.00 |
------------------------------------------------------------------------
                            Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB  Left                           |NB  Left      *
    Thru               *           |    Thru
    Right              *           |    Right     *
    Peds               *           |    Peds      *
WB  Left          *                |SB  Left
    Thru          *    *           |    Thru
    Right                          |    Right
    Peds                           |    Peds
NB  Right                          |EB  Right
SB  Right                          |WB  Right
Green          10.0A 94.0A         |Green      20.0A
Yellow/AR        0.0   3.0         |Yellow/AR 3.0
Cycle Length: 130 secs  Phase combination order: #1 #2 #5
------------------------------------------------------------------------
                  Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                    Approach:
     Mvmts   Cap     Flow    Ratio   Ratio   Delay  LOS   Delay  LOS
     -----  -----  -------  ------  ------  ------  ---   ------ ---
EB   TR     4027     5569   0.434   0.723     4.7    A      4.7   A
WB   L        95     1770   0.042   0.054    37.7    D      2.4   A
     T      4470     5588   0.319   0.800     2.3    A
NB   L       278     1805   0.029   0.154    30.2    D     30.2   D
     R       248     1615   0.016   0.154    30.1    D
            Intersection Delay =    3.8 sec/veh Intersection LOS = A
Lost Time/Cycle, L =    9.0 sec   Critical v/c(x)     = 0.344
------------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                 Phillip Rowell And Associates
========================================================================
Streets: (E-W) Ala Moana Bl.               (N-S) Channel St.
Analyst: PJR                               File Name: 2PMCUMB.HC9
Area Type: Other                           11-13-98
Comment: Cumulative Weekday PM, With Ilalo St. Extension
========================================================================
           |  Eastbound   |  Westbound   |  Northbound  |  Southbound
           | L    T    R  | L    T    R  | L    T    R  | L    T    R
           |----  ----  ----|----  ----  ----|----  ----  ----|----  ----  ----
No. Lanes  | 0    3 <  0  | 1    3    0  | 1    0    1  | 0    0    0
Volumes    |    3043   11 |   5 2874     |   58     59  |
Lane W (ft)|    12.0      |12.0 12.0     |12.0     12.0 |
RTOR Vols  |            0 |            0 |            0 |
Lost Time  |    3.00 3.00 |3.00 3.00     |3.00     3.00 |
------------------------------------------------------------------------
                            Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB  Left                           |NB  Left      *
    Thru               *           |    Thru
    Right              *           |    Right     *
    Peds               *           |    Peds      *
WB  Left          *                |SB  Left
    Thru          *    *           |    Thru
    Right                          |    Right
    Peds                           |    Peds
NB  Right                          |EB  Right
SB  Right                          |WB  Right
Green          10.0A 94.0A         |Green      20.0A
Yellow/AR        0.0   3.0         |Yellow/AR 3.0
Cycle Length: 130 secs  Phase combination order: #1 #2 #5
------------------------------------------------------------------------
                  Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                    Approach:
     Mvmts   Cap     Flow    Ratio   Ratio   Delay  LOS   Delay  LOS
     -----  -----  -------  ------  ------  ------  ---   ------ ---
EB   TR     4038     5584   0.877   0.723    10.6    B     10.6   B
WB   L        95     1770   0.126   0.054    37.9    D      5.1   B
     T      4471     5588   0.769   0.800     5.0    A
NB   L       278     1805   0.367   0.154    32.2    D     32.6   D
     R       248     1615   0.423   0.154    32.9    D
            Intersection Delay =    8.6 sec/veh Intersection LOS = B
Lost Time/Cycle, L =    9.0 sec   Critical v/c(x)     = 0.758
------------------------------------------------------------------------
```

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 03-01-1999
Phillip Rowell And Associates

Streets: (E-W) Ala Moana Bl. (N-S) Channel St.
Analyst: PJR File Name: 2SACUMB.HC9
Area Type: Other 11-13-98
Comment: Cumulative Saturday, With Ilalo St. Extension

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	< 0	1	3	0	1	0	1	0	0	0
Volumes		1604	21	3	1480		4		2			
Lane W (ft)		12.0		12.0	12.0		12.0		12.0			
RTOR Vols			0			0			0			
Lost Time		3.00	3.00	3.00	3.00		3.00		3.00			

Signal Operations

```
Phase Combination 1     2     3     4 |            5     6     7     8
EB  Left                              |NB  Left    *
    Thru                *             |    Thru
    Right               *             |    Right   *
    Peds                *             |    Peds    *
WB  Left          *                   |SB  Left
    Thru          *     *             |    Thru
    Right                             |    Right
    Peds                              |    Peds
NB  Right                             |EB  Right
SB  Right                             |WB  Right
Green          10.0A 94.0A            |Green    20.0A
Yellow/AR       0.0   3.0             |Yellow/AR 3.0
Cycle Length: 130 secs  Phase combination order: #1 #2 #5
```

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	TR	4030	5574	0.469	0.723	4.9	A	4.9	A
WB	L	95	1770	0.073	0.054	37.7	D	2.6	A
	T	4471	5588	0.396	0.800	2.5	A		
NB	L	278	1805	0.025	0.154	30.2	D	30.2	D
	R	248	1615	0.016	0.154	30.1	D		

Intersection Delay = 3.9 sec/veh Intersection LOS = A
Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.373

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 03-01-1999
Phillip Rowell And Associates

Streets: (E-W) Ala Moana Bl. (N-S) Punchbowl Street
Analyst: PJR File Name: 3PMEX.HC9
Area Type: Other 11-13-98
Comment: Existing Weekday PM Conditions

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	3	0	0	3	0	0	0	0	2	0	2
Volumes		2575			2559					565		266
Lane W (ft)		12.0			12.0					12.0		12.0
RTOR Vols			0			0						0
Lost Time		3.00			3.00					3.00		3.00

Signal Operations

