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December 12, 2012

TO: THE HONORABLE GARY GILL, ACTING DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
DEPARTMENT OF HEALTH

FROM: GLENN M. OKIMOTO, Ph.D.
DIRECTOR OF TRANSPORTATION

SUBJECT: KAPALAMA CONTAINER TERMINAL DRAFT ENVIRONMENTAL IMPACT STATEMENT, HONOLULU HARBOR, OAHU
JOB H. C. 10298

The Hawai'i Department of Transportation hereby transmits the *Kapālama Container Terminal Draft Environmental Impact Statement* (DEIS) for publication in the next available edition of *The Environmental Notice*. The project is situated at the following Tax Map Keys in the Honolulu District on the Island of Oahu:

Kapalama site: 1-2-25: 02, 09, 12, 16, 17, 30, 40, 42, 44 to 47, 49 to 53, 55, 58 to 68, 71, 73, 74 to 78, 80, 82, 83, 86, 88, 92, 94, 97, 98, 108 to 112, and portions of 11 and 54; and 1-5-32: portions of 2 and 43.

Piers 24-28 site: 1-5-38: 11, 17, 55, 72, 73, 74, and portions of 1, 4 and 5.

A distribution list for verification by the Office of Environmental Quality Control (OEQC) under Section 11-200-20, Hawai'i Administrative Rules was submitted by email on October 24, 2012 for your advance review. Upon receiving verification from OEQC (along with the bulletin proof of the notice containing the pertinent details for commenters), we will make the DEIS and the bulletin proof available to those so indicated on the distribution list so that they will have the full 45-day statutory period to review and comment on the DEIS.

Finally, enclosed is a completed OEQC Publication Form, two copies of the DEIS, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to the OEQC.

If there are any further questions, please have your staff contact Dean Watase of our Harbors Division Engineering Planning Section at 587-1883.

Enc.

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (JULY 2012 REVISION)

Project Name Kapālama Container Terminal
Island: O‘ahu
District: Honolulu

TMK: Kapālama site: 1-2-25: 02, 09, 12, 16, 17, 30, 40, 42, 44 to 47, 49 to 53, 55, 58 to 68, 71, 73, 74 to 78, 80, 82, 83, 86, 88, 92, 94, 97, 98, 108 to 112, and portions of 11 and 54; and 1-5-32: portions of 2 and 43; and Pier 24-28 site: 1-5-38: 11, 17, 55, 72, 73, 74, and portions of 1, 4 and 5.

Permits: U.S. Department of the Army Permit (Clean Water Act Section 404); Marine Protection Research and Sanctuaries Act, Section 103 Permit; Rivers and Harbors Act, Section 10 and 14 Permits; Clean Water Act, Section 401 – Water Quality Certification; Coastal Zone Management (CZM) Federal Consistency Certification; National Pollutant Discharge Elimination System (NPDES) Permit; and Conservation District Use Permit.

Proposing/Determination Agency:
State of Hawaii
Department of Transportation, Harbors Division
79 S. Nimitz Highway
Honolulu, Hawaii 96813

Contact: Carter Luke, Engineering Program Manager
(808) 587-1862

Consultant: Belt Collins Hawaii LLC
2153 North King Street
Honolulu, Hawaii 96819

Contact: Glen Koyama
(808) 521-5361

Status (check one only):

__DEA-AFONSI Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqc@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.

__FEA-FONSI Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__FEA-EISPN	Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqc@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.
__Act 172-12 EISPN	Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqc@doh.hawaii.gov). NO environmental assessment is required and a 30-day consultation period upon publication in the periodic bulletin.
_X_DEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.
__FEIS	The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqc@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.
__ Section 11-200-23 Determination	The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.
__Section 11-200-27 Determination	The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.
__Withdrawal (explain)	

Summary (Provide proposed action and purpose/need in less than 200 words. Please keep the summary brief and on this one page)**:**

The State of Hawaiʻi Department of Transportation, Harbors Division, is proposing to develop a new overseas container terminal at the former Kapalama Military Reservation (Kapālama site) in Honolulu Harbor to increase existing overseas container terminal capacity. The Proposed Action consists of the development of a new pier with berthing capacity for two container ships, and an approximately 94-acre container yard with necessary support buildings, entry and exit gates, security fencing, parking, gantry cranes and container-handling equipment, on-site utilities, outdoor lighting, and other ancillary features. A direct access connection to the adjacent inter-island barge service at Auiki Street would provide efficient container transfers for neighbor island shipments and reduce impacts on local street traffic. The truck ingress and egress for the container yard would on Sand Island Access Road. Also included in the Proposed Action are land improvements associated with Piers 24 through 28 to accommodate maritime-dependent operators currently at the Kapālama site.

The Proposed Action is needed to accommodate the anticipated demand of overseas cargo volumes associated with projected growth of the state of Hawaiʻi through 2039. Construction at the Kapālama site is expected to begin in 2014, after design and permits are secured. Completion is anticipated in 2016.

KAPĀLAMA CONTAINER TERMINAL

Draft Environmental Impact Statement

State Department of Transportation
Harbors Division

KAPĀLAMA CONTAINER TERMINAL

Draft Environmental Impact Statement

December 2012

State Department of Transportation
Harbors Division

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Appendix F Flora and Fauna Survey
Appendix G Invasive Species Report
Appendix H State Historic Preservation Division Letter

Prepared by Belt Collins Hawaii LLC.

Acronyms and Abbreviations

AAQS	Ambient Air Quality Standards
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ACT	Aloha Cargo Transport
AIS	Aquatic invasive Species
ANS	aquatic nuisance species
ANSI	American National Standards Institute
BMP(s)	Best Management Practice(s)
BWS	Honolulu Board of Water Supply
CAA	Clean Air Act
CCD	constituent census district
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Clean Islands Council
CIC/CRU	Clean Island Council / Emergency Response Unit
City	City and County of Honolulu
CO	carbon monoxide
CO_2	carbon dioxide
COC	contaminants of concern
CT	Census Tract
CWA	Clean Water Act of 1977
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act of 1972
DAR	Division of Aquatic Resources (State Department of Land and Natural Resources)
dB	decibel
dBA	decibels, A-weighted scale
DBEDT	Department of Business, Economic Development and Tourism (State of Hawai‘i)
DHS	U.S. Department of Homeland Security

DLNR	Department of Land and Natural Resources (State of Hawai‘i)
DNL	day-night sound level
DOA	Department of Agriculture (State of Hawai‘i)
DOD	U.S. Department of Defense
DOE	Department of Education (State of Hawai‘i)
DOH	Department of Health (State of Hawai‘i)
DOT	Department of Transportation (State of Hawai‘i)
DOT-A	Department of Transportation, Airports Division (State of Hawai‘i)
DOT-H	Department of Transportation, Harbors Division (State of Hawai‘i)
DPP	Department of Planning and Permitting (City and County of Honolulu)
EA	Environmental Assessment
EFH	Essential Fish Habitats
EHMP	Environmental Hazard Management Plan
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
EO	Executive Order(s)
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
ESA	Environmental Site Assessment
F	Fahrenheit
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FEMA	Federal Emergency Management Agency
FHA	Federal Housing Administration
FIRM	Flood Insurance Rate Map(s)
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
GHG	greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GWP	global warming potential
H_2S	hydrogen sulfide
HAR	Hawai‘i Administrative Rules
HART	Honolulu Authority for Rapid Transit

HCC	Honolulu Community College
HCDA	Hawai‘i Community Development Corporation
HECO	Hawaiian Electric Company
HEERO	Hazard Evaluation and Emergency Response Office (State of Hawai‘i)
HEPA	Hawai‘i Environmental Policy Act
HFFC	Hawaii Fueling Facilities Corporation
HFD	Honolulu Fire Department
HFM	Hawaiian Flour Mill
HHUG	Hawaii Harbor Users Group
HIA	Honolulu International Airport
HISC	Hawai‘i Invasive Species Council
HRS	Hawai‘i Revised Statutes
HTO	Hawaiian Telcom
HUD	U.S. Department of Housing and Urban Development
IBC	International Building Code
IC Plan	Institutional Controls Plan
IDPP	Iwilei District Participating Parties
JBPHH	Joint Base Pearl Harbor-Hickam
KDA	Kapālama Development Area
KMR	Kapalama Military Reservation
kV	kilovolt
lbs/sf	pound(s) per square foot
LEDPA	least environmentally damaging practicable alternative
Leq	equivalent sound level
LID	Low Impact Development
LOS	Level of Service
LPG	liquefied petroleum gas (also propane)
LUC	Land Use Commission (State of Hawai‘i)
LUO	Land Use Ordinance
MARSEC	Maritime Security
MBTA	Migratory Bird Treaty Act
MEP	maximum extent practical
METC	Marine Education and Training Center (University of Hawai‘i)

mgd	million gallons per day
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
$MMTCO_2Eq$	million metric tons of carbon dioxide equivalent
MPRSA	Marine Protection, Research and Sanctuaries Act
MS4	Small Municipal Separate Storm Sewer System
msl	mean sea level
MSRC	Marine Spill Response Corporation
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industrial Classification System
NAS	National Airspace System
NEC	Network Enterprise Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service (National Oceanic and Atmospheric Administration)
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTAS	National Terrorism Advisory System
O_3	ozone
OCCL	Office of Conservation and Coastal Lands (State of Hawai‘i)
OEQC	Office of Environmental Quality Control
OHA	Office of Hawaiian Affairs (State of Hawai‘i)
OMPO	Oahu Metropolitan Planning Organization
ORMP	Ocean Resources Management Plan (State of Hawai‘i)
OTWC	Oceanic Time Warner Cable
OU1C	Operating Unit 1 C
Pb	lead
PFM	Pendleton Flour Mill
PM-10	particulate matter less than 10 microns in diameter

PM-2.5	particulate matter up to 2.5 microns in diameter
PSI	Pacific Shipyards International
PTS	permanent threshold shift
PUC	Public Utilities Commission
PVC	polyvinyl chloride
REC	Recognized Environmental Conditions
RMS	root mean square
RO/RO	roll-on/roll-off
ROI	region of influence
ROW	right of way
SHPD	State Historic Preservation Division
SLUC	State Land Use Commission
SMA	Special Management Area
SOEST	School of Ocean and Earth Science and Technology (University of Hawai‘i)
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control and Countermeasure
SPS	Sewage Pump Station
State	State of Hawai‘i
SVOC	semi-volatile organic compounds
SWMP	Storm Water Management Plan
TEU(s)	twenty-foot equivalent unit(s)
TMDL(s)	Total Maximum Daily Load(s)
TMK	Tax Map Key
TPH-d	total petroleum hydrocarbons diesel
TPH-g	total petroleum hydrocarbons gasoline
TPH-r	total petroleum hydrocarbons residual
TTS	temporary threshold shift
TWSC	two-way stop controlled
UBC	Uniform Building Code
UH	University of Hawai‘i
UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States

USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VA	U.S. Department of Veterans Affairs
WQC	Water Quality Certification
WWTP	Wastewater Treatment Plant

SUMMARY SHEET

SUMMARY SHEET

PROJECT NAME
Kapālama Container Terminal

PROPOSING AGENCY
State of Hawai‘i Department of Transportation, Harbors Division

LOCATION
Honolulu Harbor, Honolulu District, Island of O‘ahu

TAX MAP KEY
Kapālama site: 1-2-25: 02, 09, 12, 16, 17, 30, 40, 42, 44 to 47, 49 to 53, 55, 58 to 68, 71, 73, 74 to 78, 80, 82, 83, 86, 88, 92, 94, 97, 98, 108 to 112, and portions of 11 and 54; and 1-5-32: portions of 2 and 43.

Pier 24-28 site: 1-5-38: 11, 17, 55, 72, 73, 74, and portions 1, 4 and 5.

PROPOSED ACTION
The State of Hawai‘i Department of Transportation (DOT), Harbors Division (DOT-H) is proposing to develop a new overseas container terminal in Honolulu Harbor, O‘ahu, which is the port for all container cargo entering and exiting the State of Hawai‘i. This action would increase the port’s existing container terminal capacity to accommodate projected future cargo volumes. Because State funds and land would be used, the *Kapālama Container Terminal Environmental Impact Statement* (EIS) has been prepared in accordance with the Hawai‘i environmental impact statement law, Hawai‘i Revised Statutes (HRS), Chapter 343, and its implementing rules, Hawai‘i Administrative Rules (HAR) Title 11, Chapter 200.

The Proposed Action is the construction and operation of a new overseas container terminal at the Kapālama site in Honolulu Harbor. Approximately 94 acres on the west side of Honolulu Harbor would serve as the site for the container yard with necessary support buildings, entry and exit gates, security fencing, parking, gantry cranes and container-handling equipment, on-site utilities, potential off-site associated utilities and entry/exit intersection improvements, outdoor lighting, and other ancillary facilities. On the waterfront, a pier would be constructed with berthing capacity for two container ships. In the existing slip on the east side of the site, dredging is proposed to widen the slip from approximately 256 feet to

approximately 300 feet to accommodate future wider inter-island cargo vessels at Piers 40 and 41. Further details are presented in Chapter 2.

In addition to the development of a new overseas container terminal and piers at the approximately 94-acre site, the Proposed Action also includes improvements on land associated with Piers 24 through 28 to accommodate maritime-dependent operators currently at Kapālama. These operators include: Pacific Shipyards International (PSI), which would be located landside of Piers 24 through 26, and Atlantis Submarines, which would be located landside of the end of the slip containing Piers 26 and 27.

The total cost for the Proposed Action at the Kapālama site is estimated to be $243 million, which would be financed entirely by the State of Hawaiʻi through revenue bonds and revenues from harbor tariffs and leases.

SIGNIFICANT BENEFICIAL AND ADVERSE IMPACTS, INCLUDING INDIRECT AND CUMULATIVE IMPACTS

Potential direct, indirect, and cumulative impacts have been evaluated and are document in the EIS for the following resources or issues: land use; land ownership; public health and safety; roadways and traffic; utilities; public facilities and services; topography, geology, and soils; hydrology; natural hazards; climate and air quality; noise; visual resources; marine environment; terrestrial flora and fauna; cultural resources; and socioeconomics. Of these resources and issues evaluated, the following impacts are potentially significant.

- **Marine Environment.** The proposed construction (dredging, excavating, and filling activities) along the waterfront and in the harbor could significantly and adversely impact specific species and habitat that have established and/or adapted to the marine environment in this manmade harbor. Coral would necessarily be removed and the habitat it provides for fish would be eliminated, at least until any natural re-colonization occurs. Fragmentation of biological material, including invasive species (five sponges observed in the project area and a marine algae not observed, but recorded in Honolulu Harbor), could disperse to areas outside the harbor and colonize.

- **Socioeconomics.** The proposed construction and operational activities could significantly and beneficially impact the socioeconomic environment. With or without the Proposed Action, overseas cargo volumes will increase with the anticipated growth of the state. A new modernized cargo container terminal at the Kapālama site would improve handling and transfer efficiencies, thus avoiding additional costs associated with the following: land transfer of overseas cargo to inter-island vessels, handling and management of cargo within existing terminal areas, and increased risk of accidents associated with denser terminal

area operations. The cost avoided with the Proposed Action is estimated at $4,275,210 per year.

The Proposed Action is also estimated to provide 456 direct jobs and 765 indirect and induced jobs, along with a rough estimate of 400 jobs for container terminal operations.

Noise is not expected to be significant with the Proposed Action in the industrial harbor area and with respect to State noise rules; however, with the proposed change, the impulsive type noises are anticipated to be audible and could result in complaints from residents. From the Kapālama site, noise complaints could come from Kalihi Kai residents. While less likely, nighttime noise emanating from Piers 24-28 could result in noise complaints from residents located over 1,800 feet away in Downtown Honolulu. Nighttime noise emanating from Piers 22 and 23 could also result in noise complaints from residents located approximately 1,000 feet away in Downtown Honolulu. For these reasons, possible measures to minimize noise are presented in Chapter 3.

PROPOSED MITIGATION MEASURES

As the Proposed Action involves dredging and filling in harbor waters, a Department of the Army permit will be required from the U.S. Army Corps of Engineers (USACE) to comply with Section 404 of the federal Clean Water Act (CWA) and Section 10 of the federal Rivers and Harbors Appropriation Act. With USACE involvement, the agency will need to satisfy its other federal agency obligations, including Section 7 consultation under the Endangered Species Act (ESA) and consultation under the Magnuson-Stevens Fishery Conservation and Management Act for Essential Fish Habitat (EFH). The mitigation that results from these consultations will serve to minimize impacts on specific regulated species and the marine environment as a whole. The following species that have been identified in the project area and are listed on the federal ESA threatened and endangered species list or are candidate species include: threatened green sea turtle (*Chelonia mydas*), endangered hawksbill turtle (*Eretmochelys imbricate*), endangered humpback whale (*Megaptera novaengliae*), Hawaiian monk seal (*Monachus schauinslandi*), and one candidate species of coral (*Montipora patula*). While none of the 33 species of fish observed in the project area are believed to be currently managed within EFH, consultation under the Magnuson-Stevens Act for EFH as required for the coral reef ecosystem will minimize any impacts to EFH.

Mitigation measures to reduce fragmentation of invasive species and to prevent their dispersal are identified in Chapter 4.

ALTERNATIVES CONSIDERED

Various alternatives to the Proposed Action were considered and are described in Chapter 2, but only the Proposed Action and one other Alternative Action met the purpose and need for the project and were carried forward for further analysis in this EIS. The Alternative Action evaluated in the EIS proposes the construction of a deck and piles system to retain the water within Snug Harbor. This design would provide a continuous main pier along the waterfront to support two berths and would cost approximately $351 million, approximately $108 million or 44 percent more than the Proposed Action ($243 million).

The third alternative considered in this EIS is the No Action Alternative. Under the No Action Alternative, the Kapālama site would be vacant (with the exception of PSI and Atlantis Submarines) and the existing deteriorating structures would be removed under separate actions. Snug Harbor would not be filled (its pier facilities would continue to be available for marine vessel mooring and the waters and marine resources within the slip would continue to exist. The No Action Alternative provides the baseline condition from which the other alternatives are compared.

UNRESOLVED ISSUES

No unresolved issues have been identified.

COMPATIBILITY WITH LAND USE PLANS AND POLICIES, AND A LISTING OF PERMITS AND APPROVALS

The Proposed Action and alternatives are consistent with federal and State environmental and land use policies and plans, including DOT-H's long-range master plans for Honolulu Harbor and the current State Administration's "New Day" initiative to modernize commercial harbors. Reviews, permits, and approvals anticipated for the project are listed below and are described in Chapter 5 of this document.

- Endangered Species Act (ESA) Section 7 consultation (National Marine Fisheries Service [NMFS] and U.S. Fish and Wildlife Service [USFWS])*
- Essential Fish Habitat (EFH) consultation (NMFS)*
- National Historic Preservation Act (NHPA) Section 106 consultation (State Historic Preservation Officer)*
- National Environmental Policy Act*
- Clean Water Act (CWA) Section 404 permit (U.S. Army Corps of Engineers))
- CWA Section 401 water quality certification (Department of Health [DOH])

- CWA Section 402 National Pollutant Discharge Elimination System Permit (DOH)
- Rivers and Harbors Act, Section 10 permit (USACE)
- Rivers and Harbors Act, Section 14 permit (USACE)
- Marine Protection Research and Sanctuaries Act, Section 103 permit (USACE with U.S. Environmental Protection Agency concurrence)
- Navigable Airspace Analysis (U.S. Department of Transportation Federal Aviation Administration)
- Chapter 343, Hawaii Revised Statutes, Environmental Review (Office of Environmental Quality Control)
- Hawaiʻi Coastal Zone Management Federal Consistency Review (Office of Planning)
- Conservation District Use Permit (State Board of Land and Natural Resources)

** Identifies a USACE obligation.*

1 Purpose and Need

CHAPTER 1
PURPOSE AND NEED

1.1 INTRODUCTION AND PROJECT DESCRIPTION

The State of Hawaiʻi, Department of Transportation, Harbors Division (DOT-H) is responsible for administering the State-owned and controlled commercial harbors system in Hawaiʻi. These deep-draft harbors are used by commercial cargo, passenger, and fishing vessels. DOT-H is responsible for the control, management, use, and regulation of the commercial harbors and their improvements.

In 1997, DOT-H developed the *Oahu Commercial Harbors 2020 Master Plan* (hereafter referred to as the 2020 Master Plan) as an update to the *Honolulu Waterfront Master Plan* (OP 1989). The 2020 Master Plan is a conceptual plan that addresses Honolulu and Kalaeloa Barbers Point Harbors as dependent harbors, and functions as a long-range guide for the development and enhancement of those commercial facilities. The cornerstone project of the above referenced plan includes the redevelopment of the former Kapalama Military Reservation (KMR) site (referred to as "Kapālama site" in this document) into an overseas container terminal to increase existing container terminal capacity in Honolulu Harbor, Oʻahu (see Figure 1-1).

The Kapālama site, most of which was acquired by the State of Hawaiʻi from the United States (U.S.) Army in 1993 is bound by Kapālama Basin and Kalihi Channel on the south, Servco Pacific Inc. and Sand Island Access Road on the west, Auiki STreet and Young Brothers Limited on the north, and Pier 41 on the east (see Figure 1-2). The 94-acre site has been occupied by the University of Hawaiʻi (UH) Marine Center, Pacific Shipyard International, Island Movers, Atlantis Submarines, and numerous other smaller tenants. Existing tenants are being vacated by February 28, 2014, as the existing structures are deteriorating, and therefore would not present when this action would be implemented. All tenants (the majority of whom are on month-to-month revocable permits) have been notified.

Figure 1-1. Honolulu Harbor, O'ahu

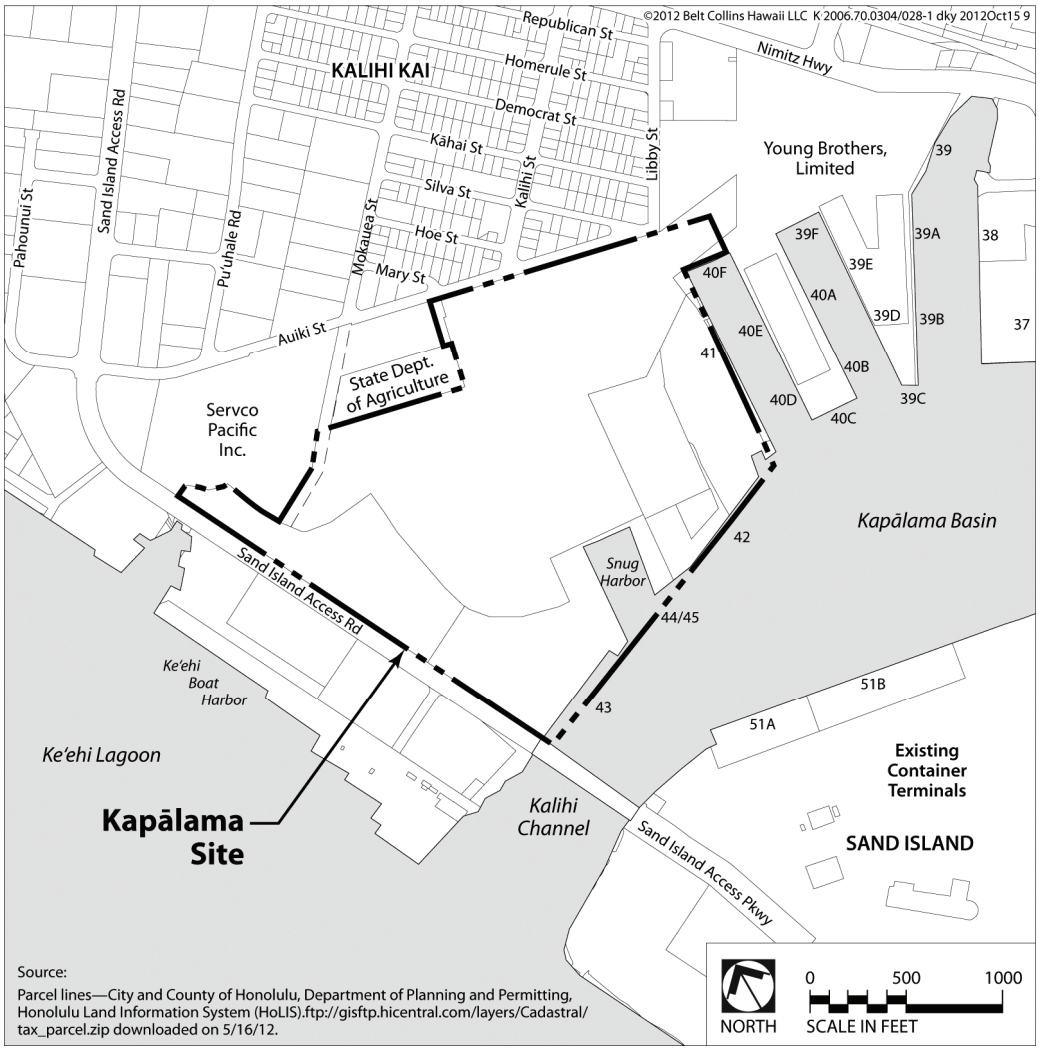

Figure 1-2. Kapālama Site

The Proposed Action consists of the development of an approximately 94-acre container yard with necessary support buildings, entry and exit gates, security fencing, parking, gantry cranes and container-handling equipment, on-site utilities, outdoor lighting, and other ancillary features. On the waterfront, a pier would be constructed with berthing capacity for two container ships. Construction of this main pier would require dredging along the waterfront and in the harbor channel to achieve the desired water depth for the docking ships.

On the east side of the proposed container yard, the existing slip between Piers 40 and 41 would be widened from 256 feet to 300 feet to accommodate the wider, 4-by-1 inter-island vessels (barges that measure up to 400 feet in length by up to 100 feet in width) expected within the project's planning horizon. The proposed widening

would require dredging the Pier 41 side and reconstructing Pier 41. A single vessel slip behind Pier 41 would be removed and incorporated in the Pier 41 reconstruction. At the adjacent inter-island cargo facility, located to the east side of the proposed container yard, improvements would be made to deteriorating pavement surfaces (e.g., asphalt and spalling) and to allow direct access between the proposed container yard and the existing inter-island cargo facility. Total improvement cost for the Proposed Action at Kapālama is estimated to be $243 million (2012 estimate), and to be financed entirely by the State of Hawaiʻi (State) through revenue bonds and revenues from harbor tariffs and leases.

HRS Chapter 343

This Environmental Impact Statement (EIS) has been prepared in accordance with Hawaiʻi Revised Statutes (HRS) Chapter 343 and its implementing rules, Hawaiʻi Administrative Rules (HAR) Title 11, Chapter 200, because State funds and lands would be used. The direct, indirect, and cumulative effects of proposed development of the Kapālama site have been evaluated. The effects of tenant moves are addressed in the cumulative impact section of this EIS, with the exception of the moves by Pacific Shipyards International (PSI) and Atlantis Submarines. While not dependent upon the Proposed Action, PSI's and Atlantis Submarines' dependence on being on the waterfront and their associated obligation to comply with HRS Chapter 343 can and have been satisfied by making them part of the Proposed Action.[1]

Federal Scope of Analysis

As the project would involve dredging and filling in harbor waters, a Department of the Army permit will be required from the U.S. Army Corps of Engineers (USACE) for dredge and fill activities to comply with Section 404 of the federal Clean Water Act (CWA) and Section 10 of the federal Rivers and Harbors Appropriation Act. Therefore, this EIS has also been prepared to provide information to the USACE to facilitate review and processing of the Department of the Army permit application, including consultations to comply with applicable federal requirements such as Section 7 of the Endangered Species Act (ESA) and Executive Order (EO) 13089, Coral Reef Protection.

[1] Existing maritime-dependent tenants/operators (i.e., operators that require direct access to the waterfront) on the Kapālama site would relocate to another location within Honolulu Harbor. While the relocation of these maritime operators is not dependent upon the development of the Kapālama site, the relocations and associated improvements within Honolulu Harbor are subject to HRS Chapter 343 and can be satisfied under this Proposed Action. Two of the three operators have elected to do so (PSI and Atlantis Submarines). A third operator (UH Marine Center) is being assisted by DOT-H to prepare a HRS Chapter 343 document for the Marine Center move to Piers 34 and 35. Another Environmental Assessment (EA) will be prepared for the educational operations of the Marine Center move to Sand Island. The implementation timeline for these actions are different than this Proposed Action.

Because federal jurisdiction for the Proposed Action is limited to waters of the U.S., not all elements of the Kapālama project are within the USACE scope of analysis. The federal scope of analysis consists of in-water activities required to construct the water-dependent portions of the project, for example, bulkheads and piers. Activities would involve dredging to create adequate depths for the container vessels, demolition and dredging to reconstruct deteriorating pier facilities and widen the slip between Piers 40 and 41, and the disposal of dredged material. In addition, the project proposes filling Snug Harbor to provide sufficient pier length to berth two container ships.

The federal scope of analysis does not include the non-water dependent elements of the project, such as demolition of existing buildings and construction of new buildings; tenant relocations; construction of paving, roadways, and parking; on-site and off-site vehicular circulation; installation and operation of equipment; and development of on-site utilities. The direct, indirect, and cumulative impacts of both water-dependent and non-water dependent activities and facilities are evaluated in this document.

1.2 PURPOSE, NEED, AND OBJECTIVES

Background information for contextual purposes is presented in section 1.2.1 to understand and appreciate the purpose, need, and objectives that follow in sections 1.2.2 through 1.2.4. The purpose, need, and objectives are derived from the goals and interests of the State of Hawaiʻi (Governor's office), the State of Hawaiʻi Department of Transportation (DOT-H), and the Hawaiʻi Harbor Users Group (HHUG). Documents expressing such goals and interests include the following:

- *Honolulu Waterfront Master Plan* (Office of State Planning 1989);
- *Final Master Plan Report, Kapalama Development Project* (DOT-H 1991);
- *Oahu Commercial Harbors 2020 Master Plan* (DOT-H 1997);
- *Hawaii Harbor Users Group Report* (HHUG) *on Port Facilities and Development Priorities* (HHUG 2005);
- *Kapalama Planning Final Report* (DOT-H 2007);
- *Harbors Modernization Plan* (DOT-H and HHUG 2007);
- *Development Plan for Relocation of Kapalama Military Reservation Tenants, Honolulu Harbor, Hawaiʻi* (DOT-H Jun 2010); and
- A New Day in Hawaii (Office of the Governor 2010).

These plans are further described in Chapter 5 of this document.

1.2.1 Background

In the central Pacific Ocean, Hawaiʻi is an island archipelago located over 2,000 miles from the nearest continental coast (see Figure 1-3). As a result, its residents pay for the geographic isolation with a nearly absolute dependence on ocean surface transportation for their sustenance. Eighty percent of all consumer goods are imported into Hawaiʻi. Its commercial harbors system (Figure 1-4) receives and processes 98.6 percent of these imports (DBEDT ORB 1994). Ocean transportation thus is Hawaiʻi's lifeline to the world, supporting every facet of the local economy: tourism, construction, national defense, agriculture, and all other industries. No other state in the union is as dependent on ocean transportation as Hawaiʻi.

Hawaiʻi has imported and will continue to import the necessary basics, such as food, clothing, consumer goods, fuel, and raw materials, to support its growth. An efficient commercial harbors system is critical to support these needs. To ensure continued and unimpeded movement of cargo in and out of the state, as well as between the islands, the commercial harbors system must be expanded and improved to keep up with the corresponding economic and resident population growth.

Honolulu Harbor has served as Hawaiʻi's main port of entry for cargo from around the world since the late-18th century. Today, Honolulu Harbor continues to be the hub of ocean transportation activities for the state, where on Oʻahu 70 percent of the state's population (Census 2010) resides and 67 percent of the islands' business activities (Census 2011) are conducted.

Harbor Users

Presently, Honolulu Harbor includes over 30 major berth facilities with over five linear miles of mooring space and over 200 acres of container yard. Major types of cargo that pass through the harbor include:

Overseas Containers (domestic and foreign). Most cargo moving through the harbor is containerized. Containers arriving at the harbor are generally unloaded from the ship or barge and temporarily stored in the container yard of the terminal. From the container yard, the containers may be reloaded to a barge for other overseas destination, trucked to another facility for inter-island destinations, or picked up by consignees on Oʻahu.

Automobiles. Automobiles arrive in containers or onboard ships with roll-on/roll-off (RO/RO) capabilities.

Neobulk. Includes lumber, steel, construction equipment and vehicles, and newsprint that are loaded on shipping racks.

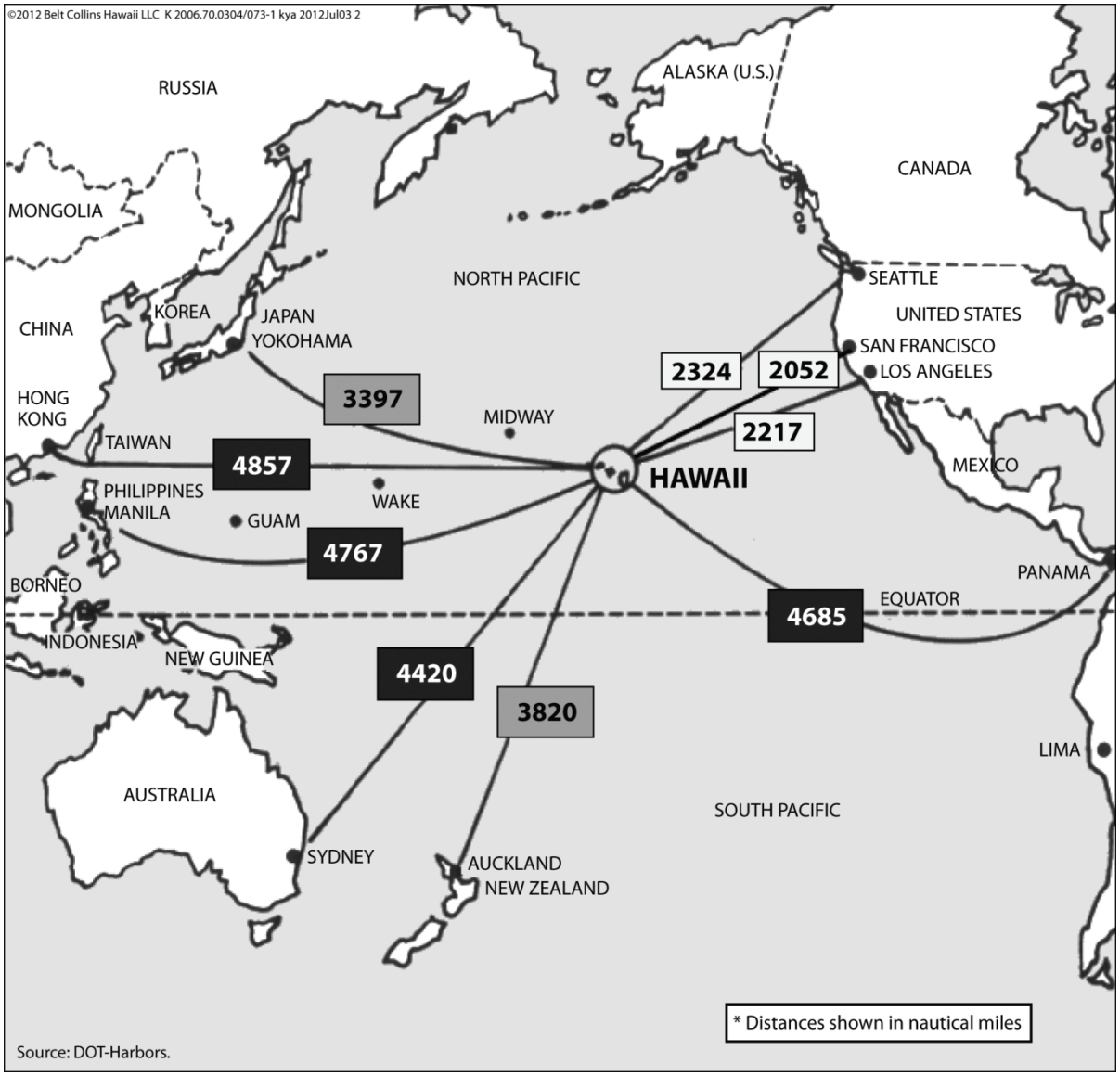

Figure 1-3. Hawai'i's Mid-Pacific Location

BREAK BULK/GENERAL CARGO. Includes almost any type of small lot commodity which can be shipped on a pallet as an individual unit.

DRY BULK. Includes sugar, cement, scrap metal, sand, and coal.

LIQUID BULK. Includes jet fuel, gasoline, diesel, fuel oil, ethanol, liquefied petroleum gas (LPG), chemicals, and molasses.

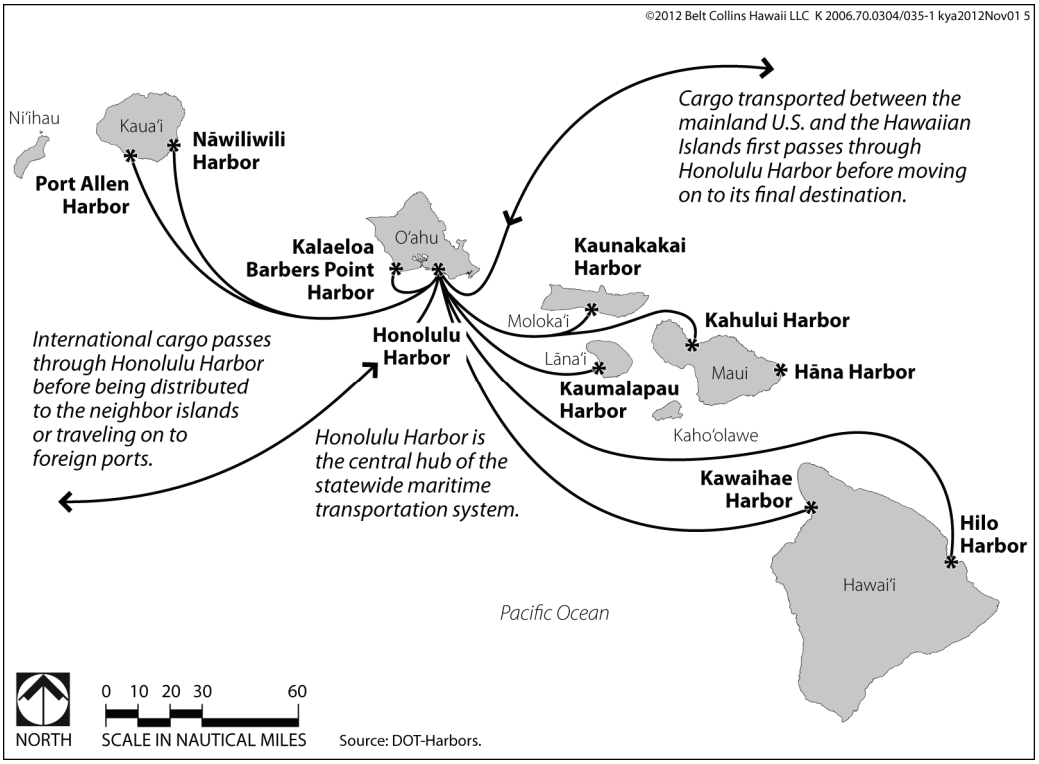

Figure 1-4. Hawai'i Commercial Harbors System

INTER-ISLAND CARGO. Consists primarily of commodities shipped through various inter-island shippers. The largest of these shippers is Young Brothers that operate from Piers 39 and 40.

Other Harbor Users

In addition to the cargo industry, the harbor is also home to commercial fishing and passenger vessel activities.

COMMERCIAL FISHING. Fishing operations include fish loading, storage, vessel repair, etc. These are accommodated primarily at Kewalo Basin and Piers 15 through 18. Honolulu Harbor's Domestic Commercial Fishing Village, at Piers 36 through 38, is a facility used to process the day's catch.

CRUISE SHIPS. Cruise ships visit Honolulu Harbor approximately 11 times per month. Pier 2 is the primary berthing pier for inter-island cruise lines, and Piers 10 and 11 are the primary berthing piers for foreign cruise ships.

EXCURSION VESSELS. These vessels are smaller in size than the foreign and inter-island cruise ships. Excursion cruises last for a few hours. Most operate out of Kewalo Basin, but a few operate out of Honolulu Harbor.

Honolulu Harbor

As the port of entry for the state commercial harbors system, significant investments have been made at Honolulu Harbor, including waterfront improvements, new distribution centers, State Department of Agriculture (DOA) inspection facilities, and harbor support operations and infrastructure upgrades.

Transported cargo has been increasingly containerized through the years because of inherent efficiencies. Containerized cargo throughput is measured in twenty-foot equivalent units (TEUs).[2] As the port of entry for the state, during the peak of the economy, Honolulu Harbor accommodated shipments of over one million TEUs per year overall from the U.S. West Coast and other points overseas. Upon arrival at Honolulu Harbor, container and other cargo are distributed and delivered by inter-island cargo services to the neighbor islands. Similarly, export cargo is consolidated in Honolulu Harbor and then shipped to overseas ports.

Because of space constraints, on-site cargo handling density in Honolulu Harbor is higher than any other U.S. West Coast harbor. The number of U.S. mainline vessel TEUs handled at Honolulu Harbor per terminal acre annually in 2005 was over 7,000 (HHUG 2007). This compared with around 4,000 TEUs per acre for Seattle, Tacoma, and Oakland, and around 5,000 for Los Angeles and Long Beach. Operating at this high density requires costly ground-stacking and multiple handling of containers. For the existing container terminals at Sand Island, a wheeled container operation (containers stored on wheeled chassis or trailers) is preferred.

Historically, cargo growth at Honolulu Harbor's Sand Island Terminals has increased at an average annual compounded rate of 2.2 percent. This growth rate is based on the direct linehaul (i.e., service between Honolulu and the U.S. mainland) growth in containerized cargo between 1985 and 2011. Although recent throughput has slowed as a result of economic conditions, long-term economic and population growth trends, which translate to long-term increased demand for consumer goods and the shipment of these goods in containers, will require additional terminal capacity in the harbor.

DOT-H projected the theoretical capacity of the Sand Island Terminals to be approximately 950,000 TEUs per year (see Figure 1-5). With the anticipation that the volume of TEUs currently passing through Honolulu Harbor would catch up to its

[2] TEU = a container with the approximate dimensions of 8 feet wide x 20 feet long x 8 feet high . The larger common containers measure approximately 8 feet wide x 40 feet long x 8 feet high (equivalent to 2 TEUs).

long-term growth rate, and that the growth in demand for consumer goods continues to reflect the State Department of Business, Economic Development and Tourism's (DBEDT) overall growth forecast, the capacity of the harbor's existing Sand Island Terminals would be reached within several years (Figure 1-5).

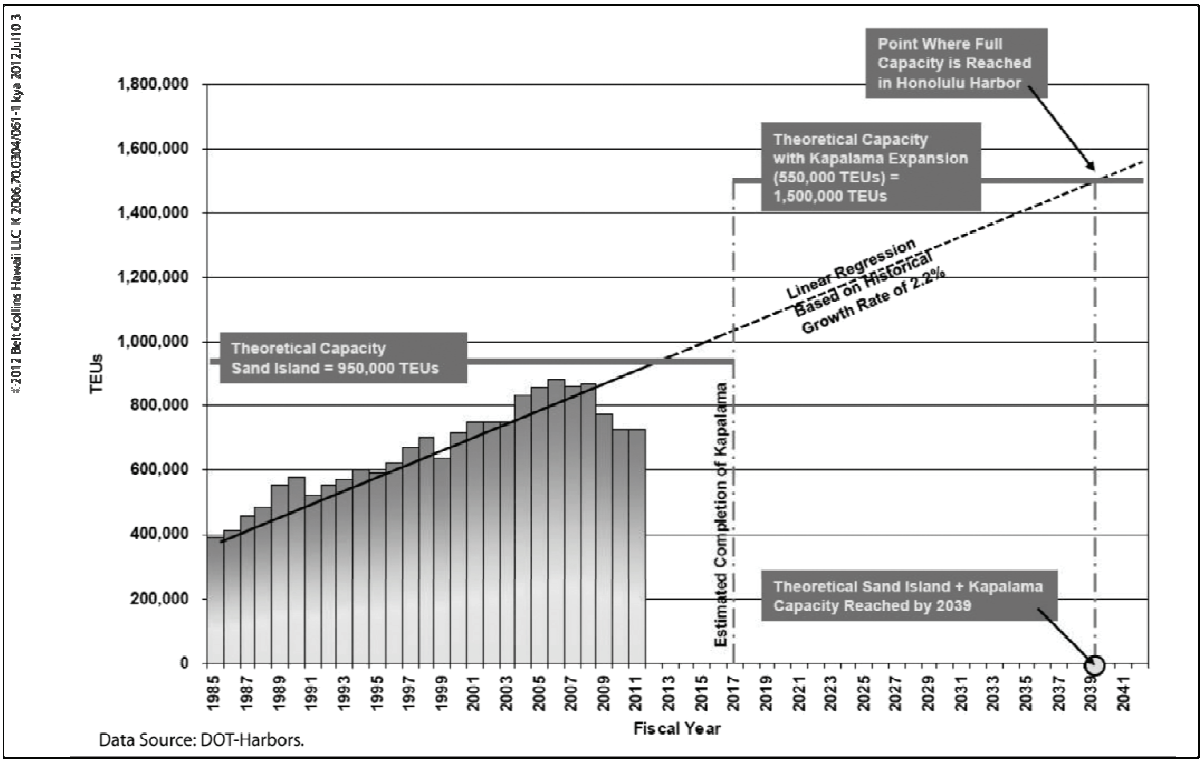

Figure 1-5. Projected Cargo Volumes for Sand Island Terminals

If no new capacity of significance is developed by 2020, the movement and handling of cargo would effectively be constrained with substantial impacts on Hawai'i's economy, including loss of jobs and income, foregone business revenues and taxes, and potential shortages of goods (HHUG 2007). The cargo distribution and delivery system involves a large network of sub-industries, including trucking companies, wholesalers, packaging operations, and distribution centers. These businesses employ workers and pay business taxes. Based on long-term trends, by 2030, the loss of real gross state product could amount to $50 billion; Hawai'i consumers and exporters could be subject to 18 percent higher shipping costs (HHUG 2007). Notably, cargo congestion in the harbor creates uncertain and substantial delays and increased operational costs that hinder Hawai'i's economy.

Expansion of container terminal capacity in Honolulu Harbor is necessary to assure sustained economic growth. With a long-term 20-year planning horizon for harbor

improvements to meet future needs, the capacity of container terminals must increase by approximately 58 percent. At the current annual growth rate in cargo volume of 2.2 percent, container terminal capacity in Honolulu Harbor would need to increase by 550,000 TEUs or from approximately 950,000 TEUs to approximately 1,500,000 TEUs. A throughput volume of this amount would require a new major container terminal site within the harbor.

Considering the land constraints of an island state and its highly land-constrained harbors, the availability of the 94-acre Kapālama waterfront site presents an ideal and unique opportunity to satisfy the anticipated overseas container terminal demand, at least through 2039.

1.2.2 Purpose

The purpose of DOT-H's Proposed Action is to develop a new container terminal in Honolulu Harbor with sufficient ship berthing and landside container storage space to increase existing overseas container terminal capacity. This purpose includes dredging, filling, and new construction of waterfront piers and draft depths needed to support the container terminal operations (excluding areas within the USACE's jurisdiction for dredging); increasing the handling and transportation efficiencies associated with over-land and inter-island distribution; and decreasing distribution risks associated with dependence on the Sand Island Bridge connecting the overseas cargo terminals, all currently located on Sand Island, with consumers and inter-island distributors on mainside. Implementation of the project is part of the current State Administration's "New Day" initiative to modernize its commercial harbors.

1.2.3 Need

The Proposed Action is needed to accommodate the anticipated demand of overseas cargo volumes associated with projected growth of the state of Hawaiʻi through 2039.

1.2.4 Objectives

As the port of entry to the state, Honolulu Harbor has the infrastructure and access to distribution networks necessary to support expanded capacity. It serves as the hub of the hub-and-spoke system for overseas cargo distribution to the neighbor islands. DOT-H objectives for the Proposed Action are as follows:

- Increase overseas cargo handling capacity in Honolulu Harbor an additional 50 percent or 550,000 TEUs per year to accommodate demand projected through 2039. This necessarily requires a two-berth layout, based on a 245,000 TEUs to berth capacity planning factor (550,000 TEUs/245,000 TEUs per berth = 2.24

berths). The associated land-side (container yard) area requirement for a two-berth facility is 72 acres.[3] A single-berth facility is insufficient to meet near-term needs because it increases the likelihood of a berth occupancy rate of 60 percent or greater, which leads to vessel rescheduling, sub-optimal vessel utilization, and less likelihood of adding more vessel calls, which translates into an increase in costs. (Note: Berth occupancy below 40 percent creates few problems or delays to vessels; occupancy from 40 to 60 percent forces some vessel to be re-scheduled, which may sub-optimize vessel use and limit the ability to efficiently add more vessel calls; occupancy from 60 to 80 percent leads to periodic berthing delays and sub-optimal vessel scheduling; and occupancy at or above 80 percent is not achievable as a practical matter because such rates would create large vessel queues. [HHUG 2005]).

- Improve traffic conditions by providing adequate street access and capacity for large volumes of container trucks that travel to and from the container terminal. Efficient container terminal operations require timely access for entering and departing the container yard through gates and special queuing lanes.
- Improve distribution efficiencies over land and to inter-island vessels by moving overseas container terminal operations next to inter-island operators. Overseas containers are currently unloaded from vessels at Sand Island, transported by trucks (over land) through local streets to mainside inter-island cargo operators.
- Reduce distribution risks associated with existing overseas containers received on Sand Island. Should the two-lane roadway that bridges the channel between Sand Island and O‘ahu’s mainside be unavailable, over-land distribution to the inter-island cargo operators and O‘ahu distribution destinations would be cut off.
- Utilize the unprecedented opportunity presented with the availability of the former KMR, a 94-acre harbor site.
- Minimize costs on overseas goods shipped to Hawaii and safety risks to harbor operators by providing the space for harbor operators to optimize container handling efficiencies.
- Improve the adjacent inter-island cargo slip to accommodate wider (100-foot-wide) vessels anticipated during the operational period (through 2039).
- Improve the existing deteriorated Pier 41 for use by future inter-island vessels. Inter-island vessel use of Pier 41 would be needed to distribute the increased volume of overseas cargo (all resulting from the state’s economic and population

[3] An analysis was conducted by DOT-H to estimate container area requirement to support berthing area for two ships. See Appendix B.

growth). Minimize air emissions contributing to potential degradation of air quality and greenhouse gases at the project site. Provide on-site electrical power/support for electric cranes and vessels. This would allow vessels in berth to use electricity rather than fossil fuels, a process called "cold-ironing." This action would be necessary because the vessel's onboard combustion of fuel is shut down and the vessel "goes cold."

- Support the State's effort to minimize the risk of invasive species spread by providing space for an inspection, quarantine, and treatment facility on the Kapālama site for DOA.

1.3 PUBLIC INVOLVEMENT

1.3.1 Introduction

Early consultation is the most important element of the Hawai'i Environmental Policy Act (HEPA) process. Section 11-200-15, Hawai'i Administrative Rules (HAR) requires that the proposing agency consult appropriate agencies, citizen groups, or individuals. Scoping, other outreach procedures to identify environmental concerns to be addressed in the EIS are described in sections 1.3.2 and 1.3.3, respectively. Input received through consultation is summarized in section 1.3.4. The Draft EIS distribution and public review process are described in section 1.3.5.

1.3.2 Scoping

Scoping for the Kapālama container terminal project was an early and open process for actively and constructively involving agencies (federal and state), organizations, and the public in helping to determine the environmental concerns to be addressed in the EIS. The following activities, described below, were conducted during scoping: meetings and interviews, publication and distribution of an EIS preparation notice (EISPN), and two public informational meetings.

Meetings and Interviews

Meetings and interviews were conducted with the following agencies and other stakeholders.

Federal Government

- Federal Aviation Administration
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service

- National Marine Fisheries Service

State of Hawai'i

- Department of Agriculture
- Department of Land and Natural Resources, Aquatics Division
- Department of Transportation, Highways Division
- Department of Transportation, Airports Division
- Office of Hawaiian Affairs

Stakeholders

- Hawai'i Harbor Users Group
- Hawaiian Flour Mill
- Horizon Lines
- Matson Navigation Company
- Pacific Shipyard International
- Sause Bros.
- Servco Pacific
- Young Brothers, Limited

EIS Preparation Notice

On November 23, 2011, the EISPN was published by the State Office of Environmental Quality Control (OEQC) in its *Environmental Notice.* The notice announced that an EIS would be prepared for the proposed Kapālama container terminal project. The EISPN included a description of the proposed action and alternatives and potential impacts. Copies of the EISPN were mailed to interested parties for review and comment (see Appendix A for a copy of the EISPN and the distribution list). The EISPN distribution included 28 government agencies (federal, state, and county), 3 elected officials, and 11 community organizations, special interest groups and other stakeholders. Of the 42 parties who received the EISPN by mail, 18 provided comments (see Appendix A for copies of comment and response letters). Several parties requested to be placed on the mailing list for the Draft EIS in order to comment on the project when the Draft EIS became available for public review. Other commenters offered project information to be included in the DEIS, requested compliance with existing government regulations, and asked that the EIS address potential impacts on marine resources, terrestrial flora and fauna, overland transportation systems, water quality, potential floods, traffic, and utilities.

Public Meetings

Two public informational meetings were held to inform the public about the project and to gather community input. The first meeting was held on July 19, 2011 at Puʻuhale Elementary School in Kalihi near the Kapālama site. Two sessions were held to accommodate different schedules, one starting at 2:30PM and the second starting at 6:30PM. Approximately 70 people attended the first session. They included area residents, tenants on the Kapālama property, government agency representatives, and other interested parties. Approximately 20 people attended the second session, predominantly Kapālama tenants and residents from the neighboring community. Primary concerns voiced during the sessions included the following: crane heights and possible impact on navigable airspace, project financing and implementation, the date when tenants would be required to vacate the Kapālama site, traffic, noise, alternative sites for the container terminal, and work area safety.

The second public meeting was held on May 10, 2012 at Honolulu Harbor's Pier 19. The purpose was to provide an update on the project and EIS preparation. This meeting also had two sessions which were well attended. Approximately 70 people attended the first session. These were primarily representatives from agencies as well as businesses operating in the project area. Approximately 20 people attended the second session, predominantly area residents. Concerns and issues regarding project financing, traffic, noise, and navigable airspace were again raised. Cultural resources were brought up for the first time. Concern about the eviction date for the Kapālama property was not as pronounced as in the first public meeting, since tenants were by now well advised of the proposed development and timeline.

DOT-H made special outreach efforts to inform as many community members as possible about the scheduled public meetings. Typical announcements for such meetings involve publishing a meeting notice in a local newspaper and mailing a notice to stakeholders. For the public meetings, DOT-H published newspaper notices, sent mail-outs to stakeholders, and also ran radio announcements on the air for five days. In addition, DOT-H staff walked through the Kalihi Kai community distributing flyers to residents and businesses.

1.3.3 Other Outreach

Project Website

A project website was launched in June 2011. It includes the following pages: Introduction, Proposed Action and Alternatives, Purpose and Need, Planning Process, Schedule, Documents, FAQs, and Contacts. The website address is www.kapalamaeis.com. There are links to current news and latest information from DOT-H and State OEQC. The website is regularly updated and has a contact box for the public to ask questions or express concerns.

Neighborhood Board Meeting

On March 21, 2012, State DOT representatives presented an update on the Kapālama project to the Kalihi-Palama Neighborhood Board No. 15. Neighborhood board meetings are held monthly and include progress reports from city agencies on public projects and services in the area, as well as reports from others on planned public and private sector projects. The public is invited to attend these meetings and ask questions or provide comments. Concerns raised at the March 21 meeting included potential traffic impacts, noise, impacts to Mokauea Island, and possible alternative location of container terminal at Kalaeloa Barbers Point Harbor.

1.3.4 Summary of Input from Consultations

Agency input was predominantly requests for information to be included in the EIS in order for the agencies to review project impacts. Stakeholder input generally included information about their operations, which was used to describe proposed activities and assess their environmental impacts. Issues and concerns identified during the meetings/interviews are summarized below.

Proposed Action/Alternatives

- Establish biosecurity inspection facility at Kapālama site.
- Provide possible U.S. Customs and Border Protection station at Kapālama site.
- Provide DOT-Highways weighing stations at the new terminal.
- Analyze filling and dredging requirements for pier construction.
- Develop alternatives to filling in harbor waters.

Land Use/Land Ownership

- Discuss maintenance of existing access rights.

Public Health and Safety

- Disclose hazardous materials condition on the property.
- Evaluate impact of proposed gantry cranes on navigable airspace.

Roads and Traffic

- Study impact on local streets, traffic, and pedestrian safety.
- Identify potential off-site road improvements to benefit proposed action.

Air Quality

- Assess air pollution from proposed action.
- Assess emissions from ships.

Noise

- Identify noise impact on nearby residences.

Visual Resources

- Describe visual appearance from surrounding neighborhood and region.
- Consider potential for glare from outdoor lighting in container yard.

Marine Environment

- Conduct a quantitative survey of marine biological resources along the project waterfront.
- Identify existing coral and coral reef ecosystems.
- Analyze construction impacts on water quality and endangered marine species.
- Comply with USACE requirements for in-water work.
- Assess potential spread of invasive marine species in ships' hulls and ballasts.

Terrestrial Flora and Fauna

- Evaluate impact of outdoor lighting on Newell shearwaters.
- Assess potential spread of invasive terrestrial species from cargo.
- Implement upgraded biosecurity inspection facilities for State harbors system.

Cultural Resources

- Identify early fishponds in project area.
- Retain/preserve cultural information gained from site excavations.
- Recognition of former KMR.

1.3.5 Draft EIS Distribution and Public Review

DOT-H has prepared a distribution list for the Draft EIS and submitted it to OEQC for review and verification, in accordance with Section 11-200-21, HAR. The distribution list includes agencies and other stakeholders involved during the scoping and Draft EIS preparation process (see Appendix A).

Publication of the Draft EIS initiates a required 45-day public review and comment period. Section 11-200-18, HAR requires the proposing agency to provide point-by-point responses to each substantive question, comment, or recommendation received in writing during the comment period. The Final EIS will incorporate comments received during the Draft EIS public review period, including any revisions to the document as needed.

2 Proposed Action and Alternatives

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action is the construction and operation of a new overseas container terminal at the Kapālama site in Honolulu Harbor. The estimated timeline for implementation, tenant relocations, construction activities, and operational activities of the action are presented in this section.

2.1.1 Timeline

The Proposed Action is intended to meet the anticipated demand of overseas cargo associated with Hawai‘i’s growth. Project site preparation (including demolition of existing buildings) would occur as soon as 2014, after environmental and land use permits and approvals are obtained and existing tenants vacate the site. Actual construction of the main pier and container terminal is anticipated to occur through the year 2016. Operational activities would follow and are projected and evaluated through the year 2039 for purposes of this Environmental Impact Statement (EIS).

2.1.2 Tenant Relocations

As presented in Chapter 1, existing tenants will vacate the Kapālama site by February 28, 2014, with or without the Proposed Action. Tenant relocations made part of the Proposed Action are those maritime-dependent operators (i.e., operators that require direct access to the waterfront) whose relocation timeframe coincides with the Proposed Action.

The present locations of these maritime-dependent operators are shown in Figure 2-1 and named below.

- Pacific Shipyards International (PSI)
- Atlantis Submarines
- University of Hawai‘i (UH) Marine Center (addressed under a separate Hawai‘i Revised Statutes [HRS] Chapter 343 document)

Figure 2-1. Existing Kapālama Site

Figure 2-2 shows the proposed maritime tenant relocations. The UH Marine Center, part of the School of Ocean and Earth Science Technology (SOEST), would move from the Kapālama site to Piers 34 and 35 and to the Honolulu Community College (HCC) Marine Education Training Center (METC) on Sand Island. However, because the timing and financing of these moves are proceeding on different schedules, the effects of these actions are being evaluated in separate environmental documents. The overall relocation effort by the UH Marine Center, however, will be addressed in this EIS as indirect and cumulative impacts of the Proposed Action.

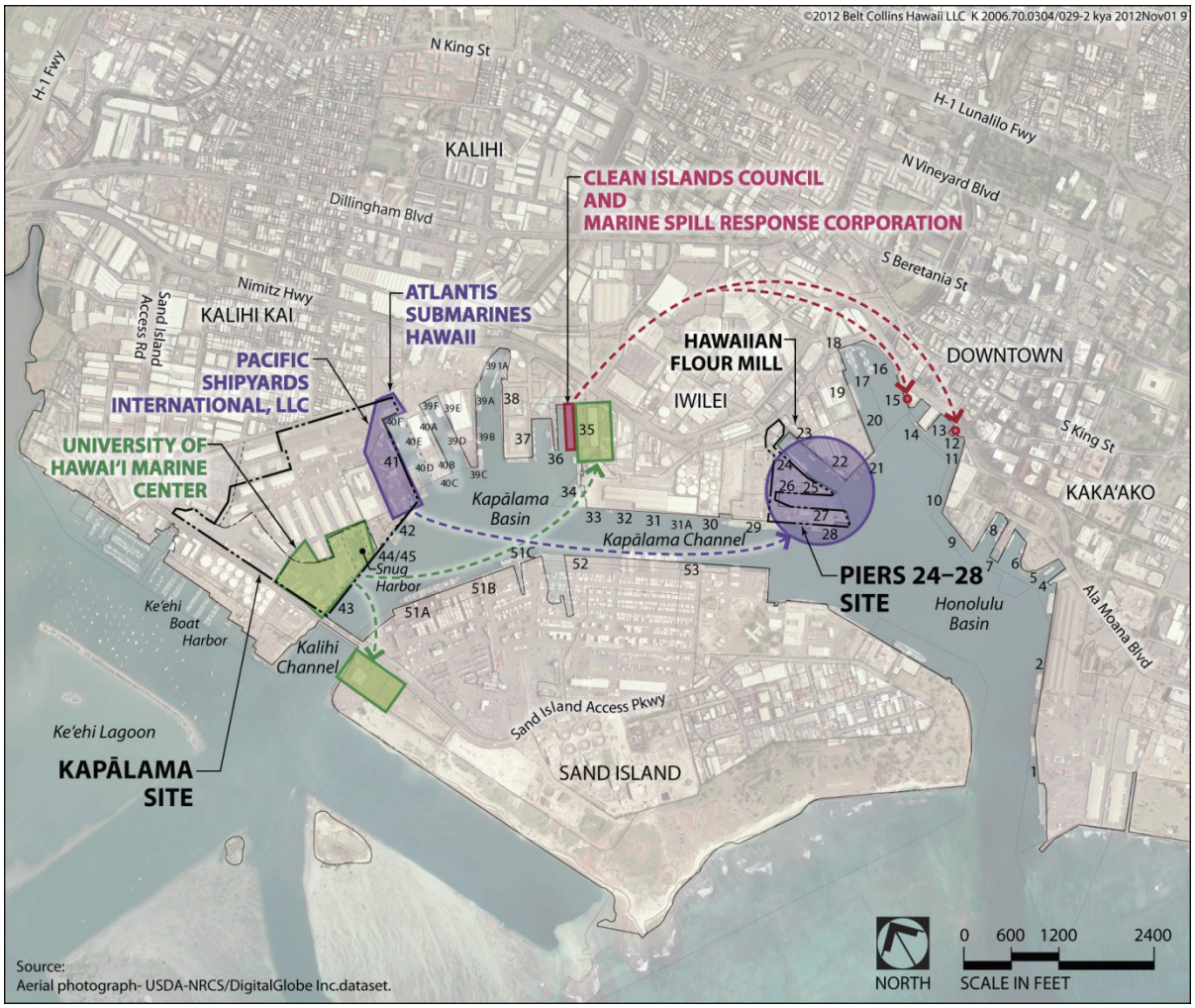

Figure 2-2. Maritime Tenant Relocations

PSI and Atlantis Submarines would move from Piers 40 and 41 to Piers 24 through 27. PSI would be located at Piers 24 to 26, and Atlantis would move to the slip area of

Piers 26 and 27. Improvements at Piers 24–28, to exclude any work in water, are part of the Proposed Action evaluated in this EIS.

The move by PSI and Atlantis Submarines from the Kapālama site to Piers 24–28 would occur at a site that is predominantly vacant. Three buildings are located in the northern corner of the site. PSI plans to use at least two of these buildings for administrative and operations support purposes. The two existing maritime-dependent tenants (Harbor Police and Sause Bros.) will relocate to a yet to be determined location elsewhere within the harbor. The non-maritime tenant of the other building will relocate on its own to another site on the island.

PSI's occupation of the pier area of the new site would include the mooring of two large floating work platforms or drydocks along Piers 24 and 25. The placement of these drydocks along these piers would occupy a major portion of the slip between Piers 22/23 and 24/25 and, as a result, affect Hawaiian Flour Mill's (HFM's) use of Piers 22/23 for its shipments of raw wheat grain to its dockside silos.[1] In part because of the infrequent shipments of raw wheat grain, approximately two to three times per year, HFM plans to berth its ships at Pier 20 and convey grain over land to its silos at Piers 22/23.

The relocation of UH Marine Center's research operations from the Kapālama site to Piers 34 and 35 will require the existing tenants, Clean Islands Council and Marine Spill Response Corporation, to vacate their current location and relocate to Piers 12 and 15, respectively. The timing of this action is based on the UH Marine Center move and, as a result, a separate HRS Chapter 343 document is being prepared for the Clean Islands Council and Marine Spill Response Corporation. The educational operations of the UH Marine Center would move to the HCC-METC facilities on Sand Island. Relocation to this site will be evaluated in a separate HRS Chapter 343 document when movement on this action occurs.

2.1.3 Construction Activities

In general, construction of the new container terminal, which is estimated at $243 million, would involve dredging of approximately 300,000 cubic yards of material to create sufficient draft depths for vessels; filling of approximately 132,000 cubic yards of existing man-made harbor (Snug Harbor) to create approximately 2.4 acres of land, new pier construction and reconstruction; demolition/removal of existing facilities, pavement, and infrastructure; and construction of new container yard facilities. The latter would include grading, paving, installing utilities, building new structures, and installing equipment. In addition, improvements to the adjacent

[1] HFM also imports refined flour in 20- to 24-foot long containers and 25- and 50-pound bags.

inter-island cargo site and possible improvements to the intersections on Sand Island Access Road at the Kapalama site entry/exit gates are included in this action, along with improvements to the landside areas of Piers 24–28 for the maritime operators identified in section 2.1.2. The results of construction activities associated with the Proposed Action at the Kapālama site and adjacent inter-island cargo site are reflected in Figure 2-3. Figure 2-4 illustrates the areas to be improved at the landside area of Piers 24–28.

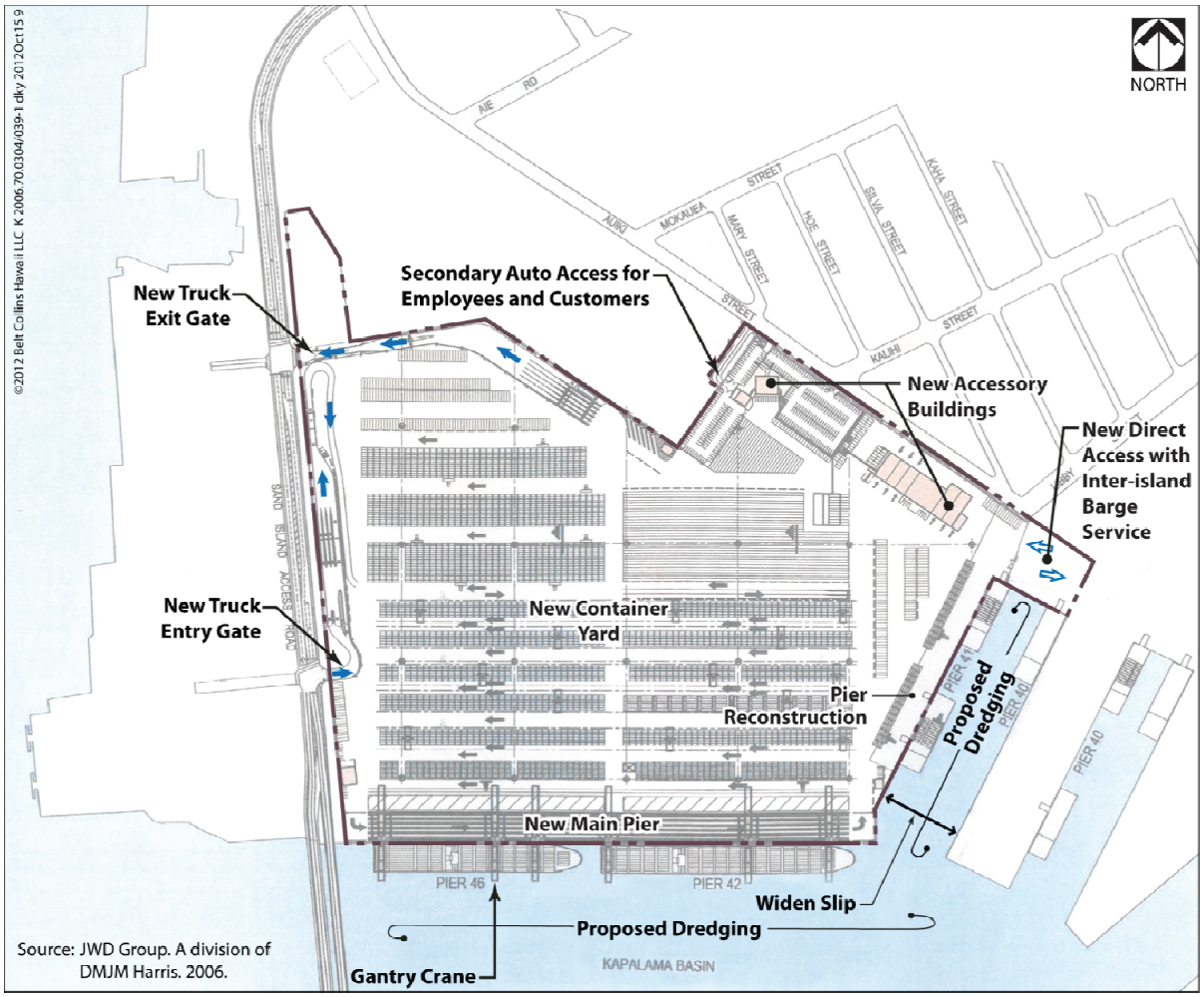

Figure 2-3. Proposed Kapālama Container Terminal Layout

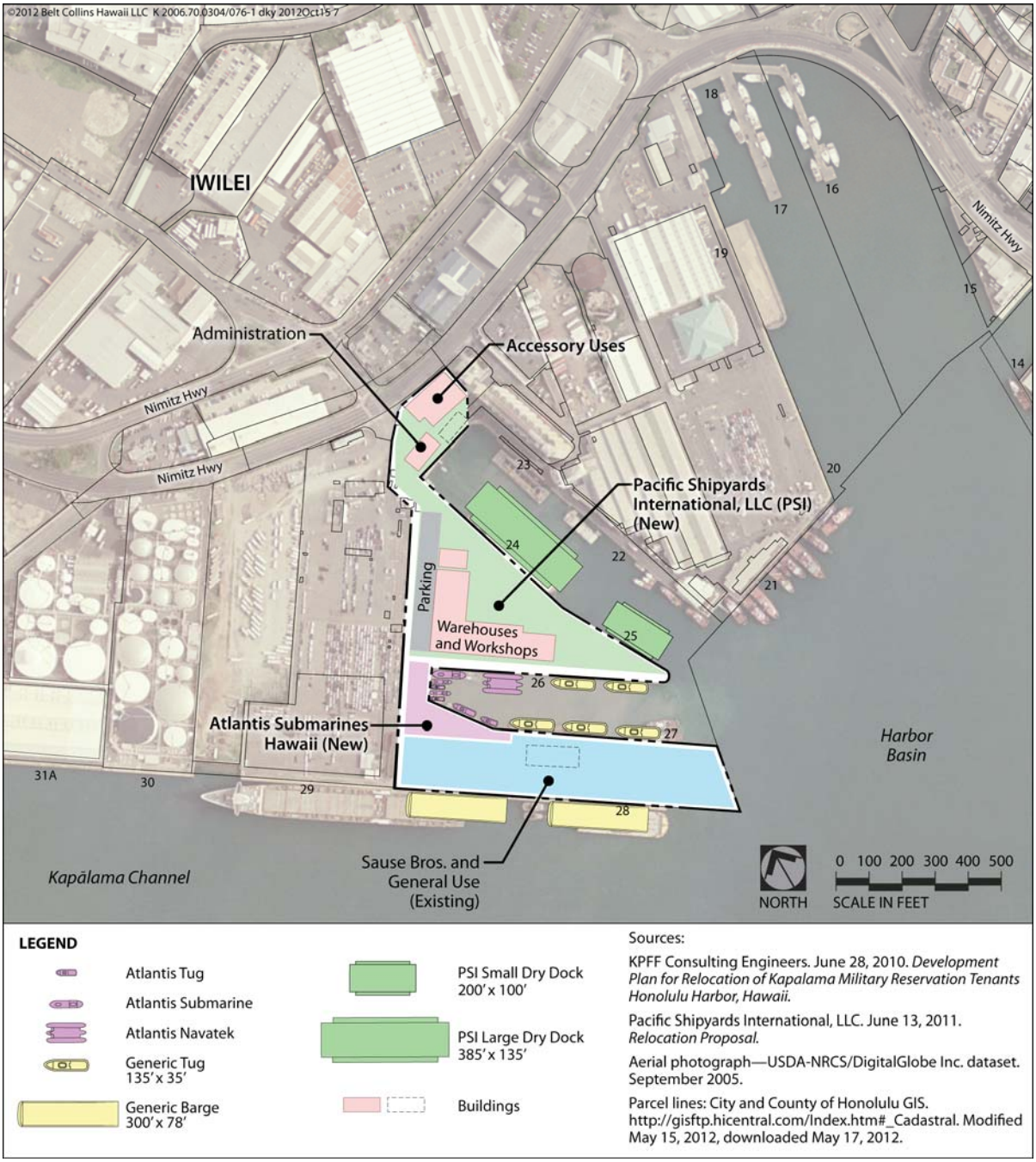

Figure 2-4. Proposed Pier 24–28 Improvements

Specifically, construction activities would include the following:

Dredging and Excavation

To accommodate the existing and future (modernized) vessels carrying shipping containers, construction dredging to 40 feet below mean lower low water (MLLW) would provide sufficient draft depths.[2] While hydrographic and dredge material studies would be completed in the design stage (subsequent to this EIS), it is roughly estimated that approximately 200,000 cubic yards of sediment would be dredged around Piers 42 and 43.

Dredging and excavating would occur at Pier 41 to widen the existing slip between Piers 40 and 41 from 256 feet to 300 feet; the volume of sediment and earth to be dredged and excavated is approximately 100,000 cubic yards. Possible fill of approximately 40,000 cubic yards may occur depending on final reconstruction design of Pier 41. After widening the slip and reconstructing Pier 41, the net increase in water area at this location would be approximately 0.6 acre.

Dredged sediment would be tested, and depending on the results, would be reused onsite to the extent practicable, ocean disposed, disposed at an approved upland site, or if contaminated, disposed of appropriately. Likewise, excavated material from the shore area would be tested and reused on-site as fill to the extent practicable or appropriately disposed offsite.

Filling

To provide a two-berth configuration, the existing 2.4-acre Snug Harbor would be filled. This manmade slip was constructed in the 1940s for the military with the deck portion completed in the 1970s for the UH Marine Center. Fill from excavation would be used to the extent practicable. Import fill (fill from off-site sources) would be used as needed. A total of approximately 132,000 cubic yards of clean fill material would be needed. This fill would displace a volume of approximately 105,000 cubic yards of water in the slip.

New Pier

A new pier, approximately 1,871 feet long with crane rails, utilities, bollards, hatches and associated equipment would be constructed to accommodate two berths, identified as Piers 42 and 43 on Figure 2-3 (Note: Piers 43, 44, and 45 are located in

[2] Based on a U.S. Army Corps of Engineers (USACE) June 15, 2007 soundings survey map, dredging will be required to achieve the overall existing harbor depth of -40 feet MLLW, since existing elevations along the new pier range from a depth of -13 feet MLLW to -30 feet MLLW. Routine maintenance dredging within Honolulu Harbor by USACE has attempted to maintain the depths in the federal project area within the harbor at-40 feet MLLW.

Snug Harbor). While pier design has not yet commenced, three options appear as possibilities:

- deck and piling system with revetment,
- bulkhead, and
- combination bulkhead with piling system

The deck and piling system option consists of a deck over the shoreline supported by vertical concrete piles. The shoreline beneath the deck would be reinforced with a revetment to retain a natural shoreline profile as well as to absorb wave energy in the harbor when vessels travel past the Kapālama site (see Figure 2-5).

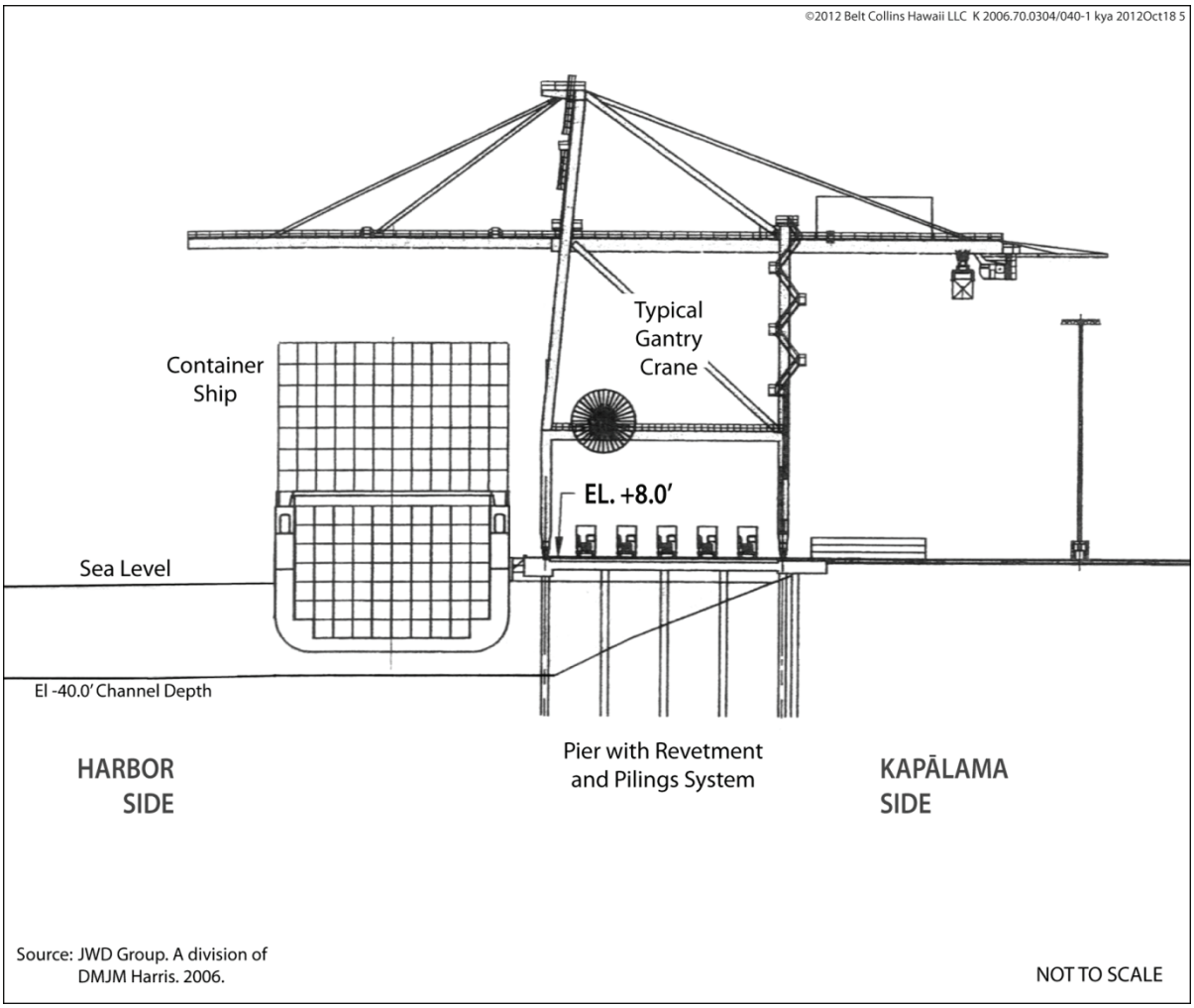

Figure 2-5. Typical Main Pier Section (Revetment and Piling System) for Kapālama Container Terminal

The bulkhead option consists of a wall or vertical sheet piles constructed at the very edge of the concrete pier deck (see Figure 2-6). Fill would be placed behind the bulkhead to support the deck.

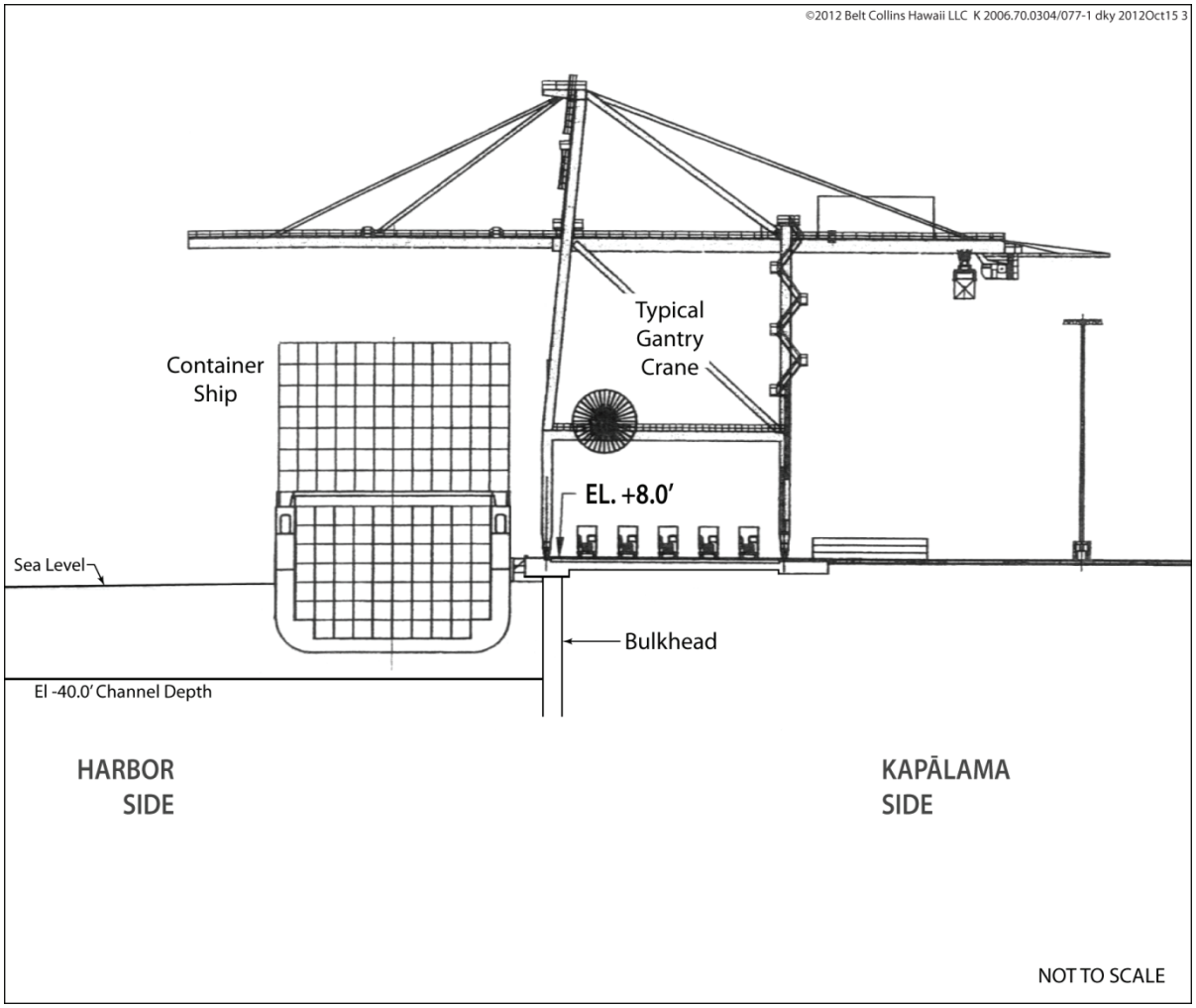

Figure 2-6. Typical Wharf (Bulkhead System) For Kapālama Container Terminal Section

The combination bulkhead with piling system consists of a deck supported by vertical concrete piles and a wall or vertical sheet piles constructed at the edge of the pier deck. There is no fill behind the wall, water is confined between the wall and the shoreline, and the original shoreline is retained.

The three pier options represent different design concepts. The final design of the pier is expected to be determined in the project design stage when project

parameters are determined, specific engineering studies are conducted, and the permit process with the U.S. Army Corps of Engineers (USACE) is underway.

Pier Reconstruction

At the eastern side of the Kapālama site, Pier 41 would be reconstructed for future use by an inter-island cargo operator. After demolition, excavation, and dredging to widen the existing slip between Piers 40 and 41, Pier 41 would be reconstructed. Widening would add approximately 0.6 acres of slip area between Piers 40 and 41.

Reconstruction of Pier 41 would involve a revetment and piling system or a bulkhead wall. The revetment and piling system would provide a sloped embankment to absorb wave energy. Construction of the pier structure would require driving concrete piles to support the concrete deck. The pile driving would be conducted using a barge-mounted diesel, hydraulic impact and/or vibratory hammer, depending on geotechnical conditions.

Construction of a bulkhead would involve driving steel sheet piles and backfilling with dredged or other suitable material. The interconnected sheet piles can be installed by using a barge-mounted diesel hammer, a hydraulic impact hammer, and/or vibratory hammer. The sheet piles are typically tied back to concrete deadman anchors or to a sheet pile anchor wall.