```
Phase Combination 1     2     3     4 |            5     6     7     8
EB  Left                              |NB  Left
    Thru          *                   |    Thru
    Right                             |    Right
    Peds                              |    Peds
WB  Left                              |SB  Left    *
    Thru          *                   |    Thru
    Right                             |    Right   *
    Peds          *                   |    Peds    *
NB  Right                             |EB  Right
SB  Right                             |WB  Right
Green           94.0A                 |Green    30.0A
Yellow/AR        3.0                  |Yellow/AR 3.0
Cycle Length: 130 secs  Phase combination order: #1 #5
```

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	T	4041	5588	0.746	0.723	7.5	B	7.5	B
WB	T	4041	5588	0.741	0.723	7.5	B	7.5	B
SB	L	833	3610	0.777	0.231	33.5	D	31.7	D
	R	745	3230	0.448	0.231	28.0	D		

Intersection Delay = 10.9 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.753

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                         Phillip Rowell And Associates
==========================================================================
Streets: (E-W) Ala Moana Bl.                  (N-S) Punchbowl Street
Analyst: PJR                                  File Name: 3SATEX.HC9
Area Type: Other                              11-13-98
Comment: Existing Saturday Conditions
==========================================================================
              |  Eastbound    |  Westbound    |  Northbound   |  Southbound
              | L    T    R   | L    T    R   | L    T    R   | L    T    R
              |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes     | 0    3    0   | 0    3    0   | 0    0    0   | 2    0    2
Volumes       |     1251      |     1196      |               | 165       105
Lane W (ft)   |     12.0      |     12.0      |               |12.0       12.0
RTOR Vols     |              0|              0|               |             0
Lost Time     |     3.00      |     3.00      |               |3.00       3.00
--------------------------------------------------------------------------
                              Signal Operations
Phase Combination 1     2     3     4 |               5     6     7     8
EB  Left                              |NB  Left
    Thru          *                   |    Thru
    Right                             |    Right
    Peds                              |    Peds
WB  Left                              |SB  Left       *
    Thru          *                   |    Thru
    Right                             |    Right      *
    Peds          *                   |    Peds       *
NB  Right                             |EB  Right
SB  Right                             |WB  Right
Green          94.0A                  |Green     30.0A
Yellow/AR       3.0                   |Yellow/AR 3.0
Cycle Length: 130 secs  Phase combination order: #1 #5
--------------------------------------------------------------------------
                    Intersection Performance Summary
     Lane   Group:  Adj Sat    v/c     g/C                     Approach:
     Mvmts   Cap     Flow     Ratio   Ratio    Delay   LOS   Delay   LOS
     -----  ----   -------   -----   -----    -----   ---   -----   ---
EB   T      4041     5588    0.378   0.723     4.5    A      4.5    A
WB   T      4041     5588    0.362   0.723     4.4    A      4.4    A
SB   L       833     3610    0.242   0.231    26.4    D     26.3    D
     R       745     3230    0.212   0.231    26.1    D
            Intersection Delay =   6.8 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   6.0 sec   Critical v/c(x)    = 0.346
--------------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                         Phillip Rowell And Associates
==========================================================================
Streets: (E-W) Ala Moana Bl.                  (N-S) Punchbowl Street
Analyst: PJR                                  File Name: 3PMCUMB.HC9
Area Type: Other                              11-13-98
Comment: Cumulative Weekday PM, With Ilalo St. Extension
==========================================================================
              |  Eastbound    |  Westbound    |  Northbound   |  Southbound
              | L    T    R   | L    T    R   | L    T    R   | L    T    R
              |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes     | 0    3    1   | 0    3    0   | 2  > 0  < 0   | 1  > 1    2
Volumes       |     2791  147|     2932      | 165          5| 258   44  579
PHF or PK15   |     0.94 0.54|     0.94      |0.73      0.50|0.90 0.38 0.90
Lane W (ft)   |     12.0 12.0|     12.0      |12.0 12.0      |12.0 12.0 12.0
Grade         |        0      |        0      |        0      |        0
% Heavy Veh   |        2     2|        2      |    0         0|    0    0    0
Parking       |N       N      |N       N      |N       N      |N       N
Bus Stops     |              0|              0|              0|             0
Con. Peds     |              0|              0|              0|             0
Ped Button    |(Y/N) N        |(Y/N) N        |(Y/N) N        |(Y/N) N
Arr Type      |        3     3|        3      |    3    3     |    3    3    3
RTOR Vols     |             60|              0|              0|           200
Lost Time     |     3.00 3.00|     3.00      |3.00      3.00|3.00 3.00 3.00
Prop. Share   |               |               |  23           |  35        50
Prop. Prot.   |               |               |               |
--------------------------------------------------------------------------
                              Signal Operations
Phase Combination 1     2     3     4 |               5     6     7     8
EB  Left                              |NB  Left             *
    Thru          *                   |    Thru
    Right         *                   |    Right            *
    Peds                              |    Peds
WB  Left                              |SB  Left       *
    Thru          *                   |    Thru       *
    Right                             |    Right      *
    Peds          *                   |    Peds       *
NB  Right                             |EB  Right
SB  Right                             |WB  Right
Green          82.0A                  |Green     22.0A 22.0A
Yellow/AR       3.0                   |Yellow/AR 3.0   3.0
Cycle Length: 135 secs  Phase combination order: #1 #5 #6
--------------------------------------------------------------------------
                    Intersection Performance Summary
     Lane   Group:  Adj Sat    v/c     g/C                     Approach:
     Mvmts   Cap     Flow     Ratio   Ratio    Delay   LOS   Delay   LOS
     -----  ----   -------   -----   -----    -----   ---   -----   ---
EB   T      3394     5588    0.962   0.607    22.5    C     21.8    C
     R       962     1583    0.167   0.607     7.5    B
WB   T      3394     5588    1.011   0.607    31.4    D     31.4    D
NB   L       588     3610    0.304   0.163    32.2    D     32.1    D
     LR      290     1779    0.214   0.163    31.7    D
SB   L       294     1805    0.636   0.163    37.2    D     44.4    E
     LT      303     1857    0.714   0.163    39.8    D
     R       526     3230    0.904   0.163    49.4    E
            Intersection Delay =  28.7 sec/veh Intersection LOS = D
Lost Time/Cycle, L =   9.0 sec   Critical v/c(x)    = 0.869
--------------------------------------------------------------------------
```

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 03-01-1999
Phillip Rowell And Associates

Streets: (E-W) Ala Moana Bl. (N-S) Punchbowl Street
Analyst: PJR File Name: 3SACUMB.HC9
Area Type: Other 11-13-98
Comment: Cumulative Saturday, With Ilalo St. Extension

	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R
No. Lanes	0	3	1	0	3	0	3	> 0	< 0	2	> 1	2
Volumes		1440	76		1484		125		5	180	12	108
Lane W (ft)		12.0	12.0		12.0		12.0	12.0		12.0	12.0	12.0
RTOR Vols			40			0			0			40
Lost Time		3.00	3.00		3.00		3.00		3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left					NB Left		*		
Thru	*				Thru				
Right	*				Right		*		
Peds					Peds				
WB Left					SB Left	*			
Thru	*				Thru	*			
Right					Right	*			
Peds	*				Peds	*			
NB Right					EB Right		*		
SB Right					WB Right				
Green	76.0A				Green	25.0A	25.0P		
Yellow/AR	3.0				Yellow/AR	3.0	3.0		

Cycle Length: 135 secs Phase combination order: #1 #5 #6

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	Approach: LOS
EB	T	3146	5588	0.536	0.563	12.1	B	11.7	B
	R	1220	1583	0.055	0.770	2.4	A		
WB	T	3146	5588	0.552	0.563	12.2	B	12.2	B
NB	L	1003	5415	0.124	0.185	29.6	D	29.8	D
	LR	329	1778	0.185	0.185	30.0	D		
SB	L	669	3610	0.238	0.185	30.3	D	30.2	D
	LT	342	1846	0.228	0.185	30.3	D		
	R	598	3230	0.144	0.185	29.8	D		

Intersection Delay = 14.3 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.417

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 03-02-1999
Phillip Rowell And Associates

Streets: (E-W) Ala Moana Bl. (N-S) Punchbowl Street
Analyst: PJR File Name: 3PMPLANE.HC9
Area Type: Other 11-13-98
Comment: Cumulative Plus Project Weekday PM, With Ilalo St. Extension

	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R	Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R
No. Lanes	0	3	1	0	3	0	2	> 0	< 0	1	> 1	2
Volumes		2851	361		2957		386		46	258	44	579
PHF or PK15		0.94	0.54		0.94		0.90		0.90	0.90	0.38	0.90
Lane W (ft)		12.0	12.0		12.0		12.0	12.0		12.0	12.0	12.0
Grade		0			0			0			0	
% Heavy Veh		2	2		2		0		0	0	0	0
Parking	N	N		N	N		N	N		N	N	
Bus Stops			0			0			0			0
Con. Peds			0			0			0			0
Ped Button	(Y/N)	N		(Y/N)	N		(Y/N)	N		(Y/N)	N	
Arr Type		4	4		4		3	3		3	3	3
RTOR Vols			125			0			0			200
Lost Time		3.00	3.00		3.00		3.00		3.00	3.00	3.00	3.00
Prop. Share							20			35		50
Prop. Prot.												

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left					NB Left		*		
Thru	*				Thru				
Right	*				Right		*		
Peds					Peds				
WB Left					SB Left	*			
Thru	*				Thru	*			
Right					Right	*			
Peds	*				Peds	*			
NB Right					EB Right		*		
SB Right					WB Right				
Green	82.0A				Green	22.0A	22.0P		
Yellow/AR	3.0				Yellow/AR	3.0	3.0		

Cycle Length: 135 secs Phase combination order: #1 #5 #6

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	Approach: LOS
EB	T	3394	5588	0.983	0.607	27.0	D	24.2	C
	R	1255	1583	0.349	0.793	3.1	A		
WB	T	3394	5588	1.020	0.607	35.0	D	35.0	D
NB	L	588	3610	0.600	0.163	41.1	E	40.8	E
	LR	283	1739	0.483	0.163	40.1	E		
SB	L	294	1805	0.636	0.163	43.2	E	50.6	E
	LT	303	1857	0.714	0.163	45.9	E		
	R	526	3230	0.904	0.163	55.7	E		

Intersection Delay = 32.2 sec/veh Intersection LOS = D
Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.926