Final selection of the pier design would occur in the design stage when project parameters are determined and specific engineering studies are conducted.

New Container Yard

To provide a container yard with a capacity of 550,000 twenty-foot equivalent units (TEUs), at least 72 acres would be required. Additional acreage would provide room for associated ancillary improvements, including support buildings to accommodate administration, maintenance and repair, marine operations, automobile processing office, conflict resolution office, comfort stations, guard stations, etc. Other improvements include entry and exit truck gates, DOT-Highways Division truck weighing station, queuing lanes to stage truck traffic, perimeter and other fencing to secure the terminal and meet security requirements, secondary access and parking for employees and the public, gantry cranes and other container-handling equipment, on-site utilities including lighting and security systems, and potential associated off-site utility improvements to serve the site and potential required off-site roadway and entrance intersection improvements. Further, a direct internal access connection with gate will be provided with the adjacent inter-island cargo facility.

Allocation of a Site for State of Hawai'i, Department of Agriculture

This allocation would be used for the State of Hawai'i (State), Department of Agriculture (DOA) to support on-site biosecurity inspection, quarantine, and treatment services. At the time of Draft EIS publication, the area to be allocated is approximately 2.5 acres within the Kapālama site or adjacent to the existing DOA facility on Auiki Street. Funding, scheduling, and development of the new facility will be the responsibility of DOA.

U.S. Customs and Border Protection

Current plans call for use of the proposed container terminal by a domestic operator. In the future, the container terminal may be partially used by or shared with an operator carrying foreign cargo. Hence, a U.S. Service Port station for foreign cargo inspection would be needed within the terminal area. Details of the facility, including location, type of spaces and required equipment, would be developed during the project planning and design stages. Funding and development of the facility would be the responsibility of the U.S. Government.

Utilities

Electrical utilities would be developed to provide cargo vessels berthed at proposed Piers 42 and 43 with shore-to-ship power (cold-ironing), power to electric gantry cranes moving cargo on and off the vessels, and general site power. Other utilities, including potable water, wastewater, and telecommunications, would be sized and improved accordingly. Construction of an on-site electrical power substation may be required.

Surface Improvements

At the eastern end of the container terminal site adjacent to the existing inter-island cargo facility, improvements would be made to deteriorating pavement surfaces (e.g., asphalt and spalling) to strengthen pavement surfaces for roll-on/roll-off (RO/RO) cargo operations, and to allow direct access between the proposed container yard and inter-island cargo facility.

Pier 24-28 Landside Improvements

To accommodate the relocation of PSI and Atlantis from the existing Kapālama site to Piers 24–28, the following landside improvements would be made: resurfacing of pavement; installation of underground utility lines; renovation and construction of administration, operations, repair and maintenance buildings; and addition of ancillary facilities including employee and guest parking and security systems.

The landside of Piers 24 to 26 are already paved but require resurfacing for PSI's operations. Improvements to the pavement surface would be the responsibility of the new tenant. An existing industrial building is available for renovation and can be

used for the tenant's administrative operation. Two floating work platforms or drydocks would be secured in place along Piers and 25.

The slip between Piers 26 and 27 would be occupied by Atlantis. Although the piers are under the jurisdiction of DOT-H, any improvements to the landside section of the piers would be the new tenant's responsibility. Atlantis may resurface the existing pavement but is expected to transfer its existing buildings and facilities from Kapālama to the new site. No work in water is planned as part of the tenant's relocation effort.

Pier 28 is currently being used as a universal berth by Sause Bros. Ocean Towing Co., Inc. and other marine vessels. Sauce Bros. is a marine transportation services operator that provides ocean towing as well as shipyard services. Minor surface improvements to accommodate the continued use of landside operations at Pier 28 are expected to occur. No work in water is planned around this pier.

2.1.4 Operational Activities

Container cargo vessels typically call on Honolulu Harbor several times a week. At the dock, container cargo is unloaded by gantry cranes and temporarily stored in the container yard until picked up by commercial truckers for delivery to customers around the island. Other containers are transported to an inter-island barge terminal for shipment to the neighbor islands.

A breakdown of the above activities indicates the operations per berth expected at the proposed container terminal.

- 2.4 vessels or ships call per peak week
- 2 cranes per berth
- 2 to 3 shifts per 24-hour day for vessel (unloading) operations
- 1,700 to 1,800 lifts (containers unloaded) per call
- 25 lifts per gantry crane per hour
- 35 hours mean berth occupancy time

Based on existing container practices in the harbor, operational procedures at the new container terminal would be as follows. Containers would be unloaded from the cargo ship by gantry cranes, transported on wheeled chassis to the storage yard, parked, and later picked up on truck by the customer. Other containers would be grounded or stacked by top-pick vehicles or rubber-tired gantry cranes. Side-pick vehicles may also be used to stack containers up to a maximum of five high, based on current labor restrictions.

Two container terminals currently operate on Sand Island. Matson Navigation Company, which operates on the larger site, stores approximately 80 to 90 percent of its containers on wheeled chassis. The remainder of the containers is on grounded stacks. Horizon Lines, which operates on a smaller site, has approximately 80 percent of its containers on grounded stacks. The remainder of the containers is on wheeled chassis.

The new container terminal would operate using a wheeled-base operation in order to maximize cargo handling efficiency. Truckers favor wheeled-base operations over grounded (stack) operations because wait times are less.

The busiest pick-up times for the container trucks are expected to be early in the morning on two separate days of the week when a cargo ship is in port. A second busiest pick-up time on the same day would occur later in the day. Trucks would pick up their loads and leave the terminal in 20 to 24 minutes.

2.2 ALTERNATIVES ANALYSIS

An alternatives analysis was conducted to satisfy the requirements of HRS Chapter 343 and its implementing rules, HAR 11-200. The analysis also meets anticipated requirements of the project's Department of the Army permit for the federal scope of the project, specifically those relating to the National Environmental Policy Act (NEPA) and Clean Water Act (CWA) Section 404(b)(1) Guidelines.

The first step in organizing the range of alternatives developed during the planning process involved categorization. The following categories were ultimately used: alternative locations, alternative waterfront configurations, and alternative site ingress/egress for land transportation (section 2.2.3). These alternatives were then compared to the purpose, need, and objectives of the project (see section 1.2), which were derived over the course of almost 25 years by the Governor's office, DOT-H, and HHUG. To help identify additional alternatives to meet the purpose, need, and objectives of the project, the working draft of purpose, need, objectives, and alternatives was distributed to federal agencies in Honolulu, including U.S. EPA and USACE, for input and comments on the alternatives.

The CWA Section 404(b)(1) Guidelines prohibit discharge of dredged or fill material if a practicable[3] alternative to the proposed discharge exists that would have less adverse impacts on the aquatic ecosystem, as long as the alternative does not have

[3] The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes (40 C.F.R. §230.3[q]).

other significant adverse environmental consequences.[4] Hence, the next step of the alternatives analysis involved identifying alternatives to meet the CWA Section 404(b)(1) Guidelines. Specifically, DOT-H examined practicable alternatives to the proposed discharge, that is, not discharging into the waters of the U.S. or discharging into an alternative aquatic site with potentially less damaging consequences.[5] Identifying such an alternative was challenging considering the purpose, need, and objectives of the proposed project. In particular, the following objectives limited the proposed aquatic site to that identified under the Proposed Action:

- Increase overseas cargo handling capacity in Honolulu Harbor to accommodate projected demand through the year 2039. This necessarily requires a two-berth waterfront (estimated linear length of 1,871 feet). Note: Honolulu Harbor is the only harbor in the state that has such linear waterfront space available.
- Reduce distribution risks associated with current reliance on the bridge between Sand Island and mainside. All commercial overseas containers are currently received on Sand Island, and all distribution over land or over water (via inter-island vessels) must be first transported over this bridge.

One alternative action was identified in an attempt to minimize fill on the aquatic ecosystem—No Fill of Snug Harbor Alternative.

In compliance with HRS Chapter 343, NEPA, and CWA Section 404(b)(1) requirements, the following alternatives are analyzed in this EIS:

- Proposed Action (section 2.1),
- No Fill of Snug Harbor Alternative (section 2.2.1), and
- No Action Alternative (section 2.2.2).

2.2.1 No Fill of Snug Harbor Alternative (Alternative Action)

This alternative would be similar to the Proposed Action, but excludes the 132,000 cubic yards of fill that would displace approximately 105,000 cubic yards of water in the existing man-made Snug Harbor. This alternative addresses provisions of the federal Clean Water Act (CWA) that call for proposed actions to minimize their impacts to waters of the U.S. It also would retain the marine resources that presently occur in these waters.

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4 40 C.F.R. §230.10(a)

5 40 C.F. R. §230.5(c)

Because the surface area (approximately 2.4 acres with a waterfront length of approximately 200 linear feet) represented by Snug Harbor is needed to provide the required operational area for two ships (a total of 1,870 linear feet) and to optimize container handling efficiencies (minimizing costs and safety risks), this alternative includes construction of an extensive deck over the water within Snug Harbor. The deck would allow the main pier of the container yard to extend along the full length of the site's main waterfront. See Figure 2-7. Use of the pier's full length would allow the rail system for the gantry cranes to extend in a straight-line fashion. This would provide the full length of landside needed to operate the cranes for two ships, allow maximum maneuverability along the waterfront, and optimize container handling efficiencies in the terminal.

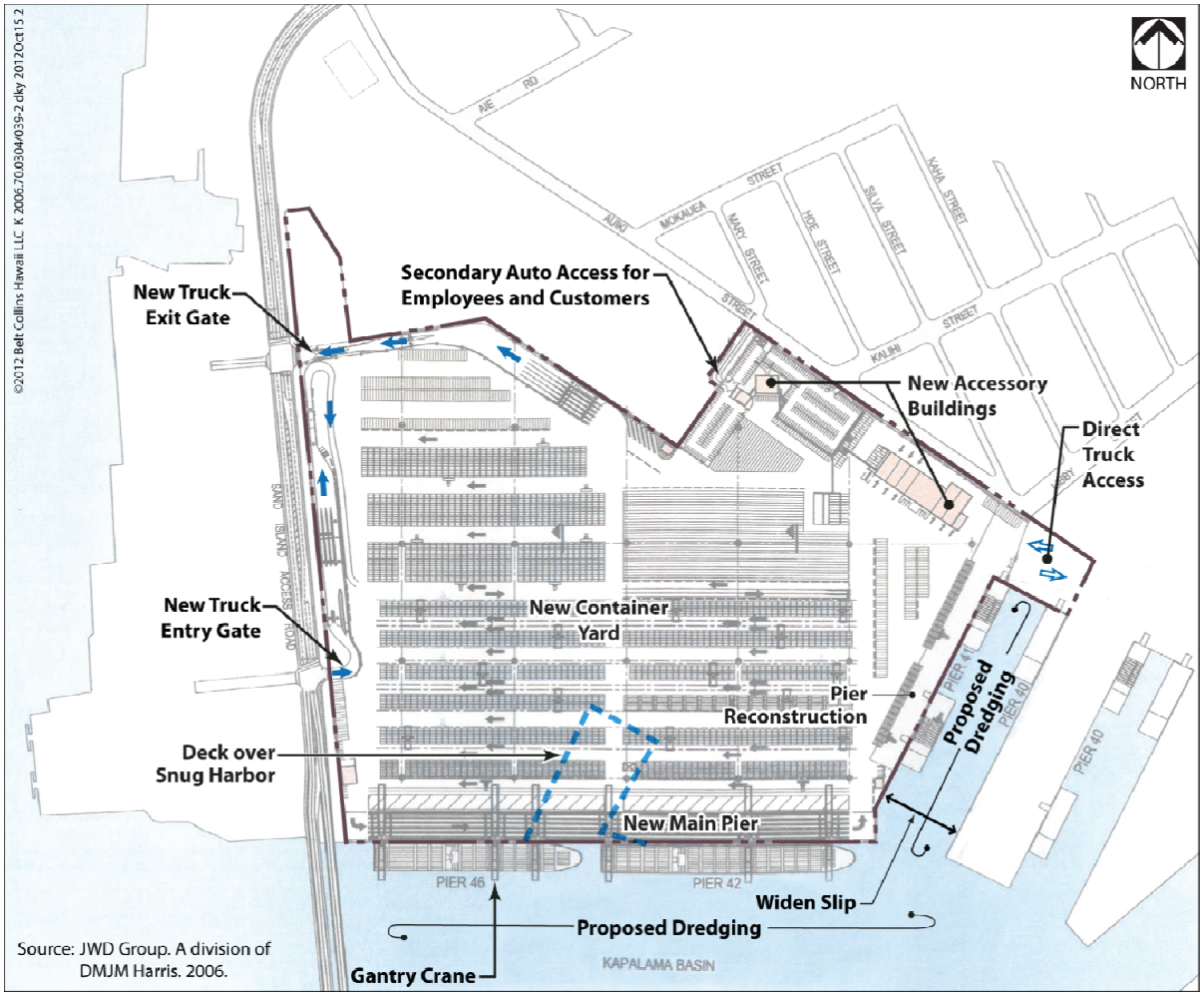


Figure 2-7. Typical Main Pier Section over Snug Harbor

The construction cost for this alternative with the deck is approximately $351 million (cost of Proposed Action is approximately $243 million). The long-term cost for this alternative includes not only the cost of operating and maintaining the container terminal as in the Proposed Action, but also the cost of routine maintenance of the deck and water quality beneath the deck. In the latter case, water in the covered slip would need to be circulated and kept free of debris.

2.2.2 No Action Alternative

Under this alternative, the Proposed Action would not occur. The waterfront area of the Kapālama site would remain in its present condition, Snug Harbor would not be filled (its pier facilities would continue to be available for marine vessel mooring and the waters and marine resources within the slip would continue to exist), the maritime tenants being evaluated under the Proposed Action (PSI and Atlantis Submarines) would not relocate, and the development of the site with piers and a container terminal would not occur. Existing tenants would be vacated, existing structures would be demolished, and the site would be cleared under separate actions to protect public health and safety (existing non-maritime buildings are in poor conditions) and in accordance with DOT-H's list of exempt classes of actions, pursuant to the implementing rules of HRS Chapter 343.

Under the No Action Alternative, consumer growth and demand for products would not change. Hence, evaluation of the No Action Alternative would involve considering the effects of trying to meet anticipated overseas container cargo demand without the Proposed Action.

The existing container terminals on Sand Island would continue to accommodate existing and increasing future incoming cargo volumes and as a result would experience escalated congestion in container movement and storage in the yard. This situation has raised serious concerns on safety and welfare by the operators and container handlers.

2.2.3 Alternatives Considered But Not Carried Forward for Analysis

The process used to determine the reasonable range of alternatives evaluated in this EIS is described in section 2.2 and is based on screening the alternatives with the project's purpose, need, and objectives. The alternatives that were screened out and not further considered for evaluation in this EIS include: alternative locations for the container terminal and for tenants PSI and Atlantis Submarines (section 2.2.3.1), alternative waterfront configurations (section 2.2.3.2), and alternative ingress/egress for land transportation (section 2.2.3.3).

2.2.3.1 Alternative Locations

Mainside Honolulu Harbor

Within Honolulu Harbor (mainside), various sites were reviewed but dismissed from further consideration as they were deemed too small or not readily available. Over 95 percent of the harbor's waterfront is presently occupied by existing tenants. Only approximately 1,500 linear feet of waterfront is currently available for new uses, and of that total, the longest continuous available frontage is approximately 500 linear feet. A fully functional container terminal, large enough for at least two container ships, would require at least 1,870 linear feet of waterfront (DOH-H March 2007).

Only with the availability of the former Kapalama Military Reservation (KMR) property is a new container terminal in Honolulu Harbor a possibility.

Sand Island Container Terminal Expansion

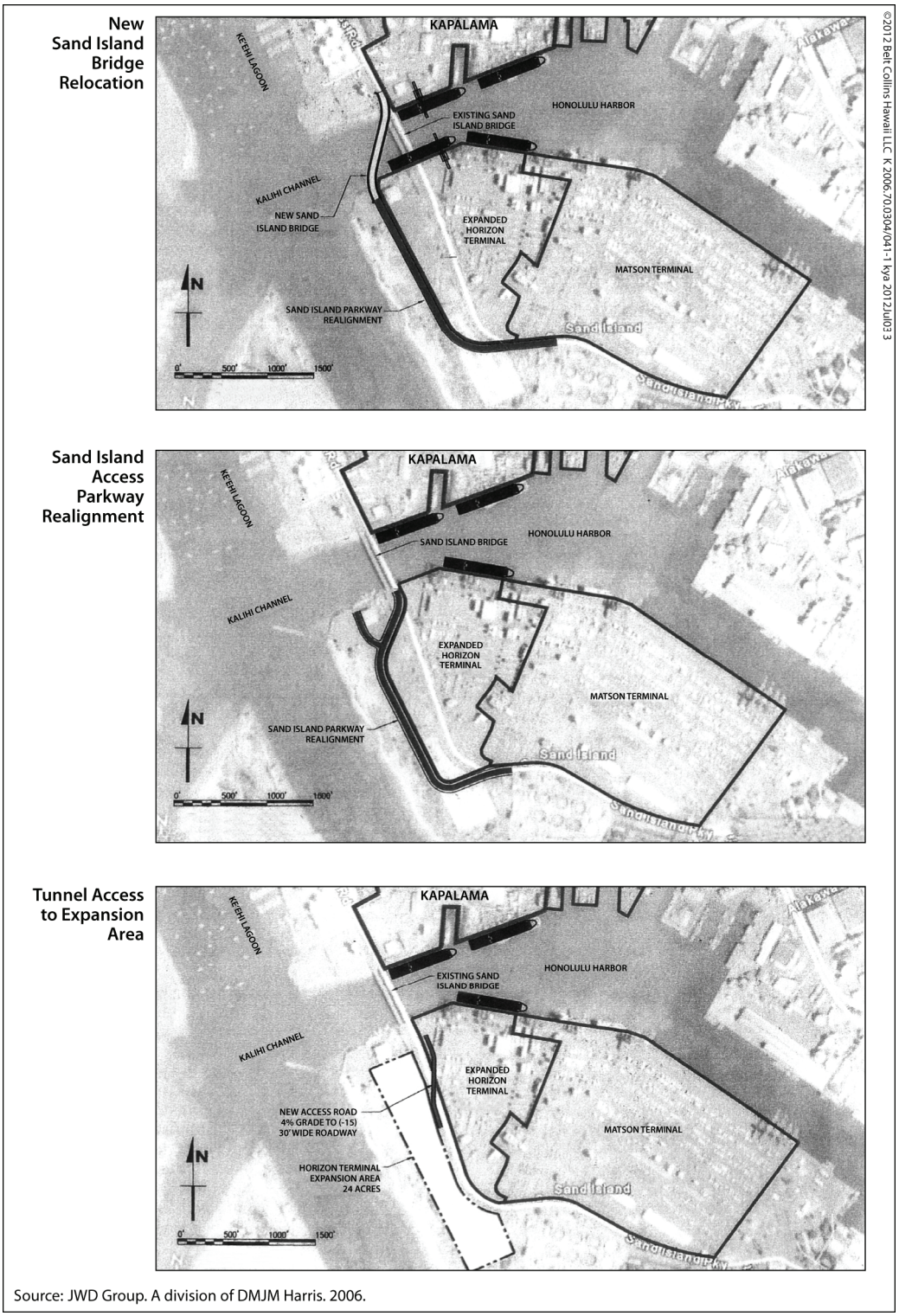
A study (DOT-H August 2006) prepared in 2006 reviewed the possibility of expanding an existing container terminal on Sand Island. One option was to expand the Horizon Lines container yard toward the ocean (Figure 2-8). There was sufficient land area on the *makai* side of the terminal to add up to 20 to 24 acres to the operator's existing 38-acre site. This option, however, would have involved extensive infrastructure cost to realign Sand Island Access Road around the *makai* boundary of the expanded site.

It is noted that this option included two versions: one involving realignment of Sand Island Bridge, as well as a portion of Sand Island Access Road abutting the Horizon Lines site; and a second version involving realignment of only Sand Island Access Road abutting the Horizon Lines site (see Figure 2-8).

In the first version, realignment of the bridge would have allowed increased water frontage for two berths rather than one, which is presently allowed. This version would have been significantly more costly, with more environmental concerns due to construction of the realigned bridge in the harbor channel and the channel's connection to the ocean.

In the second version, no bridge realignment would be necessary, and as a result, no work in the channel waters would be required. This version, however, would not provide capacity for a second berth on the waterfront.

The 2006 study also considered the option of including the 24 acres on the *makai* side of Sand Island Access Parkway to the Horizon site without realigning the road (see Figure 2-8). With the parkway remaining in place, construction of a tunnel would be required to establish a connection to the *makai* site and to facilitate continuous and uninterrupted access between the two properties.



Source: JWD Group. A division of DMJM Harris. 2006.

Figure 2-8. Alternative Sites on Sand Island

The cost of the tunnel would add to the development budget for the container yard expansion, but not as much as for the bridge and road realignment option.

The alternative of expanding container terminal operations on Sand Island is not further considered because it does not meet DOT-H's objective to "reduce distribution risks associated with existing overseas containers being received on Sand Island" (section 1.2.4). This alternative would continue to present a risk to the distribution of supplies should the two-lane roadway from Sand Island to the mainside be compromised. The relatively small area available for increased site use, up to 24 acres, is also not adequate and does not meet DOT-H's objective for providing sufficient capacity through the 2039 planning horizon.

Kalaeloa Barbers Point Harbor

The purpose of the Proposed Action is to develop a container terminal with sufficient ship berthing and landside container storage space to increase overseas container terminal capacity in Honolulu Harbor. The need for this additional container terminal space has long been identified in the State's long-range plans for Hawai'i's main port of entry. Consequently, consideration of such a new facility at Kalaeloa Barbers Point Harbor was readily dismissed, as this alternative is not consistent with the project's purpose.

Further, a new container terminal at Kalaeloa Barbers Point Harbor does not meet the objective to locate overseas container terminal operations next to inter-island operators to improve over-land and inter-island distribution. Presently, there are no inter-island container barge operators at Kalaeloa Barbers Point.

Further, the west O'ahu harbor, which is intended to be a niche port that handles dry- and liquid-bulk cargos, also has a number of physical constraints that make the use of the harbor for container ships inappropriate and infeasible, including lack of berthing space for new container ships, lack of background lighting conditions that make Kalaeloa a daylight-only navigation harbor, and a narrow harbor entrance which should be 100 feet wider. For more details on the harbor's constraints, see Appendix I which contains DOT-H's presentation at a public meeting in May 2012.

Maritime-Dependent Tenant Relocations

PACIFIC SHIPYARD INTERNATIONAL. In exploring relocation options, PSI and DOT-H considered several sites other than Piers 24–28, including sites within and outside of Honolulu Harbor:

Alternative Site 1: Sand Island between Sand Island Bridge and Pier 51A.

Alternative Site 2: Oceanfront site on Sand Island near Kalihi Channel.

Alternative Site 3: Kalaeloa Barbers Point Harbor.

Alternative Sites 1 and 2 would require extensive improvements and infrastructure upgrades and result in possible delays for PSI to move to its new home. Alternative Site 3, Kalaeloa Barbers Point Harbor, was briefly considered but quickly dismissed, as it was found to have inadequate space for PSI's berthing requirements, and sea conditions in the harbor are not consistently stable for the company's dry dock operations.

ATLANTIS SUBMARINES. Since the operations of Atlantis Submarines would not be in direct conflict with the proposed container terminal, consideration was given to keep the operator at its current site on Pier 40F. However, such a location—between the proposed overseas container terminal and inter-island cargo terminal—was determined to be inappropriate and not ideal for the visitor-oriented recreational operator.

2.2.3.2 Alternative Waterfront Configurations

Angled Waterfront Configuration

This alternative considered a two-berth configuration that would maximize the length of each berth to accommodate potentially larger ships (Figure 2-9). The concept for this alternative included filling of Snug Harbor, along with additional excavation and dredging (relative to that in the Proposed Action) in the adjacent section of the port. This alternative was readily dismissed from further consideration for three main reasons: (1) it would not meet the objective of optimizing container handling efficiencies, as the angled main pier creates an overlapping handling area in the container terminal area, (2) it would reduce the terminal operating area by approximately 4.2 acres, and (3) it would not meet the objective of providing opportunities for Pier 41 improvements for future inter-island vessel use.

Single Berth Waterfront Configuration

This alternative considered the use of one berth for the proposed container terminal. As described above, a one-berth container terminal would not meet the purpose and need for the project which calls for a facility to accommodate:

1. anticipated cargo volumes associated with projected growth of the state of Hawai'i, and

2. DOT-H's objective to develop a container terminal with a capacity for 550,000 TEUs per year.

Such a requirement dictates a need to develop a two-berth facility, based on 245,000 TEUs to berth capacity planning factor.

Retention of Snug Harbor

This alternative considered retaining Snug Harbor (slip) and constructing the container terminal's main pier on either side of the slip. The water area and existing piers within the slip would remain intact and be available for general harbor use. The terminal's new pier on the east side of Snug Harbor would be approximately 850 feet in length and on the west side, approximately 610 feet in length.

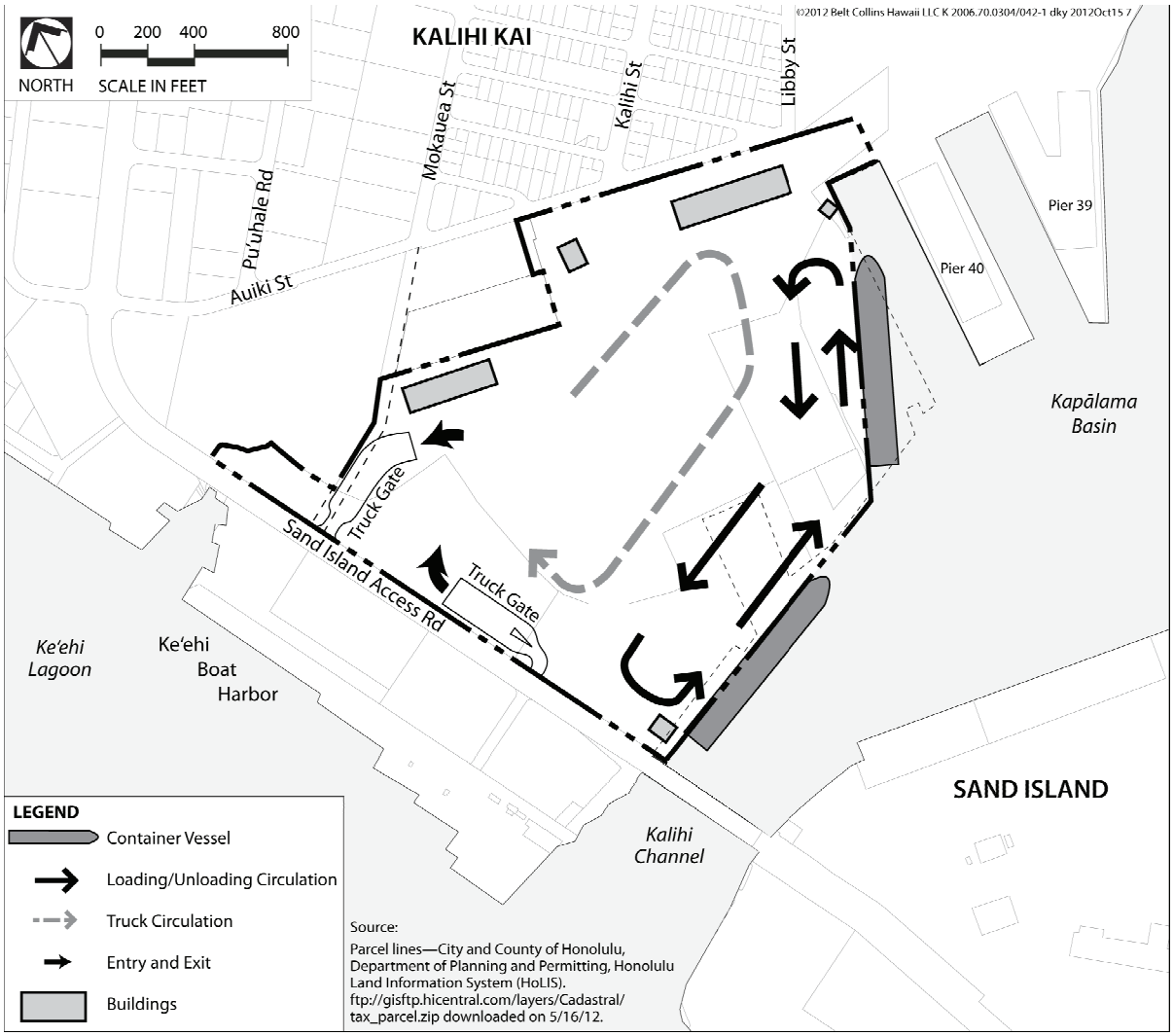


Figure 2-9. Angled Waterfront Configuration

Although the longer main pier (east of slip) would be adequate in terms of linear berth space to accommodate the typical container ships that call on Honolulu Harbor, the shorter main pier (west of slip) would be inadequate. Snug Harbor's central location would hinder unloading/loading operations with two or even one

ship in mooring because gantry cranes operate on rails that run the full length of the berthed ships to allow cranes from one berth to move along the rails to assist at the other berth.

Snug Harbor's location would also interfere with truck movements involved in the waterfront unloading/loading process, as well as access to logistical container storage areas behind the gantry crane operations.

The project objective to develop a two-berth terminal at Kapālama to accommodate 550,000 TEUs per year would not be met with a one-berth facility as proposed with this alternative. Further, the central location of Snug Harbor along the waterfront would severely restrict container handling and therefore efficiency, which conflicts with one of the main objectives of the Proposed Action. For these reasons, retaining Snug Harbor in its current state was not considered further.

Partial Filling of Snug Harbor

This alternative considered filling a portion of Snug Harbor to minimize the loss of slip area for marine vessels and maximize the landside area of the waterfront for the container yard. The northern and western sides of the Snug Harbor contain the port's auxiliary piers. The eastern side of the slip is deteriorated; only pilings remain after years of idleness. Occasionally, a vessel may be tied to the pilings.

Partial filling could occur on the east side of the slip to cover the pilings and attain the original design configuration of Snug Harbor. The fill, approximately 21,000 cubic yards, would reduce the water area in the slip from 2.4 acres to 1.9 acres, but would allow the pier on the east side to be completed, creating 70 linear feet of new berthing space. It would also add 70 feet to the length of the new main pier on the east side of Snug Harbor.

Similar to the Retention of Snug Harbor Alternative, there would only be one and not two berths of adequate length on the waterfront, and Snug Harbor would severely restrict container handling and therefore efficiency, which conflicts with one of the main objectives of the Proposed Action.

Table 2-1 summarizes and compares effects of the Proposed Action, Alternative Action, No Action Alternative, and other alternatives considered but not further evaluated in the EIS in terms of dredge and fill quantities, as well as water areas gained or lost. Creation of new water area due to slip widening helps to balance the loss of water area due to fill.

Table 2-1. Comparison of Dredge and Fill Associated With Snug Harbor Alternatives

Alternatives	Dredge (in CY)	Fill (in CY)	Displaced Water Volume (in CY)	Surface Water Area Loss (in acres)	Creation of New Surface Water Areas at Pier 41 (in acres)
Proposed Action (Filling of Snug Harbor)	0	132,000	105,000	2.4 ac	0.6
Alternative Action (No Fill with Deck Construction)	0	0	0	No loss	0.6
No Action Alternative	0	0	0	No loss	0
Angled Waterfront Configuration (Not Further Evaluated in EIS)	0	132,000	105,000	2.4 ac	5.1
Retention of Snug Harbor (Not Further Evaluated in EIS)	Partial	0	0	No loss	0
Partial Filling of Snug Harbor (Not Further Evaluated in EIS)	Partial	26,000	21,000	Partial loss 0.5 ac	0

Notes:

Measurements in this table for quantities and surface areas were taken from the edge of existing piers and uncovered shorelines.

CY = cubic yards. ac = acre

The quantities shown for the No Fill Alternative would involve some slight volumes for the installation of pilings required to support the deck. Design has not yet been developed to determine the number and size of pilings, if any, to be constructed in Snug Harbor.

The creation of new water areas refers to the effect of widening the slip between Piers 40 and 41 or the reconfiguration of Pier 42.Under the Retention of Snug Harbor and Partial Filling of Snug Harbor Alternatives, it was assumed no widening of the slip between Piers 40 and 41 would occur to maximize the length of Pier 42.

2.2.3.3 Alternative Ingress/Egress For Land Transportation

Alternative truck entry and exit locations for the Kapālama site were considered in layout plans for the new container terminal. These alternative locations would normally be an internal circulation design issue, but their connections to the abutting public street system would have different effects on the surrounding community. For that reason, alternative truck entry and exit gate locations were considered.

Auiki Street Entry/Exit

In this alternative, the truck entry and exit gates are located on Auiki Street, which is closer to Nimitz Highway than the gates on Sand Island Access Road as provided in the Proposed Action (Figure 2-10). Additionally, the gates on Auiki Street would be more accessible from multiple points along Nimitz Highway (Pu‘uhale Road, Mokauea Street, Kalihi Street, and Libby Street).

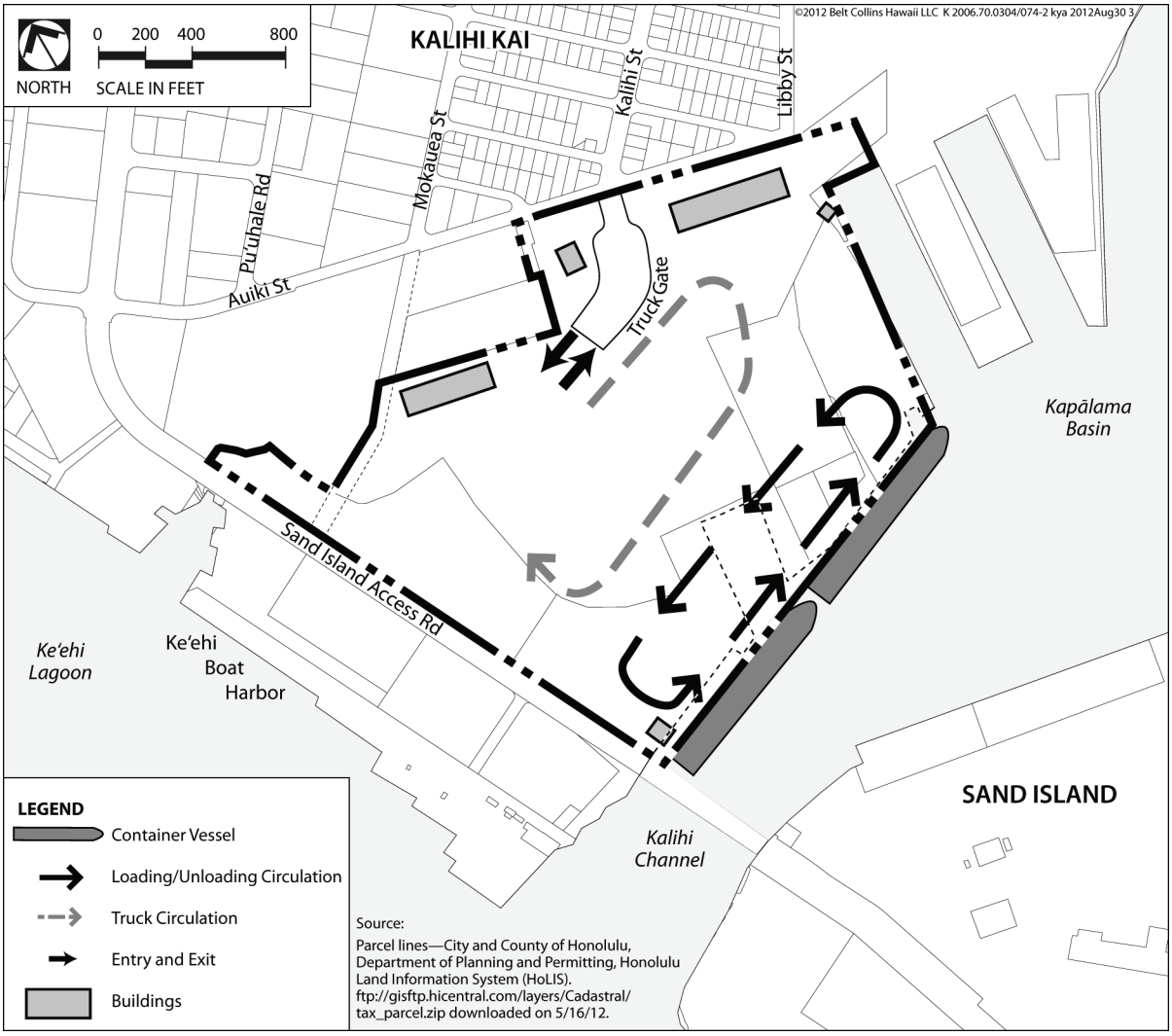


Figure 2-10. Auiki Street Access

From a circulation standpoint, the multiple access/departure points provide flexibility and efficiency in the travel route. From a traffic and safety standpoint, they would be problematic. Connecting streets from Nimitz Highway traverse a neighborhood of mixed uses consisting predominantly of light industrial and commercial uses and a scattering of residential apartments in the neighborhood's eastern section. Traffic on these streets can be heavy at various times throughout the day. On-street parking makes the travelway on some of these streets narrower with less capacity. The presence of residences in the area creates potential conflicts, including hazards to pedestrians.

As a result of community input, this alternative was not further considered.

Auiki Street Entry/ Sand Island Access Road Exit

To minimize truck traffic on connecting streets, this option proposes to locate the entry gate on Auiki Street and the exit gate on Sand Island Access Road (Figure 2-11). Even if a reverse route is proposed, i.e., entry gate on Sand Island Access Road and exit gate on Auiki Street, traffic impact from this option on the adjacent neighborhood would be substantially less than if both gates were installed on Auiki Street. The reduction in truck traffic through the connecting streets would result in a lesser burden on the streets' carrying capacity as well as less wear and tear on road pavement. Although the benefits are clear in terms of lower volume of truck traffic in the neighborhood, the potential hazard of mixing truck traffic with pedestrian use is still a concern. This potential hazard is difficult to measure and would require monitoring and continued public awareness.

As a result of community input, this alternative was not further considered.

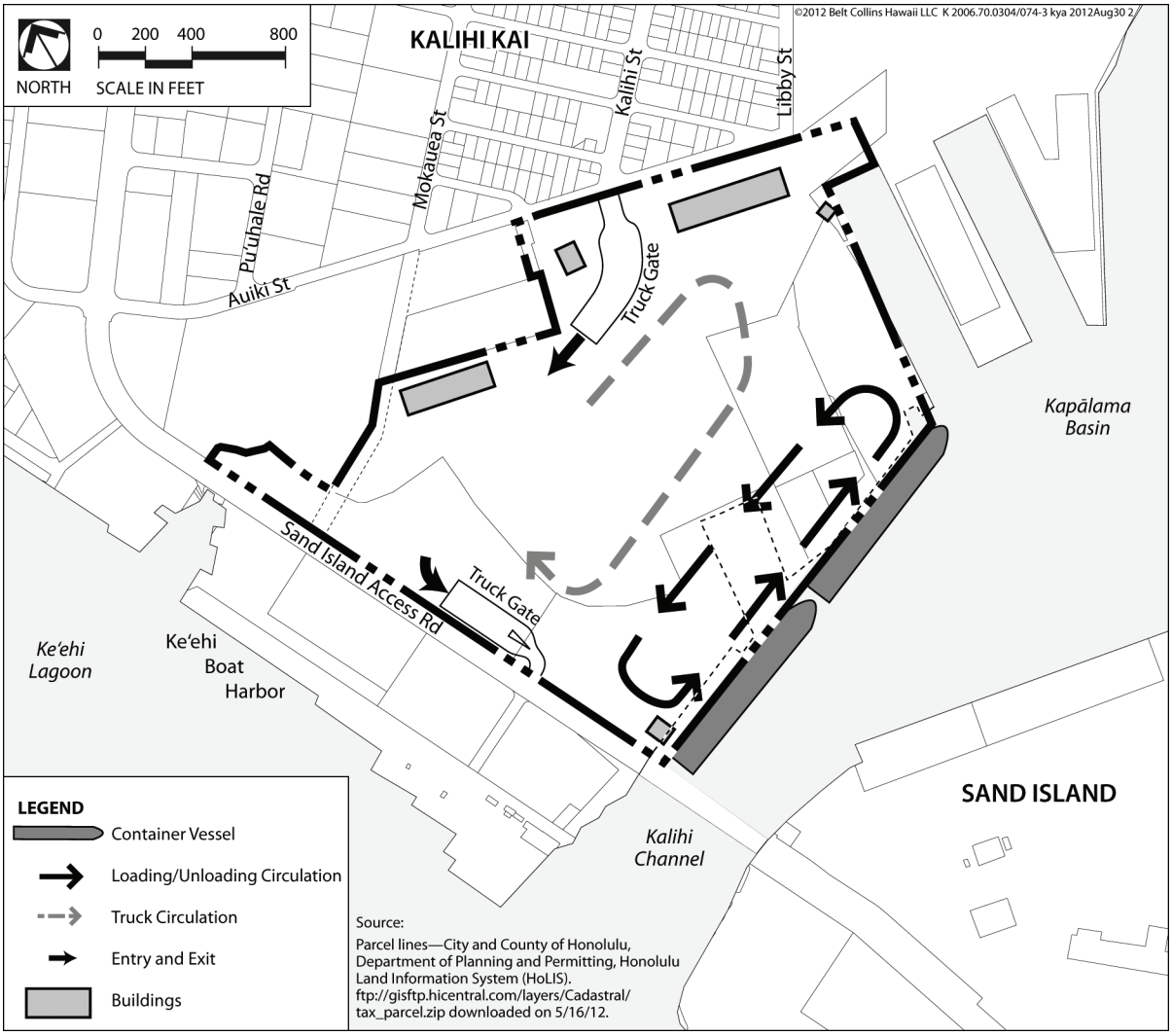


Figure 2-11. Auiki Street Entry/Sand Island Access Road

Affected Environment and Potential Consequences: Physical Environment

3

CHAPTER 3
AFFECTED ENVIRONMENT AND POTENTIAL CONSEQUENCES: PHYSICAL ENVIRONMENT

3.1 INTRODUCTION

Chapters 3 and 4 describe the affected environment (existing or baseline conditions) at the Kapālama and Pier 24–28 sites, disclose potential environmental consequences of each alternative, and propose mitigation measures if needed. Chapter 3 addresses resources/issues in the physical environment (listed below), while Chapter 4 addresses issues/resources in the biological, flora, fauna, cultural resources, and socioeconomics environment.

- Land Use
- Land Ownership
- Public Health and Safety
- Roadways and Traffic
- Utilities
- Public Facilities and Services
- Topography, geology, and soils
- Hydrology
- Natural Hazards
- Climate and Air Quality
- Noise Environment
- Visual Resources

In each section, two items are identified in the introduction: (1) factors considered in evaluating impacts, including but not limited to applicable statutes and regulations designed to avoid or minimize impacts; and (2) the region of influence (ROI), that is, the geographic extent being evaluated for each resource or issue. The ROI may vary for each resource/issue and when evaluating direct versus indirect and cumulative impacts.

3.2 LAND USE

This section describes existing land uses at the Kapālama site, Pier 24–28 site and in the surrounding areas and then analyzes the project's land use compatibility with those areas. The extent of the impact is first determined by whether the proposed activities are allowable within the designated State of Hawai'i (State) land use district or City and County of Honolulu (City) zoning district. The analysis then determines the proximity of the proposed activities to other land uses in the immediate vicinity. The ROI for the Kapālama site encompasses the neighboring Kalihi Kai residential area. The ROI for the Pier 24–28 site encompasses the residential areas across Nimitz Highway.

3.2.1 Kapālama Site

3.2.1.1 Affected Environment

3.2.1.1.1 Existing Land Uses

The Kapālama site includes a range of uses. The major harbor-dependent uses are located along the waterfront. These uses include:

- a visitor-oriented ocean recreation company (Atlantis),
- a shipyard repair company (Pacific Shipyards International [PSI]), and
- an ocean research facility (University of Hawai'i [UH] Marine Center).

Behind this tier of harbor dependent uses are smaller commercial-industrial tenants in separate individual warehouses that were part of the former Kapalama Military Reservation (KMR). The project site includes submerged lands at Snug Harbor and along the southern property line that abuts the Kalihi Channel. Uses on the project site are shown in Figure 3-1.

The Kapālama site is zoned I-3, Waterfront Industrial zone. See Figure 3-2. The intent of zone I-3 "…is to permit a full range of facilities necessary for successful and efficient performance of port functions. It is intended to exclude uses which are not only inappropriate but which could locate elsewhere." The submerged areas of the property are within the P-1, Restricted Preservation zone where the zoning intent is "…to include state designated conservation district" (City Land Use Ordinance [LUO]). See Chapter 5 for more information.

Figure 3-1. Kapālama Site Existing Land Use

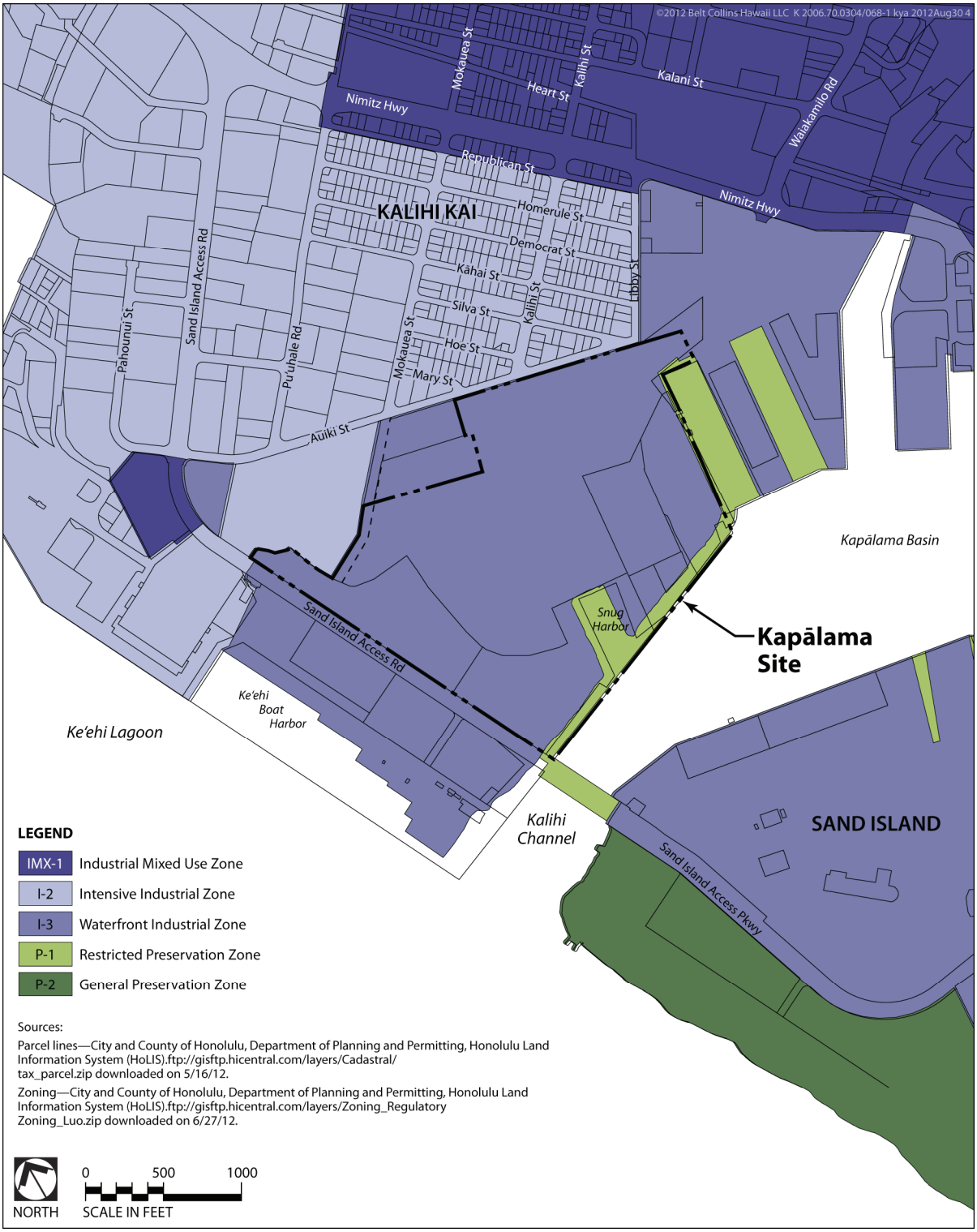


Figure 3-2. Kapālama Site Zoning

3.2.1.1.2 Surrounding Land Uses

The uses surrounding the Kapālama site include the following:

- North side: The Servco Pacific automotive center, Plant Quarantine Branch of the Hawai'i Department of Agriculture (DOA), an adjacent distribution warehouse (Building T-904 fronting the DOA facility on Auiki Street), and the Kalihi Kai neighborhood. Kalihi Kai, which is located on the north side of Auiki Street, includes commercial and industrial properties interspersed by apartments and residential properties. A police union hall is located on Auiki Street across from the project site.
- East side: Young Brothers facility at the Inter-island Cargo Terminal (Piers 39-40);
- South side: Kalihi Channel and the Sand Island container terminal facilities of Horizon Lines LLC and Matson Navigation Company;
- West side: Sand Island Access Road, State Department of Transportation, Harbors Division (DOT-H) base yard, fuel storage facilities of the Hawaii Fueling Facilities Corp. and Tesoro Hawaii Corporation Sand Island Terminal.

Ke'ehi Boat Harbor is located northeast of the Kapālama site. The boat harbor is used by boaters, fishermen and their families, and boaters residing on board. Boat harbor facilities include: 389 berths, boat ramp, vessel washdown, and a harbor office. Offshore moorings include 202 mooring and dinghy docks (HSBS 2012). Located north of the boat harbor are the privately-owned Keehi Marine Center and the La Mariana Sailing Club.

Zoning around the Kapālama site includes I-3, Waterfront Industrial zone, and I-2, Intensive Industrial zone. Within the I-3 zone are the Inter-island Cargo Terminal to the east, the Horizon Lines and Matson Navigation cargo terminals to the south, and Honolulu Harbor's base yard and bulk fuel storage area to the west. The intent of the I-3 zoning, as discussed earlier, is to support the port functions.

Within the I-2, Intensive Industrial zone, are the Servco Pacific and Kalihi Kai properties. The intent of the I-2 zone, according to the City's LUO, is "…to set aside areas for the full range of industrial uses necessary to support the city. It is intended for areas with necessary supporting public infrastructure, near major transportation systems and with other locational characteristics necessary to support industrial centers. It shall be located in areas away from residential communities where certain

heavy industrial uses would be allowed."[1] See Figure 3-2. See Chapter 5 for further discussion.

The Kalihi Kai area along Nimitz Highway is zoned IMX-1, Industrial-Commercial Mixed Use. The intent of this designation is "…to provide for areas of diversified business and employment opportunities by permitting a broad range of uses, without exposing nonindustrial uses to unsafe and unhealthy environments."[2]

3.2.1.2 Environmental Consequences

Proposed Action

Construction Impacts

Prior to construction, needed approvals for the project will be secured. During construction, short-term impacts such as dust, noise, and runoff from construction site would be addressed through implementation of Best Management Practices (BMPs) and other management measures.

Operational Impacts

The issue of land use compatibility is relevant during operations. For the Proposed Action, the entire Kapālama site would be in waterfront industrial use that is consistent with its location in the harbor and the site's I-3 zone. Container terminal operations are not expected to adversely affect nearby Kalihi Kai establishments since I-2 and I-3 zones both involve industrial activities. The scale of activities would differ as the Kalihi Kai businesses are smaller establishments operating on smaller lots. However, Kalihi Kai residential uses situated near Auiki Street and lower Kalihi Kai may be affected by container terminal activities.

Mitigation Measures

No mitigation is required.

Alternative Action

Similar to the Proposed Action, there would be no impact. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

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1 City and County of Honolulu, Land Use Ordinance (LUO).

2 City and County of Honolulu, Land Use Ordinance (LUO).

3.2.2 Piers 24–28

3.2.2.1 Affected Environment

3.2.2.1.1 Existing Land Uses

The Pier 24–28 site is located within Honolulu Harbor and nearly one mile away from the Kapālama Site. The site entry is at the intersection of Nimitz Highway and Pacific Street. See Figure 3-3.

The Pier 24–28 site includes the waterfront and back area for Piers 24, 25, 26, 27, and 28. The present users of the site are described below:

- Pier 24 landside: Bella Pietra, a natural stone company, presently leases a building (Tax Map Key [TMK] 1-5-038:055) for their sales and showroom near the entrance at Nimitz Highway. The company sells a variety of stones, e.g. marble, granite, etc, that are imported to Hawai'i for residential and commercial uses.
- Pier 24 dockside: The Harbor Police and Sause Bros. Ocean Towing Company share a building at Pier 24 (TMK 1-5-038:017). Sause Bros. has provided tug, barge and ocean transportation services to the state of Hawai'i since 1966.[3]
- Piers 24, 25 and 26: These piers are used as universal berths for tugs, barges, and general storage.
- Pier 27/28: These piers are universal berths used by Sause Brothers and other vessels. The Sause Brothers maintains a repair shop and restroom at the site. Also, there is a stockpile of concrete pilings on a small fill area at the end of the pier. The Kapālama Channel is on the seaward side (Pier 28) of the pier.
- The Pier 24-28 site is designated I-3, Waterfront Industrial zone, by the City and County's Land Use Ordinance (LUO). The intent of I-3, according to the LUO, is "…to set apart and protect areas considered vital to the performance of port functions and to their efficient operation. It is the intent to permit a full range of facilities necessary for successful and efficient performance of port functions. It is intended to exclude uses which are not only inappropriate but which could locate elsewhere."[4] See Figure 3-4.

[3] www.sause.com/index.php?page=history.

[4] Chapter 21 Section 21-3.10(f) HAR.

Figure 3-3. Pier 24–28 Existing Land Use

Figure 3-4. Pier 24–28 Zoning

3.2.2.1.2 Surrounding Land Uses

The uses surrounding the Pier 24–28 site are as follows:

- North side: The site is bordered on the north by Nimitz Highway, Pacific Street, and several commercial uses that are part of the Iwilei industrial-commercial area.
- East side: The flour mill, silos, and warehouse of the Pendleton Flour Mill (PFM), dba Hawaiian Flour Mill (HFM) are located at Piers 22 and 23 where they receive grain shipment from large cargo vessels about every four or five months. The company imports raw wheat grain, bulk source refined flour, and pre-bagged flour. The raw grain is milled at the pier facility where 75 percent is used for refined flour and 25 percent is used for dairy feed either locally or exported to Asia. HFM operates the only flour mill in the state.[5]
- South side: The Kapālama Channel and Honolulu Harbor Basin are on the south side of Pier 28.
- West side: Pier 29 is presently occupied by Aloha Cargo Transport (ACT) which is a division of Northland Services Marine Transportation. ACT provides ocean transport services from Seattle to Honolulu and interconnecting barge services to Kaua'i, Maui, Hawai'i, Moloka'i, and Lāna'i. ACT recently moved to Pier 29 from Pier 1 at the east end of Honolulu Harbor.[6] (TMK 1-5-037:001 and 1-5-038:002)

The Iwilei area that abuts the site at Nimitz Highway and Pacific Street is zoned IMX-1, Industrial-Commercial Mixed Use. The intent of this designation is "…to provide for areas of diversified business and employment opportunities by permitting a broad range of uses, without exposing nonindustrial uses to unsafe and unhealthy environments."[7] See Figure 3-4.

On the east side beyond the HFM facilities are industrial, commercial, and residential properties. The residential properties include midrise and highrise residential projects along Nimitz Highway in downtown Honolulu. They are approximately 1,800 to 2,400 feet from Piers 24–28 and zoned BMX-4, Central Business Mixed Use. See Figure 3-3.

5 DOT-Harbors and PFM Meeting, January 10, 2012.

6 www.northlandservices.com.

7 City and County of Honolulu, Land Use Ordinance (LUO).

3.2.2.2 Environmental Consequences

Proposed Action

For the Proposed Action, the relocation of the PSI and Atlantis to Piers 24-28 would have the following effect on the land uses at Pier 24-28:

- Bella Pietra would be displaced and would relocate to another site elsewhere on the island.
- The Sause Brothers and the Harbor Police would be displaced and would relocate to another site elsewhere within Honolulu Harbor.
- The vessels delivering grain to HFM's silos at Piers 22 and 23 will be restricted by PSI's two dry docks berthed at Piers 24 and 25. Alternative provisions are being developed to accommodate HFM cargo delivery at Piers 19 and/or 20.

Construction Impacts

During construction, short-term impacts such as dust, noise, and runoff from construction site would be addressed through implementation of BMPs and other management measures.

Operational Impacts

The issue of land use compatibility is relevant during operations. The relocated PSI and Atlantis operations would be consistent with the permitted uses of the I-3, Waterfront Industrial zone. Further, they will comply with regulatory requirements (e.g. National Pollutant Discharge Elimination System [NPDES] permits, BMPs, and spill containment procedures) to prevent or minimize operational impacts.

Mitigation Measures

No mitigation is required.

Alternative Action

Similar to the Proposed Action, there would be no impact. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.3 LAND OWNERSHIP

3.3.1 Kapālama Site

3.3.1.1 Affected Environment

The Kapālama site, which is comprised of a number of parcels, is owned by the State of Hawaiʻi. The DOT-H has managerial control of the site, except for a 11.3-acre section along Sand Island Access Road which is under the managerial control of the DOT-Airports Division (DOT-A). See Figure 3-5.

DOT-H currently leases land areas and issues monthly revocable permits for building spaces in the existing warehouses in the Kapālama site. Major land tenants include PSI, Atlantis, Island Movers, and the UH Marine Center. The building tenants include a number of small light industrial, construction contractors and commercial businesses.

Tax map parcels for the site represent current and past property areas. The current tax maps show the following tax map keys (TMK) for the Kapālama site: TMK 1-2-25: 02, 09, 12, 16, 17, 30, 40, 42, 44 to 47, 49 to 53, 55, 58 to 68, 71, 73, 74 to 78, 80, 82, 83, 86, 88, 92, 94, 97, 98, 108 to 112 and portions of 11 and 54; and TMK 1-5-32: portions of 2 and 43. See Figure 3-6 and Figure 3-7.

3.3.1.1.1 Ceded Lands

The Hawaiʻi State Constitution provides that certain lands granted or later conveyed to the State of Hawaiʻi by the United States as part of the Admissions Act of 1959 will be held in public trust for Native Hawaiians and the general public. There are two parcels of land identified as ceded land on the Kapālama site. These parcels include the 11.28-acre parcel of the DOT-Airports Division and 13.23-acre parcel around Snug Harbor. See Figure 3-5 (DOT-H 1993).

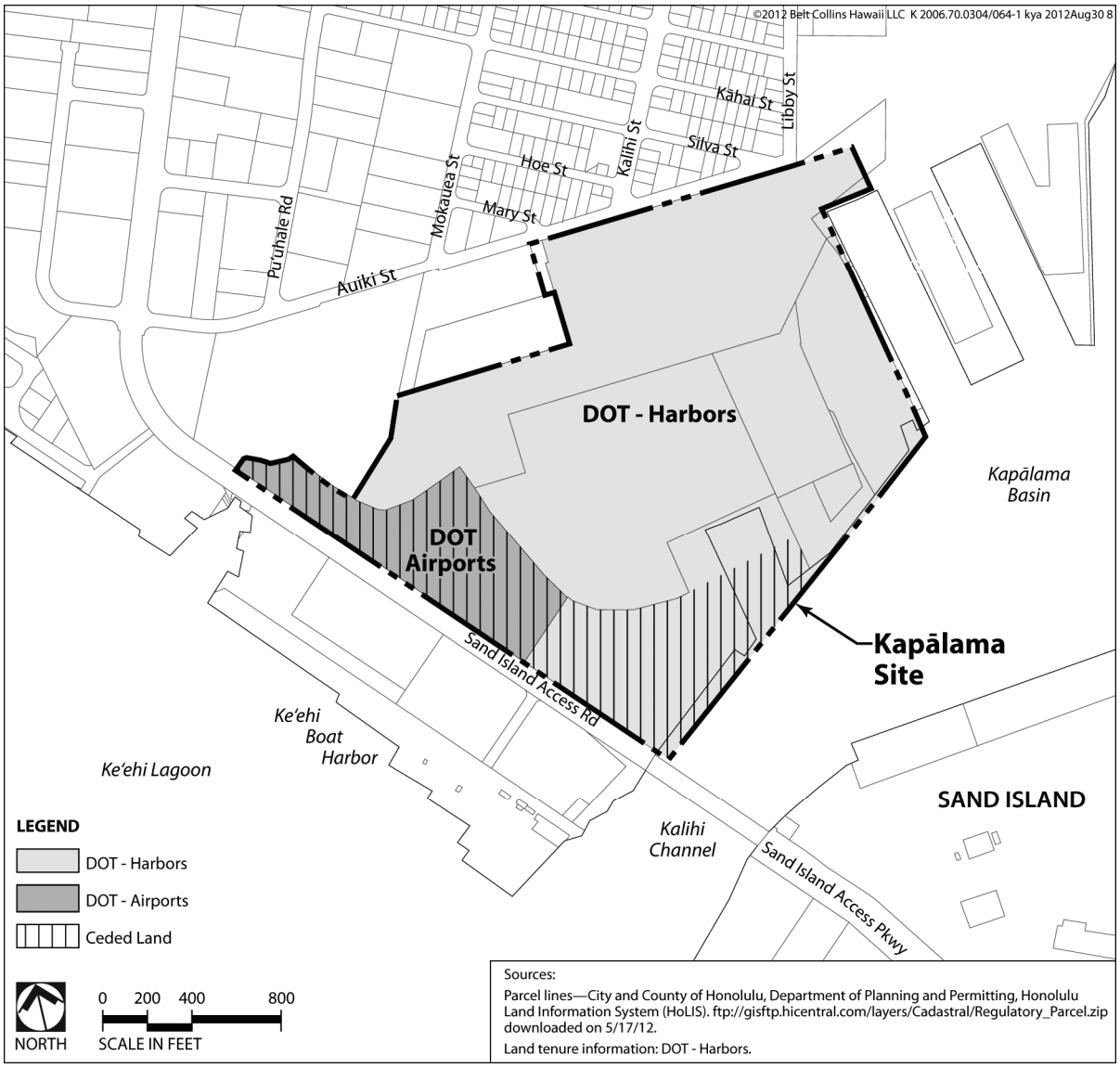

Figure 3-5. Kapālama Site Land Tenure

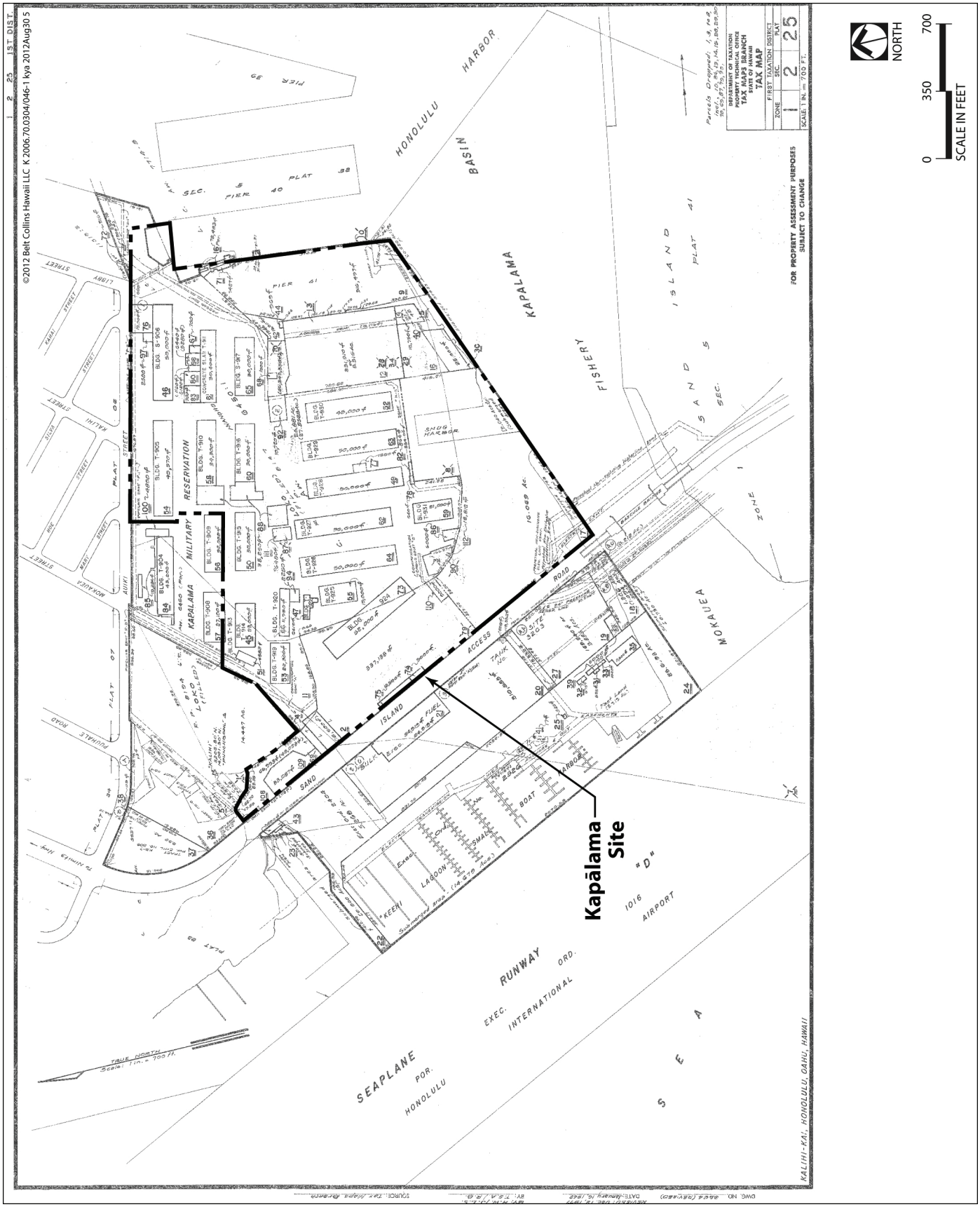

Figure 3-6. Kapālama Site TMK 1-2-25

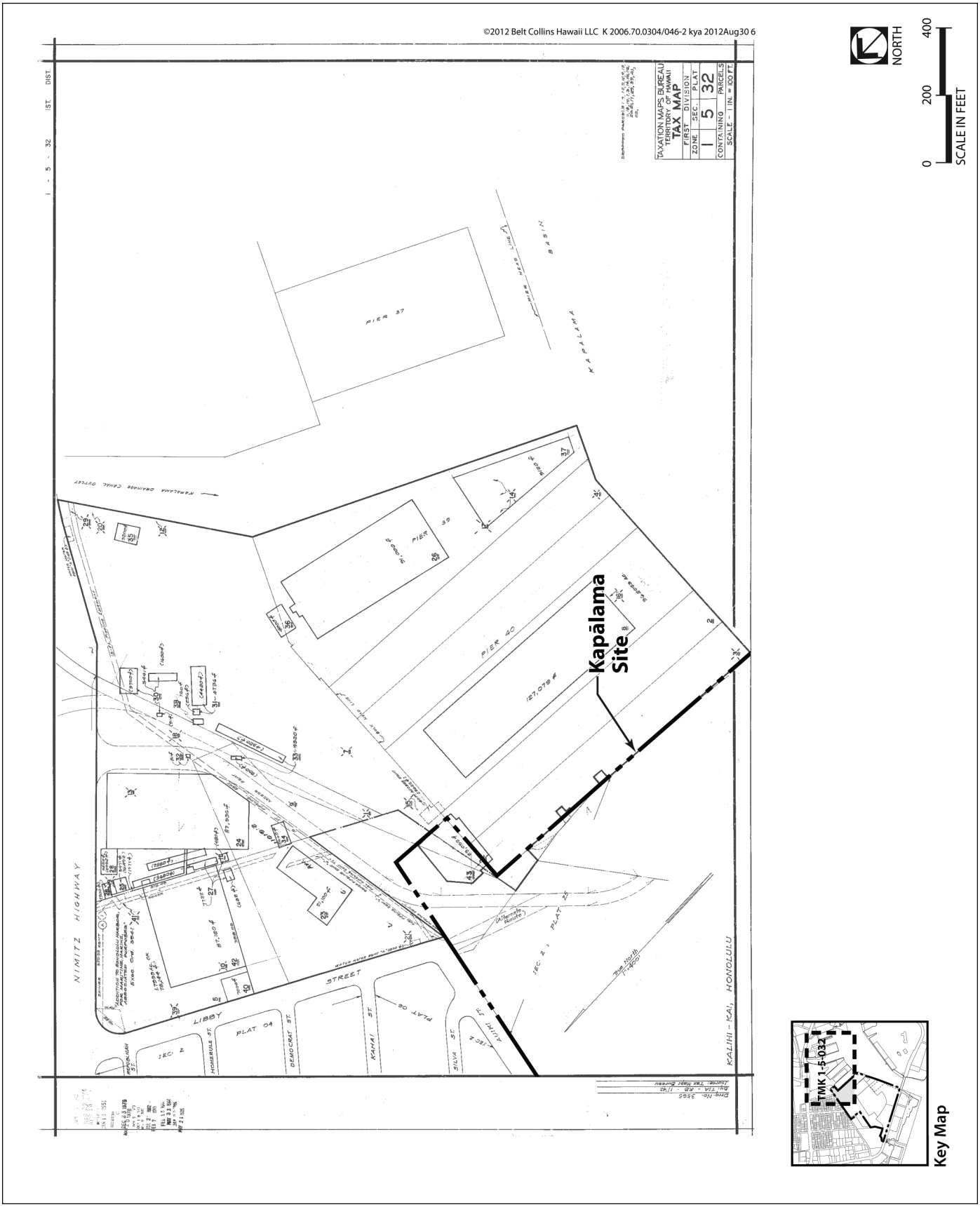

Figure 3-7. Kapālama Site TMK 1-5-32

3.3.1.1.2 Easements

The Kapālama site is traversed by a number of easements for access, fuel pipeline, drainage and utility purposes. These include, among others, Easement P-1 along Auiki Street for fuel pipeline purposes and Easement K-11 for transmission of source energy. See Table 3-1 which lists easements identified from various tax maps and subdivision maps. The identification, location, and status of these easements are expected to be further verified by a title search.

Table 3-1. Easements at Kapālama Site

Easement	Purpose
Easement 1	See DPP File No. 2001/SUB-139
Easement 5 (30 feet wide)	For access purposes
Easement 6	Perpetual Non-Exclusive Easement for joint use access purposes in Favor of Servco Pacific, Inc.
Easement 7	For temporary joint use access purposes
Easement F-1 (3-ft wide)	NA
Easement Parcel R-1	For access purposes
Easement Parcel R-2 (Alternate)	For access purposes
Easement P-1	For fuel pipeline purposes in favor of Standard Oil Company of California
Easement P-2	For fuel pipeline purposes in favor of Standard Oil Company of California
Easement P-3 (15 ft. wide)	For fuel pipeline purposes in favor of Standard Oil Company of California
Easement D-1	For drainage purposes (box culvert)
10-foot wide perpetual easement	For overhead pole line purposes
Easement S-1	For sewer line purposes
Easement K-11 (15 ft. wide)	For transmission of source of energy (energy corridor)
Easement 4	For electric line
Easement E-1 (10 ft wide)	For HECO power line
Easement A (Validation in progress by U.S. Army)	For communication cable purposes (portion of JTS cable)
Easement C	For communication cable
Perpetual non-exclusive easements	For water line purposes
25-foot wide perpetual non-exclusive easement	For electrical transmission line
Easement H	For drainage purposes (box culvert)

Source: City and County of Honolulu Tax Plat Map 1-2-25 and Subdivision Map 2006/SUB-160.

Two easements are currently used by Servco Pacific to access their property. Servco auto carriers (trucks) enter from Auiki Street via a permanent access easement (Easement 6) and exit onto Sand Island Access Road via a temporary easement (Easement 7). See Figure 3-8 Easement 6 and 7 at the Kapālama Site.

According to a quitclaim deed of record, Servco's temporary easement ended when the U.S. Army transferred the land to the State of Hawai'i in 1993. The State of Hawai'i is now the full owner of this access and is not subject to adverse possession.

The temporary easement is part of the Kapālama site controlled by DOT Airports. As part of the development effort, DOT-H has secured a commitment for this land in the form of a long-term lease. As lessee, DOT-H will not be permitted to issue a permanent easement to Servco for access onto Sand Island Access Road.

The status of the permanent easement may also change as part of the development process. The DOT-H has informed Servco of its intention to make an offer to purchase the portion of the permanent easement between the temporary easement and permanent easement adjacent to the Department of Agriculture's (DOA's) property (Figure 3-8). Depending upon the success of the negotiations, condemnation may also be an option.

The portion of the permanent easement between Auiki Street and the DOA's property will remain as a permanent access easement available to Servco, the DOA, and the current tenants Building T-904.

On the eastern side of the DOA property is a "paper" access (pole portion of DOA's existing flag lot) to Auiki Street. No physical vehicular driveway or road occupies this paper access. DOT-H is coordinating with the DOA to replace this access with the permanent access easement on the west side of the property which the DOA is already using. DOT-H would then obtain the use of the pole portion of the flag lot for the container yard's secondary access to Auiki Street.

3.3.1.1.3 Governor's Executive Orders

Under Section 171-11, Hawai'i Revised Statutes (HRS), Governor's Executive Orders (EO) have been issued by past Governors that set aside some of the lands at Kapālama for harbor use, including EO No. 3013 (Piers 41 and 42), EO No. 3457 (Piers 39 and 40), EO No. 3947 (former KMR Phase IIB lot) and EO4206 (Marine Expeditionary Center). EO No. 4074/4075 was issued to transfer a portion of EO No. 3947 to the Department of Agriculture for its plant quarantine facility (Figure 3-9).

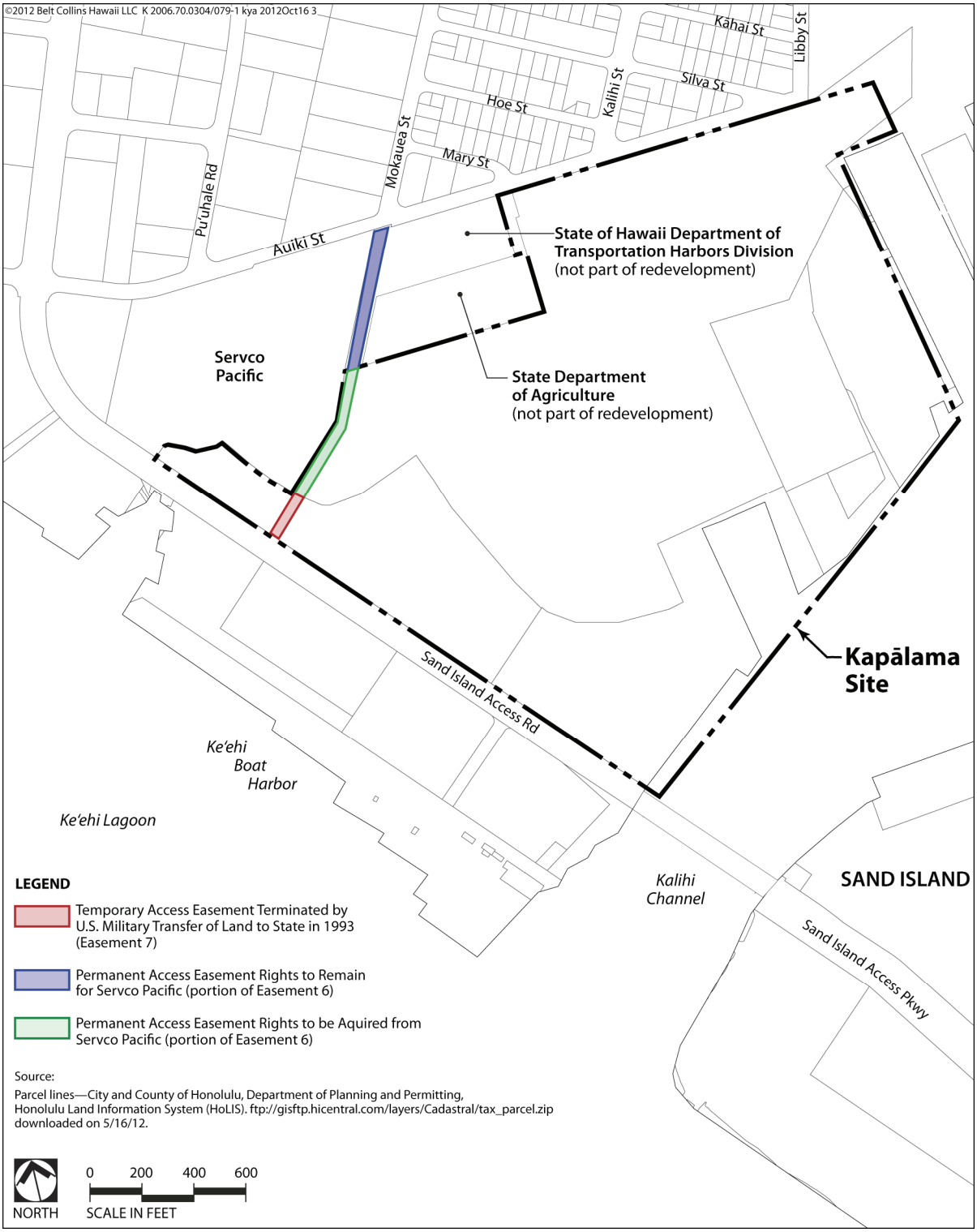

Figure 3-8. Kapālama Access Easements

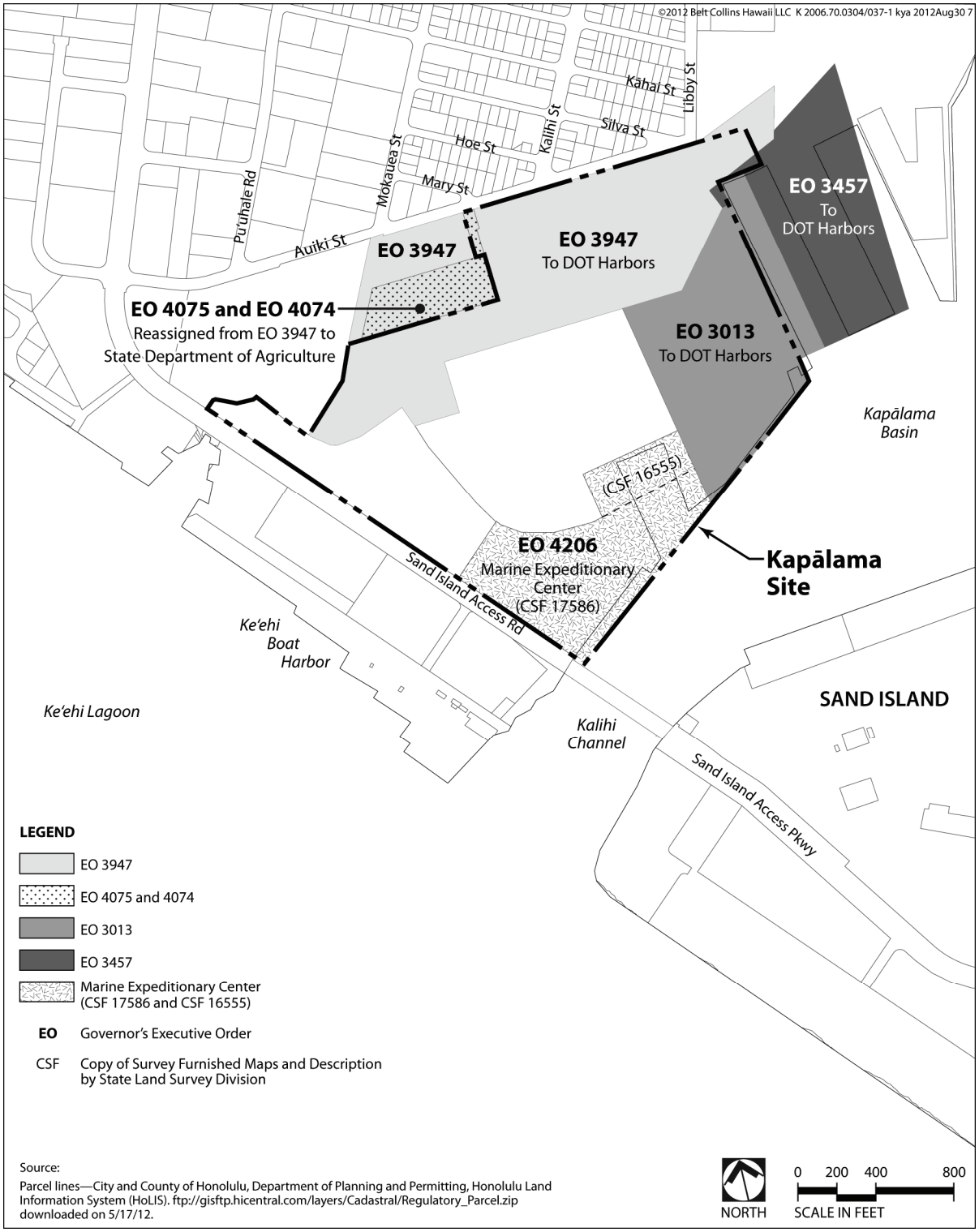

Figure 3-9. Kapālama Site Executive Orders

State EO No. 3201, issued in 1983, set aside public lands for the Honolulu International Airport (HIA) and included an avigation easement that extends over the Kapālama site and Kalihi Channel.

3.3.1.2 Environmental Consequences

Proposed Action

Construction Impacts

No impacts on land ownership would occur. Prior to construction, all existing tenants and lessees will have relocated from the Kapālama site. Additionally, arrangements are currently being made by DOT-H to use the DOT-A parcel for the new container terminal. The various access, fuel pipelines, and infrastructure easements would be verified and modified, as required, to accommodate final site design.

Ownership, throughout this process, will remain with the State of Hawaiʻi.

Operational Impacts

No impact on land ownership would occur. Prior to operation of the new facility, leases and other land tenureships for the operations of the facility would be implemented.

Ownership of property, throughout this process, will remain with the State of Hawaiʻi.

Mitigation Measures

No mitigation is required.

Alternative Action

Similar to the Proposed Action, there would be no impact. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.3.2 Pier 24-28 Site

3.3.2.1 Affected Environment

The Pier 24–28 site, which is owned by the DOT-H, has property leases to Kerr Pacific Corporation, Sause Brothers, Dewain A. Dedrick, and Uaukewai Diving, Salvage & Fishing Inc. The TMK for this site is 1-5-38: 11, 17, 55, 72, 73, 74, and portions of 1, 4, and 5. See Figure 3-10.

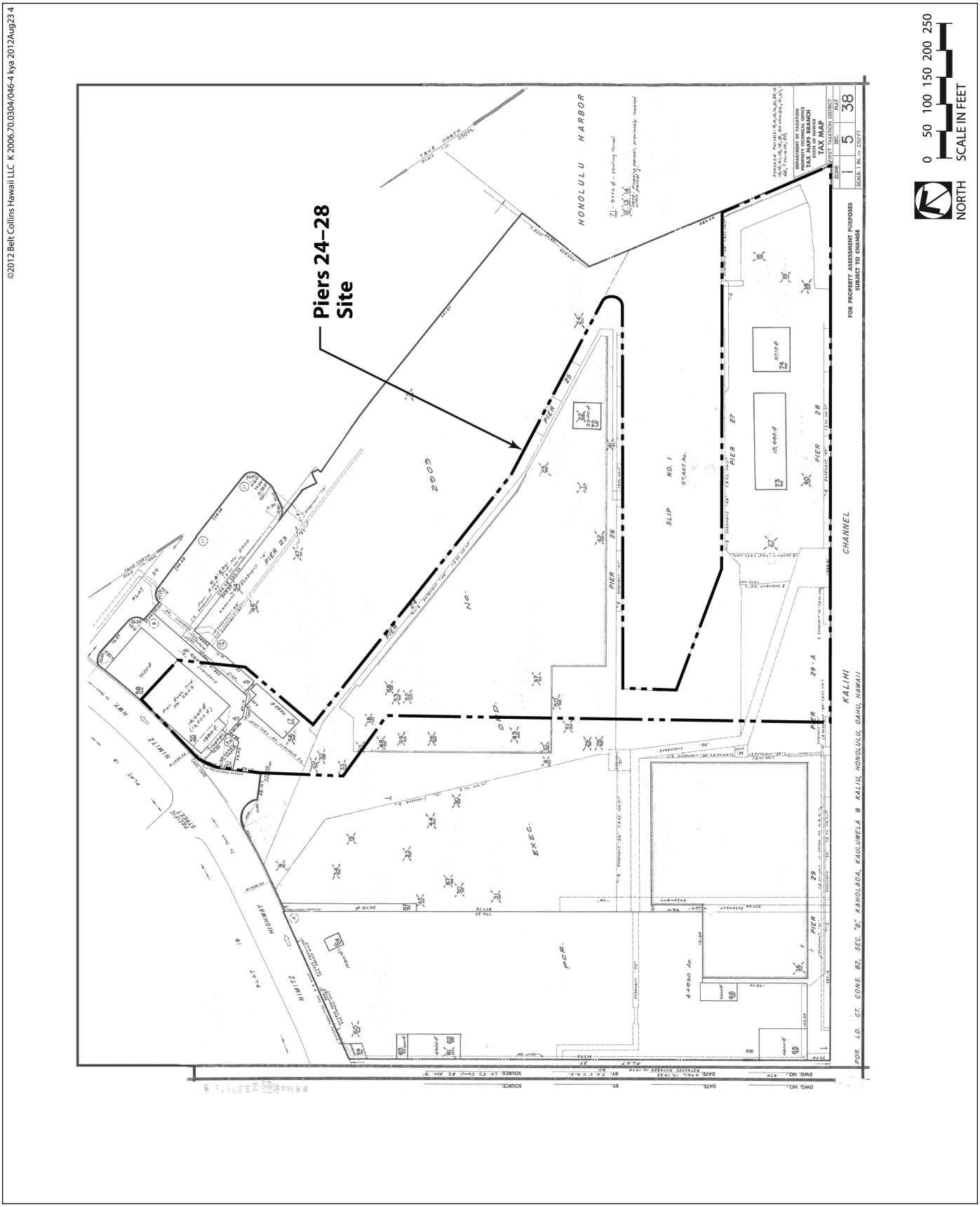

Figure 3-10. Piers 24–28 TMK

3.3.2.2 *Environmental Consequences*

Proposed Action

Construction Impacts

No impact on land ownership would occur. Prior to construction, lease arrangements with existing tenants would be reconsidered and leases with the new tenants arranged. Throughout this process, the property will remain with the State of Hawai'i.

Operational Impacts

No impact on land ownership would occur. Prior to operations, lease arrangements with the new tenants would be completed. The property will remain with the State of Hawai'i.

Mitigation Measures

No mitigation is required.

Alternative Action

Similar to the Proposed Action, there would be no impact. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.4 PUBLIC HEALTH AND SAFETY (NAVIGABLE AIRSPACE; HAZARDOUS SUBSTANCES/ MATERIALS/ WASTE AND PETROLEUM)

This section addresses risks to public health and safety associated with navigable airspace and hazardous substances/materials/waste and petroleum.

3.4.1 Navigable Airspace

Considering that the largest airport in the state is located approximately one mile east of the proposed project site, navigable airspace is discussed herein. Honolulu International Airport (HIA) is a joint-use airport serving military and civilian aircrafts. Joint Base Pearl Harbor-Hickam (JBPHH)[8] bounds the airport to the west.

[8] In January 2010, installation management functions for Hickam Air Force Base and Naval Station Pearl Harbor were officially merged to Joint Base Pearl Harbor-Hickam (JBPHH) under the 2005 Defense Base Closure and Realignment Commission Report.

3.4.1.1 Kapālama Site

3.4.1.1.1 Affected Environment

The National Airspace System (NAS) is a complex aviation system made up of airports, airway routes, airlines, and people (pilots, flying public). The Federal Aviation Administration (FAA) manages the NAS, which controls airspace from ground level up to 60,000 feet above mean sea level (msl). FAA rules and regulations protect the safe and efficient use of airspace, including controlled airspace.

The NAS can be described in two parts. One part deals with navigable airspace, which is defined as the "airspace above the minimum altitudes of flight prescribed by regulations under this subpart and subpart III of this part, including airspace needed to ensure safety in the takeoff and landing of aircraft" (49 USC Section 40102). This could be thought of as the flying portion of airspace. Navigable airspace is controlled in accordance with their designations, e.g., Class A or special use airspace. The second part of the NAS addressed herein pertains to surface structures relative to defined imaginary surfaces that extend from runways.

Airspace Designations

Airspace is an area of defined dimensions within which air traffic control (ATC) service is provided to instrument and visual flights. Airspace can be divided into two broad categories: Regulatory (Classes A to E, restricted and prohibited areas), and Nonregulatory (Military Operating Area [MOA] warning areas, alert areas, and controlled firing areas). HIA falls under Class B airspace (Figure 3-11). This airspace extends out from the airport to an area defined by a five nautical mile radius. Class B airspace is typically assigned to the nation's busiest airports, which are considered congested and has a complex mix of aircraft operations.

Imaginary Surfaces

In addition to the defined Class B airspace shown in Figure 3-11, there are other areas of airspace defined by surfaces that extend out from the airport and runways. These are referred to as imaginary surfaces. Imaginary surfaces for civil airports such as HIA are established with relation to the airport and to each runway. Following is a description of the various Code of Federal Regulations (CFR) Title 14 Part 77 imaginary surfaces, as shown in Figure 3-12. Figure 3-13 also provides other views of the imaginary surfaces.

PRIMARY SURFACE. A surface longitudinally centered on a runway. The width of the primary surface varies with the type of runway. The width can range from 250 feet to 1,000 feet. The 1,000-foot width is applied to the HIA runways.

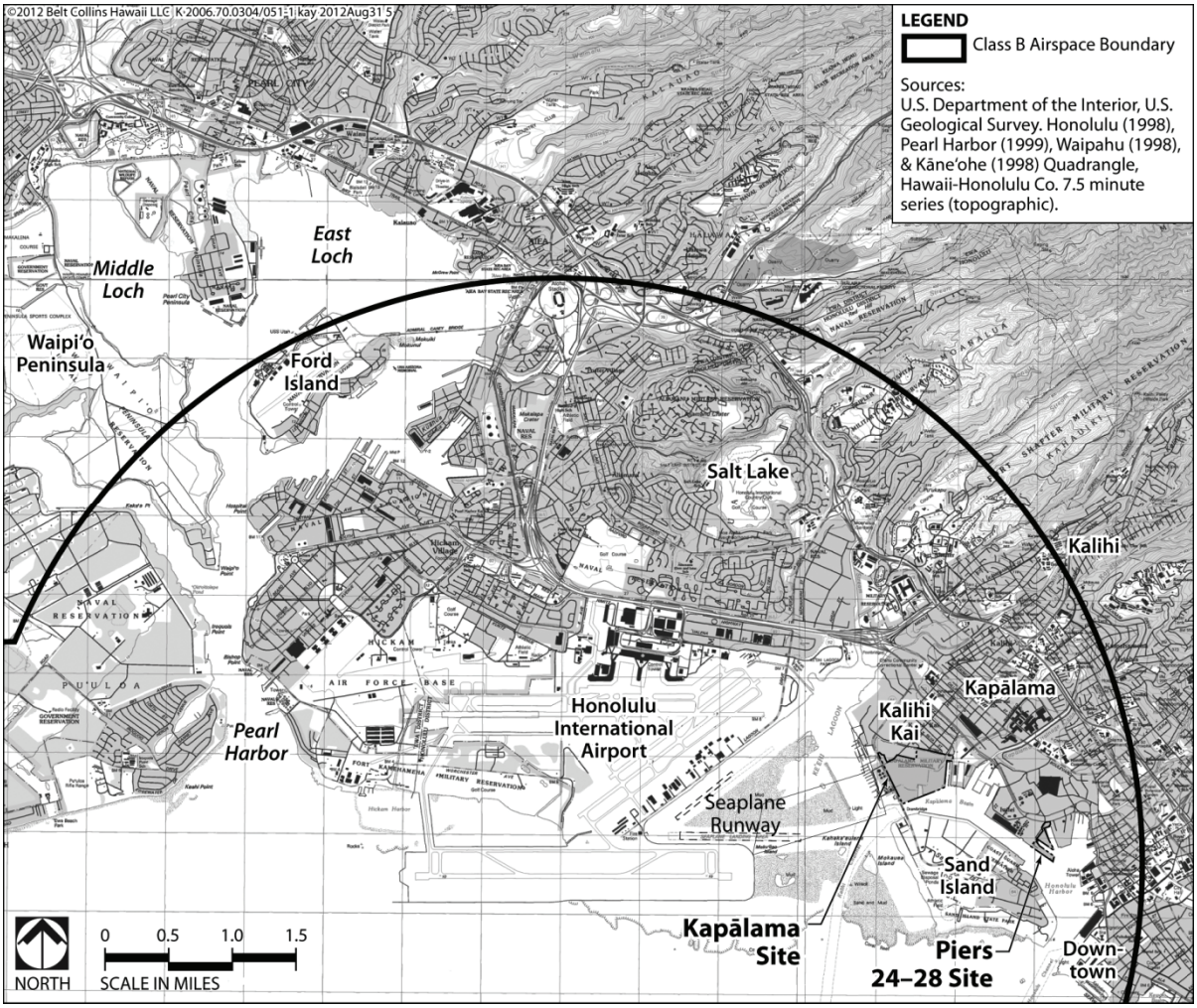

Figure 3-11. Honolulu International Airport Airspace

TRANSITIONAL SURFACE. A surface extending outward and upward at right angles to the runway center at a slope of 7 to 1. This surface limits the height of structures perpendicular to the runway.

HORIZONTAL SURFACE. A horizontal plane 150 feet above the established airport elevation. The perimeter is delineated by swinging arcs from the center of each end of the runway primary surface, connecting the adjacent arcs by lines tangent to those arcs. The arc radius is either 5,000 feet or 10,000 feet depending on the type of runway. The 10,000-foot radius is applied to the HIA runways. This surface is set at 163 feet above mean sea level.[9]

[9] Airport elevation is considered to be 13 feet above msl. This is based on the highest point of the airport's runways.

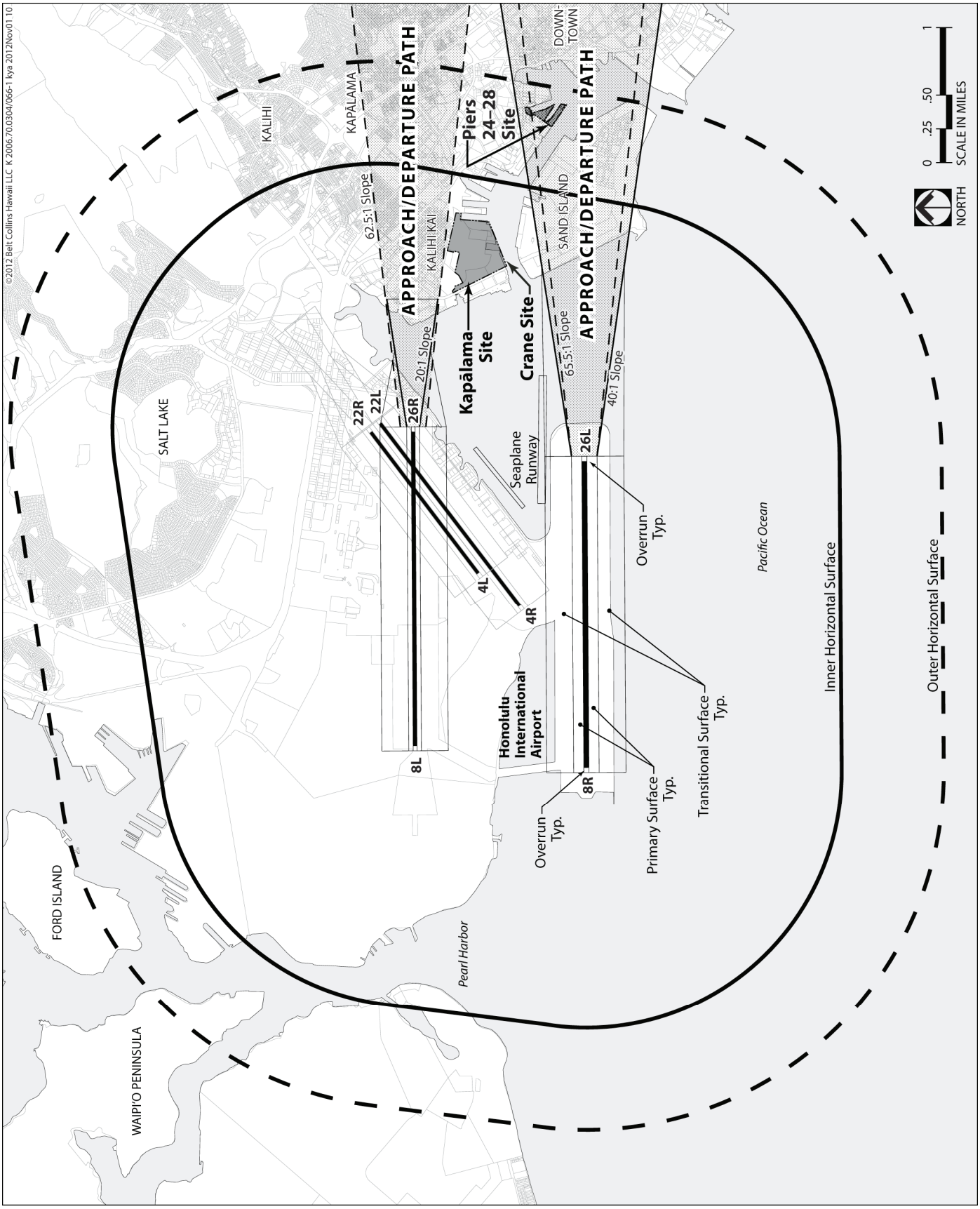

Figure 3-12. HIA Part 77 Imaginary Surfaces for Runways 26R and 26L

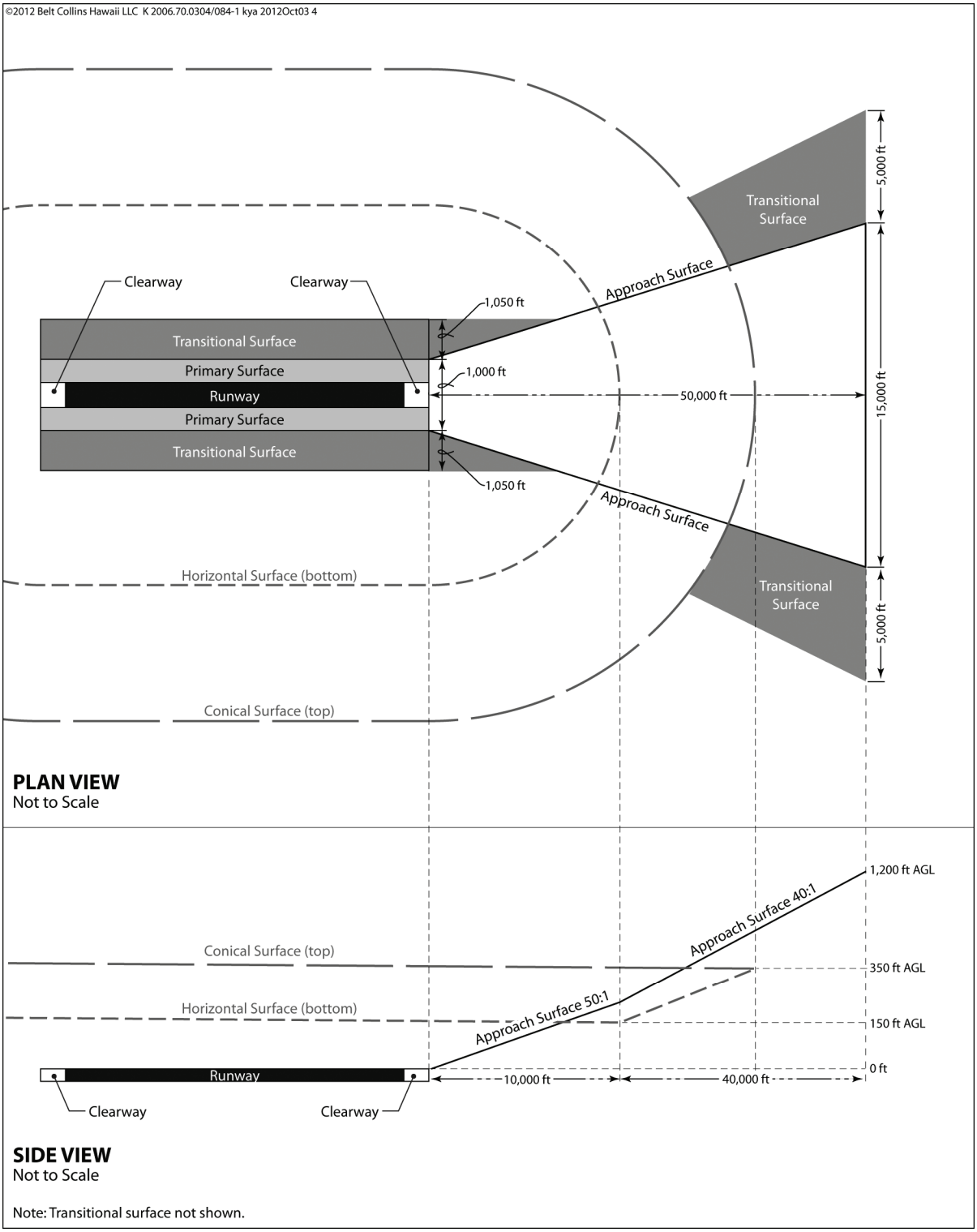

Figure 3-13. FAA Part 77 Imaginary Surfaces Plan and Side View

CONICAL SURFACE. A surface extending outward and upward at a slope of 20 to 1 from the horizontal surface perimeter. The slope goes out to a distance of 4,000 feet. The height of the conical surface is 200 feet above the horizontal surface.

APPROACH SURFACE. A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based on the type of approach available or planned for that runway end. The width, length, and slope of the approach surface vary depending on the existing or planned use for that runway end.

Objects Affecting Navigable Airspace

Under 14 CFR Part 77, the FAA is also responsible for evaluating objects affecting navigable airspace. The regulations define notification requirements, procedures, and standards for the assessment. The process allows FAA to identify potential hazards in advance of construction or use, hence preventing or minimizing impacts to the safe and efficient use of navigable airspace.

Construction or alteration situations that would require notifying FAA are detailed in 14 CFR Part 77.9 and briefly summarized as follows:

- any construction or alteration that would exceed an imaginary 100:1 slope within 20,000 feet for the nearest runway,
- an object that is 200 feet AGL or above the established airport elevation within three nautical miles of the airport reference point,[10]
- or any object that penetrates into a runway imaginary surface.

3.4.1.1.2 Environmental Consequences

Proposed Action

Construction Impacts

The potential impact of any pile driving and dredging cranes would not be significant as the FAA process established under 14 CFR Part 77, which prevents or minimizes adverse impacts to the safe and efficient use of navigable airspace, would be initiated and completed by the operator. As the height of construction equipment is not yet known, no determination can be made as to whether the FAA process established under 14 CFR Part 77 is required. Applicable construction equipment would require

[10] The airport reference point is the location of the approximate center of the airport (FAA Circular 150/5300-13 Airport Design.

the operator's filing of FAA Form 7460-1 and completion of the process defined under 14 CFR Part 77.

Operational Impacts

The potential impact of any cranes would not be significant as the FAA process established under 14 CFR Part 77, which prevents or minimizes adverse impacts to the safe and efficient use of navigable airspace, would be initiated and completed by the operator.

As part of DOT-H's planning efforts, an FAA Form 7460-1 was submitted in April 2012 for gantry crane heights of approximately 200 feet. Heights were based on existing cranes in use at Sand Island. In September 2012, DOT-H received FAA's determination of a Notice of Presumed Hazard. Initial findings of this study indicate that the structure as described exceeds obstruction standards and/or would have an adverse physical or electromagnetic interference effect upon navigable airspace or air navigation facilities. Pending resolution of the issues, the structure is presumed to be a hazard to air navigation. If the structure were reduced in height so as not to exceed 155 feet above ground level (163 feet above mean sea level), it would not exceed obstruction standards and a favorable determination could subsequently be issued. To pursue a favorable determination on the approximately 200-foot high cranes, further study by FAA is necessary. Further study entails distribution to the public for comment, may extend the study period up to 120 days, and the outcome can be dependent upon public circularization.

The DOT-H acknowledges FAA's initial findings and will pursue development plans consistent with such findings should project approval be obtained. However, in the interest of providing the maximum flexibility for prospective operators of the site, DOT-H is considering the possibility of submitting a request to FAA for further study on the approximately 200-foot high cranes.

Regardless of the outcome described in FAA's further study of the approximately 200-foot cranes, the operator of the container terminal will be responsible for submitting FAA Form 7460-1, as applicable and as required under CFR 14 Part 77. Any additional associated permits or approvals will also be the responsibility of the operator.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts, along with associated mitigation under the Alternative Action would be similar to the Proposed Action.

No Action

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.4.1.2 Piers 24–28

3.4.1.2.1 Affected Environment

The affected environment is the same as that described under section 3.4.1.1 Kapālama site.

3.4.1.2.2 Environmental Consequences

Proposed Action

No significant impacts to airspace or imaginary surfaces would occur. No tall structures exceeding 163 feet msl would be constructed, or used.

Mitigation Measures

No mitigation is required.

Alternative Action

Similar to the Proposed Action, there would be no impact. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.4.2 Hazardous Substances/Materials/Waste and Petroleum

This section addresses risks to public health and safety associated with hazardous substances/materials/waste and petroleum. The ROI is the immediate area where construction is planned and where operations would occur, including areas downstream that could potentially be affected in the event of a spill (receiving waters in the harbor).

3.4.3 Kapālama Site

3.4.3.1 Affected Environment

The Kapālama site has accommodated a range of uses. Since the 1940s, the site has been in waterfront commercial and industrial use. Specific uses have included the U.S. Army's Support Command Logistics and Maintenance Installation (established in 1941) as a major military port and quartermaster warehousing facility to handle shipping requirements for the Army during World War II; use of the Pier 41 area by a dredging and construction company (1957 to 1968), use of the Pier 41 area by shipyard companies (1968 to present), and use of the Snug Harbor area by a university marine research center. Easements for energy transmission lines are also present and discussed in more detail in section 3.6, Utilities. Prior to these waterfront uses, during the 1930s and 1940s, portions of the site were reportedly used as a municipal dump (DOT-H 2005).

Hazardous substances/materials/waste and petroleum at the site have been assessed, investigated, and remediated to various specific extents since the 1980s. An Enhanced Preliminary Assessment was prepared by the U.S. Army in 1990 to present findings concerning the environmental conditions and recommendations for possible further action at KMR. It was conducted in preparation of property disposition under the Base Closure Program (USATHAMA 1990). Similar assessments to reflect the evolving nature of the environmental site assessment (ESA) process and the change in uses of KMR were conducted by the current land owner, the State of Hawai'i and specific lessee(s). The description of the affected environment in this section is based on the latest Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Phase I ESA[11] and associated reassessments, and a Phase II ESA specifically for the Pier 41 area. To follow-up on the findings and recommendations presented in the Phase I ESA and reassessments, the DOT-H has initiated contracting efforts for a Phase II site investigation.

In 2005, DOT-H conducted a Phase 1 ESA to evaluate existing conditions within and around the Kapālama Development Area (KDA), to assess KDA's environmental history, and to identify the Recognized Environmental Conditions (RECs). RECs are defined as "…the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property." (ASTM E 1527 – 00)." (DOT-H March 2006) The Phase I ESA covered the following: (1) the former KMR Area, (2) Pacific

[11] Including additional substances as specified within the Phase I ESA documents.

Shipyards area, (3) Island Movers area, and (4) UH Marine Center at Snug Harbor. The review of regulatory records and site history, included interviews, as well as review of identified and documented past RECs. The Phase 1 ESA identified several on-site and off-site RECs as well as on-site and off-site historical RECs (DOT-H March 2006).

In 2003, a Phase II ESA was prepared by Pacific Shipyards International, LLC, to provide information regarding the presence of potential petroleum contamination at the Pier 41 parcel (TMK 1-2-025: 009) (PSI 2003). This was a follow-up to two previous studies: Phase I ESA for TMK (1)-1-2-25: parcel 9 (Northern Portion) and Phase I ESA for the same parcel 9 (Southern Portion). Site investigations included surface penetrating radar to investigate the presence of USTs, 10 soil borings, installation of 6 monitoring wells, and the collection of soil and groundwater samples. No definitive patterns indicative of USTs were found. The analysis indicated the presence of total petroleum hydrocarbons as diesel (TPH-D) and total petroleum hydrocarbons as oil (TPH-O) in one soil sample and TPHJ-D in another soil sample. The sample containing TPH-D and TPH-O was further analyzed for benzene/ toluene/ ethylbenzene/xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), halogenated volatile organic compounds (HVOCs), polychlorinated byphenyls (PCBs), total cadmium, and total lead. The soil sample containing TPH-D was further analyzed for BTEX and PAHs. All soil samples had constituent concentrations either below method detection limits or below the State Department of Health (DOH) Tier 1 Action Levels for soil in areas where drinking water source is not threatened, with the exception of sample 2013.B1.2 in which benzo(a)pyrene concentration exceeded the DOH Tier 1 Action Level. TPH concentrations in groundwater samples were all below method detection limits" (PSI 2003).

In 2006, a KDA Reassessment document was prepared as a follow-up to the 2005 Phase I ESA to update site activities and tenants and/or their respective remedial actions. The reconnaissance, together with interviews revealed:

- The nature of operations for business old and new has not changed.
- The presence and severity of RECs was either the same or better, but generally improved compared to observations made in 2004.
- New RECs were identified; however, they were generally similar to those identified in the 2005 Phase I ESA, though not as extensive or as many (DOT-H March 2006).

3.4.3.2 Environmental Consequences

Proposed Action

Construction Impacts

No significant risks to public health and safety from hazardous substances/ materials/waste and petroleum would occur under the Proposed Action. Compliance with existing laws and regulations, and any further site remediation recommendations identified in the Phase II ESA currently being conducted would be implemented to prevent the public and workers from exposure to hazardous substances/materials/wastes and petroleum that would significantly impact human health. Contractors will be responsible for proper handling and disposal of contractor-generated hazardous waste and will follow any restrictions identified as a result of the above studies and made part of the design documents.

Operational Impacts

No significant risks to public health and safety from hazardous substances/ materials/waste and petroleum would occur under the Proposed Action. Compliance with existing applicable laws and regulations associated with the handling and management of hazardous materials and waste would prevent or minimize risks to public health and safety.

Mitigation Measures

Mitigation measures would be identified after the Phase II ESA is completed. Depending on the nature and extent of any contaminant, such measures could include design and engineering methods that are made part of the Proposed Action.

Alternative Action

Construction Impacts

Construction impacts under the Alternative Action would be similar to the Proposed Action.

Operational Impacts

Operational impacts under the Alternative Action would be similar to the Proposed Action.

Mitigation Measures

Mitigation measures would be identified in the same manner as described under the Proposed Action.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.4.4 Piers 24–28

3.4.4.1 Affected Environment

A portion of the Pier 24–28 area is in the south part of the Iwilei District, a district which has been used for storage and distribution of petroleum products since the early 1900s. This approximately 315-acre district is bounded by the Nuʻuanu Drainage Canal to the east, Dillingham Boulevard and North King Street to the north, Kapālama Drainage Canal to the west, and Honolulu Harbor to the south (HEERO 2009).

The Iwilei District Participating Parties (IDPP) is working to remediate the impacts to soil and groundwater caused by past releases of petroleum hydrocarbons from historic storage tanks and below ground pipelines that are no longer in use within the Iwilei District[12] The IDPP was formally established in 2001 after DOH determined that (1) petroleum releases needed to be investigated as an area-wide project and that (2) investigations should be conducted through a cooperative effort by: facilities where contamination was previously found or past releases were believed to have occurred, facilities connected by fuel pipelined, and facilities believed to be contributors based on their business activities (TRC 2003). Based on numerous investigations of petroleum-related contaminants of concern (COCs), the IDPP identified volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) in soil and groundwater, SVOCs in soil, certain metals in soil, petroleum hydrocarbons and methane in soil gas, and separate phase hydrocarbons in groundwater. Human and ecological risk evaluations were conducted and based on these findings, the Iwilei District was divided into three areas: Operating Unit 1, 2, and 3. Operating Unit 1 (OU1) (TRC 2003). Subsequently, OU1 was subdivided and the area that intersects the Pier 24-28 area is OU1C, an 18.5-acre area located between Piers 24 and 29 (Figure 3-14).

Based the results of IDPP investigations, remediation planning, and remedy implementation work (e.g., separate phase hydrocarbon recovery) that has been completed for OU1C and as documented in the Environmental Hazard Management Plan (EHMP), COCs pose a low hazard to human health and the environment because there is practically no exposure to them (SESI 2011). The following IDPP-related COCs by media were identified at OU1C.

[12] http://sesinconline.net/pages/SOQs/remed/39C%20Honolulu%20Harbor_Strategic%20Plan%20-%2017.pdf, accessed October 20, 2012.

Figure 3-14. OU1C Area at Piers 24–28

- **SOILS.** Separate phase hydrocarbons, total petroleum hydrocarbons quantified as gasoline (TPH-g), diesel (TPH-d), residual (TPH-r), benzo(a)pyrene equivalents, benzene, toluene, and xylene. Other non-IDPP COCs[13] identified as potential hazards are arsenic, beryllium, and lead.
- **GROUNDWATER.** Separate phase hydrocarbons, benzene, ethylbenzene, toluene, xylenes, naphthalene, and methyl tert butyl ether.
- **SOIL GAS.** TPH-g, benzene, ethylbenzene, toluene, xylenes, and methane.

As documented in the EHMP, the IDPP has or is implementing the following engineered remedies to mitigate potential hazards:

- **STORM DRAIN REPLACEMENT AT PIER 26.** The new storm drain has mitigated the migration of very small quantities of separate phase hydrocarbons along the previously damaged drain to the harbor at Pier 26.
- **STORM DRAIN REPLACEMENTS AT PIER 24.** These new storm drains mitigate the potential for future migration of separate phase hydrocarbons along previously damaged storm drains to the harbor in the Pier 24 area.
- **SEPARATE PHASE HYDROCARBON EXTRACTION WELLS IN THE NORTHERN PORTION OF OU1C AND NEAR PIER 24.** Both existing wells and the installation of new extraction wells are intended to reduce the amount of potentially mobile separate phase hydrocarbons in the area where the maximum amounts occur relatively near the harbor walls.
- **NEW HARBOR WALL AND HARBOR WALL SEALING NEAR THE END OF PIER 24.** These measures would be precautionary and intended to provide barriers to any potential future separate phase hydrocarbon migration into harbor waters where the maximum amounts of separate phase hydrocarbon occur relatively near the harbor walls.
- **SHEET PILE WALL JOINT SEALING ALONG PIERS 25 AND 29 TO RENDER WATER TIGHT.** These precautionary measures are intended to provide barriers to potential future separate phase hydrocarbon migration into harbor waters, and have been completed.

[13] COCs not related to past petroleum releases, as defined in the Enforceable Agreement between IDPP and the State DOH.

Additionally, DOT-H is planning to construct a thick concrete cap over much of the southern portion of OU1C as part of a Capital Improvement Project. This will provide additional protection against exposure to surface soils under the cap.

Potential hazards associated with COCs remaining after engineered remedies are implemented are addressed by the Institutional Controls Plan (IC Plan) (HEERO 2009). Future activities in the OU1C area must comply with the IC Plan and include the following (SESI 2011):

- Obtaining and hiring competent resources to review and understand how the requirements of the IC Plan apply and obtaining and evaluating the relevant background information on site conditions and the engineered remedies. IDPP and DOH are available to provide assistance in locating relevant information.
- Obtaining sufficient information for complete environmental due diligence relevant to planned work or land use.
- Preparing and implementing appropriate site-specific health and safety plans and protocols that address potential worker exposure issues related to planned work.
- Assessing and selecting appropriate control measures and obtaining appropriate approvals from DOH and other governmental entities keeping in mind that: (1) the Hazard Criteria are based on generalized site conditions and hazard exposures; and (2) actual site conditions can differ from these general assumptions and need to be accounted for in specific site plans.
- Obtaining information, such as the functional requirements and location and descriptions of the existing or planned engineered remedies, and determining which if any would be impacted by the proposed development, construction and property use. IDPP and DOH will be available to assist in making these determinations.
- Communicating and coordinating with IDPP and DOH in order to provide or obtain pertinent information.

Other than the IDPP-related documents referenced above, no other environmental documents were identified for the Pier 24–28 area.

3.4.4.2 Environmental Consequences

Proposed Action

Construction Impacts

As identified in the EHMP, hazards to workers and the environment could develop in the event below ground construction activities (e.g., excavation of soil and associated groundwater) are improperly managed, and hazards associated with soil gas could result with modifications to building interior ground floors, subsurface utilities in or connecting to existing buildings, or the construction of new buildings. In addition to hazards associated with toxicity, explosive hazards can occur as methane is generated by the bio-degradation of separated phase hydrocarbons. To mitigate potential hazards, Institutional Controls have been established for Soil Management Zones,[14] Groundwater Management Zones, and Soil Gas Control Zones[15] over OUC1, and are implemented by the IDPP.

No significant risks to public health and safety from hazardous substances/ materials/waste and petroleum would occur under the Proposed Action. The DOT-H is coordinating with IDPP. Mitigation measures established in the EHMP, particularly Institutional Controls, and any future updates will be made part of the planning and incorporated into the design of any construction to support the Proposed Action. Prior to construction, studies would be conducted to verify if hazardous building materials are present and incorporated into the design to ensure the proper disposition of any hazardous material from Piers 24-28. Compliance with existing applicable laws and regulations will also serve to prevent impacts.

Contractors will be responsible for proper handling and disposal of contractor-generated hazardous waste and will follow any restrictions identified as a result of the above studies and made part of the design documents.

Operational Impacts

No significant risks to public health and safety from hazardous substances/ materials/waste and petroleum would occur under the Proposed Action. Proposed operations would be planned and coordinated with IDPP and DOH, and the IC Plan would be followed. Compliance with existing applicable laws and regulations associated with the handling and management of hazardous materials and waste would also serve to prevent impacts.

Mitigation Measures

No additional mitigation required.

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14 Soil Management Zones are defined as areas where concentrations of IDPP-related COCs in soil have exceeded the Hazard Criteria.

15 Soil Gas Control Zones are defined as areas where soil gas could pose a potential hazard to indoor air in new buildings, below ground excavations, and construction of new underground utilities.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No additional mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.5 ROADWAYS AND TRAFFIC

Roadways and traffic in the vicinity of the project area (the ROI) were evaluated by analyzing a total of eight key intersections within one-half mile of the project area.[16] Details of the analysis are included in Appendix C. Findings are summarized herein.

Traffic conditions in this analysis are characterized by using the Level of Service (LOS) methodology. This methodology provides a quantitative means to describe traffic flow and is based on the Transportation Research Board's 2000 Highway Capacity Manual (HCM 2000). The LOS range from excellent free-flowing conditions (LOS A) to very congested conditions (LOS F). Table 3-2 defines each LOS and provides the average delay per vehicle.

Table 3-2. LOS Definitions

	Average Delay Per Vehicle	
Level of Service	At Unsignalized Intersections	At Signalized Intersections
A	Up to 10 seconds	Up to 10 seconds
B	>10 and ≤15 seconds	>10 and ≤20 seconds
C	>15 and ≤25 seconds	>20 and ≤35 seconds
D	>25 and ≤35 seconds	>35 and ≤55 seconds
E	>35 and ≤50 seconds	>55 and ≤80 seconds
F	>50 seconds	>80 seconds

Source: Highway Capacity Manual 2000.

[16] Traffic was counted at a ninth intersection—the entrance to the Horizon container terminal—but this intersection was not included in the Level of Service (LOS) analysis.

The accepted LOS in urban areas is typically considered to be a minimum LOS D. However, due to declining public resources and various engineering and environmental challenges of implementing roadway improvements, conditions worse than LOS D are not considered "unacceptable" and may not require mitigation.

3.5.1 Kapālama Site

3.5.1.1 Affected Environment

The existing (2011) traffic conditions are based on field observations conducted in October and November 2011. Traffic counts were scheduled to avoid special events or holidays, and were recorded in 15-minute intervals. Figure 3-15 shows the location of the nine manually counted intersections. Five of the nine intersections were controlled by a traffic signal system, while the other four were controlled by two-way stop controlled (TWSC) signs. At a TWSC intersection "STOP" signs are located on the minor street approach, allowing the street with higher traffic volumes to proceed with minimal delay. For intersection 9 on Sand Island Access Road and the main entrance into the Horizon terminal, only the vehicles entering and exiting the terminal were counted to determine the traffic generation volumes of the existing terminal. This intersection is not included in the LOS analysis.

Table 3-3 summarizes existing (2011) conditions at the intersections during the morning (AM) and afternoon (PM) peak hours. The analysis indicates that two of the eight intersections studied operated at LOS E during at least one of the peak hours.

Table 3-3. Existing Traffic Operating Conditions (LOS)

Intersection	Control[1]	AM Peak Hour	PM Peak Hour
1) Nimitz Highway & Sand Island Access Road	Signal	D	D
2) Nimitz Highway & Kalihi Street	Signal	D	E
3) Sand Island Access Road & Auiki Street	Signal	C	D
4) Sand Island Access Road & Road No. 2	Signal	B	C
5) Sand Island Access Road & UH Snug Harbor Access	TWSC	E	C
6) Auiki Street & Puʻuhale Road	TWSC	C	D
7) Auiki Street & Mokauea Street	TWSC	C	C
8) Auiki Street & Kalihi Street	TWSC	B	C

[1] Intersection is controlled by a traffic signal or TWSC sign. For unsignalized intersections, LOS for the worst movement is reported.

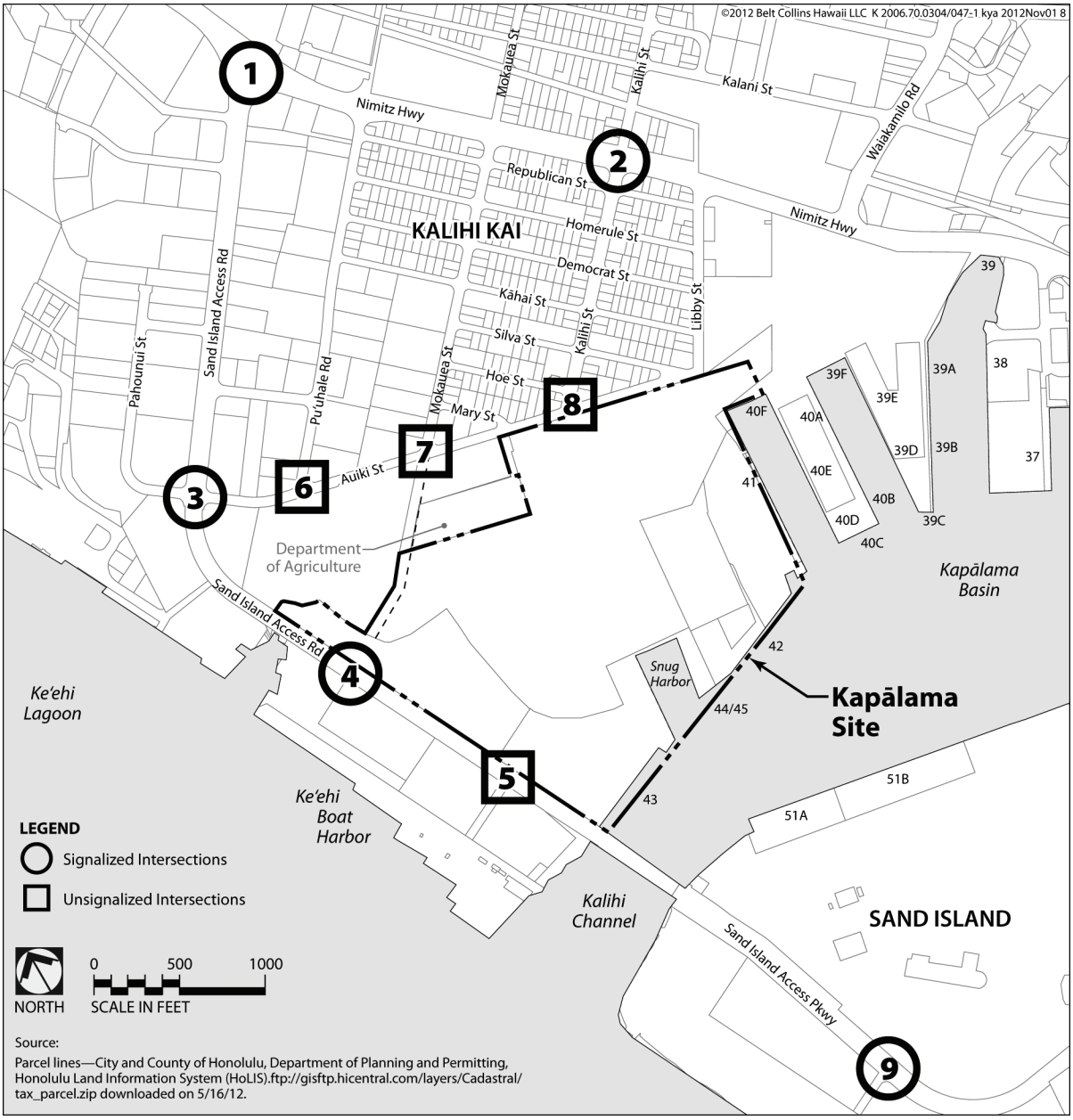


Figure 3-15. Traffic Count Locations

Pedestrians and bicyclists were also counted at the intersections; their numbers were minimal (less than 60 per hour). Most pedestrians on Auiki Street were observed parking their vehicles on the street and walking to work or walking to or from a bus stop to their place of work. On Nimitz Highway, there were a few more pedestrians since there are several bus routes and many stops along Nimitz Highway. Schools are also located mauka of Nimitz Highway, so a few students were observed crossing the highway.

The City Department of Transportation Services, Public Transit Division, operates TheBus, a public transit system that includes a route through Kalihi Kai. The route travels along Kalihi Street, Auiki Street, Sand Island Access Road, Nimitz Highway and then connects with Mokauea Street to a route that goes northeast up ʻĀlewa Heights. On the weekdays, during daylight hours, buses run approximately every 40 to 75 minutes.

Although Sand Island Access Road has a dedicated bicycle lane, very few bicyclists (less than 10 per hour) were observed traveling along this roadway. Even fewer bicyclists were observed on Auiki Street, which does not have a designated bike lane.

3.5.1.2 Environmental Consequences

The incremental change in the LOS between the No Action Alternative ("Future Baseline")[17] and the Proposed Action ("Future with Project) is used to determine potential impacts on traffic. Project impacts were identified using the following criteria:

No Action Alternative (Future Baseline)	Proposed Action (Future with Project)	Project Impact
LOS D or better	LOS D or better	No
LOS D or better	LOS E or F	Yes
LOS E or F	LOS E or F	No

Proposed Action

Construction Impacts

Construction-related traffic would be short-term and is not expected to create a significant adverse impact. The number of construction vehicles traveling to and from the site would generate less vehicular traffic than the existing tenants. Also, in comparison to the average daily volume along Sand Island Access Road, the number of trucks is not expected to exceed daily traffic by more than 5 percent.

No impacts on traffic would occur within neighborhood streets as project construction would not involve any work activity within Auiki Street or other Kalihi Kai streets. TheBus service would not be impacted.

[17] The No Action Alternative (2039) conditions were determined by removing traffic from existing tenants expected to vacate the old warehouses on the project site and applying growth factors projected by existing studies. One of these studies, titled *Transportation Technical Report, Honolulu High-Capacity Transit Corridor Project*, anticipates traffic in the area to increase less than one percent annually.

Operational Impacts

Table 3-4 provides the LOS analysis for the Proposed Action conditions during the morning (AM) and afternoon (PM) peak hours. Five of the eight intersections are expected to operate at acceptable conditions (LOS D or better).

Table 3-4. Proposed Action Traffic Operating Conditions (LOS)

Intersection	Control	AM Peak Hour		PM Peak Hour		Project Impact?
		No Action	Proposed Action	No Action	Proposed Action	
1) Nimitz Highway & Sand Island Access Road	Signal	D	D	E	E	No
2) Nimitz Highway & Kalihi Street	Signal	E	E	E	E	No
3) Sand Island Access Road & Auiki Street	Signal	D	C	D	D	No
4) Sand Island Access Road & Road No. 2	Signal	A	B	A	B	No
5) Sand Island Access Road & UH Snug Harbor Access	TWSC	F	F	E	E	No
6) Auiki Street & Pu‘uhale Road	TWSC	C	C	D	D	No
7) Auiki Street & Mokauea Street	TWSC	C	C	C	C	No
8) Auiki Street & Kalihi Street	TWSC	C	C	D	D	No

Note: Intersection is controlled by a traffic signal or TWSC sign. For unsignalized intersections, LOS for the worst movement is reported.

Changes in traffic volumes due to the project would not significantly degrade the LOS at most of the study intersections and no significant impacts would occur with the Proposed Action. Although intersection 5 (Sand Island Access Road and UH Marine Center [Snug Harbor] Access) shows a poor level of service for both the no action and proposed action conditions, the failing LOS is isolated to the left turn eastbound approach during the afternoon peak. At this intersection an alternative for accessing Sand Island Access Road already exists at the nearby Road No. 2, which has sufficient capacity to accommodate any diverted traffic from the UH Marine Center intersection. Notably, signalizing of intersection 5 would be considered when needed and warranted for safety to allow large trucks to turn left and enter the site. No

significant impacts on pedestrians and bicyclists would occur with these low vehicular volumes.

Auiki Street traffic volumes would see an improvement in LOS as a result of the Proposed Action. Container trucks traveling to the inter-island terminal would use an internal connection within the Kapālama site with the adjacent inter-island cargo service instead of public roads. Therefore, the Proposed Action would improve the LOS at Sand Island Access Road and Auiki Street, as well as Pu‘uhale Road and Auiki Street. Further, with less heavy trucks on Auiki Street, there would be less wear and tear on its surface pavement.

Access to the Servco property adjacent to the Proposed Action would also be limited to Auiki Street near the intersection with Mokauea Street. Impacts to this intersection would be accommodated by the installation of a traffic signal, which is already being planned by the City and County of Honolulu. The signal would benefit turning movements at the intersection as well as help improve pedestrian safety with the inclusion of crosswalks.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

The No Action Alternative analysis, however, indicates that three intersections would degrade to LOS E or F (Intersection 1, 2, and 5) and five intersections would continue to operate at LOS D or better (Intersections 3, 4, 6, 7, and 8). Table 3-5 summarizes the No Action Alternative conditions during the AM and PM peak periods.

Table 3-5. No Action Alternative Traffic Operating Conditions (LOS)

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Existing	2039	Existing	2039
1) Nimitz Highway & Sand Island Access Road	Signal	D	D	D	E

Table 3-5. No Action Alternative Traffic Operating Conditions (LOS)

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Existing	2039	Existing	2039
2) Nimitz Highway & Kalihi Street	Signal	D	E	E	E
3) Sand Island Access Road & Auiki Street	Signal	C	D	D	D
4) Sand Island Access Road & Road No. 2	Signal	B	A	C	A
5) Sand Island Access Road & UH Snug Harbor Access	TWSC	E	F	C	E
6) Auiki Street & Pu'uhale Road	TWSC	C	C	D	D
7) Auiki Street & Mokauea Street	TWSC	C	C	C	C
8) Auiki Street & Kalihi Street	TWSC	B	C	C	D

Note: Intersection is controlled by a traffic signal or two-way stop controlled (TWSC) signs. For unsignalized intersections the LOS for the worst movement is reported.

3.5.2 Piers 24–28

3.5.2.1 Affected Environment

A traffic assessment for Pier 29, which was performed for the *Final Environmental Assessment of the Construction of Pier 29 Container Yard (2009),* provided information about the peak hour and average daily traffic at the key intersection for the Pier 24–28 site—Nimitz Highway and Pacific Street (DOT-H 2009). No traffic counts were performed at this intersection.

3.5.2.2 Environmental Consequences

Proposed Action

Construction Impact

Construction-related traffic would be short-term and not expected to create a significant impact on traffic volumes of surrounding roadways. The number of trucks and passenger vehicles associated with construction work is not expected to exceed 5 percent of the daily traffic volume at the Nimitz Highway and Pacific Street intersection.

Operational Impacts

No significant traffic impacts would occur as a result of the relocation of PSI and Atlantis Submarines. The area is already developed; hence, vehicle trips associated with the Proposed Action would replace some of the vehicle trips from the existing Pier 24-28 tenants. Further, any additional traffic generated by the Proposed Action is expected to be insignificant in comparison to the volume of vehicles traveling along Nimitz Highway. Traffic generated by PSI and Atlantis Submarines employees is expected to occur before the peak hours of 7:15AM to 8:15AM and 4:15PM to 5:15PM at the Nimitz Highway and Pacific Street intersection. This tenant traffic would not significantly impact traffic on Nimitz Highway.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6 UTILITIES

Impacts on utilities are evaluated based on the capacity of existing systems and facilities to accommodate any increase in demand or service associated with the Proposed Action and alternatives, as well as the need to construct new on-site and possible off-site system facilities. The ROI differs for each utility. For most utilities (potable water, wastewater, storm drainage, electrical, telecommunications), the ROI is typically regional. For solid waste disposal, the ROI is island-wide since the H-POWER waste-to-energy facility, municipal solid waste landfill, and construction and demolition landfill on Oʻahu serve the entire island.

3.6.1 Kapālama Site

3.6.1.1 Affected Environment

3.6.1.1.1 Water

The Honolulu Board of Water Supply (BWS) provides water service to the Kapālama site. The water is supplied by the BWS source and distribution system. There are two points of connection to the BWS water system. One connection is a pair of 8-inch diameter compound water meters connected to the existing 12-inch diameter water line located within the Auiki Street right-of-way (ROW) near the intersection with Kalihi Street. The other connection is an 8-inch meter and backflow preventer connected to the existing 16-inch diameter water line located within the Sand Island Access Road ROW, approximately 200 feet north of the Sand Island Bridge (see Figure 3-16). There are existing off-site fire hydrants within the ROWs of both adjacent roadways and existing on-site fire hydrants at the Kapālama site.

3.6.1.1.2 Sewer

On-site domestic wastewater generated within the project site discharges from 6-inch and 8-inch diameter sewer laterals to sewer manholes on the existing 24-inch diameter City sewer main within the Auiki Street ROW (see Figure 3-16). The 24-inch diameter sewer eventually discharges at the Hart Street Sewage Pumping Station (SPS). The SPS pumps the wastewater beneath Honolulu Harbor to the Sand Island Wastewater Treatment Plant (WWTP) for treatment and disposal.

3.6.1.1.1 Storm Drainage

The on-site drainage system consists of inlets and drain pipes ranging from 12 inches to 24 inches in diameter that discharge at the piers directly to the Kapālama Basin, or indirectly through the City and County of Honolulu's drainage system that discharges to Keʻehi Lagoon. Two large box drains are located within the general project area: a 10-foot by 4-foot box drain that flows south along Libby Street and discharges storm water into Honolulu Harbor near Pier 41; and a 7-foot by 5-foot box drain that flows southwest along Mokauea Street, then westward along Auiki Street, and finally beneath the Servco Pacific property to the point of discharge into Keʻehi Lagoon (see Figure 3-16).

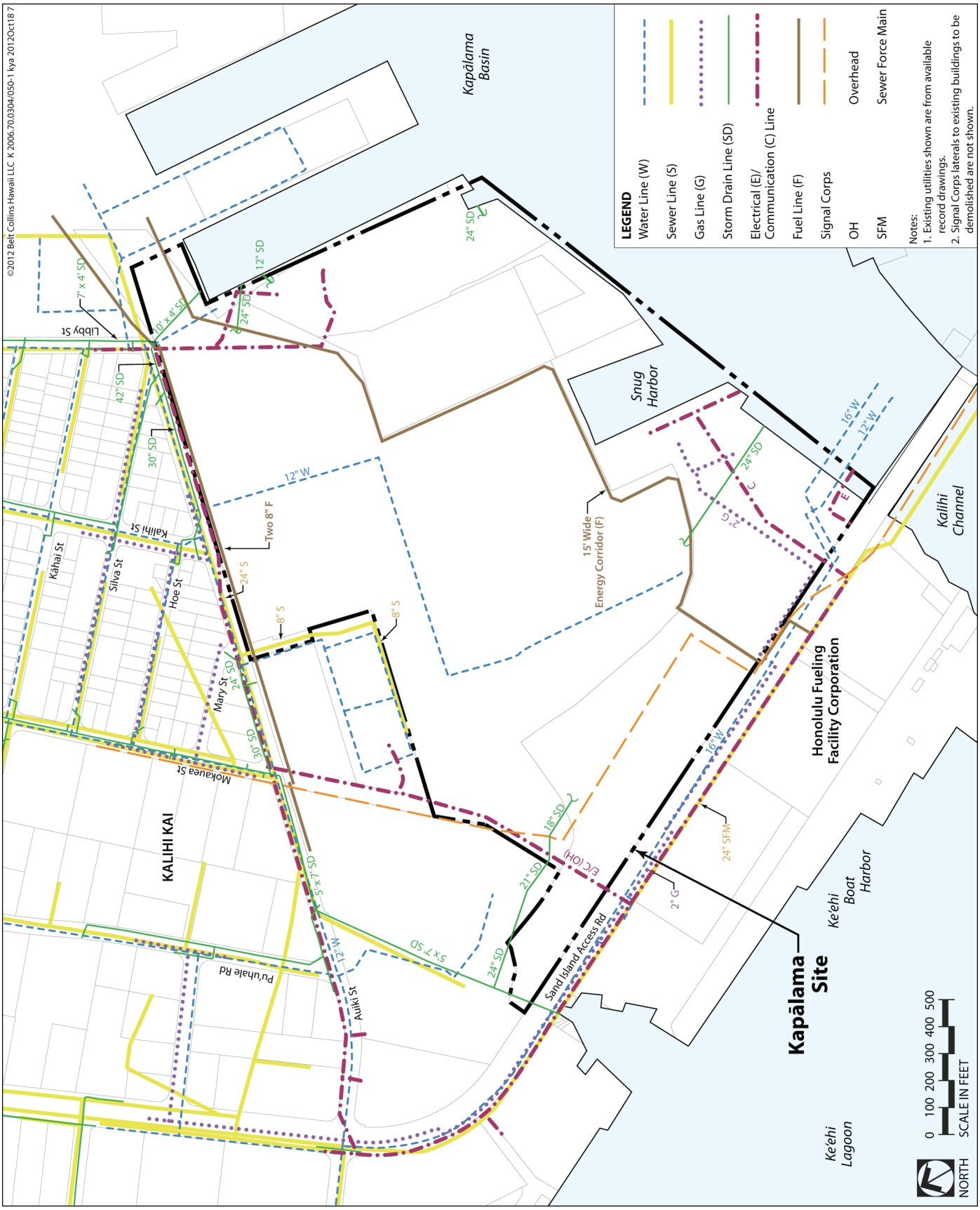


Figure 3-16. Kapālama Site Existing Utilities

3.6.1.1.2 Electrical/Telecommunications

The off-site electrical power generation and transmission systems are operated by the Hawaiian Electric Company (HECO). Three substations provide service to the project area: (1) Kapālama Substation in Kalihi Kai; (2) Sand Island Substation on Sand Island; and (3) Sand Island WWTP Substation, on the east side of the WWTP. The Kapālama substation is the primary source of off-site electrical power. HECO's off-site transmission and distribution system consists of uninsulated aerial cables attached to joint (shared with other utilities) overhead poles located: (1) adjacent to the southern boundary of the project site on the west side of Sand Island Access Road; (2) along Auiki Street adjacent to the northern boundary of the project site; and (3) through the project site adjacent to the access road for the existing Department of Agriculture facility.

The primary off-site electrical point-of-connection to the Kapālama site is located adjacent to Auiki Street near the intersection of Kalihi Street. A second off-site electrical point-of-connection is located adjacent to Sand Island Access Road for a portion of the facilities currently leased to UH School of Ocean and Earth Science and Technology (SOEST).

Telecommunications

Off-site telecommunications utilities for the project site are provided by Hawaiian Telcom (HTCO) and Oceanic Time Warner Cable (OTWC). The off-site telecommunications utilities consist of overhead cables attached to utility poles located along Sand Island Access Road and along Auiki Street. HTCO provides service to the project site from its Kalihi Central Office on Kalihi Street. OTWC provides service to the project site from localized power supplies. HTCO and OTWC each have multiple overhead points-of-connection along periphery of the site and adjacent to the access roadway for the adjacent DOA facilities.

HTCO also maintains military communication cables that cross the southwest corner of the site (see Figure 3-16). The Network Enterprise Center (NEC), formerly known as the Army Directorate of Information Management, has off-site underground "Signal Corps" cables within easements that transect the project site. One NEC cable terminated at the former telecommunications building for telecommunications service within the project site. The NEC had indicated that one cable may also cross the site to provide service to the western side of Keʻehi Lagoon.[18]

[18] Personal communication. Steve Sakai with NEC, 2012.

3.6.1.1.3 Roadway Light Systems

Existing street lights are located along Auiki Street and Sand Island Access Road. The street lights on Auiki Street are mounted on wooden poles and interconnected by overhead power lines. The Auiki Street lighting system is owned and maintained by the City. The highway lights along Sand Island Access Road are also mounted on wooden poles, but are interconnected by underground power lines. The Sand Island Access Road lighting system is owned and maintained by the DOT.

3.6.1.1.4 Gas/Petroleum

On-site gas service is currently provided by a 2-inch diameter gas line connected to a meter adjacent to the Sand Island Access Road, located approximately 300 feet north of the Sand Island Bridge (see Figure 3-16). There are no gas lines along Auiki Street except for a 250-lineal-foot segment east of Kalihi Street, which appears to provide service to a lot across Auiki Street from the Kapālama site.

A 15-foot-wide fuel line corridor easement that extends from the Hawaii Fueling Facilities Corporation (HFFC) located on the west side of Sand Island Access Road to Nimitz Highway in the vicinity of Pier 41 bisects the project site. Two Chevron oil lines are located along Auiki Street: one adjacent to and one south of the fence line within an oil line easement (see Figure 3-16). The HFFC fuel line corridor and the oil lines do not supply petroleum fuel to the project site.

3.6.1.1.5 Solid Waste Disposal

Solid waste is currently collected by private waste collection companies. Typically, solid waste is transported to the City and County of Honolulu's H-POWER plant for waste energy recovery or to the City's Waimanalo Gulch Sanitary Landfill for disposal. Waste from construction and demolition activities is transported to the PVT Landfill in Nānākuli.

3.6.1.2 Environmental Consequences

3.6.1.2.1 Water

Proposed Action

Construction Impacts

The Proposed Action would require reconstruction of on-site water lines and appurtenances in compliance with new tenant facilities' requirements and current codes. The on-site water system would be reconfigured to correspond with the new site building configuration. Existing on-site water lines may be abandoned in place or

removed if in conflict with other new utilities. Removal of existing and construction of new below-ground water utilities may include excavation, temporary stockpiling of material, pressure testing of utilities with water, disinfection of potable water lines, compaction of embankment material to fill excavations, and repaving.

On-site fire hydrants may be required by the Honolulu Fire Department (HFD) for new structures that are more than 150 feet from existing hydrants in the adjacent roadway ROWs.

The on-site water system may either use the same points-of-connection to the public utility water system or new points-of-connection. BWS approval would be required prior to reactivating existing or constructing new points-of-connection to the BWS water system. BWS approval for compliance with BWS and HFD requirements would be required prior to issuance of building permits for the proposed structures.

Construction impacts would be minimized by implementation of best management practices (BMPs) and compliance with applicable City and DOH permits and approvals.

Operational Impacts

The Proposed Action is not anticipated to adversely impact the public utility water system. The Proposed Action would demolish approximately 100,000 square feet of existing buildings (maritime-dependent tenants) and construct approximately 50,000 square feet of new structures. Commensurate with the decrease in building area, domestic water demand is expected to decrease. Fire flow demand should be identical, since design requirements are based on a single fire event and the general land use remains unchanged. The sufficiency of water system capacity is usually governed by fire flow demand peak flow rates that are typically much higher in magnitude than potable demand peak flow rates. BWS stated in their EIS preparation notice response letter of November 29, 2011 that the existing water system is adequate to accommodate the Proposed Action at Kapālama.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction Impacts

Construction activities would be similar to those under the Proposed Action.

Operational Impacts

The Alternative Action would similarly have no adverse impact to the public water utility system. The BWS affirmation of the adequacy of the existing public water utility system would equally apply to the Alternative Action.

Mitigation Measures
No mitigation is required.

No Action Alternative
No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.1.2.2 Sewer

Proposed Action

Construction Impacts
No significant impacts on the sewer system would occur with construction under the Proposed Action. The Proposed Action would require reconstruction of on-site sewer utilities in compliance with new tenant facilities' requirements and current codes. The on-site sewer system would be reconfigured to correspond with the new site building configuration and likely use the same points of discharge to the City sewer system. City approval would be required for new discharges to any new or existing points of connection to the City sewer system.

Existing on-site sewer lines may be abandoned in place or removed if in conflict with other new utilities. Existing sewer manholes would be demolished and filled in to minimize subterranean void spaces. Removal of existing and construction of new below-ground sewer utilities may include dewatering, excavation, temporary stockpiling of material, pressure testing of utilities with water, compaction of embankment material to fill excavations, and repaving. Construction impacts would be minimized by compliance with applicable City and DOH permits and approvals.

Operational Impacts
The Proposed Action is not anticipated to adversely impact the public sewer system. Based on the preceding reduction in building area from 100,000 square feet to 50,000 square feet, the Proposed Action is anticipated to result in decreased wastewater discharge rates. The City approved a Sewer Connection Permit on November 21, 2012 for the Proposed Action to demolish approximately 100,000 square feet of existing structures and reconstruct approximately 50,000 square feet of new structures. The Proposed Action does not include provisions for ship discharge of wastewater.

Mitigation Measures
No mitigation is required.

Alternative Action
Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.1.2.3 Storm Drainage

Proposed Action

Construction Impacts

No significant impacts on storm drainage would occur with construction under the Proposed Action. The Proposed Action would require reconstruction of on-site drainage lines, drain inlets, and other collection structures, as well as appurtenances in compliance with new tenant facilities' requirements and current codes. The on-site drainage system would be reconfigured to correspond with the new site configuration and likely use the same points of discharge to Kapālama Basin or the City and County of Honolulu drainage system. DOT-H or City approval would be required for new discharges to any new or existing points of connection to the respective drainage systems.

The Honolulu Harbor has a Small Municipal Separate Storm Sewer System (MS4) permit issued under Hawai'i Administrative Rules (HAR) 11-55, Appendix K. The permit includes construction and post-construction requirements that are addressed in the Honolulu Harbor Storm Water Management Plan (SWMP) and apply to all projects within Honolulu Harbor. The SWMP is currently undergoing revisions, including revision to the post construction BMP program. All construction projects will be required to go through a post construction BMP review to ensure that peak runoff volume and flow is reduced to the maximum extent practicable (MEP) and storm water runoff pollution is reduced to the MEP.

Existing on-site drain lines may be abandoned in place or removed if in conflict with other new utilities. Removal of existing and construction of new below-ground drainage utilities may include dewatering, excavation, temporary stockpiling of material, compaction of embankment material to fill excavations, and repaving. Construction impacts would be minimized given compliance with applicable City and DOH permits and approvals.

Operational Impacts

The Proposed Action would remove existing buildings and structures and repave the existing pavement surface for storing of shipping containers. The Proposed Action would include BMPs to meet the City and County of Honolulu's NPDES MS4 permit requirements or DOT-H's MS4 permit requirements, depending on the system to which the on-site drainage system is connected.

Mitigation Measures
No mitigation is required.

Alternative Action
Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative
There would be no operational or construction impacts under the No Action Alternative. No mitigation is required.

3.6.1.2.4 Electrical/Telecommunications

Proposed Action
Construction Impacts
No significant impacts on electrical systems would occur with construction under the Proposed Action. The existing HECO off-site 46 kilovolt (kV) and 12 kV overhead transmission mains that transect the project site may be relocated along the perimeter of the project site to lessen on-site development constraints and increase space utilization.

Off-site electrical systems may be constructed within the project site to provide on-site service. It is anticipated that HECO would install a transformer to step down the transmission voltage and switchgear to provide protection to minimize outages and protect off-site HECO main circuits. The system would consist of metal cabinets placed on concrete pads and concrete-encased PVC conduits.

No significant impacts on telecommunications systems would occur with construction under the Proposed Action. Telephone and cable television service would be extended to the property from the existing off-site overhead lines in adjacent public roadway ROWs. Separate service conduit laterals would be provided for HTCO and OTWC. All conduits would be connected to a HTCO handhole or manhole before rising up the existing overhead pole in accordance with Joint Pole Committee rules.

The NEC Signal Corps telecommunication lines would no longer provide any on-site service because the former telecommunications building would no longer exist under the No Action Alternative.

Construction of on-site electrical and telecommunications systems for the Proposed Action would consist of underground concrete-encased PVC conduits and manholes. Both electrical power and telecommunications are typically installed within a common trench and located, where feasible, within roadways, pavement areas, or

open spaces to allow for unrestricted maintenance. These facilities would be designed and constructed per design codes and respective utility policies. Installation of on-site lighting and traffic signal improvement would similarly require the installation of concrete-encased PVC conduits and manholes for power and signal cables.

Potential construction impacts from excavation, underground utility installation, backfill and paving would be minimized by compliance with applicable regulatory requirements and implementation of BMPs.

Operational Impacts

The Proposed Action would increase off-site electrical demand; telecommunications demand would decrease. HECO has indicated that the existing Kapālama Substation has adequate capacity to meet anticipated power needs. Additional off-site electrical power and telecommunications infrastructure would be required to extend new service connections to the project site.

HECO and HTCO are regulated by the Public Utilities Commission (PUC). Regulated public utilities are required to extend off-site utility service to supply public demand. Although OTWC is not a PUC-regulated utility, its policies for off-site utility development are similar. OTWC provides service when the anticipated revenue from the prospective service connections would exceed expenditures within a reasonable payback period. Therefore, the Proposed Action is not anticipated to adversely affect off-site electrical and telecommunications capacity.

Development of the site as a container yard capable of 24-hour operation would require the installation of area lights throughout the parcel to provide adequate illumination for safe operation of the articulated trucks and container lifts. Based on recent designs at other DOT-H facilities, a high-mast lighting system would be proposed for most of the container yard. The high-mast poles would be equipped with lowering assemblies to facilitate the maintenance of the fixtures. For areas along the property border but inside the project site, shorter poles and fixtures would be proposed to prevent glare into the adjacent properties. Illumination of the container yard and access driveways would be based on Illuminating Engineering Society (IES)/American National Standards Institute (ANSI) criteria. For a discussion of impacts related to outdoor lighting, see section 3.13, Visual Resources.

Mitigations Measures

No mitigation is required.

Alternative Action

Construction Impacts

Construction impacts for the Alternative Action would be identical to the Proposed Action.

Operational Impacts

Operational impacts for the Alternative Action would be identical to the Proposed Action.

Mitigation Measures

No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.1.2.5 Gas/Petroleum

Proposed Action

Construction Impacts

No significant impacts on gas/petroleum systems would occur with construction under the Proposed Action. Existing on-site gas lines may be abandoned in place or removed if in conflict with other new utilities. If the operator requires gas service, new service laterals and meters would be constructed in accordance with current City and County of Honolulu codes. Construction of new below-ground gas lines may include excavation, temporary stockpiling of material, compaction of embankment material to fill excavations, and repaving. Construction would be accomplished in compliance with applicable permit requirements.

Operational Impacts

The quantity of gas, if required, is anticipated to be very small and have negligible impact to off-site supplies. There are no anticipated impacts to the HFFC fuel corridor and the Chevron oil lines because the Proposed Action does not include construction of any permanent structure over the existing fuel line alignments.

The Proposed Action would likely utilize barges to deliver heavy fuel oil and tanker trucks to deliver marine gas oil to ships berthed at the Kapālama site. Terminal facilities may require tanker truck delivery and on-site storage tanks for diesel, unleaded fuel and propane gas. Storage tanks would need to comply with U.S. Environmental Protection (EPA) Agency Spill Prevention, Control and Countermeasure (SPCC) regulations and Honolulu Fire Department fire protection ordinances.

Mitigation Measures
No mitigation is required.

Alternative Action
Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative
No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.1.2.6 Solid Waste Disposal

Proposed Action
Construction Impacts
No significant impacts on solid waste disposal would occur with construction under the Proposed Action. The Proposed Action would require the removal of existing buildings (maritime-dependent tenants) that total approximately 100,000 square feet in area. More than half of the buildings are light-frame construction. Some construction waste, such as concrete floor slabs, could be recycled on site as embankment material or for use as structural fill. Prior to recycling materials, the materials would be tested for suitability. In the unlikely event that a material is found to be hazardous, the material would be disposed of properly, in accordance with federal regulations.

Depending on recycling diversion rates, the amount of construction waste could be in the order of magnitude of about 5,000 tons, which is based on a solid waste generation rate of 50 pounds per square foot (lbs/sf) for light-frame construction and 150 lbs/sf for heavy-frame construction.

City projections based on historical records estimate that 1.7 million tons of waste will be generated in 2012. It is estimated that the Proposed Action would generate about 0.3 percent of the annual estimated total solid waste tonnage.

Waste would be hauled by dump trucks to the PVT Landfill, a private construction and demolition solid waste landfill in Nānākuli. This could result in about 120 round trips by truck, depending on the capacity of the trucks and the diversion rates.

Operational Impacts
The domestic waste generation would increase relative to the No Action Alternative due to the increase in number of employees on site. However, the quantity of industrial waste is likely to be reduced under the Proposed Action because the industrial harbor repairs and maintenance from the existing marine-related tenants

would be eliminated. As appropriate, the container terminal operator would implement recycling to further reduce the volume of solid waste generated during operations and impacting H-POWER facility and landfills.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

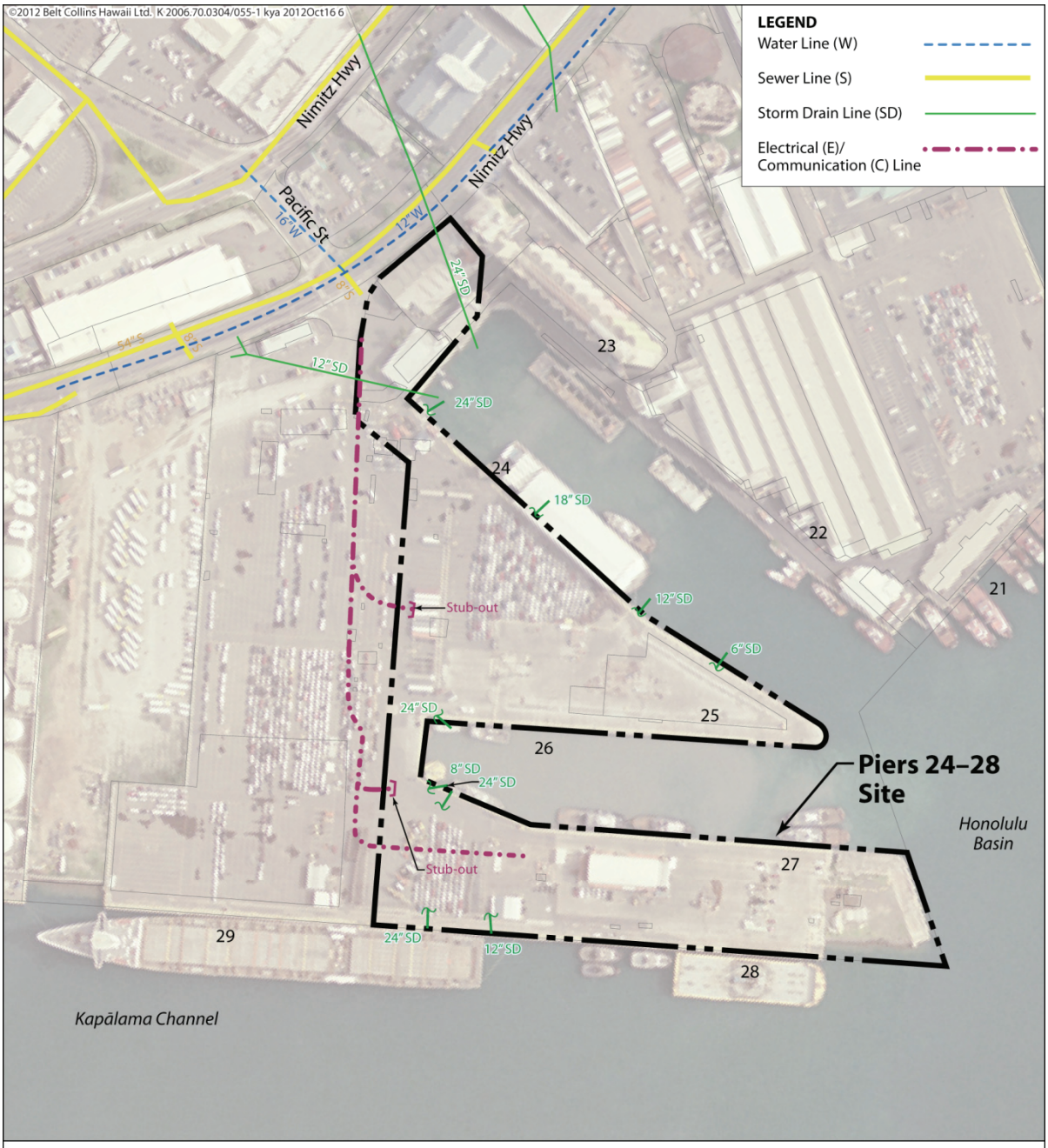
3.6.2 Piers 24–28

The Proposed Action includes the relocation of PSI and Atlantis Submarines from the Kapālama site to Piers 24–28. For the purpose of assessing utility impacts, the PSI improvements are presumed to involve approximately 50,000 square feet of new buildings, and the relocation of Atlantis Submarines is presumed to require 10,000 square feet of new building area.

3.6.2.1 Affected Environment

3.6.2.1.1 Water

The existing points of connection to the BWS water system are a 12-inch diameter water main within the Nimitz Highway ROW and a 16-inch diameter water main within the Pacific Street ROW. Existing domestic water service to the site is provided through an 8-inch diameter on-site water lateral connected to the 12-inch diameter BWS water main within the Nimitz Highway ROW. Existing fire protection water service is provided through an on-site 10-inch diameter water lateral connected to the 16-inch diameter BWS water main within the Pacific Street ROW. There are BWS water meters at each point of connection. Refer to Figure 3-17.



Sources:
Aerial photograph—USDA-NRCS/DigitalGlobe Inc. dataset. September 2005.
Parcel lines: City and County of Honolulu GIS. http://gisftp.hicentral.com/Index.htm#_Cadastral. Modified May 15, 2012, downloaded May 17, 2012.

NORTH
0 100 200 300
SCALE IN FEET

Notes:
1. Existing utilities shown are from available record drawings.
2. Proposed buildings and designated areas are from Development Plan for Relocation of Kapalama Military Reservation Tenants, Kapalama Tenants Relocation Option 5A, dated 5/4/10.

Figure 3-17. Pier 24–28 Existing Utilities

3.6.2.1.2 Sewer

The existing on-site sewer system consists of 8-inch and 6-inch diameter gravity lines and a 4-inch diameter pressure sewer lines. Piers 24 through 26 are serviced by gravity sewer lines that are conveyed to an on-site sewer pumping station located near Pier 24. Piers 27 and 28 are serviced by gravity sewer lines that are conveyed to an on-site sewer pumping station located at Pier 27. All on-site gravity and pumped sewers in the vicinity of Piers 24–28 discharge to the public sewer system at two City sewer manholes located within the Nimitz Highway ROW. Both of these manholes discharge through off-site 8-inch diameter sewer laterals to the 54-inch diameter sewer interceptor also located within the Nimitz Highway ROW. The 54-inch diameter sewer eventually discharges at the Hart Street SPS, which pumps the wastewater to the Sand Island WWTP for treatment and disposal.

3.6.2.1.3 Storm Drainage

The existing on-site drainage system consists of inlets and drain pipes ranging from 3 inches to 24 inches in diameter. The drainage system discharges at numerous locations along the piers into Honolulu Harbor (see Figure 3-17).

3.6.2.1.4 Electrical/Telecommunications

Electrical

HECO's existing substations serving this area are: (1) Kapālama Substation, located in Kalihi Kai; and (2) Iwilei Substation, located at the corner of Ka'aahi Street and Dillingham Boulevard. The Iwilei Substation is the primary source of electrical power for Piers 24–28. HECO's off-site facilities serving Honolulu Harbor consists of 11.5 kV overhead lines within the Nimitz Highway ROW. A system of underground cables and ducts distribute on-site power throughout the Pier 24–28 area.

Telecommunications

HTCO's and OTWC's existing off-site facilities are co-located on the Nimitz Highway overhead line that also supports HECO's facilities. HTCO serves the Pier 24–28 area from its Alakea Central Office. OTWC provides service to Piers 24–28 from localized power. HTCO and OTWC distribution lines are routed on-site within the Pier 24–28 area through a system of underground cables and ducts. DOT–H project H.C. 10354 Pier 29 Container Yard has constructed a new duct system with provisions to extend electric and telecommunications service to Piers 24–28.

Lighting

Except for access driveways and parking lots, installation and maintenance of site and area lighting within each tenant area is the responsibility of the tenant.

3.6.2.1.5 Gas/Petroleum

There is no gas or petroleum service to the Pier 24–28 site.

3.6.2.1.6 Solid Waste Disposal

See description in section 3.6.1.1.5.

3.6.2.2 Environmental Consequences

3.6.2.2.1 Water

Proposed Action

Construction Impacts

No significant impacts on water systems would occur with construction under the Proposed Action. The Proposed Action would require reconstruction of on-site water lines and appurtenances in compliance with new tenant facilities' requirements and current codes and an upgrade of the on-site water system to comply with fire flow standards. These improvements would include a new connection to the BWS water system with new water meters and backflow preventers.

Existing on-site water lines may be abandoned in place or removed if in conflict with other new utilities. Removal of existing and construction of new underground water lines may include excavation, temporary stockpiling of material, pressure testing of utilities with water, disinfection of potable water lines, compaction of embankment material to fill excavations, and repaving. Construction impacts would be minimized given compliance with applicable City and DOH permits and approvals.

Operational Impacts

Operational impacts of the Proposed Action on the public utility water system would need to be assessed by the BWS. Additional engineering studies would be required to determine the impact of the expanded on-site system capacity on the BWS water system. Off-site improvements, such as an upsized or relief water line, would need to be incorporated in the Proposed Action if required by BWS during final design review. BWS approval of all proposed water system improvements is required prior to City approval of building permits.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.2.2.2 Sewer

Proposed Action

Construction Impacts

No significant impacts on the sewer system would occur with construction under the Proposed Action. The Proposed Action would require reconstruction of on-site sewer utilities in compliance with new tenant facilities' requirements and current codes. The new system would consist of gravity sewer laterals, pressure sewers and sewage pumping stations, and would likely use the same point of discharge to the City sewer system. The City approved a Sewer Connection Permit on November 21, 2012 for the Proposed Action, which includes the relocation of PSI and Atlantis Submarine personnel to Piers 24-28 .

Existing on-site sewer lines may be abandoned in place or removed if in conflict with other new utilities. Existing sewer manholes would be demolished and filled in to minimize subterranean void spaces. Removal of existing and construction of new underground sewer lines may include excavation, temporary stockpiling of material, pressure testing of utilities with water, compaction of embankment material to fill excavations, and repaving. Construction impacts would be minimized given compliance with applicable City and DOH permits and approvals.

Operational Impacts

The City Department of Planning and Permitting (DPP) stated that there was sufficient off-site sewer capacity in response to a preliminary request for connection made in 2009 as part of a relocation feasibility study (DOT-H 2010). There would be no adverse operational impacts.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.2.2.3 Storm Drainage

Proposed Action

Construction Impacts

No significant impacts on storm drainage would occur with construction under the Proposed Action. The Proposed Action would require reconstruction of on-site drainage lines, drain inlets, and other collection structures, as well as appurtenances in compliance with new tenant facilities' requirements and current codes. The new drainage system would be reconfigured to correspond with new site configuration and likely use the same points of discharge to the harbor. DOT-H approval would be required for new discharges to any new or existing points of connection to the drainage system.

Honolulu Harbor has a Small MS4 permit issued under HAR 11-55, Appendix K. The permit includes construction and post-construction requirements that are addressed in the Honolulu Harbor SWMP and apply to all projects within Honolulu Harbor. The SWMP is currently undergoing revisions, including revision to the post construction BMP program. All construction projects will be required to go through a post construction BMP review to ensure that peak runoff volume and flow is reduced to the MEP and storm water runoff pollution is reduced to the MEP.

Existing on-site drain lines may be abandoned in place or removed if in conflict with other new utilities. Removal of existing and construction of new below-ground drainage utilities may include dewatering, excavation, temporary stockpiling of material, compaction of embankment material to fill excavations, and repaving. Construction impacts would be minimized given compliance with applicable City and DOH permits and approvals.

Operational Impacts

The Proposed Action would not substantially increase impervious surface area. As a result, an increase in surface runoff volume or peak flow rate is not expected. The Proposed Action would include BMPs to meet the NPDES MS4 permit requirements for DOT-H.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.2.2.4 Electrical/Telecommunications

Proposed Acton

Construction Impacts

No significant impacts on electrical/telecommunication systems would occur with construction under the Proposed Action. The on-site electrical and telecommunications systems would consist of concrete-encased PVC conduits and manholes, typically installed within a common trench and located within roadways, pavement areas, or open spaces to allow for unrestricted maintenance access. HECO would also require the installation of switchgear within the project site to isolate and protect the off-site power system from the local on-site power system. Installation of on-site lighting would similarly require the installation of concrete-encased PVC conduits and manholes for power and signal cables. Illumination of the access driveway and parking lots would be based on IES/ANSI criteria and would utilize fixtures with cut-off optics. Potential construction impacts from the excavation, underground utility installation, backfill and paving of the preceding underground electrical and telecommunication utilities would be minimized by compliance with applicable regulatory requirements and implementation of BMPs.

Operational Impacts

The Proposed Action would not adversely affect off-site electrical or telecommunications system capacity. Electrical and telecommunications service to the project site would be extended underground to facilities on Piers 24–28 from the duct system recently constructed under the Pier 29 Container Yard. For a description of impacts related to outdoor lighting, see section 3.13, Visual Resources.

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.2.2.5 Gas/Petroleum

Proposed Action

Construction Impacts

No gas or petroleum utilities are proposed for the Proposed Action; therefore, there would be no impact on gas or petroleum utilities.

Operational Impacts

No gas or petroleum utilities are proposed for the Proposed Action; therefore, there would be no impact on gas or petroleum utilities.

Alternative Action

Similar to the Proposed Action, no proposed gas or petroleum utilities are planned for construction and operations under the Alternative Action; therefore there would be no impact on gas or petroleum utilities. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.6.2.2.6 Solid Waste Disposal

Proposed Action

Construction Impacts

No significant impacts on solid waste disposal would occur with construction under the Proposed Action. Piers 24-28 is largely a paved open area. The Proposed Action would include construction debris from construction of new facilities on the property. The amount of construction waste is expected to be negligible compared to the estimated 1.7 million tons per year of waste generated within the City.

Construction of the Proposed Action would result in a few truckloads of solid waste. Construction-related traffic impacts due to trucks hauling solid waste to the PVT Landfill would be minimized by scheduling these trips during non-peak hours. In addition, reuse of construction materials would reduce the volume of solid waste from demolition.

Operational Impacts

PSI performs primarily repair and maintenance services and Atlantis Submarines recharges and maintains their vessels, which generate relatively little quantities of solid waste in comparison to other industrial activities. No net impact would occur because existing operations are being transferred from one location to another within Honolulu Harbor. Recycling would serve to reduce the volume of waste sent to the H-POWER facility and the City landfill.

Mitigation Measures

No mitigation is required.

Alternative Action

Similar to the Proposed Action, no proposed gas or petroleum utilities are planned for construction and operations under the Alternative Action; therefore there would be no impact on gas or petroleum utilities. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.7 PUBLIC SERVICES

This section presents an evaluation of how the Proposed Action and alternatives may affect the following public services: police/security, fire protection services and medical and emergency services. The analysis of police/security, fire, and medical/emergency services focuses on whether existing services or facilities have the capacity to accommodate anticipated changes due to the Proposed Action and alternatives.

The ROI varies depending on the service or facility being analyzed. The Kapālama site and Pier 24–28 site services are generally located within the same ROI.

3.7.1 Affected Environment

3.7.1.1 Police/Security and Fire Protection

Police and security services in Honolulu Harbor and vicinity are provided by the Department of Transportation Harbor Patrol, the U.S. Coast Guard, and the Honolulu Police Department (Districts 3 and 5). Fire protection is provided by the Honolulu Fire Department's (HFD's) Kalihi Kai, Central, Kakaʻako, and Waterfront (Pier 15) Fire Stations.

3.7.1.2 Medical and Emergency Services

Hospital care facilities within relatively close proximity to Honolulu Harbor are Queen's Medical Center in downtown Honolulu, Straub Clinic and Hospital at King Street/Ward Avenue, and Kaiser Permanente Medical Center in Moanalua. Emergency services are provided by the City's Emergency Medical Services Division (EMS). Private ambulance companies also provide emergency services.

EMS District 1 covers the project area. The ambulances are stationed at Queen's Medical Center and Kuakini Medical Center. EMS also has two rapid Response

Paramedic units, with one unit per district. The HFD provides response to medical emergencies with personnel trained at the first responder level (EMS 2012).

3.7.2 Environmental Consequences

3.7.2.1 Police/Security and Fire Protection

Kapālama Site and Piers 24–28

Proposed Action

No construction or operational impacts are anticipated as police, harbor security, and fire protection services already cover the project sites. The Proposed Action would result in few buildings and large open spaces bounded by security fences. These provisions require less demanding security surveillance and emergency response. The construction contractor is expected to provide security for its own equipment and supplies during construction.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.7.2.2 Medical and Emergency Services

Kapālama Site and Piers 24–28

Proposed Action

No significant construction or operational impacts are anticipated under the Proposed Action. A number of medical and emergency facilities are located in the project vicinity to adequately accommodate any medical or emergency needs during project construction and long-term operations.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.8 TOPOGRAPHY, GEOLOGY, AND SOILS

This section describes the topography, geology and soils at the Kapālama and Pier 24–28 sites. For land-based construction, the ROI includes the development footprint and, with regard to erosion and runoff, receiving waters.

3.8.1 Kapālama Site

3.8.1.1 Affected Environment

3.8.1.1.1 Topography

The topography of the Kapālama site is fairly level, sloping about 0.5 percent from the center both south toward Honolulu Harbor and north toward Auiki Street (USATHAMA 1990).

Ground elevations range from about four to nine feet above msl. Elevations along the waterfront range from about four to seven feet above msl (USATHAMA 1990). Along the south side, the waterfront is an approximate four-foot-high shoreline of earth and rubble subject to erosion. The remainder of the shoreline, including Snug Harbor and Pier 41, is lined with improved piers.