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-02-1999
                     Phillip Rowell And Associates
=======================================================================
Streets: (E-W) Ala Moana Bl.              (N-S) Punchbowl Street
Analyst: PJR                              File Name: 3SAPLANF.HC9
Area Type: Other                          11-13-98
Comment: Cumulative Plus Project Saturday, With Ilalo St. Extension
=======================================================================
           |  Eastbound    |  Westbound    |  Northbound   |  Southbound
           | L    T    R   | L    T    R   | L    T    R   | L    T    R
           |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes  | 0    3    1  | 0    3    0  | 2  > 0  < 0  | 1  > 1    2
Volumes    |     1493  290|     1564     | 346        46| 180   12  108
PHF or PK15|     0.94 0.54|     0.94     |0.73      0.50|0.90 0.38 0.90
Lane W (ft)|     12.0 12.0|     12.0     |12.0 12.0     |12.0 12.0 12.0
Grade      |        0     |        0     |        0     |        0
% Heavy Veh|        2    2|        2     |   0         0|  0    0    0
Parking    |N       N     |N       N     |N       N     |N       N
Bus Stops  |             0|             0|             0|             0
Con. Peds  |             0|             0|             0|             0
Ped Button |(Y/N) N       |(Y/N) N       |(Y/N) N       |(Y/N) N
Arr Type   |        3    3|        3     |   3    3     |  3    3    3
RTOR Vols  |           120|             0|             0|            50
Lost Time  |     3.00 3.00|     3.00     |3.00      3.00|3.00 3.00 3.00
Prop. Share|              |              |  20          |  40       30
Prop. Prot.|              |              |              |
-----------------------------------------------------------------------
                          Signal Operations
Phase Combination 1     2     3     4 |            5     6     7     8
EB  Left                              |NB  Left          *
    Thru          *                   |    Thru
    Right         *                   |    Right         *
    Peds                              |    Peds
WB  Left                              |SB  Left    *
    Thru          *                   |    Thru    *
    Right                             |    Right   *
    Peds          *                   |    Peds    *
NB  Right                             |EB  Right         *
SB  Right                             |WB  Right
Green          76.0A                  |Green     25.0A 25.0A
Yellow/AR       3.0                   |Yellow/AR 3.0   3.0
Cycle Length: 135 secs  Phase combination order: #1 #5 #6
-----------------------------------------------------------------------
                 Intersection Performance Summary
     Lane  Group:  Adj Sat   v/c    g/C                  Approach:
     Mvmts  Cap     Flow    Ratio  Ratio   Delay  LOS   Delay  LOS
     -----  ----   -------  -----  -----   -----  ---   -----  ---
EB   T      3146    5588    0.555  0.563    12.3   B    10.9    B
     R      1220    1583    0.258  0.770     2.9   A
WB   T      3146    5588    0.582  0.563    12.6   B    12.6    B
NB   L       669    3610    0.583  0.185    33.4   D    33.8    D
     LR      318    1716    0.588  0.185    34.6   D
SB   L       334    1805    0.359  0.185    31.3   D    30.8    D
     LT      340    1834    0.330  0.185    31.0   D
     R       598    3230    0.120  0.185    29.6   D
            Intersection Delay =  15.6 sec/veh Intersection LOS = C
Lost Time/Cycle, L =   9.0 sec   Critical v/c(x)    = 0.539
-----------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                     Phillip Rowell And Associates
=======================================================================
Streets: (E-W) Nimitz Eastbound           (N-S) Pacific Street
Analyst: PJR                              File Name: 4PMEX.HC9
Area Type: Other                          11-18-98
Comment: Existing Weekday PM Conditions
=======================================================================
           |  Eastbound    |  Westbound    |  Northbound   |  Southbound
           | L    T    R   | L    T    R   | L    T    R   | L    T    R
           |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes  | 0  > 4  < 0  | 0    0    0  | 0    1    1  | 1    1    0
Volumes    | 187 2525   23|              |       77   20| 150   12
Lane W (ft)|     12.0     |              |     12.0 12.0|12.0 12.0
RTOR Vols  |             0|              |             0|             0
Lost Time  |3.00 3.00 3.00|              |     3.00 3.00|3.00 3.00
-----------------------------------------------------------------------
                          Signal Operations
Phase Combination 1     2     3     4 |            5     6     7     8
EB  Left          *                   |NB  Left
    Thru          *                   |    Thru    *
    Right         *                   |    Right   *
    Peds                              |    Peds
WB  Left                              |SB  Left    *
    Thru                              |    Thru    *
    Right                             |    Right
    Peds                              |    Peds
NB  Right                             |EB  Right
SB  Right                             |WB  Right
Green          66.0P                  |Green     18.0P
Yellow/AR       3.0                   |Yellow/AR 3.0
Cycle Length:  90 secs  Phase combination order: #1 #5
-----------------------------------------------------------------------
                 Intersection Performance Summary
     Lane  Group:  Adj Sat   v/c    g/C                  Approach:
     Mvmts  Cap     Flow    Ratio  Ratio   Delay  LOS   Delay  LOS
     -----  ----   -------  -----  -----   -----  ---   -----  ---
EB   LTR    5431    7406    0.611  0.733     4.6   A     4.6    A
NB   T       373    1863    0.362  0.200    23.9   C    23.6    C
     R       317    1583    0.114  0.200    22.4   C
SB   L       211    1054    0.816  0.200    40.6   E    38.7    D
     T       373    1863    0.054  0.200    22.1   C
            Intersection Delay =   7.2 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   6.0 sec   Critical v/c(x)    = 0.655
-----------------------------------------------------------------------
```

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                      Phillip Rowell And Associates
==========================================================================
Streets: (E-W) Nimitz Eastbound          (N-S) Pacific Street
Analyst: PJR                             File Name: 4PMCUM.HC9
Area Type: Other                         11-18-98
Comment: Cumulative Weekday PM Conditions
==========================================================================
             |  Eastbound    |  Westbound    |  Northbound   |  Southbound
             | L    T    R   | L    T    R   | L    T    R   | L    T    R
             |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes    | 0  > 4  < 0  | 0    0    0  | 0    1    1  | 1    1    0
Volumes      | 197 2711   24|              |      81   21| 158   13
PHF or PK15  |0.83 0.92 0.48|              |    0.57 0.56|0.87 0.60
Lane W (ft)  |     12.0     |              |    12.0 12.0|12.0 12.0
Grade        |        0     |              |       0     |        0
% Heavy Veh  |   2    2    2|              |       2    2|   2    2
Parking      |N        N    |              |N      N     |N       N
Bus Stops    |             0|              |            0|             0
Con. Peds    |             0|             0|            0|             0
Ped Button   |(Y/N) N       |              |(Y/N) N      |(Y/N) N
Arr Type     |        3     |              |       3    3|   3    3
RTOR Vols    |             0|              |            0|             0
Lost Time    |3.00 3.00 3.00|              |    3.00 3.00|3.00 3.00
Prop. Share  |              |              |             |
Prop. Prot.  |              |              |             |
--------------------------------------------------------------------------
                           Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB  Left          *                |NB  Left
    Thru          *                |    Thru      *
    Right         *                |    Right     *
    Peds                           |    Peds
WB  Left                           |SB  Left      *
    Thru                           |    Thru      *
    Right                          |    Right
    Peds                           |    Peds
NB  Right                          |EB  Right
SB  Right                          |WB  Right
Green          66.0P               |Green     18.0P
Yellow/AR       3.0                |Yellow/AR 3.0
Cycle Length:   90 secs  Phase combination order: #1 #5
--------------------------------------------------------------------------
                  Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                     Approach:
     Mvmts  Cap     Flow      Ratio   Ratio   Delay  LOS   Delay  LOS
     -----  ----    -------   -----   -----   -----  ---   -----  ---
EB   LTR    5432    7407      0.655   0.733     4.9   A      4.9   A
NB   T       373    1863      0.381   0.200    24.0   C     23.7   C
     R       317    1583      0.117   0.200    22.4   C
SB   L       203    1016      0.896   0.200    51.8   E     48.6   E
     T       373    1863      0.059   0.200    22.2   C
               Intersection Delay =   8.0 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   6.0 sec   Critical v/c(x)    = 0.706
--------------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                      Phillip Rowell And Associates
==========================================================================
Streets: (E-W) Nimitz Eastbound          (N-S) Pacific Street
Analyst: PJR                             File Name: 4PMPROJ.HC9
Area Type: Other                         11-18-98
Comment: Cumulative Plus Project Weekday PM Conditions
==========================================================================
             |  Eastbound    |  Westbound    |  Northbound   |  Southbound
             | L    T    R   | L    T    R   | L    T    R   | L    T    R
             |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes    | 0  > 4  < 0  | 0    0    0  | 0    1    1  | 1    1    0
Volumes      | 197 2925   26|              |      28   75| 158   90
PHF or PK15  |0.83 0.92 0.48|              |    0.57 0.56|0.87 0.60
Lane W (ft)  |     12.0     |              |    12.0 12.0|12.0 12.0
Grade        |        0     |              |       0     |        0
% Heavy Veh  |   2    2    2|              |       2    2|   2    2
Parking      |N        N    |              |N      N     |N       N
Bus Stops    |             0|              |            0|             0
Con. Peds    |             0|             0|            0|             0
Ped Button   |(Y/N) N       |              |(Y/N) N      |(Y/N) N
Arr Type     |        3     |              |       3    3|   3    3
RTOR Vols    |             0|              |            0|             0
Lost Time    |3.00 3.00 3.00|              |    3.00 3.00|3.00 3.00
Prop. Share  |              |              |             |
Prop. Prot.  |              |              |             |
--------------------------------------------------------------------------
                           Signal Operations
Phase Combination 1    2    3    4 |              5    6    7    8
EB  Left          *                |NB  Left
    Thru          *                |    Thru      *
    Right         *                |    Right     *
    Peds                           |    Peds
WB  Left                           |SB  Left      *
    Thru                           |    Thru      *
    Right                          |    Right
    Peds                           |    Peds
NB  Right                          |EB  Right
SB  Right                          |WB  Right
Green          59.0P               |Green     25.0P
Yellow/AR       3.0                |Yellow/AR 3.0
Cycle Length:   90 secs  Phase combination order: #1 #5
--------------------------------------------------------------------------
                  Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                     Approach:
     Mvmts  Cap     Flow      Ratio   Ratio   Delay  LOS   Delay  LOS
     -----  ----    -------   -----   -----   -----  ---   -----  ---
EB   LTR    4857    7408      0.786   0.656     9.0   B      9.0   B
NB   T       517    1863      0.095   0.278    18.3   C     19.3   C
     R       440    1583      0.305   0.278    19.6   C
SB   L       428    1540      0.425   0.278    20.7   C     20.1   C
     T       517    1863      0.290   0.278    19.5   C
               Intersection Delay =  10.3 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   6.0 sec   Critical v/c(x)    = 0.679
--------------------------------------------------------------------------
```