3.8.1.1.2 Geology

The Kapālama site was formed by two basaltic volcanoes: the Waiʻanae Range on the west and the Koʻolau Range on the east. Lava flows created the land between the two ranges while stream and marine erosion and submersion carved the island's land forms and coastal plains (Stearns 2001).

Pre-1920s maps show the Kapālama site as a submerged nearshore area consisting of the Ananoho and Auiki Fishponds (DOT-H February 2007a). The Kapālama site is presently fill land configured along the waterfront to accommodate Honolulu Harbor.

3.8.1.1.3 Soils

The U.S. Department of Agriculture (USDA) Soils Report (1972) categorizes the Kapālama site's soil type as "[f]ill land, mixed," consisting of dredged material from the ocean or hauled from nearby areas, garbage and other imported material (SCS 1972). These soils are well drained, have low to moderately low permeability, rarely

flood or pond, and are found in urban areas usually near airports, housing areas, and industrial facilities.

Dames & Moore prepared a geotechnical report as part of the Final Physical and Economic Feasibility Study of a Multi-Level Container Staging and Distribution Center. That report "… indicates that the Kapālama Development Complex was once part of a fringing reef formation in an area known as Kalihi-Kai. The report notes that a 1930s geological map shows that fish ponds were located at this site. The ponds were filled in the late 1930s with coral and limestone fill material. Snug Harbor was constructed in 1940 for military use. Previous investigations for the site were reviewed in the report and data on borings were researched. Conclusions about the subsurface conditions were that 'borings indicate the site is underlain by coral gravel fill over varying thickness of soft compressible lagoonal soil. The lagoonal soil overlies a coral formation.' A possible contour of the coral surface was plotted for this research. Along with further geotechnical studies, this preliminary information may assist in the determination of possible foundation requirements for future development of the project site" (DOT-H 1993).

3.8.1.2 Environmental Consequences

Proposed Action

Construction Impacts

Potential impacts during construction would be avoided or minimized by compliance with applicable regulations and building codes, including the NPDES permit program for erosion and sediment control and dust control measures required by the State Department of Health (DOH) (Hawai'i Administrative Rules [HAR] 11-60.1). Best management practices (BMPs) would be incorporated as part of the Proposed Action. Construction impacts would also be avoided or minimized through compliance with appropriate siting, planning, and design standards, including the International Building Code (IBC). Geotechnical engineering studies would be conducted to identify appropriate design requirements.

Landside construction would involve demolition, grading, paving, trenching for utilities, equipment installation, and building construction. Construction activities would be completed in compliance with geotechnical engineering recommendations, which would be specific to the project design. Soil settlement, erosion, or expansion is not anticipated with the implementation of applicable geotechnical engineering practices during design and construction.

Construction of the piers would require dredging, excavation of materials, installation of earth retaining and lateral support systems, dewatering, and subgrade preparation. Fill from excavation work would be used to the extent practicable to minimize the amount of fill from off-site sources to construct the proposed piers.

Approximately 132,000 cubic yards of appropriate structural fill is required for the improvements. The diversion of a small portion of dredged material would be largely limited to coastal areas due to the high salt concentrations in the marine sediments. Saline sediments would limit the regrowth of vegetation and potentially percolate soluble salt into the underlying groundwater.

Dredging impacts are discussed in section 4.2, Marine Environment.

Due to the relatively level topography, soil erosion potential during construction would be minimal. City construction permits would require the implementation of best management practices (BMP) to minimize the potential for soil transport and fugitive dust emissions. State-issued NPDES permits would mandate the implementation of BMPs to any dewatering discharge, if required. As discussed above, construction-related impacts would also be avoided or minimized through compliance with applicable regulatory and NPDES permit requirements as well as engineering design standards prior to, during, and after construction.

Operational Impacts

Once construction is completed, container terminal operations would not significantly alter the topography, geology, or soils of the site.

Mitigation Measures

No additional mitigation is required.

Alternative Action

Construction Impacts

Construction impacts under the Alternative Action would be less than the Proposed Action as less fill would be required.

Operational Impacts

As with the Proposed Action, once construction is completed, container terminal operations would not alter the topography, geology, or soils of the site.

Mitigation Measures

No mitigation is required.

No Action Alternative

Construction Impacts

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.8.2 Piers 24–28

3.8.2.1 Affected Environment

3.8.2.1.1 Topography

The Pier 24–28 site is fairly level at an elevation of about five feet above msl.

3.8.2.1.2 Geology

The Pier 24–28 site, as with the Kapālama site, is part of the pre-historic volcanic process that created the coastal plains of O'ahu. Like most of Honolulu Harbor, the Pier 24–28 site is on fill land and was once a nearshore area.

3.8.2.1.3 Soils

According to the USDA Soils Report (SCS 1972), the Pier 24–28 site, like most of the Honolulu Harbor waterfront, is fill land comprised of dredged sediment and/or garbage and other material. These soils are well drained, have low to moderately low permeability, rarely flood or pond, and are found in urban areas usually near airports, housing areas, and industrial facilities.

The Final Environmental Assessment for Pier 29 (adjacent to Piers 24–28) describes Pier 29's soil and geology as "….granular fill occur below the pavement from two to five feet. Below the fill material lagoonal deposits consisting of soft to very soft sandy silt occur between 10 to 15 feet. Coralline material occurs below the sandy silt. Groundwater was encountered at depths of 5.4 to 6.6 feet below the existing pavement or ground surface. It was also observed that the groundwater was tidally influenced (CH2M Hill, 2004)." (DOT-H 2009, pages 12-13.)

3.8.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Office, shop, maintenance, and infrastructure improvements would be constructed under the Proposed Action. Construction would involve excavation for the footings and foundations of the new buildings, trenching for utility lines, as well as grading and paving. These activities would be completed in compliance with geotechnical engineering recommendations, which would be specific to the proposed project design. Soil settlement, erosion, or expansion is not anticipated with the implementation of applicable geotechnical engineering practices during design and

construction. Due to the relatively level topography soil erosion potential during construction would be minimal. Construction-related impacts would also be avoided or minimized through compliance with applicable regulatory requirements and engineering design standards, as discussed above. No significant impacts on the topography or soils would occur with construction under the Proposed Action.

Operational Impacts

The new facility operations would not alter the site topography or soils; therefore, no significant impacts would occur.

Mitigation Measures

No additional mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.9 HYDROLOGY

This section describes site hydrology (surface water and groundwater) for the Proposed Action. Factors considered in the evaluation of hydrology include site changes that would affect surface water and groundwater. The ROI is the Kapālama site, Pier 24–28 site, and the area's receiving waters.

3.9.1 Kapālama Site

3.9.1.1 Affected Environment

3.9.1.1.1 Surface Water

The Kapālama Basin to the south of the site and Keʻehi Lagoon to the west of the site are receiving waters closest to the Proposed Action. Honolulu Harbor is listed in EPA's 303(d) list as an impaired water body[19], but total maximum daily loads

[19] As listed under Clean Water Act Section 303(d), http://iaspub.epa.gov/waters10/attains_state.report_control?p_state=HI&p_cycle=2006&p_report_type=T.

(TMDLs) have not yet been established. A zone of mixing, which is also regulated by the State under HAR 11-54, is located adjacent to the site in Kapālama Basin. Keʻehi Lagoon is designated Class A marine water, which mean they are protected for recreational purposes and aesthetic enjoyment, and regulated by the State under *Title 11 Hawaiʻi Administrative Rules (HAR), Department of Health, Chapter 54 Water Quality Standards.*

The existing site consists of paved areas and buildings. Surface runoff generally sheet flows south toward the Kapālama Basin, or is collected by drain inlets and piped to the basin or Keʻehi Lagoon. The underground drainage system is discussed in section 3.6, Utilities.

3.9.1.1.2 Groundwater

There is no potable groundwater resource within the Kapālama site. The groundwater beneath the Kapālama site is highly brackish and unsuitable for potable use.

3.9.1.2 Environmental Consequences

Proposed Action

Construction Impacts

Project design provisions and compliance with NPDES permit requirements would control storm water runoff impacts during construction. Implementation of these BMPs to control, treat, or reduce runoff (before entering nearby surface waters via drain inlets or sheet flow) would be installed before construction begins and remain until permanent BMPs are in place. With proper installation of these BMPs, no substantial impact on surface water quality is expected. No impact would occur on groundwater resources.

Operational Impacts

Development of the new container yard would not substantially increase impervious surface areas since the area is already developed. Therefore, an increase in surface runoff is not expected. The project is also expected to meet, to the maximum extent practicable, Low Impact Development (LID) standards which will be adopted by the City in 2013. These standards set requirements for implementation of BMPs that infiltrate, treat, or propose off-site mitigation measures. Due to the close proximity to the water table and requirements for the Proposed Action, many retention and biofiltration treatment control BMPs would be infeasible. However filter media installed in trench drains and drain inlets could provide some filtration before entering the storm drain. Provided that the project will follow these standards and with implementation of BMPs and other measures required under the NPDES permit

program, it is anticipated there would be no substantial impact on surface water quality. No impact would occur on groundwater resources.

Mitigation Measures

No additional mitigation is required.

Alternative Action

Construction Impacts

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.9.2 Piers 24–28

3.9.2.1 Affected Environment

3.9.2.1.1 Surface Water

Honolulu Harbor, which is the nearest surface water body and the receiving water for the Proposed Action, is listed in the EPA's 303(d) list as an impaired water body[20], but TMDLs have not yet been established.

The existing site consists primarily of paved areas and a few buildings. The site is relatively flat. Surface runoff is collected by drain inlets and discharged into the harbor. The underground drainage system is discussed in section 3.6, Utilities.

3.9.2.1.2 Groundwater

There is no potable groundwater resource within the Pier 24–28 site. The groundwater beneath the Pier 24–28 site is highly brackish and unsuitable for potable use.

[20] As listed under Clean Water Act Section 303(d), http://iaspub.epa.gov/waters10/attains_state.report_control?p_state=HI&p_cycle=2006&p_report_type=T.

3.9.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Project design provisions and compliance with NPDES permit requirements would control storm water runoff impacts during construction. Implementation of these BMPs to control, treat, or reduce runoff (before entering nearby surface water via drain inlets or sheet flow) would be installed before construction begins and remain until permanent BMPs are in place. With proper installation of these BMPs no substantial impact on surface water quality is expected. No impact would occur on groundwater resources.

Operational Impacts

The Proposed Action would not substantially increase impervious surface area since the area is currently developed. Therefore, an increase in surface runoff is not expected. With implementation of BMPs and other measures required under the NPDES permit program, no substantial impact on surface water quality would occur. No impact to ground water resources would occur.

Mitigation Measures

No additional mitigation is required.

No Action Alternative

Construction Impacts

No construction-related impacts on hydrology are anticipated with the No Action Alternative.

Operational Impacts

No changes to hydrology are anticipated with the No Action Alternative.

Mitigation Measures

No mitigation is required for the No Action Alternative.

3.10 NATURAL HAZARDS

This section addresses tsunami, flood hazard, earthquake, hurricane, and risks associated with climate change at the Kapālama and Pier 24–28 sites as they relate to the Proposed Action. Impacts are determined by how potential hazards or risks are minimized by implementation of management measures, including but not limited to applicable construction and design standards, as well as disaster preparedness and evacuation procedures and instructions from the State Department of Civil Defense and City Department of Emergency Management. The ROI for natural hazards is Honolulu Harbor.

3.10.1 Kapālama Site

3.10.1.1 Affected Environment

3.10.1.1.1 Tsunami

A tsunami is a series of waves with great speed and long wave length generated in the ocean by earthquakes, volcanic actions, and landslides.

In port facilities, a tsunami event can flood and damage on-shore port facilities, create strong currents that may affect ships in the harbor entrances, and create large water surges that may affect moored ships and ships underway (DOT-H 1999). Historically, tsunami runup has not been a serious problem at Honolulu Harbor. Recorded tsunami runup heights on the coast between Ala Moana Park and Pearl Harbor have typically been 5 feet or less (DOT-H 1998).

Facility siting and design measures can be implemented to minimize damage due to tsunami wave action.

In 2010, the City's Department of Emergency Management issued updated tsunami inundation maps. Current scientific techniques and technology were used to update the maps issued in 1991 by the UH's Tsunami Inundation Mapping Project.

For the Kapālama site, the new maps show evacuation areas along the waterfront of Piers 41 to 45. See Figure 3-18.

3.10.1.1.2 Flood

Land areas affected by surface flooding are identified on the Federal Insurance Rate Maps (FIRMs) prepared by the Federal Emergency Management Agency (FEMA). The maps, based on flood studies, identify flood hazard areas and flood elevations. See Figure 3-19.

The majority of the Kapālama site is in Flood Zone X, which is outside of the 0.2 percent annual chance of flood. Portions of the site along the Kapālama Basin are within Flood Zone AE, which is within the 1 percent annual chance of flood and where the base flood elevations of 6 to 10 feet have been determined.

The shoreline of the UH Marine Center site from the Sand Island Access Bridge to Snug Harbor is within Zone VE (El 10). This shoreline area is within the 1 percent annual chance of flood and is susceptible to wave action. The base flood elevation for this Zone VE has been determined to be 10 feet.

Figure 3-18. Kapālama Site Tsunami Evacuation Zones

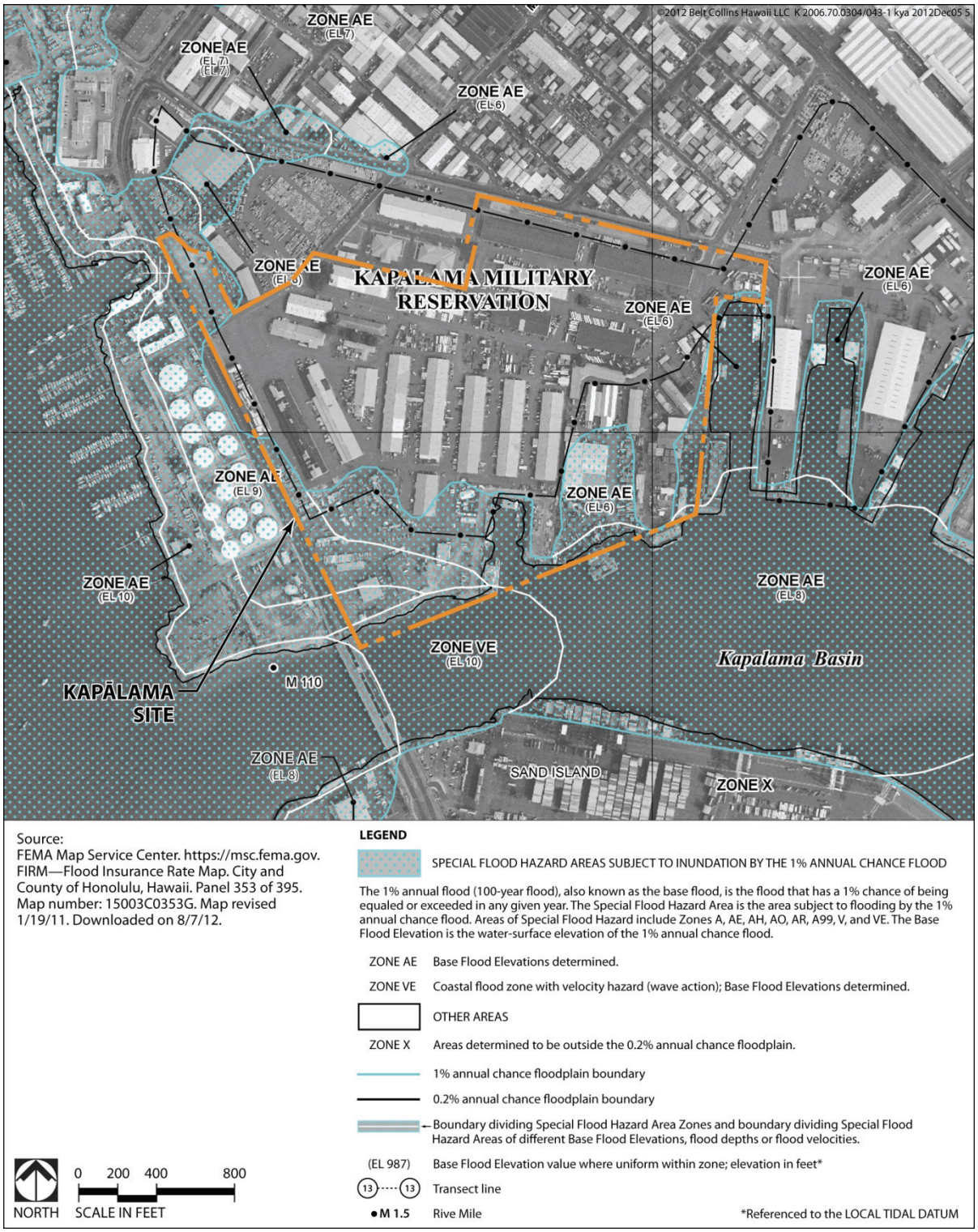


Figure 3-19. Kapālama Site Flood Maps

3.10.1.1.3 Earthquake

The Island of O'ahu is subject to earthquake activity. The most recent earthquakes occurred offshore in 2010 and 2011. In 2010, the U.S. Geological Survey (USGS) reported a 3.6-magnitude earthquake in the Kaiwi Channel east of O'ahu. The 2011 earthquake (4.0-magnitude) had an epicenter south of O'ahu. According to the USGS, the only other recent earthquakes near O'ahu occurred in 2002 (3.9-magnitude) and 1980 (4.0-magnitude), both offshore (Star-Advertiser 2010, 2011).

The IBC provides design criteria to address potential earthquake damages. Proposed facilities would be designed and constructed in accordance with site-specific geotechnical and structural engineering investigations and comply with the IBC seismic design criteria.

3.10.1.1.4 Hurricane

Hurricanes are strong tropical winds with wind speeds greater than 74 miles per hour. They often come with heavy rains and, depending on the wind speeds, can damage on-shore buildings and structures and vessels within the harbor.

The USGS identifies the storm hazard in the vicinity of Honolulu as 4 on a scale of 1 to 4, with 4 being "high" (Fletcher et al. 2002). The IBC includes design criteria to allow buildings to withstand prescribed minimum wind loads.

3.10.1.1.5 Climate Change

Global warming was addressed by the State's Ocean Resources Management Plan (ORMP) Working Group in 2009. In its report to the State Legislature, the Working Group stated: "…Some key vulnerabilities for U.S. islands due to climate change include: availability if freshwater, exposure to coastal hazards including sea level inundation, and negative impacts of climate change to coastal and marine ecosystems." (OP 2009).

For ports and harbors management, the ORMP Working Group identified risks associated with climate change. The following are relevant to the Proposed Action:

- "Submersion of harbor infrastructure due to sea level rise and flooding.
- Weakened drainage systems that remove storm water runoff from harbor facilities.
- Increased potential for the spread of diseases and other public safety issues due to flooding conditions.

- Delayed shipments, higher shipping costs, and loss of operational time due to flooding conditions at cargo terminals."[21]

DOT-H is engaged in efforts to develop adaptation strategies to address the long-term impacts of climate change. This includes collaborating with other agencies (DOT is a member of both the ORMP Policy Group and ORMP Working Group) and incorporating climate change adaptation into harbor master plans and designs.

The Oahu Metropolitan Planning Organization (OMPO) issued a study in 2011 that assessed the climate change risk for five Oʻahu transportation assets (Honolulu Harbor, Honolulu International Airport Area, Kalaeloa Area, and bridges at Waikiki. The assessment was based on five climate change variables (sea level rise, storm surge, rainfall, wind velocity, and air temperature) for three time periods (baseline definitions from 1970-2000, 2050, and 2100). The assessment also included a socioeconomic assessment based on nine variables (societal value of asset, level of use, degree of redundancy, cost to replace, economic loss, environmental impacts, cultural value, loss of life, and recovery time needed) (OMPO 2011). The study noted Honolulu Harbor's high value because 90 percent of Hawaiʻi goods are imported and 98 percent of that arrives via the commercial harbor system. See Table 3-6.

Table 3-6. Socioeconomic Importance Assessment for Honolulu Harbor

Socioeconomic Variable	Assessment
Societal Value of Asset	High
Level of Use	High
Degree of Redundancy	Low
Cost to Replace	High
Economic Loss	High
Environmental Impacts	Low-Moderate
Cultural Value	Low
Loss of Life	Low
Recovery Time Needed	High

Source: Oahu Metropolitan Planning Organization, Transportation Asset Climate Change Risk Assessment (November 2011). Page 19.

[21] Office of Planning, Department of Business, Economic Development & Tourism, Report to the Legislature In Response to Act 20 Special Session 2009 Relating to Global Warming. Attachment A, Page 17.

The climate change risk assessment for Honolulu Harbor is shown in Table 3-7. The study predicted high risk for storm surges during both time periods, 2050 and 2100.

- Sea level rise: For 2050, a predicted 1-foot sea level rise would impact the southern ocean-facing shore of Sand Island and have minimal impact on Honolulu Harbor. For 2100, a predicted 3-foot sea level rise would result in significant land loss at Sand Island and Sand Island Access Road. The area between Snug Harbor (Piers 44 and 45) and Pier 41 might also be flooded.[22]
- Storm surge: A storm surge model was used to evaluate six-areas[23] based on a Category 4 storm about 100 miles west of the harbor and a resultant sea level surge of about 3 to 10 feet at current mean sea level elevation. The most severe surge impact was predicted for the Young Brothers Piers 39/40, due to its low elevation and proximity to Nuʻuanu Stream. The study noted "…the planned Kapālama Container Terminal may be highly vulnerable to storm surge" (OMPO 2011).
- Wind: The potential risk of increased wind velocity was based on predicted impact to gantry cranes designed to withstand a 120 mph hurricane (Category 3 hurricane). In 2050 and 2100, the risk levels were low and moderate, respectively, based on a wind velocity increase up to 25 percent in 2100.
- High intensity rainfall: The study predicted rainfall in 2050 and 2100 to decrease in amount overall and frequency, but to occur as high-intensity, heavy rainfall events. The moderate risk assessment in 2100 is due to the predicted heavy rainfall coupled with the predicted higher sea level.
- Air temperature: The study predicted a small increase in temperature (1.6 degrees Fahrenheit) between 2000 and 2100. Therefore, a low risk assessment was given to air temperature change.

Table 3-7. Climate Change Risk Assessment for Honolulu Harbor

Climate Change Variable	Risk Level in Year 2050	Risk Level in Year 2100
Sea Level Rise	Low Vulnerability, Low Structural Impact	Moderate Vulnerability, Moderate Structural Impact
Storm Surge	High Vulnerability, High Structural Impact	High Vulnerability, High Structural Impact

22 The new cargo terminal is expected to be at about 8 feet, i.e., the same elevation as the existing Sand Island cargo terminals, which is above the 3-foot sea level rise predicted for the year 2100.

23 Sand Island, Young Brothers Piers 39/40, Piers 1/2 Fort Armstrong, the Sand Island Wastewater Treatment Plant, the new Kapālama Container Terminal, and the HDOT Harbors Division Offices next to Pier 12.

Table 3-7. Climate Change Risk Assessment for Honolulu Harbor

Climate Change Variable	Risk Level in Year 2050	Risk Level in Year 2100
Wind	Low Vulnerability, Low Structural Impact	Moderate Vulnerability, Moderate Structural Impact
High Intensity Rainfall	Low Vulnerability, Low Structural Impact	Moderate Vulnerability, Moderate Structural Impact
Air Temperature	Low Vulnerability, Low Structural Impact	Low Vulnerability, Low Structural Impact

Source: Source: Oahu Metropolitan Planning Organization, Transportation Asset Climate Change Risk Assessment (November 2011). Pages 21-23.

The integrated risk assessment of climate change and socioeconomic variables is shown in Table 3-8. The study assessed Honolulu Harbor as having a high risk level for both 2050 and 2100 based on the high vulnerability to storm surges for both years and to the high socioeconomic importance of Honolulu Harbor. The study also noted "In addition, HDOT Harbors Division is planning to build a 70-acre container terminal yard at the former Kapalama Military Reservation, and this new asset may be affected by both sea level and storm surge" (OMPO 2011).

Table 3-8. Integrated Risk Assessment for Honolulu Harbor

Transportation Asset	Risk Level in Year 2050	Risk Level in Year 2100
Honolulu Harbor	HIGH	HIGH

Source: Source: Oahu Metropolitan Planning Organization, Transportation Asset Climate Change Risk Assessment (November 2011). Page 24.

3.10.1.2 Environmental Consequences

Proposed Action

Construction Impacts

Significant impacts from natural hazards would be minimized under the Proposed Action. Heavy storms, tsunamis, and other natural hazards may disrupt construction work, damage buildings and equipment, and create debris and sediment runoff. Existing disaster preparedness and evacuation procedures would be implemented for personnel safety and to minimize impacts from those hazards (DOT-H March 2010).

Operational Impacts

Significant impacts from natural hazards would be minimized under the Proposed Action. Site development would be designed with respect to risks from known natural hazards and climate change to minimize impacts. Examples follow:

- For tsunami hazards, waterfront portions of the Kapālama site are within the evacuation zone. Facility siting and design measures would be implemented as needed to minimize damage due to tsunami wave action.
- For flood hazards, the 1 percent annual chance of flood area (or 100-year floodplain) is generally along the waterfront. No building would be developed in this area. Improvements would comply with applicable regulatory requirements.
- For earthquake hazards, facilities would be designed based on site geotechnical and structural engineering investigations and comply with IBC seismic design requirements.
- For hurricane hazards, buildings would be designed to comply with IBC requirements.
- Potential impacts associated with climate change are being addressed through long-range planning as described above.

The occurrence of storms, tsunami, and earthquakes may disrupt normal daily operations of the container terminal and in some cases cause damage to structures, equipment, and other facilities. Existing disaster preparedness and evacuation procedures would be implemented for personnel safety and to minimize impacts. The procedures include notifying terminal operators, tenants, and construction projects to secure pipelines, cranes, containers; hazardous material, facilities, equipment and loose materials and to evacuate all non-essential personnel prior to a disaster event (DOT-H March 2010).

Mitigation Measures

No additional mitigation measures are required.

Alternative Action

Construction Impacts

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No additional mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.10.2 Piers 24–28

3.10.2.1 Affected Environment

3.10.2.1.1 Tsunami

The USGS identifies tsunami hazards in Honolulu as 4 on a scale of 1 to 4, with 4 being "high". The entire Pier 24–28 site is within the tsunami evacuation zone (Figure 3-20).

3.10.2.1.2 Flood

The majority of the Pier 24–28 site is in Flood Zone X, which is outside of the 0.2 percent annual chance of flood. The waterfront edge of the pierheads and bulkheads are within the Flood Zone AE, which is the area within the 1 percent annual chance of flood and where the base flood elevation of 5 feet has been determined. See Figure 3-21.

3.10.2.1.3 Earthquake

See description in section 3.10.1.1.3.

3.10.2.1.4 Hurricane

See description in section 3.10.1.1.4.

3.10.2.1.5 Climate Change

The OMPO climate change study in 2011 included an analysis of climate change impacts on Honolulu. The study placed a high socioeconomic value on the harbor asset and estimated the following for the climate change variables for the years 2050 and 2100:

- Sea level rise: Low vulnerability and low structural impact in 2005. Moderate vulnerability and moderate structural impacts in 2100.
- Storm surge: High vulnerability, High structural impact in both 2050 and 2100.
- Wind: Low vulnerability and low structural impact in 2050. Moderate vulnerability and moderate structural impact in 2100.

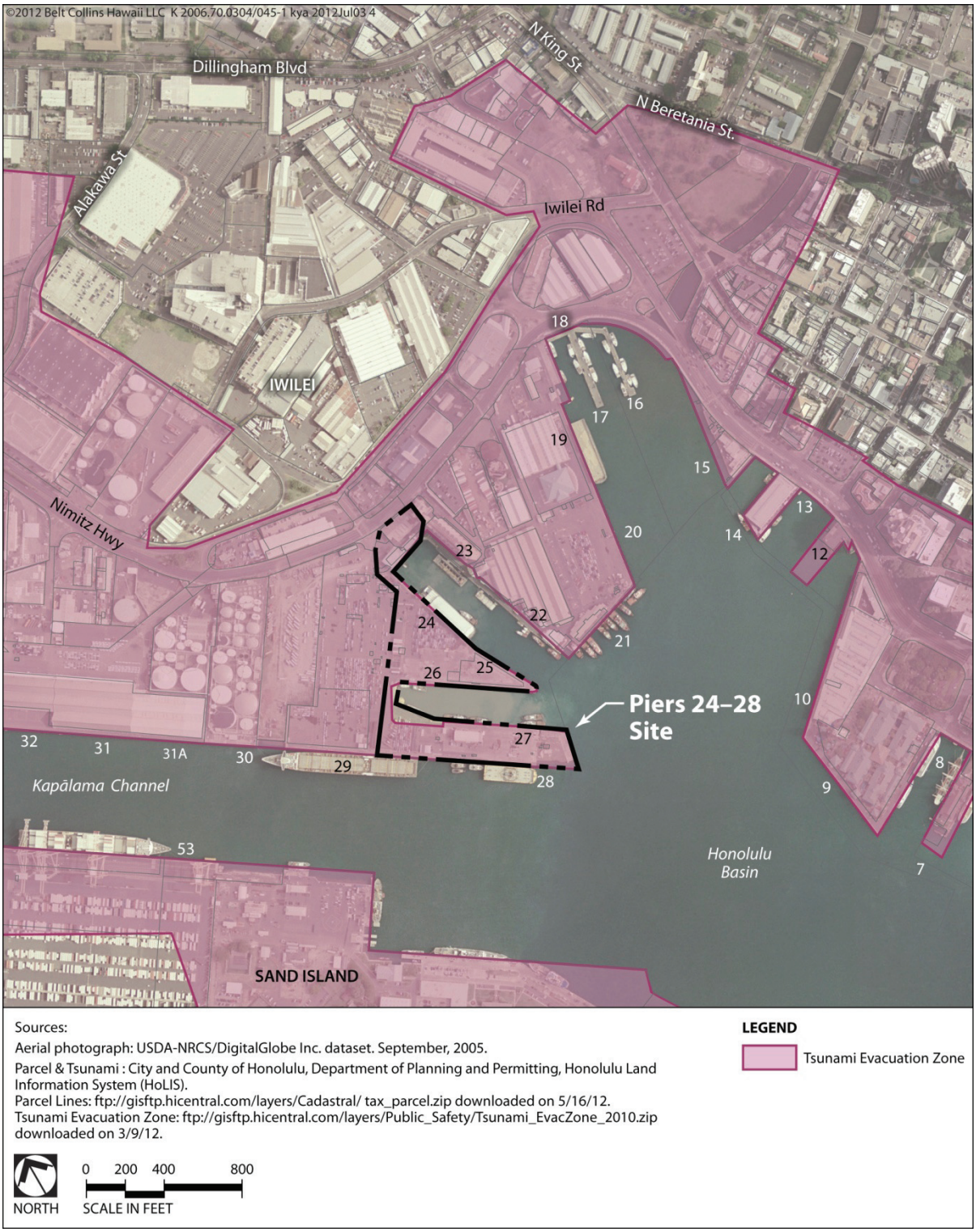


Figure 3-20. Pier 24–28 Tsunami Evacuation Zones

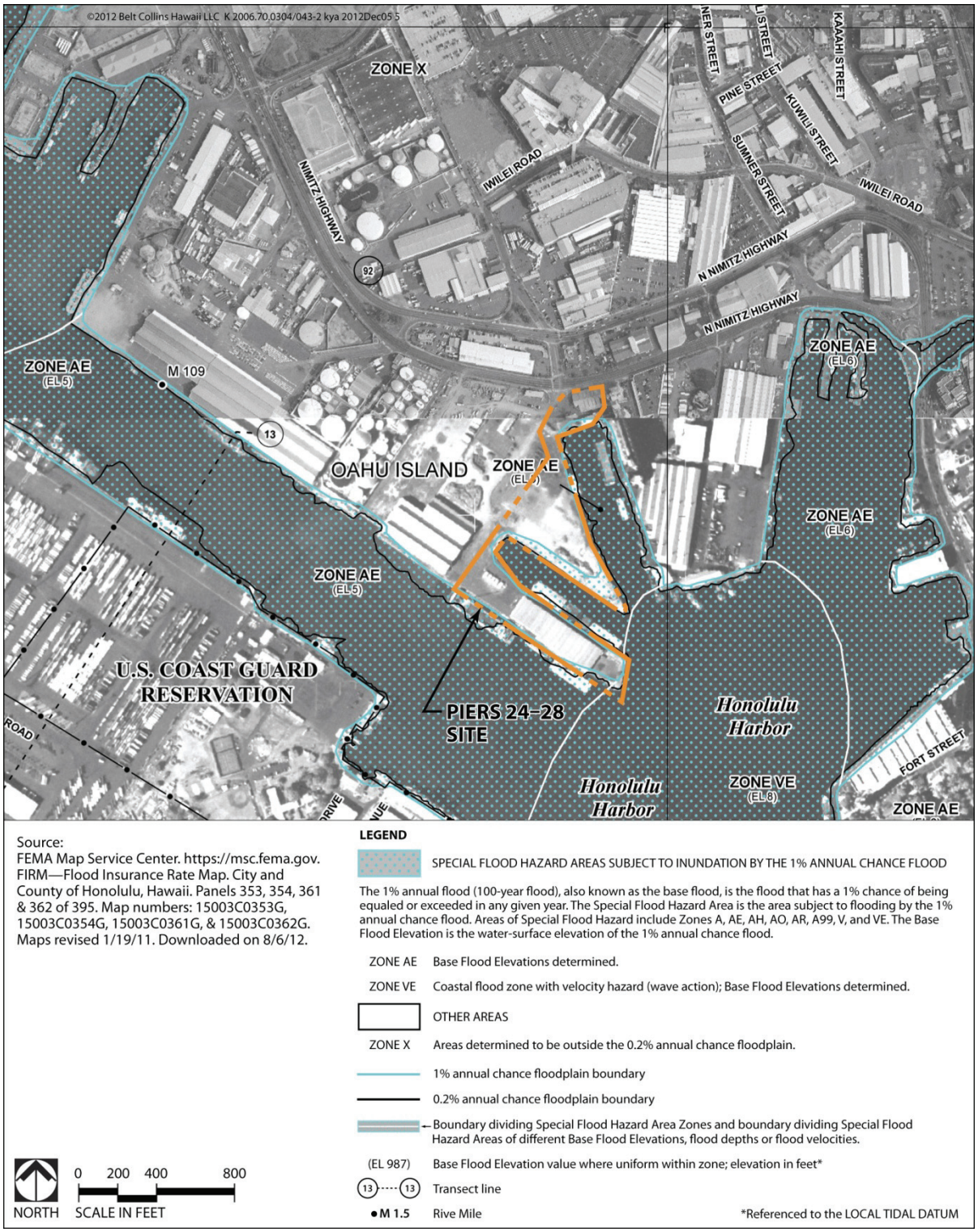


Figure 3-21. Pier 24–28 Flood Map

- High intensity rainfall: Low vulnerability, Low structural impact in 2050, and moderate vulnerability and moderate structural impact in 2050 and 2100.
- Air temperature: Low vulnerability, low structural impact in 2050. Low vulnerability, low structural impact in 2100.

The integrated risk assessment for the Honolulu Harbor was rated high in both the years 2050 and 2100 due to the island's dependence on imported goods, most of which enter through the Honolulu Harbor.

3.10.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Construction impacts at Piers 24–28 would be similar to those at the Kapālama site. Existing disaster preparedness, response, and evacuation procedures would be followed.

Operational Impacts

Operational impacts at Piers 24–28 would be similar to those at the Kapālama site. Site development would be designed with respect to risks from known natural hazards and climate change to minimize risks of impacts. Examples follow:

- For tsunami hazards, the entire Pier 24-28 site is within the evacuation zone. Facility siting and design measures can be implemented, as needed, to minimize damage due to tsunami wave action.
- For flood hazards, the 1 percent annual chance of flood area (or 100-year floodplain) is generally along the waterfront. Buildings, as currently proposed, would be outside of this zone. In addition, no change in elevations along the pier edges are anticipated.
- For earthquake hazards, buildings would be designed based on site geotechnical and structural engineering investigations and would comply with IBC seismic design requirements.
- For hurricane hazards, facilities would be designed to comply with IBC requirements.
- Potential impacts associated with climate change are being addressed through long-range planning, as described in section 3.5.1.1.5.

The occurrence of storms, tsunami, and earthquakes may disrupt normal daily operations of the container terminal and in some cases cause damage to structures, equipment, and other facilities. Existing disaster preparedness and evacuation procedures would be implemented for personnel safety and to minimize impacts. The procedures include notifying terminal operators, tenants, and construction projects to secure pipelines, cranes, containers; hazardous material, facilities, equipment and loose materials and to evacuate all non-essential personnel prior to a disaster event (DOT-H March 2010).

Mitigation Measures

No additional mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.11 CLIMATE AND AIR QUALITY

The ROI for air quality generally depends on the source and type of pollutant being evaluated. The immediate project area and the regional (state) area are considered in this evaluation.

As required by the Clean Air Act (CAA), EPA has established the National Ambient Air Quality Standards (NAAQS), 42 U.S. Code (USC) §7409, 40 Code of Federal Regulations (CFR) Part 50 for the following pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter up to 2.5 microns in diameter ($PM_{2.5}$), ozone (O_3), and lead (Pb). The CAA also established primary and secondary standards. Primary standards set limits to protect public health, and secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Most of the secondary standards are the same as the primary standards, with the addition of the 3-hour SO_2 concentration. There is currently no primary NAAQS for 3-hour SO_2. Hawai‘i has an ambient air standard for H_2S, in addition to the pollutants identified above.

Table 3-9. Air Quality Standards

Air Pollutant	Averaging Time	Standards		
		Hawai'i State Standard	Federal Primary Standard[1]	Federal Secondary Standard[2]
Carbon Monoxide (CO)	1-hour 8-hour	9 ppm 4.4 ppm	35 ppm 9 ppm	None
Lead (Pb)[4]	Calendar Quarter	1.5 μg/m^3	1.5 μg/m^3	0.15 μg/m^3
Nitrogen Dioxide (NO_2)	1-hour[5] Annual	None 0.04 ppm	100 ppb 53 ppb	None 53 ppb
Ozone (O_3)	8-hour	0.08 ppm	0.075 ppm	0.075 ppm
$PM_{2.5}$	24-hour Annual	None	35 μg/m^3 15 μg/m^3	35 μg/m^3 15 μg/m^3
PM_{10}	24-hour Annual[3]	150 μg/m^3 50 μg/m^3	150 μg/m^3 —	150 μg/m^3 —
Sulfur Dioxide (SO_2)	1-hour[6] 3-hour 24-hour Annual	None 0.5 ppm 0.14 ppm 0.03 ppm	75 ppb None 0.14 ppm 0.03 ppm	0.5 ppm
Hydrogen Sulfide	1-hour	0.025 ppm	None	None

Notes:

1 Primary Standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children and the elderly

2 Secondary Standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

3 Due to lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM10 standard effective December 17, 2006. However, the State still has an annual standard.

4 Due to almost non-detectable levels, ambient air monitoring for lead was discontinued in October 1997 with EPA approval. However, since 2003 lead continues to be measured as part of the Air Toxics monitoring program.

5 Effective January 22, 2010.

6 Effective June 2, 2010.

ppm = parts per million by volume, μg/m^3 = micrograms per cubic meter of air

Source: Department of Health, State of Hawai'i. September 2011. *State of Hawaii Annual Summary 2010 Air Quality Data.* State standards HAR §11-59; Federal standards 40 CFR Part 50.

The state is in attainment of the NAAQs and also meets the State AAQS. Exceptions include exceedances of the NAAQS for SO_2 because of natural events—Kilauea volcano—and exceptional events—New Year's Eve fireworks. As the entire state in attainment of the NAAQS, emissions from the Proposed Action are not subject to the

General Conformity Regulations, 40 CFR Parts 51 and 93, pursuant to section 176(c) of the CAA (FR 2010).

The issues of climate change and greenhouse gases (GHGs) are global considerations that are addressed in Chapter 6, Cumulative Impacts.

3.11.1 Kapālama Site

3.11.1.1 Affected Environment

Weather observations recorded at Honolulu International Airport, located one mile west of the Kapālama site, have been used to characterize climatological conditions in the Honolulu Harbor area.

TEMPERATURE. From 1997 to 2010, the average annual temperature at Honolulu International Airport was of 78° F (DBEDT 2010). The extreme temperatures were from 53° (1998) to a high of 94°.

TRADE WINDS. The Hawaiian Islands wind conditions are heavily influenced by its location in the Pacific Ocean. A high-pressure system known as the North Pacific High or Anticyclone is located northeast of Hawai'i. Winds spiral out of this system in a clockwise direction. This constitutes the trade winds that blow over the islands from a northeastern direction. These trade winds consistently blow over 80 percent during the summer (May through September) and 50 to 80 percent during the winter (October through April). Because of Hawai'i's location, persistent trade winds, and low concentration of industrial pollutants, Hawai'i air quality meets or exceeds standards.

MOBILE AND STATIONARY AIR EMISSIONS. Sources of mobile emissions for Honolulu Harbor include: vessels, vehicles, material handling equipment such as forklifts, and generators. There are two power plants nearby, the Honolulu Power Plant and the Emergency Power Facility[24] located at HIA. Sources of natural emissions include the ocean, wind-blown dust, and SO_2 from volcanoes on the island of Hawai'i.

AIR QUALITY. DOH maintains two monitoring stations in the area. The closest is at 1039 Sand Island Access Parkway near the Sand Island State Recreation Area. This station monitors for $PM_{2.5}$ and O_3 from vehicle traffic. A second air monitoring station is located two miles away at 1250 Punchbowl Street, on the roof of DOH's office building. This station monitors for SO_2, CO_2, PM_{10}, PM_2. Based on air quality data from these stations, all federal and state standards are being met.

[24] The Emergency Power Facility will be a 10 MW power plant fueled with biodiesel.

3.11.1.2 Environmental Consequences

Proposed Action

Construction Impacts

Construction-related air emissions would not be significant because they would be short term and controlled through implementation of required controls. Air emissions from construction would consist primarily of fugitive dust and diesel-powered equipment and vehicles. As required by HAR 11-60.1-33, fugitive dust would be controlled during demolition, earthmoving, and truck transport. As applicable, permits under HAR 11-60.1 would be obtained by the operator of the regulated stationary source equipment used for construction, e.g., portable diesel generators.

Operational Impacts

Operational air emissions would be generated from container trucks and other vehicles, diesel-powered equipment and generators, and arriving/departing vessels. With the Proposed Action, the new container terminal would be designed so that vessels moored at berth would be powered by shore-based electricity rather than vessel-based fossil-fuel burning generators. Other operations that would serve to reduce or minimize air emissions, relative to the No Action Alternative, would include the use of low-sulfur fuel, use of electric powered gantry cranes (rather than traditional diesel-powered engines that typically sit high atop the crane), and use of electric-powered vehicles and equipment where possible. As applicable, permits under HAR 11-60.1 would be obtained by the operator of the regulated stationary source equipment. Such permits and their requirements serve to meet Ambient Air Quality Standards (AAQS).

Use of shore-based electrical power will reduce localized air emissions and impacts to air quality in the localized project area. Indirect emissions from island-wide grid generators, e.g, Kahe generating station, used to provide electrical power to the project site would be controlled as specified with its stationary source operating permit and would not significantly impact air quality in the area of the generating station.

With the anticipated reduction in fossil-fuel emissions that would occur with this modernized container terminal, any associated odors with combustion would also be reduced.

Mitigation Measures

No additional mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No additional mitigation is required.

No Action Alternative

Under the No Action Alternative, the Kapālama container terminal would not be developed and existing wharves and terminals would need to accommodate the increase in overseas container cargo. As existing equipment and technology would be used within existing limited container terminal areas, air emissions and GHGs would increase. While increases would occur, regulated emissions would not significantly impact air quality because the permitting process prevents such impacts from occurring, and GHGs would not have an appreciable impact on climate change relative to global GHG (as referenced in Chapter 6, Cumulative Impacts).

3.11.2 Piers 24-28

3.11.2.1 Affected Environment

The affected environment at Piers 24–28 is characterized in section 3.11.1.1.

3.11.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Construction-related air emissions would not be significant because they would be short term and controlled through implementation of required controls. Air emissions from construction would consist primarily of fugitive dust and diesel-powered equipment and vehicles. As required by HAR 11-60.1-33, fugitive dust would be controlled during demolition, earthmoving, and truck transport. As applicable, permits under HAR 11-60.1 would be obtained by the operator of the regulated stationary source equipment used for construction, e.g., portable diesel generators.

Operational Impacts

Operational air emissions would be generated from vehicles, any diesel-powered equipment and generators, and arriving/departing vessels. As applicable, permits under HAR 11-60.1 would be obtained by the operator of the regulated stationary source equipment. Such permits and their requirements serve to meet AAQS.

Mitigation Measures

No additional mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be the same as the Proposed Action. No additional mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.12 NOISE ENVIRONMENT

Noise Measurement

Noise impacts are dependent on (1) sound pressure measured in decibels (dB) and usually based on an A-weighted scale (dBA), which simulates the range of sound that is audible by the human ear; (2) the distance to the receptor; (3) the medium present between the source and the receptor; and (4) the period of exposure. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB at 3 feet. A jackhammer has a sound level of approximately 100 dB at 33 feet. Sound levels between 120 dB and 140 dB can be felt as pain. The minimum change in the sound level that an average human ear can detect is about 3 dB. On average, a person perceives a doubling (or halving) of the sound's loudness when there is a 10 dB change in sound level. Energy produced by these sound pressures averaged over a defined period of time is the equivalent sound level (Leq).

The day-night sound level (DNL) is another average commonly used to characterize background environmental noise and for relating the acceptability of the noise environment for various land uses. DNL represents the 24-hour averaged sound level with nighttime sound levels (10PM to 7AM) increased by 10 dB prior to computing the 24-hour average. DNL values in urbanized areas typically range between 50 and 75 DNL. In comparison, the typical range of intermittent noise events may have maximum sound level meter readings between 75 and 105 dBA (see Appendix D).

Federal agencies generally consider a level of 65 dBA DNL or lower acceptable for exterior residential noise. These agencies include the Federal Aviation Administration (FAA), Department of Defense (DoD), Federal Housing Administration, Housing and Urban Development (FHA/HUD), and Veterans Affairs (VA).

Permissible Sound Levels

DOH, in HAR 11-46, defines maximum permissible sound levels and provides for protection, control, and abatement of noise pollution from stationary noise sources and agricultural, construction, and industrial equipment. These levels are shown in Table 3-10 and are not to be exceeded more than 10 percent of the time in a 20-minute period without a permit or variance. Maximum permissible sound levels

apply to excessive noise sources emanating within the specified zoning district and at any point at or beyond (past) the property line of the premises in a manner deemed appropriate by the Director of DOH.

Honolulu Harbor is zoned industrial, Class C, which includes all areas equivalent to lands zoned agriculture, country, industrial, or similar type. As shown in Table 3-10, the maximum permissible sound level for Class C is 70 dBA for both daytime hours (7AM to 10PM) and nighttime hours (10PM to 7AM). Maximum impulsive noises are 80 dBA for day and night.

Table 3-10. Maximum Permissible Sound Levels

Zoning District	Daytime (7AM to 10PM)		Nighttime (10PM to 7AM)	
	Stationary Noise	Impulsive Noise	Stationary Noise	Impulsive Noise
Class A	55 dBA	65 dBA	45 dBA	55 dBA
Class B	60 dBA	70 dBA	50 dBA	60 dBA
Class C	70 dBA	80 dBA	70 dBA	80 dBA

Stationary noise: Any mechanical source of noise fixed in or on a station, course, or mode within any premises including but not limited to mechanical air conditioning units, exhaust systems, generators, compressors, pumps, or other similar equipment.

Impulsive noise: Any sound with a rapid rise and decay of sound pressure level, lasting less than one second, caused by sudden contact between two or more surfaces, or caused by a sudden release of pressure, including but not limited to any hammering, pile driving, and explosion.

Source: HAR 11-46 Community Noise Control.

Noise computer modeling and predictive studies were conducted to evaluate the potential noise impacts in the ROI of the project area—the surrounding neighborhoods of three areas: the new Kapālama container yard, the future PSI facility at Piers 24 and 25, and the future HFM operations at Pier 20. Potential noise from the Proposed Action was modeled or evaluated to determine whether noise impacts may be significant (exceed State maximum permissible sound levels). Possible mitigation is identified for nearby populations most susceptible to noise, e.g., residences and schools or where noise has been identified as an issue in scoping and consultations and is anticipated to be a concern. Noise studies are presented in Appendix D, and the findings are summarized herein.

3.12.1 Kapālama Site

3.12.1.1 Affected Environment

The Kapālama site includes a variety of industrial and commercial users whose activities generate noise. Waterfront activities include shipyard repair, and berthing and maintenance of ocean research and recreational vessels. Approximately 80 to 90 tenants operate primarily commercial or light industrial activities within the structures on the site. In the adjacent areas, industrial harbor users are located to the east, mixed-use residences and industrial users are to the north (in Kalihi Kai) and northwest, small boat harbors and fuel storage tanks are to the west, and industrial harbor users are across the Kalihi Channel to the south. Other sources contributing to ambient or background noise include aircraft bound to or from Honolulu International Airport; street traffic along Auiki Street, Sand Island Access Road; and harbor activities.

The nearest residences are located across Auiki Street, which is adjacent to and north of the Kapālama site. The nearest school is Puʻuhale Elementary School, approximately 2,000 feet (more than 1/3-mile) to the north, just past Nimitz Highway.

3.12.1.2 Environmental Consequences

Proposed Action

Construction Impacts

Temporary construction noise would be unavoidable. With mitigation measures identified in the DOH noise permit or variance, as applicable, impacts would be minimized.

The noisiest construction activities are anticipated with site preparation and include the use of excavators, pavers, graders, dump trucks, jackhammers, concrete mixers, sheet pile hammering, and pile driving. Offshore construction noises would be generated by dredging activities and vessels supporting pier construction. During construction, estimated to take place from 2014 to 2016, noise levels may temporarily exceed DOH maximum permissible levels, requiring a permit or variance from DOH.

Noise impacts from construction activities would also propagate through the water, primarily from sheet and pile driving. See section 4.2, Marine Environment, for information on potential impacts of underwater noise on protected animal species.

Operational Impacts

Operational noise from the proposed container terminal and its operating equipment is expected to be within the State's maximum permissible sound levels and would not be significant. However, impulsive type noise would be audible and could be the source of complaints. For this reason, possible mitigation measures have been identified for impulsive noises, as described below.

Container terminal activities would operate at various times and levels, 24 hours a day, seven days a week. Noise generating activities would include vehicle movements, vehicle safety devices (such as horns and the "beep" sound emitted when backing up), heavy equipment operations, power generators/engines, ship loading and unloading, cranes, forklifts, other gantry equipment, and other mechanical equipment such as generators and ship and tugboat engines. Impulsive type noises would include containers striking other containers or the pavement, and banging noise from forklifts and other equipment hitting containers. Banging noises are expected to generate the loudest noises, and avoidance would be the only means to mitigate this effect.

The nearest residential community, Kalihi Kai, is adjacent to and north of the Kapālama site. Three locations in the community were modeled and the nearest one, Location G (a second-story residence on Auiki Street, which fronts the Kapālama site), is discussed herein. See Figure 3 of Appendix D. At this location, State maximum permissible sound levels are expected to be met with the Proposed Action. Model results indicate they would be within 70 dBA for steady state noise and 80 dBA for impulsive type noise. [25]

Model results indicate that most impulsive noises would occur in a range between 47 and 62 dBA at Location G. Impulsive noises include beeper noise (backup alarms), in a range between 47 and 59 dBA, and banging noise, in a range between 61 and 74 dBA. Based on these model results and measured background noise levels (nighttime), noise from proposed nighttime container handling operations are likely to be audible unless such operations are limited to less than 50 dBA at Auiki Street. The high frequency beeper type backup alarms would need to be less than 35 dBA to be inaudible.

The nearest school is Puʻuhale Elementary School, approximately 2,000 feet (more than 1/3-mile) to the north (just past Nimitz Highway). Any noise heard at this

[25] Steady state noise is estimated to be less than 65 dBA (Figure 20 of Appendix D) with the use of diesel engines used to power the cranes situated at a height of 208 feet above ground level. However, the Proposed Action proposes the use of electrical engines rather than diesel engines, thus eliminating this steady state source of noise.

location is expected to be faint and would not be at levels to be noticed or to cause disruptions.

Mitigation Measures

HAR 11-46 provides controls for limiting noise during construction activities. These rules restrict construction noise during the hours before 7AM and after 6PM Monday through Friday, 9AM to 6PM on Saturday, and Sundays and holidays. In addition to time limitation, other typical mitigation measures include noise mufflers on gas powered equipment and night work restrictions to include activities with less noise.

Mitigation measures for pile driving could include limiting the number of piles installed per day, and the use of air/bubble curtains or other available sound attenuating technologies to dampen the sounds from pile driving in the water. Any mitigation will be identified through consultations with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) as such consultations are required to obtain necessary permits and approvals from the U.S. Army Corps of Engineers (USACE) and EPA for dredging and work in water. This is discussed in section 4.2, Marine Environment.

DOT-H and its contractors would work with the community to identify appropriate mitigation measures for any noise permit or variance and/or provide notification of work schedules to communicate periods of noisier activity.

Measures to minimize impulsive type noise could include the following:

- Construct sound attenuation barriers/wall. Using the Highway Noise Policy and Abatement Guidelines (DOT Highways Division, April 25, 2011, with corrections dated November 29, 2011) for roadway vehicle noise sources (steady state noise), which is not directly applicable to the vehicular noise sources from the Proposed Action, a 7 dBA reduction goal is considered. Based on model results, a continuous wall along Auiki Street with a height of 25 feet would be needed to achieve the 7 dBA reduction. Using DOT Highways Division's noise policy guidelines for feasibility and reasonableness, the 25-foot high wall should not cost more than $60,000 per benefitted resident. Because the total number of benefitted residences is estimated at 35, the cost of the wall should not exceed $2,100,000 to be considered under the DOT Highways Division policy.

  With the wall, banging noise is estimated to range between 54 and 68 dBA (compared to about 61 to 74 dBA without the wall). Other impulsive noise would range between 40 and 55 dBA (compared to about 47 to 62 dBA without the wall).

- Site noisier activities farther away from the residential community. Avoid use of the north section of the site closest to the existing residences for overnight stacking of empty and full containers that are moved to/from cargo vessels. Use the north section of the site for daytime loading (pick-up) and unloading (deliveries) by off-site tractor trailers.
- Use the quietest equipment available that also meets operational needs.
- Use broadband noise backup alarms rather than commonly used high-frequency beeper type backup alarms. The broadband noise alarm emits the same sound in dBA as the high frequency alarm. However, because it is more difficult for the human ear and brain to detect a broadband noise than it is to detect a coherent and unique high-frequency noise, the audible range may be reduced by a factor of three. The broadband alarm should also include automatic controls that adjust the sound level based on background sound levels.
- Include sound attenuation treatments to all fixed machinery so that steady state noise levels do not exceed 50 dBA at the nearest residence.

Should noise be a concern for residents after the operations begin, sound level measurements can be conducted to determine whether levels exceed the Federal Housing Administration (FHA)/Housing and Urban Development (HUD) noise standard of 65 DNL for residences. If noise exceeds this level, mitigation could include sound attenuation treatment in the form of closure and air conditioning for the affected residence(s).

Alternative Action

Impacts and mitigation measures would be similar to the Proposed Action. Pile driving could be of longer duration under the Alternative Action, as additional piles would be needed to create the deck over Snug Harbor.

No Action Alternative

Under the No Action Alternative, a new container yard and pier would not be constructed. Noise levels would increase with the increase in truck trips between Sand Island and the inter-island vessel operators on the mainside of Honolulu Harbor, as the number of containers handled would continue to increase.

3.12.2 Piers 24–28

3.12.2.1 Affected Environment

Piers 24–28 (Figure 1-1) are located near the intersection of Nimitz Highway and Pacific Street. This area includes waterfront activities such as vessel berthing and office/administrative uses. The area is surrounded by waterfront industrial uses to the east and west, industrial mixed use activities to the north (in Iwilei), and the harbor to the south. The adjacent Nimitz Highway to the north is the predominant source of noise in the vicinity. Based on 2010 counts, an estimated 4,500 to 6,500 vehicles use this stretch of road per hour (peak hour).

The nearest residences to the Pier 24–28 site are located approximately 1,800 feet to the east in Chinatown and Downtown Honolulu (at River Street). No schools are in the vicinity.

3.12.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Temporary construction noise is not anticipated to be significant in the surrounding industrial areas where the predominant source of noise would be from vehicles on Nimitz Highway. Construction is expected to occur from 2014 to 2015 or 2016. At the nearest residences, approximately 1,800 feet to the east, noise levels from construction are estimated to range between 44 dBA and 56 dBA.

Operational Impacts

Operational noise at Piers 24-28 from the proposed shipyard and associated vehicles on Nimitz Highway is expected to be within the State's maximum permissible sound levels and would not be significant. Because certain types of shipyard operations could generate complaints from residences in Downtown Honolulu during the nighttime and early morning periods, possible mitigation measures have been identified.

For the purpose of this noise evaluation, shipyard activities were presumed to operate at various levels 24 hours a day. Noise generating activities include needle gun operations, chipping and hammering on a floating dry dock, indoor sandblasting, outdoor dust collectors, and water blasting.

The nearest residences to the Pier 24–28 site are located approximately 1,800 feet to the east in Chinatown and Downtown Honolulu (at River Street). Noise from the Proposed Action is not expected to exceed the State's maximum permissible sound level of 70 dBA (daytime and nighttime). However, noise complaints could result at

night because nighttime background noise levels may be lower than Proposed Action noise levels.[26] For these reasons, mitigation has been identified.

The additional 100 vehicle trips per hour associated with the Proposed Action are estimated to increase baseline (future No Action) project noise by less than 0.1 dBA. Such a change would be very difficult to detect or measure.

Mitigation Measures

No mitigation is required. Possible mitigation has been identified to prevent nighttime complaints from residents approximately 1,800 feet away. Mitigation would involve conducting sound level measurements (at the nearest residence during the quietest periods of the nighttime and/or early morning hours when shipyard work is anticipated to occur) to determine whether background levels are 50 dBA or less. If less, the total noise level associated with nighttime shipyard work could be attenuated so as not to exceed 50 dBA at the nearest residence. If measured background levels are greater than 50 dBA, nighttime shipyard noise levels could operate so as not to exceed the measured minimum background level.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.12.3 Hawaiian Flour Mill

3.12.3.1 Affected Environment

HFM currently uses Piers 22 and 23 to berth grain ships, unload the grain, and transport the grain via conveyor to its silos at Pier 23. These operations occur at four to five month intervals (approximately two or three times a year). Unloading operations occur continuously until the grain ship is completely unloaded. Future ship-unloading operations are expected to occur at Pier 20.

The nearest residences are located in the Harbor Village Apartments, approximately 1,000 feet northeast of Pier 20 in Downtown Honolulu. No schools are in the vicinity.

[26] Minimum background noise levels at the residences are estimated to range from 48 to 51 dBA. Proposed Action noise levels are estimated to range from 46.0 to 53.5 dBA.

3.12.3.2 Environmental Consequences

Proposed Action

Construction Impacts

No construction activities and therefore noise would occur.

Operational Impacts

Operational noise from the proposed grain ship unloading operations at Pier 20 is expected to be within the State's maximum permissible sound levels and would not be significant. Because certain types of operations could cause complaints from residents in Downtown Honolulu, possible mitigation measures have been identified.

Under the Proposed Action, HFM would use Pier 20 for grain unloading operations. It is anticipated HFM would use trucks to transport the grain to the silos. These operations would occur over several 24-hour periods. Noise-generating activities would include truck traffic, crane operations transferring grain from ship to truck, and a small front end loader used to transfer grain to the conveyor system. Predicted noise levels during grain unloading and transporting operations are not expected to exceed the maximum permissible level of 70 dBA for noise emanating from Class C, industrial zoned areas.

The nearest residences are located in the Harbor Village Apartments, approximately 1,000 feet northeast of Pier 20 in Downtown Honolulu. Predicted noise levels at these residences during grain unloading and transporting operations would range from 37 to 66 dBA. Using a minimum background ambient noise level of 50 dBA, these Proposed Action noise levels could be audible during the nighttime period (see Appendix D).

Mitigation Measures

No mitigation is required. However, certain activities are anticipated to be audible at the nearest residences during nighttime operations. To minimize risk of complaints, the following have been identified:

- If horns are audible during the quietest nighttime period at the nearest residence, use lights or radio frequency devices.
- If beeper type backup alarms are audible during the quietest nighttime period at the nearest residence, use broadband noise backup alarms rather than commonly used high-frequency beeper type backup alarms. The broadband noise alarms emits the same sound in dBA as the high frequency alarm, but because it is more difficult for the human ear and brain to detect a broadband noise than it is to detect a coherent and unique high-frequency noise, the audible range may be reduced by a factor of three. The broadband alarm should also

include automatic controls that adjust the sound level based on background sound levels.

- Minimize engine speed to the lowest rpm possible for tractor trailer trucks, and attempt to not exceed a noise level of 80 dBA at 50 feet during the nighttime hours.
- Outfit the grain hoppers used on the pier or on the trucks with resilient bumpers to minimize noise during contact between the hopper and the clamshell bucket.

If noise complaints occur as a result of nighttime grain unloading operations at Pier 20, and HFM is not able to reduce noise to acceptable levels of approximately 50 dBA at the complainant (see description of mitigation for Piers 24 and 25), restrictions in the hours of the nighttime grain unloading operations may need to be considered.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.13 VISUAL RESOURCES

This section describes existing views and visual resources in the project vicinity and evaluates potential visual impacts of the proposed development at the Kapālama site and at Piers 24-28. The potential for visual impact is determined by the presence of important views from certain points that would be changed by the container terminal and shipyard development. These includes views from the shoreline (for example, from public beach parks) looking toward the ocean, along the shoreline, and toward the mountains, as well as views from upper valley and mountain areas. Views from the mountains may be from scenic lookouts. Views from public roadways are also considered when analyzing visual impacts.

The ROI for visual impacts includes adjacent public roadways, nearby public parks, areas surrounding Honolulu Harbor, and upland areas from which the Kapālama and Pier 24-28 sites are visible. Areas within Honolulu Harbor are not considered part of the ROI. The two sites are located in a working harbor, and it is not necessary to evaluate views of harbor facilities such as buildings and equipment from other parts of the harbor.

3.13.1 Kapālama Site

3.13.1.1 Affected Environment

The proposed container terminal is located in the midst of an industrial area. Views of the Kapālama site from adjacent roadways (Auiki Street, Sand Island Access Road) are characterized by large warehouse-type buildings, electrical power poles and lines, containers, and vehicles. There are no important views on the site itself.

The Kapālama site is visible from the Sand Island container terminal across the channel, but views of the Kapālama site from the public roadway on Sand Island are generally blocked by buildings, containers, and other facilities.

The Kapālama site is not visible from Sand Island State Recreation Area. Buildings and trees located north of the park almost completely block views toward the existing container terminal. One of the Matson cranes is briefly visible at one point as one drives through the park. Part of Sand Island State Recreation Area, located near the park entrance, looks across the harbor toward downtown Honolulu. The Kapālama site is not visible to park users at this location. From this point, there are distant views of Iwilei (for example, the flour mill silos on Nimitz Highway). The Kapālama site is located too far to the west to be visible.

Like the rest of Honolulu Harbor, the Kapālama site is visible from certain upland areas. However, viewers may not be able to differentiate particular facilities in the harbor, with the exception of the large cargo-handling (gantry) cranes on Sand Island.

3.13.1.2 Environmental Consequences

Proposed Action

Construction Impacts

Any visual impacts to neighboring or upland areas during construction would be temporary and, therefore, not significant.

Operational Impacts

With the proposed development, views of the Kapālama site would change. Existing buildings, which are currently the most dominant features, would be demolished. The site's appearance would be characterized by a paved yard, containers, large cargo-handling cranes at the waterfront, and administration buildings. At night, the container yard would be illuminated with lighting. Facilities most visible from outside the property boundaries would include the cranes and lighting. These changes in appearance would be most apparent from Auiki Street and Sand Island Access Road. Visibility of the gantry cranes to the businesses and residences on Auiki

Street would be minimized by their waterfront location. The appearance of these cranes from other areas would be similar to the appearance of the existing Sand Island terminal cranes. Two issues are discussed below: potential visual impacts on Sand Island State Recreation Area, and potential impacts of site/area lighting at night on both neighboring and upland areas.

SAND ISLAND STATE RECREATION AREA. As described above, users at Sand Island State Recreation Area have a limited view of areas located north and northwest of the park, except from the area near the park entrance. The beach and campsites are oriented toward the ocean, looking south and southeast. Since the large cranes at the Sand Island terminals are barely visible from the park, cranes at the Kapālama site would similarly not represent a significant change in views from the park.

SITE AND AREA LIGHTING. Proper illumination is required in the container yard during evening operations. Lighting would be visible from nearby and upland areas. However, the use of high mast lighting would minimize the amount of light cast beyond the property boundaries. Furthermore, light fixtures would be shielded to direct light downward.

Mitigation Measures

No mitigation is required to preserve views from Sand Island State Recreation Area.

The following measures may be considered during design of the area lighting system to minimize visual impacts:

1. Locate high-mast lighting poles as far from the Auiki Street boundary as practicable. For perimeter lighting, consider aiming floodlights toward the center of the container yard. In addition to the site layout, consider alternatives with and without internal louvers. If required, internal louvers could serve to block views of light sources from neighboring properties.

2. If Maritime Security (MARSEC) regulations require a setback of the container yard from publicly accessible roadways, this perimeter could be used as an additional buffer between the illuminated area and adjacent roadways.

3. Where feasible, locate buildings along the Auiki Street perimeter to block some of the area light from the Kalihi Kai neighborhood.

4. Depending upon the height of the planned perimeter fencing, install slats in the fence mesh or shade cloth attached to the fence.

5. Limit the area where night operations are required to the center of the container yard or closer to the Sand Island Access Road boundary.

6. Minimize light spillage from the container inspection facility with roofing, half-height walls, or similar provisions.

7. Establish operational hours to limit the amount of area lighting required during the late evening and earlier morning hours.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

3.13.2 Piers 24–28

3.13.2.1 Affected Environment

Piers 24–28 are located in the midst of an industrial area. Views from the adjacent roadway (Nimitz Highway) and from buildings located across the roadway are characterized by harbor facilities. There are no important views on the site itself.

Piers 24–28 and their environs are visible from a portion of Sand Island State Recreation Area located near the park entrance. From this vantage point, a park user looks across the harbor toward downtown Honolulu and has distant views of Iwilei (for example, the flour mill silos on Nimitz Highway).

Like the rest of Honolulu Harbor, Piers 24–28 are visible from certain upland areas, but specific facilities may not be discernable given distance and development density.

3.13.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Visual impacts to neighboring or upland areas during construction would be temporary and, therefore, not significant.

Operational Impacts

Improvements at Piers 24-28 would not include any facility with a high profile. The change in appearance of the site from outside the boundaries would be minimal, consistent with other industrial activities in Honolulu Harbor. As with the Kapālama

site, illumination would be required during night operations. Downward-projecting lighting fixture would minimize impacts of stray light on residences located across Nimitz Highway or upland areas. When night operations are not required, area lighting would be curtailed.

Mitigation Measures

Some of the mitigation measures listed above for the Kapālama site may be considered to further minimize impacts of night lighting.

No Action Alternative

No impact.

Affected Environment and Potential Consequences: Biological, Cultural, and Socioeconomic Environment

4

CHAPTER 4
AFFECTED ENVIRONMENT AND POTENTIAL CONSEQUENCES: BIOLOGICAL, CULTURAL, AND SOCIOECONOMIC ENVIRONMENT

4.1 INTRODUCTION

The following resources/issues are analyzed in this chapter:

- Marine Environment
- Terrestrial Flora and Fauna
- Cultural Resources
- Socioeconomics

4.2 MARINE ENVIRONMENT

This section describes the in-water environment fronting the Kapālama site, where pier improvements and dredging are proposed, and the in-water environment fronting Piers 24–28, where relocation of Pacific Shipyards International (PSI) and Atlantis Submarines operations is proposed.

Water depths in the immediate vicinity of the Kapālama site range from approximately 13 feet below mean lower low water (MLLW) at the waterfront edge to approximately 43 feet below MLLW at the middle of the channel. Water depths within Snug Harbor are in the range of 25 to 31 feet below MLLW. At the waterfront edges of Piers 24–28, depths range from approximately 23 to 38 feet below MLLW (USACE HD 2011).

Waters within Honolulu Harbor are protected from the south swell and Kona storm waves by Sand Island. The harbor is not exposed to prevailing northeast tradewind waves and the winter North Pacific swell. Although tidal influences (mean tide range is 1.2 feet) and ship wakes occur within the harbor, conditions are typically calm

except during local storms or hurricanes (DOT-H Jun 1998). Honolulu Harbor receives surface runoff via sheet flow and drainage outlets and from Kapālama and Nuʻuanu Streams.

Water quality in Honolulu Harbor is categorized by the DOH as "impaired." A water body is considered impaired if (a) water quality does not meet established water quality standards, or (b) the designated use described in Chapter 11-54, Hawaiʻi Administrative Rules (HAR) is not being achieved. Water in Honolulu Harbor is impaired for turbidity, total nitrogen, and chlorophyll α during the dry season based on data from two sampling stations on nearby Sand Island (HM 2007 Appendix E). The June/July 2012 study referenced above reported that water clarity throughout most of the survey area was limited to two to four meters, with high concentrations of suspended particular material throughout the water column.

Past surveys have reported several areas within Honolulu Harbor supporting some growth of stony corals. Corals were reported growing around the intake and discharge basins of the Honolulu Generating Station at Piers 6 to 8, in the harbor entrance off the Sand Island shore across from Fort Armstrong, between Piers 12 and 15 (up to 25 percent cover on the sloping bottom of Pier 12), and on pilings around Pier 1 (up to a maximum of 10 to 15 percent coral cover). The mouth of Kapālama Stream has been characterized as "barren" in comparison with a number of other sites surveyed in the harbor (DBEDT 1994).

As in-water work (dredging and filling) would occur at the Kapālama site, both quantitative and qualitative assessments were carried out for this site. With no dredging or other in-water work proposed at Piers 24–28, except for the placement of spuds to support a drydock, quantitative and qualitative investigations were conducted for the shoreline fronting Pier 24 (proposed location of the drydock) and a qualitative investigation was done for Piers 25–28. Marine environmental surveys of the Kapālama site and Pier 24-28 site were conducted in June and July of 2012 to document the existing marine biotic community structure, and a follow-up survey was carried out in November 2012 at Piers 41 and 42, which had not been included in the original surveys (see Appendix E).

Environmental consequences are evaluated based on: potential impacts on threatened and endangered marine species listed under the Endangered Species Act of 1973 (ESA), as amended; impacts on marine habitats, specifically coral reefs;[1] impacts on Essential Fish Habitats (EFH) managed and protected under 1996 amendments to the Magnusson-Stevens Fishery Conservation and Management Act; impacts on marine species regulated by the State of Hawaiʻi (State), Department of

[1] Federal Executive Order (EO) 13089, Coral Reef Protection, 1998.

Land and Natural Resources (DLNR), Division of Aquatic Resources (DAR); impacts due to alien marine species; and existing management measures designed to avoid, minimize, or prevent such impacts.

The region of influence (ROI) for the Proposed Action is the marine waters in Honolulu Harbor fronting the Kapālama site and Pier 24–28 site—specifically those areas where in-water construction work is planned

4.2.1 Kapālama Site

4.2.1.1 Affected Environment

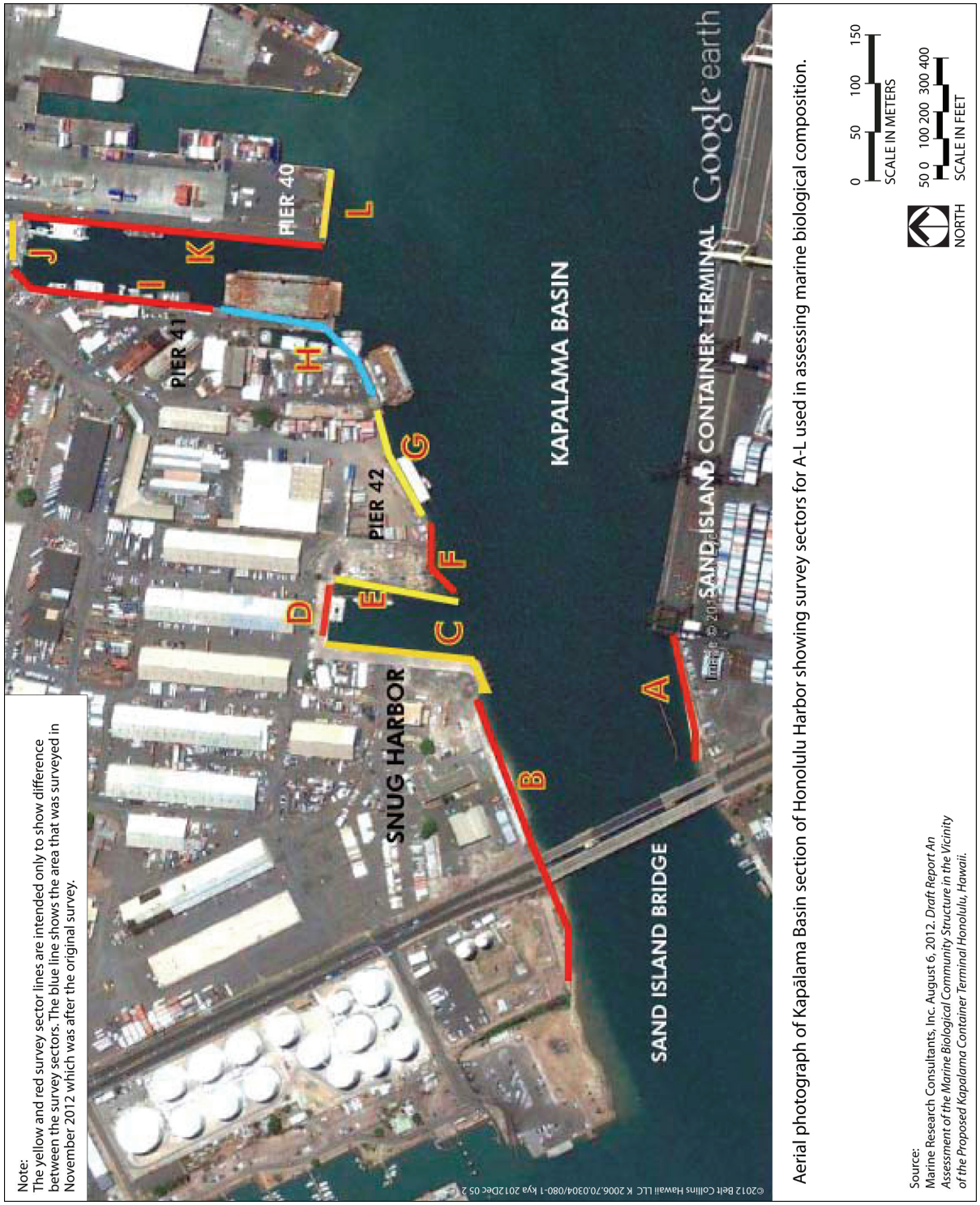
The Kapālama site study area was divided into 12 sectors, A to L, as shown in Figure 4-1 to conduct quantitative surveys. Although no work is planned in Sector A, located across the channel from the Kapālama site, it was included in the study area to provide baseline data. Several of the larger sectors were divided into sub-sectors. Quantitative surveys were conducted of the following: (1) coral communities, (2) non-coral macro-invertebrate communities, (3) algal communities, and (4) fish communities.

Physical Structure

The physical structure of the study area has been created by human activity, in the form of dredged channels, piers, and pilings. Sectors A, B, and F consist of undeveloped dredged shorelines with narrow flat shelves that abut the shoreline and terminate in a steep slope that extends to the channel floor. In Sector A, a portion of the shoreline consists of large boulders. In Sector B, the shelf and slope structure grades into a rubble bed beyond the Sand Island Bridge. Biotic settlement in all areas of dredged shoreline, particularly corals, is more pronounced on shelves than on slopes.

The entire harbor floor adjacent to the study area consists of deposits of fine-grained silty mud pocked with openings from burrowing fauna.

At Sectors C, D, E, H, I, and J, concrete pilings extend into the mud of the harbor floor. Virtually all surfaces of the pilings are encrusted with remnant mollusk shells that form a settlement substratum for other invertebrates. Partially submerged piles in Sector E provide habitat for some of the largest coral colonies within the area. The juncture of Sectors E and F contains pilings and a dredged shelf/slope region similar to Sectors A and B. These conditions provide habitat for a diverse aggregation of reef fish. Further to the east, Sector F consists of undeveloped dredged shoreline.



Aerial photograph of Kapālama Basin section of Honolulu Harbor showing survey sectors for A-L used in assessing marine biological composition.

Source:
Marine Research Consultants, Inc. August 6, 2012. *Draft Report An Assessment of the Marine Biological Community Structure in the Vicinity of the Proposed Kapalama Container Terminal Honolulu, Hawaii.*

Figure 4-1. Marine Biological Survey Sectors, Kapālama Site

Solid vertical corrugated metal sheet piling covered with remnant mollusk shells are found in Sectors K and L. Suspended sediment in this area appears to be less than in the sectors closer to Snug Harbor.

Biotic Community Structure

Coral Communities

Coral colonies were observed on hard substratum throughout the Kapālama site survey area. While high sedimentation is considered detrimental to corals, several species of coral are able to successfully colonize non-natural environments characterized by high levels of suspended and settling particulates. Exposure to light is another limiting factor for observed coral and most other macro-invertebrates. At Kapālama, corals are generally limited to the outer facing surfaces of pilings exposed to direct sunlight for at least part of the day.

Quantitative evaluation of coral in Sectors A to L yielded a total count of 5,668 coral colonies, with counts ranging from a low of 92 in Sector D to a high of 1,201 in Sector K. Total counts in individual size classes ranged from a low of 0 (>160 centimeters) to a high of 1,682 (>2<5 centimeters), with larger size classes (>40 centimeters) occurring predominantly in Sectors B, E, and K. Eleven species of coral were encountered; the number of species within sectors ranged from four (Sector B) to nine (Sector K). Table 2 in Appendix E-1 summarizes counts of total coral colonies of all species by size class. The November 2012 survey of Piers 41–42 (Sector H) covered berthing sites for dry docks and boats. As Sector H had the highest density of large vessels moored for extended periods, biotic colonization of the pier faces was lowest of any other survey sector at the Kapālama site. The continued presence of moored vessels appears to restrict light, hence restricting the development of larger colonies such as those found elsewhere. Quantification of coral colony abundance in Sector H by size class is shown in Appendix E-2.

Following tabulation of colonies by size class per sector, biodiversity indices of community structure were calculated (summarized in Table 2, Appendix E-1).

- Swartz's index of species dominance, defined as the number of species that accounts for 75 percent of the colonies, ranged from 1 (Sector F) to 4 (Sector K). Three species accounted for about 85 percent of the total observed colonies: *Pocillopora damicornis*, *Leptastrea purpurea*, and *Porites lobata* (listed in order of abundance). *Pocillopora damicornis* and *Porites lobata* were the only coral species to occur in every survey sector. The fourth and fifth most abundant coral were *Montipora patula* and *M. capitata,* respectively. *Montipora patula* is a candidate species for ESA listing (see discussion below). See Table 5 in Appendix E-1 and Table 1 in Appendix E-2 for summaries of counts of coral colonies by species and size class.

- The Shannon-Wiener diversity index, which takes into account relative abundance of species and includes both species richness (number of species) and evenness (distribution), ranged from a low of 0.67 (Sector C) to a high of 1.61 (Sector K). Communities with a large number of species that are evenly distributed are the most diverse, and communities with few species that are dominated by one species are the least diverse. As shown in Table 3 in Appendix E-1, higher diversity is found in Sectors K, A, E. J, L, and I (in descending order).

While all coral species occurring in the area are considered resistant to high loading of particulate material, individual species are adapted to particular physical conditions. *Pocillopora damicornis* proliferates on the dredged channel shelves of Sectors B and F, while colonies of *Montipora* spp. thrive on vertical surfaces of pilings on west-facing piers in Sectors E and K. (East facing piers in Sectors C and I have relatively few large colonies.)

Skeletal remains of large colonies were observed in several survey areas. These remains are evidence of past episodic events in the harbor that elevated stress levels to the point of complete mortality of living communities, for example, heavy sediment loads due to storms.

In 2009, the Center for Biological Diversity petitioned NMFS to list 82 species of reef building corals under ESA.[2] After completing a formal status review and a public engagement process, NMFS issued a proposal on November 30, 2012 to list 66 of the 82 species. Three of these coral species occur in Hawaiʻi, including one species observed in the June/July 2012 and November 2012 surveys. *Montipora patula* (457 colonies; 8.06% of total) is proposed for threatened species status. One of the most common corals observed in Hawaiʻi on naturally occurring reefs, *Montipora patula* was observed throughout the harbor, often in large colonies.

Macro-Invertebrate Communities

The Kapālama site study area is characterized by a high density of sponges, tunicates, bivalves, and bryozoans. Forty-four species of non-coral macro-invertebrates were identified (see Table 7 in Appendix E-1). Of these 44 species, 13 were introduced species. Abundance and diversity were highest for sponges. The red encrusting sponge *Porbus amaranthus* was present in every sector, occurring in large colonies on pilings and smaller colonies on rock outcroppings. Tunicates were the next most abundant group, occurring in large numbers throughout the sectors composed of pilings. Of note was the relative lack of living mollusks, with only three species occurring abundantly. Virtually all of the exposed hard surfaces were encrusted with a layer of dead mollusk shells.

[2] Nine of the 82 coral species are found in Hawaiʻi.

Overall, invertebrates are far more abundant on piers and pilings than on dredged shorelines of Sectors A and B. The cement piling substratum has very high densities of macro-invertebrates, showing little variation between sectors. Habitats within Sectors A, B, F, and G—characterized by very high sedimentation on narrow rocky shelves and slope—contain smaller, compact colonies of sessile macro-invertebrates and lower abundance of macroflora.

Algal Communities

Frondose algae are scarce at all survey locations, indicating that physical conditions in the harbor are not conducive to algal growth. Only three species were observed, including *Dictyosphaeria cavernosa* (the most common*)*, *Dictyota* sp., and *Codium edule. D. cavernoa* was observed on a concrete pile in Sector C and on sheet piling in Sector K. The other species were observed in Sector C.

Fish Communities

The June/July 2012 and November 2012 surveys showed substantial variability in both the number of fish species and individuals observed within different sectors. A total of 1,793 individuals, comprised of 33 species, were counted in the Kapālama site survey area. The largest numbers of fish were observed in Sectors B and G. The lowest numbers were observed in Sectors D, J, and L. Overall, the numbers of fish observed in sectors composed of concrete piles (C, D, I, J) were lower than counts in sectors consisting of dredged shoreline. The highest densities and more diverse assemblages were observed on flatter dredged reef shelves and slopes. Few or no fish were observed on the mud/silt of the harbor floor.

The ring-tailed surgeonfish (*Acanthurus blochii*) was the most frequently observed fish, occurring in all sectors. Other frequently observed species included the convict surgeonfish (*Acanthurus triostegus*), yellow tang (*Zebrasoma flavescens*), Hawaiian white-spotted toby (*Canthigaster jactator*), damselfish (*Dasyllus ablisella*), threadfin butterfly fish (*Chaetodan auriga*), and raccoon butterfly fish (*Chaetodon lunula*). Tables 8 and 9 in Appendix E-1 and Table 2 in Appendix E-2 list fish species by sector, abundance, and estimated size. It is noted that the entire survey area is a restricted access zone experiencing little or no fishing pressure.

Invasive Species

Thirteen introduced species of macro-invertebrates were identified in the surveys, primarily as part of fouling communities on piers and pilings. Four of these species are classified under Management Class 4 (species that are established; impacts unclear) in the State of Hawai‘i Aquatic Invasive Species (AIS) Management Plan (DAR 2003). The four species include two sponges, *Mycole armata* and *Haliclona caerulea*, and two bryozoans, *Amathia distans* and *Schizoporella errata.*

Introduced marine invertebrates have arrived in Hawaiʻi through hull fouling and from ballast water and solid ballast from ships, establishing communities in marine and brackish waters. Aside from sponges, almost all of the recorded introduced species at the Kapālama site are widespread in the Hawaiian Islands. Introduced sponges are mainly confined to several harbors and to embayments such as Kāneʻohe Bay (Eldredge 2001).

While not recorded during the surveys for this project, the invasive barnacle *Chthamalus proteus* was recorded in Snug Harbor in 2006 (USGS 2006; Eldredge 2001). *C. proteus* is classified as Management Class 3 (species that are established; potential for impacts—no known effective or practical control techniques). *C. proteus* has been reported on all of the main Hawaiian Islands, mostly in harbors and along the south shore of Oʻahu (Global Invasive Species Database, 2007). It potentially threatens to alter natural substrates through dense colonization, which could lead to habitat conversions, a change in settlement patterns of native species, and exclusion of benthic algal grazers such as ʻopihi (limpets).

No introduced or invasive marine algae were found at the Kapālama site. *Kappaphycus* spp., an invasive algal species, was recorded in Honolulu Harbor in 2002 (Smith et al., 2002) but was not seen during the surveys conducted for this project.

One species of introduced fish was observed during the surveys. The black snapper (*Lutjantus fulvus*) was found at Sectors F and G (Pier 42) and Sector I (Pier 41). This species is established in coastal waters of Hawaiʻi but not abundant. It is classified under Management Class 4 in the State's AIS Management Plan referenced above.

Regulated Species

STATE OF HAWAIʻI REGULATED MARINE FISHES AND INVERTEBRATES. DAR lists a variety of "regulated" marine fishes and invertebrates. Several regulated fish species were observed during the June/July 2012 surveys, including a school of āholehole (*Kuhlia xenura*) in Sector G and parrotfish (*Scarus psittacus*) in Sectors A, B, I, and L. The only listed invertebrates were observed in Sector A: a single octopus (*Octopus cyanea*) and several sea urchins (*Echinothrix diadema*).

THREATENED AND ENDANGERED SPECIES. No ESA-listed species were observed in the study area during the surveys. The threatened green sea turtle (*Chelonia mydas*) and endangered hawksbill turtle (*Eretmochelys imbricate*) undoubtedly occur within Honolulu Harbor but were not observed. Populations of the endangered humpback whale (*Megaptera novaengliae)* winter in the Hawaiian Islands from December to April. As the survey was conducted during the summer, whales were absent from Hawaiian waters. The endangered Hawaiian monk seal (*Monachus schauinslandi*)

commonly hauls out of the water onto sandy beaches. Although there is a potential for monk seals to enter the harbor, there are no beaches to serve as haul-out sites.

The humpback whale and monk seal are also protected under the Marine Mammal Protection Act.

One coral species being proposed for listing as threatened under ESA was observed at the Kapālama site.

ESSENTIAL FISH HABITAT (EFH). None of the fish species observed in the surveys are currently managed within EFH by NMFS and the Western Pacific Fishery Management Council. However, EFH includes waters and substrate (e.g., coral reef ecosystem) necessary to fish (the federally managed species in the region) for spawning, breeding, feeding, or growth to maturity.

4.2.1.2 Environmental Consequences

Proposed Action

Construction Impacts

During construction, BMPs would be implemented for erosion and sediment control, as required under National Pollutant Discharge Elimination System (NPDES) permits. Storm water runoff would be contained on-site. In compliance with various federal statutory and regulatory authorities, measures would be implemented to prevent or reduce the discharge of pollutants to storm water through proper material handling, storage, and disposal, and training of contractors and subcontractors. Spill prevention control procedures would be in place to reduce the chance of spills, stop sources of spills, contain and clean up spills, and properly dispose of spill materials.

In-water construction activities at the Kapālama site would have varying impacts on biotic communities, including potentially significant impacts on specific species. Biotic communities are summarized below by the sectors covered in the marine biological surveys (see Figure 4-1 for the sector locations), followed by an evaluation of in-water construction noise impacts on protected marine species, and an evaluation of the construction-related impacts relative to the spread of invasive species.

- **SECTOR A.** No construction is planned in Sector A. It was included in the surveys to provide baseline data because of its proximity across the channel from the project.
- **SECTORS B, C, D, E, F AND G.** These sectors cover the area to be improved for berthing of two container ships; activities would include dredging, excavation,

fill, and pier construction. Coral colonies and sessile macro-invertebrates located on vertical pilings and within the dredge limits on the edge of the dredged channel wall and shelf would be removed to construct the new piers and provide adequate depth for the ships. With the filling of Snug Harbor, all coral colonies and macro-invertebrates in Sectors C, D, and E would be lost. Coral counts in the sectors varied, with the lowest counts recorded in Sector D. Larger size classes were recorded in Sectors B and E. Biodiversity indices for coral are low in Sectors B, C, D, F, and G. One coral candidate species being considered for ESA-listing, *Montipora patula,* was observed in Sectors D, E, F, and G—a total of 97 colonies found mostly in Sectors E, F, and G. Considering these factors, impacts would be relatively greater in Sector E (a west-facing pier) and Sector F (dredged shelf). It is noted that all coral species occurring in the area are resistant to high loading of particulate material.

In addition, there is a potential for remaining coral colonies (those not removed during dredging or excavation) to be affected by sedimentation during in-water work. Corals could also be affected by sedimentation from construction of the container terminal (land-side construction). Implementation of Best Management Practices (BMPs) would minimize sedimentation impacts. Periodic water quality monitoring during construction would be evaluated against baseline data to evaluate the effectiveness of dredging BMPs. There would be little or no impact on algal communities, which are scarce at all locations surveyed.

Regarding potential impacts on fish communities, the largest numbers of fish were observed during the surveys in Sectors B and C, the lowest in Sector E. Two species on the DLNR list were observed: āholehole (*Kuhlia xenura*) in Sector G and parrotfish (*Scarus psittacus*) in Sector B. As they are free-swimming, compared to sessile corals and macro-invertebrates, fish are less likely to be affected during construction activities and able to find suitable habitat at nearby locations.

- **SECTORS H, I, J, K. AND L.** These sectors cover the area where Pier 41 would be widened. Activities would involve dredging, excavation, and pier construction and the removal of coral colonies and macro-invertebrates found on pilings. Sector H had the lowest biotic colonization of all sectors at the Kapālama site. Sector K had the highest number of coral colonies counted in the June/July 2012 and November 2012 surveys, as well as larger size classes. Of the 11 species encountered in the surveys, nine were found in Sector K, which has the highest biodiversity indices in the total study area. To widen Pier 41, construction would occur on the east-facing pier, thereby minimizing impacts on coral colonies and macro-invertebrates in Sector K (west-facing pier). There would be little or no

impact on algal communities. Fish counts were relatively low in these sectors (lowest counts overall were in Sectors D, J, and L). Six individual parrotfish on the DLNR list were observed in Sector I. Therefore, impacts on fish communities *during construction* would be minimal for the same reasons given above. As with the sectors described above, there is a potential for impacts on ESA-listed green sea turtles and hawksbill turtles.

Approximately 200,000 cubic yards of maintenance dredging adjacent to Piers 42 and 43 is required to remove sediment buildup from the west end of Honolulu Harbor and to return the previously dredged area to its original design depth of minus 40 feet MLLW. Approximately 100,000 cubic yards of new dredging and excavation is required to enlarge the slip betweens Piers 40 and 41. The dredging would be conducted by DOT-H, but some of the dredging may be conducted by the U.S. Army Corps of Engineers (USACE) as part of its periodic Honolulu Harbor maintenance dredging that is tentatively scheduled for the spring of 2015. Should DOT-H participate with the USACE in the maintenance dredging of the federal project area[3] of Honolulu Harbor, a Rivers and Harbors Act, Section 14 permit may be required.

Mechanical or hydraulic methods may be used for both the new dredging and maintenance dredging. Hydraulic methods would need to be supplemented with cutter heads at the end of the suction terminus to remove hard substrates that may be encountered in the new dredging of the slip between Piers 40 and 41. The method of dredging may be determined by suitability for the type of sediment or the availability of equipment.

The dredged material would most likely be disposed of in the south Oʻahu disposal site, a rectangular area approximately 1.5 miles wide and 2 miles long with a bottom depth of approximately 400 meters, located about 4 miles offshore from the mouth of Pearl Harbor. The south Oʻahu disposal site has been used for the disposal of 90 percent of the dredged material in the State of Hawaiʻi (USGS 2000) and is the designated site for the disposal of dredged material from Pearl Harbor, Honolulu Harbor, and Barbers Point Harbor (EPA 1980). It is the sole remaining disposal site offshore of Oʻahu.

With respect to dredged material (sediment), significant impacts on the marine environment would be avoided or mitigated because sediment testing, water quality monitoring, and evaluation of construction methods will be conducted to obtain permits and approvals required under the Marine Protection, Research, and Sanctuaries Act (MPRSA) and Clean Water Act (CWA) Section 404. The USACE, with

[33] The federal project area in Honolulu Harbor consists of the USACE's maintenance dredge area within the port.

the U.S. Environmental Protection Agency's (EPA's) concurrence, is responsible for authorizing these permits and approvals.

NOISE DURING CONSTRUCTION. In-water construction at the Kapālama site—in particular, pile driving for the piers—has the potential for underwater sound pressure impacts on protected marine mammals and sea turtles. No protected species were observed at any of the sectors during the surveys. However, since green sea turtles and hawksbill turtles may frequent the harbor and it is possible for marine mammals to be present, there is a potential for impacts on these species during construction activities. Impacts on green sea turtles are more likely to be present than any other federally protected species given their larger population numbers.

Underwater sound pressure levels from marine pile driving vary depending on the size of the pile, size and type of equipment (e.g., impact hammer or vibratory driver/extractor), water depth, and geotechnical conditions which determine how difficult it is to drive a pile. Temperature, salinity, and pressure affect the speed of sound traveling through water. Cumulative underwater sound impacts are also a factor, for example, ambient noise in the harbor from vessels and other sources combined with construction noise. Sound in water is typically measured in units of root mean square (RMS) acoustic pressure in micropascals (μPa), or decibels (dB).

Previous studies provide marine pile driving sound data from various projects in northern California (CALTRANS 2007). After specific site investigations and engineering design have been completed for the Kapālama project, this database can be used to estimate underwater sound levels from the construction activity and develop sound attenuation measures, if needed. For example, measurements of near-source (10-meter) unattenuated sound pressures for in-water pile driving (various pile types and sizes) using an impact hammer at various water depths are in a range of peak average sound pressure levels from 185 to 220 dB, and RMS sound pressure levels from 170 to 205 dB. Unattenuated sound pressure measurements of in-water pile installation using a vibratory driver/extractor (various pile types and sizes and water depths) are in a relatively lower range: peak average sound pressure levels from 165 to 195 dB, and RMS sound pressure levels from 150 to 180 dB.

Marine mammals can suffer permanent hearing loss, called permanent threshold shifts (PTS) or temporary hearing loss, referred to as temporary threshold shifts (TTS). In-water thresholds potentially relevant to the proposed project are as follows (dB RMS):

- Injury (PTS) would results from exposure to:
  - 180 dB (any sound) for cetaceans (whales and dolphins)
  - 190 dB for pinnipeds (seals)

- Behavioral changes (TTS) such as avoiding the area would result from exposure to:
  - 160 dB for impulsive sound (impact pile drivers) for all marine mammals
  - 120 dB for non-impulsive (continuous) sound from vibratory drivers or drills for all marine mammals

These thresholds were derived for marine mammals but are currently also used for sea turtles (Air Force 2000).

PTS would be considered Level A Harassment under the 1994 amendments to the Marine Mammal Protection Act, i.e., any act with the potential to injure a marine mammal. TTS would be categorized as Level B Harassment, defined as any act with the potential to disturb a marine mammal by causing disruption of behavioral patterns, including but not limited to migrating, breathing, nursing, breeding, feeding, or sheltering, but which does not have the potential to injure the animal.[4]

As disclosed above, no marine mammals or sea turtles were observed during the surveys. In January 2012, two humpback whales entered Honolulu Harbor, but this was recognized as a highly unusual event. Monk seals are unlikely to frequent the harbor due to the lack of beaches suitable for hauling out. However, green sea turtles and hawksbill turtles may frequent the harbor, with green sea turtles being more likely given their larger population numbers.

RISK OF SPREAD OF INVASIVE SPECIES DURING CONSTRUCTION. Dredging and filling activities are likely to result in the fragmentation of biological material, with the negative impact of invasive species dispersing and regenerating from fragments. If allowed to move through the water column or along the sea floor, these fragments have the potential to disperse to areas outside the harbor and colonize areas where the species are currently not present. Invasive species observed at the Kapālama site that regenerate through fragmentation and are currently restricted in distribution in Hawaiʻi include all five introduced sponge species documented in the surveys, as well as the invasive marine algae *Kappaphycus* spp, which has been recorded in Honolulu Harbor but not within the survey area. Details of the marine invasive species evaluation are provided in Appendix G.

Operational Impacts

Potential impacts on marine biota from storm water discharge and hazardous materials at the Kapālama site during operation of the container terminal would be

[4] National Marine Fisheries Service. Reference Section: Definitions. http://swr.nmfs.noaa.gov/deter/reference_section.htm. Accessed October 13, 2012.

avoided or minimized through compliance with management measures, including regulatory requirements and standard operating procedures.

The risk of spread of invasive species during operations would continue to be prevented or minimized through compliance with existing management measures. The risk of spread of invasive species associated with operations is addressed as a cumulative impact in Chapter 6, because the Proposed Action would not introduce additional overseas vessels and containers. The Proposed Action would enable DOA to develop a biosecurity facility, which would serve to support efforts to mitigate invasive species.

Mitigation Measures

Measures to mitigate impacts during in-water work—including the loss of corals, increased sediment deposition during dredging and filling, and impact on ESA-listed sea turtles—would be developed during the USACE permitting process and the USACE's ESA Section 7 and Magnuson-Stevens Act (for EFH) consultation processes. Such measures could include monitoring prior to pile driving activities and/or establishing appropriate stand-off distances (safety radius/exclusion zone) to avoid or minimize construction-related impacts on sea turtles.

Measures to reduce fragmentation of invasive species during dredging and filling activities and to prevent the dispersal of fragments were evaluated for the Proposed Action and could include the following. Details are presented in Appendix G.

- Reduce the falling velocity of buckets on mechanical dredges, especially before seafloor impact, to minimize both fragmentation and dispersion.
- Reduce travel speed of buckets to prevent spillage of dredged sediment.
- When using a hydraulic dredge, avoid moving the head faster than it can pump sediment to prevent suspension of fragments into the water column.
- Use silt curtains for the full duration of the dredge/fill work to prevent dispersal of fragments outside the immediate area. Silt curtains must cover the full depth of the water column to contain the dispersion of fragments. Sponges are negatively buoyant and likely to fall to the sea floor and roll with water movement. Fragments of algae float and could be found on the water surface. Prior to silt curtain removal, remove biological fragments from the seafloor and surface along the silt curtain. For example, a diver could use a suction pump to remove the fragments from the sea floor and surface. Surface fragments could also be scooped up with a fine mesh net.
- Monitor water quality during construction to evaluate changes from pre-construction baseline conditions.

- Until properly disposed of, store dredged sediment in a way that prevents both runoff and biological fragments from being washed back into coastal areas.
- Conduct pre-dredging sediment surveys to determine whether areas of contamination exist. If contamination exists, conduct additional surveys to delineate these areas. Dredged materials with high contamination would be segregated from other dredged materials, and handled in accordance with applicable regulations.

Alternative Action

Construction Impacts

Construction impacts under the Alternative Action would be similar to the Proposed Action with one exception. Under the Alternative Action, a deck would be constructed over Snug Harbor. The deck would require piles for support, and installation of the piles could have impacts similar to those discussed above (sedimentation, acoustic impacts on marine fauna). If Snug Harbor is not filled, fewer coral and macro-invertebrate communities at Sectors C, D, and E would be affected. There is a potential to reduce impacts to coral colonies in Sector E, with its higher biodiversity indices and larger class sizes. (As an east-facing pier, Sector C is characterized by low coral abundance and low biodiversity indices.)

However, over the long-term, with reduced sunlight under the deck, remaining coral colonies in Snug Harbor are unlikely to thrive. The deck may not eliminate light completely, but it may reduce it below a threshold limit required for coral growth. Reef building corals are always found in areas where there is available light. The comparison of coral abundance on east-facing piers with west-facing piers in the study area illustrates this point. Furthermore, one of the "events" of sufficient magnitude to completely overwhelm coral defense mechanisms—besides storms—is the long-term mooring of vessels which restrict light for a period sufficient to result in complete mortality. Constructing a deck over Snug Harbor rather than completely filling the harbor would reduce the initial loss of coral colonies, but may reduce light below a threshold limit required for coral growth.

Operational Impacts

Operational impacts under the Alternative Action would be similar to the Proposed Action.

Mitigation Measures

Mitigation measures would be the similar to those described above for the Proposed Action.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

4.2.2 Piers 24–28

4.2.2.1 Affected Environment

No in-water construction work is proposed at Piers 24–28 except for the placement of spuds to support a dry dock at Pier 24. Therefore, quantitative investigations were limited to the in-water area fronting Pier 24. Qualitative investigations were conducted for Piers 25–28 (see Figure 4-2).

Physical Structure

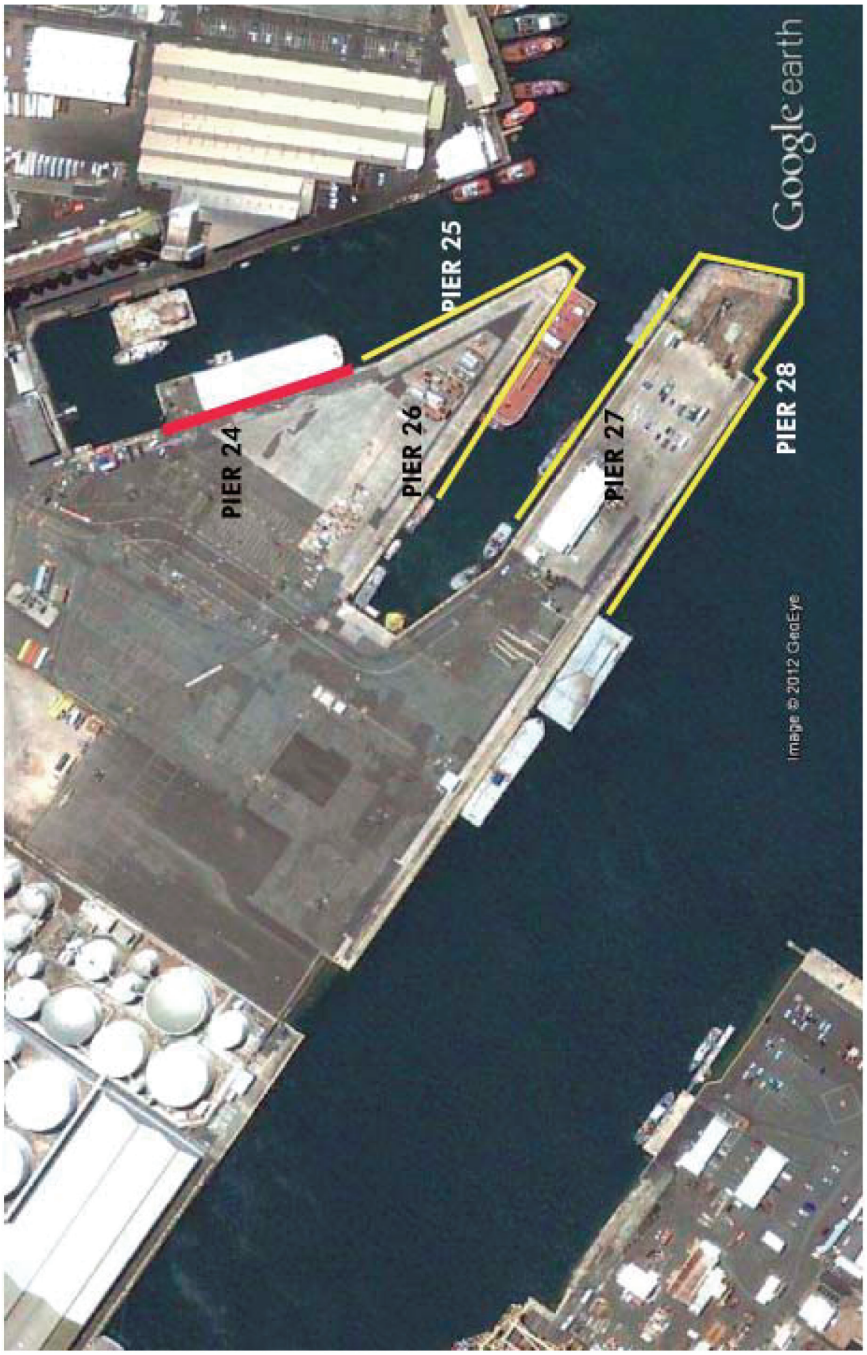
The physical structure at Piers 24–28 is similar to that of the pier areas at the Kapālama site, characterized by concrete pilings encrusted with remnant mollusk shells and skeletal remains of dead coral colonies, as well as a dredged shoreline. At the end of Piers 27–28 is an area consisting of a dredged section of shallow reef platform. Large boulders on the edge of the platform provide a complex habitat for reef fish and coral settlement. The harbor floor at the end of Piers 27–28 consists of a more solid sand-mud substratum compared to the silt-mud substratum found elsewhere throughout the Kapālama Basin. With less sediment deposition, water quality is improved in this area.

Biotic Community Structure

Coral Communities

Qualitative surveys of the Pier 24–28 site revealed a different coral community structure than observed at the Kapālama site. In particular, pilings at Piers 24 and 26 contain skeletal remains of large colonies either completely or partially devoid of living tissue. These remnants suggest either events of sufficient magnitude to completely overwhelm coral defense mechanisms, or the long-term mooring of vessels which restricted light for a period sufficient to result in complete mortality.

The dredged edges of the reef platform at the end of Piers 27–28 provide habitat for extensive growth of corals, including large colonies of *Porites lobata* and vertical sheets of overlapping plates of *Montipora* spp.



Aerial photograph of central portion of Honolulu Harbor showing Piers 24-28. Area depicted by red line is proposed mooring site of Pacific Shipyards Dry Dock. This area was quantitatively evaluated for coral abundance similar to survey area in Kapālama Basin. Piers 25-28, shown in yellow, were qualitatively described.

0 25 50 100
SCALE IN METERS

NORTH
0 100 200 300
SCALE IN FEET

Source:
Marine Research Consultants, Inc. August 6, 2012. *Draft Report An Assessment of the Marine Biological Community Structure in the Vicinity of the Proposed Kapalama Container Terminal Honolulu, Hawaii.*

©2012 Belt Collins Hawaii LLC K:2006.70.0304/080-2 kya 2012Aug091

Figure 4-2. Marine Biological Survey Sectors, Pier 24-28 Site

Quantitative evaluation of coral communities at Pier 24 showed a total count of 158 coral colonies, mainly in the size range of between 2 to 20 centimeters. *Leptastrea purpurea* was by far the most abundant species (118 colonies), found growing on concrete piles. (See Table 2 in Appendix E for a list of the seven coral species counted at Pier 24.) The coral candidate species proposed for ESA listing was not observed at Pier 24.

Macro-Invertebrate Communities

Twenty-seven species of non-coral macro-invertebrates were identified at Piers 24–28 (see Table 7 in Appendix E). Of the 27 species, 10 were introduced. Sponges and tunicates were the most abundant. No mollusks or urchins were observed in this sector.

Algal Communities

No frondose algae were observed in the Pier 24–28 vicinity. A small patch of the native Hawaiian seagrass, *Halophila hawaiiana*, was observed on the harbor floor adjacent to the dredged channel wall at the junction of Piers 27–28.

Fish Communities

During the June/July 2012 surveys, the most abundant fish communities were observed in the vicinity of the juncture of Piers 27 and 28, where the structural composition of the channel floor most closely resembles natural reef. A total of 224 individuals comprised of 21 species were counted here. Several species found to be abundant at the Kapālama site were also abundant in this area, including surgeonfish and damselfish (see Tables 8 and 9 in Appendix E).

Invasive Species

Ten introduced species of macro-invertebrates were identified in the survey, primarily as part of fouling communities on piers and pilings. Of these, two are classified under Management Class 4 in the State's AIS Management Plan: the sponge *Mycale armata* and the bryozoan *Amathia distans*. No introduced or invasive fish or marine algae were recorded during the surveys of the project site.

Regulated Species

STATE OF HAWAIʻI REGULATED MARINE FISHES AND INVERTEBRATES. Species on DLNR's list observed at this site included a single papio (*Caranx melamphygus*) and eight parrotfish (*Scarus psittacus*) at Pier 28.

THREATENED AND ENDANGERED SPECIES. No ESA-listed species were observed at the Pier 24–28 site. The discussion above for the Kapālama site also applies to the Pier 24–28 site.

4.2.2.2 Environmental Consequences

Proposed Action

Construction Impacts

No significant impacts on the marine environment would occur with construction under the Proposed Action. In-water work at this site would be limited to the placement of spuds at Pier 24 to support a drydock. This work would have little or no impact on coral communities, as the Pier 24 sector is mainly comprised of concrete pilings with skeletal remains of coral colonies either completely or partially devoid of living tissue. Locating the drydock at Pier 24 would reduce or eliminate sunlight needed for coral growth. However, given the sparse nature of resources in this sector and the predominance of skeletal remains, the drydock would have minimal impact on coral communities,

No in-water construction is planned with the potential for underwater sound pressure impacts on marine fauna.

With no dredging or filling activities, the fragmentation of biological material from invasive species and their subsequent dispersal and regeneration are unlikely.

Impacts of land-side work on marine biota would be avoided or minimized by implementation of management measures, as described above for the Kapālama site.

Operational Impacts

No significant impacts on the marine environment would occur with operations under the Proposed Action. Potential impacts on marine biota at the Pier 24–28 site during operation of Pacific Shipyard and Atlantis Submarines would be addressed through compliance with management measures, including regulatory requirements and standard operating procedures. Storm water discharge would be avoided or minimized through compliance with NPDES permit conditions. Hazardous material spills would be avoided or minimized through implementation of pollution prevention measures.

Vessels that are brought to Piers 24–28 for repair and maintenance may be from overseas ports. These vessels may collect invasive species on their hull bottoms and from ballast water and solid ballast taken on by the vessels. The risk of spread of invasive species would continue to be prevented or minimized through compliance with existing management measures. The risk of spread of invasive species associated with operations is addressed as a cumulative impact in Chapter 6.

Mitigation Measures

No mitigation is required.

Alternative Action
Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative
No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

4.3 TERRESTRIAL FLORA AND FAUNA

This section describes terrestrial plants and animals at the Kapālama and Piers 24-28 sites. The information is based on a survey conducted by SWCA in June 2012; the survey report is presented in Appendix F. An invasive species evaluation was also conducted by SWCA in August 2012 and is presented in Appendix G.

Environmental consequences are evaluated based on their potential impacts on threatened and endangered terrestrial species listed under ESA and the Migratory Bird Treaty Act (MBTA) of 1918 as amended; impacts due to invasive species; and existing management measures designed to avoid, minimize, or prevent such impacts. The ROI consists of the two project sites.

4.3.1 Kapālama Site

4.3.1.1 Affected Environment

The Kapālama site is a heavily disturbed area due to ongoing industrial activity. It is mostly covered in asphalt concrete with numerous warehouses and other buildings.

Flora
The Kapālama site does not contain any critical habitat for threatened or endangered plants, as designated by the U.S. Fish and Wildlife Service (USFWS) under the ESA. In addition, no state or federally listed threatened or endangered plant species, or rare native Hawaiian plant species, were observed during the SWCA survey (see Appendix F).

The survey identified 105 plant species on the Kapālama site, five of which are considered native to the Hawaiian Islands. These indigenous species, which are common in disturbed coastal areas, include moa (*Psilotum nudum*), kipukai (*Heliotropium curassavicum*), milo (*Thespia populnea*), and ʻuhaloa (*Waltheria indica*).

Much of the site is paved and without vegetation. Sparse vegetation occurs as ornamental plants near buildings or weedy non-native grasses and herbaceous plants that are common in disturbed coastal areas. Naturally growing plants are found in cracks in concrete and in shady areas near equipment and buildings. Buffelgrass (*Cenchrus ciliaris*), swollen finger (*Chloris barbata*), and Natal redtop (*Melinis repens*) are abundant here. Other non-native herbaceous species found throughout the site or in isolated patches include *Bidens alba var. radiate*, *Flaveria trinervia*, coat buttons (*Tridax procumbens*), *Heliotropium procumbens*, hairy spurge (*Euphorbia hira*), prostrate spurge (Euphorbia prostrate), Florida beggarweed (*Desmodium tortuosum*), and creeping indigo (*Indigofera hendecaphylla*). The shoreline at Piers 44/45 contains a dense thicket of red mangrove (*Rhizophora mangle*) and scattered ironwood trees (*Casurina equisetifolia*).

Fauna

The Kapālama site does not contain any critical habitat and is not near any critical habitat for ESA-listed vertebrate or invertebrate species. The proposed project is not likely to impact nesting or feeding habitat of any native bird species.

The SWCA survey observed 12 birds during the June 2012 survey of the Kapālama site. Of these, two are native birds (white tern [*Gygis alba*] and cosmopolitan black-crowned heron [*Nycticorax nycticorax*]) and one is a migratory bird (ruddy turnstone [*Arenaria interpres*]). All three are protected by the MBTA. The white tern is listed by the State as threatened on the island of Oʻahu.

Although not observed during the survey, other native seabirds may possibly frequent the site. These include the wedge-tailed shearwater (*Puffinus pacificus*), Newell's shearwater (*Puffinus auricularis newelli*), Pacific golden plover (*Pluvialis fulva*), wandering tattler (*Heteroscelus incanus*), and sanderling (*Calidris alba*). These birds are protected under the MBTA, and Newell's shearwater is both State and federally listed as threatened.

Other possible animals that occur include cat (*Felis catus*), mongooses (Herpestes javanicus), rats (*Rattus* spp.), mice (*Mus musculus*), non-native geckos (*Gekkonidae*), wasp, and Sonoran carpenter bee (*Xylocopa sonorina).* No Hawaiian hoary bats were observed and the likelihood of their possible presence is small.

In sum, no federally listed threatened, endangered, or candidate bird, mammal, or insect species were observed at the Kapālama site or vicinity during the survey. The survey report does note that for foraging seabirds, like the great frigate bird and the white tern, "If measures are emplaced to maintain water quality during the construction of the project, there should be no effect on the distribution of their prey or the foraging abilities of these species."

Invasive Species

Weedy non-native grasses and herbaceous plants are common throughout the Kapālama site. Details of the terrestrial invasive species evaluation are presented in Appendix G.

4.3.1.2 Environmental Consequences

Proposed Action

Construction Impacts

No significant impacts on terrestrial flora and fauna would occur with construction under the Proposed Action. No ESA-listed plant species would be affected by the proposed construction. Potential impacts to shorebirds would be temporary, as alternate roosting areas are available close by. For foraging seabirds, like the great frigate bird and the white tern, with measures in place to maintain water quality during the construction, there should be no effect on the distribution of their prey or the foraging abilities of these species. Water quality would be maintained through compliance with NPDES permit requirements.

Invasive, weedy, non-native grasses and herbaceous plants are common throughout the Kapālama site and widespread on Oʻahu. Hence, their control is not expected to result in a significant decrease in their number or distribution, and the primary goal would be to minimize the potential for introducing new invasive species to the area. To avoid unintentional introduction of new invasive species to Oʻahu, all construction equipment and vehicles arriving from outside of the island of Oʻahu would be washed and inspected prior to entering the project area. Inspection and cleaning activities would be conducted at a designated location. Revegetation or landscaping in the yard area by hydroseeding and/or outplanting would be certified weed-free or inspected prior to revegetation. Details of implementation are presented in Appendix G.

Operational Impacts

Newell's and wedge-tailed shearwaters may become disoriented when flying over the container terminal at night if there is increased outdoor lighting on the site. Downward orientation and shielding of outdoor lights would be incorporated into the project to prevent upward light emissions and thereby minimize attraction to shearwaters.

Shorebirds, such as the ruddy turnstone, would lose their roosting area along the shoreline between Sand Island Access Road and Piers 44-45, but displaced birds would find alternate roosting areas in the vicinity, e.g., at Keʻehi Lagoon.

With the Proposed Action, the DOA would be able to develop the biosecurity facility needed to help prevent the spread of invasive species. The biosecurity facility would

include an inspection building (Phase 1) consisting of inspection bays with consolidation/ deconsolidation capability for neighbor islands cargo, and a Treatment Area building (Phase 2) with treatment capabilities for import/export goods. Establishment of a DOA biosecurity facility at the new container terminal would improve intervention efforts.

Mitigation Measures

No additional mitigation needed. The USACE will be satisfying its ESA Section 7 obligation with USFWS. Should additional mitigation be identified in that process, it will be made part of the Proposed Action.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required. With No Action Alternative, the DOA would not have a location to establish the biosecurity facility, prolonging the wait for additional services the facility is intended to bring, including those to mitigate invasive species.

4.3.2 Piers 24–28

4.3.2.1 Affected Environment

The Pier 24–28 site has been heavily disturbed by industrial activities. The site does not contain any USFWS-designated critical habitat for threatened or endangered plants. No state of federally listed threatened, endangered, or candidate endangered plant species, or rare native Hawaiian plant species, were observed during the SWCA survey (Appendix F).

The survey identified 46 plant species; only two are native Hawaiian species, moa and ʻuhaloa. The two plants are common in disturbed coastal areas throughout the Hawaiian Islands.

The survey identified 8 bird species, of which three are native (great frigate bird, white tern, black-crowned night heron) and protected under the MBTA. The white tern is also listed by the State as threatened on the island of Oʻahu.

Due to the lack of natural shoreline and vegetation, no migratory birds are expected here. Wedge-tailed shearwater and Newell's shearwater were not observed during the survey but may possibly frequent the site.

SWCA observed 6 introduced bird species that are common in the urban environment of O'ahu. The survey also observed a mouse (*Mus musculus*). Rats (*Rattus* spp.) are likely present but were not observed. No insects, reptiles, or amphibians were observed. Hawaiian hoary bats were not expected due to lack of trees.

4.3.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Of eight bird species, three native species were observed at Piers 24-28. All three native species are protected by MBTA. No federally listed threatened, endangered, or candidate endangered animal species were observed. No state or federally listed threatened, endangered, or candidate endangered plant species, or rare native Hawaiian plant species, were recorded at the site during a survey by SWCA in 2012. Potential impacts to shorebirds would be temporary, as alternate roosting areas are available nearby. For foraging seabirds, like the great frigate bird and the white tern, with measures in place to maintain water quality during the construction, there should be no effect on the distribution of their prey or the foraging abilities of these species. Water quality would be maintained through compliance with NPDES permit requirements.

During construction, to avoid unintentional introduction of invasive species to O'ahu, all construction equipment and vehicles arriving from outside of the island of O'ahu would be washed and inspected prior to entering the project area. Inspection and cleaning activities should be conducted at a designated location.

If Piers 24–28 is to include revegatation or landscaping in the open work area by hydroseeding and/or outplanting, the off-site source should be certified weed-free or inspected prior to revegetation.

Shielding of outdoor lights would be incorporated into the project to prevent upward light emissions and thereby minimize attraction to shearwaters.

Operational Impacts

Newell's and wedge-tailed shearwaters may become disoriented when flying over the container terminal at night if there is increased outdoor lighting on the site. Downward orientation and shielding of outdoor lights would be incorporated into the project to prevent upward light emissions and thereby minimize attraction to shearwaters.

Shorebirds, such as the ruddy turnstone, would lose their roosting area along the shoreline between Sand Island Access Road and Piers 44–45, but displaced birds would find alternate roosting areas in the vicinity, e.g., at Keʻehi Lagoon.

Mitigation Measures

No additional mitigation needed. The USACE will be satisfying its ESA Section 7 obligation with USFWS. Should additional mitigation be identified in that process, it will be made part of the Proposed Action.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

4.4 CULTURAL RESOURCES

Cultural resources include deposits or artifacts giving evidence of cultural activity in the past, human burials, historic properties, and resources still in use for traditional cultural practices. Historic properties are identified in HAR 13-198 as any building, structure, object, district, or site that is significant in the history, architecture, archaeology, or culture of the state, its communities, or the nation. Under the National Historic Preservation Act (NHPA), historic properties are assessed for significance in terms of criteria in 36 Code of Federal Regulations (CFR) Part 60.4. Sites that meet eligibility criteria may be listed on the State or National Register of Historic Places (NRHP), or both.

Hawaiʻi Revised Statutes (HRS) Chapter 6E directs state agencies to consult with the State Historic Preservation Division (SHPD) before beginning any project that may affect historic property or a burial site. An historical property [5]may be assessed as significant by possessing "integrity of location, design, setting, materials, workmanship, feeling and association" and meet any of five criteria:

A. Association with events that contributed to our history;

B. Association with the lives of people important in our past;

C. Embodying the characteristics of a type, period or method of construction, or the work of a master, or high artistic value;

D. Yielding information about history or prehistory; or

[5] The first four criteria are also used for NRHP.

E. Importance to the Native Hawaiian people or any other ethnic group of the state through association with cultural beliefs, practices, events or accounts important to the group's history and cultural identity. (HAR §13-275-6)[6]

Significance assessments are to be submitted to SHPD for concurrence. If a historical property or burial site would be affected by a project, a detailed mitigation plan is to be developed and carried out. Mitigation may involve preservation, recordation, data recovery and/or ethnographic documentation. If a property is found to be significant under criterion E, consultation must occur with appropriate ethnic organizations or persons, including, for Native Hawaiians, the Office of Hawaiian Affairs (OHA). (HAR §13-275-8).

For archaeological resources, historic buildings, human burials, and other traditional cultural resources (e.g., sacred sites and other places which may or may not include physical remains), the ROI consists of the Kapālama and Pier 24–28 sites. For traditional cultural practices, the ROI is Honolulu Harbor and vicinity, including nearby Keʻehi Lagoon and Mokauea Island.

4.4.1 Kapālama Site

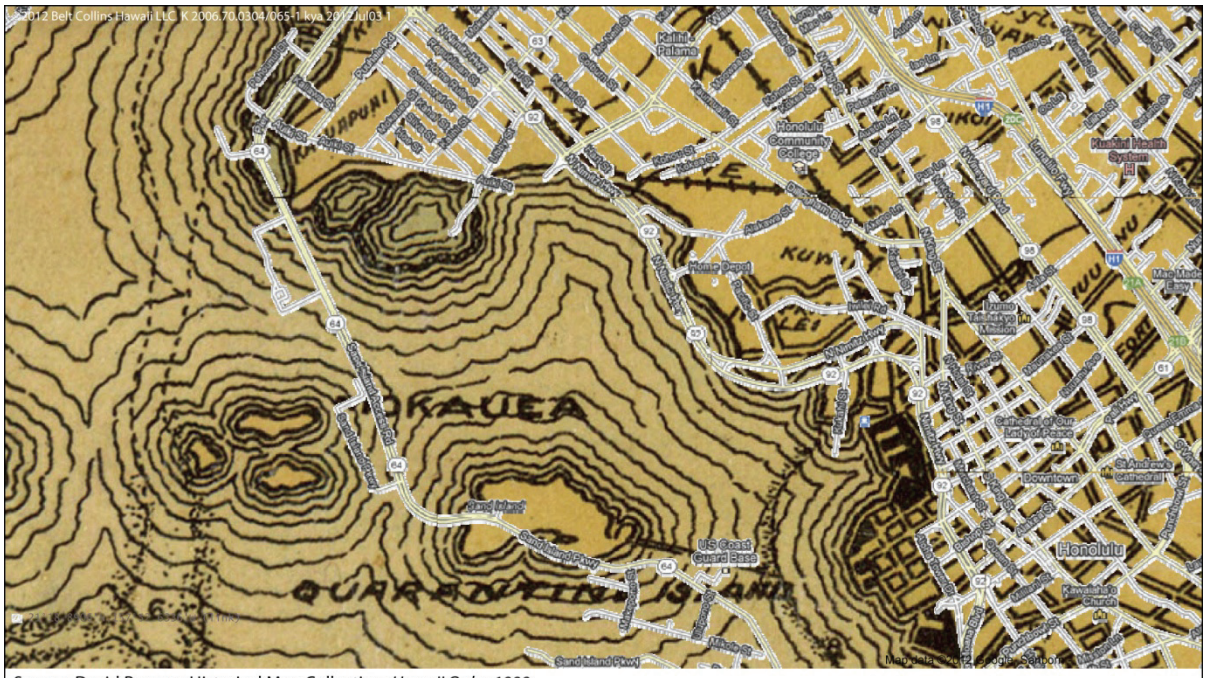
4.4.1.1 Affected Environment

Honolulu has been a center of political and economic activity in Hawaiʻi since the time of Kamehameha I. Until about 1920, the Kapālama site consisted of fishponds and tidal flats. The area that now stretches from the Honolulu Airport Reef Runway, along Keʻehi Lagoon, to Sand Island has been transformed from a series of rich fishing sites and ponds to a mix of industrial, commercial, and recreational uses. Fishing persists in Keʻehi Lagoon but is not allowed within Honolulu Harbor.

The information in the section applies to the Kapālama site and the Pier 24–28 site. This account of archaeological resources and cultural sites and practices is based on earlier studies of the Kapālama site and of Honolulu Harbor. Earlier studies illuminate cultural practices in the general area, particularly fishing and boating on the Keʻehi side of Sand Island, rather than in the harbor. For those studies, cultural specialists sought to find informants on traditional practices and interviewed several fishermen along the Sand Island shoreline. For this EIS, OHA was consulted and informal discussions were conducted with Joni Bagood and Kehaulani Kupihea of the Mokauea Fishermen's Cooperative in June 2012.

[6] The first four criteria are also used for NRHP.

Figure 4-3 shows the area around the Kapālama site on a map issued in 1899 with today's streets superimposed. The site extends from a narrow band of shoreline, through two fishponds, and into the water. Sand Island and the land surrounding Sand Island Access Road were developed from areas once under water, along with a small and isolated "Quarantine Island" farther out from land.



Source: David Rumsey Historical Map Collection. *Hawaii Oahu 1899.* http://rumsey.geogarage.com/maps/g3707000.html. Downloaded on May 22, 2012.

Figure 4-3. Area Surrounding the Kapālama Site in 1899

Archaeological Resources (Before the Territorial Period)

A fishery official reported in 1905 that the Auiki and Ananoho fishponds were in commercial use.[7] The fishponds and tidal flats were extensively filled from the 1920s through the mid-1940s. No records of salvage archaeology from that period have been noted. Maps suggest that the Army had finished filling in the Kapalama Military Reservation (KMR) site by 1943, but did not build the warehouses now on the site until later.

[7] John N. Cobb, cited in IARII (Athens and Ward), 2002. The two fishponds are recognized in the State Inventory of Historic Places (SIHP) as site 50-80-14-73.

The Kalihi area was populated and cultivated for centuries. After the Great Mahele[8], *kuleana* lands were recognized at Kaluapuhi, a site near the intersection of Auiki Street and Sand Island Access Road. Lands in Kalihi Kai were allotted to royalty and their close associates. Queen Kalama had a houselot award in Pu'uhale near Loko Auiki.

Archaeological studies in Kalihi Kai have had limited results:

- Reconnaissance of a parcel near the intersection of Sand Island Access Road and Auiki Street did not result in any finds. [9]
- A burial was discovered in 1997 at Pier 40 by Hawaiian Dredging. The site was on the pre-contact coastline.[10]
- Sediment cores from the Kapālama site were recovered and analyzed in two studies. For the first study, two sites were at Auiki fishpond, two at Ananoho, and one (within the Kapālama site, facing Pier 41) outside the fishponds (IARII 2002) (Figure 4-4) However, the soil had been so thoroughly disturbed in the course of filling that pre-contact layers could not be identified to date the initial construction of the ponds. A follow-up study took two cores from the Ananoho fishpond site (from locations within the KMR area) and reached the same conclusion (IARII 2002). SHPD concluded:

  "… you have determined that the proposed Honolulu Harbors redevelopment project will not adversely affect archaeological resources at the former Kapalama Military Reservation. We concur with your determination of effect. You also recommend that no further archaeological work is needed for either Auiki or Ananoho Fishponds. We concur with this recommendation."[11]

Historic Structures (Territorial Period)

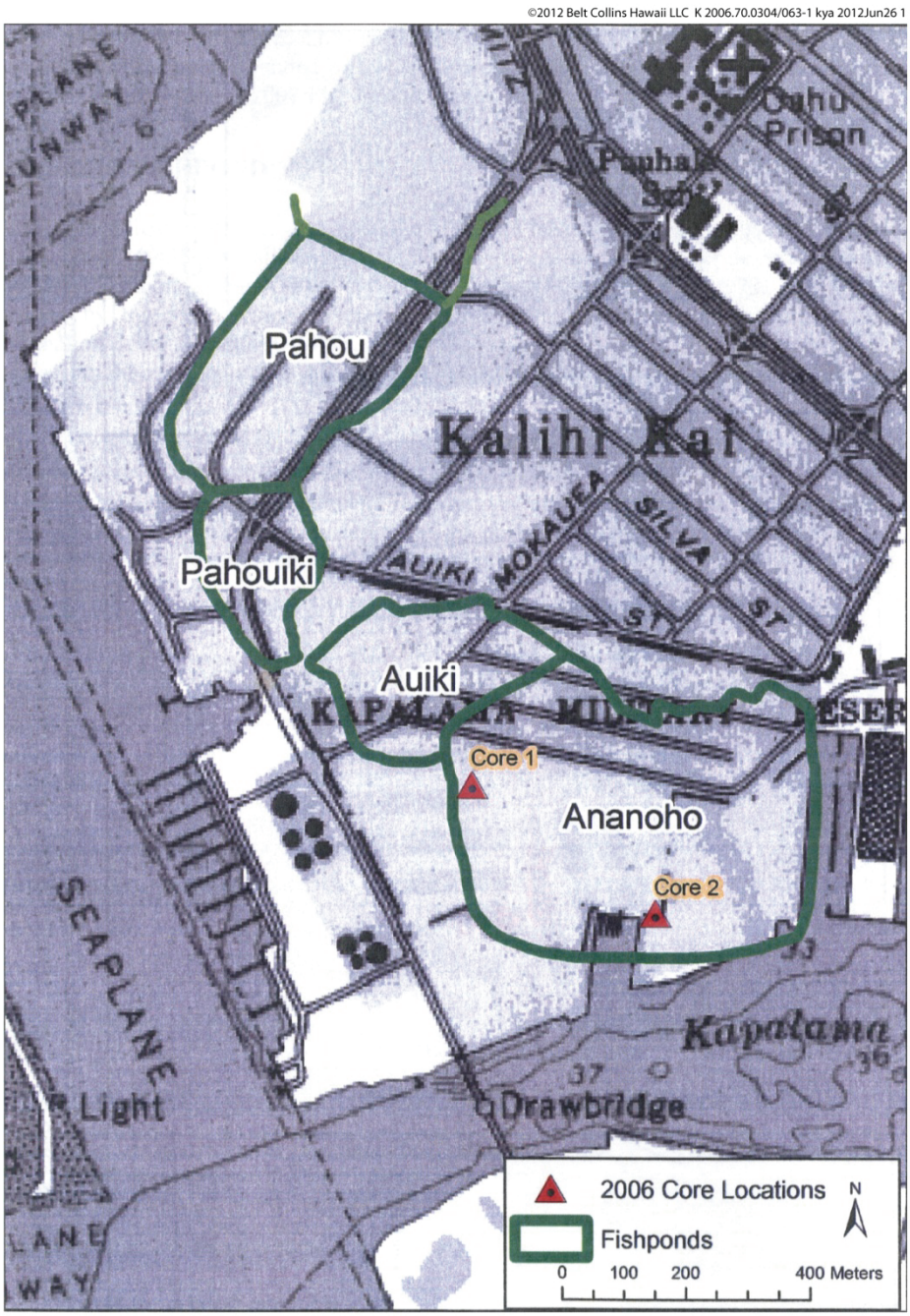
This section summarizes the account of development on the Kapālama site in the historic architectural survey completed in 2007 of the KMR and Hawaiian Dredging lands for the Department of Transportation (Fung 2007).

8 In the mid-19th century, all lands were divided among the king, the high chiefs, and the government through a process called the Mahele. Commoners were allowed to claim lands that they used and occupied (called *kuleana*) though the Land Commission process.

9 Hammatt 1986, as reported in Hammatt and Shideler 2007.

10 SIHP Site 50-80-14-5581.

11 Letter, M. Chinen to S. Athens, May 24, 2007. Agency log number: 2007.1594.



Source:
International Archaeological Research Institute, Inc. May 2007. *Anaoho Fishpond, Kalihi Kai, Honolulu, O'ahu: Paleoenvironmental Study.* Prepared for Fung Associates.

Figure 4-4. Kapālama Site Fishponds

Hawaiian Dredging Company purchased 560 acres of land along the west side of Kapālama Basin. The land included the Ananoho and Auiki fishponds. By the late 1920s, a channel 20 feet deep and 100 feet wide had been dredged. In 1930, part of Ananoho Fishpond was leased to the City and County of Honolulu (City) as a dump site. In 1939, Hawaiian Dredging built several structures on the site. Some of these continue to be used by PSI.

In 1941, the Army Quartermaster Corps recognized the need for a military terminal and storage site in Honolulu, and contracted with Hawaiian Dredging Company for the construction of piers, a terminal, and warehouses. Some 62 acres were condemned for Army use, and 25.86 acres of additional land were acquired in 1942. By 1945, some 21 warehouse buildings were on the KMR site. KMR served as the leading Army storage site for supplies and equipment during World War II and the Korean War. In 1954, a small mortuary and morgue were added by renovating Buildings 913 and 914. It remained in use as a military mortuary through the Vietnam War.

The KMR site was divided into four lots and sold to the State of Hawaiʻi and local firms (Young Brothers, Ltd. and Servco Pacific Inc.) from 1987 through 1989. The State Department of Transportation, Harbors Division (DOT-H) has long planned to demolish the structures on portions of the former KMR to construct additional cargo handling facilities. It has communicated with SHPD about the treatment of the buildings on the site. SHPD indicated that demolition could proceed (a) once core samples (discussed in section 5.4.2) were taken and analyzed, (b) architectural and ethnographic documentation of the site "as a district and placing KMR in the historic context of both WWII and the Vietnam War" was completed, and (c) attempts were made to find a construction or salvage firm that could salvage windows, doors, or other features of the buildings.[12]

DOT-H commissioned a study to Historic American Buildings Survey (HABS) III standards of the KMR buildings built before 1965. The study covered Buildings 904, 905, 906, 910, 913, 914, 915, 916, 917, 918, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, and 935, and buildings occupied by PSI and Island Movers. The study also dealt with buildings currently occupied by Young Brothers, Ltd. at Pier 40. Documentation included site plans, exterior and interior photographs, and written reports describing physical elements, features, and details of the buildings. Historic records were searched for plans, descriptions, and photographs of KMR. Interviews were conducted with two persons who had served at KMR.

[12] Letter, Melanie A. Chinen, Administrator, SHPD, to Sandra Pfund, April 3, 2006, SHPD log no. 2006.0829, included in the Fung Associates report.

The warehouses at the Kapālama site have been leased on an "as is" basis. Leases will end by early 2014, and the structures will be demolished soon thereafter.

Cultural Practices

The ponds and tidal flats at Kalihi Kai once were extensively fished. In addition to the named ponds with high banks, smaller *pu'uone* ponds with dune banks were developed nearby or at the mouth of streams. These often belonged to commoners.[13] Fishing areas were also recognized by the Board of Land Commissioners. It is clear that Kai o Mokauea, the Mokauea fishery, extended to the current Kalihi Channel on its western side. The eastern boundary may have been along Loko Ananoho.

Salt was made in ponds near the fishponds to the northwest of the Kapālama site. Out to sea, the reef provided fish and shellfish. The reef was dry at low tide, so it was possible to walk to some of the offshore islets. Also, travelers could walk and swim between Honolulu and Pu'uloa (Pearl Harbor), avoiding the much longer trip along the coast. Residents of Mokauea Island traveled by canoe daily and carried water from Pu'uhale to their homes.[14]

Mokauea Island was inhabited in 1975 but claimed by the State of Hawai'i. Residents were evicted and their homes burned. After protests, a lease was negotiated and members of the local community rebuilt their homes. The Mokauea Fishermen's Association, with help from volunteers, has worked to clear the island of debris and to redevelop a fish pond. The restoration effort has been continued and extended by Kai Makana, a group dedicated to ocean education.[15] Mokauea is now both home to a few families and the site for educational programs.

Sand Island Recreation Area and Ke'ehi Lagoon are actively used for fishing. Outrigger canoe paddling, the official state sport of Hawai'i, has found a home at the Ke'ehi Lagoon Beach Park, used by canoe clubs as a launch site for practices, races, and regattas. Clubs also store canoes and launch them near the boat ramp on the Sand Island side of the bridge to the island.

A study in 2008 compiled testimony of extensive fishing from the Ke'ehi side of Sand Island but no fishing in the harbor (DOT-H November 2008).

As an active port, Honolulu Harbor is subject to federal security regulations enforced by the U.S. Coast Guard's (USCG's) Captain of the Port. No swimming or diving in the harbor is permitted. Areas actively used for cargo operations are fenced, and admission is controlled.

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13 Maly and Maly 2003, cited in Hammatt and Shideler 2007.

14 Oppenheimer [Napoka] 1976.

15 For details of history and current volunteer activity, see http://www.kaimakana.org/mirp.htm.

In sum, fishing and related cultural practices have been important in and near the Kapālama site for many years. Fishing continues to be important to Honolulu residents to this day, but Honolulu Harbor waters are no longer used for this activity.

4.4.1.2 Environmental Consequences

Proposed Action

Construction Impacts

The Proposed Action would not significantly impact cultural resources, including cultural practices. SHPD restated its determination of "no adverse effect" on archaeological resources in response to the EISPN for the Proposed Action in a letter dated December 12, 2011. Its letter of April 3, 2006 (see Appendix H-1) spelled out mitigation measures and reached a determination of "'effect, with proposed mitigation commitments' (or 'no adverse effect') per Chapter 6E-8 (HRS)." SHPD's review of the project considered properties listed and eligible (by nomination) for listing on the Hawaii Register of Historic Places and National Register of Historic Places. If human remains or subsurface archaeological resources are encountered during construction, work at the site in question would stop, and SHPD would be contacted in accordance with State law and rules.

The warehouses built in this century on the Kapālama site will have been demolished before the Proposed Action occurs. DOT-H has already documented their use and appearance.

Operational Impacts

No operational impacts on cultural resources or practices are expected.

Mitigation Measures

No additional mitigation measures are needed. Mitigation measures for historic structures include documentation, which has been completed, and an attempt to salvage intact architectural features. That attempt would be made during demolition.

Alternative Action

Construction Impacts

Construction impacts would be similar to the Proposed Action.

Operational Impacts

No operational impacts on cultural resources or practices are expected.

Mitigation Measures

As with the Proposed Action, no additional mitigation measures are required.

No Action Alternative

With no development at the Kapālama site and no change in use, there would be no construction or operational impacts. No mitigation is needed.

4.4.2 Piers 24–28

4.4.2.1 Affected Environment

Piers 24–28 are currently developed and in use for maritime activities. They are part of the controlled harbor area, in which access by the public at large is limited and activities such as fishing and swimming are banned. For a summary of cultural resources and practices, see section 4.4.1, Kapālama Site.

4.4.2.2 Environmental Consequences

Proposed Action

Construction Impacts

Construction of new landside facilities at the Pier 24–28 site is not expected to affect cultural resources. If human remains or subsurface archaeological resources are encountered during construction, work at the site in question would stop, and the State Historic Preservation Division would be contacted in accordance with State law and rules. No cultural practices have been identified at Piers 24–28; hence, no impacts on cultural practices are expected.

Operational Impacts

No operational impacts on cultural resources or practices are expected.

Mitigation Measures

No additional mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

4.5 SOCIOECONOMICS

This section evaluates how the Proposed Action and alternatives would affect or contribute to changes in economic and social conditions, including demography, community cohesion, and economic or community wellbeing. The significance of an impact is determined by the amount of change anticipated, as compared to the No

Action Alternative. For this assessment, the ROI ranges from the community surrounding Honolulu Harbor to the entire state.

4.5.1 Affected Environment

The account of existing socioeconomic conditions addresses both the Kapālama and Pier 24–28 sites. Potential impacts are discussed below separately for each site.

4.5.1.1 State of Hawai'i and Island of O'ahu

Hawai'i depends on its ports far more than any other state. Honolulu Harbor is the entry point for nearly all the freight to Hawai'i and the transfer point for cargo to and from the neighbor islands.

The City and County of Honolulu (island of O'ahu) is home to 70 percent of the state population. It is the economic center and transportation hub of Hawai'i. Both the state and the island economy depend on efficient and low-cost freight movements through Honolulu Harbor.

The leading Hawai'i maritime carrier, Matson Navigation Company, pioneered the conversion of cargo shipments from bulk to container loads, starting in the 1950s. Containerization has greatly lowered the cost and time involved in cargo movement, increased the variety of products available in the islands, and lowered the costs to consumers. In Hawai'i containerization and cargo handling has evolved over decades into a highly mechanized process integrated with information systems for shippers, carriers, and recipients, thus reducing the need for expensive Hawai'i land (warehousing) and labor.

In 2004, some 820,000 twenty-foot equivalent units (TEUs)[16] moved through Honolulu Harbor. Volumes declined through 2009 but have since stabilized. DOT and maritime stakeholders have recognized since the 1990s that a new container-handling area would soon be needed (DOT-H 1997, DOT-H September 1997, HHUG 2005, HHUG 2007).

The largest industries in Hawai'i (in terms of employment and wages) are tourism and national defense. Both depend on container shipment for supplies that support their operations. Even plantation agriculture in Hawai'i has largely converted from bulk shipping, with high value-added products traveling by container (packaged specialty sugar) and air freight (high-value pineapples).

[16] TEU is the standard measure of container volume. A standard container, or one TEU, is 20feet by 8 feet by 8 feet. The longer containers, 40 feet by 8 feet by 8 feet, equal two TEUs.

4.5.1.2 Area Near The Project Sites

The area surrounding the Kāpalama site is largely industrial. Kalihi Kai, north of Auiki Street, has a mix of small businesses, warehouses, and residential buildings. The narrow streets are crowded during the day by parked cars of workers. Nearby, Sand Island Access Road conveys truck traffic to and from the container yards on Sand Island, and serves a mix of businesses in the Kalihi Kai area. Sand Island Access Road ends at Nimitz Highway, which connects Honolulu's central business district to the airport and the Māpunapuna industrial area. Honolulu Harbor extends along Nimitz Highway. While many of the older piers serve smaller vessels, Pier 29 has been refurbished for overseas barge traffic, Piers 37 and 38 serve as the center of the fishing industry, and Piers 39 and 40 house Young Brothers, the leader in inter-island cargo traffic. See Figure 2-2 for pier locations.

Sand Island faces the project sites across the harbor. It includes two operating container yards, the base for USCG maritime activity, an industrial area, and on the seaward side, a State recreation area. It is linked to the mainside by Sand Island Bridge. The bridge has been fixed in place since the second span was built, so no ship traffic can pass between Honolulu Harbor and Keʻehi Lagoon. Keʻehi Lagoon has a small boat harbor, a separate small boat launch ramp, additional moorings, and space used for outrigger canoe activities. The small boat harbor has nearly 600 slips and off-shore moorings. A small community lives on Mokauea Island in the lagoon off Sand Island.

The project sites are within the Kalihi-Palama Neighborhood Board (No. 15) area, as shown in Figure 4-5. Neighborhood Board No. 15 has a population of approximately 38,000. Social characteristics of the immediate area near the Kāpalama site were derived in part from U.S. Census data, Honolulu Census Tract (CT) 59, which includes the blocks between the project sites and Dillingham Boulevard, and the area along Sand Island Access Road before the bridge to the island. In 2010, CT 59 had a household population of 1,892 persons, most of whom lived between Nimitz Highway and Auiki Street.[17] The Pier 24–28 area is within CT 57, along with all of Sand Island. The area inland from Piers 24–28, across Nimitz Highway, largely consists of industrial and commercial/office uses.

[17] The Census counts people as in households or "group quarters." In Census Tract 59, the Oʻahu Community Correctional Center, north of Nimitz, accounts for nearly all of the group quarters population. Its inhabitants are considered outside the area of interest for this study, so the analysis deals, where possible, only with the population in households. Also, for most of the 2006 to 2010 period, no group quarters were included in any American Community Survey samples.

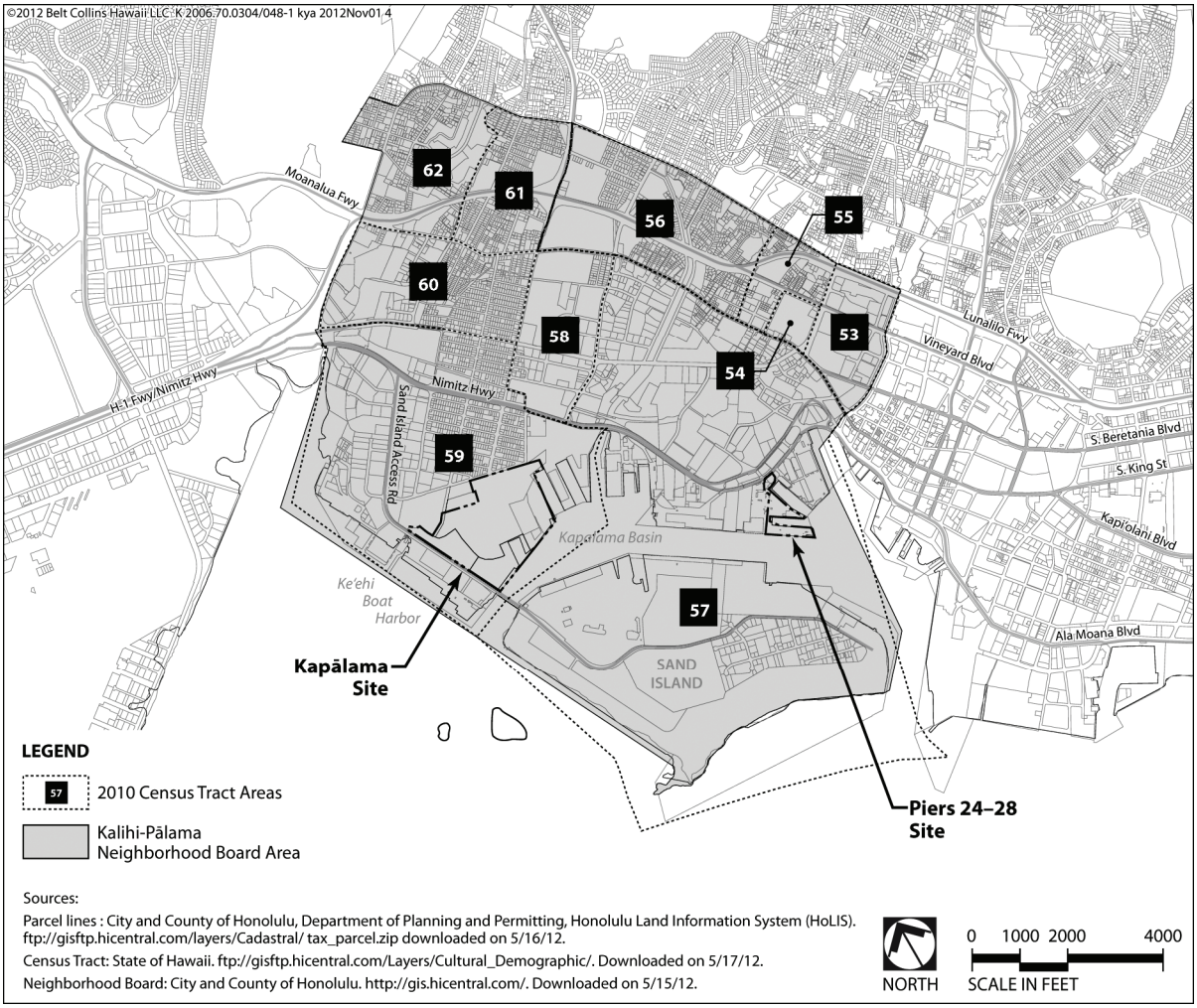

Figure 4-5. Kalihi-Palama Neighborhood Board Area and Census Tracts

Census data are available from the 2010 Census, which was designed as an enumeration of all residents, and from the American Community Survey (ACS). Currently, the decennial census deals only with a short set of questions about persons and households. Data on employment, income, commuting, and many other topics are compiled through the ACS. The ACS is an annual sample survey. When samples from multiple years are combined, data can be reported for small areas such as CTs.

Three distinct zones of concern have been identified for the social impact analysis. The zones and associated reasons for concern follow.

- The Kalihi Kai area between Auiki Street and Nimitz Highway. This area could be affected by a change in the volume and type of traffic, depending on the plan for the yard layout and access.
- Sand Island Access Road and nearby tenants. This area could also be affected by changes in traffic patterns.
- Residential areas in downtown Honolulu. These areas could experience changes in noise levels due to the move of PSI and Atlantis to Piers 24–28. (Nimitz Highway and commercial establishments along the highway separate the Pier 24–28 area from residential communities. Therefore, potential social impacts of the PSI move would be associated with possible noise impacts, rather than from direct involvement with existing communities.)

4.5.1.3 Local Economy

Many in the CT 59 population have modest incomes (as shown in Table 4-1). The median household income was estimated to be about two-thirds of the islandwide median. The percentage of households relying on food stamps is greater than the islandwide percentage, and few households have retirement income. Unemployment is low at 1.2 percent.

Table 4-1. Household Income

Survey-based data collected 2006 to 2010: Income is for most recent year, in 2009 $	City and County of Honolulu	Census Tract 59	Census Tract 57
Median Household Income	$70,093	$47,284	$35,294
Share of Households With			
Earnings	83.4%	91.7%	80.3%
Social Security	30.4%	29.0%	11.1%
Retirement Income	23.0%	12.2%	8.0%
Supplemental Security	3.3%	5.7%	7.1%
Cash Public Assistance	3.3%	5.5%	0.0%
Food Stamps	6.6%	12.2%	11.6%

SOURCE: American Community Survey, 2006 through 2010, downloaded from American FactFinder (www.census.gov).

The industries with the largest workforce among CT 59 residents are hotels and food service. However, the industries with the largest employment in the immediate area

are transportation, construction, and wholesale trade.[18] Local industry depends on workers who commute from other parts of O'ahu, far more than on the local area resident workforce.

Table 4-2. Employment

Survey-based data collected 2006 to 2010	City and County of Honolulu	Census Tract 59	Census Tract 57
Estimated Working Age Population	752,343	1,603	1,946
Estimated Civilian Labor Force	462,843	983	1,223
Employed	439,701	971	988
Unemployed	23,142	12	235
Unemployment Rate	5.0%	1.2%	19.2%
Share of Employed, by Industry			
Agriculture, forestry, fishing and hunting, and mining	0.8%	0.0%	1.1%
Construction	7.2%	7.2%	10.4%
Manufacturing	3.5%	3.6%	5.2%
Wholesale Trade	2.9%	9.0%	0.9%
Retail Trade	11.1%	4.7%	12.4%
Transportation and Warehousing, and Utilities	6.0%	6.2%	7.8%
Information	2.1%	0.0%	1.0%
Finance and Insurance, and Real Estate and Rental and Leasing	7.2%	0.9%	10.1%
Professional, Scientific, and Management, and Administrative and Waste Management Services	10.2%	14.8%	8.8%
Educational Services, and Health Care and Social Assistance	21.7%	14.1%	13.2%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	13.6%	32.3%	21.0%
Other Services, Except Public Administration	9.5%	3.2%	6.4%
Public Administration	4.3%	3.9%	1.7%

SOURCE: American Community Survey, 2006 through 2010, downloaded from American FactFinder (www.census.gov).

[18] Economic census data for Zip Code Tabulation Area 96819 for 2009 posted at www.census.gov. This area is much larger than CT 59. However, no data on employment within Census Tracts (as opposed to employment of residents of those tracts) has been reported since the 2000 Census.

4.5.1.4 Population and Households

Table 4-3 provides information for the City and County of Honolulu as a whole, CT 59 (including the Kapālama site), and CT 57. CT 57 covers the Pier 24–28 site and much of the remaining harbor/industrial area.

Table 4-3. Population Characteristics, 2010

	City and County of Honolulu	Census Tract 59	Census Tract 57
Population	953,207	3,353	2,148
Under 5	61,261	134	100
5 to 18	149,239	1,224	950
18 to 64	604,217	1,776	887
65 and over	138,490	219	211
Share of Population			
Under 5	6.4%	4.0%	4.7%
5 to 18	15.7%	36.5%	44.2%
18 to 64	63.4%	53.0%	41.3%
65 and over	14.5%	6.5%	9.8%
Race—alone or in combination with other races			
White	36.8%	16.4%	24.0%
Black or African American	3.4%	3.1%	3.6%
American Indian and Alaska Native	2.1%	0.7%	2.8%
Asian	62.0%	51.6%	59.5%
Native Hawaiian and Other Pacific Islander	24.5%	38.3%	30.3%
Some Other Race	2.3%	2.4%	2.3%
Racial Identifications/Population	1.31	1.12	1.23
Latino Share	12.7%	5.9%	7.3%

SOURCE: 2010 Census downloaded from American FactFinder (www.census.gov).

Table 4-3 shows the local population as of 2010 in relation to the City as a whole. Table 4-4 adds citizenship data from the ACS. Indications of the distinctive demography of CT 59 include:

- A population with relatively few small children and few elders;
- A large Native Hawaiian and Other Pacific Islander population, and a majority Asian population;

- A relatively low incidence of multiple race claims (for Hawai‘i);
- A population in which 40 percent were born in Hawai‘i and 45 percent were born outside the United States; and
- A quarter of the population without American citizenship.

The CT 59 household population consists overwhelmingly of renters. Households tend to be larger than the island average.

Table 4-4. Citizenship

Survey-based data collected 2006 to 2010	City and County of Honolulu	Census Tract 59	Census Tract 57
Citizenship			
Native	80.5%	55.2%	70.3%
Born in Hawai‘i	54.7%	40.1%	38.4%
Foreign-born	19.5%	44.8%	29.7%
Naturalized	11.3%	20.5%	14.3%
Not U.S. citizen	8.3%	24.3%	15.3%

SOURCE: American Community Survey, 2006 through 2010, downloaded from American FactFinder (www.census.gov).

Table 4-5. Households

	City and County of Honolulu	Census Tract 59	Census Tract 57
Population	953,207	3,353	2,148
Population in Households	917,907	1,892	1,725
Share of Population in households	96%	56%	80%
Households	311,047	609	868
Rented	43.9%	90.8%	82.4%
Average Household Size			
All Households	2.95	3.11	1.99
Owner-occupied	3.11	2.46	2.27
Rented	2.75	3.17	1.93

SOURCE: 2010 Census, downloaded from American FactFinder (www.census.gov).

Information collected by the school nearest the Kapālama project site, Puʻuhale Elementary, brings out more detailed ethnic and economic characteristics of the local population (DOE 2011). The school's 2011 student population is:

- Largely Filipino (52.3 percent), while 18.0 percent are Micronesian and 13.8 percent are counted as Native Hawaiian;[19]
- From households with low incomes—78.6 percent qualify for free or reduced-cost meals at school; and
- Comprised of a large group (35 percent) with limited English proficiency.

4.5.1.5 Community Concerns

Minutes of the Kalihi-Palama Neighborhood Board meetings for 2011 and early 2012 were reviewed to learn of community concerns independent of the project. Major issues discussed included:

- **HOMELESS PERSONS AND THEIR BELONGINGS.** Residents were concerned about the presence of many homeless persons. While considerable sympathy was expressed, many speakers were frustrated because sidewalks and other areas were obstructed.
- **SPEEDING AND TRAFFIC.** Some narrow side streets are used as shortcuts to Likelike Highway, creating dangerous conditions. Installation of speed bumps or other control devices was considered but difficult to implement because these are not City streets. In Kalihi Kai, residents reported trucks waiting on City streets to enter the Young Brothers yard. In both cases, the local road system is clearly inadequate to handle growing traffic demand.
- **COST OF PROPOSED GOVERNMENT PROJECTS.** The monthly reports on the Honolulu rail project to the Neighborhood Board usually led to discussions of the public's ability to pay for the rail project. Similarly, a plan for major improvements at Sand Island State Recreation Area was greeted by cost and traffic concerns.
- **POSSIBLE SCHOOL CLOSURES.** Residents of the area opposed possible closure of Likelike or Puʻuhale Elementary School by the State Department of Education (DOE).

Questions were raised about the Kapālama Container Terminal project, and DOT officials were invited to present the project to the Neighborhood Board. Comments pertained to concerns about traffic, noise, possible impacts to Mokauea Island, and

[19] Department of Education listings treat each student as having a single ethnicity, and hence differ from the Census's current practice of recognizing more than one racial identification.

the idea of locating the new container yard at Kalaeloa Barbers Point Harbor. One resident was concerned that the project would affect property taxes for nearby properties.

At two public meetings (each with two sessions) convened by DOT for the Kapālama site, major concerns included when existing tenants in the Kapālama warehouses would need to move, traffic congestion and pedestrian safety, and noise due to yard operations and truck movements.

4.5.1.6 Socioeconomic Trends

Both population increase and economic growth are expected to proceed at a slow pace in the next few years. Oʻahu's population is forecast to grow by 0.5 percent annually from 2010 to 2035; employment is expected to increase at 0.8 percent annually.[20] The Kalihi-Palama area is expected to see slower changes: 0.4 percent annual population growth and 0.5 percent employment growth.

Population growth on Oʻahu is directed by City and State policy towards the Primary Urban Center (stretching from ʻAiea to Kāhala) and the ʻEwa Development Plan area on the west side of the island. In the Honolulu urban area, the increase in population is expected to be accommodated through redevelopment and increased density, especially at locations near transit stations. The planned rail line will run along Dillingham Boulevard, at the inland edge of CT 59. New stations will be located near Middle Street, Mokauea Street, and Honolulu Community College. Current plans call for significant increases in density at the latter site, but no change in building heights at the Kalihi Station, nearest the Kāpalama Container Terminal site (DPP 2012). Eventual (over 20 to 30 years) new development within a half-mile of the Kalihi transit station is seen as involving up to 700 residential units, 27,000 square feet of commercial space, and 700,000 square feet of light industrial and office space. Within the Kalihi transit corridor, this "development potential" amounts to 11 percent of residential growth, seven percent of commercial growth, and 63 percent of light industrial growth. In effect, the forecast is for increasingly dense industrial activity in Kalihi Kai. At other station areas (along the Kāpalama Canal near Dillingham Boulevard, and in Iwilei) transit-oriented development plans call for much taller buildings and more development.[21]

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20 The forecast is from the DBEDT's 2009 projections for the State and counties. A more recent forecast shows little change in the long term trends. (The 2009 forecast is mentioned here because its results have been allocated to smaller areas by DPP.)

21 The plans discussed here are in draft form; no bill to allow changes in density shown in the plans has been submitted to the Honolulu City Council.

4.5.1.7 Relocation of Kapālama Tenants

Approximately 80 to 90 tenants currently rent space at Kapālama from DOT-H. Tenants are on month-to-month revocable permits. Gross lease rent is about $0.80 per square foot per month. The permits are "as-is" and tenants are responsible for repairs, if needed.[22] Tenants have been put on notice that DOT-H plans to convert the industrial area to a container terminal, and that their occupation at the Kapālama site will end as of early 2014. These communications have allowed tenants time to seek new space and plan their moves.

Tenants will need to find space elsewhere on the island. Currently, the vacancy rate for Oʻahu industrial areas is 5.8 percent, and the average gross rent is $1.28. The Iwilei and Kalihi areas have slightly higher vacancy rates than the island average, but rents are also higher. (The average gross rent in these districts is $1.33 and $1.35 per square foot, respectively.) (CBRE 2012). The current Kapālama tenants will not only pay to relocate but can expect to pay more in rent for new space. On the other hand, that space will likely be maintained in better condition than the Kapālama warehouses, and could be adapted to suit the specific needs of the tenant.

Tenants interviewed for a recent article in the Pacific Business News (PBN 2012) recognized that relocated tenants will pay more for space elsewhere. Brokers suggested that the process would "tighten up" the industrial market, and some tenants might not be able to continue operations at competitive lease rents.

The departure of these non-maritime dependent tenants at the Kapālama site and subsequent demolition of warehouses (buildings) and site clean-up would occur as a separate action. Therefore, the No Action Alternative, the Proposed Action, and the Alternative Action presume that these tenant departures and building demolition and site clean-up have occurred.

4.5.2 Environmental Consequences

4.5.2.1 Kapālama Site

Socioeconomic impacts would be associated with the on-site construction activities and with operations of the new container terminal at the Kapālama site. The impacts range from ones occurring on-site (such as employment of longshoremen) to ones possibly affecting nearby homes and businesses, to fiscal impacts on revenues gathered by the City State.

[22] Personal communication, Calvert J.T. Chun, Property Management, Harbors Division, Hawaiʻi State Department of Transportation, June 2012.

Proposed Action

Construction Impacts

Construction activities include (a) dredging, excavation, filling, construction of piers, and development of a container yard; and (b) further improvements by tenants to operate the yard effectively. Yard construction and improvements may be done in phases by DOT-H and by tenants, although the bulk of the work would be done initially, once permits are in place and a container yard tenant has been selected.

The total cost of construction of new facilities under the Proposed Action is estimated as $243 million dollars.[23] Based on recent data, it is reasonable to estimate construction employment on a major infrastructure project as generated at a ratio of 3.75 full-time workers per million dollars in infrastructure construction spending (DBEDT 2010). Direct construction employment for the Proposed Action would amount to 911 jobs.

Indirect and induced employment would also be generated by construction. Indirect jobs are created as firms involved in the direct activity, i.e., construction, purchase goods and services in the local economy. Induced jobs are created as direct and indirect workers spend much of their wages in the local economy. These effects, estimated using the State Input-Output Model (DBEDT 2011), would be 1,531 additional jobs.

Wages can be estimated using average wages per industry for construction, and average wages islandwide for indirect and induced jobs.[24] The total wages associated with construction come to $62.9 million for direct construction employment and $69.2 million for indirect and induced employment.

Construction activities could occur over a period of approximately two years. Given that timetable, the average annual employment with the Proposed Action would amount to some 456 direct jobs, and a total of 1,221 direct, indirect, and induced jobs. Hawaiʻi had a total of 39,100 construction jobs as recently as 2007. The total dropped to 28,800 by 2010, or 73.7 percent of the earlier figure. While construction job counts will increase due to work on the Honolulu Rail project and other major projects, the existing labor force is large enough to support the work involved in developing the Kapālama Container Terminal without significant impacts on the overall labor market.

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23 DOT-H estimate based on master plan for Kapālama and changes in bids for construction in the years since that study was published.

24 State of Hawaiʻi, Department of Labor and Industrial Relations, *2009 Employment and Wages in Hawaii.* Posted at http://hawaii.gov/labor/rs/whats-new/LFR_QCEW_ES2009.pdf. Wages are adjusted to 2011 dollars in line with changes in the Consumer Price Index. <link no longer works>

Construction and construction-related spending would generate revenues for the State City, as shown in Table 4-6.

Table 4-6. Government Revenues Associated with Construction at the Kapālama Site

	Proposed Action	Alternative Action
Construction cost estimate [1]	$243.0	$350.8
Construction-related wages	$132.1	$190.7
Excise Taxes to State [3]		
On construction	$9.8	$14.2
On spending by workforce	$3.4	$4.8
Excise taxes to City and County of Honolulu		
On construction	$1.1	$1.6
On spending by workforce [4]	$0.4	$0.5
Income taxes		
Corporate [5]	$0.4	$0.6
Personal [6]	$8.0	$11.6
Total revenues from construction spending		
State of Hawai‘i	$21.7	$31.3
City and County of Honolulu	$1.5	$2.1

Notes:

All $ values are for millions of dollars.

1 In millions of mid-2011 dollars.

2 Estimated from average industry wages, as discussed in text.

3 The State collects General Excise Tax (4%) and, on O‘ahu, an additional tax for transit (0.5%). Act 247 of 2005 directs the State to retain 10% of the County surcharge for administration costs. Hence, the State share of excise taxes is 4.05% and the City and County share is 0.45%.

4 Excise tax is calculated on disposable income, estimated as 62.6% of wages (from historical spending rates).

5 Corporate income taxes estimated (from historical rates) as 0.17% of revenues (data from 2000).

6 Personal income tax estimated as 6.1% of taxable income (from 2005 data).

In sum, significant beneficial impacts on construction jobs and wages would occur with the Proposed Action construction.

Operational Impacts

The Hawai'i economy is projected to grow over the coming years, and container traffic will increase with it. Development of a new cargo yard is needed to assure efficient container operations.

Maritime stakeholders have indicated that increases in container traffic could be handled with limited yard space, i.e., without a new container yard. However, with more containers in a limited space, the cost and time needed for cargo handling would increase. With limited yard space, the number of containers stacked (as opposed to on chassis) and the height of container stacks would increase. The space available to load, unload, and move containers would decrease. With higher stacks, the number of container movements in the yard would increase. For example, when a trucker comes to haul a container that has been placed in the middle of a stack, it would be necessary to remove containers stacked over it, and place them on the ground nearby, just to get to the desired container, and then restack those containers.

However, if yard space increases along with container traffic, more efficient operations can be conducted. Consequently, cargo handling activities would be more efficient and safe, as discussed below.

EMPLOYMENT. The workforce at the new terminal would include longshoremen, supervisors, maintenance staff, staff handling pick-up and drop-off of vehicles, planners, and administrators. The total workforce onsite when one ship is being loaded and unloaded could number up to 250 persons. If the volume of cargo is large enough, work could continue through two or three shifts.[25]

With two ships in port, the number of terminal workers on-site at any given time could climb to approximately 400 persons.

These numbers are presented in rounded form because the size of the workforce would depend on details of terminal design. New terminals are increasingly planned to take advantage of information systems, reducing time spent generating, checking, and correcting paperwork. Also, some administrative functions could be located off-site, either nearby or at other offices of the terminal operations company.

Since the increase in container handling jobs is due to economic growth, not due to the development of a new terminal, it is not appropriate to treat indirect and induced jobs associated with direct jobs at the terminal as impacts. Accordingly, these are not calculated here.

[25] This estimate derives from discussions with Hawai'i Harbor Users Group (HHUG) members in 2009 and 2010 and personal communication by Todd Iida, Terminal Operations Manager, Horizon Lines, Honolulu, June 2012.

EFFICIENCY. The operations employment impact of the Proposed Action, as compared to the No Action Alternative, involves efficiency, cost, and safety.

With a new container yard located next to the inter-island terminal, inter-island container traffic could be offloaded onto chassis and moved directly from one yard to the other. The work could be done by longshoremen at little or no additional effort (as compared to unloading containers, then finding and readying them for pick up by truckers). Travel time between container ship and inter-island vessel would be greatly reduced. The total cost savings is estimated as growing from about $473,000 annually in 2016 to $643,000 in 2039, for a total savings over the period of $13,392,707.[26]

POPULATION AND HOUSING. On-site worker population and Oʻahu population and housing are evaluated below.

- **ON-SITE WORKER POPULATION.** Conversion of the Kapālama site to a container terminal would increase the average on-site population from zero (after demolition of existing warehouses) to about 250 persons. As demand increases, this number could increase. However, efforts to increase operational efficiency should tend to reduce the time that trucks spend on-site, so the number of drivers on-site at a given time would likely not increase as quickly as cargo volumes. As noted above, the number of terminal employees on-site could reach 400 when cargo from two ships is being handled.
- **OʻAHU POPULATION AND HOUSING.** Development of the Kapālama Container Terminal would have minimal consequences for employment. Hence, it would not support population change or create new demand for housing. To the extent that efficient transport of container cargo increases efficiency and lowers the cost of transporting materials, the project can help to limit increases in the cost of housing materials, and hence the cost of construction in Hawaiʻi. That impact is expected to be beneficial but not significant.

SURROUNDING COMMUNITY. At public meetings held by DOT-H, residents of the surrounding area expressed concerns about noise, traffic, and property values. The first two issues are covered in technical studies (Appendices D and C to this EIS). Socioeconomic impacts can be associated with changes in traffic condition or noise level if a project creates new irritants that impede normal social life. Based on the

[26] The costs are based on estimated truckers' time (at 30 minutes for a trucker to move a loaded container and an empty between Piers 51 and 40, a round-trip distance of 3.3 miles) and on diesel costs at current (June 2012) cost per gallon and an average fuel consumption of 5.3 miles/gallon). The volume involved is estimated at, on average, 700 loaded containers/week currently being trucked between these piers, with the volume increasing in proportion to total container volumes in Honolulu Harbor from 2010 to 2039.

technical studies, no significant adverse impact on the surrounding community from noise (section 3-12) or traffic (section 2-5) is expected.

- **REAL PROPERTY IMPACTS.** These are not anticipated. Real property values are set by City assessors on the basis of market transactions. Development of the new container terminal would not create a sale value considered in assessing nearby properties, nor would terminal operations have an adverse effect on industrial and commercial activity nearby that could affect values.

ISLAND AND STATE DEVELOPMENT. The provision of container berthing and yard space to accommodate increasing cargo volumes would be beneficial for the island and state in several ways:

- First, local governments would recoup some of the cost of construction in the form of taxes on income and spending, as estimated above in Table 4-6.
- Next, the proposed development would limit the costs of transporting goods from the pierside to consumers in Hawai‘i. The increases in travel time estimated for the No Action Alternative would be small in relation to the overall time needed to move freight between overseas ports and Hawai‘i consumers. The cost involved – roughly $4/container – would add a small amount to the cost of goods sold in or exported from Hawai‘i. That cost would presumably be passed on to consumers.
- Third, development of a new container terminal would provide shippers with both space and an incentive to develop procedures that increase efficiency in the yards, and hence control the cost and time associated with their operations in the years to come.
- Finally, development of a container terminal on the mainside of Honolulu Harbor reduces the risk of disruption to commerce if traffic across the Sand Island Bridge were interrupted by any damage to the bridge or obstruction of the roadway.

The only significant socioeconomic impact of operations with the Proposed Action would be the long-term beneficial increase in efficiency and consequential support for the island and state economies. No significant adverse socioeconomic impact is anticipated.

Mitigation Measures

No mitigation is required.

Alternative Action

The Alternative Action would differ from the Proposed Action in its construction cost, construction-related economic impacts, and in the efficiency of operations.

Construction Impacts

Construction would be more expensive and would involve more labor with the Alternative Action as compared to the Proposed Action. For the Alternative Action, the estimated cost of construction comes to $351 million. At that cost, the direct construction jobs created would total 1,316 person-years; indirect and induced jobs associated with construction would number 2,210. Wages associated with construction of the Alternative Action come to $90.8 million for direct construction jobs, and $99.9 million for indirect and induced jobs.

As shown in Table 4-6, government revenues associated with construction would be larger with the Alternative Action than with the Proposed Action.

Operational Impacts

The Alternative Action would likely be less efficient than the Proposed Action. The condition of the structures and marine area at Snug Harbor under a deck would need to be assessed and maintained regularly. During maintenance, the new terminal might not be able to operate at capacity full-time. This difference would increase over time, as the structures age. Meanwhile, pier occupancies are expected to increase, so the impact of additional maintenance activity would also grow.

Mitigation Measures

No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

In the No Action Alternative, more containers would be moved in a space that is already constrained. Without port facility improvements, the cost of doing business in the ports would increase, and the Hawaiʻi economy as a whole would need to deal with a higher cost of goods imported or exported. The results include higher costs for consumers and slower economic growth. These costs have been estimated at a system level (HHUG 2007).