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                      Phillip Rowell And Associates
=========================================================================
Streets: (E-W) Nimitz Westbound               (N-S) Pacific Street
Analyst: PJR                                  File Name: 5PMEX.HC9
Area Type: Other                              11-18-98
Comment: Existing Weekday PM Conditions
=========================================================================
               |  Eastbound     |  Westbound     |  Northbound    |  Southbound
               |  L    T    R   |  L    T    R   |  L    T    R   |  L    T    R
               |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes      |  0    0    0   |  0  > 4  < 0   |  1    1    0   |  0    1    0
Volumes        |                |  63 2776  103|   78  172       |       117
Lane W (ft)|                    |      12.0      |12.0 12.0        |      12.0
RTOR Vols      |                |               0|              0|            0
Lost Time      |                |3.00 3.00 3.00|3.00 3.00         |      3.00
-------------------------------------------------------------------------
                                  Signal Operations
Phase Combination 1      2      3      4 |          5     6     7     8
EB  Left                                 |NB  Left   *
    Thru                                 |    Thru   *
    Right                                |    Right
    Peds                                 |    Peds
WB  Left        *                        |SB  Left
    Thru        *                        |    Thru   *
    Right       *                        |    Right
    Peds                                 |    Peds
NB  Right                                |EB  Right
SB  Right                                |WB  Right
Green         66.0P                      |Green     18.0P
Yellow/AR      3.0                       |Yellow/AR 3.0
Cycle Length:  90 secs  Phase combination order: #1 #5
-------------------------------------------------------------------------
                     Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                      Approach:
     Mvmts   Cap     Flow     Ratio   Ratio    Delay   LOS    Delay   LOS
     -----   ----   -------   -----   -----    -----   ---    -----   ---
WB   LTR     5427    7400     0.672   0.733     5.0     A      5.0     A
NB   L        151     753     0.691   0.200    33.8     D     43.9     E
     T        373    1863     0.923   0.200    47.0     E
SB   T        373    1863     0.373   0.200    24.0     C     24.0     C
               Intersection Delay =  9.8 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   6.0 sec   Critical v/c(x)     = 0.726
-------------------------------------------------------------------------
```



```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                      Phillip Rowell And Associates
=========================================================================
Streets: (E-W) Nimitz Westbound               (N-S) Pacific Street
Analyst: PJR                                  File Name: 5PMCUM.HC9
Area Type: Other                              11-18-98
Comment: Cumulative Weekday PM Conditions
=========================================================================
               |  Eastbound     |  Westbound     |  Northbound    |  Southbound
               |  L    T    R   |  L    T    R   |  L    T    R   |  L    T    R
               |---- ---- ----|---- ---- ----|---- ---- ----|---- ---- ----
No. Lanes      |  0    0    0   |  0  > 4  < 0   |  1    1    0   |  0    1    0
Volumes        |                |  66 3120  108|   82  181       |       123
PHF or PK15|                    |0.93 0.89 0.80|0.75   86        |      0.84
Lane W (ft)|                    |      12.0      |12.0 12.0        |      12.0
Grade          |                |        0       |       0         |         0
% Heavy Veh|                    |   2    2     2|    2    2       |         2
Parking        |                |N          N    |N          N     |N        N
Bus Stops      |                |               0|              0|            0
Con. Peds      |               0|               0|              0|            0
Ped Button     |                |(Y/N) N         |(Y/N) N         |(Y/N) N
Arr Type       |                |          3     |   3    3       |         3
RTOR Vols      |                |               0|              0|            0
Lost Time      |                |3.00 3.00 3.00|3.00 3.00         |      3.00
Prop. Share|                    |                |                |
Prop. Prot.|                    |                |                |
-------------------------------------------------------------------------
                                  Signal Operations
Phase Combination 1      2      3      4 |          5     6     7     8
EB  Left                                 |NB  Left   *
    Thru                                 |    Thru   *
    Right                                |    Right
    Peds                                 |    Peds
WB  Left        *                        |SB  Left
    Thru        *                        |    Thru   *
    Right       *                        |    Right
    Peds                                 |    Peds
NB  Right                                |EB  Right
SB  Right                                |WB  Right
Green         66.0P                      |Green     18.0P
Yellow/AR      3.0                       |Yellow/AR 3.0
Cycle Length:  90 secs  Phase combination order: #1 #5
-------------------------------------------------------------------------
                     Intersection Performance Summary
     Lane   Group:  Adj Sat   v/c     g/C                      Approach:
     Mvmts   Cap     Flow     Ratio   Ratio    Delay   LOS    Delay   LOS
     -----   ----   -------   -----   -----    -----   ---    -----   ---
WB   LTR     5429    7403     0.752   0.733     5.9     B      5.9     B
NB   L        143     715     0.762   0.200    39.8     D     45.3     E
     T        373    1863     0.923   0.200    47.0     E
SB   T        373    1863     0.392   0.200    24.1     C     24.1     C
               Intersection Delay = 10.2 sec/veh Intersection LOS = B
Lost Time/Cycle, L =   6.0 sec   Critical v/c(x)     = 0.789
-------------------------------------------------------------------------
```