The No Action Alternative involves dealing with increasing congestion in existing container yards and on the nearby highways. Table 4-7 lists the assumptions used to develop annualized estimates of these savings. The table shows the total and average annual costs over the period 2016 through 2039. The estimates are based on information from Hawaiʻi commercial port experts (from discussions in 2009 and

2011), on federal standards for transportation studies, and current wage and fuel costs. The average cost associated with the No Action Alternative from 2016 through 2039 would be more than four million dollars annually. In other words, timely expansion of Honolulu's container yards would avoid this cost.

Additional costs of the No Action Alternative, not calculated here, include additional wear and tear on port equipment (leading to higher maintenance costs and shorter operating life), similar costs for trucks, and greenhouse gas emissions. All of the costs estimated here for the No Action Alternative can be considered as averted costs for the Proposed Action and Alternative Action.

4.5.2.2 Piers 24–28

Proposed Action

Construction Impacts

The total cost of proposed improvements could come to approximately $5 million. The exact amount would depend on whether new structures or renovated existing ones are used. Using the multipliers discussed above, the impact of construction at this site would come to about 19 direct jobs and would generate an additional 32 indirect and induced jobs. The wage impacts would come to a total of $2.7 million for all construction-related employment.

The State could gain approximately $445,000 from revenues associated with construction at Piers 24–28, while the City would gain a total of approximately $30,000.

No significant socioeconomic impact is anticipated from construction activities at Piers 24–28.

Operational Impacts

The major socioeconomic impact associated with new operations at Piers 24–28 consists of the relocation of ship repair and maintenance closer to residential areas. Findings from a noise impact study by Y. Ebisu and Associates (in Appendix D) indicate that operational noise from the shipyard operation is expected to be within the State's maximum permissible sound levels and would not be significant. Because certain types of shipyard operations could cause complaints from residences in Downtown Honolulu during the nighttime and early morning periods, possible mitigation measures have been identified.

Table 4-7. Estimate of Increasing Costs of Yard Congestion With No Action Alternative

Costs of No Action are due in part to:

A. Truckers' extra wait time if containers in yard are hard to reach.
Truckers handle an estimated 87% of containers (remainder moving from container yard to barge).

$21.19	Hourly cost of drivers' time (May 2011)	
1,000,000	TEU: containers in Honolulu Harbor, 2010	
1,500,000	TEU: containers in Honolulu Harbor, 2039	
2	average TEU per truck haul	
25	minutes: increase in truckers' wait time per R/T, 2010 to 2039	
	cost, 2016 to 2039	$75,032,694

B. Cost of diesel fuel while trucks are idling (wait time discussed above)

$4.69	Current (2012) cost per gallon	
0.875	Gal per hour	Fuel consumption while idling
	cost, 2016 to 2039	$14,531,166

C. With container yards packed more densely, longshoremen will need to do additional lifts and moves from ground to chassis to get containers to truckers

25%	increase in operations, by 2039	
2	TEU per lift or move on average	
25	moves/hr in TEU (average port crane)	
3	Yard workers affected per move	
$21.73	Average wage (based on transportation workers and crane operators)	
	cost, 2016 to 2039	$6,369,018

D. With dense yards, the risk of accidents for longshoremen increases

$5,009,701	Average annual cost of accidents, Hawaii Harbor System, 2006-2008	
$5,560,142	Cost in 2011 dollars (CPI adjustment)	
350	Acreage, Hawaii Harbor System, 2007	
70	Increased usable acreage with Kapalama	
20%	reduced density, 2016	
	density reduction (with lower accident rate) disappears by 2039	
50%	Share of accidents due to/affected by dense pack conditions	
	cost, 2016 to 2039	$6,672,171
	Total calculated cost, 2016-2039	**$102,605,049**
	Average annual cost	$4,275,210

Sources

Wages: Bureau of Labor Statistics, posted average wages in Honolulu Metropolitan Statistical Area for May 2011: http://www.bls.gov/oes/current/oes_26180.htm

Gas Prices: Diesel, lowest within five miles of container yards, June 11, 2012. www.honolulugasprices.com/index.aspx?fuel-D

Gas consumption: L Gaines, A Vyas and J. Anderson, "Estimation of Fuel Use by Idling Commercial Trucks." Transportation Research Board Paper no. 06-2567. www.transportation.anl.gov/pdfs/TA/373.pdf

Average lifts/hour, container ports (2002 paper; 2012 expert discussion). www.liftech.net/Publications/Cranes/Procurement%20and%20New%20Development/Quay%20Crane%20Productivity%20Paper.pdf. www.linkedin.com/groups/whats-average-crane-lifts-per-1947860.S.94487414

Cost of accidents: data provided by U.S. Department of Labor, Longshore District Office 13 (in 2009)

Mitigation Measures

No mitigation is required.

Alternative Action

Construction and operational impacts under the Alternative Action would be similar to the Proposed Action. No mitigation is required.

No Action Alternative

No change and, therefore, no impacts would occur under the No Action Alternative. No mitigation is required.

5 Relationship to Public Policies and Programs

CHAPTER 5 RELATIONSHIP TO PUBLIC POLICIES AND PROGRAMS

5.1 INTRODUCTION

This section addresses the compliance of the Proposed Action with applicable federal, state, and county policies and programs, notably the following:

- State law and implementing rules covering the preparation and processing of this Environmental Impact Statement (EIS).
- Federal laws and executive orders applicable to the proposed work in water.
- State of Hawaiʻi plans providing overall guidance on a number of issues, as well as specific planning documents on harbor development.
- City and County of Honolulu (City) land use plans.

5.2 HAWAIʻI REVISED STATUTES CHAPTER 343

This EIS is prepared in accordance with Hawaiʻi Revised Statutes (HRS) Chapter 343 and its implementation regulations (Hawaiʻi Administrative Rules [HAR] Section 11-200). For the Kapālama project, this law is triggered by the use of state land and funds.

5.3 RELATIONSHIP TO FEDERAL LAWS AND EXECUTIVE ORDERS

While this EIS is written according to HRS Chapter 343 and its implementing rules, it is also designed to satisfy expected content and consultation requirements relating to the need for a Department of the Army permit.

As the project would involve dredging and filling in harbor waters, a Department of the Army permit will be required from the U.S. Army Corps of Engineers (USACE) to comply with Section 404 of the federal Clean Water Act (CWA) and Section 10 of the federal Rivers and Harbors Appropriation Act. Therefore, this EIS has also been

prepared to provide information to the Corps to facilitate review and processing of the Department of the Army permit application, including consultations to comply with applicable federal requirements such as Section 7 of the Endangered Species Act (ESA) and Executive Order (EO) 13089, Coral Reef Protection.

Because federal jurisdiction for the Proposed Action is limited to waters of the U.S., the federal scope of analysis consists of in-water activities required to construct the water-dependent portions of the project, for example, bulkheads and piers. The federal scope of analysis does not include the non-water dependent elements of the project.

The project will be accomplished in compliance with the following federal laws and EOs, which are applicable to the proposed work in water and required Department of the Army permit. This list is not exhaustive, and other federal laws, regulations, and EOs may also apply.

- Clean Water Act (CWA) of 1972, Sections 401 (water quality certification), 402 (National Pollutant Discharge and Elimination System [NPDES]), and 404 (dredging)
- Clean Air Act (CCA), Section 176(c), General Conformity Rule Review
- Coastal Zone Management (CZM) Act of 1972
- Endangered Species Act (ESA) of 1973, Section 7
- Fish and Wildlife Coordination Act of 1980
- Marine Mammal Protection Act (MMPA) of 1972
- Marine Protection, Research and Sanctuaries Act
- Rivers and Harbors Appropriation Act of 1899, Section 10
- Executive Order (EO) 13089, Protection of Coral Reefs
- EO 13175, Consultation with Indian Tribes, Alaska Natives, and Native Hawaiians
- EO 11988 Floodplain Management
- EO 12898 Environmental Justice
- EO 13112 Invasive Species

5.3.1 Summary of Required Federal Approvals and Consultations

Following is a list of federal government consultations and permits that may be required (approving or administering agency in parentheses):

- National Environmental Policy Act*
- ESA Section 7 consultation (National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS)*

- NHPA Section 106 consultation (State Historic Preservation Officer)*
- CWA Section 404 permit (U.S. Army Corps of Engineers (USACE))
- CWA Section 401 water quality compliance (U.S. Environmental Protection Agency [EPA])
- CWA Section 402 National Pollutant Discharge Elimination System Permit (State Department of Health (DOH))
- Rivers and Harbors Act, Section 10 permit (USACE)
- Rivers and Harbors Act, Section 14 permit (USACE)
- Marine Protection Research and Sanctuaries Act, Section 103 permit (USACE with Environmental Protection Agency [EPA])
- Essential Fish Habitat (EFH) consultation (NMFS)
- Navigable Airspace analysis (Federal Aviation Administration)

(* Identifies a USACE obligation.)

5.3.2 Other Applicable Federal Requirements

In addition, various aspects of the Proposed Action may be subject to other federal requirements, including those relating to hazardous materials and waste.

5.4 HAWAIʻI STATE PLAN

The Legislature in 1978 adopted the Hawaiʻi State Planning Act (Planning Act) as HRS Chapter 226 to establish direction and provide long-range planning for the State. The Planning Act called for the creation of 12 functional plans to set specific objectives, establish policies, and implement actions for a particular field of activity.

The Legislature in 2005 under the Special Session Laws of Hawaiʻi enacted Act 8, which provided for the development of the *Hawaiʻi 2050 Sustainability Plan*. Legislators felt that with the passage of time and new challenges facing the State a thorough review of existing 30-year-old plans would be in the public interest. Legislators recognized that while many key initiatives were accomplished under the Hawaiʻi State Plan and State functional plans, they were simply outdated and needed updating. The intent, however, of the *Hawaiʻi 2050 Sustainability Plan* is not to replace existing State and County plans but to augment and complement them.

The following sections will evaluate the Action in relation to the goals and policies of the (1) Hawaiʻi State Planning Act; (2) State functional plans; and (3) the new Hawaiʻi 2050 Sustainability Plan.

The State Department of Business, Economic Development, and Tourism (DBEDT) (formerly known as the Department of Planning and Economic Development) completed in 1978 a *Hawai'i State Plan* to: (1) improve the planning process; (2) increase the effectiveness of government and private actions; (3) improve coordination among agencies and levels of government; (4) provide for the wise use of Hawai'i's resources; and (5) guide the future development of the state (DPED 1978).

The Planning Act consists of a series of broad goals, objectives, and policies that serve as guidelines for future long-term growth and development. It further (1) provides a basis for determining priorities and allocating limited resources; (2) seeks to improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and (3) establishes a system for plan formulation and program coordination to provide for an integration of all major state and county activities.

The Planning Act is divided into three sections: Part I—Overall Theme, Goals, Objectives and Policies; Part II–Planning Coordination and Implementation; and Part III–Priority Guidelines. Part I of the Planning Act consists of three overall themes: (1) individual and family self-sufficiency; (2) social and economic mobility; and (3) community or social well-being. These themes are considered "basic functions of society" and goals toward which government must strive (HRS §226-3).

Part II of the Planning Act primarily addresses internal government policies to help streamline, coordinate, and implement various plans and processes between governmental agencies. It seeks to eliminate or consolidate burdensome or duplicative governmental requirements imposed on business, where public health, safety, and welfare would not be adversely affected.

Part III of the Planning Act establishes overall priority guidelines to address areas of statewide concern (HRS §226-101). The overall direction and focus are on improving the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action (HRS §226-102).

Table 5-1and Table 5-2 present Parts I and III of the Planning Act, and evaluate the Action's conformance to the State's goals and objectives. Part II is not presented, as that section primarily pertains to internal government affairs. Certain sections within Parts I and III that do not pertain to the subject Action have been omitted.

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE		
226-1	Findings and purpose.	
226-2	Definitions.	
226-3	Overall Theme.	
226-4	State Goals. In order to guarantee, for present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve:	
(1)	A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations.	A
(2)	A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well being of the people.	C
(3)	Physical, social, and economic well being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.	A
CONFORMANCE DETERMINATION: The action appears to fully support HRS Section 226-4 since development of the container yard will enable and encourage economic activity and growth.		
226-5	**OBJECTIVE AND POLICIES FOR POPULATION**	
(a)	It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter;	
(b)	To achieve the population objective, it shall be the policy of this State to:	
(1)	Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.	C
(2)	Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.	C
(3)	Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.	A
(4)	Encourage research activities and public awareness programs to foster an understanding of Hawai'i's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawai'i's population.	NA
(5)	Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.	NA
(6)	Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.	NA
(7)	Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.	NA
CONFORMANCE DETERMINATION: Development of additional container yard space in Honolulu Harbor will encourage economic growth and will help control costs of inter-island transshipment.		

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
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226-6	**OBJECTIVES AND POLICIES FOR THE ECONOMY - IN GENERAL.**	
(a)	Planning for the State's economy in general shall be directed toward achievement of the following objectives:	
(1)	Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people.	C
(2)	A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.	A
(b)	To achieve the general economic objectives, it shall be the policy of this State to:	
(1)	Expand Hawai'i's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.	C
(2)	Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.	C
(3)	Seek broader outlets for new or expanded Hawai'i business investments.	C
(4)	Expand existing markets and penetrate new markets for Hawai'i's products and services.	A
(5)	Assure that the basic economic needs of Hawai'i's people are maintained in the event of disruptions in overseas transportation.	A
(6)	Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.	C
(7)	Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawai'i's small-scale producers, manufacturers, and distributors.	A
(8)	Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.	C
(9)	Foster greater cooperation and coordination between the government and private sectors in developing Hawai'i's employment and economic growth opportunities.	A
(10)	Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.	C
(11)	Maintain acceptable working conditions and standards for Hawai'i's workers.	C
(13)	Provide equal employment opportunities for all segments of Hawai'i's population through affirmative action and nondiscrimination measures.	C
(14)	Encourage businesses that have favorable financial multiplier effects within Hawai'i's economy.	C
(15)	Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.	C

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
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(16)	Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.	C
(17)	Foster a business climate in Hawai'i - including attitudes, tax and regulatory policies, and financial and technical assistance programs - that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.	C
CONFORMANCE DETERMINATION: The action supports orderly development of Hawai'i's industries.		
226-7	**OBJECTIVES AND POLICIES FOR THE ECONOMY - AGRICULTURE**	
(a)	Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:	
(1)	Viability of Hawai'i's sugar and pineapple industries.	NA
(2)	Growth and development of diversified agriculture throughout the State.	A
(3)	An agriculture industry that continues to constitute a dynamic and essential component of Hawai'i's strategic, economic, and social well-being.	A
(b)	To achieve the agriculture objectives, it shall be the policy of this State to:	
(1)	Establish a clear direction for Hawai'i's agriculture through stakeholder commitment and advocacy.	A
(2)	Encourage agriculture by making best use of natural resources.	C
(3)	Provide the governor and the legislature with information and options needed for prudent decision making for the development of agriculture.	NA
(4)	Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.	NA
(5)	Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawai'i's economy.	NA
(6)	Seek the enactment and retention of federal and state legislation that benefits Hawai'i's agricultural industries.	NA
(7)	Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawai'i's producers and consumer markets locally, on the continental United States, and internationally.	C
(8)	Support research and development activities that provide greater efficiency and economic productivity in agriculture.	NA
(9)	Enhance agricultural growth by providing public incentives and encouraging private initiatives.	NA
(10)	Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.	NA
(11)	Increase the attractiveness and opportunities for an agricultural education and livelihood.	C

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
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(12)	Expand Hawai'i's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.	C
(13)	Promote economically competitive activities that increase Hawai'i's agricultural self-sufficiency.	C
(14)	Promote and assist in the establishment of sound financial programs for diversified agriculture.	NA
(15)	Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.	NA
(16)	Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.	NA
CONFORMANCE DETERMINATION: The action supports orderly development of Hawai'i's industries		
226-8	**OBJECTIVE AND POLICIES FOR THE ECONOMY - VISITOR INDUSTRY.**	
(a)	Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawai'i's economy.	
(b)	To achieve the visitor industry objective, it shall be the policy of this State to:	
(1)	Support and assist in the promotion of Hawai'i's visitor attractions and facilities.	A
(2)	Insure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people.	C
(3)	Improve the quality of existing visitor destination areas.	NA
(4)	Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.	NA
(5)	Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.	NA
(6)	Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the visitor industry.	NA
(7)	Foster a recognition of the contribution of the visitor industry to Hawai'i's economy and the need to perpetuate the aloha spirit.	C
(8)	Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai'i's cultures and values.	C
CONFORMANCE DETERMINATION: The action appears to support the goals of HRS Section 226-8 by encouraging the orderly development of container facilities serving O'ahu and supporting inter-island shipments.		
226-9	**OBJECTIVE AND POLICIES FOR THE ECONOMY – FEDERAL EXPENDITURES.**	
(a)	Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawai'i's economy;	

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(b)	To achieve the federal expenditures objective, it shall be the policy of this State to:	
(1)	Encourage the sustained flow of federal expenditures in Hawai'i that generates long-term government civilian employment.	NA
(2)	Promote Hawai'i's supportive role in national defense.	C
(3)	Promote the development of federally supported activities in Hawai'i that respect state-wide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawai'i's environment.	C
(4)	Increase opportunities for entry and advancement of Hawai'i's people into federal government service.	NA
(5)	Promote federal use of local commodities, services, and facilities available in Hawai'i.	C
(6)	Strengthen federal-state-county communication and coordination in all federal activities that affect Hawai'i.	NA
(7)	Pursue the return of federally controlled lands in Hawai'i that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.	NA
CONFORMANCE DETERMINATION: Federal agencies, including the military branches, depend on Honolulu's container terminals for supplies and equipment. Development of container yards helps to control transshipment costs to and from the Neighbor Islands, and hence makes products from all of Hawai'i as well as overseas available for federal purchasers.		
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 Hawai'i's economic base.	
(b)	To achieve the potential growth activity objective, it shall be the policy of this State to:	
(1)	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.	A
(2)	Expand Hawai'i's capacity to attract and service international programs and activities that generate employment for Hawai'i's people.	NA
(3)	Enhance and promote Hawai'i's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.	NA
(4)	Accelerate research and development of new energy- related industries based on wind, solar, ocean, and underground resources and solid waste.	NA
(5)	Promote Hawai'i's geographic, environmental, social, and technological advantages to attract new economic activities into the State.	NA
(6)	Provide public incentives and encourage private initiative to attract new industries that best support Hawai'i's social, economic, physical, and environmental objectives.	A
(7)	Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.	NA

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

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(8)	Develop, promote, and support research and educational and training programs that will enhance Hawai'i's ability to attract and develop economic activities of benefit to Hawai'i.	NA
(9)	Foster a broader public recognition and understanding of the potential benefits of new, growth-oriented industry in Hawai'i.	C
(10)	Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawai'i's social, economic, physical, and environmental objectives.	NA
(11)	Increase research and development of businesses and services in the telecommunications and information industries.	NA
CONFORMANCE DETERMINATION: Development of additional container yard space in Honolulu Harbor will encourage economic growth and will help control costs of inter-island transshipment.		
226-10.5	**OBJECTIVES AND POLICIES FOR THE ECONOMY – INFORMATION INDUSTRY.**	**Omitted**
226-11	**OBJECTIVES AND POLICIES FOR THE PHYSICAL ENVIRONMENT – LANDBASED, SHORELINE, AND MARINE RESOURCES.**	
(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 Hawai'i's land-based, shoreline, and marine resources.	A
(2)	Effective protection of Hawai'i's unique and fragile environmental resources.	C
(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 Hawai'i's natural resources.	C
(2)	Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.	C
(3)	Take into account the physical attributes of areas when planning and designing activities and facilities.	C
(4)	Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.	C
(5)	Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.	NA
(6)	Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.	C
(7)	Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.	C
(8)	Pursue compatible relationships among activities, facilities, and natural resources.	C
(9)	Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.	A

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
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CONFORMANCE DETERMINATION: Development of additional container yard space in Honolulu Harbor will encourage economic growth and will help control costs of inter-island transshipment. The proposed container yard will be built following best practices for environmental impact management.		
226-12	**OBJECTIVE AND POLICIES FOR THE PHYSICAL ENVIRONMENT – SCENIC, NATURAL BEAUTY, AND HISTORIC RESOURCES.**	
(a)	Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources.	C
(b)	To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:	
(1)	Promote the preservation and restoration of significant natural and historic resources.	C
(2)	Provide incentives to maintain and enhance historic, cultural, and scenic amenities.	NA
(3)	Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	NA
(4)	Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.	C
(5)	Encourage the design of developments and activities that complement the natural beauty of the islands.	C
CONFORMANCE DETERMINATION: Development of additional container yard space in Honolulu Harbor will encourage economic growth and will help control costs of inter-island transshipment.		
226-13	**OBJECTIVES AND POLICIES FOR THE PHYSICAL ENVIRONMENT – LAND, AIR, AND WATER QUALITY.**	
(a)	Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:	
(1)	Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.	A
(2)	Greater public awareness and appreciation of Hawai'i's environmental resources.	C
(b)	To achieve the land, air, and water quality objectives, it shall be the policy of this State to:	
(1)	Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.	C
(2)	Promote the proper management of Hawai'i's land and water resources.	A
(3)	Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.	A
(4)	Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.	C
(5)	Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.	NA

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(6)	Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.	NA
(7)	Encourage urban developments in close proximity to existing services and facilities.	NA
(8)	Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.	C
CONFORMANCE DETERMINATION: Development of additional container yard space in Honolulu Harbor will encourage economic growth and will help control costs of inter-island transshipment.		
226-14	**OBJECTIVE AND POLICIES FOR FACILITY SYSTEMS – IN GENERAL.**	
(a)	Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.	A
(b)	To achieve the general facility systems objective, it shall be the policy of this State to:	
(1)	Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	A
(2)	Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.	C
(3)	Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	C
(4)	Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.	C
CONFORMANCE DETERMINATION: Development of additional container yard space in Honolulu Harbor will encourage economic growth and will help control costs of inter-island transshipment.		
226-15	**OBJECTIVE AND POLICIES FOR FACILITY SYSTEMS -- IN GENERAL.**	**NA**
226-16	**OBJECTIVE AND POLICIES FOR FACILITY SYSTEMS – WATER.**	**NA**
226-17	**OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS – TRANSPORTATION.**	
(a)	Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:	
(1)	An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.	A
(2)	A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.	A
(b)	To achieve the transportation objectives, it shall be the policy of this State to:	
(1)	Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;	A
(2)	Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;	A

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE		
(3)	Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;	A
(4)	Provide for improved accessibility to shipping, docking, and storage facilities;	A
(5)	Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;	A
(6)	Encourage transportation systems that serve to accommodate present and future development needs of communities;	A
(7)	Encourage a variety of carriers to offer increased opportunities and advantages to inter-island movement of people and goods;	A
(8)	Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;	A
(9)	Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;	A
(10)	Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai'i's natural environment;	C
(11)	Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;	C
(12)	Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and	A
(13)	Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.	NA
CONFORMANCE DETERMINATION: CONFORMANCE DETERMINATION: Development of additional container yard space in Honolulu Harbor will encourage economic growth and will help control costs of inter-island transshipment.		
226-18	**OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS – ENERGY**	
(a)	Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all	
(1)	Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;	NA
(2)	Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased;	NA
(3)	Greater energy security in the face of threats to Hawai'i's energy supplies and systems; and	NA
(4)	Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.	NA
(b)	To achieve the energy objectives, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand.	NA
(c)	To further achieve the energy objectives, it shall be the policy of this State to:	

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SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
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(1)	Support research and development as well as promote the use of renewable energy sources;	NA
(2)	Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;	NA
(3)	Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;	NA
(4)	Promote all cost-effective conservation of power and fuel supplies through measures including: (A) Development of cost-effective demand-side management programs; (B) Education; and (C) Adoption of energy efficient practices and technologies;	C
(5)	Ensure to the extent that new supply-side resources are needed, the development or expansion of energy systems utilizes the least-cost energy supply option and maximizes efficient technologies;	C
(6)	Support research, development, and demonstration of energy efficiency, load management, and other demand-side management programs, practices, and technologies;	NA
(7)	Promote alternate fuels and energy efficiency by encouraging diversification of transportation modes and infrastructure;	NA
(8)	Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications; and	C
(9)	Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives.	NA
CONFORMANCE DETERMINATION: The development of new harbor-oriented infrastructure has a negligible impact on the demand side of energy and no impact on the supply side. However, development of additional container yard space in Honolulu Harbor that will encourage economic growth and will help control costs of inter-island trans-shipment.is consistent with the intent of the Energy Functional Plan.		
226-18.5	**OBJECTIVES AND POLICIES FOR FACILITY SYSTEMS – TELECOMMUNICATIONS.**	**NA**
226-19	**OBJECTIVES AND POLICIES FOR SOCIO – CULTURAL ADVANCEMENT – HOUSING.**	**NA**
226-20	**OBJECTIVES AND POLICIES FOR SOCIO – CULTURAL ADVANCEMENT – HEALTH.**	**NA**
226-21	**OBJECTIVE AND POLICIES FOR SOCIO–CULTURAL ADVANCEMENT – EDUCATION.**	**NA**
226-23	**OBJECTIVE AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT – LEISURE.**	**NA**
226-24	**OBJECTIVE AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT – INDIVIDUAL RIGHTS AND PERSONAL WELL-BEING.**	**NA**
226-25	**OBJECTIVE AND POLICIES FOR SOCIO – CULTURAL ADVANCEMENT – CULTURE.**	**NA**
226-26	**SECTION 226-26 OBJECTIVES AND POLICIES FOR SOCIO – CULTURAL ADVANCEMENT – PUBLIC SAFETY.**	
(a)	Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:	

Table 5-1. Hawai'i State Plan – HRS Chapter 226, Part I

SECTION	CHAPTER 226 - PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES	RATING
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(1)	Assurance of public safety and adequate protection of life and property for all people.	C
(2)	Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.	C
(3)	Promotion of a sense of community responsibility for the welfare and safety of Hawai'i's people.	NA
(b)	To achieve the public safety objectives, it shall be the policy of this State to:	
(1)	Ensure that public safety programs are effective and responsive to community needs.	NA
(2)	Encourage increased community awareness and participation in public safety programs.	NA
(c)	To further achieve public safety objectives related to criminal justice, it shall be the policy of this State to:	
(1)	Support criminal justice programs aimed at preventing and curtailing criminal activities.	NA
(2)	Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.	NA
(3)	Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.	NA
(d)	To further achieve public safety objectives related to emergency management, it shall be the policy of this State to:	
(1)	Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.	NA
(2)	Enhance the coordination between emergency management programs throughout the State.	NA
CONFORMANCE DETERMINATION**:** Orderly development of capacity for handling container freight promotes efficient means of moving supplies and equipment inter-island during times of crises or emergency.		
226-27	**OBJECTIVES AND POLICIES FOR SOCIO-CULTURAL ADVANCEMENT – GOVERNMENT.**	NA

Table 5-2. Hawai'i State Plan – HRS Chapter 226, Part III

SECTION	CHAPTER 226 - PART III. PRIORITY GUIDELINES	RATING
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE		
226-101	Establishes overall priority guidelines to address areas of statewide concern.	
226-102	Overall direction. The State shall strive to improve the quality of life for Hawai'i's present and future population through the pursuit of desirable courses of action in five major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, and quality education.	A
226-103	**ECONOMIC PRIORITY GUIDELINES**	
(a)	Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai'i's people and achieve a stable and diversified economy:	A
(1)	Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.	A
(A)	Encourage investments which:	
(i)	Reflect long term commitments to the State;	C
(ii)	Rely on economic linkages within the local economy;	A
(iii)	Diversify the economy;	A
(iv)	Reinvest in the local economy;	C
(v)	Are sensitive to community needs and priorities; and	
(vi)	Demonstrate a commitment to provide management opportunities to Hawai'i residents.	NA
(2)	Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.	NA
(3)	Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.	NA
(4)	Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.	NA
(5)	Streamline the building and development permit and review process, and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where public health, safety and welfare would not be adversely affected.	NA
(6)	Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawai'i's small-scale producers, manufacturers, and distributors.	NA
(7)	Continue to seek legislation to protect Hawai'i from transportation interruptions between Hawai'i and the continental United States.	NA
(8)	Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:	NA
(A)	An industry that can take advantage of Hawai'i's unique location and available physical and human resources.	A

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(B)	A clean industry that would have minimal adverse effects on Hawai'i's environment.	C
(C)	An industry that is willing to hire and train Hawai'i's people to meet the industry's labor needs at all levels of employment.	C
(D)	An industry that would provide reasonable income and steady employment.	C
(9)	Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawai'i business.	NA
(10)	Enhance the quality of Hawai'i's labor force and develop and maintain career opportunities for Hawai'i's people through the following actions:	
(A)	Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.	NA
(B)	Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.	NA
(C)	Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.	NA
(D)	Promote career opportunities in all industries for Hawai'i's people by encouraging firms doing business in the State to hire residents.	NA
(E)	Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on-the-job training opportunities.	NA
(F)	Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.	NA
(b)	Priority guidelines to promote the economic health and quality of the visitor industry:	
(1)	Promote visitor satisfaction by fostering an environment which enhances the aloha spirit and minimizes inconveniences to Hawai'i's residents and visitors.	C
(2)	Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.	NA
(3)	Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.	NA
(4)	Encourage visitor industry practices and activities which respect, preserve, and enhance Hawai'i's significant natural, scenic, historic, and cultural resources.	NA
(5)	Develop and maintain career opportunities in the visitor industry for Hawai'i's people, with emphasis on managerial positions.	NA
(6)	Support and coordinate tourism promotion abroad to enhance Hawai'i's share of existing and potential visitor markets.	NA
(7)	Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.	NA

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(8)	Support law enforcement activities that provide a safer environment for both visitors and residents alike.	NA
(9)	Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.	NA
(c)	Priority guidelines to promote the continued viability of the sugar and pineapple industries:	
(1)	Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.	NA
(2)	Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawai'i.	NA
(3)	Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.	NA
(d)	Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:	
(1)	Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.	NA
(2)	Assist in providing adequate, reasonably priced water for agricultural activities.	NA
(3)	Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.	NA
(4)	Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.	NA
(5)	Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawai'i's agricultural community.	A
(6)	Seek favorable freight rates for Hawai'i's agricultural products from inter-island and overseas transportation operators.	NA
(7)	Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.	C
(8)	Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.	NA
(9)	Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.	NA
(10)	Support the continuation of land currently in use for diversified agriculture.	NA
(e)	Priority guidelines for water use and development:	
(1)	Maintain and improve water conservation programs to reduce the overall water consumption rate.	NA
(2)	Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.	NA

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SECTION	CHAPTER 226 - PART III. PRIORITY GUIDELINES	RATING
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(3)	Increase the support for research and development of economically feasible alternative water sources.	NA
(4)	Explore alternative funding sources and approaches to support future water development programs and water system improvements.	NA
(f)	Priority guidelines for energy use and development:	
(1)	Encourage the development, demonstration, and commercialization of renewable energy sources.	NA
(2)	Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.	NA
(3)	Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.	NA
(4)	Encourage the development and use of energy conserving and cost-efficient transportation systems.	C
(g)	Priority guidelines to promote the development of the information industry:	
(1)	Establish an information network that will serve as the catalyst for establishing a viable information industry in Hawai'i.	NA
(2)	Encourage the development of services such as financial data processing, products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.	NA
(3)	Encourage the development of small businesses in the information field such as software development, the development of new information systems and peripherals, data conversion and data entry services, and home or cottage services such as computer programming, secretarial, and accounting services.	NA
(4)	Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.	NA
(5)	Encourage research activities, including legal research in the information and telecommunications fields.	NA
(6)	Support promotional activities to market Hawai'i's information industry services.	NA
226-104	**POPULATION GROWTH AND LAND RESOURCES PRIORITY GUIDELINES.**	
(a)	Priority guidelines to effect desired statewide growth and distribution:	
(1)	Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i's people.	NA
(2)	Manage a growth rate for Hawai'i's economy that will parallel future employment needs for Hawai'i's people.	NA
(3)	Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.	NA

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SECTION	CHAPTER 226 - PART III. PRIORITY GUIDELINES	RATING
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE		
(4)	Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.	NA
(5)	Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.	NA
(6)	Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.	NA
(7)	Support the development of high technology parks on the neighbor islands.	NA
(b)	Priority guidelines for regional growth distribution and land resource utilization:	
(1)	Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	NA
(2)	Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.	NA
(3)	Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.	NA
(4)	Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.	NA
(5)	In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.	NA
(6)	Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.	NA
(7)	Pursue rehabilitation of appropriate urban areas.	NA
(8)	Support the redevelopment of Kaka'ako into a viable residential, industrial, and commercial community.	NA
(9)	Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	NA
(10)	Identify critical environmental areas in Hawai'i to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.	NA
(11)	Identify all areas where priority should be given to preserving rural character and lifestyle.	NA
(12)	Utilize Hawai'i's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	NA

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SECTION	CHAPTER 226 - PART III. PRIORITY GUIDELINES	RATING
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(13)	Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.	NA
226-105	**CRIME AND CRIMINAL JUSTICE. PRIORITY GUIDELINES IN THE AREA OF CRIME AND CRIMINAL JUSTICE.**	NA
226-106	**AFFORDABLE HOUSING. PRIORITY GUIDELINES FOR THE PROVISION OF AFFORDABLE HOUSING.**	NA
226-107	**QUALITY EDUCATION. PRIORITY GUIDELINES TO PROMOTE QUALITY EDUCATION.**	NA

5.5 HAWAI'I CLIMATE CHANGE INITIATIVE: ACT 286 OF 2012

The State of Hawai'i recognizes the importance of climate change. Act 286 of 2012 amended the State Planning Law (HRS Chapter 226) to include climate change adaptation as one of seven areas of statewide concern crucial to the quality of life. Ten priority guidelines were adopted. These deal with outreach, stewardship, monitoring and the development of knowledge and strategies that integrate climate change adaptation into state activities. Two are especially relevant to the present action:

> (5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change.
>
> (6) Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments.

Development of the container terminal would involve the removal of some corals that have grown in the harbor. This loss would be mitigated, with the specific mitigation identified in consultation with federal environmental agencies in the course of application for a Corps of Engineers permit. The Proposed Action would conform to goal (5).

Development of a new container terminal on the island of O'ahu, rather than Sand Island, would reduce dependence on the Sand Island Access Road and bridge, and hence lower the risk of harm to the island economy and environment that could

result from any impacts of climate change on that vulnerable link. Development of the terminal hence actively supports goal (6).

5.6 STATE FUNCTIONAL PLANS

The Planning Act called for the creation of functional plans to set specific objectives, establish policies, and implement actions for a particular field of activity. These functional plans further identified those organizations responsible for carrying out the actions, the implementing timeframe, and the proposed budgets. The specific areas covered by the functional plans include (1) agriculture, (2) conservation lands, (3) education and higher education (4) employment, (5) energy, (6) health, (7) historic preservation, (8) housing, (9) human services, (10) recreation, (11) tourism, (12) transportation, and (13) water resource development.

The functional plans directly relevant to the State Department of Transportation, Harbors Division's (DOT-H's) action for commercial harbor improvements are discussed in the following sections. It is important to note that while these plans are considered to be the current "official" State functional plans, they were last updated in 1990 and 1991. Hence, a deviation from the original goals of the plan may have occurred due to local, national, or world events or other unforeseeable factors.

5.6.1 State Agricultural Functional Plan (1991)

Goals of the Plan

The *State Agricultural Functional Plan* seeks to ultimately increase the overall level of agricultural development in Hawaiʻi. At the time the plan was written, the two fundamental objectives were to (1) ensure the continued viability of Hawaiʻi's sugar and pineapple industries, and (2) encourage the continued growth and development of diversified agriculture throughout the State. Diversified agriculture has helped to partially offset declines in sugar and pineapple. The total value of crop and livestock sales reached a total of $595 million, exceeding for the first time the level reached in 1990 (DBEDT 2010). Currently, seed crops account for more than $200 million of that total.

The functional plan for agriculture also set objectives to develop capabilities to convert Hawaiʻi-grown crops into potential new value/added products for the local community, visitor industry, and export markets. The goal was to promote and develop a diverse range of products and programs focusing on niche marketing, such as ag-tourism, and to assist in the development of diversified agriculture.

Conformance with the Goals of the Plan

The current action will support the continuing movement of agricultural supplies and product by assuring adequate space for cargo to or from overseas and by making transshipment of cargo between overseas and inter-island carriers more efficient.

5.6.2 State Conservation Functional Plan (1991)

Goals of the Plan

The *State Conservation Lands Functional Plan* addresses the impacts of population growth and economic development on Hawai'i's natural environment and provides a framework for the protection and preservation of former forest reserves, shorelines, and submerged lands. The objective of the plan is to provide for a management program allowing the judicious use of the State's natural resources balanced with the need to protect them. The State's Office of Conservation and Coastal Lands (OCCL) is the lead authority for management of conservation areas.

Conformance with the Goals of the Plan

The harbor area on submerged State-owned land lies within the Resource subzone of the Conservation District. The proposed development area at Honolulu Harbor is encumbered with various Executive Orders to DOT-H. The objective of the Resource Subzone, as set forth in Section 13-5-13, HAR, is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas. The Proposed Action is an identified land use pursuant to HAR, §13-5-22, P-6 Public Purpose Uses, (D-1) which identifies "not for profit land uses undertaken in support of a public service by an agency of the county, state or federal government, or by an independent non-governmental entity, except that an independent non-governmental regulated public utility may be considered to be engaged in a public purpose use." This use requires a Conservation District Use Permit approved by the State Board of Land and Natural Resources.

5.6.3 State Tourism Functional Plan (1991)

Goals of the Plan

The 1991 *State Tourism Functional Plan* focused on six issues: (1) the positive and negative impacts of tourism growth on the community; (2) physical development in terms of product quality, product diversity, land use planning, adequate infrastructure, and visitor use of public services; (3) environmental resources and cultural heritage; (4) community, visitor, and industry relations; (5) employment and career development; and (6) effective marketing.

The plan primarily sought to strengthen tourism, while developing other industries to diversify the State's economic base in order to reduce its vulnerability from the fluctuations of a single market.

Conformance with the Plan

The action generally conforms with the goals and objectives of the plan by helping to facilitate transportation of goods to, from, and among the islands for visitors and residents alike.

5.6.4 State Transportation Functional Plan (1991)

Goals of the Plan

The 1991 *State Transportation Functional Plan* sought to (1) construct facility and infrastructure improvements in support of Hawai'i's thriving economy and growing population base; (2) develop a transportation system balanced with an array of new alternatives; (3) implement Transportation Systems Management to maximize the use of existing facilities and systems; (4) foster innovation and use of new technology in transportation; (5) maximize joint efforts with the private sector; (6) pursue land use initiatives which help reduce travel demand; (7) encourage resident quality-of-life improvements through improved mobility opportunities and travel reduction.

Conformance with the Plan

The action fully supports the State's Transportation Plan by contributing to a balanced transportation system.

5.6.5 Hawai'i 2050 Sustainability Plan

The Hawai'i State Legislature in 2005 sought answers to the long-term future of our state and the pressing issues facing our people. Under the Special Session Laws of Hawai'i 2005, the Legislature enacted Act 8, which provided for (1) the development of a sustainability plan to address the vital needs of Hawai'i through the year 2050, and (2) the establishment of the Hawai'i Sustainability Task Force under the guidance of the Office of the State Auditor (HSTF 2008).

Concerns over the "steady deterioration of public infrastructure, lack of affordable housing, continued reliance on a service-based economy, the vulnerability of Hawai'i in a volatile global energy market, possible interruptions in travel and critical food supplies, threats to our fragile island ecosystems, and the ever increasing numbers of residents and visitors" were vital issues that needed to be addressed. Questions were raised about the direction, the long-term limits of growth, and the need to plan and act to assure a preferred future for the people of Hawai'i. Moreover, the task force addressed a most basic question: What is the state's carrying capacity?

The 2050 Plan recognized that tourism, defense, construction, and agriculture have been the foundation of our economy and likely to continue to be economic drivers in the future. Tourism alone generates an estimated 20 percent of all economic activity and a quarter of the state's tax revenue. While most residents support keeping the level of tourism and military activity the same, they also want a more diverse, sustainable, and resilient economy to expand our economic base beyond current industries.

The 2050 Plan recognized that diversified agriculture, knowledge- and innovation-based industries would offer quality employment and greater diversity to our economy, but that the replacement of one sector of the economy with another in the same way that the visitor industry supplanted agriculture would not be a solution. The creation of greater resiliency in the economy would mean buying locally produced goods and services. However, as an island state, becoming totally economically self-sufficient would not be a possibility, but there are many products that residents could purchase locally to reduce dependence on outside sources.

The 2050 Plan called for a quality transportation system that links people to places and provides opportunities for social interaction, recreation, and community engagement. A system that enables the flow of commerce would ensure that businesses could transport their goods and services to their destination in a timely and cost-effective way.

The action directly contributes to improving transportation infrastructure, and thereby helping move goods in a timely and cost-effective way.

5.7 STATE LAND USE DISTRICT—THE LAND USE LAW

The Hawai'i State Legislature determined in 1961 that a state-wide zoning system was needed to protect Hawai'i's valuable land from development that provided a short-term gain for a few and resulted in a long-term loss to the income and growth potential of the state's economy. Accordingly, the Legislature established an overall framework of land-use management and adopted the Land Use Law under HRS Chapter 205. The law placed all lands in the State in one of four land-use districts: Urban, Agricultural, Conservation, or Rural (the Rural District was added in 1963), and established the Land Use Commission (LUC) under HRS Section 205-1. DOT-H lands are designated urban.

Section 205-2 (b) of the Land Use Law states that "Urban districts shall include activities or uses as provided by ordinances or regulations of the county within which the urban district is situated." Commercial harbors are designated Urban.

As described in section 5.6.2, submerged lands—harbor waters—are designated in the Conservation District. Conservation District Use Permits are required for new development in these waters. The DOT-Harbors presides over most of the harbors due to the crucial role the commercial ports have on our island state.

5.8 HAWAIʻI COASTAL ZONE MANAGEMENT PROGRAM

The Hawaiʻi CZM Program was established in 1977 as a result of the CZM Act of 1972 and federal CZM Program. The objectives and policies of the Hawaiʻi CZM Program, which are intended to manage, develop, and protect resources of the coastal zone, include in areas of:

- recreational resources
- historic resources
- scenic and open space resources
- coastal ecosystems
- economic uses
- coastal hazards
- managing development
- public participation
- beach protection
- marine resources

Projects seeking a U.S. Department of the Army permit will require a CZM Federal Consistency Review by the State Office of Planning.

The Hawaiʻi CZM Program designates special management areas along the coastal zones of each major island in the state and the Counties are responsible for administering and regulating land uses in those areas.

5.9 HAWAIʻI OCEAN RESOURCES MANAGEMENT PLAN

In December 2006, the Hawaiʻi CZM Program, Office of Planning, published the *Hawaiʻi Ocean Resources Management Plan*. Staff from the State Department of Land and Natural Resources (DLNR) advises that the goals and objectives of the plan should be addressed in all environmental assessments and impact statements.

Table 5-3. Hawaii Ocean Resources Management Plan

A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE	**RATING**
ILLUSTRATIVE RESULTS INDICATORS FOR MANAGEMENT GOALS AND STRATEGIC ACTIONS UNDER PERSPECTIVE 1	
Improve coastal water quality by reducing land-based sources of pollution	NA
Reduce soil erosion from upland forest ecosystems and conservation lands	NA
Reduce pollutant loads from residential, agricultural, and commercial uses in priority watersheds	NA
Protect beaches, wetlands, and coastal communities from shoreline erosion and other coastal hazards	NA
Develop and implement a comprehensive and integrated shoreline policy that addresses the impacts of chronic and episodic coastal hazards	NA
Develop a Hawai'i beach and shoreline management plan with specific management measures to address coastal erosion and other hazards in priority coastal areas	NA
Encourage appropriate coastal-dependent development that reduces risks from coastal hazards and protects coastal and cultural resources	C
Improve and ensure maintenance and appropriate use of environmental infrastructure	C
Repair leaking sewers in priority watersheds	NA
Reduce the number of individual wastewater disposal systems in the coastal environment	NA
Reduce unpermitted storm-water discharges to the sewers in priority watersheds	NA
Provide appropriate waste management infrastructure to support commercial and recreational marine facilities	NA
ILLUSTRATIVE RESULTS INDICATORS FOR MANAGEMENT GOALS AND STRATEGIC ACTIONS UNDER PERSPECTIVE 2	
Management Goals and Strategic Actions Illustrative Results Indicators	
Minimize the introduction and spread of marine alien and invasive species into and throughout archipelagic waters	NA
Establish wastewater-discharge restricted zones and conditions for commercial vessels in archipelagic waters	NA
Improve the health of coral reef resources for sustainable traditional, subsistence, recreational, and commercial uses	NA
Strengthen and expand marine protected area management	NA
Develop ecosystem-based approaches for nearshore fisheries management	NA
Establish and institutionalize approaches for restoring, operating, and preserving ancient Hawaiian coastal fishponds for the benefit of coastal communities around the State	NA
Improve enforcement capacity and voluntary compliance with existing rules and regulations for ocean resource protection	NA
Enhance public access and appropriate coastal-dependent uses of the shoreline	NA
Enhance and restore existing public shoreline areas and scenic vistas	NA
Establish new shoreline areas for public and appropriate coastal-dependent uses	NA

Table 5-3. Hawaii Ocean Resources Management Plan

A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE	RATING
Promote appropriate and responsible ocean recreation and tourism that provide culturally informed and environmentally sustainable uses for visitors and residents	NA
Develop community-based frameworks and practices for identifying and mitigating ocean recreational use conflicts	NA
Develop responsible and sustainable ocean-based tourism	NA
Encourage cutting edge and appropriate ocean science and technology with safeguards for ocean resource protection	NA
Promote alternative ocean energy sources	NA
Plan and develop sustainable commercial aquaculture in coastal areas and ocean waters to diversify and expand Hawai'i's economy and provide locally produced sources of seafood	NA
Expand ocean science and technology	NA
ILLUSTRATIVE RESULTS INDICATORS FOR MANAGEMENT GOALS AND STRATEGIC ACTIONS UNDER PERSPECTIVE 3	
Management Goals and Strategic Actions Illustrative Results Indicators	NA

5.10 HRS CHAPTER 6E, HISTORIC PRESERVATION

HRS Chapter 6E-8 states that "[b]efore any agency or officer of the state or its political subdivisions commences any project which may affect historic property, aviation artifact, or a burial site, the agency or officer shall advise the department [DLNR, SHPD] and allow the department an opportunity for review of the effect of the proposed project on historic properties, aviation artifacts, or burial sites … especially those listed on the Hawai'i register of historic places. The proposed project shall not be commenced, or in the event it has already begun, continued, until the department shall have given its written concurrence." The State Historic Preservation Division (SHPD) is provided an opportunity to review and comment on the Draft EIS for this Master Plan.

Section 4.3 discusses the reviews that have already occurred, the mitigation measures identified by SHPD for development at the Kapālama site, and the steps to be taken to implement those measures.

5.11 HAWAIʻI WATER POLLUTION LAW

The Hawaiʻi Water Pollution Law[1], which provides a comprehensive regulatory program for discharges of pollution to the waters of Hawaiʻi, establishes the NPDES permit program required under CWA, as amended. Permits covered under this program are issued by the State Department of Health (DOH). The DOH is responsible for reviewing and approving project compliance with HRS Chapter 342D (water pollution), HAR Chapter 11-55 (Water Pollution Control), and HAR Chapter 11-54 (Water Quality Standards).

The Proposed Action is expected to generate discharges of stormwater runoff from its construction site to State surface waters and as a result would require an NPDES Permit (see section 5.3)

5.12 PLANS FOR DEVELOPMENT OF THE HONOLULU WATERFRONT

5.12.1 Honolulu Waterfront Master Plan

Honolulu grew as an island port town, and the waterfront is the city's face to the world, the linchpin of all industrial activity and transportation, and an important recreational resource. Jurisdiction over the waterfront is shared by the U.S. Coast Guard, State agencies (DOT-H and Department of Transportation, Airports Division [DOT-A], Hawaiʻi Community Development Authority [HCDA], Aloha Tower Development Corporation) and the City.

5.12.1.1 Goals of the Plan

The purpose of the *Honolulu Waterfront Master Plan* (OP 1989), produced for the Governor's Office of State Planning in 1989, was three-fold:

- To identify and articulate "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 Hawaiʻi's residents";
- To assure orderly and achievable phasing of improvements in a way that minimizes disruption; and
- To maximize public benefits associated with the improvement of State-owned lands (OP 1989).

[1] HRS Chapter 342D.

The Waterfront Plan treats maritime uses as a first priority, but also deals extensively with recreational uses and urban development.

5.12.1.2 Conformance with the Plan

Forecasts for the Waterfront Plan identified a need for an additional 40 to 50 acres of container yard space by 2010. The plan calls for redevelopment of the Kapālama property as a "full-scale modern containerized cargo terminal." The plan recognized that this action would call for relocation of University of Hawai'i (UH) facilities.

Development of the Kapālama terminal follows the 1989 plan's goals of meeting the needs of Hawai'i's people, of orderly phasing of improvements, and of increasing the public benefits from the use of State lands. The Waterfront Plan called for terminal development by 2010; the Proposed Action is, from that perspective, late in realizing the Plan's objectives.

5.12.2 O'ahu Commercial Harbors 2020 Master Plan

5.12.2.1 Goals of the Plan

The DOT-H develops long-term master plans for its facilities serving each of the major islands of the state. The 2020 Master Plan for O'ahu dealt with Honolulu Harbor, Barbers Point Harbor, and Kewalo Basin. It was developed by planning groups comprised of agency representatives and maritime stakeholders, after a technical study of port facilities requirements. It was approved by the Governor in 1997, with the explicit support of five state department directors.

Objectives of the plan were to:

- Plan development of O'ahu's commercial harbors, facilitating cargo shipments for the state and its people;
- Optimize the use of land and water resources for marine cargo, passenger and fishing;
- Provide terminals, other resources, and access to serve the port system in an efficient, safe and secure manner; and
- Minimize impacts on environmental quality and recreational opportunities.

The recommended plan covered twenty major topics. Key elements of the 2020 plan included:

- Provide container terminal space at Pier 1, Kapalama Military Reservation (KMR), and Piers 51-53 on Sand Island;
- Provide six container berths at Pier 1, KMR and Sand Island;
- Re-open Kalihi Channel for large vessels, relieving congestion at the main channel entrance and in the turning basins; and
- Improve roadways to assure access to the commercial harbor areas, in co-ordination with the Highways Division's plans for improvements along Nimitz Highway. The roadway recommendations included a tunnel to replace the Sand Island Bridge or a new bridge high enough to all vessels to pass under it.

The KMR terminal was the first improvement considered by the Planning Committee for the 2020 plan.

5.12.2.2 Conformance with the Plan

The Proposed Action implements a key recommendation of the 2020 plan. The map showing future uses of the land and nearby waters of Honolulu Harbor identifies the KMR site for overseas container use. It also indicates that the pier face should be moved some 100 feet inland. This recommendation was to support movement of ships between Kapālama Basin and Kalihi Channel when container vessels were berthed at the KMR pier nearest the Kalihi entrance to the harbor.

The Proposed Action conforms to the plan. However, the plan's recommendation on pier location (and thereby the width of the channel between KMR and Sand Island) is no longer included. The proposed replacement of the Sand Island Bridge has not occurred, for financial and technical reasons. As a result, the extra channel width is not needed.

5.12.3 Summary of Required State Permits and Approvals

Following is a summary list of State government permits and approvals that may be required for implementation of the Proposed Action (approving agency in parenthesis):

- Chapter 343, HRS, Environmental Review
- Hawai'i CZM Federal Consistency Review (Office of Planning)
- Section 401 of CWA, Water Quality Certification (DOH)
- Conservation District Use Permit (OCCL)
- National Pollutant Discharge Elimination System (NPDES) Permit (DOH)

5.13 CITY GENERAL PLAN AND REGIONAL DEVELOPMENT PLAN

State law and county charter require each county to prepare and adopt a long-range general plan to guide the overall future development of the county. HRS Chapter 46 grants the counties certain powers and responsibilities. Among them is the power to regulate land development through zoning, which must be based on a general plan.

A plan usually provides guidance for land use regulations, the location and character of new development and facilities, and planning for county and State facilities and services. Updates of a general plan occur from time to time and the document becomes law through the adoption of an ordinance by the county council. Ordinances usually amend, repeal or supplement the municipal code; provide zoning specifications; or appropriate money for specific purposes.

In addition, each county prepares plans at the regional level. These plans are intended to establish more detailed policies, strategies, and implementing actions in support of the general plans. Evaluations of the county general plans in this section are followed by discussion of the appropriate regional plan.

5.13.1 General Plan for O‘ahu

Of the following sections contained in *O‘ahu’s General Plan*, Section 2 - Economic Activity, and Section 5 - Transportation and Utilities will be discussed.

1. Population
2. Economic Activity
3. Natural Environment
4. Housing
5. Transportation and Utilities
6. Energy
7. Physical Development and Urban Design
8. Public Safety
9. Health and Education
10. Culture and Recreation
11. Government Operations and Fiscal Management

The sections relevant to this EIS are. These sections are discussed in Table 5-4. The entire *City and County of Honolulu General Plan* can be found at http://honoluludpp.org/planning/OahuGeneralPlan/.

Table 5-4. Honolulu General Plan

Honolulu General Plan	Rating
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE	
ECONOMIC ACTIVITY	
OBJECTIVE A To promote employment opportunities that will enable all the people of Oʻahu to attain a decent standard of living.	
Policy 1: Encourage the growth and diversification of Oʻahu's economic base.	A
Policy 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oʻahu residents.	C
Policy 3: Encourage the development in appropriate locations on Oʻahu of trade, communications, and other industries of a nonpolluting nature.	C
Policy 4: Encourage the development of local, national, and world markets for the products of Oʻahu-based industries.	C
Policy 5: Encourage the wider distribution of available employment opportunities through such methods as shortening the work week and reducing the use of overtime.	NA
Policy 6: Encourage the continuation of a significant level of Federal employment on Oʻahu.	NA
OBJECTIVE B To maintain the viability of Oʻahu's visitor industry.	NA
Policy 1: Provide for the long-term viability of Waikīkī as Oʻahu's primary resort area by giving the area priority in visitor industry related public expenditures.	NA
Policy 2: Provide for a high quality and safe environment for visitors and residents in Waikīkī.	NA
Policy 3: Encourage private participation in improvements to facilities in Waikīkī.	NA
Policy 4: Prohibit major increases in permitted development densities in Waikīkī.	NA
Policy 5: Prohibit further growth in the permitted number of hotel and resort condominium units in Waikīkī.	NA
Policy 6: Permit the development of secondary resort areas in West Beach, Kahuku, Mākaha, and Lāʻie.	NA
Policy 7: Manage the development of secondary resort areas in a manner which respects existing lifestyles and the natural environment, and avoids substantial increases in the cost of providing public services in the area.	NA
Policy 8: Preserve the well-known and widely publicized beauty of Oʻahu for visitors as well as residents.	NA
Policy 9: Encourage the visitor industry to provide a high level of service to visitors.	NA
OBJECTIVE C To maintain the viability of agriculture on Oʻahu.	
Policy 1: Assist the agricultural industry to ensure the continuation of agriculture as an important source of income and employment.	C
Policy 2: Support agricultural diversification in all agricultural areas on Oʻahu.	C
Policy 3: Support the development of markets for local products, particularly those with the potential for economic growth.	A
Policy 4: Provide sufficient agricultural land in ʻEwa, Central Oʻahu, and the North Shore to encourage the continuation of sugar and pineapple as viable industries.	NA

Table 5-4. Honolulu General Plan

Honolulu General Plan	Rating
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE	
Policy 5: Maintain agricultural land along the Windward, North Shore, and Wai‘anae coasts for truck fanning, flower growing, aquaculture, livestock production, and other types of diversified agriculture.	NA
Policy 6: Encourage the more intensive use of productive agricultural land.	NA
Policy 7: Encourage the use of more efficient production practices by agriculture, including the efficient use of water.	NA
Policy 8: Encourage the more efficient use of non- potable water for agricultural use.	NA
OBJECTIVE D To make full use of the economic resources of the sea.	
Policy 1: Assist the fishing industry to maintain its viability.	NA
Policy 2: Encourage the development of aquaculture, ocean research, and other ocean-related industries	NA
Policy 3: Focus the development of ocean related economic activities in the Northwestern Hawaiian Islands on those which are compatible with preserving the area's unique environmental, marine, and wildlife assets.	NA
OBJECTIVE E To prevent the occurrence of large scale unemployment.	
Policy 1: Encourage the training and employment of present residents for currently available and future jobs.	NA
Policy 2: Make full use of State and Federal employment and training programs.	NA
Policy 3: Encourage the provision of retraining programs for workers in industries with planned reductions in their labor force.	NA
OBJECTIVE F To increase the amount of Federal spending on O‘ahu.	
Policy 1: Take full advantage of Federal programs and grants which will contribute to the economic and social well-being of O‘ahu's residents.	A
Policy 2: Encourage the Federal government to pay for the cost of public services used by Federal agencies.	C
Policy 3: Encourage the Federal government to lease new facilities rather than construct them on tax-exempt public land.	C
Policy 4: Encourage the military to purchase locally all needed services and supplies which are available on O‘ahu.	C
OBJECTIVE G To bring about orderly economic growth on O‘ahu.	
Policy 1: Direct major economic activity and government services to the primary urban center and the secondary urban center at Kapolei.	NA
Policy 2: Permit the moderate growth of business centers in the urban-fringe areas.	NA
Policy 3: Maintain sufficient land in appropriately located commercial and industrial areas to help ensure a favorable business climate on O‘ahu.	NA

Table 5-4. Honolulu General Plan

Honolulu General Plan	Rating
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE	
Policy 4: Encourage the continuation of a high level of military-related employment in the Hickam-Pearl Harbor, Wahiawā, Kailua-Kanēʻohe, and ʻEwa areas.	NA
TRANSPORTATION AND UTILITIES	
OBJECTIVE A To create a transportation system which will enable people and goods to move safely, efficiently, and at a reasonable cost; serve all people, including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.	
Policy 1: Develop and maintain an integrated ground-transportation system consisting of the following elements and their primary purposes:	NA
a. Public transportation-for travel to and from work, and travel within Central Honolulu;	NA
b. Roads and highways-for commercial traffic and travel in nonurban areas;	NA
c. Bikeways-for recreational activities and trips to work, schools, shopping centers, and community facilities; and	NA
d. Pedestrian walkways-for getting around Downtown and Waikīkī, and for trips to schools, parks, and shopping centers.	NA
Policy 2: Provide transportation services to people living within the ʻEwa, Central Oʻahu, and Pearl City-Hawaiʻi Kai corridors primarily through a mass transit system including exclusive right-of-way rapid transit and feeder-bus components as well as through the existing highway system with limited improvements as may be appropriate.	NA
Policy 3: Provide transportation services outside the ʻEwa, Central Oʻahu, and Pearl City-Hawaiʻi Kai corridors primarily through a system of express- and feeder-buses as well as through the highway system with limited to moderate improvements sufficient to meet the needs of the communities being served.	NA
Policy 4: Improve transportation facilities and services in the Ewa corridor and in the trans-Koʻolau corridors to meet the needs of ʻEwa and Windward communities.	NA
Policy 5: Improve roads in existing communities to reduce congestion and eliminate unsafe conditions.	NA
Policy 6: Consider both environmental impact as well as construction and operating costs as important factors in planning alternative nodes of transportation.	C
Policy 7: Promote the use of public transportation as a means of moving people quickly and efficiently, of conserving energy, and of guiding urban development.	NA
Policy 8: Make available transportation services to people with limited mobility: the young, the elderly, the handicapped, and the poor.	NA
Policy 9: Promote programs to reduce dependence on the use of automobiles.	NA
Policy 10: Discourage the inefficient use of the private automobile, especially in congested corridors and during peak-hours.	NA
Policy 11: Make public, and encourage private, improvements to major walkway systems.	NA
Policy 12: Encourage the provision of separate aviation facilities for small civilian aircraft.	NA
Policy 13: Facilitate the development of a second deep-water harbor to relieve congestion in Honolulu Harbor.	NA

Table 5-4. Honolulu General Plan

Honolulu General Plan	Rating
A = ACTIVELY SUPPORTS C= CONFORMS F = FAILS TO MEET PLAN GOAL NA = GOAL IS NOT APPLICABLE	
OBJECTIVE B To meet the needs of the people of O'ahu for an adequate supply of water and for environmentally sound systems of waste disposal.	
Policy 1: Develop and maintain an adequate supply of water for both residents and visitors.	NA
Policy 2: Develop and maintain an adequate supply of water for agricultural and industrial needs.	NA
Policy 3: Encourage the development of new technology which will reduce the cost of providing water and the cost of waste disposal.	NA
Policy 4: Encourage a lowering of the per-capita consumption of water and the per-capita production of waste.	NA
Policy 5: Provide safe, efficient, and environmentally sensitive waste-collection and waste- disposal services.	NA
Policy 6: Support programs to recover resources from solid-waste and recycle wastewater.	NA
Policy 7: Require the safe disposal of hazardous waste.	NA
OBJECTIVE C To maintain a high level of service for all utilities.	
Policy 1: Maintain existing utility systems in order to avoid major breakdowns.	NA
Policy 2: Provide improvements to utilities in existing neighborhoods to reduce substandard conditions.	NA
Policy 3: Plan for the timely and orderly expansion of utility systems.	NA
Policy 4: Increase the efficiency of public utilities by encouraging a mixture of uses with peak periods of demand occurring at different times of the day.	NA
OBJECTIVE D To maintain transportation and utility systems which will help O'ahu continue to be a desirable place to live and visit.	
Policy 1: Give primary emphasis in the capital-improvement program to the maintenance and improvement of existing roads and utilities.	NA
Policy 2: Use the transportation and utility systems as a means of guiding growth and the pattern of land use on O'ahu.	NA
Policy 3: Encourage the study and use of telecommunications as an alternative to conventional transportation facilities.	NA
Policy 4: Evaluate the social, economic, and environmental impact of additions to the transportation and utility systems before they are constructed.	C
Policy 5: Require the installation of underground utility lines wherever feasible.	NA
Policy 6: Seek improved taxing powers for the City and County in order to provide a more equitable means of financing transportation and utility services.	NA

The City Department of Planning and Permitting (DPP) has begun a "focused update" process for the General Plan. The update will deal with objectives and policies related to Oʻahu's overall growth, the economy, affordable housing, and sustainability. No specific changes in policy have been proposed. Under the heading of sustainability, concern has been expressed with regard to the effects of sea level rise on Hawaiʻi. This issue has been considered closely in the planning for the Kapālama Container Terminal, as discussed in section 3.10.

5.13.2 Primary Urban Center Development Plan (2003)

The *Primary Urban Center Development Plan* (2003), covering the Honolulu Harbor area, is one of eight regional plans based on the Oʻahu General Plan that establish more detailed policies to shape growth in the urban core of the island. A leading goal of the *Primary Urban Center Development Plan* is to make Honolulu "the Pacific's leading city and travel destination. As part of the work to accomplish this aim, it calls out actions for the project area and its surroundings:

- Enhance Honolulu Harbor and harbor-related uses: Reserve lands adjacent to the harbor for harbor-related uses.
- Support industrial uses in Kalihi-Pālama industrial districts: Support existing mixed-usages in the industrial districts of Kalihi-Kai and Kapālama, as well as existing commercial uses along the Nimitz, Dillingham, King, Kalihi, and Waiakamilo corridors.

The Proposed Action helps to implement these actions and the overall goals of the plan.

5.13.3 City Land Use Ordinance

State law identifies the duties of the DOT-H, and explicitly directs the Department to pursue those duties as its mission warrants:

> Notwithstanding any law or provision to the contrary, the department of transportation is authorized to plan, construct, operate, and maintain any commercial harbor facility in the State, including, but not limited to, the acquisition and use of lands necessary to stockpile dredged spoils, without the approval of county agencies. (HRS 266-2 (7) (b))

Consequently, City land use regulations do not apply to development of the Kapālama Container Terminal. All construction proposed will meet the purposes of

assuring the health, safety and welfare of users that guide building, electrical, plumbing, and fire codes.

5.13.4 Special Management Area

Although the Special Management Areas (SMAs) originated under the federal CZM and Hawai'i CZM Programs, the counties in the state of Hawai'i regulate and administer the SMAs in their respective jurisdictions. For O'ahu, the SMA in Honolulu Harbor is along the coastline seaward of Sand Island Access Road and inland boundary of Sand Island. As a result, the Kapālama and Pier 24–28 sites are outside of the SMA boundary and not subject to SMA Rules and Regulations of the City.

5.13.5 Shoreline Setback

In addition to the SMA authorized under the CZM Act and HRS, Chapter 205A, there is also a statewide shoreline setback regulation that generally prohibits within the shoreline setback area any construction or activity that may adversely affect beach processes, public access along the shoreline, or shoreline open space. DLNR is vested with the authority to determine the location of the shoreline and the counties are authorized to enforce the land use restrictions in the setback areas.

Existing records at the State Survey Office indicate that the shoreline (for shoreline setback purposes) is located at the mouth of Honolulu Harbor.[2] The shoreline follows the edge of Kalihi Channel to the seaward edge of the Sand Island Access Road bridge. It crosses Kalihi Channel along the bridge's seaward edge and then comes back out on the opposite side of the channel following the shoreline of Sand Island.

The Kapālama site is located on the opposite side of the Sand Island Access Road bridge within Honolulu Harbor and outside of the shoreline setback area.

[2] Telecommunication with Land Survey Division, Hawai'i State Department of Accounting and General Services, on October 30, 2012.

6 Cumulative Impacts

CHAPTER 6
CUMULATIVE IMPACTS

6.1 INTRODUCTION

Cumulative impacts are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. They can result from individually minor but collectively significant actions taking place over a period of time.[1]

Considering the resources affected by the Proposed Action and alternatives, other actions (projects) that could incrementally impact the same resources were identified. Such actions/projects include past and present actions on the Kapālama site and Pier 24–28 site, and past, present, and future actions/projects not related to the Proposed Action but with potential for cumulative impacts. Some of these projects are physically outside of Honolulu Harbor, but affect a similar resource or resources.

6.2 ACTIONS AND PROJECTS CONSIDERED IN THE CUMULATIVE IMPACT ANALYSIS

6.2.1 Past and Present Actions on the Kapālama and Pier 24–28 Sites

Past Use of Kapalama Military Reservation (KMR) by the U.S. Army/Federal Government and Transfer of Property to the State of Hawai‘i

This past action is identified because associated activities, up to the time of transfer in 1993, have affected site conditions and associated resources. The conditions may have been modified with subsequent use of the site by State of Hawai‘i (State) tenants (see following action). Site conditions arising from past KMR activities are characterized in the “affected environment” sections of this Environmental Impact Statement (EIS).

[1] Hawaii Administrative Rules (HAR) §11-200.

Past and Present Use of the Kapālama Site by State Tenants
These actions are identified because associated activities have affected site conditions and associated resources between 1993 and the present. The conditions of relevant resources are characterized in the "affected environment" sections of this EIS.

Past and Present Use of Pier 24–28 Site by State Department of Transportation, Harbors Division (DOT-H) Tenants
These actions are identified because associated activities have affected site conditions and associated resources. Site conditions arising from past tenant activities, estimated to have occurred since 1910, are characterized in the "affected environment" sections of this EIS.

Kapālama Site Warehouses: Tenant Relocations then Building Demolition
Existing tenants will vacate from the Kapālama site by February 28, 2014 with or without the Proposed Action. Tenant relocations made part of the Proposed Action (Pacific Shipyards International [PSI] and Atlantis Submarines) are those maritime-dependent operators who are working with the DOT-H to obtain a waterfront site in Honolulu Harbor. All non-maritime tenants, which are primarily on month-to-month revocable permits, will relocate outside the harbor's waterfront and elsewhere on the island. The warehouses will be demolished soon afterwards.

University of Hawai'i Marine Center Relocation
A separate Environmental Assessment (EA) is being prepared for this action. The University of Hawai'i School of Ocean and Earth Science and Technology (UH SOEST) is temporarily relocating its Marine Center research operations from Kapālama's Snug Harbor to Piers 34 and 35. At the new site, improvements would include renovations to an existing building, improvement to on-site utilities, resurfacing of an existing pavement area, and provision of additional parking. Other improvements would include construction of a new fence and installation of a new box culvert. The Marine Center's research vessels would be moored along Piers 34 and 35.

The Marine Center's educational operations would relocate from Snug Harbor to the Honolulu Community College METC outside of Honolulu Harbor on the western end of Sand Island. Plans for this relocation are further in the future and have no definite timetable. As with the Marine Center's research operations, a separate EA will be prepared for this action when it is ready to move forward.

Clean Islands Council/Marine Spill Response Corporation (CIC/MSRC)
CIC/MSRC is planning to move to Piers 12 and 15 from Piers 34 and 35. Improvements which would be required at Piers 12 and 15 to accommodate the new tenants include new berthing and mooring structures. While the DOT-H is preparing

a separate EA for this move, the action and its potential impacts are being recognized in this EIS.

Hawaiian Flour Mill (HFM)

With the proposed move of PSI from the KMR area to Piers 24 to 26, PSI's drydocks would locate along Piers 24 and 25 thus constraining existing grain cargo ship operations at Piers 22/23. Consequently, HFM is planning to relocate its current grain cargo ship berth from Piers 22/23 to Pier 20. This move would separate the grain cargo ship from existing storage silos, so present plans include the use of trucks to transfer HFM's grain from the ship to its silos via an internal harbor route through Piers 20/23. This activity would occur two or three times per year.

Harbor Police and Sause Brothers

PSI plans to occupy Piers 24 to 26 and at least two of three existing buildings on the property. The DOT Harbor Police and Sause Bros., which conduct water-dependent operations, presently occupy one of the buildings and would relocate to another building(s) within the harbor with the assistance of DOT-H. Planning for the relocation is currently in progress. The other building, to be occupied by PSI, is presently being used by Bella Pietra, A Natural Stone Design Center. This non-maritime enterprise will, on its own, relocate to another facility elsewhere on the island.

Hawai'i Harbors Modernization Plan

The Hawai'i Harbors Modernization Plan is a comprehensive, system-wide harbor modernization plan that addresses current and projected shipping requirements through a financially feasible development program implemented in an expeditious time period. Goals include: provide a harbor system that addresses critically needed improvements and promotes harbor user operational efficiencies; provide a harbor system with expanded capacity to accommodate Hawai'i's projected growth in cargo volume; and ensure Hawai'i's continued economic growth through improved harbor infrastructure.

For O'ahu Island, the Modernization Plan identifies development of the former KMR and improvements at Kalaeloa Barbers Point Harbor, specifically:

- Construction of a deep-draft pier at Kapālama with berthing capacity to accommodate two container ships.
- Development of a new 70-acre container yard at Kapālama with necessary paved area, gates, buildings, and off-site improvements, as well as direct connection to the Young Brothers inter-island barge operating yard.
- Construction of Kalaeloa west harbor utilities infrastructure.

- Construction of a new dedicated fuel pier at Kalaeloa.

6.2.2 Other Past, Present, and Future Actions/Projects Considered in the Cumulative Impact Analysis

Aloha Cargo Transport (ACT) Relocation

An opening ceremony was held in May 2012 to mark the beginning of ACT's move from Pier 2 to Pier 29. Ground improvements to Pier 29 consisted primarily of pavement resurfacing, underground utilities, and outdoor lighting. Service at the site started in June 2012.

Honolulu Marine Floating Drydock in Kalihi Channel

The proposed small boat shipyard with a 135-foot finger pier and floating drydock is located on the waterfront facing the Kalihi Channel, makai of the Sand Island Access Road Bridge. While an EA was prepared for this project in 2007, cumulative impacts are being considered in this EIS. Construction has not started.

Foreign Trade Zone Expansion at Pier 2

Plans have been announced for the expansion of the existing Foreign Trade Zone facility at Pier 2. The expansion will improve special customs services to U.S. companies engaged in international trade. Included in the expansion is a new conference center to facilitate conferences, seminars, and evening gatherings.

Honolulu Rail Transit Project

Construction on the City and County of Honolulu's (City's) 20-mile rail transit project started in May 2012. The first segment of the $5.17 billion project (HART 2012) is starting from East Kapolei and will continue towards downtown Honolulu and Ala Moana. During construction, the project will involve the creation of approximately 10,000 jobs annually throughout the Hawai'i economy. At its peak, the rail transit project might involve as many as 6,000 construction jobs, and potentially affect the availability of construction labor and materials islandwide.

In August 2012, the Hawai'i State Supreme Court ruled that the City must conduct a complete archaeological study for the 20-mile line before the new rail system can be built. As a result, the Honolulu Authority for Rapid Transit (HART), which is responsible for managing the rail system, announced that no new construction on the project, including "ground-altering activity," will be done until the archaeological survey work is completed. It is uncertain at this time when construction will recommence, but the delay could affect the Kapālama project if work on these projects occur at the same time. Each project will require construction labor, equipment, material, and supplies. If the extensive rail project uses a large

proportion of available construction resources on the island, this could be problematic for the Kapālama project if remaining resources are in short supply.

City Wastewater System Upgrades

The City entered into a Consent Decree filed in federal court on December 17, 2010 to upgrade major components of its wastewater collection and treatment system. The Consent Decree requires that the City install a valve system at the Hart Street Sewage Pumping station by December 31, 2014 to facilitate the transfer of pumped flows to the backup force main sewer if necessary. The Consent Decree also requires that the City upgrade the Sand Island Wastewater Treatment Plant to comply with secondary treatment standards, as defined in 40 Code of Federal Regulations (CFR) 133, by December 31, 2035.

Construction of the required improvements will involve the use of available labor, equipment, materials, and supplies. Major projects occurring at the same time would be competing for available construction resources. If the timetable for these projects is different, then there would be less of a supply and scheduling problem.

Major Residential Projects

Koa Ridge, a planned residential community of 3,500 homes in Waipiʻo, Oʻahu, and Hoʻopili, a planned residential community of 11,700 homes in ʻEwa, Oʻahu, were recently approved by the State Land Use Commission (SLUC). These major projects are currently proceeding through the entitlement process, seeking zoning approval from the City. Final details of their development plans will continue to be refined. In Kakaʻako, in urban Honolulu, the Hawaiʻi Community Development Authority (HCDA) is soliciting bids for a residential tower at 690 Pohukaina Street that could include 1,000 units. Master plans by the Howard Hughes Corporation and Kamehameha Schools allow for construction of as many as 3,750 more units nearby.

Although it is reasonable to expect that these projects will be constructed in phases, the magnitude of their overall size represents a significant undertaking that could have major impacts on the construction industry. The use of construction resources to implement the projects could affect the availability of such resources for other construction projects.

6.3 ANALYSIS OF CUMULATIVE IMPACTS

Resource areas identified for which cumulative impacts are discussed below include: roadways and traffic; utilities; hydrology (surface runoff); climate and air quality (including greenhouse gases); noise; visual resources; terrestrial flora and fauna; and socioeconomics. Some resources/issues were not presented in this section as they are inherently cumulative and evaluated in Chapters 3 and 4, or because they are not

affected by or affect other projects. These resources/issues include: land use; land ownership; public health and safety; public facilities and services; topography, geology, and soils; cultural; and natural hazards.

6.3.1 Roadways and Traffic

The traffic analysis for this project estimated future traffic volumes on adjacent roads to the year 2039, the year the container yard would be in full operation and at capacity. This traffic analysis in Chapter 3 is inherently cumulative, including anticipated urban population growth and associated increases in traffic volume in the project vicinity. The traffic study was based on assumptions regarding several of the actions listed above, including those involving the relocation of existing businesses.

The Honolulu rail transit project, which would run along Dillingham Boulevard and Nimitz Highway near the Kapālama site, may affect traffic volumes on these roadways. However, the Proposed Action and Alternative Action would not contribute significantly to these cumulative impacts.

6.3.2 Utilities

There are no other planned projects that would adversely impact utilities in the Kapālama vicinity. The building demolition and site cleanup of the Kapālama site however, which is a separate project, would impact solid waste disposal. The building demolition and site cleanup would remove existing non-maritime buildings that total approximately 840,000 square feet in area. Some construction waste, such as concrete floor slabs, could be recycled on site as embankment material or for use as structural fill. Depending on recycling diversion rates, the amount of construction waste could be in the order of magnitude of about 20,000 tons, which is about 1.2 percent of the annual estimated total solid waste tonnage. The cumulative impact with the Proposed Action would be about 1.5 percent of the annual estimated total solid waste tonnage, which is relatively minor.

Construction hauling impacts of the non-marine buildings would not be cumulative because this separate action is anticipated to occur prior to the Proposed Action.

6.3.3 Hydrology

Development of various projects in Honolulu Harbor have the potential to cumulatively increase surface runoff during construction. However, with implementation of Best Management Practices (BMPs) as conditions of project-specific National Pollutant Discharge Elimination System (NPDES) permits, impacts would be avoided or minimized. There would be little or no cumulative increase in

surface runoff during operations. Existing conditions in areas to be redeveloped are mainly paved surfaces and buildings, to be replaced by new pavement, structures, utilities, etc.

6.3.4 Climate and Air Quality

This section analyzes cumulative impacts of the Proposed Action in the context of state and federal policies addressing climate change and greenhouse gases (GHGs).

6.3.4.1 Climate Change (Including GHGs)

Climate change refers to changes in the mean and/or variability of climate properties that can be identified, e.g., using statistical tests, by changes, that persist for an extended period, typically decades or longer (IPCC 2007). The rise in global air temperatures and its association with the rise in anthropogenic (man-made) GHGs, primarily through the burning of fossil fuels, has led to the identification of climate change as an issue of great importance. As concluded by the Intergovernmental Panel on Climate Change (IPCC), most of the warming in recent decades is very likely the result of human activities (EPA 2012). Since 1900, the earth's average surface temperature has increased by about 1.2 to 1.4 degrees Fahrenheit (F) (EPA 2012).

Without GHGs, it is estimated that temperatures would be about 60 degrees Fahrenheit (F) cooler (EPA 2012). GHGs include carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Each of these gases have its own global warming potential (GWP) to trap heat in the atmosphere relative to CO2. Methane has 21 times the warming potential than CO_2, so it has a GWP of 21; CO_2's GWP is 1. Using these GWPs and the quantities of each gas, the gases can be aggregated and expressed in million metric tons of carbon dioxide equivalent ($MMTCO_2Eq$).

Projections of GHG concentrations and temperature in time suggest adverse effects of varying proportions due to alteration in the balance of energy transfers between the atmosphere, space, land, and oceans. In Hawai'i, the following changes have been observed: air temperature has risen; rainfall and stream flow have decreased; rain intensity has increased; sea level and sea surface temperatures have increased; and the ocean is acidifying (Fletcher 2010). Sea level rise can accelerate and expand erosion along beaches. Certain research indicates that a rise of three feet above the 1990 level could occur by the end of the 21st century (Vermeer 2009 and Fletcher 2009). While geographic variability exists and more monitoring and studies are needed, sea level rise is expected to continue.

Initiatives have been developed at both federal and state levels to address climate change. For purposes of this EIS, initiatives regarding GHG inventories and climate change adaptation planning are described below.

GHG Inventories. In general, inventories provide the quantification needed to establish and identify target reductions to stabilize GHG concentrations and to prevent dangerous influences on climate.

In 1992, the U.S. signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC), which includes the ultimate objective of achieving stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Further, the UNFCCC identifies that such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner (EPA 2012). The latest U.S. inventory estimates that total U.S. GHG emissions in 2010 were 6,821.8 $MMTCO_2Eq$. The energy sector, primarily fossil fuel combustion, represented 83.6 percent of this total. Other sectors contributing lesser amounts are: industrial processes, solvent and other product use, agriculture, land use and land-use change, forestry, and waste. Between 2009 and 2010, total U.S. GHG emissions increased 3.2 percent, primarily as a result of an increase in energy consumption across all sectors and much warmer summer conditions resulting in an increase in electricity demand. Since 1990, U.S. GHGs have increased an average of 0.5 percent per year (EPA 2012).

The latest Hawai'i inventory indicates total GHG emissions in 2007 of 24.27 $MMTCO_2Eq$. Marine transportation contributed 10 percent of all GHGs (2.16 $MMTCO_2Eq$). This compares to 20 percent (4.47 $MMTCO_2Eq$) for ground transportation, 22 percent (4.83 $MMTCO_2Eq$) for aviation transportation, and 40 percent (8.76 $MMTCO_2Eq$) for electric power.

No national, state, or local reporting or controls are imposed on GHG emissions from the sources considered in this cumulative impact analysis. However, federal and State of Hawai'i directives and plans suggest that reporting and controls are likely to affect some of these sources under other requirements in the near future.

- With Executive Order (EO) 13514, October 5, 2009, the President established an integrated strategy toward sustainability in the federal government and made the reduction of GHG emissions a priority for federal agencies. The EO requires agencies to conduct and submit comprehensive inventories of GHG emissions, and to develop agency-wide targets for emissions reductions (FEMP 2012).

- With the promulgation of 40 CFR Part 98, referred to as the Greenhouse Gas Reporting Program (GHGRP) on October 30, 2009, large GHG emissions sources in the U.S. were required to report GHGs. Reporting is at the facility level, except for certain suppliers of fossil fuels and industrial GHGs. The 2010 data set was released in January 2012 and is being evaluated by the U.S. Environmental Protection Agency (EPA) for use in improving the UNFCCC-compliant inventory.

- At the State of Hawaiʻi level, the Global Warming Solutions Act (Act 234, Session Laws of Hawaiʻi 2007) established a policy to achieve statewide GHG emissions levels at or below those in 1990 by January 1, 2020. It also established a GHG emissions reduction task force to prepare a work plan and regulatory scheme to achieve the statewide GHG limits. The *Hawaii Greenhouse Gas Inventory: 1990 and 2007* (DBEDT 2008), an update of previously estimated 1990 GHG emissions and inventory of 2007 GHGs, was a product of Act 234. While rules to meet the 2020 GHG emission limit have not yet been promulgated,[2] draft rules have been developed by the State Department of Health (DOH). DOH plans to hold public hearings in the within the next couple of months, respond to public comments, and expedite the rule-making process.[3]

ADAPTATION PLANNING. State and federal governments have issued directives to manage the effects of climate change in both the short and long term.

- At the state level, Act 286, Session Laws of Hawaiʻi 2012, encourages collaboration and cooperation among county, state, and federal agencies, policy makers, businesses, and other community partners to plan for the impacts of climate change and avoid, minimize, or mitigate loss of life, land, and property of future generations. Act 286 amends the Hawaiʻi State Planning Act (Hawaiʻi Revised Statutes [HRS] Chapter 226) to include climate change adaptation priority guidelines.

- At the federal level, EO 13514 directs agencies to evaluate risks and vulnerabilities to manage climate change effects on the agency's operations and mission in the short and long term. EO 13514 charges agencies to actively participate in the Interagency Climate Change Adaptation Task Force and mandates the Task Force to develop recommendations for the President on how the policies and practices of federal agencies can be made compatible with and reinforce a national climate change adaptation strategy (CEQ 2011).

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2 Act 234 of 2007 directed the adoption and operation of rules by December 31, 2011.

3 Personal communication between Mr. Nolan Hirai, Clean Air Branch Acting Manager of the State of Hawaiʻi Department of Health and Ms. Lesley Matsumoto, Belt Collins Hawaii. August 21, 2012.

No significant cumulative impacts on climate change would occur, as the GHG emissions from the Proposed Action and Alternative Action would not be sufficient to have an appreciable impact on climate. Rather, global man-made activities would also need to be considered. With that said, however, implementation of the Proposed Action and Alternative Action would reduce GHG emissions with the increase in efficiency (decrease in fuel use). Specific measures include improved handling operations using electric powered equipment within the yard, elimination of truck travel needed to move cargo from Sand Island to the inter-island barges on mainside, and elimination of vehicle miles traveled represented by the distance between Sand Island and the proposed Kapālama Container Terminal. Similarly, harbor related projects considered in this cumulative analysis should also help in reducing GHGs, as modernization implies use of newer technologies, equipment, and efficiencies.

No significant cumulative impacts from climate change would occur, as plans for adaptation have already been established, e.g., Act 286, Session Laws of Hawai‘i 2012. Climate change adaptation considerations for the Proposed Action and Alternative Action are addressed in Chapter 3, Natural Hazards.

6.3.4.2 Air Quality

Implementation of the Proposed Action or Alternative Action and other harbor projects considered in this cumulative analysis would reduce regulated air pollutant emissions in Honolulu Harbor. With modernization, increases in handling and transportation efficiencies within and immediately outside of the harbor are expected. The use of newer technologies and equipment, as well as improved efficiencies, would serve to reduce air pollutant emissions. One such example is the use of electricity, rather than diesel-powered engines, for gantry cranes. Projects outside Honolulu Harbor may increase air pollutant emissions but are unlikely to cumulatively and significantly affect air quality. Existing air pollution control rules and regulations serve to minimize pollutant emissions, and regional meteorological conditions effectively disperse pollutants.

6.3.5 Noise Environment

The overall sound environment for Honolulu Harbor is characteristically marine industrial. Sources of sounds include gantry cranes, material handling equipment, generators, other mechanical and cargo equipment, vehicle movements, and ships. Of the projects considered in the cumulative assessment, the Kapālama Container Terminal would introduce the greatest change with respect to noise, and the noise impacts would primarily be localized. Cumulative impacts on noise would not be significant.

Other than the container terminal construction, the Honolulu Harbor projects would be either renovations to existing buildings or improvements to the pier being used by the moving tenants. These construction activities are not expected to exceed DOH regulations for construction noise. The noisiest construction activities that would impact areas outside the project boundary are pile and sheet driving, and possibly dredging for the new terminal. For these activities, a permit or variance from the DOH would be acquired prior to construction. Construction for the downtown portion of the Honolulu Rail Transit was expected to be started some time in 2017/2018, with the entire system completed in 2019. Construction for the container yard is expected to start in 2014. However, in August 2012, construction for the rail project was delayed in order to complete an archaeological study along the entire route. No schedule has been published on when construction would resume. This delay would increase the time between the Kapālama terminal and rail construction.

New technologies and equipment used to reduce air emissions and lower energy costs with the proposed terminal development also result in reducing source noise levels. One technology is a process called cold ironing. This allows a ship to draw power from an electric station allowing the ship to not run their engines while in port. The Proposed Action and Alternative Action would use electric-powered gantry cranes that eliminate noise from diesel generators typically positioned high atop each crane. Another recent development are electric-powered and hybrid ships.

6.3.6 Visual Resources

The overall visual setting of Honolulu Harbor is characteristically marine industrial. Development of the container terminal and other new facilities would not appreciably change the appearance of the harbor, which would continue to include gantry cranes and other structures visible from a distance. Night-time operations would continue, requiring outdoor lighting. With little change in the general view of the harbor, cumulative visual impacts are expected to be minimal.

6.3.7 Marine Environment

The impacts disclosed in Chapter 4 of this EIS are site-specific, based on a quantitative and qualitative surveys of marine fauna and flora conducted in June/July 2012 and November. Following is an assessment of potential cumulative impacts.

- **CORAL COMMUNITIES.** The proposed redevelopment would result in removal of old piers and other vertical structures whose surfaces provide habitat for both coral and macro-invertebrate communities. In addition, remaining corals not removed

during dredging and excavation could be affected by sedimentation from construction activities. There may be a cumulative loss of coral when effects of the Kapālama project are combined with the effects of other in-water construction projects in Honolulu Harbor and elsewhere in the state.

- **MACRO-INVERTEBRATE COMMUNITIES.** See discussion above for coral communities; the same applies to macro-invertebrate communities.

- **ALGAL COMMUNITIES.** Algal communities were scarce at all locations surveyed for the Kapālama site and the Pier 24–28 site. The Proposed Action would not contribute to cumulative impacts on algal communities.

- **FISH COMMUNITIES.** Chapter 4 identified potential impacts on fish communities in sectors B and C at the Kapālama site and at Pier 27. Fish counts were low at the other locations. There may be cumulative impacts on fish communities when effects of the Kapālama project are combined with effects of other in-water construction projects in Honolulu Harbor and statewide. However, as noted in section 4.2, fish would be able to find suitable habitat at nearby locations.

RISK OF SPREAD OF INVASIVE SPECIES. Approximately 200 introduced species have established communities in marine and brackish waters. In Hawai'i's harbors, ships are the main source of invasive species—on hull bottoms and from ballast water and solid ballast taken on by ships. Invasive species here originated largely from the Indo-Pacific region, but also from the tropical western Atlantic and Caribbean regions (Eldredge 2001).

During dredging and filling activities, fragmentation of biological material could disperse invasive species, enabling regeneration from the fragments. These fragments have the potential to disperse to areas outside the harbor where such species do not yet occur. Measures to reduce fragmentation and prevent dispersal of fragments are suggested in Chapter 4. Implementation of appropriate mitigation measures on all dredging and filling projects with the potential for marine invasive species fragmentation would minimize cumulative impacts.

During operations, the new Kapālama Container Terminal *per se* would not cause an increase in the introduction of invasive marine species. Rather, the projected increase in cargo volume and, hence, ship arrivals (which would occur with or without the Proposed Action or Alternative Action) pose the potential for more invasive species to be introduced here. The major pathway for aquatic species introductions is ballast water. Compliance with the existing National Invasive Species Act of 1996, as amended, and its implementing regulations prevent the

discharge of ballast water and would continue to prevent the spread of aquatic nuisance species (ANS). [4]

- **REGULATED SPECIES**. The analysis in Chapter 4 discloses that construction-related impacts on Endangered Species Act (ESA)-listed species are most likely for the threatened green sea turtles than for other protected species known to occur in the project area. Mitigation measures include monitoring prior to pile driving activities and/or establishing appropriate stand-off distances. Mitigation measures will be developed during the USACE permitting process, the USACE's consultation process under Section 7 of the ESA, and the USACE's consultation process for EFH under the Magnuson Stevens Fishery Conservation and Management Act. These measures will serve to avoid or reduce cumulative impacts on regulated species.

6.3.8 Terrestrial Flora and Fauna

Other than the concern for the risks of spread of invasive species, no other cumulative impacts on terrestrial flora and fauna have been identified. Terrestrial invasive species concerns are presented herein.

Invasive species risks increase each year with the increase in goods and materials entering and leaving the state. The effects on the State economy can be costly. Federal studies estimate total potential annual damage to Hawai'i of between $593 million and $2.14 billion for the brown tree snake, over $200 million per year for the red fire ant, and upwards of $2 million per year for the coqui frog.

President Clinton issued EO 13112 in 1999 that directed federal agencies to cooperatively work to prevent the introduction of invasive species and to control and minimize their economic, ecological, and human health impacts. Invasive species was defined as "….an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health" (FR 1999). An alien species "…means, with respect to a particular ecosystem, any species…that is not native to that ecosystem" (FR 1999).

On the state level, the plant quarantine branch of the State Department of Agriculture (DOA) has worked for many years to prevent the entry of unwanted species that are harmful to agriculture, animal or public health, or natural resources. Despite these efforts, many unwanted species have entered the state and caused damage to the islands' agricultural, native species, and the environment. With over 90 percent of

[4] ANS may displace native species, degrade native habitats, spread disease, and disrupt human social and economic activities that depend on water resources.

consumer food and goods imported into the state, there are many pathways for the introduction of invasive species.

In 2003, the 22nd Legislature passed Act 85 pertaining to controlling invasive species in Hawai‘i. The Act stated, “The legislature finds that the silent invasion of Hawai‘i by insects, disease-bearing organisms, snakes, weeds, and other pests is the single greatest threat to Hawai‘i’s economy and natural environment and to the health and lifestyle of Hawai‘i’s people.” The act aimed to upgrade the plant quarantine model by introducing the concept of a biosecurity program with multiple layers (DOA 2007):

- Pre-entry measures to minimize pest risks prior to entry;
- Port-of-entry inspections to detect pests upon arrival;
- Post-entry measures to mitigate the establishment of invasive species; and
- Growth of agriculture to reduce dependency on imports.

In 2011, the 26th State Legislature passed Act 202 pertaining to establishment of biosecurity facilities at airports and commercial harbors. The act recognized “…the need for the efficient and secure movement of agricultural commodities into the State, out of the State, and between the islands and important to the long-term health of the State’s agricultural industry.”…. For commercial harbors, the DOT-H was directed to provide space for biosecurity and inspection facilities at its harbors and work with the DOA to design and construct a biosecurity facility for DOA’s use. The intent of the biosecurity was “…to enhance the efficient and safe movement of imported and exported marine cargo….”

Table 6-1 includes high-profile invasive species for the four main islands in the state of Hawai‘i. These include species that are present only on certain islands, species that are widespread throughout the islands, species not in Hawai‘i, and Hawai‘i species not in the continental U.S. The Hawai‘i Invasive Species Council (HISC) maintains this list. The HISC is composed of federal, state, international, and local agencies and groups that provide policy level initiatives for controlling and eradicating harmful invasive species. It is co-chaired by the State Department of Land and Natural Resources (DLNR) and the DOA.

Table 6-1. Hawai'i's High-Profile Invasive Species

Invasive Species Name	O'ahu	Maui	Kaua'i	Hawai'i
Africanized honey bee *(Apis melifera scutellata)*	Not present	Not present	Not present	Not present
Apple snail *(Pomacea canaliculata, Pomacea bridgesi, Pomacea paludosa,* and *Pila conica)*	Present	Present	Present	Present
Australian tree fern *(Cyathea cooperi)*	Spreading	Widely cultivated and naturalized	Spreading	Spreading
Barbados gooseberry *(Pereskia aculeate)*	Known from cultivation	Unknown	Unknown	Unknown
Biting flies	Not present	Not present	Not present	Not present
Brown treesnake, aka BTS *(Bolga irregularis)*	Not present	Not present	Not present	Not present
Bush beardgrass *(Andropogon glomeratus var. pumilus)*	Present	None known	None known	Established
Cat's claw *(Caesalpinia decapetala)*	Widespread	One location	Widespread	Present in Kau
Cattail *(Typha latifolia)*	Present	One location	Present	Unknown
Coqui frog *(Eleutherodactylus coqui)*	Limited	Present	Limited	Established
False Kava *(Piper auritum)*	Limited	Present	Limited	Unknown
Fire tree *(Morella faya)*	Established	Present	Present	Established
Fireweed *(Senecio madagascariensis)*	Removed	Present	Removed	Widespread
Fountain grass *(Pennisetum setaceum)*	Controlled	Limited	Limited	Established
Fruit flies (export to US problem)	Established	Established	Established	Established
Giant reed *(Arundo donax)*	Limited	Limited	Limited	Unknown
Gorse *(Ulex europaeus)*	Present	Infestations	Present	Infests higher altitude areas
Himalayan blackberry *(Rubus discolor;* syn: *Rubus armeniacus)*	Limited	Limited	None known	Present
Hiptage *(Hiptage benghalensis)*	Present	None known	Present	Unknown
Hookweed *(Hypnea musciformis)*	Present	Present	Limited	Not known
Ivy gourd *(Coccinia grandis)*	Widespread	Localized	Limited	Widespread
Kappaphycus spp. *(K. alvarezii,* and *K. striatum)*	Limited	Not known	Not known	Not known
Lethal yellowing	Not present	Not present	Not present	Not present
Little fire ant *(Wasmannia auropunctata)*	Not known	Not known	Limited	Infestation on windward side
Long-thorn kiawe *(Prosopis juliflora)*	Present	None known	Present	Unknown
Miconia *(Miconia calvescens)*	Established	Present	One population	Present

Table 6-1. Hawai'i's High-Profile Invasive Species

Invasive Species Name	O'ahu	Maui	Kaua'i	Hawai'i
Mongoose *(Herpestes javanicus)*	Established	Established	Verifying	Established
Nettle caterpillar *(Darna pallivitta)*	Unknown	Unknown	Unknown	Present
New Zealand flax *(Phormium tenax)*	Present	Present	Present	Present
Pampas grass *(Cortaderia jubata, Cortaderia selloana)*	Limited	Present	Limited	Established
Plume poppy *(Bocconia frutescens)*	Present	Present	Not present	Infestations
Red Imported Fire Ant *(Solenopsis invicta;* syn: *Solenopsis wagner)*	Not present	Not present	Not present	Not present
Red-vented Bulbul *(Pycnonotus cafer)*	Present	Not known	Not known	Limited
Red-whiskered Bulbul *(Pycnonotus jocosus)*	Present	Not known	Not known	Not known
Rubbervine *(Cryptosegia grandiflora* and *C. madagascariensis)*	Present	Limited	Limited	Limited
Smoke bush *(Buddleja madagaascariensis)*	Present	Present	Spreading	Limited infestation
Glory bush *(Tibouchina)*	Present	Naturalized	Naturalized	Naturalized
Veiled chameleon *(Chamaeleo calyptratus)*	Not known	Not known	Single sighting	Not known
West Nile virus	Not known	Not known	Not known	Not known
Wood rose *(Merremia tuberosa)*	Present	Present	Present	Present

Source: Hawai'i Invasive Species Council (HISC).
http://www.hawaiiinvasivespecies.org/pests/index.html, accessed June 30, 2012.

The list of pests designated for control or eradication by DOA and that warrant restriction on import and/or inter-island movement are contained in Chapter 4-69-A, Hawai'i Administrative Rules (HAR).

There are several aspects to stopping the spread of invasive species:

- Export intervention: Prevent invasive species in Hawai'i (such as fruit flies) from reaching the continental U.S. or other areas.
- Import intervention: Prevent invasive species (such as Africanized honey bee, biting flies, brown tree snake, and red imported fire ant) from entering Hawai'i.
- Inter-island intervention: Prevent invasive species from moving from one island to another island. For example, fountain grass is established on the Island of Hawai'i, but limited on O'ahu, Maui, and Kaua'i.

Cargo containers and their contents provide a pathway for invasive species to enter the state or to exit Hawaiʻi and enter the continental U.S. Cargo containers in transit to or from the Neighbor Islands can allow inter-island movement of invasive species. The inspection effort is a collaborative one involving federal and state agencies.

As part of the Proposed Action and Alternative Action, DOT-H would set aside approximately 2.5 acres at the Kapālama site where DOA could develop a biosecurity facility next to its existing facility. The biosecurity facility would include an inspection building (Phase 1) consisting of inspection bays with consolidation/ deconsolidation capability for neighbor islands cargo, and a Treatment Area building (Phase 2) with treatment capabilities for import/export goods. The harbor biosecurity facility would allow inspection off the port, reduce congestion at the harbor, and provide a climate controlled facility for food safety. DOA would fund development of this facility.

The Proposed Action and Alternative Action would enable the establishment of a biosecurity facility at the Kapālama site that would improve intervention efforts and reduce the cumulative risks associated with the spread of invasive terrestrial species.

6.3.9 Cultural Resources

The fishponds that once covered most of the Kapālama site were filled decades ago, and repeated investigations have been made to learn about them, as described in section 4.4.1.1. The warehouses built before and during World War II at that site have been used until the present. A study to the Historic American Buildings Survey (HABS) III standards has provided detailed documentation of the structures and their past uses. The warehouses will be vacated and demolished soon. The Proposed Action will have no additional impact on cultural resources and practices.

The studies undertaken on behalf of DOT-H have already provided mitigation for changes in the cultural landscape. No additional mitigation is needed.

6.3.10 Socioeconomics

The findings disclosed in Chapter 4, Socioeconomics, are based on a cumulative impacts analysis, with the region of influence (ROI) being the island of Oʻahu and even the entire state. Increased economic throughput and job growth as a result of projects listed above are examples of cumulative impacts discussed in Chapter 4. The operational efficiencies achieved with increased container yard space are the most significant impact of the project, with beneficial effect on the island and state economies.

Of particular interest is the possible cumulative impact of planned projects such as Koa Ridge and Hoʻopili on the construction industry—including the availability of

labor, equipment, and materials. Since construction for the new container terminal is projected to begin in 2014, while nearly all the Kakaʻako development and the two suburban residential projects are projected to begin further in the future, no significant cumulative impacts are expected. The availability of labor, equipment, and materials may be cumulatively affected by other projects listed above, but the impact would depend on actual construction schedules and would occur after completion of construction of the Kapālama project.

The relocation of tenants from warehouses at the Kapālama site will have a significant impact on the relocated firms. The Proposed Action will not add to that impact.

7 Summary of Impacts

CHAPTER 7
SUMMARY OF IMPACTS

7.1 INTRODUCTION

Table 7-1 summaries the potential impacts of the Proposed Action and alternatives (including Alternative Action and No Action Alternative), and possible mitigation measures, if needed, as disclosed in this Environmental Impact Statement (EIS).

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Land Use	**Construction:** No significant impacts. During construction, temporary impacts would be addressed through implementation of BMPs and other construction management measures. **Operations:** No significant impacts. New container yard would be consistent with existing industrial use of the property and compatible with other harbor land uses. Residential uses occur in nearby areas. **Mitigation:** No mitigation is required.	**Construction:** Similar to Proposed Action. **Operations:** Similar to Proposed Action. **Mitigation:** No mitigation is required.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.
Land Ownership	**Construction:** No significant impacts. Right-of-entry will be required for construction on lands owned by parties other than DOT-H. **Operations:** No significant impacts. Leases and other land tenureships will be required for long-term use of lands owned by parties other than DOT-H. **Mitigation:** No mitigation is required.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** Similar to the Proposed Action.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Public Health and Safety	**Construction:** No significant risks to public health and safety. The potential impact of any cranes at the Kapālama site would not be significant as the FAA process established under 14 CFR Part 77 would be initiated and completed by the operator. At the Kapālama site, a Phase II is being conducted by the DOT-H to identify the nature and extent of any contaminant. Any resulting mitigation measures identified, which could include design and engineering methods, would be made part of the action. At the Pier 24-28 site, the DOT-H is coordinating with IDPP, and mitigation measures, particularly Institutional Controls, established in the EHMP and any future updates will be made part of the planning and incorporated into the design of any construction. Activities would be conducted to comply with applicable environmental laws and regulations. **Operations:** No significant risks to public health and safety. The potential impact of any cranes at the Kapālama site would not be significant as the FAA process established under 14 CFR Part 77 would be initiated and completed by the operator. At the Kapālama site, a Phase II is being conducted by the DOT-H to identify the nature and extent of any contaminant. Any resulting mitigation measures identified, which could include design and engineering methods, would be made part of the action.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No mitigation is required.	**Construction:** No impact. **Operations:** No change in impacts. **Mitigation:** No mitigation is required.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Public Health and Safety *(cont.)*	At the Pier 24-28 site, the DOT-H is coordinating with IDPP, and mitigation measures, particularly Institutional Controls, established in the EHMP and any future updates will be made part of the planning and incorporated into the design of any operations. Activities would be conducted to comply with applicable environmental laws and regulations. **Mitigation.** Mitigation measures would be identified after the Phase II ESA at the Kapālama site is completed. Depending on the nature and extent of any contaminant, such measures could include design and engineering methods that are made part of the Proposed Action. .		
Roadways and Traffic	**Construction:** Construction-related traffic would be short-term and not expected to be significant. **Operations:** Traffic generated would not be significant. Traffic volumes, however, would still increase on the surrounding streets, but not significant enough to change the streets' level of service (exception: Snug Harbor entry). Truck traffic from the container yard will be primarily on Sand Island Access Road (SIAR) where truck gates are proposed. Auiki Street traffic would improve as direct transfers of container cargo from Kapālama site to Young Brothers occur without access through Auiki Street. Also, a traffic light is planned at Auiki Street - Mokauea Street intersection for improved traffic and pedestrian safety. Impact on traffic from Piers 24-28 would be insignificant. **Mitigation:** No mitigation is required.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No mitigation is required.	**Construction:** No impact. **Operations:** Relative to existing conditions, traffic at three intersections around Kapālama would degrade to LOS E or F. **Mitigation:** No mitigation is required.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Utilities	**Construction:** No significant impacts. Construction would be accomplished in compliance with applicable permit requirements. **Operations:** No significant impacts. DOT-H will coordinate with City agencies and utility companies to bring utility service to the site. **Mitigation:** No mitigation is required.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No mitigation is required.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.
Public Facilities and Services	**Construction:** No significant impacts. Existing services or facilities have the capacity to accommodate anticipated changes during construction. **Operations:** No significant impacts. Existing services or facilities have the capacity to accommodate anticipated changes with the proposed use. **Mitigation:** No mitigation is required.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No mitigation is required.	**Construction:** No impacts anticipated. **Operations:** No change in impacts. **Mitigation:** No mitigation is required.
Topography, Geology and Soils	**Construction:** No significant impacts. Earthwork and grading would be conducted in compliance with applicable laws, regulations and NPDES permit requirements, thus avoiding or minimizing impacts. Fill from excavation work would be used to the extent practicable to minimize the amount of fill from off-site sources to construct the proposed piers. **Operations:** No impact. No significant alteration of topography, geology, or soils expected. **Mitigation:** No additional mitigation is required.	**Construction:** Impacts would be less than Proposed Action as less fill would be required. **Operations:** No significant impacts. **Mitigation:** No additional mitigation is required.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Hydrology	**Construction:** No significant impacts. Runoff to surface water would be avoided or minimized through compliance with NPDES permit requirements and implementation of BMPs. No impact would occur on groundwater resources. **Operations:** No significant impacts. Minimal net increase in impervious surface due to new pavement. With implementation of LID standards, BMPs, and other measures required under the NPDES permit program, no substantial impact on surface water quality would occur. No impact would occur on groundwater resources. **Mitigation:** No additional mitigation is required.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No additional mitigation is required.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.
Natural Hazards	**Construction:** Significant impacts from natural hazards would be minimized. Disaster preparedness and evacuation procedures, as well as appropriate site design, would be implemented. **Operations:** Significant impacts from natural hazards would be minimized. Site development would be designed with respect to risks from known natural hazards and climate change to minimize impacts. **Mitigation:** No additional mitigation is required.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No additional mitigation is required.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.
Climate and Air Quality	**Construction:** No significant impacts from temporary fugitive dust and diesel-powered vehicle/equipment emissions. DOH regulatory controls and permit requirements would minimize impacts.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No additional mitigation is required.	**Construction:** No impact.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Climate and Air Quality *(cont.)*	**Operations:** Emissions from diesel-powered equipment and vehicles would not significantly impact air quality. The Proposed Action would be designed so vessels moored at the berths would receive shore-based electricity. Other operations that would serve to reduce or minimize air emissions would include use of low-sulfur fuel, use of electric-powered gantry cranes, and use of electric-powered vehicles and equipment where possible. As applicable, permits under HAR 11-60.1 would be obtained by operators of regulated stationary source equipment. No significant cumulative impacts on climate change would occur, as the GHG emissions from the Proposed Action and Alternative Action would not be sufficient to have an appreciable impact on climate (see Chapter 6, Cumulative Impacts). **Mitigation:** No additional mitigation is required.		**Operations:** Existing container terminals on Sand Island would need to accommodate increase in overseas container volumes. Air emissions and GHGs would increase there, but not significantly because permitting process will control impact. **Mitigation:** No mitigation is required.
Noise Environment	**Construction:** At the Kapālama site, unavoidable, temporary noise impacts would occur. With use of mitigation measures as identified in the State DOH noise permit or variance, whichever is applied, impacts would be minimized. At Piers 24-28, no significant impacts from construction noise are expected.	**Construction:** Similar to the Proposed Action. Impacts from piling driving could occur over a longer period as additional piles would be needed to create the deck over Snug Harbor. **Operations:** Similar to the Proposed Action. **Mitigation:** No mitigation is required.	**Construction:** No impact. **Operations:** Noise levels would increase with the increase in truck trips between Sand Island and the inter-island vessel operators on the main side of Honolulu Harbor, as the number of containers handled would continue to increase. **Mitigation:**No mitigation is required.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Noise Environment *(cont.)*	**Operations:** Operational noise from the container terminal is expected to be within the State's maximum permissible sound levels and would not be significant. Impulsive type noise, however, will be audible and could be the source of complaints. Possible mitigation measures have been identified for use on impulsive noise and include: sound attenuation barriers/wall, selective siting of noisy operations, use of quietest equipment, use of broadband backup alarms, and sound attenuation treatment on machinery. At Piers 24-28, noise is expected to be within the State's maximum permissible sound levels and would not be significant. Noise could be the source of complaints from residences in Downtown Honolulu during the nighttime and early morning. Possible mitigation measures have been identified and include: monitoring noise levels and attenuation of nighttime/early morning shipyard noise. At Pier 20, noise is expected to be within the State's maximum permissible sound levels and would not be significant. Noise could be the source of complaints from residences in Downtown Honolulu during the nighttime and early morning. Possible mitigation measures have been identified and include: use of lights or radio frequency devices (rather than horns), use of broadband backup alarms, minimize engine speed, use of resilient bumpers on grain hoppers. **Mitigation:** No mitigation is required.		

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Visual Resources	**Construction:** Visual impacts from construction would be temporary and not significant. **Operations:** No significant impacts. Distant view of site would be obscured by surrounding industrial uses; view from uplands would be relatively indistinguishable within highly urbanized setting. Outdoor lighting would be visible from adjacent areas. **Mitigation:** No mitigation is required. To minimize potential impacts of outdoor lighting, a range of mitigation measures from use of directional lighting, creation of lighting buffers and fences with slats along the property line to limiting night-time operations to specific areas in the yard and to specific times are available.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No mitigation is required.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.
Marine Environment	**Construction:** Marine biota would be affected in varying degrees. Potentially significant impacts include loss of coral (mainly on piers and vertical surfaces), disturbance to green sea turtles during pile driving, and spread of marine invasive species from fragmentation. The risk of spread of invasive species would be minimized with the measures identified in Chapter 4. **Operations:** Impacts on marine biota would be avoided or minimized by complying with existing management measures, including regulatory requirements and standard operating procedures. Proposed Action would enable DOA to develop biosecurity facility, which would serve to support efforts to mitigate invasive species. **Mitigation:** Mitigation measures for in-water construction impacts would be developed during the ESA Section 7 and Magnuson-Stevens Act EFH consultations and USACE permitting processes.	**Construction:** Similar to the Proposed Action, except for impacts at Snug Harbor: less loss of coral at least in the short term and less loss of ocean water surface for harbor use. Constructing a deck over Snug Harbor rather than completely filling the harbor would reduce the initial loss of coral colonies, but may reduce light below a threshold limit required for coral growth. **Operations:** Similar to the Proposed Action. **Mitigation:** Similar to the Proposed Action.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Terrestrial Flora and Fauna	**Construction:** No ESA-listed plant species occur on the property. Potential impacts to shorebirds would be temporary as alternative roosting areas are available nearby. The risk of introduction of new invasive species would be minimized with the measures identified in Chapter 4. **Operations:** Downward oriented outdoor lights would reduce impacts on Newell's and wedge-tailed shearwaters. **Mitigation:** No additional mitigation identified. Should additional mitigation be identified when USACE satisfies its ESA Section 7 obligation, any mitigation will be made part of the Proposed Action.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** No additional mitigation needed.	**Construction:** No impact. **Operations:** Without this development opportunity, the DOA's biosecurity facility would not be developed and would further delay efforts to further minimize risks of spread of invasive species. **Mitigation:** No mitigation is required.
Cultural Resources	**Construction:** No significant impacts. SHPD determined "no adverse effect" on archaeological resources at the Kapālama site. No structures were determined significant for preservation. Investigations show no cultural practices occur on or through the site. If human remains or subsurface archaeological resources are encountered during construction, work would stop and SHPD would be contacted in accordance with State law and rules. **Operations:** No impact. **Mitigation:** No additional mitigation is required.	**Construction:** Similar to the Proposed Action. **Operations:** Similar to the Proposed Action. **Mitigation:** None.	**Construction:** No impact. **Operations:** No impact. **Mitigation:** No mitigation is required.

Table 7-1. Summary of Impacts by Resource Area

Impacts to Resource Area	Proposed Action Probable Impact	Alternative Action Potential Impact	No Action Alternative Potential Impact
Socio-economics	**Construction:** Significant beneficial impacts on construction jobs and wages would occur. The 456 direct jobs and 765 indirect and induced jobs would benefit the economy. **Operations:** Significant long-term beneficial increase in efficiency and consequential support for the island and State economies. Increased capacity in the harbor's container terminals would increase efficiency of cargo handling. New jobs would be created stimulating further spending and growth in the economy. **Mitigation:** No mitigation is required.	**Construction:** Similar to the Proposed Action. Economy would benefit more from this alternative which includes 1,316 direct jobs and 2,210 indirect and induced jobs. **Operations:** Similar to the Proposed Action, although maintenance of improvements and waters at Snug Harbor could reduce operational efficiency and container throughput **Mitigation:** No mitigation is required.	**Construction:** No impact. **Operations:** Shipment of goods and supply to Hawai‘i would be constrained by limited capacity of existing container terminals. Cost of doing business in the ports would increase which would translate to higher cost of goods shipped in and out of Honolulu. **Mitigation:** No mitigation is required.

8 Other Considerations

CHAPTER 8
OTHER CONSIDERATIONS

8.1 RELATIONSHIPS BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Section 11-200-17, Hawai'i Administrative Rules (HAR) requires discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. Short-term and long-term do not necessarily refer to fixed time periods but are viewed relative to environmentally significant consequences of the Proposed Action. This section discusses the extent to which the Proposed Action involves trade-offs among short-term and long-term gains and losses, as well as the extent to which the Proposed Action forecloses future options and/or narrows the range of beneficial uses of the environment.

Short-term impacts would result from construction activities on land and in the waters of the harbor. Short-term construction-related traffic, noise, air quality, and water quality impacts described in this document would not be significant given implementation of required Best Management Practices (BMPs) to avoid or minimize impacts. In addition, there is a potential for short-term impacts on Endangered Species Act (ESA) listed green sea turtles during in-water construction activities such as pile driving. Mitigation would be developed in the ESA Section 7 consultation process. Development of container terminal piers would not foreclose future use of harbor waters by green sea turtles.

The project requires dredging and filling to develop new pier facilities, which would involve removal of existing coral. Most of the coral to be removed is located on old piers and other vertical structures. This impact represents a trade-off between loss of coral resources and enhancing the long-term productivity of Honolulu Harbor. It is recognized that failing to accommodate future growth in cargo demand (No Action Alternative) could lead to negative socio-economic impacts for O'ahu and the rest of the state.

8.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES BY THE PROPOSED ACTION

A commitment of resources is considered irreversible when it precludes restoration of those resources to their pre-project condition. Use, consumption, destruction, or degradation of resources resulting from implementation of the Proposed Action, such that those resources cannot be retrieved or replaced in any form, is considered an irretrievable commitment of resources. One issue to be addressed is the use of non-renewable resources during the construction and operational phases of the Proposed Action.

Irreversible and irretrievable commitments of resources during construction include:

- Use of construction materials;
- Excavation and disposal of soil and sediment;
- Use of available space in the construction and demolition landfill;
- Expenditure of funds to finance construction;
- Construction manpower; and
- Use of energy in the form of direct consumption of fossil fuel for vehicles and equipment.

With construction of the piers and dredging to achieve adequate depths, certain marine biota would be irreversibly or irretrievably lost, including coral communities. However, depending on the outcome of ESA Section 7 consultations, loss of coral at the Kapālama site may be mitigated to some extent by the provision of suitable coral habitat at another location.

Fossil fuel would be irreversibly and irretrievably committed during operations to provide electrical power to the container yard.

8.3 PROBABLE ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED

The Proposed Action, including the required dredging and filling activity, could result in certain unavoidable environmental impacts. Loss of coral and impacts on green sea turtles are two examples. Another example is the likelihood that future growth in cargo demand and resulting increase in ship traffic that the new container terminal is intended to accommodate may foster the spread of invasive species. In addition,

noise during operations at the container terminal—particularly at night—may affect nearby area residents. Measures are available to mitigate these impacts to levels that are not significant.

Construction associated with the Proposed Action would generate short-term impacts such as noise, fugitive dust, emissions from vehicles and equipment, traffic congestion, and sedimentation. These impacts cannot be avoided but would be limited to the immediate construction vicinity and managed through implementations of BMPs in accordance with applicable regulations.

8.4 UNRESOLVED ISSUES

No unresolved issues have been identified.

9 List of Preparers

CHAPTER 9
LIST OF PREPARERS

This Environmental Impact Statement (EIS) for the Kapālama Container Terminal project was prepared for the State of Hawai‘i Department of Transportation, Harbors Division (DOT-H). The prime consultant for this EIS is Belt Collins Hawaii LLC. The following list identifies the organizations and individuals involved in the preparation of this document.

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APPENDIX A

Public Involvement

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Final Environmental Assessment/Environmental Impact Statement Preparation Notice

A-2
Environmental Impact Statement Preparation Notice Comment Letters

A-3
Environmental Impact Statement Preparation Notice Response Letters

A-4
Public Meeting Power Point Presentation 2011 Jul 19

A-5
Public Meeting 2011 Jul 19 Afternoon Public Input

A-6
Public Meeting 2011 Jul 19 Evening Public Input

A-7
Public Meeting Power Point Presentation 2012 May 10

A-8
Public Meeting 2012 May 10 Afternoon Public Input

A-9
Public Meeting 2012 May 10 Evening Public Input

A-10
Draft Environmental Impact Statement Distribution List

FINAL ENVIRONMENTAL ASSESSMENT/ ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE

Kapalama Container Terminal
Honolulu Harbor

State of Hawai´i
Department of Transportation
Harbors Division

FINAL ENVIRONMENTAL ASSESSMENT/ ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE

Kapalama Container Terminal
Honolulu Harbor

November 2011

Prepared for:

State of Hawai´i
Department of Transportation
Harbors Division

Prepared by:

Belt Collins Hawaii Ltd.
Honolulu, Hawaii

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ACRONYMS AND ABBREVIATIONS

BMPs	Best Management Practices
CIA	Cultural Impact Assessment
DEIS	Draft Environmental Impact Statement
DLNR	Department of Land and Natural Resources, State of Hawai´i
DOA	Department of Agriculture, State of Hawai´i
DOH	Department of Health, State of Hawai´i
DOT-Harbors	Department of Transportation, Harbors Division, State of Hawai´i
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FAA	Federal Aviation Agency
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
HAR	Hawai´i Administrative Rules
HHUG	Hawai´i Harbors User Group
HRHP	Hawai´i Register of Historic Places
HRS	Hawai´i Revised Statutes
KMR	Kapalama Military Reservation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
TMK	Tax Map Key
UH	University of Hawai´i
U.S.	United States

1 Proposing Agency

The State of Hawai´i (State) Department of Transportation, Harbors Division (DOT-Harbors) is the proposing agency for this action.

2 Accepting Authority

The accepting authority for the Environmental Impact Statement (EIS) is the Governor of Hawai´i or the Governor's authorized representative.

3 Purpose of Environmental Impact Statement Preparation Notice (EISPN)

This EISPN was prepared in accordance with Hawai´i Administrative Rules (HAR) Title 11 Chapter 200, which implements Hawai´i Revised Statutes (HRS) Chapter 343.The intent of this EISPN is to inform interested parties of the project, and to seek agency and public input on issues or resources of concern. Input received as a result of the EISPN that is relevant to the proposed action will be used in developing the Draft Environmental Impact Statement (DEIS), HRS Chapter 343 requirements are applicable to this project because the proposed action will use State land and funds.

4 Project Description

DOT-Harbors is proposing to redevelop the former Kapalama Military Reservation (KMR) property at Honolulu Harbor into a new shipping container terminal to handle current and projected cargo volumes. Formerly owned by the U.S. government, the land was acquired by the State in 1993 for future harbor expansion and improvements.

The approximately 90-acre Kapalama site is bounded on the west by Sand Island Access Road, on the north by Auiki Street, on the east by Young Brothers' inter-island barge terminal, and on the south by the harbor waters of Kapalama Basin (Figure 1). Existing vehicular access is via Sand Island Access Road and Auiki Street.

The DEIS will evaluate direct impacts associated with the proposed action and its alternative actions, as well as indirect and cumulative impacts associated with the construction and long-term operation of the project.

4.1 Purpose and Need for the Project

Hawai´i is the only state in the nation that is completely surrounded by ocean and, as a result, its residents are heavily dependent on ocean surface transportation for their sustenance. Approximately 80 percent of Hawai´i's goods—including food, consumer products, vehicles, fuel, and construction materials—are imported into the state. Of that amount, 98 percent comes through its commercial harbors. Ocean transportation and commercial harbors are Hawai´i's lifeline to the world, supporting every facet of the islands' economy.

As the resident population in the islands continues to grow, and to ensure continued and unimpeded movement of cargo in and out of the state, as well as between the islands, the

commercial harbors in Hawai'i must undergo major expansion and improvements. Through the years, transported cargo has been increasingly containerized. Containerized cargo throughput at the existing Sand Island container terminals is projected to increase at an annual compounded rate of three percent, based on the direct linehaul (service between Honolulu and the mainland) growth in containerized cargo between 1994 and 2005. Although recent throughput has slowed as a result of current economic conditions, long-term growth trends continue to push for increased terminal capacity at Honolulu Harbor.

Existing terminal capacity in Honolulu Harbor, the hub of the state commercial harbor system, has not been recently expanded. If no new capacity is developed in the current projection timeframe, major reductions in service time and increases in cost at the Sand Island terminals are expected. By 2020, the movement and handling of cargo will effectively be constrained with significant impacts on Hawai´i's economy, including lost jobs and income, foregone business revenue and taxes, and potential shortages of goods. By 2030, the loss of real gross state product could amount to $50 million, and consumers could be subject to 18 percent higher shipping costs. Expansion of container terminal capacity in Honolulu Harbor is a high priority to assure that continuing growth in cargo volumes entering the state is accommodated.

4.2 Background

As early as 1989, a container cargo facility was included in the *Honolulu Waterfront Master Plan* on directions from the Office of State Planning.

In 1991, the *Final Master Plan Report, Kapalama Development Project* , was prepared and included a development program for the container terminal operation, State Department of Agriculture facility, and some related-maritime users.

The *Oahu Commercial Harbors 2020 Master Plan*, which was prepared in 1997 and updated the *Honolulu Waterfront Master Plan* and the *2010 Master Plan for Barbers Point Harbor*, ensures Oahu's commercial harbors will be capable of meeting the expanding needs of the State's growing economy through the year 2020.

In 2008, the Hawai´i State Legislature appropriated funds to implement the State's *Harbors Modernization Plan*. The Plan, prepared by DOT-Harbors in partnership with the Hawai´i Harbors User Group (HHUG), included priorities to expand and upgrade statewide commercial harbor facilities to meet the need for increased maritime cargo and passenger service. Recognizing the vital importance of Honolulu Harbor in the state's commercial harbor system, the Plan called for constructing a new container terminal at the former KMR site.

In moving forward with the development of the new container terminal, existing tenants will be required to relocate from the property. The former KMR site is presently occupied by some shipping-related companies, a University of Hawai´i (UH) marine research facility, and a number of small maritime and non-maritime enterprises (Figure 2). All, except a handful, are on month-to-month revocable permits and are on notice for future non-renewal of permit. Those who are not on permits are on leases which are due to expire in the short-term. All of the tenants have been informed of the pending development plan for the property.

The specific date when all tenants must move out of the property has not been firmly established and is dependent on the project's final construction schedule. At a recent public meeting on the project, attendees were told that the tenants could possibly expect relocation notices in 2014. To date, a few major tenants have secured or are in the process of securing

relocation sites elsewhere within the harbor. The UH marine research facility is planning to relocate a major portion of its facility to Piers 34 and 35, and two or three other maritime tenants are planning to relocate to Piers 24 to 28. To accommodate their move, possible dock-side improvements and renovations may be performed.

4.3 Proposed Action

The proposed action calls for the following improvements (see Figure 3):

- Development of an approximately 90-acre container yard with necessary support buildings, fencing and gates, gantry cranes and container-handling equipment, onsite utilities and lighting, and associated off-site improvements, including a direct access connection with the adjacent Young Brothers inter-island barge operation.
- Construction of a deep draft wharf or pier with berthing capacity to accommodate two container ships. This improvement will involve filling in Snug Harbor and dredging in the area fronting the container yard to achieve sufficient water depth at the new wharf.
- Improvements to Piers 40 and 41 to accommodate use for interisland cargo operations.

Operational hours for the new container terminal are anticipated to be from Monday through Sunday, 24 hours per day. Heavy activity in the container yard, however, will depend on when a container ship is in port. Typical peak times or days for existing terminals are Mondays and Thursdays. Additionally, container truck pick-ups and deliveries from the container terminal are expected to occur only during the daytime hours.

4.4 Alternatives Considered

4.4.1 Alternative Yard Configurations

DOT-Harbors considered several layouts/configurations for the new container terminal, including:

- Waterfront wharf alignment:
  - Option 1: Longest possible main berth face; preferred since it serves two vessels simultaneously and provides more container yard area in a favorable layout (Figure 3).
  - Option 2: A two-segmented main berth that permits more total length but reduces container yard area (Figure 5).
- Barge berth alignment:

  Three options were considered for the development of a barge berth along existing Pier 41 at the eastern edge of the proposed container terminal (Figure 6). Young Brothers may eventually operate barges from this berth as an expansion of its existing facility. Hence, adequate clearance is needed between Pier 41 and Pier 40 to facilitate operations of a large barge. The options vary in terms of clearance distance between Piers 41 and 40,

length and angle of the main berth, and cargo yard area. Two of the options comprise DOT-Harbors' preferred approach:

- Option 1 - Improvement of Pier 41 berth in its current location with 256 feet of clearance distance with Pier 40.
- Option 2 - Widening of Pier 41 berth area to achieve 300 feet of clearance without sacrificing main berth length or cargo yard area.

- Container terminal truck access:

  Two options for truck access to the terminal were considered. One option is for access from Sand Island Access Road (Figure 3), and the other option is for access from Auiki Street (Figure 4). The Sand Island Access Road is the preferred option to avoid impacts on neighboring mixed-use Kalihi Kai characterized by narrow roads.

4.4.2 Alternative Location

Alternative locations within the harbor are extremely limited given the required land area to operate a fully functional container terminal. Over 85 percent of the waterfront in Honolulu Harbor is already occupied by existing facilities.

Piers 26 to 29 are vacant but are committed to other harbor users. Even if these piers were not committed, the land behind the piers would not be sufficient to accommodate a fully functional container terminal.

4.4.3 No Action

Under the "No Action" alternative, DOT-Harbors would not redevelop the former KMR site into a container terminal. Honolulu Harbor would continue to operate with existing facilities at their existing locations. Future increases in cargo volume would create stress on facilities and infrastructure, with the container terminals operating at overcapacity. This could cause delays in cargo deliveries, increase transportation fuel costs, and increase the cost of consumer products. A modest increase in terminal capacity may be possible through improvements in cargo-handling technology, but not sufficient to meet future needs.

Environmentally, no redevelopment of the Kapalama property would result in no changes to the site's physical and biological conditions and to the harbor waters. Existing land uses on the property would continue to operate unaffected.

Proceeding with the no action alternative would not meet the purpose and need for the project.

4.5 Time Frame

The Final Environmental Impact Statement (FEIS) is expected to be completed in the fall of 2012. Design of the facility will then begin. Once all land use, environmental, and construction permits and approvals as well as financing are secured, construction can commence.

4.6 Funding Source

The proposed improvements, estimated to cost $221 million (2011 estimate), will be paid for by revenue bonds. Potential sources of project funding include harbors revenue bonds, revenue from harbor activities, rentals, and leases. The financial plan for the project includes a combination of scheduled increases in harbor user fees (tariffs) and land leases with minimum annual guarantees.

4.7 Required Permits and Approvals

The State Land Use Law (HRS Chapter 205) established the Land Use Commission and placed all lands in one of four land use districts: Urban, Agricultural, Conservation, or Rural. The commercial harbors in the state are designated in the Urban district. According to HRS Chapter 205-2(b), "Urban districts shall include activities or uses as provided by the ordinances or regulations of the county within which the urban district is situated." Due to the crucial role of the commercial harbors in the islands, DOT-Harbors (rather than the respective counties) has jurisdiction over all commercial harbors.

Development of the container terminal at the Kapalama site will be consistent with applicable federal, state and county land use plans and policies, which will be specifically addressed in the DEIS.

In-water construction will require a U.S. Department of the Army Permit in accordance with the federal Clean Water Act and compliance with the Coastal Zone Management (CZM) Act, Endangered Species Act, and other applicable laws and regulations. A major part of the in-water construction will involve dredging and construction of the new wharf. Depending on the results of a bioassay test, the dredged material will be taken to an ocean disposal site or upland disposal site with approval from the appropriate authorities. Disposal of the dredged material as a fill in Snug Harbor will also be explored.

DOH-established Water Quality Standards are set forth in HAR 11-54. Honolulu Harbor is classified as Class A marine waters. The objective of Class A waters is that their use for recreational purposes and aesthetic enjoyment be protected. Other uses are permitted as long as they are compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters.

A Conservation District Use Permit from the State Board of Land and Natural Resources is expected to be required for construction of the wharf improvement in the harbor water.

Since construction on the project site will occur over an area of one acre or more, a National Pollutant Discharge Elimination Systems (NPDES) Permit will be required. This permit relates to projects that, among others, potentially generate stormwater associated with construction activities resulting in the disturbance of equal to or greater than one acre of total land area.

In summary, the following permits and approvals will be required before construction on the project can begin.

Permits or Approvals	Regulatory Agency
Federal	
U.S. Department of Army Permit	U.S. Army Corps of Engineers
Ocean Disposal of Dredged Material (or)	Environmental Protection Agency/US Army Corps of Engineers
Upland Disposal of Dredged Material	Disposal Site Operator
State	
Section 401 Water Quality Certification	Department of Health
Coastal Zone Management (CZM) Federal Consistency Certification	Office of Planning
Conservation District Use Permit	Office of Conservation and Coastal Lands, Board of Land and Natural Resources
National Pollutant Discharge Elimination Systems (NPDES) Permit	Department of Health

5 Summary of Affected Environment, Potential Impacts, and Proposed Mitigation Measures

The DEIS will discuss the relationship of the proposed action to land use plans, policies, and controls for the affected project area. It will identify and evaluate potential impacts of the proposed action and its alternatives (including no action) and propose mitigation measures to prevent or minimize any adverse impacts. Cumulative impacts will also be addressed in the DEIS. Preliminary information about relevant resource areas is summarized below.

5.1 Existing Land Use

The waterfront section of the Kapalama container terminal site, known as Snug Harbor, is presently occupied by the University of Hawai´i Marine Center. Plans are underway to relocate the Marine Center to another site within the harbor. There are over 80 other tenants who are predominantly on month-to-month revocable permits and are occupying the former military warehouse buildings on the property. A few tenants are in separate structures and are on leases, which are due to expire in the short term.

Businesses on the property are a mix of light industrial and commercial uses. Some are maritime-related businesses which would look to relocate somewhere within the harbor, and the majority of businesses that are non-maritime related and which would look to relocate outside of the harbor area. The State Department of Agriculture has a plant quarantine inspection and treatment facility as well as office spaces on the former KMR property, but are not included in the Kapalama container terminal project site.

Uses in the immediate surrounding area include Young Brothers Limited inter-island cargo operations, fuel storage facilities, Servco Pacific, Ke´ehi Small Boat Harbor, and a mix of land uses in the Kalihi Kai area, predominantly light industrial (e.g., construction base yards,

warehouses, and wholesalers), as well as retail, and some residential. Matson Navigation Company and Horizon Lines, LLC are located on Sand Island across the channel from the project site.

5.2 Land Ownership

The Kapalama container terminal site consists of approximately 90 acres and is bound by Sand Island Access Road on the west, Auiki Street on the north, Pier 40 on the east, and Kapalama Basin on the south. DOT-Harbors is the primary owner of the Kapalama site with the exception of the State Department of Land and Natural Resources (DLNR), which owns the approximately 16-acre Snug Harbor section of the property and DOT-Airports Division, which owns an approximately 11-acre section along Sand Island Access Road. The DLNR waterfront area is presently occupied by the UH Marine Center via a lease. The DOT-Airports land along Sand Island Access Road is occupied by warehouse buildings and vehicle parking and is ceded land.

In the northern section of the Kapalama site, a less than five-acre section with access from Auiki Street is owned by the State and used by the Department of Agriculture (DOA) via Executive Order 4075. This isolated site is not included in the development of the Kapalama container terminal.

Use of State funds and land and the anticipated probable impacts from the proposed action are reasons an EIS is being prepared for this project. Development of the site for a single use and operator may interest DOT-Harbors to consolidate the multiple parcels into a single parcel.

5.3 Geology, Soils, and Topography

In the early 1930s, the shoreline in lower Kapalama, which included two fishponds, was located just makai of Auiki Street, and Sand Island was a shallow reef flat. In subsequent years, the fishponds were filled from the dredging of seaplane runways in Ke´ehi Lagoon and construction of the Kapalama basin in Honolulu Harbor. Snug Harbor was constructed in the mid-1940s for the military, and in 1972, the deck section at Snug Harbor was completed for the University of Hawai´i research facility. The shoreline of the filled land is now located more than 400 feet makai of Sand Island Access Road.

The Kapalama site is relatively level with elevations ranging from approximately 8 feet (above mean sea level) at the Auiki Street boundary to approximately 5 feet (msl) at the waterfront. The property is virtually all paved, and stormwater runoff is by sheetflow to a limited underground stormwater drainage system which discharges into the harbor.

5.4 Terrestrial Biological Resources

Given the developed condition of the property, the presence of terrestrial flora and fauna is sparse. Existing flora includes small patches of grass or groundcover, and existing fauna generally consists of stray domestic animals and low-land urban birds. Threatened and endangered terrestrial species are not known to permanently inhabit the site, but may occur in the vicinity or occasionally pass through the harbor area (e.g., threatened Newell's shearwater, *Puffinus auricularis newelli*).

Adverse direct impacts to terrestrial biota resulting from the proposed action are not expected to be significant. Artificial lights could present a danger to threatened or endangered seabirds that may pass through the Kapalama site. However, the risk of groundings would be reduced by use of shielded lighting on most fixtures at the harbor.

5.5 Marine Environment

Development of the new container terminal will require filling in Snug Harbor and constructing a new wharf along the length of the container yard waterfront. Construction of the wharf will involve dredging in the harbor water and disposal of the dredged material to an appropriate site.

In contrast to the sparse distribution of terrestrial flora and fauna, marine biota within Honolulu Harbor is more probable in abundance and diversity. Threatened and endangered marine species may occasionally occur in or near the harbor water (e.g., threatened green sea turtle, *Chelonia mydas* and endangered Hawai´ian monk seal, *Monachus schauinslandi*. Other protected marine species are also present in the open ocean.

A marine environmental assessment will be conducted and its findings and recommended mitigative measures will be included in the DEIS. The study will include a biota survey, water quality assessment, and sediment testing. It is noted that sediments in the harbor water come not only from runoffs on adjacent harbor facilities but also from flows in streams that discharge into the harbor. Of particular focus, the study will determine whether any threatened or endangered marine species or coral reef ecosystems (presently a candidate for the endangered species list) will be negatively affected, and if that is the case, a quantitative analysis will be performed to determine the type, size, and number of such species in the area.

Results from the sediment testing will determine whether the dredged material is suitable for ocean disposal under federal Environmental Protection Agency (EPA) review or is required for disposal to an approved upland containment site. An alternative to the latter may be shipment of the material to an approved mainland facility.

Pile drivers may be used to install concrete piles and/or sheet piles along the wharf improvement. As a result, marine or underwater noise is expected to be generated and could adversely affect possible threatened or endangered marine life in the area. Construction methodology for the project will be evaluated to determine mitigative measures to minimize underwater noise impacts.

Adverse direct impacts to surface water quality resulting from the proposed action are not expected to be significant. Any generation of sediment plumes is expected to be controlled by Best Management Practices (BMPs) and turbidity control devices, such as silt curtains, cofferdams, etc., to prevent widespread effects in the harbor and drifts to Ke´ehi Lagoon and the open ocean.

5.6 Natural Hazards

According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) for Honolulu, the Kapalama site is located outside of any significant floodway. A portion of the site is located within the tsunami evacuation zone, as identified by the Hawai´i Civil Defense.

Earthquakes could occur and cause damage to the site depending on the earthquake's epicenter location and magnitude. Most of the earthquakes in the islands occur at the far eastern end of the island chain where rift zones and volcanoes are still active. Facilities will be designed and constructed in accordance with site-specific geotechnical and structural engineering investigations and would comply with applicable seismic design criteria.

5.7 Cultural Resources

Cultural resources include archaeological sites/features and buildings listed on or eligible for listing on the National Register of Historic Places (NRHP) or the Hawai‘i Register of Historic Places (HRHP), as well as traditional cultural practices.

The U.S. Geological Survey maps, prepared by the Department of Engineering, Territory of Hawai´i, during 1927-1928, show two fishponds in the project area: Auiki Pond and Ananoho Pond. These ponds have since been filled and the shoreline extended to the present location to accommodate light industrial and maritime uses. Within the vicinity, the U.S. military took control of a large area of the filled land in 1941 and established the Kapalama Military Reservation (KMR) for use as a logistics support and warehouse facility. Almost all of the buildings that were constructed during their tenure still remain and are currently being used by tenants.

In a recent inventory survey of the former KMR property, the buildings were noted to be constructed primarily in the mid-1940s. These would qualify the structures as “historic” under State law, but from a preservation standpoint they are not architecturally significant nor historically important. The State Historic Preservation Division (SHPD) has issued a letter indicating the proposed harbor improvement would not affect any historically significant feature. A subsequent consultation with SHPD is being planned for the EIS preparation process to confirm the agency’s original assessment of the property.

5.8 Visual and Aesthetic Resources

Visual resources include scenic vistas, scenic overlooks, unique topography, or visual landmarks having scenic value. Honolulu Harbor generally has a developed and industrial appearance with industrial buildings and warehouse structures, paved parking, gantry cranes and container storage yards, service/utility facilities, and minimal trees and other landscaping.

Adverse impacts to visual and aesthetic resources are not anticipated as a result of the proposed action. The appearance of the container terminal will be consistent with the existing maritime industrial setting of the commercial harbor.

5.9 Socio-Economic Setting

The socio-economic environment is a reflection of economic and social factors on the island. The existing socio-economic environment of Kapalama, the Island of O´ahu, and state, including population, economy, and shipping transportation, will be assessed in the DEIS

The draft environmental document will also review the tenant relocation process at the site and its impact on the community.

5.10 Public Health and Safety

A Phase I environmental site assessment (ESA) was conducted by Brewer Environmental Services in 2005 to identify hazardous substances, including petroleum products, that may have been released into structures or into the ground on the property, ground water, or surface water. The ESA was followed up with a Reassessment Report (Environet, Inc., March 27, 2006), involving site reconnaissance and interviews to update tenant occupancy and/or operational changes and tenant compliance issues. The report indicated that the results of the study will serve as a guide for the future development and planning of the project site. The project will be in compliance with applicable laws and regulations to mitigate environmental impacts on the Kapalama property, if any.

Present procedures for screening invasive species from entering the islands through cargo transfer involve the deployment of DOA inspectors at the shipping yards. Containers are checked at the container terminals and at the importers' storage/distribution sites. The State Legislature approved Act 202 this year, which requires DOT-Harbors to assist State DOA in setting up bio-security inspection stations at state commercial harbors. The proposed container terminal at Kapalama will be considered in the planning and implementation of the needed "barrier" for invasive species.

5.11 Air Quality and Noise

Adverse direct impacts to air quality resulting from the development and operations of the new container terminal are not expected to be significant. Emissions associated with construction of harbor improvements would be minimal and temporary. Stationary source emissions large enough to be of any concern are regulated by DOH, as required by HAR 11-60.1. Fugitive dust and earth-moving activities would be minimized in accordance with HAR 11-60.1-33. Potential indirect air quality impacts at the container terminal will be evaluated in the DEIS.

Noise related to normal terminal operations are expected to include container truck movements and back-up maneuvers (beeping warning sounds), gantry crane operations, container lifts (top picks/side picks), and other mechanical equipment, and ship and tugboat engines. In anticipation of noise concerns on major operators in the project, a noise study will be conducted and its findings will be reported in the DEIS.

Adverse impacts to the noise environment resulting from container terminal operations are not expected to be significant. Construction-related noise will be temporary, and activities will be conducted in compliance with state regulations (i.e., noise permit or variance would be obtained, as required). Potential underwater noise associated with wharf construction is discussed in Section 5.5 of this document.

5.12 Circulation and Traffic

The development concepts for the proposed terminal include a container yard with truck access from Sand Island Access Road and, alternatively, truck access from Auiki Street. Depending on which alternative is selected, the impact on adjacent roads would be different. If the container truck gate is located on Sand Island Access Road, traffic on this state road would be affected. If the truck gate is located on Auiki Street, traffic on this city street, as well as the traffic through the Kalihi Kai subdivision, would be affected.

Should the truck gate be located on Sand Island Access Road, traffic impacts on this road is not expected to be significant. This is because most of the traffic generated by the project would not represent an actual increase but rather a relocation of the traffic generator, from

Sand Island to Kapalama on the same road. If the operator of the new facility is considered an existing operator that has expanded its operation to the new site to accommodate the normal cargo volume growth in the harbor, then the associated traffic generation should be considered as part of the normal increase in operations along that same access road and overall traffic in the area.

The internal connection with the adjacent Young Brothers operation will reduce truck traffic on the public roadways. High-efficiency gates will reduce queuing of idling trucks and thus improve traffic flow and reduce congestion on roadways.

A traffic study will assess baseline traffic condition in and around the project area. It will evaluate the truck operational requirements from the container terminal, estimate future increases in ambient traffic from the region and container terminal and its alternatives, and assess how the project's generated trips will impact area traffic. Results of the study will be presented in the DEIS along with any needed mitigation to avoid or minimize those impacts.

Safety concerns will also be addressed regarding potential conflicts between the anticipated truck traffic travelling through the adjacent mixed-use neighborhood and its likely effects on pedestrian and bicycle traffic.

5.13 Airspace

The Kapalama container terminal is located approximately 0.8 mile from Honolulu International Airport and is within the airport's approach and departure pattern of aircraft. The gantry cranes to be used for loading and unloading containers from the ships may be as high as 208 feet and may pose as an obstruction in the aircrafts' airspace. An analysis of the potential impact on airspace, using Federal Aviation Administration (FAA) Form 7460-1, will be conducted. Results of the analysis and any proposed mitigation will be provided in the DEIS.

5.14 Infrastructure and Public Services

Honolulu Harbor is heavily industrialized and served by a variety of public services and utilities, including police and fire protection services, water supply, wastewater collection, drainage, electricity, communications, and solid waste collection. Adverse impacts to public services and infrastructure are not anticipated as a result of the proposed action. Container terminal development will not significantly increase demand on the existing shore-side utilities.

Operations of the container terminal will depend to a large extent on diesel or other suitable fuel to operate the container trucks, mobile lifts, and gantry cranes. Electrical power will be required for a portion of the container terminal operation.

6 EIS Determination

The anticipated probable impacts from the proposed Kapalama container terminal call for the preparation of an EIS. This EISPN has been prepared in accordance with Chapter 343, HRS and Title 11, Chapter 200, HAR (Environmental Impact Statement Rules).

7 Public Outreach

Early consultation on the project has been carried out with various agencies and stakeholder groups as part of the scoping process for this project. A public informational meeting was held on July 19, 2011 to provide opportunities for the community to obtain information on the proposed action. A second public meeting is scheduled for the spring or summer of 2012 during the Draft EIS public review period. As a result of these public interactions, substantial input from agencies and the public is being obtained. With the information received through this outreach, the distribution of this EISPN, and subsequent consultations, environmental concerns should be sufficiently identified prior to finalization of the EIS.

Consulted parties, DOT-Harbors' public informational meetings, and the parties to be consulted with distribution of this EISPN are identified below.

7.1 Consulted Parties

The governmental agencies and stakeholder groups consulted to date include the following:

Federal Agencies

U.S. Department of the Army

- Corps of Engineers

U.S. Department of Commerce:

- National Oceanic and Atmospheric Association, National Marine Fisheries Service, Pacific Islands Office

U.S. Department of the Interior:

- U.S. Fish and Wildlife Service, Pacific Islands Ecological Field Service Office

U.S. Department of Transportation

- Federal Aviation Administration

State Agencies

Department of Agriculture:

- Plant Industry Division, Plant Quarantine Branch

Department of Transportation

- Airports Division
- Highways Division

Office of Hawaiian Affairs

Stakeholders

Hawai´i Harbors User Group

Horizon Lines

Matson Navigation Company

Pacific Shipyards

Young Brothers Limited

Other agencies to be consulted in the EIS preparation process:

Federal Agencies

Environmental Protection Agency

7.2 Public Informational Meetings

DOT-Harbors held a public informational meeting for the project on July 19, 2011 in Kapalama. Mailed invitations to agencies and stakeholders, flyers distributed door-to-door, public notice in a major local newspaper, and public announcements from a local radio station were made for the meeting. The meeting offered opportunities for the public to provide input pertaining to resources and issues of concern that should be addressed in the EIS. Attendees were encouraged to share their ideas through both oral comments and written input.

A second public informational meeting is scheduled for the spring or summer of 2012 during the DEIS public review period. At this meeting, members of the audience will have an opportunity for direct interaction with DOT Harbors representatives and the DEIS project team.

7.3 EISPN Distribution List

Governmental agencies, elected officials, media, and special interest/stakeholder groups who will be provided a copy of this preparation notice are listed below.

Federal Agencies
Environmental Protection Agency
Federal Aviation Administration
NOAA-National Marine Fisheries Service
U.S. Fish and Wildlife Service
U.S. Department of the Army, Corps of Engineers

State Agencies
Department of Agriculture
Department of Business, Economic Development and Tourism, Office of Planning
Department of Health
Department of Land and Natural Resources, Land Division
Department of Land and Natural Resources, Historic Preservation Division
Department of Land and Natural Resources, Office of Conservation and Coastal Lands
Department of Transportation, Airports Division
Department of Transportation, Highways Division
Department of Transportation, Statewide Transportation Office
Office of Hawaiian Affairs

A-1. Environmental Impact Statement Preparation Notice

University of Hawaii at Manoa
University of Hawaii at Manoa, School of Ocean & Earth Science & Technology

City and County of Honolulu
Board of Water Supply
Department of Design and Construction
Department of Environmental Services
Department of Facility Maintenance
Department of Planning and Permitting
Department of Transportation Services
Fire Department
Police Department

Libraries
Kalihi-Palama Public Library
Liliha Public Library
Salt Lake/Moanalua Public Library

New Media
Honolulu Star Advertiser

Elected Officials
State Senator Suzanne Chun Oakland
State Representative Joey Manahan
Councilmember Romy M. Cachola

Special Interest and Stakeholders Groups
Airline Group
Aloha Cargo Transport
Atlantis Submarines Hawaii
Hawaii Harbors User Group
Horizon Lines
Kalihi-Palama Neighborhood Board
Matson Navigation Company
Pacific Shipyards International
Sause Brothers
Young Brothers Limited

8 References

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R.M. Towill Corporation. July 2001. *Final Environmental Impact Statement for the Hawai´i Commercial Harbors 2020 Master Plan.* Prepared for State of Hawai'i Department of Transportation, Harbors Division.

State Historic Preservation Division. June 20, 2007. Letter of determination of "no adverse effect" from proposed demolition of existing structures.

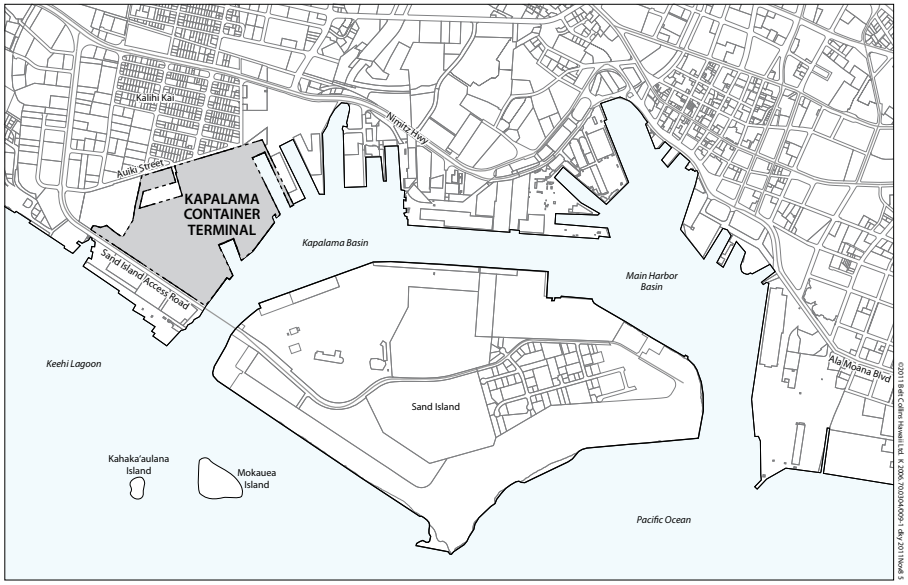
State of Hawai´i, Department of Transportation, Harbors Division. August 14, 2008. *Fact Sheet – Kapalama Container Terminal, Honolulu Harbor, Honolulu, Hawai´i.*

State of Hawai´i, Department of Transportation, Harbors Division. August 1998. *Hawai´i Commercial Harbors, 2020 Master Plan.*

State of Hawai´i, Department of Transportation, Harbors Division. Agency website: http://hawaii.gov/dot/harbors

U.S. Federal Aviation Administration, *49 CFR Part 77 for the "Safe, Efficient Use and Preservation of the Navigable Airspace".*

Wil Chee – Planning, Inc. September 1999. *Final Environmental Impact Statement for the O´ahu Commercial Harbors 2020 Master Plan Immediate Phase.* Prepared for State of Hawai'i Department of Transportation, Harbors Division.



BELT COLLINS

NORTH 0 500 1000 1500 SCALE IN FEET

Figure 1
LOCATION MAP

Kapalama Container Terminal
Honolulu Harbor, Hawaii

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NORTH 0 200 400 600 SCALE IN FEET

Figure 2
EXISTING LAND USE

Kapalama Container Terminal
Honolulu Harbor, Hawaii

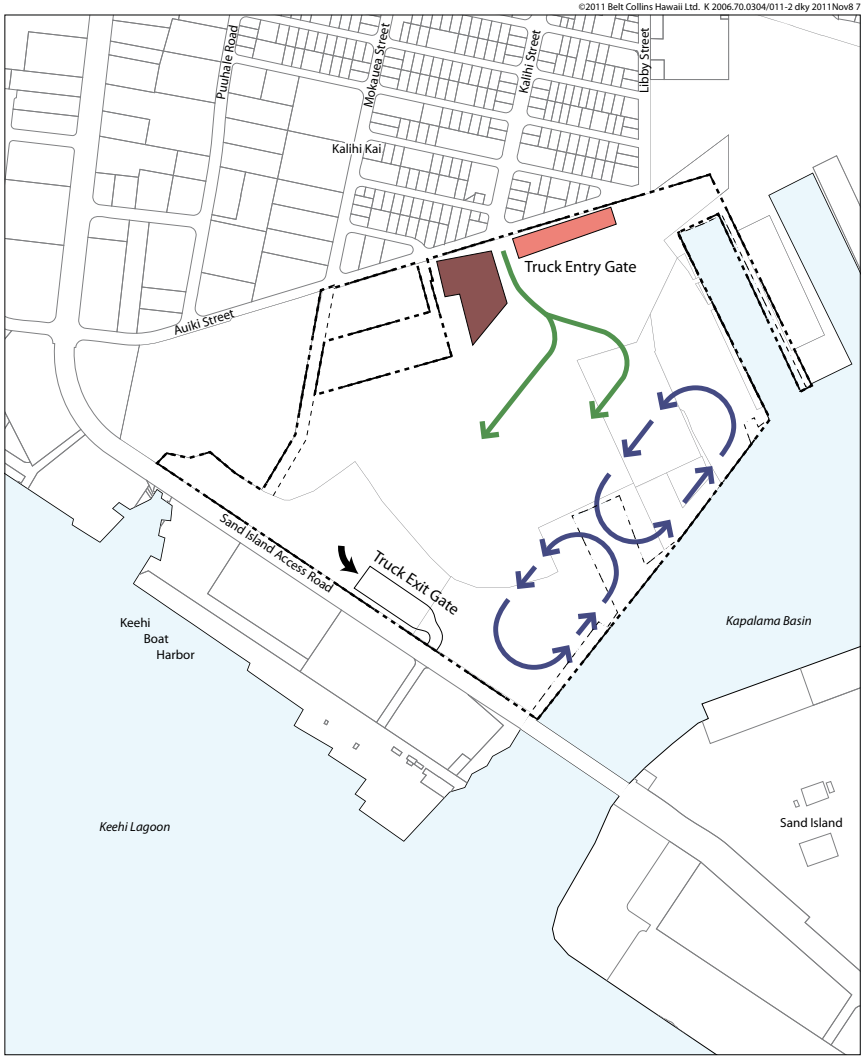
BELT COLLINS

NORTH

0 200 400 600
SCALE IN FEET

Figure 3
PROPOSED CONTAINER TERMINAL

Kapalama Container Terminal
Honolulu Harbor, Hawaii



BELT COLLINS

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Figure 4
PROPOSED CONTAINER TERMINAL WITH ALTERNATIVE TRUCK ACCESS

Kapalama Container Terminal
Honolulu Harbor, Hawaii

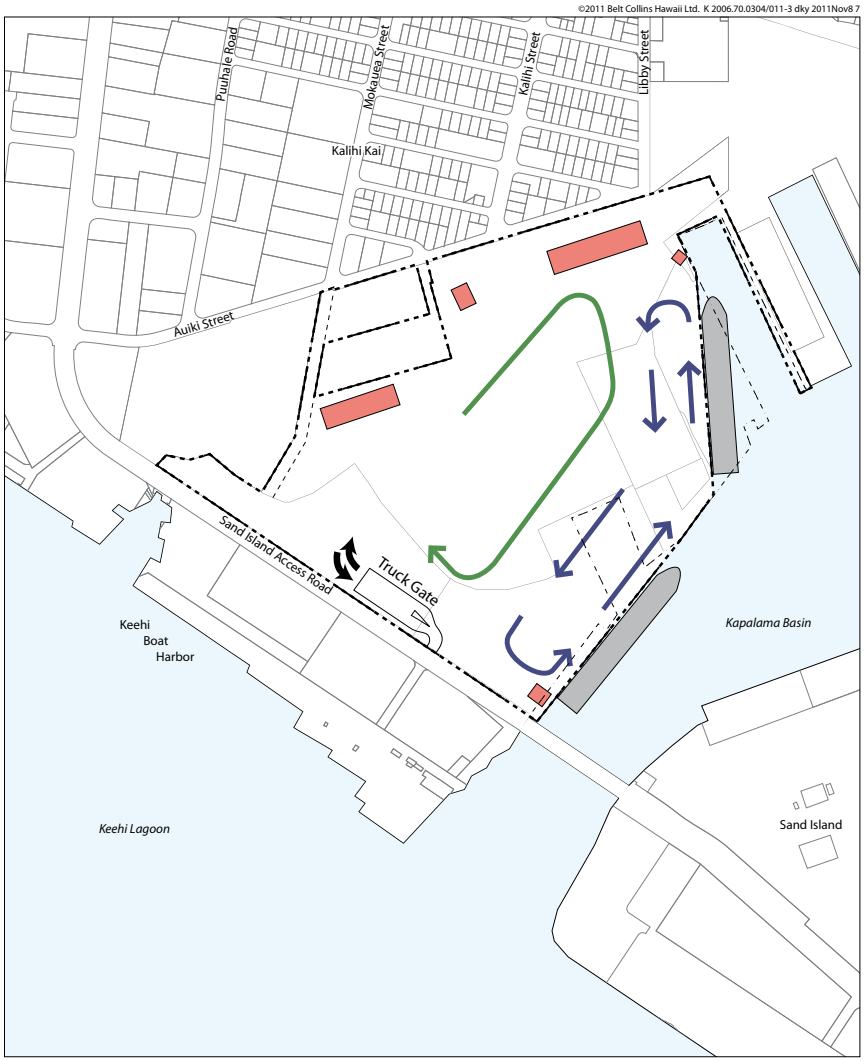

Figure 5
PROPOSED CONTAINER TERMINAL WITH ALTERNATIVE WHARF ALIGNMENT

Kapalama Container Terminal
Honolulu Harbor, Hawaii

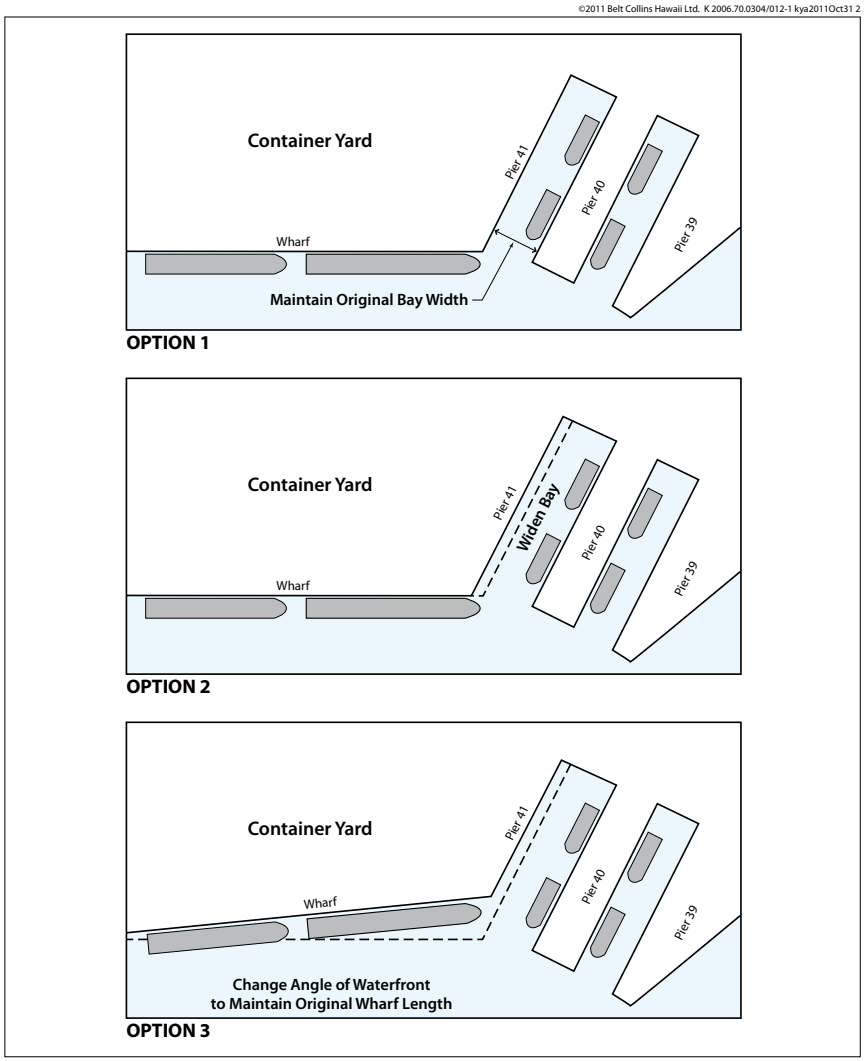

Figure 6
ALTERNATIVE BARGE BERTH ALIGNMENTS AT PIERS 40 AND 41

Kapalama Container Terminal
Honolulu Harbor, Hawaii

DISTRIBUTION LIST FOR
KAPALAMA CONTAINER TERMINAL
ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE

November 10, 2011

Federal Agencies
Environmental Protection Agency
Federal Aviation Agency
NOAA-National Marine Fisheries Service
U.S. Coast Guard
U.S. Department of the Army, Corps of Engineers
U.S. Fish and Wildlife Service

State Agencies
Department of Agriculture
Department of Business, Economic Development and Tourism, Office of Planning
Department of Health
Department of Land and Natural Resources, Land Division
Department of Land and Natural Resources, Historic Preservation Division
Department of Land and Natural Resources, Office of Conservation and Coastal Lands
Department of Transportation
Department of Transportation, Airports Division
Department of Transportation, Highways Division
Department of Transportation, Statewide Transportation Office
Office of Hawaiian Affairs
University of Hawaii at Manoa, Marine Center
University of Hawaii at Manoa, SOEST

City and County of Honolulu
Board of Water Supply
Department of Design and Construction
Department of Environmental Services
Department of Facility Maintenance
Department of Planning and Permitting
Department of Transportation Services
Fire Department
Police Department

Elected Officials
State Senator Suzanne Chun Oakland
State Representative Joey Manahan
Councilmember Romy M. Cachola

Special Interest and Stakeholders Groups
Airlines Committee of Hawaii
Aloha Cargo Transport
Atlantis Submarines Hawaii
Hawaii Harbors User Group
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Horizon Lines
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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
(808) 944-2200 · Fax: (808) 973-2941

December 19, 2011

Glen T. Koyama
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, HI 96819-4554

Dear Mr. Koyama,

The Habitat Conservation Division (HCD) of the NOAA Fisheries Service (NMFS) Pacific Islands Regional Office has reviewed the Environmental Impact Statement Preparation Notice (EISPN) for the development of the new Kapalama Cargo Container Terminal at Honolulu Harbor. We offer the following pre-consultation comments, pursuant to the Essential Fish Habitat (EFH) provision (§305(b)) of the Magnuson Stevens Fishery Conservation and Management Act (MSA;16 U.S.C. 1855(b)).

The project is proposed by the State of Hawaii Department of Transportation, Harbor Division (DOT-Harbors) and involves redevelopment of the former Kapalama Military Reservation property at Honolulu Harbor into a new shipping container terminal. The purpose of the project is to improve the Honolulu Harbor infrastructure to increase capacity to handle predicted increase in ocean transportation of cargo and passengers. The proposed action includes the following: 1) development of an approximately 90-acre container yard with necessary support buildings, fencing and gates, gantry cranes and container-handling equipment, onsite utilities and lighting, and associated off –site improvements; 2) construction of a deep draft wharf and pier with berthing capacity to accommodate two container ships (involving the filling of Snug Harbor and dredging of the area fronting the container yard to depths of 40-45 ft); and 3) improvement to Piers 40 and 41 to accommodate use of interisland cargo operations.

As identified in section 5.5 on page 8 of your EISPN, coral reef resources including coral reef ecosystem EFH are likely present in the harbor and may be adversely affected by the action. To allow us to fully evaluate impact to our trust resources, and to develop conservation recommendations to mitigate impacts, we suggest that the following be included in the draft Environmental Impact Statement (DEIS) for this project:

1) A detailed scope of work (for each alternative) including: construction activities and future operations on land; future operations in-water; construction methods and activities at Piers 40 and 41; construction methods and activities for construction of the deep draft wharf and pier; and the limits of the dredge footprint and volume of dredge material involved in this construction dredging.
2) A marine biological assessment which provides an accurate and quantitative description of marine resources present in the project area (both within the dredge footprint for each alternative, also outside of the dredge footprint if influenced by project construction and operations). The assessment should provide sufficient biological detail to allow for quantification and scaling of any unavoidable impacts to coral reef resources to enable replacement of functions associated with these resources by implementation of compensatory mitigation.
3) A detailed description of the mitigation measures that will be implemented to avoid and minimize impacts to coral reef resources. This would include measures that avoid/reduce impacts to coral reef resources from land based construction and operations such as implementation of low impact development, and from in-water construction and operations such as measures controlling water quality degradation and coral abrasion.

If there is adverse effect to EFH from this project action, a requirement of the EFH consultation (triggered at the time of the Army Corp permit application) is to provide NMFS an "EFH assessment". This EFH assessment must describe the impact to EFH and the mitigation measures proposed to avoid and minimize these EFH impacts. To streamline your process, the EFH assessment can be developed prior to the Army Corp application process and submitted to us within your DEIS in a section of the document clearly labeled as "EFH Assessment". The level of detail in the EFH assessment must be commensurate with the level of threat to EFH from the action. Much, if not all, of the information will likely overlap with information that we have recommended that you provide in the Marine Environment and Marine Impacts sections of the DEIS.

We greatly appreciate your effort to consult with us early. Please don't hesitate to contact Danielle Jayewardene at 808-944-2162 or Danielle.Jayewardene@noaa.gov with questions.

Sincerely,

Gerry Davis (Robert O'Connor)
Assistant Regional Administrator
Habitat Conservation Division

cc: U.S Environmental Protection Agency, Region 9, P.O. Box 50003, Honolulu, HI 96850 Attention: Wendy Wiltse
U.S. Fish and Wildlife Service, Environmental Services, P.O. Box 50088, Honolulu, HI 96850. Attention: Loyal Mehrhoff
State of Hawaii, Department of Land and Natural Resources, Division of Aquatic Resources, P.O. Box 621, Honolulu, HI 96809 Attention: Alton Miyasaka

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2012-CPA-0019

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Mr. Glen T. Koyama
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Subject: Environmental Impact Statement Preparation Notice, Kapalama Container Terminal, Honolulu, Oahu Island, Hawaii

Dear Mr. Koyama:

The U.S. Fish and Wildlife Service (Service) has reviewed the Environmental Impact Statement Preparation Notice (EISPN) for the Kapalama Container Terminal, Honolulu, Hawaii. The proposed project is sponsored by the Hawaii Department of Transportation, Harbors Division. The following comments have been prepared pursuant to the National Environmental Policy Act of 1969 [42 U.S.C. 4321 *et seq.*; 83 Stat. 401], as amended; the Fish and Wildlife Coordination Act (FWCA) of 1934 [16 U.S.C. 661 *et seq.*; 48 Stat. 401], as amended (FWCA); the Endangered Species Act of 1973 (16 U.S.C. 1531et seq.; 87 Stat. 884], as amended (ESA); and other authorities mandating Service concern for environmental values. Based on these authorities, we offer the following comments for your consideration.

Proposed Action

The proposed project involves modifications to the existing Kapalama Container Terminal in order to support an increase in Hawaii resident consumer needs for food, products, vehicles, fuel and construction materials. Approximately 90-acres of the terminal facility will be refurbished with new support buildings, fencing/gates, cranes and equipment, lighting and other offsite improvements. A deep draft wharf or pier will be constructed in order to accommodate two container-sized ships and will include filling in Snug Harbor as well as dredging an area fronting the container yard. Also, improvements to Piers 40 and 41 will be effected in order to accommodate interisland cargo operations.

TAKE PRIDE IN AMERICA

Important fish and wildlife resources occur throughout the proposed project areas, including the marine environment fronting and adjacent to the Kapalama terminal facility. We recommend the DEIS provide an analysis of the potential for project-related losses of marine ecological functions as a result of proposed plans to fill Snug Harbor and dredge the marine area to accommodate a new wharf or pier and also Piers 40 and 41. The Service recommends that particular attention be given in the Draft Environmental Impact Statement (DEIS) concerning construction-related impacts on endangered and threatened species, migratory birds, coral reefs, fisheries, non-coral invertebrates, and rare and native species and habitats. The DEIS should also discuss the indirect and cumulative effects of these impacts over time in conjunction with projects currently proposed for this end of the harbor (*i.e.*, Kalihi channel shipyard) and propose potential measures to mitigate these impacts.

The DEIS should include an evaluation of the impacts of the proposed action on federally threatened and endangered and candidate species and determine if species are likely to be adversely affected by the proposed action. The information provided in the assessment should support any determination regarding the effects of the terminal facility improvements and the secondary effects of the expansion of the facility on threatened and endangered species. The DEIS should address any potential project-related impacts to listed and other native Hawaii species and propose mitigation measures to avoid and minimize project impacts and determine how to offset unavoidable impacts.

The National Marine Fisheries Service (NMFS) should be contacted regarding the potential for the proposed action to affect listed species under NMFS jurisdiction. In order to facilitate early resolution of any potential conflicts between the proposed activities and endangered and threatened species, we recommend early coordination with NMFS.

The introduction of alien species, whether through the importation and use of project-related equipment and supplies, or with the resulting increase in cargo vessel traffic at the completed container terminal, may cause adverse impacts to fish and wildlife resources. To minimize these risks, the EIS should provide an evaluation for the potential threat associated with the transport and spread of invasive species and include a bio-security program to address these threats. As a result and with the enactment of Act 202 (SLH 2011), it is our understanding DOT-Harbors will be providing much needed assistance to the State DOA with identifying potential harbor space at the Kapalama site on Oahu and participating in the planning, design, and construction of biosecurity, inspection, and treatment facilities at the Kapalama Container Terminal that will ultimately strengthen biosecurity efforts in the State of Hawaii. Continued collaboration such as this will be the key to the protection of our natural resources for future generations.

The Service appreciates the opportunity to comment on the proposed Kapalama Container Terminal project. If you have any questions regarding these comments, please contact Marine Ecologist Kevin Foster by telephone at (808) 792-9420 or Invasive Species Biologist Domingo Cravalho at 808-792-9445.

Sincerely,

for Loyal Mehrhoff
Field Supervisor

cc: ACOE-Honolulu District
NMFS-PIRO-Honolulu
USEPA-Region IX, Honolulu
DOT-Maritime Administration, Washington
DOT-Harbors Division, Honolulu
DAR, Honolulu
CZMP, Honolulu
CWB, Honolulu

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

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:
STP 8.0688

December 21, 2011

Mr. Glen T. Koyama
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

Subject: Kapalama Container Terminal
Environmental Impact Statement Preparation Notice (EISPN)

The Department of Transportation (DOT) is in full support of the work. DOT staff has no comments to add at this time and will defer until the Draft Environmental Impact Statement (DEIS).

We appreciate your consultation on the harbor project. Should you have any questions or the need to meet with DOT staff, please contact Mr. Elton Teshima of the Statewide Transportation Planning Office at (808) 831-7978.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

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BELT COLLINS HAWAII

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

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:

HWY-PS
2.0429

December 19, 2011

Mr. Glen T. Koyama
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Koyama:

Subject: Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal
Oahu, Honolulu, Kapalama

Thank you for the opportunity to review and comment on the EISPN for the Kapalama Container Terminal dated November 2011. We understand that the project involves the development of a new container terminal at the former Kapalama Military Reservation site at Honolulu Harbor adjacent to State Route No. 64 (Sand Island Access Road) to allow for added container terminal capacity to meet the growing needs of the harbor users.

At this time, the Highways Division does not have any comments. When the Draft Environmental Impact Statement (DEIS) is available, we request that four (4) copies be provided to the Highways Division for our review.

If you have any questions, please contact Mr. Gary Ashikawa, Systems Planning Manager, Highways Division, Planning Branch, at 587-6336.

Very truly yours,

GLENN M. OKIMOTO, Ph.D.
Director of Transportation

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

RECEIVED
2011 DEC 27 PM 3:21
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:
EMD/CWB

12020PDCL.11

December 22, 2011

Mr. Glen T. Koyama
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Koyama:

SUBJECT: Comments on Environmental Impact Statement Preparation Notice for the Kapalama Container Terminal Kapalama, Island of Oahu, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. The DOH-CWB acknowledges that a National Pollutant Discharge Elimination System (NPDES) permit for discharges of storm water associated with construction activities will be obtained for this project.

3. You may be required to obtain additional NPDES permit coverage for discharges of wastewater into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for an NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

a. Storm water associated with industrial activities.

Please verify the North American Industrial Classification System (NAICS) United States Structure Code(s) and the corresponding Standard Industrial Classification (SIC) Code(s) for the facility. See http://www.census.gov/epcd/www/naicstab.htm to determine the NAICS Code(s) and corresponding SIC Code(s).

Facilities with SIC Codes categorized in the Code of Federal Regulations, Title 40 (Protection of Environment), Parts 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi) are required to obtain NPDES permit coverage for the discharges of storm water associated with industrial activities.

b. Hydrotesting water.

c. Construction dewatering effluent.

You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity. The NOI forms may be picked up at our office or downloaded from our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

4. For other types of wastewater not listed in Item No. 2 above or wastewater discharging into Class 1 or Class AA waters, an NPDES individual permit will need to be obtained. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://hawaii.gov/health/environmental/water/cleanwater/forms/environmental/water/cleanwater/forms/indiv-index.html.