```
HCM: SIGNALIZED INTERSECTION SUMMARY   Version 2.4g        03-01-1999
                    Phillip Rowell And Associates
=======================================================================
Streets: (E-W) Nimitz Westbound          (N-S) Pacific Street
Analyst: PJR                             File Name: 5PMPROJ.HC9
Area Type: Other                         11-18-98
Comment: Cumulative Plus Project Weekday PM Conditions
=======================================================================
              |  Eastbound   |  Westbound     |  Northbound  |  Southbound
              | L    T    R  | L    T    R    | L    T    R  | L    T    R
              |---- ---- ----|---- ---- ----  |---- ---- ----|---- ---- ----
No. Lanes     | 0    0    0  | 0  > 4  < 0    | 1    1    0  | 0    1    0
Volumes       |              | 146 3341  108  | 78   132     |     121
PHF or PK15   |              |0.93 0.89 0.80  |0.75   86     |     0.84
Lane W (ft)   |              |      12.0      |12.0 12.0     |     12.0
Grade         |              |       0        |       0      |       0
% Heavy Veh   |              |  2    2    2   |  2    2      |       2
Parking       |              |N         N     |N         N   |N         N
Bus Stops     |              |                |       0      |       0      0
Con. Peds     |              |     0          |       0      |       0      0
Ped Button    |              |(Y/N) N         |(Y/N) N       |(Y/N) N
Arr Type      |              |          3     |  3    3      |          3
RTOR Vols     |              |           25   |              |       0      0
Lost Time     |              |3.00 3.00 3.00  |3.00 3.00     |     3.00
Prop. Share   |              |                |              |
Prop. Prot.   |              |                |              |
-----------------------------------------------------------------------
                         Signal Operations
Phase Combination 1    2    3    4  |            5    6    7    8
EB  Left                            |NB  Left    *
    Thru                            |    Thru    *
    Right                           |    Right
    Peds                            |    Peds
WB  Left         *                  |SB  Left
    Thru         *                  |    Thru    *
    Right        *                  |    Right
    Peds                            |    Peds
NB  Right                           |EB  Right
SB  Right                           |WB  Right
Green         59.0P                 |Green     25.0P
Yellow/AR      3.0                  |Yellow/AR 3.0
Cycle Length:  90 secs  Phase combination order: #1 #5
-----------------------------------------------------------------------
                 Intersection Performance Summary
      Lane   Group:  Adj Sat   v/c     g/C                   Approach:
      Mvmts   Cap     Flow    Ratio   Ratio   Delay   LOS   Delay   LOS
      -----  -----  -------  ------  ------  ------  ---   ------  ---
WB    LTR    4856     7408   0.910   0.656    12.2    B     12.2    B
NB    L       255      918   0.408   0.278    20.7    C     23.3    C
      T       517     1863   0.665   0.278    24.1    C
SB    T       517     1863   0.278   0.278    19.4    C     19.4    C
             Intersection Delay =  13.4 sec/veh Intersection LOS = B
Lost Time/Cycle, L =  6.0 sec   Critical v/c(x)     = 0.837
-----------------------------------------------------------------------
```


APPENDIX C

INTERISLAND CRUISE SHIP TRAFFIC SURVEY

Appendix C

Interisland Cruise Ship Traffic Survey

A. Purpose and Objective

The primary objective of the traffic survey was to determine the amount of traffic generated by the operation of interisland cruise ships. This information will be used to estimate future traffic resulting from relocation and/or expansion of interisland cruise ship operations at Honolulu Harbor.

Additionally, vehicles were categorized so that estimates of the types of vehicles serving cruise ship operations and the length of time that vehicles dwell at the pier was determined.

B. Methodology

1. The counts were performed from 6:30 AM to 9:00 AM on Saturday, September 5, 1998. This time period was selected because vehicles start arriving at approximately 6:30 AM, which is the same time that the interisland cruise ship arrives and approximately one hour before the first passengers disembark from the cruise ship. These parameter were determined from field observations for the previous two weekends.

2. The number of vehicles arriving and departing the arrival area was recorded by category in 15-minute intervals. The vehicle categories recorded were private automobiles, trucks, taxis and buses. The busses were the full-sized vehicles with a capacity of approximately 40 persons.

3. The arrival and departure times of the buses were recorded for use in estimating the average dwell time at the arrival curbside.

C. Traffic Data

The results of the traffic survey is shown in Table C-1. The peak hourly volume is the sum of the peak hourly volume of each vehicle category. The sum of the peak for each category will be larger than the actual peak hourly volume counted since it is assumed that the peak of each category may occur concurrently. The sum of the peak inbound vehicles for all categories is 78 vehicles. The peak for the outbound volume is 51 vehicles per hour. The factor will be used to estimate future vehicular traffic generation.

D. Conclusions

1. A typical cruise ship arrival will generate 78 inbound and 51 outbound trips during the peak arrival and departure hours.

2. The number of trucks and passenger cars does not appear to be related to the number of cruise ship passengers. The majority of passenger depart the terminal area via taxis and full size buses. The remainder of the traffic is related to servicing the cruise ship, meeter and greeter services, and baggage services. Cruise ship staff appear to depart the area well after the passengers have left the area.

Table C-1 Interisland Cruise Ship Traffic Survey[1]

15-Minute Volumes

	Inbound				Outbound			
Time	Autos	Trucks	Taxis	Buses	Autos	Trucks	Taxis	Buses
6:30 to 6:45	[illegible]	1	1	0	1	2	0	0
6:45 to 7:00	[illegible]	2	1	0	4	1	0	0
7:00 to 7:30	[illegible]	[illegible]	0	1	4	1	0	0
7:15 to 7:30	[illegible]	[illegible]	1	0	4	1	1	0
7:30 to 7:45	11	[illegible]	1	[illegible]	5	0	3	2
7:45 to 8:00	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0
8:00 to 8:15	9	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8:15 to 8:30	6	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8:30 to 8:45	5	1	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]
8:45 to 9:00	6	2	7	3	4	1	6	[illegible]
Peak Hourly Volumes of Each Count								
Hourly Volume	41	13	18	6	21	7	18	5
Total[2]	78				51			

Notes:
(1) Survey was performed Saturday, September 5, 1998, from 6:30 AM to 9:00 AM.
(2) Volume shown is the total of the peak hourly volumes of each category of vehicle.

APPENDIX D

FOREIGN CRUISE SHIP TRAFFIC SURVEY

Appendix D

Foreign Cruise Ship Traffic Survey

A. Purpose and Objective

The primary objective of the traffic survey was to determine the amount of traffic generated by the arrival and departure foreign cruise ships. This information will be used to estimate future traffic resulting from construction of a new cruise ship terminal at Pier 2.

Additionally, vehicles were categorized so that estimates of the types of vehicles serving cruise ship operations and the length of time that vehicles dwell at the pier was determined.

B. Methodology

1. The counts were performed from 6:15 AM to 10:45 AM and from 4:30 PM to 7:00 PM on Friday, November 30, 1998. This morning survey period was selected since the cruise ship was scheduled to arrive at 6:30 AM. Passengers do not start arriving in the terminal area until 30 to 45 minutes later. The survey was terminated when no more passengers were in the terminal area. The afternoon survey period was selected because the cruise ship departure was scheduled for 8:00 PM. The survey was terminated at 7:00 because the terminal was closed to additional passengers.

2. The number of vehicles arriving and departing the arrival area was recorded by category in 15-minute intervals. The vehicle categories recorded were private automobiles, trucks, taxis and buses. The busses were the full-sized vehicles with a capacity of approximately 40 persons.

3. The arrival and departure times of the buses were recorded for use in estimating the average dwell time at the arrival curbside.

C. Survey Results and Conclusions

The results of the traffic survey is shown in Tables D-1 and D-2. The conclusions

1. Peak hour traffic conditions occur during the arrival of the cruise ship. During the arrival, there are 166 one-way trips whereas during the departure there were only 53 one-way trips. See table F-3.

2. During the cruise ship arrival, there were 9.50 inbound and 11.25 outbound trips per 100 passengers, assuming that the cruise ship was 100% occupied.

3. To assess worse-case conditions, the arrival of a cruise ship during afternoon peak hour traffic conditions (between 4 PM and PM on a weekday) should be examined.

Table D-1 Foreign Cruise Ship Arrival Traffic Survey

15-Minute Counts

Time Period Begins At:	Inbound Autos Pier 10	Inbound Autos Irwin Park	Inbound Autos Pier 11	Inbound Autos Total	Inbound Taxis	Inbound Trucks	Inbound Buses	Outbound Autos Pier 10	Outbound Autos Irwin Park	Outbound Autos Pier 11	Outbound Autos Total	Outbound Taxis	Outbound Trucks	Outbound Buses
6:15 AM	3	2	0	5	1	1	0	0	0	0	0	0	0	0
6:30 AM	[illegible]	0	0	10	1	5	0	3	0	0	3	0	1	0
6:45 AM	[illegible]	[illegible]	2	14	0	1	0	1	0	2	3	0	3	0
7:00 AM	[illegible]	[illegible]	2	4	1	0	0	0	0	2	2	0	0	0
7:15 AM	[illegible]	[illegible]	1	7	0	0	1	0	[illegible]	2	26	0	0	1
7:30 AM	1	[illegible]	0	1	1	3	2	0	[illegible]	0	7	1	0	0
7:45 AM	4	0	1	5	0	[illegible]	1	5	[illegible]	1	6	0	1	0
8:00 AM	4	0	2	6	0	[illegible]	0	0	[illegible]	2	2	0	0	0
8:15 AM	1	0	0	1	0	[illegible]	0	3	0	0	3	0	0	0
8:30 AM	1	0	0	1	3	[illegible]	0	[illegible]	0	0	2	8	4	1
8:45 AM	0	0	1	1	6	1	[illegible]	[illegible]	0	1	5	2	0	0
9:00 AM	4	0	0	4	0	0	[illegible]	[illegible]	0	0	5	0	1	[illegible]
9:15 AM	2	0	0	2	1	1	[illegible]	[illegible]	0	0	4	0	[illegible]	[illegible]
9:30 AM	0	0	[illegible]	0	[illegible]	0	[illegible]	0	0	[illegible]	0	[illegible]	[illegible]	[illegible]
9:45 AM	2	0	[illegible]	7	[illegible]	0	0	5	0	[illegible]	10	[illegible]	[illegible]	[illegible]
10:00 AM	0	0	[illegible]	3	[illegible]	3	0	0	0	[illegible]	3	[illegible]	[illegible]	1
10:15 AM	0	0	[illegible]	0	[illegible]	2	1	1	0	[illegible]	1	[illegible]	2	1
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	48	6	17	71	35	25	14	33	31	18	82	31	22	12
Peak Hourly Volume of Each Count														
	28	4	8	36	21	8	9	15	31	8	54	20	9	7
Totals				78							90			

NOTES:

(1) Survey was performed on Friday, November 30, 1996 from 6:15 AM to 10:45 AM. The cruise ship arriving was the Norwegian Dynasty, which has a capacity of 800 passengers and 300 crew members.

Table D-2 Foreign Cruise Ship Departure Traffic Survey

15-Minute Counts

Time Period Begins At:	Inbound Autos Pier 10	Inbound Autos Irwin Park	Inbound Autos Pier 11	Inbound Autos Total	Inbound Taxis	Inbound Trucks	Inbound Buses	Outbound Autos Pier 10	Outbound Autos Irwin Park	Outbound Autos Pier 11	Outbound Autos Total	Outbound Taxis	Outbound Trucks	Outbound Buses
4:30 PM	0	0	1	1	3	0	[illegible]	[illegible]	0	1	2	1	[illegible]	[illegible]
4:45 PM	[illegible]	0	0	5	[illegible]	[illegible]	[illegible]	[illegible]	0	0	6	[illegible]	[illegible]	[illegible]
5:00 PM	[illegible]	0	2	6	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0	[illegible]	[illegible]	[illegible]
5:15 PM	[illegible]	0	0	0	[illegible]	[illegible]	[illegible]	[illegible]	0	2	2	[illegible]	[illegible]	[illegible]
5:30 PM	[illegible]	0	0	0	[illegible]	[illegible]	1	0	0	0	0	[illegible]	0	1
5:45 PM	0	0	[illegible]	1	4	0	0	0	0	0	0	4	0	0
6:00 PM	0	0	[illegible]	0	0	1	0	0	0	[illegible]	1	0	1	0
6:15 PM	0	0	[illegible]	3	0	0	0	0	0	[illegible]	2	0	0	0
6:30 PM	0	0	[illegible]	0	1	0	1	0	0	[illegible]	1	1	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	[illegible]	0	0	1	0
Totals	9	0	7	18	17	4	4	7	0	7	14	17	4	4
Peak Hourly Volume of Each Count														
	9	0	4	13	9	3	2	7	0	4	11	11	2	2
Totals				27							28			

NOTES:

(1) Survey was performed on Friday, November 30, 1996 from 6:15 AM to 10:45 AM. The cruise ship arriving was the Norwegian Dynasty, which has a capacity of 800 passengers and 300 crew members.

(2) Irwin Park was open for public parking for Aloha Tower Marketplace. It was unlikely that any vehicles parked in Irwin Park were associated with the cruise ship departure because no pedestrian movements between the park and Pier 11 were observed.

Table D-3 Calculation of Trip Generation Rates[1]

Passenger Ship Capacity	800 Passenger											
Vehicle Classification and Parking Location	Cruise Ship Arrival						Cruise Ship Departure					
	Inbound		Outbound		Total		Inbound		Outbound		Total	
	Trips	Rate	Trips	Rate	Trips	Rate	Trips	Rate	Trips	Rate	Trips	Rate
Autos at Pier 10 Garage	26	3.25	15	1.88	41	5.13	9	1.13	7	0.88	16	2.00
Autos at Irwin Park	4	0.50	31	3.88	35	4.38	0	0.00	0	0.00	0	0.00
Autos at Pier 11 Curb	8	1.00	8	1.00	16	2.00	4	0.50	4	0.50	8	1.00
Total Autos	38	4.75	54	6.75	92	11.50	13	1.63	11	1.38	24	3.00
Trucks at Pier 10 Garage	8	1.00	9	1.13	17	2.13	3	0.38	2	0.25	5	0.63
Taxis	21	2.63	20	2.50	41	5.13	9	1.13	11	1.38	20	2.50
Buses	9	1.13	7	0.88	16	2.00	2	0.25	2	0.25	4	0.50
Total Vehicles	76	9.50	90	11.25	166	20.75	27	3.38	26	3.25	53	6.63

NOTES:
(1) Trip generation rate is calculated as trips per 100 passengers.

APPENDIX E

KEWALO BASIN EXCURSION VESSEL TRAFFIC SURVEY

Appendix E

Kewalo Basin Excursion Vehicle and Traffic Survey

A. Purpose and Objective

The purpose of the traffic survey was to determine the amount of traffic generated by the operation of excursion boats. This information will be used to estimate future traffic resulting from relocation and/or expansion of excursion cruise boat operations at Honolulu Harbor.

B. Methodology

The objective of the survey was accomplished by counting the number of excursion boats and the amount of vehicular traffic entering and exiting the excursion parking areas and then calculating the number of peak hour inbound and outbound trips during the afternoon peak hour. The vehicular counts were conducted on July 21 and 22, 1998 between 4 and 6 PM. The excursion cruise ships were counted from 6 AM to 6 PM on July 28, 1998.

Vehicular counts were tabulated in 15 minute increments and the types of vehicles were noted. The excursion cruise ships were tabulated in one-hour increments and the types of excursion ship was also noted. The categories of excursion ships recorded were:

Submarine tour,
Fishing boat,
Excursion,
Dinner cruise, and
Other

C. Survey Results

The hourly excursion vehicle volumes are shown in Table E-1. The peak hour for excursion vehicle activity is between 2 and 3 PM during which 12 boats enter and 7 boats exit. The total daily operations are 65 inbound and 56 outbound, for a total of 131 one-way boat operations.

The inbound and outbound vehicular volumes are shown in Table E-2 and E-3, respectively. The peak inbound hour is between 4 and 5 PM during which 102 vehicles enter the parking areas. The ratio of peak hour inbound vehicle trips to daily one-way boat operations is 102/131 = 0.779.

The peak hour for outbound traffic is between 4:15 PM and 5:15 PM. During the peak outbound hour, there are 89 outbound vehicles. The ratio of outbound vehicle trips to daily one-way boat operations is 89/131 = 0.679.

For the trip generation analysis, the peak hour of the generator is assumed to coincide with the peak hour of the street and the inbound and outbound peak hour coincide. Therefore, the total peak hour trips generated is estimated to be 1.458 trips per one-way boat trip (the sum of inbound and outbound boat movements). The directional split is 53.4% inbound and 46.6% outbound.

Table E-1 Kewalo Basin Boat Movement Counts

Time		Sub Tour		Fishing		Excursion		Dinner		Other		Total		
From	To	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	Total
6 AM	7 AM	0	0	1	9	0	0	0	0	0	0	1	9	10
7 AM	8 AM	0	0	0	2	0	3	0	0	0	0	0	5	5
8 AM	9 AM	0	1	0	0	1	4	0	0	0	0	1	5	6
9 AM	10 AM	2	2	0	1	0	2	0	0	2	3	4	8	12
10 AM	11 AM	2	2	0	0	3	1	0	0	3	2	8	5	13
11 AM	NOON	2	2	1	0	3	3	0	0	3	2	9	7	16
NOON	1 PM	1	1	0	0	2	3	0	0	0	0	3	4	7
1 PM	2 PM	3	1	0	1	2	2	0	0	2	2	7	6	13
2 PM	3 PM	2	2	2	0	5	1	0	0	3	4	12	7	19
3 PM	4 PM	1	1	2	0	0	0	0	0	4	2	7	3	10
4 PM	5 PM	1	1	4	0	1	0	0	0	1	1	7	2	9
5 PM	6 PM	0	0	1	0	0	0	0	5	0	0	1	5	6
AFTER 6 PM		0	0	0	0	0	0	5	0	0	0	5	0	5
TOTALS		14	13	11	13	17	19	5	5	18	16	65	66	131