5. The DOH-CWB acknowledges that a Section 401 Water Quality Certification (WQC) will be obtained for this project.

6. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at: http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

Darryl Lum TA FOR

ALEC WONG, P.E., CHIEF
Clean Water Branch

DCL:ml

c: Mr. Glen Koyama, Belt Collins Hawaii Ltd. [via email gkoyama@beltcollins.com]
DOH-EPO #11-255 [via email only]

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 22, 2011

Belt Collins Hawaii Ltd.
Attention: Mr. Glen T. Koyama
2153 N. King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: gkoyama@beltcollins.com

Dear Mr. Koyama:

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Kapalama Container Terminal located in Honolulu, Island of Oahu

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from (a) Division of Boating & Ocean Recreation; and (b) Land Division – Oahu District on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 6, 2011

MEMORANDUM

RECEIVED
LAND DIVISION
2011 DEC 12 P 3:09
DEPARTMENT OF LAND & NATURAL RESOURCES
HONOLULU

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Kapalama Container Terminal
LOCATION: Honolulu, Island of Oahu
APPLICANT: Belt Collins on behalf of the State of Hawaii, Department of Transportation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 20, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed:
Date: 12/12/11

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 6, 2011

MEMORANDUM

TO:

DLNR Agencies:
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Kapalama Container Terminal
LOCATION: Honolulu, Island of Oahu
APPLICANT: Belt Collins on behalf of the State of Hawaii, Department of Transportation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 20, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:
Date: 12/9/2011

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 28, 2011

Belt Collins Hawaii Ltd.
Attention: Mr. Glen T. Koyama
2153 N. King Street, Suite 200
Honolulu, Hawaii 96819-4554

via email: gkoyama@beltcollins.com

Dear Mr. Koyama:

SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Kapalama Container Terminal located in Honolulu, Island of Oahu

Thank you for the opportunity to review and comment on the subject matter. In addition to the comments previously sent you on December 22, 2011, enclosed are comments from the Division of Aquatic Resources on the subject matter. Should you have any questions, please feel free to call Darlene Nakamura at 587-0417. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

AM✓
JK✓

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

12-15-11

December 6, 2011

MEMORANDUM

RECEIVED
DEC 8 2011
AQUATIC RESOURCES

PAE 6/15
RECEIVED
LAND DIVISION
2011 DEC 23 P 2:46
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
X Div. of Aquatic Resources
X Div. of Boating & Ocean Recreation
X Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
X Commission on Water Resource Management
X Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Environmental Impact Statement Preparation Notice (EISPN) for the Kapalama Container Terminal
LOCATION: Honolulu, Island of Oahu
APPLICANT: Belt Collins on behalf of the State of Hawaii, Department of Transportation

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 20, 2011.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: _____
Date: ROBERT T. NISHIMOTO, Ph.D.
Aquatic Resources Program Manager

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

RECEIVED
DEC 16 PM 1:24
COLLINS HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

REF:OCCL:MC

Correspondence: OA-12-138

DEC 1 5 2011

Glen T. Koyama
Belt Collins Hawai`i Ltd.,
2153 North King, Suite 200
Honolulu, HI 96819

Dear Mr. Koyama,

SUBJECT: EISPN – Kapālama Container Terminal
Honolulu Harbor, Honolulu, O`ahu
TMK (1) 1-2-025:002, 009, 011, 012, 016, 017, 040 & submerged lands

The Department of Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL) has reviewed the material you provided regarding the Environmental Impact Statement Preparation Notice for the proposed new 90-acre Kapālama Container Terminal at Honolulu Harbor. Parts of the project will occur on the submerged lands of Kapālama Basin and the Mokauea Fishery, which are in the Resource Subzone of the State Land Use Conservation District.

The portions of the proposed action that might involve Conservation District lands include the construction of a deep draft wharf or pier with berthing capacity to accommodate two container ships, and the associated filling of Snug Harbor and dredging in the area fronting the container yard. Additional improvements to Pier 30 and Pier 41 might also involve Conservation District Lands.

The project is an identified land use pursuant to Hawai`i Administrative Rules (HAR) §13-5-22, P-6 PUBLIC PURPOSE USES, (D-1) *Not for profit land uses undertaken in support of a public service by an agency of the county, stone, or federal government, or by an independent non-governmental entity, except that an independent non-governmental regulated public utility may be considered to be engaged in a public purpose use.* This use requires a Conservation District Use Permit (CDUP) approved by the Board of Land and Natural Resources.

Please note that §13-5 was amended in December, 2011. OCCL has updated its Conservation District Use Application (CDUA) to reflect the amendments. The amended rules and CDUA are available on our website at hawaii.gov/dlnr/occl.

The applicant will need to secure the following in order to determine which portions of the project fall in Conservation District lands:

REF:OCCL:MC Correspondence: OA-12-038

1. A valid *Shoreline Survey* certified by the Chairperson of the Board of Land and Natural Resources. Applications for Shoreline Surveys are processed by DLNR's Land Division.

2. A *Boundary Interpretation* from the State Land Use Commission (LUC) which delineates the Urban/Conservation boundary. The Boundary Interpretation will be based on the outcome of the Shoreline Survey.

Should you have any questions, please feel free to contact Michael Cain at 587-0048.

Sincerely,

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

c: Chair, DLNR Land Division, LUC

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

RECEIVED
2011 DEC 20 PM 12: 54
BELT COLLINS HAWAII

HRD11/1828F

December 12, 2011

Glen T. Koyama, Project Manager
Belt Collins Hawai'i, Ltd.
2153 North King Street, Suite 200
Honolulu, Hawai'i 96819-4554

Re: Environmental Impact Statement Preparation Notice
Kapalama Container Terminal Project
Honolulu Harbor, Island of O'ahu

Aloha e Glen T. Koyama,

The Office of Hawaiian Affairs (OHA) is in receipt of your November 21, 2011 notification that the State of Hawai'i-Department of Transportation, Harbors Division intends to prepare a draft environmental impact statement (DEIS) to support the Kapalama Container Terminal Project (project) at Honolulu harbor on the Island of O'ahu. The project will redevelop the ninety (90) acre former Kapalama Military Reservation parcel at Honolulu Harbor into a new shipping container terminal to handle current and projected cargo volumes.

OHA has no substantive comments to offer at this time. We look forward to reviewing the DEIS and providing comments at that time. Please send one electronic copy and one hardcopy of the DEIS to OHA attn: Compliance Monitoring Program when it is available. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Chief Executive Officer

CWN:kl

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

RECEIVED
2012 JAN -6 PM 1:07
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAHUHIHEWA BUILDING
601 KAMOKILA BLVD, KAPOLEI HI 96707

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

DATE: December 12, 2011

LOG: 2011.3125
DOC: 1112RS23

TO: Glen T. Koyama
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Unit 200
Honolulu, HI 96819-4554

SUBJECT: **Section 6E-42 Historic Preservation Review**
National Historic Preservation Act (NHPA) Section 106 Review
Project: Environmental Impact Statement Preparation Notice
Permit # (None)
Owner: Harbors Division, Department of Transportation, Hawaii State Government
Location: Former Kapalama Military Reservation
Tax Map Key: (1) 1-2-025:002

This letter is in response to materials dated November 21, 2011 and received by SHPD on November 23, 2011, regarding submission of an *Final Environmental Assessment/Environmental Impact Statement Preparation Notice Kapalama Container Terminal Honolulu Harbor* to be located at the former Kapalama Military Reservation. The project would remove existing ex-military warehouses, relocate existing tenants, pave the former building footprints, dredge the harbor, and alter the shoreline for construction of new container piers. The Area of Potential Effect (APE) would be the parcel and the harbor immediately adjacent.

The property was created in the early part of the 20th century by filling in a series of fishponds along the makai side of Kalihi-Kapalama-Palama. A cargo container terminal was first proposed as early as 1989. The former Kapalama Military Base buildings could potentially be eligible under Criterion C (Military Architecture during World War II and Korea).

However, as part of an earlier mitigation, SHPD agreed to documentation of the Kapalama Military Reservation before demolition. SHPD in 2007 received the report entitled *Historic Architectural Survey of Former Kapalama Military Reservation and Hawaiian Dredging Sites* (Fung and Associates for the Department of Transportation).

In a letter dated June 20, 2007, SHPD's Architecture Branch concurred with a determination of "no adverse effect" for the *Master Plan for Harbor Infrastructure Improvement and Expansion.* Our architectural office continues to hold that position. As for archaeology concerns covering alteration of the shoreline, our Oahu Archaeologist, Nona Naboa, also concurs with a determination of "no adverse effect" for archaeology.

Thus **SHPD accepts the report.** Please provide a hardcopy to this office for the SHPD Library.

Any questions should be addressed to Ross W. Stephenson, SHPD Historian, at (808) 692-8028 (office), (808) 497-2233 (cell) or ross.w.stephenson@hawaii.gov.

Mahalo for the opportunity to comment.

Angie Westfall
Architecture Branch Chief, Hawaii Historic Preservation Division

In the event that historic resources, including human skeletal remains, lava tubes, and lava blisters/bubbles are identified during construction activities, all work should cease in the immediate vicinity of the find, the find should be protected from additional disturbance, and the State Historic Preservation Division should be contacted immediately at (808) 692-8015.

DEPARTMENT OF PLANNING AND PERMITTING

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

RECEIVED
2011 DEC 22 PM 1: 17
BELT COLLINS HAWAII

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

2011/ELOG-2650(sn)

December 21, 2011

Mr. Glen T. Koyama, Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

Subject: Environmental Impact Statement Preparation Notice
Kapalama Container Terminal
Kapalama, Honolulu, Hawaii

We reviewed the Environmental Impact Statement Preparation Notice and offer the following comments:

1. Identify the Tax Map Keys for the project.

2. Discuss the project's relationship to land use plans, policies, and controls including the City and County of Honolulu's General Plan, Primary Urban Center Development Plan (June 2004), and Kalihi-Palama Action Plan. Based on the information provided, the project is consistent with the City's long-range and community plans.

3. The existing 24-inch sewer line on Auiki Street is not adequate to support the proposed project. Submit a Department of Planning and Permitting Site Development Master Application for Sewer Connection to initiate discussions regarding the required improvements to the municipal sewer lines.

4. Reference the State statute that exempts the Department of Transportation from obtaining approvals from the City for activities on lands identified as commercial harbors.

   If stockpiling of dredged material for dewatering purposes occurs on lands not identified as a commercial harbor facility, then a permit will be required if the quantity of the stockpiled material exceeds 100 cubic yards.

5. Address compliance with the flood protection requirements since portions of the project site are located in the 100-year flood zones, as identified on the federal flood maps.

6. Final project plans should avoid/minimize impacts of truck traffic on residents, small businesses, pedestrians, and bicyclists in Kalihi Kai area. Locate truck entry and exit gate(s) off Sand Island Access Road.

Should you have any questions, please contact Sharon Nishiura of my staff at 768-8031.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:dj
899910

cc: Carter Luke, State Department of Transportation

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU
1000 Uluohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

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2011 DEC 21 PM 2:10
BELT COLLINS HAWAII

PETER B. CARLISLE
MAYOR

WESTLEY K.C. CHUN, Ph.D., P.E., BCEE
DIRECTOR AND CHIEF ENGINEER

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 11-1048

December 19, 2011

Belt Collins Hawaii, Ltd.
Mr. Glen Koyama
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

Subject: Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, State of Hawaii

Thank you for the opportunity to review the subject EISPN. We only have one comment. Since your drawings show an access to the Kapalama Container Storage from Auiki Street which is a City road, can you evaluate whether the existing pavement will be able to meet the large truck loads for use by the Harbors. If the pavement is insufficient, then maybe the access and exit should be from Sand Island Access Road.

Should you have any questions, please call Lan Yoneda, Assistant Chief of the Division of Road Maintenance at 768-3600.

Sincerely,

Westley K.C. Chun, Ph.D., P.E., BCEE
Director and Chief Engineer

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

RECEIVED
2011 DEC 15 PM 12:54
BELT COLLINS HAWAII

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

TP11/11-442800R

December 12, 2011

Mr. Glen T. Koyama, Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

Subject: Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal; Kapalama, Honolulu, Hawaii

This responds to your letter of November 21, 2011, requesting our comments concerning this proposed project.

Our Traffic Engineering Division (TED) reserves commenting on the project until they have an opportunity to review the Draft Environmental Impact Statement (DEIS), which should include a traffic assessment and discuss traffic impacts as a result of the project, including short-term impacts during construction and proposed mitigating measures.

Our Public Transit Division (PTD) has the following comments:

- Your DEIS should include a description of Public Transit, the impact of your project on Public Transit bus operations during construction. Basic information is available on our websites: www.thebus.org and www.honolulu.gov/dts. For more details, you may contact our staff at 768-8370.

- Construction notes should include the following note regarding transit:

  "This project may affect bus routes, bus stops, and paratransit operations, therefore, the Contractor shall notify the Department of Transportation Services, Public Transit Division at 768-8396 and Oahu Transit Services, Inc. (bus operations: 848-4578 or 852-6016 and paratransit operations:

454-5041 or 454-5020) of the scope of work, location, proposed closure of any street, traffic lane, sidewalk, or bus stop and duration of project at least two weeks prior to construction."

We reserve further comment pending submission of the DEIS.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

WAYNE Y. YOSHIOKA
Director

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

RECEIVED
2011 DEC -2 PM 12: 48
BELT COLLINS HAWAII

November 29, 2011

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
DENISE M. C. DE COSTA, Vice Chair
THERESIA C. McMURDO
DUANE R. MIYASHIRO
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

DEAN A. NAKANO
Acting Manager

Mr. Glen T. Koyama, Project Manager
Belt Collins Hawaii, Limited
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

Subject: Your Letter Dated November 21, 2011 Requesting Comments on the Environmental Impact Statement Preparation Notice for the Kapalama Container Terminal, TMK: 1-2-25: 2, 9,11,12, 16, 17, 40

Thank you for the opportunity to comment on the proposed project.

The existing water system is adequate to accommodate the proposed Kapalama Container Terminal. However, please be advised that this information is based upon current data and, therefore, the Board of Water Supply reserves the right to change any position or information stated herein up until the final approval of your building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

When water is made available, the applicant will be required to pay our Water System Facilities Charges for resource development, transmission and daily storage.

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

The proposed project is subject to Board of Water Supply Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

SUSAN UYESUGI
Program Administrator
Customer Care Division

Water for Life . . . Ka Wai Ola

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

RECEIVED
2011 DEC 14 PM 12: 42
BELT COLLINS HAWAII

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE JT-LS

December 9, 2011

Mr. Glen T. Koyama, Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

This is in response to your letter dated November 21, 2011, regarding the Environmental Impact Statement Preparation Notice for the Kapalama Container Terminal project. Please note that the project site is under the jurisdiction of the State Harbors Division.

This project may cause an increase in calls for police service because of the anticipated traffic congestion during the construction phase. However, once the project is completed, it should have no significant impact on the facilities or services of the Honolulu Police Department.

If there are any questions, please call Major William Chur of District 5 (Kalihi) at 847-6253.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
JOHN THOMPSON
Acting Assistant Chief of Police
Support Services Bureau

Serving and Protecting With Aloha

HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulufd.org/hfd

RECEIVED
2011 DEC 19 PM 2: 37
BELT COLLINS HAWAII

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

EMMIT A. KANE
DEPUTY FIRE CHIEF

December 13, 2011

Mr. Glen Koyama
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Subject: Environmental Impact Statement Preparation Notice
Kapalama Container Terminal, State of Hawaii
Kapalama, Honolulu, Hawaii

In response to your letter of November 21, 2011, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]™, 2006 Edition, Section 18.2.3.2.2.)

   A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; UFC™, 2006 Edition, Section 18.2.3.2.1.)

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an

approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFC™, 2006 Edition, Section 18.3.1, as amended.)

3. Submit civil drawings to the HFD for review and approval.

Should you have any questions, please contact Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151 or sbratakos@honolulu.gov.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/SY:bh

cc: Dean Watase, Department of Transportation

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

RECEIVED
2012 JAN 19 PM 12: 21
BELT COLLINS HAWAII

PETER B. CARLISLE
MAYOR

LORI M.K. KAHIKINA, P.E.
ACTING DIRECTOR

CHRIS TAKASHIGE, P.E.
DEPUTY DIRECTOR

January 18, 2012

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819-4554

Dear Mr. Koyama:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for the opportunity to review and comment on this project. The Department of Design and Construction has no comments.

Should there be any questions, please contact me at 768-8480.

Sincerely,

for Lori M.K. Kahikina, P.E.
Director

LMKK:pg(442789)

February 10, 2012
20060-70-0304 / 12P-013

Mr. Gerry Davis
Assistant Regional Administrator
Habitat Conservation Division
U. S. Department of Commerce
NOAA
National Marine Fisheries Service
Pacific Island Regional Office
1601 Kapiolani Boulevard, Suite 1110
Honolulu, HI 96814-4700

Dear Mr. Davis:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 19, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Loyal Mehrhoff
Field Supervisor
U. S. Fish and Wildlife Services
National Marine Fisheries Service
Pacific Island Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, HI 96850

Dear Mr. Mehrhoff:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 22, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Alec Wong, P.E. Chief
State of Hawaii
Department of Health
Clean Water Branch
P. O. Box 3378
Honolulu, HI 96801-3378

Dear Mr. Wong:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 22, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Ms. Angie Westfall
Architecture Branch Chief
State of Hawaii
Department of Land and Natural Resources
Historic Preservation Division
601 Kamokila Boulevard
Kapolei, HI 96707

Dear Ms. Westfall:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 12, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Samuel J. Lemmo, Administrator
Department of Land and Natural Resources
Office of Conservation and Coastal Lands
State of Hawaii
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Lemmo:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 15, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Ms. Susan Uyesugi, Program Administrator
Customer Care Division
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Dear Ms. Uyesugi:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated November 29, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Westley K.C. Chun, Ph.D., P.E., BCEE
Director and Chief Engineer
City and County of Honolulu
Department of Facility Maintenance
1000 Uluohia Street, Suite 215
Kapolei, HI 96707

Dear Mr. Chun:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 19, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
2006-70-0304 / 12P-013

Mr. David K. Tanoue, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, HI 96813

Dear Mr. Tanoue:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 21, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Wayne Y. Yoshioka, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, HI 96813

Dear Mr. Yoshioka:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 12, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
2006-70-0304 / 12P-013

Mr. Kenneth G. Silva, Fire Chief
Honolulu Fire Department
City and County of Honolulu
636 South Street
Honolulu, HI 96813-5007

Dear Chief Silva:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 13, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
2006-70-0304 / 12P-013

Mr. Louis M. Kealoha
Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, HI 96816

Dear Chief Kealoha:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter dated December 9, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. We will address your areas of interest in the Draft EIS, which we expect to be available later this year. Thank you for your participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK:ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Russell Y. Tsuji
Land Administrator
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Tsuji:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letters of December 22, 2011 and December 28, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. Although you had no comment or objection to the proposed action at this time, we look forward to your continued participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK: ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Glenn M. Okimoto, Ph.D.
Director of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Dr. Okimoto:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letters of December 19, 2011, and December 21, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. Although you had no comment or objection to the proposed action at this time, we look forward to your continued participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK: ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Mr. Clyde Namu'o
Chief Executive Officer
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, HI 96813

Dear Mr. Namu'o:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter of December 12, 2011, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. Although you had no comment or objection to the proposed action at this time, we look forward to your continued participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK: ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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February 10, 2012
20060-70-0304 / 12P-013

Ms. Lori M.K. Kahikina, P.E.
Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, HI 96813

Dear Ms. Kahikina:

Environmental Impact Statement Preparation Notice (EISPN)
Kapalama Container Terminal, Honolulu Harbor, State of Hawaii
Kapalama, Honolulu, Hawaii

Thank you for your letter of January 18, 2012, and your input on the project's Environmental Impact Statement (EIS) Preparation Notice. Although you had no comment or objection to the proposed action at this time, we look forward to your continued participation in the review of this very important project.

Sincerely yours,

BELT COLLINS HAWAII LLC

Glen T. Koyama
Project Manager

GTK: ajk

cc: Mr. Carter Luke, Department of Transportation – Harbors Division

Belt Collins Hawaii LLC | 2153 North King Street, Suite 200 | Honolulu, HI 96819-4554 USA
Tel: 808.521.5361 | Fax: 808.538.7819 | www.beltcollins.com | honolulu@beltcollins.com
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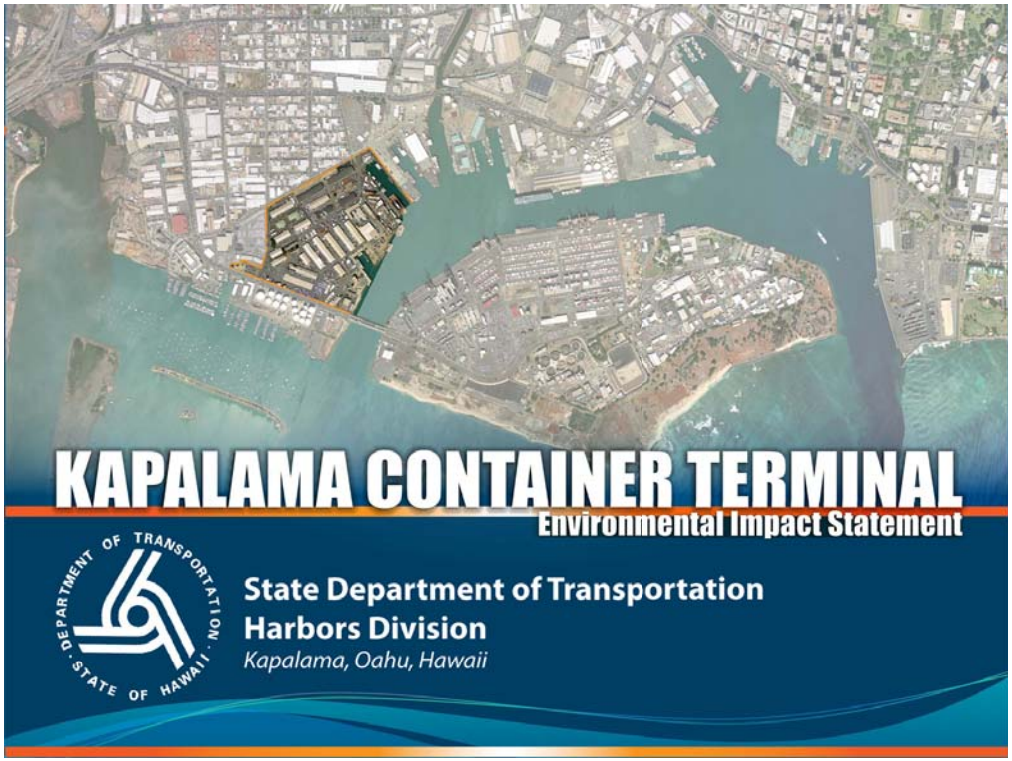
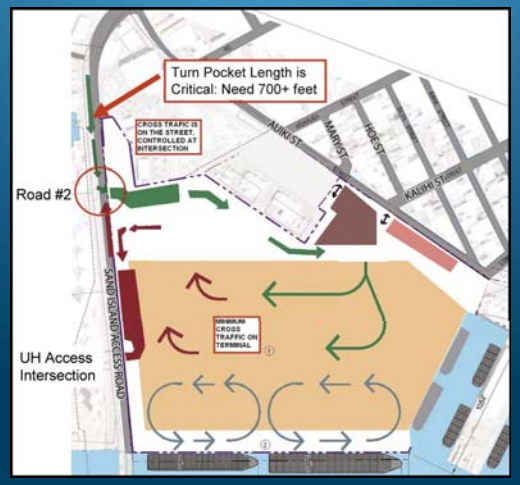


HONOLULU HARBOR IMPROVEMENT PLANS

- Oahu Commercial Harbors 2020 Master Plan (1997)
- Kapalama Planning Final Report (February 2007)
- Harbors Modernization Plan (June 2008)
- “New Day” Initiative (2011)

PROPOSED DEVELOPMENT CONCEPT

PROPOSED DEVELOPMENT ALTERNATIVES



Alternative 1

PROPOSED DEVELOPMENT ALTERNATIVES

Alternative 2

MARITIME-DEPENDENT USERS PRELIMINARY RELOCATION PLAN

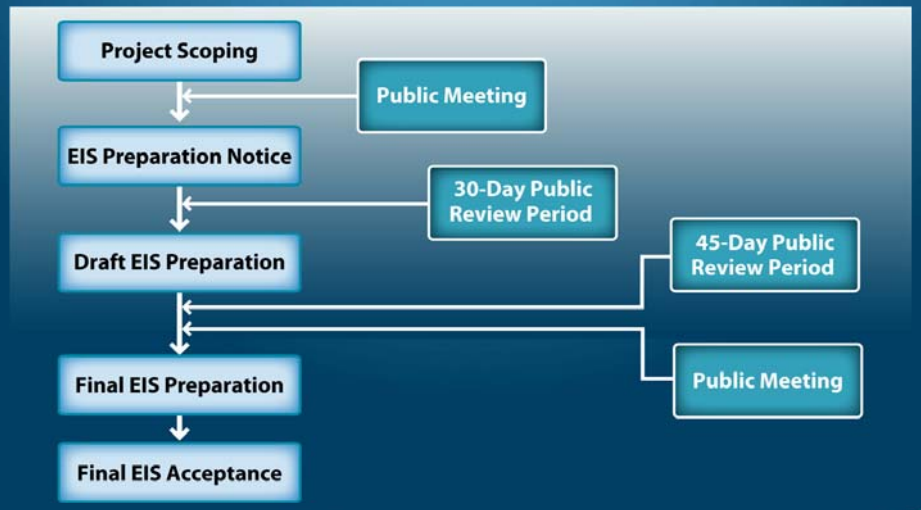
WHAT IS AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

- Informational document that publicly discloses specific information about the proposed project or action
- Existing environmental conditions in the project area
- Probable impacts of the project on the environment
- Alternative proposed actions and their probable impacts
- Mitigative measures to reduce or minimize impacts
- Compliance with existing public policies and programs

PURPOSE OF EIS?

- Detailed information about proposed action for public review
- Opportunity for public comment on proposed action
- Information for informed decision-making by government agencies

EIS PROCESS



PROJECT TIMETABLE

PROJECT EVENTS	ESTIMATED TIMETABLE
Project Scoping, Meetings with HHUG, Agencies and Stakeholders	May 2011 to August 2011
Public Meeting	July 19, 2011
EIS Preparation Notice (EISPN)	August 2011 to September 2011
EISPN Public Review	September 2011 to October 2011
Preparation of Draft EIS	October 2011 to May 2012
Draft EIS Public Review	June 2012 to July 2012
Public Meeting	July 2012
Preparation of Final EIS and Acceptance	July 2012 to October 2012

ENVIRONMENTAL STUDIES

- Existing Land Use
- Land Tenure
- Flora
- Fauna
- Air Quality
- Natural Hazards
- Scenic Resources
- Traffic
- Utilities
- Public Services
- Geology, Soils
- Hydrology/Surface and Ground Water
- Marine Water/Marine Life
- Acoustical Environment
- Archaeological Resources
- Cultural Resources
- Socio-Economic Setting
- Federal, State, and City Land Use and Environmental Policies

PROJECT CONSULTANTS

EIS DOCUMENT
- Belt Collins Hawaii Ltd.

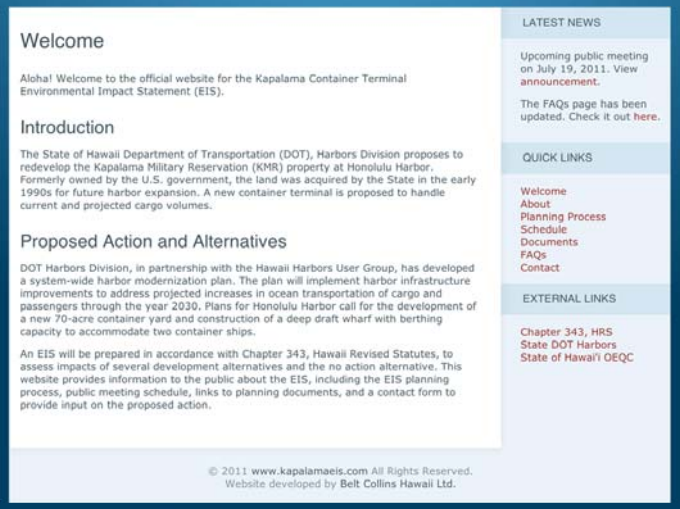
TRAFFIC STUDY
- Julian Ng Inc.
- Belt Collins Hawaii Ltd.

NOISE STUDY
- Y. Ebisu & Associates

MARINE STUDY
- Marine Research Consultants, Inc

INFRASTRUCTURE
- Ronald N.S. Ho & Associates

PROJECT WEBSITE HOME PAGE



Welcome

Aloha! Welcome to the official website for the Kapalama Container Terminal Environmental Impact Statement (EIS).

Introduction

The State of Hawaii Department of Transportation (DOT), Harbors Division proposes to redevelop the Kapalama Military Reservation (KMR) property at Honolulu Harbor. Formerly owned by the U.S. government, the land was acquired by the State in the early 1990s for future harbor expansion. A new container terminal is proposed to handle current and projected cargo volumes.

Proposed Action and Alternatives

DOT Harbors Division, in partnership with the Hawaii Harbors User Group, has developed a system-wide harbor modernization plan. The plan will implement harbor infrastructure improvements to address projected increases in ocean transportation of cargo and passengers through the year 2030. Plans for Honolulu Harbor call for the development of a new 70-acre container yard and construction of a deep draft wharf with berthing capacity to accommodate two container ships.

An EIS will be prepared in accordance with Chapter 343, Hawaii Revised Statutes, to assess impacts of several development alternatives and the no action alternative. This website provides information to the public about the EIS, including the EIS planning process, public meeting schedule, links to planning documents, and a contact form to provide input on the proposed action.

LATEST NEWS

Upcoming public meeting on July 19, 2011. View announcement.

The FAQs page has been updated. Check it out here.

QUICK LINKS

Welcome
About
Planning Process
Schedule
Documents
FAQs
Contact

EXTERNAL LINKS

Chapter 343, HRS
State DOT Harbors
State of Hawai'i OEQC

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PROJECT WEBSITE ADDRESS

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LATEST NEWS

Upcoming public meeting on July 19, 2011. View announcement.

The FAQs page has been updated. Check it out here.

QUICK LINKS

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COMMENT BOX ON PROJECT WEBSITE

State Department of Transportation

Harbors Division

KAPALAMA CONTAINER TERMINAL EIS
Public Meeting, July 19, 2011, 2:30 p.m.
Pu'uhale Elementary School Cafetorium

Public Input Received During Afternoon Session:

- **Include an airspace analysis in your study due to the project's close proximity to Honolulu airport.**

- **When will tenants be given notice of eviction? How much notice? When will construction start?**
  Response: There is no definite timeline, as Harbors Division still needs to complete a second bond sale to fund demolition and the construction work for the new container yard and wharf. This process is dependent on the revenues we (Harbors Division) bring in and our ability to pay debt service on those bonds. We are, however, planning to give as much advanced notice as possible to all affected parties so you can plan early. We are tentatively targeting March 2014 as the date tenants need to vacate from their areas.

- **Is that sooner or later?**
  Response: Most likely later.

- **How much notice will be given?**
  Response: We will do our best to give advance notice. Check DOT Harbors Division's website for where we are on the project. We will know more at the next public meeting.

- **Will this be state or federal money? Will there be MARAD funding?**
  Response: All state funds, so far. Harbors Division is working with the U.S. Maritime Administration (MARAD) to fund other aspects of the "New Day Work" projects. We hope to get federal funds and will apply for TIGER III grant funds (and could receive funds as early as February 2012) to finance improvements at Kawaihae Harbor. Harbors Division, for instance, applied for and received a grant for up to $24.5 million in federal dollars to fund Pier 29 Cargo Yard, which is presently in construction. These types of federal dollars allow us to stretch our state funds.

- **How tall are the Horizon cranes?**
  Response: We will be working with FAA to look at potential impacts and with Hawaii Harbors User Group to determine the proper crane size for design. At this time, the Matson cranes are approximately 225 feet high, and 309 feet high when the gantry booms are stored in the raised position.

- **When will you know a solid date? A year in advance? 30 days notice?**
  Response: We cannot give a firm date at this point, as it is too early. We have a consultant looking at demolition and how work might be best phased to accommodate the project buildout. We plan to give at least 6 months notice.

- **Concerned since I've already gone thru condemnation at the airport. Is this really going to go through? What kind of assurance is there that this is going to happen?**
  Response: Can't say 100 percent, because nothing is 100 percent. Harbors Division, however, has issued over $150 million dollars in revenue bonds to fund the first phase of this project in November 2010. Hence, we are currently moving forward with the development.

- **What is the estimated total cost and what's the percentage covered by bonds?**
  Response: The total cost of the "New Day Work" projects is estimated at $618 million dollars. The percentage cover by bonds could vary depending on the amount of federal funds received and Harbors Division's ability to sell bonds.

KAPALAMA CONTAINER TERMINAL EIS
Public Meeting, July 19, 2011, 6:30 p.m.
Pu'uhale Elementary School Cafetorium

Public Input Received During Evening Session:

- **Will you relocate maritime users before or after construction? None of us want to move and see the place empty for five years. Trigger should be pulled when we're sure that construction will be starting.**
  Response: Bond sales and moves are in process. Schedule for demolition will be dependent on a second bond sale. March 2014 is DOT Harbors Division's best guess of when moves will take place. Our (Harbors Division's) intention is to let folks stay as long as it is safe. We will keep everyone involved in the process.

- **When will we have to move out?**
  Response: Schedule is dependent on getting funding. We have worked in partnership with our maritime users to increase tariffs to fund the "New Day Work" projects. Last November, we issued over $150 million in bonds to fund the first phase of improvements. We need to sell bonds for the second phase of work. At this time, March 2014 is our best estimate.

- **People who moved out found space on their own outside of KMR.**
  Response: Tenants will eventually have to move. KMR is a temporary situation; it is planned to be a container yard. Harbors Division is giving very early notice so you have time to relocate if you desire. As of now, March 2014 is the earliest date for moving out.

- **We will not find any place at this same price.**
  Response: The reason the price is low is because Harbors Division is not improving the spaces, as it is scheduled for demolition.

- **I am speaking on behalf of the residents in the area; born and raised here and family has been in the area since the '40s. We're concerned about noise from the container yard. There are 200 residents on my block. I have been hit by property taxes because of businesses around my property. Noise will impact people living in the area. Mitigation? Traffic to get to town….what will it be like? We're concerned about traffic on Kalihi Street. Also noise, smells, and lights from the container yard (24-hour operations).**
  Response: Traffic, noise, and visual impacts will be evaluated in the EIS.

- **Speaking on behalf of tenants. How long will tenants be given to start moving? Is this a viable timeline?**
  Response: Yes.

  If this timeline is pushed back, will we have time to make adjustments? Will tenants have additional indicators of when bonds are sold, EIS is approved, etc.? Will tenants be notified as things go along?
  Response: Keep in touch with Harbors Division, check our website. If you cannot get information, you can call me (Carter Luke) to get updates.

  Will demolition take place in phases or all at once?
  Response: DOT is looking at the best approach for the demolition, and it still needs to be determined.

- **Concerned about safety of citizens of Oahu. #1 threat from Al Qaida is dirty bombs (chemicals). Easiest way to ship is via container. Cannot check every container. Why are we forced to have a container yard at our front door? Hawaii is a target. Cannot guarantee that it's safe. Why is the container yard in a populous area? Move it to Barbers Point. Much safer. We're the only state with the ability to move our harbor. There are three Al Qaida groups in Hawaii.**
  Response: Barbers Point is the second busiest harbor in the state: all the gas and oil is shipped through that harbor. Barbers Point needs relief. It's at full capacity in terms of berths and its container yard cannot accommodate similar capacity like Honolulu Harbor.

- **If Kapalama is not used for cargo, is there something else it can be used for? What's Plan B?**
  Response: Not at this time. Clarification: these improvements are to ensure the harbor can accommodate the future needs for the state. The container operator may be paying for use of the area through wharfage fees and tariffs or a lease arrangement.

On Traffic:

1. **There is a long line to pick up and drop off cargo at Waiakamilo.**

2. **Get rid of the Sand Island Bridge to make traffic flow. A lot of land at Sand Island is underutilized. Also a lot of land at KMR (about 50%) is not being used.**

3. **Traffic on Auiki—can't get through in the mornings. Also Sand Island Access Road.**

4. **Auiki is congested. Why can't we keep traffic on Sand Island Access Road? Concerned about pollution & displacement of people. Kalihi Street cannot accommodate traffic.**

5. **Traffic won't work regardless of traffic studies because it's all one way going up and one way going down. This is a 24-hour operation. #1 is Sand Island Access Road. Make it wider.**

- **Have you considered different sites like Campbell Industrial Park?**
  Response: Kalaeloa Harbor has navigational and berthing limitations as well as limited land area — about 30 acres of cargo yard (compared to 70 acres at KMR & 150 acres at Sand Island). Also distance from the market is a consideration.

- **Is there a reason why the gate at Auiki and Mokauea can't be opened all the time (during business hours). This would save everyone ½ mile. Is it for security? Opening it would eliminate traffic on Sand Island.**
  Response: We'll look into this.

- **As a longshoreman, I have a concern. I support this project. For years, Hawaii's population has been growing. More cargo is coming in to the terminals. Same acreage but volume has increased. It's less safe to the longshoremen — more injuries over the last 10 years (compared to previous 10 years) because the yard got congested. Hazardous to workers. Workers are getting injured; lives are at stake. 70 acres will relieve pressure, with more room to work with at the existing terminals. For security, workers are looking into the containers. We have to protect the state economically.**

- **Harbors should look at what is going to be done with consideration for the folks who live here, onshore, and in the water.**

HHUG Overview

- Non-profit maritime transportation industry group founded in 2005
- Support the users through advocacy, compliance assistance, and educational outreach
- Assist the DOT Harbor's Division through legislative and congressional delegation support
- Help the State of Hawaii identify and prioritize commercial harbor improvement needs

HHUG

Hawaii Harbors Users Group (HHUG)

- Aloha Cargo Transport
- American Marine
- Ameron Hawaii
- Clean Islands Council
- Chevron
- Hawaiian Cement
- Hawaiian Electric Company
- Hawaii Pilots Association
- Hawaii Stevedores Inc.
- Horizon Lines, LLC
- Kapolei Property Development
- McCabe, Hamilton, & Renny
- Matson Navigation Company
- Norwegian Cruise Line
- Pacific Shipyards International
- Pasha Hawaii
- P&R Water Taxi
- Sause Brothers
- Tesoro Hawaii Corporation
- The Gas Company
- Young Brothers / Hawaiian Tug & Barge
- North West Canada Cruiseship Association

HHUG Mission Statement:

To promote the health and growth
of
Hawaii's commercial harbor's system
and
support users of the harbor's facilities
to ensure
the economic sustainability
of the
State of Hawaii.

Hawaii-The "State of Reliance"

- The State operates on a "Just-In-Time" supply chain management system
- No major warehouses – Horizon & Matson containers
- Ports play a critical role in the delivery of cargo
- More than 80% of all consumer goods – food, clothing, autos, building supplies, machinery, paper and allied products, medical supplies, and agricultural materials – are imported into Hawaii. Of that 80%, nearly all – some 98% – enter Hawaii through commercial harbors on six islands.

HHUG

Hawaii's Hub & Spoke Harbor System

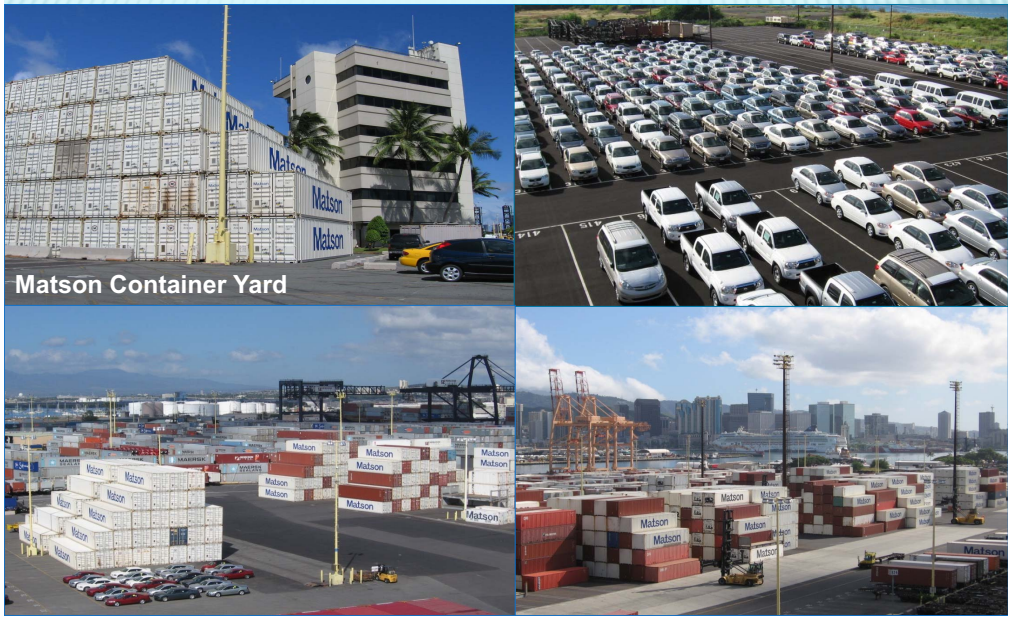
NO N.I. DIRECT CALLS by Long Haul Ship calls*

Status of Commercial Harbors

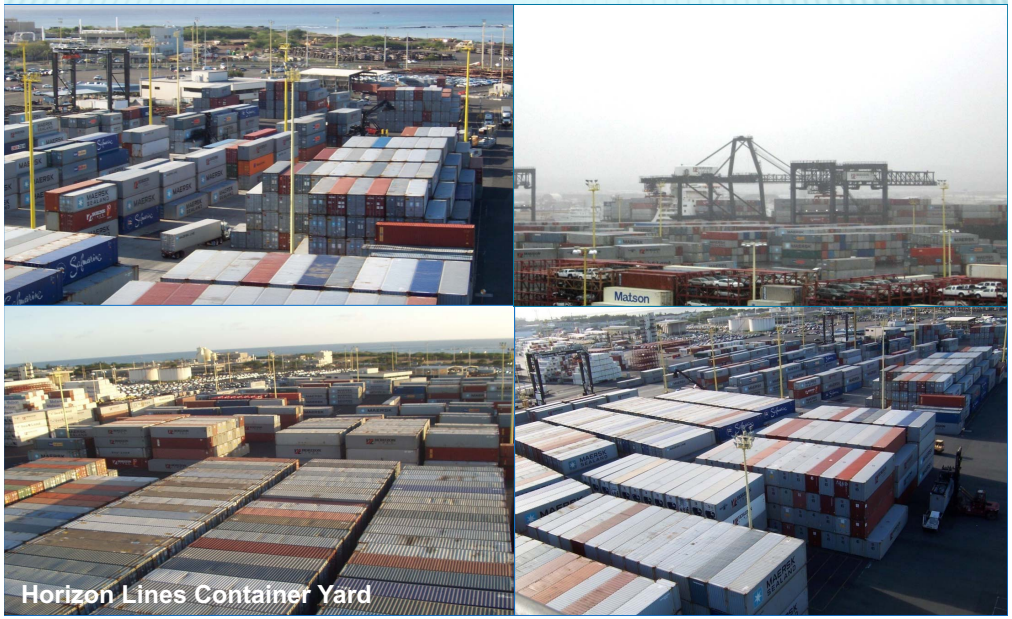
- ◊ Marine Harbor System is the lifeline to the Hawaii economy
- ◊ Cargo, automobile, and cruise ship businesses continue to grow
- ◊ The current Honolulu Harbor footprint is approaching capacity
- ◊ Berth & terminal resources are congested on certain days
- ◊ There is no reserve capacity at this time

Current Honolulu Harbor Footprint

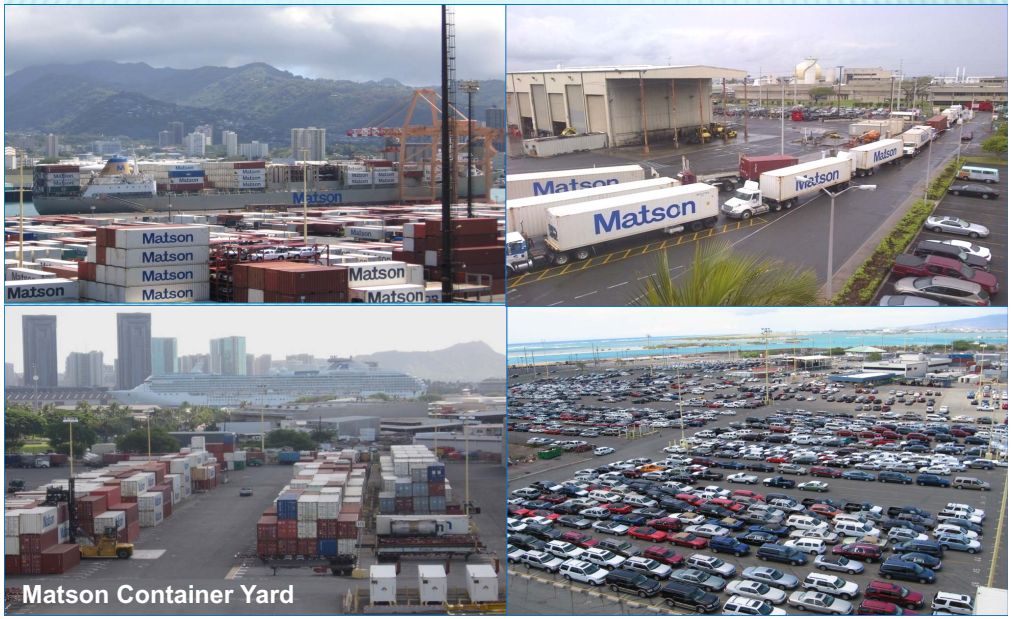
Sand Island Piers 51-53: Capacity Maximized



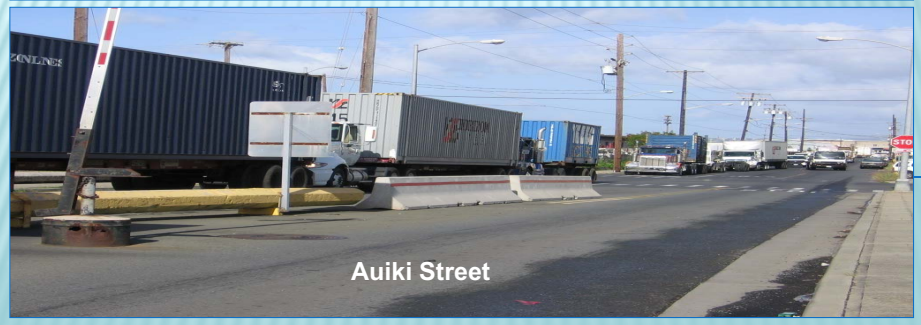
Sand Island Piers 51-53: Capacity Maximized



Congestion-Impacts to “Just-In-Time” Delivery



Congestion Surrounding Roadways

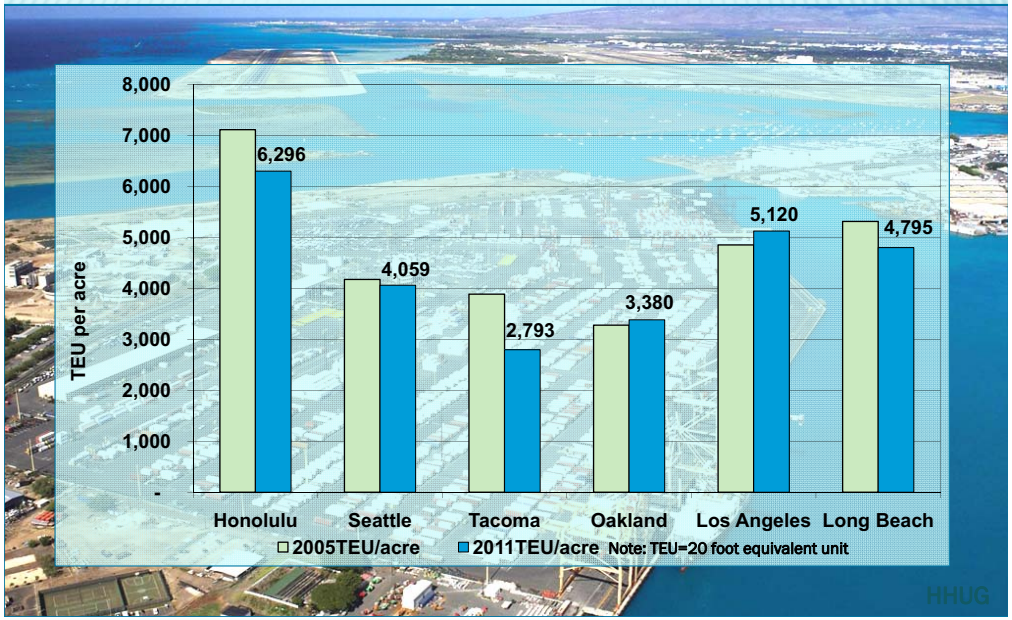


Current Container/Auto Drayage Activity

Kapalama Solution

- Harbor capacity increased by 500,000 TEU's
- Eliminate current congestion
  - Consumers benefit from improved "Just-In-Time" deliveries
- More timely NI connections
  - Elimination of Horizon drayage Sand Island to Young Brothers
- Trucker congestion reduced in the surrounding roadway area
- Safer roadways are realized by the public

Terminal Efficiency Comparison Statistics



Do-Nothing" Option

If nothing is done to address the current Honolulu Harbor capacity issue. Potential losses to Hawaii's GDP is projected to be up to *$60 billion* within 20 years according to a study by commissioned by HHUG by Dr. Leroy Laney*

**First Hawaiian Bank Economist and Economic Professor Hawaii Pacific University*

Longshoremen Safety Concerns

- Terminal Congestion due space restrictions
- Mixed operations involving containers, automobiles oversize cargoes
- Congested container parking stalls, decking areas, and the auto yards
- Overflow of ingate truckers impeding yard & vessel operations
- Comingled traffic patterns between community truckers & stevedores

ILWU 142 Hawaii
International Longshore & Warehouse Union

ILWU

HHUG

Hawaii Department of Transportation: Harbors Division

HONOLULU HARBOR: THE HUB

Honolulu Harbor has been the port-of-entry since the late 18th century.

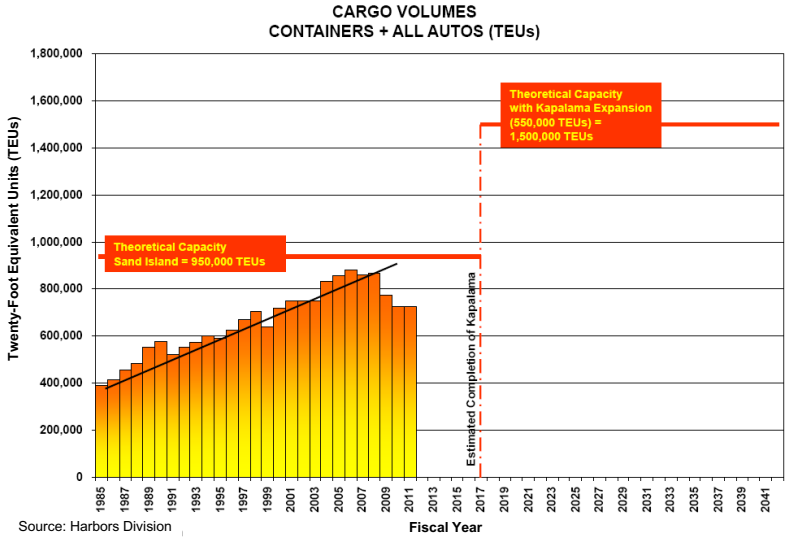
In 1850, with the rise in importance of its harbor, Honolulu was declared the Kingdom of Hawaii's capitol, and then the state capitol.

Today, it continues to be the hub of Hawaii's ocean transportation system because of its developed infrastructure.

Hawaii Department of Transportation: Harbors Division

SAND ISLAND TERMINALS

SAND ISLAND CARGO VOLUMES AND CAPACITY

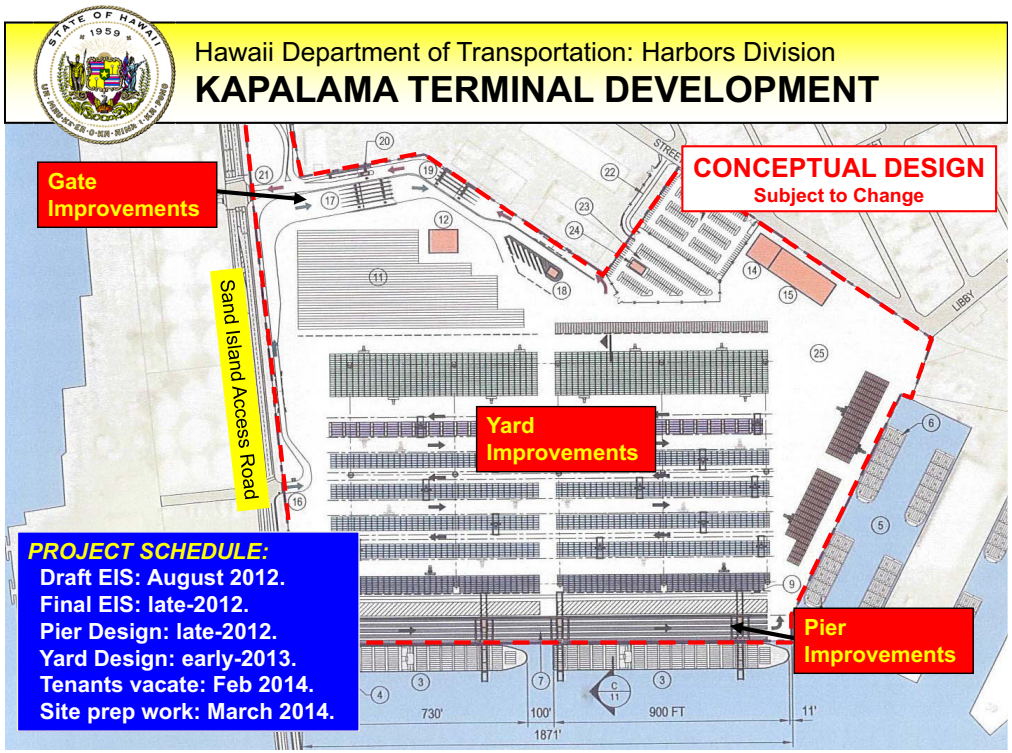


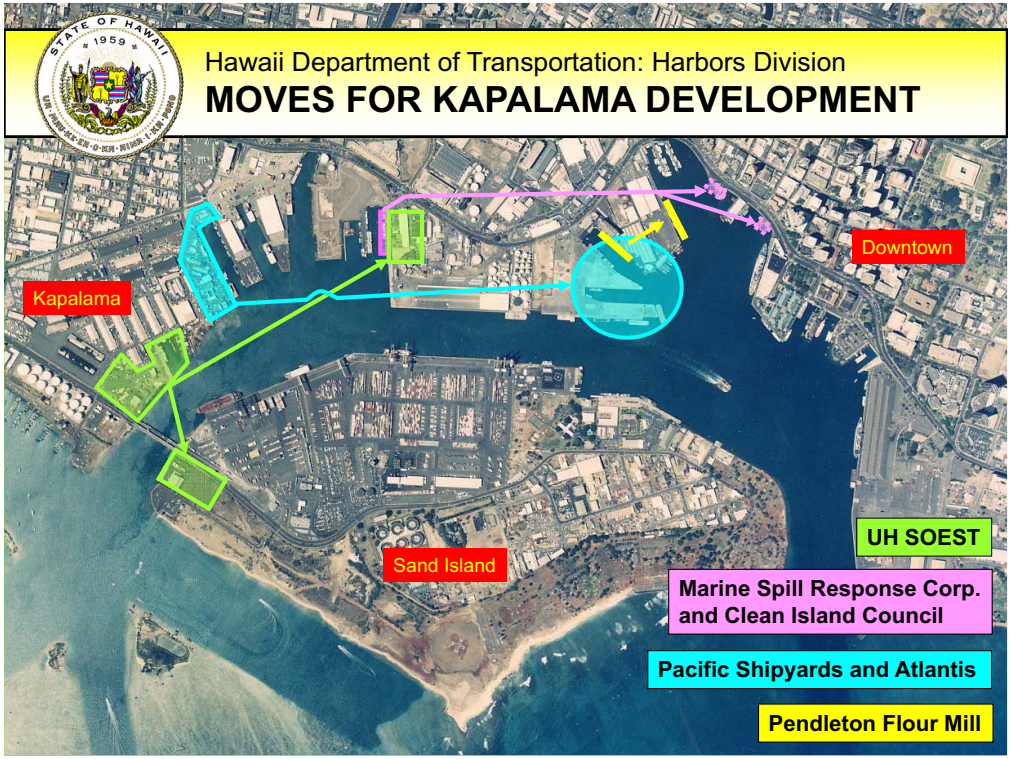
Source: Harbors Division

Hawaii Department of Transportation: Harbors Division

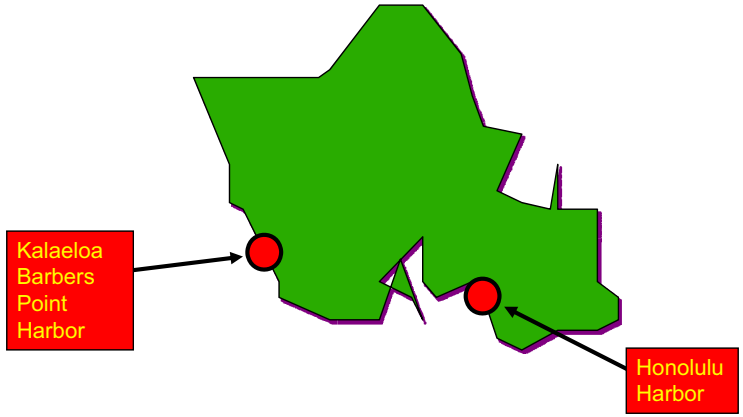
KAPALAMA TERMINAL DEVELOPMENT

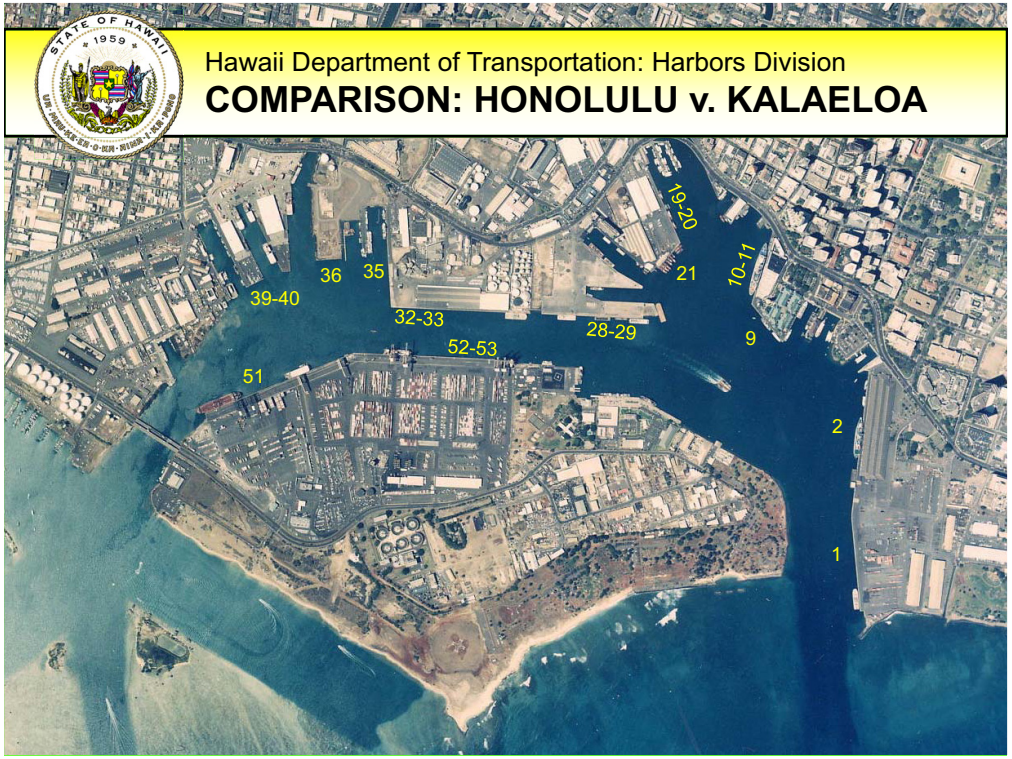
DESCRIPTION: **Development of 1,800' Plus Long Pier, 90-Acre Plus Cargo Yard, and Roadway and Gate Improvements.**
EST. CONSTRUCTION COST: **$221 million.**


Hawaii Department of Transportation: Harbors Division
KAPALAMA TERMINAL DEVELOPMENT
CONCEPTUAL DESIGN
Subject to Change
Gate Improvements
Sand Island Access Road
Yard Improvements
Pier Improvements
PROJECT SCHEDULE:
Draft EIS: August 2012.
Final EIS: late-2012.
Pier Design: late-2012.
Yard Design: early-2013.
Tenants vacate: Feb 2014.
Site prep work: March 2014.
730'
100'
900 FT
11'
1871'


Hawaii Department of Transportation: Harbors Division
MOVES FOR KAPALAMA DEVELOPMENT
Kapalama
Downtown
Sand Island
UH SOEST
Marine Spill Response Corp. and Clean Island Council
Pacific Shipyards and Atlantis
Pendleton Flour Mill

Why Not
Kalaeloa Barbers Point Harbor?





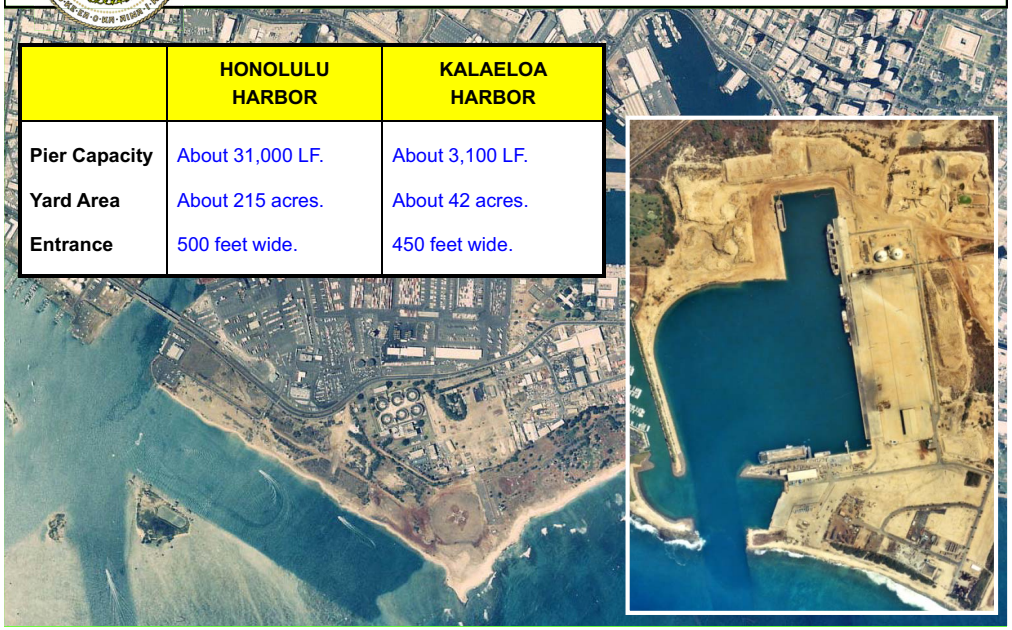
Hawaii Department of Transportation: Harbors Division

COMPARISON: HONOLULU v. KALAELOA

Hawaii Department of Transportation: Harbors Division

COMPARISON: HONOLULU v. KALAELOA

	HONOLULU HARBOR	KALAELOA HARBOR
Pier Capacity	About 31,000 LF.	About 3,100 LF.
Yard Area	About 215 acres.	About 42 acres.
Entrance	500 feet wide.	450 feet wide.

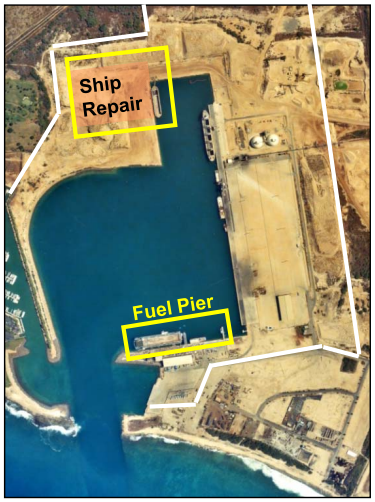


Hawaii Department of Transportation: Harbors Division

KALAELOA HARBOR: LIMITATIONS

Kalaeloa Harbor is a niche port that handles dry- and liquid-bulk cargos. There are limitations on this harbor:

1. **Narrow entrance channel presents navigational challenges.**
2. **Matson and Horizon not interested in going to Kalaeloa.**
3. **No existing interisland cargo carrier.**
4. **Kalaeloa is the 2nd busiest harbor. Already experiencing very congested conditions.**
5. **No expansion opportunities for new piers.**
6. **It is a daylight-only navigation harbor.**



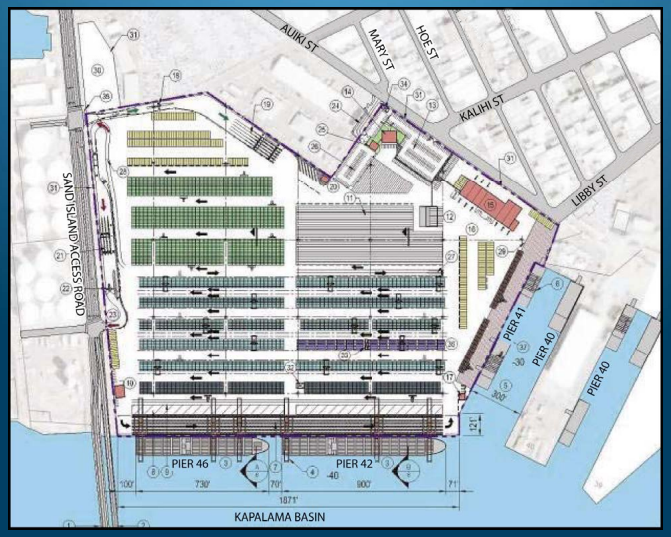
Hawaii Department of Transportation: Harbors Division

KALAELOA HARBOR: LIMITATIONS

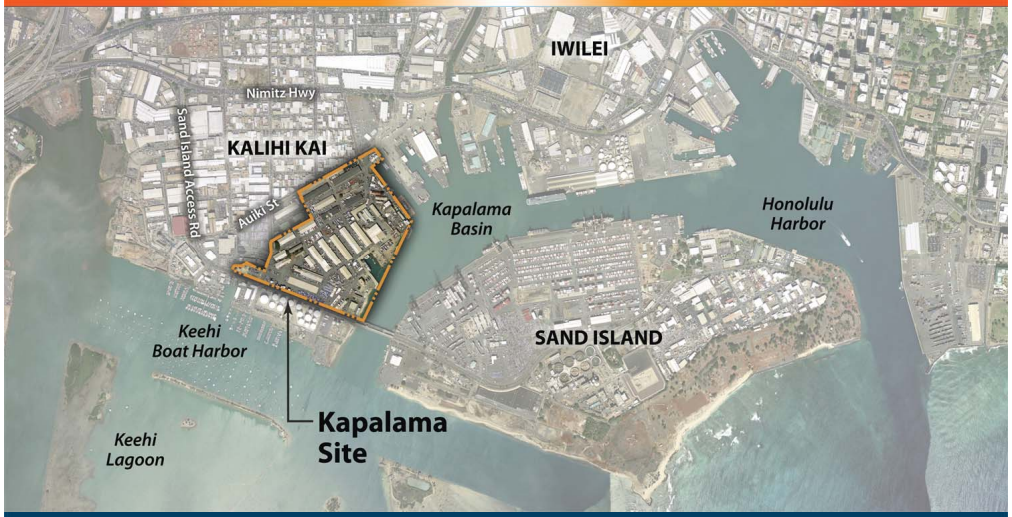
Mahalo

KAPALAMA CONTAINER TERMINAL
Environmental Impact Statement
DEPARTMENT OF TRANSPORTATION · STATE OF HAWAII
State Department of Transportation
Harbors Division
Kapalama, Oahu, Hawaii

PROPOSED DEVELOPMENT CONCEPT



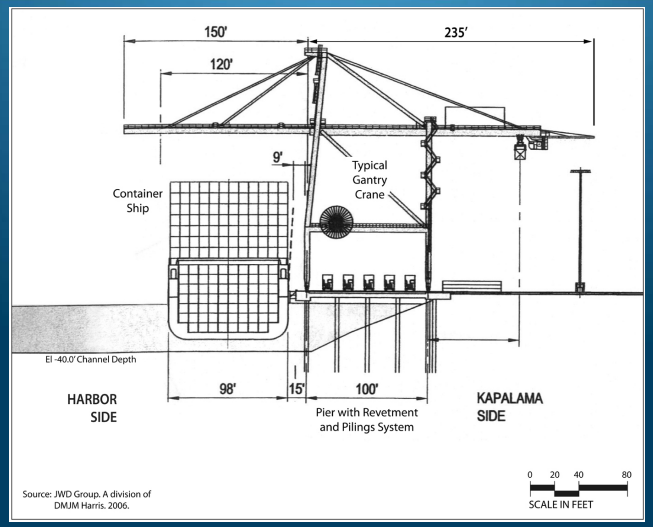
HONOLULU HARBOR



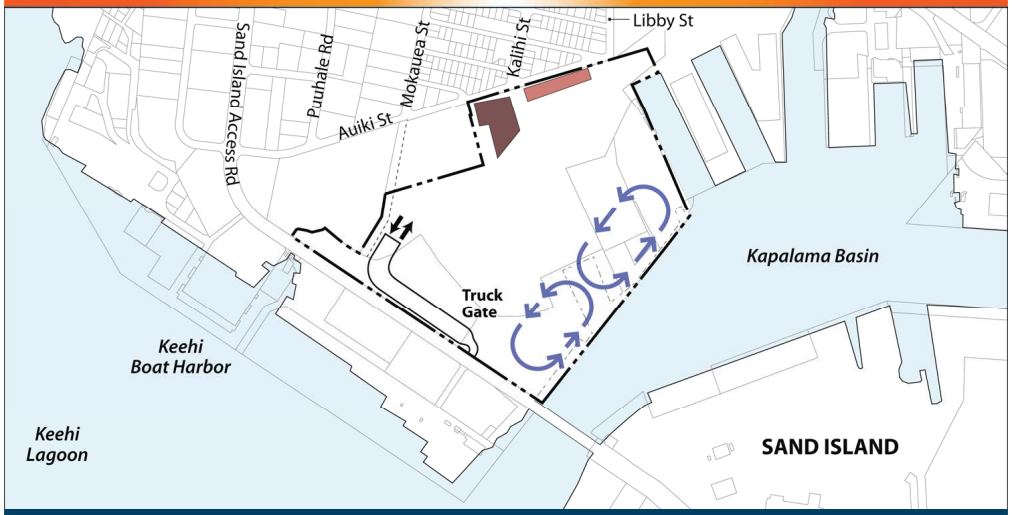
PROPOSED DEVELOPMENT ALTERNATIVES
Libby St
Sand Island Access Rd
Puuhale Rd
Mokauea St
Kalihi St
Auiki St
Kapalama Basin
Keehi
Boat Harbor
Keehi
Lagoon
SAND ISLAND
Straight Pier
Alignment

PROPOSED DEVELOPMENT ALTERNATIVES
Libby St
Sand Island Access Rd
Puuhale Rd
Mokauea St
Kalihi St
Auiki St
Kapalama Basin
Keehi
Boat Harbor
Keehi
Lagoon
SAND ISLAND
Angled Pier
Alignment

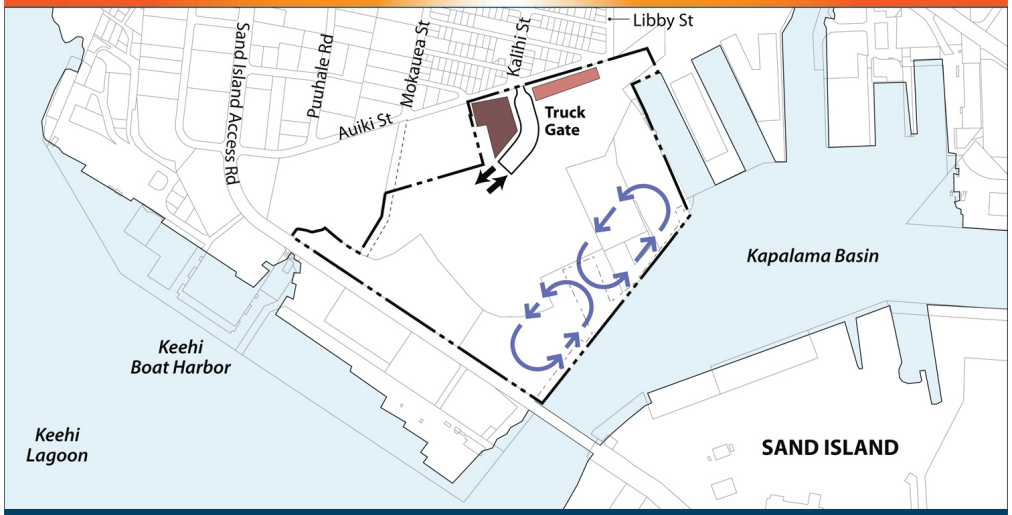
SECTION PLAN



SAND ISLAND ACCESS ROAD GATE



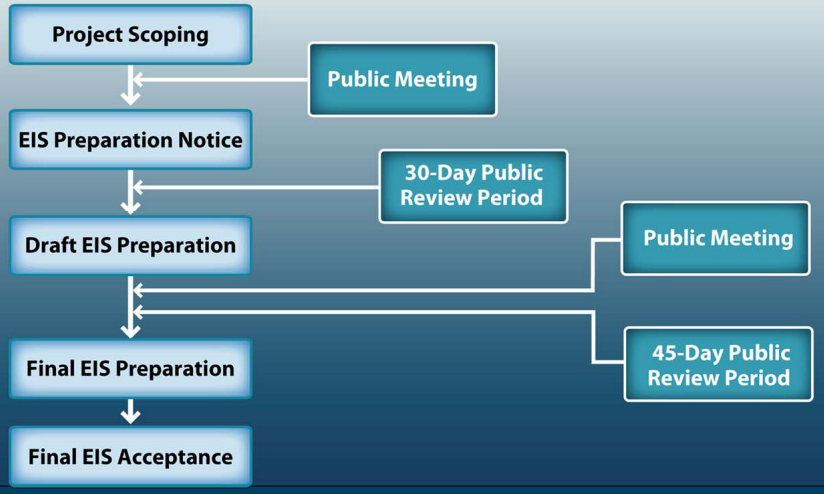
AUIKI STREET GATE



ENVIRONMENTAL STUDIES

- Existing Land Use
- Land Tenure
- Flora
- Fauna
- Air Quality
- Natural Hazards
- Scenic Resources
- Traffic
- Utilities
- Public Services
- Geology, Soils
- Hydrology/Surface and Ground Water
- Marine Water/Marine Life
- Acoustical Environment
- Archaeological Resources
- Cultural Resources
- Socio-Economic Setting
- Federal, State, and City Land Use and Environmental Policies

EIS PROCESS



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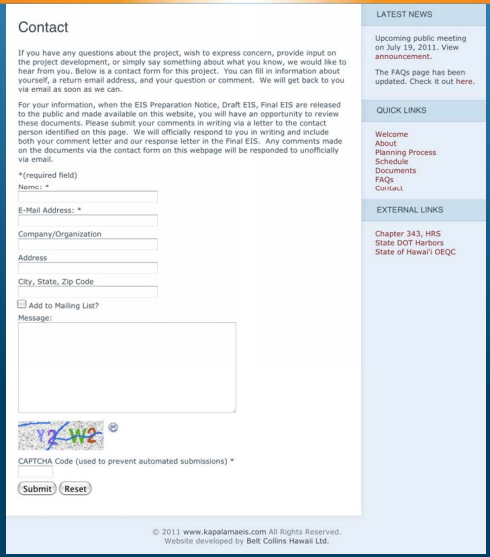

Contact

If you have any questions about the project, wish to express concern, provide input on the project development, or simply say something about what you know, we would like to hear from you. Below is a contact form for this project. You can fill in information about yourself, a return email address, and your question or comment. We will get back to you via email as soon as we can.

For your information, when the EIS Preparation Notice, Draft EIS, Final EIS are released to the public and made available on this website, you will have an opportunity to review these documents. Please submit your comments in writing via a letter to the contact person identified on this page. We will officially respond to you in writing and include both your comment letter and our response letter in the Final EIS. Any comments made on the documents via the contact form on this webpage will be responded to unofficially via email.

*(required field)

Name: *

E-Mail Address: *

Company/Organization

Address

City, State, Zip Code

Add to Mailing List?

Message:

CAPTCHA Code (used to prevent automated submissions) *

Submit Reset

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EXTERNAL LINKS

Chapter 343, HRS
State DOT Harbors
State of Hawai'i OEQC

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State Department of Transportation

Harbors Division

Public Meeting

Kapalama Container Terminal EIS
Pier 19, Kukahi Street
May 10, 2012
2:30 PM Meeting Session

Comment/Question	Response
Has State already secured bond issues to finance project?	State has secured bonds for 1st phase. $42 million of $50 million
Are any tenants being considered for relocation? For traffic study, traffic should decrease as tenants move out, wouldn't that increase traffic on Nimitz and Sand Island?	Tenants are on a 30-day /month to month revocable permit. Harbors has given about 2 years notice. Traffic counts have been taken and they do include traffic generated by the existing tenants. The traffic study will account for this traffic.
Residents opposed to project. This project will cause a lot of traffic problems, and noise (truck beeps). Would like the project to move to Kalaeloa. Should move to another harbor for backup.	A noise study is being conducted for the project. Optional mitigative measures will be available to help reduce significant impacts.
Will there be an increase of traffic on Kalihi St.? Street is identified by the state as site of pedestrian accidents. Will pedestrian safety be accommodated by project?	An increase in automobile traffic is expected along Kalihi Street. However, this increase in traffic volume is not expected to significantly affect pedestrian safety and no off-site traffic mitigation measures are being proposed as part of the container yard project.
Does EIS evaluate impact on current tenants? For the vacating date, is there a timetable for the relocation?	Impact to tenants is being covered in the EIS. Tenants need to leave site by end of February 2014. Site preparation will begin in March 2014.
Irregardless of the EIS results, will DOT still go through with relocation? If EIS has negative impact, will there be further studies? If there is a possibility to stay longer.	EIS will evaluate probable impacts from the project and if impacts are significant mitigation measures will be proposed. EIS will evaluate all project information and its use is valuable as a tool for decision making. Obtaining permits is also required for the project to move forward. End of Feb 2014 is the notification date for relocation.

Public Meeting

Kapalama Container Terminal EIS
Pier 19, Kukahi Street
May 10, 2012
2:30 PM Meeting Session

Comment/Question	Response
We have all our eggs in one basket. Does not take much to block harbor. Is this part of the consideration / how was this considered?	DOT was looking at a tunnel under the bridge, but not enough benefits. If KMR is built, Harbors will evaluate if a second entrance is feasible.
Some of us received letters last week. Have to get rid of storage tanks etc. on site. Is there any way to work with existing tenants to give us more time?	We did send letters out to everyone. We have departmental concerns about the safety of the tenants remaining on the site too long. The buildings are very old.
Will there be a new traffic light on Auiki St. by the private road into KMR?	From a recent meeting with DTS, there will be a light installed in a year or two.

Public Meeting

Kapalama Container Terminal EIS
Pier 19, Kukahi Street
May 10, 2012
6:30 PM Meeting Session

Comment/Question	Response
At the first public meeting on the project, we brought up some concerns but got no follow-up answers about security of the port, terrorist threats, or accidents of tipping over.	We apologize for not getting back to you on your comment from that meeting. We will respond to your comments.
Noise is always a problem in an urban area. What are the sources of noise and what measures to mitigate them?	People concerns were sent to us. There is a noise consultant currently working on that issue.
Traffic study is still assessing what is traffic like. We notice early in the morning turning movements onto Sand Island Access Rd, there is a lot of trucks on Auiki St. toward Diamond Head. Traffic is congested there.	While we recognize the queuing on Auiki Street as an existing problem, it is not caused by the volume of trucks, rather by the wait while entering the Young Brothers yard. We note that the proposed site plan includes a direct connection between the Kapalama Container Yard and the Young Brothers terminal that will reduce this truck volume, but the traffic study will not quantify this (positive) impact.
Safety conditions in existing container terminals.	ILWU representative provided a description of safety conditions at Sand Island terminals and his observations on how traffic on Auiki Street will improve when the new container terminal connects directly with Young Brothers.
Who is working on the CIA? There are fish ponds in the area. Can BCH pass along the names?	Belt Collins is working on the cultural study. Information from previous studies is available to us on cultural resources and the fishponds in the area. We will make a follow-up contact with you.
Has funding been secured for the project? Last July, bonds weren't sold as of last year's meeting. Dates for vacating . . . are they tentative or solid? For the existing tenants at KMR, is the State doing anything to help with relocation?	First phase has been completed. Sold $150 million in bonds. Second bond sale early 2014 for construction. Move dates are solid. No plans for assistance.

Public Meeting

Kapalama Container Terminal EIS
Pier 19, Kukahi Street
May 10, 2012
6:30 PM Meeting Session

Comment/Question	Response
Concerning Auiki St, any traffic through a gateway to the terminal? Last session there was a gate proposed on Kalihi St. I'm concerned about noise. What is going to be done about noise? And the smell from the KMR terminal. There were plans to take all this activity and move it to Campbell Industrial area. Here we go again, dumping in Kalihi.	Current plan has an auto gate/driveway on Auiki St. for employees and visitors. Thank you for sharing your concerns.
Has proposal been submitted through the air carriers? There will be an impact on the carriers due to the cranes. Would Matson move their cranes closer? There is the new 787 airplane	We have submitted FAA Form 7460-1 for the cranes. Still waiting for FAA to complete their review. Matson will likely not move their cranes. RO/RO will move, or the small barge cranes.
How long will the new container yard work for the harbor before another yard is needed?	Present population is 1.3 million. When population grows to 2.6 million, something got to give. Harbors made cargo volume projections (these are estimates) which show the need for and the life of a new container terminal.
As a resident of Sand Island area, all of this building will bring more traffic to Sand Island Access Rd. That is all.	Thank you.

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Yes	CD	1		Joey		Manahan		Representative District, 29	29th Representative District			
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Yes	CD	1		Westley	K.C.	Chun	PhD	Director and Chief Engineer	City and County of Honolulu	Department of Facility Maintenance		
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	CD	1		Samuel	J.	Lemmo		Administrator	State of Hawaii	Department of Land and Natural Resources	Office of Conservation and Coastal Lands	
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	CD	1		Aydee		Zielke		OA* Marine Habitat Specialist	United States Department of Commerce	National Oceanic and Atmospheric Administration	Pacific Islands Regional Office	Habitat Conservation Division
	CD	1		Don		Hubner		Endangered Species Biologist	United States Department of Commerce	National Oceanic and Atmospheric Administration	Pacific Islands Regional Office, Fisheries Services	Protected Resources Division
Yes	CD	1						Commander	United States Department of Homeland Security	Coast Guard	14th Coast Guard District	
	CD	1		Anthony		Montgomery		Marine Biologist	United States Department of Interior	U.S. Fish and Wildlife Services		
Yes	CD	1		Stephen	S.	Anthony		Center Director	United States Department of the Interior	Geological Survey	Pacific Islands Water Science Center	
Yes	CD	1		Melia		Lane-Kamahele		Manager, Pacific Islands Office	United States Department of the Interior	National Park Service	Pacific West Region - Honolulu	
Yes	HD & CD	1		Loyal		Mehrhoff		Field Supervisor	United States Department of the Interior	Pacific Islands Fish and Wildlife Office		
Yes	CD	1		Ronnie		Simpson		Manager	United States Department of Transportation	Federal Aviation Administration	Airports District Office	
Yes	CD	1		Abraham		Wong		Division Administrator	United States Department of Transportation	Federal Highways Administration		
Yes	CD	1							United States Department of Transportation	Federal Transit Administration		
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	CD	1		Gordon		Wong		Lead Program Manager	United States Federal Aviation Administration	Honolulu Airport District Office		
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APPENDIX B

Container Terminal Area Analysis

B-1

Berth and Container Yard Capacity Analysis

Berth and Container Yard Capacity Analysis
Department of Transportation –Harbors Division
April 2012

Container terminal operators prefer working with at least two berths to effectively run a fully-operational container yard. The reason for this is that berth occupancy of 40 to 60 percent forces some vessel re-scheduling, which results in less than optimal vessel utilization of the berth and limited ability to efficiently add more vessel calls.[1]

To obtain operational criteria for the evaluation of alternative sites, berth and container yard capacities were calculated as follows.

An accepted formula used to determine approximate throughput for a single berth is:[2]

Berth Capacity (BC) = (BO x C x CM x H x TEU)

BO = Berth occupancy is set at 50 percent. This allows for variance in ship arrivals and working periods, provides allowance for peak periods versus average periods, and enables scheduled container lines to avoid ship queuing for berths. Facility demand is a function of carrier scheduling.

C = The number of cranes in operation is nominally set at two, although many berths will have and will work three or four cranes against the ship. However, over the full cycle of ship operations, it is more likely to average out at a lower figure than the maximum number of cranes available.

CM = Crane moves per hour is nominally set at 22.5 per hour to reflect some non-productive berth occupancy time, including docking and undocking the ship and removing hatch covers.

H = Hours per day is set at two 10-hour shifts or 20 hours per day, seven days per week, and 52 weeks per year, reflecting the reported situation in Honolulu Harbor.

TEU = Number of TEUs per crane move is set at 1.5, reflecting a mix of one 20-foot container to one 40-foot container.

The calculation from this formula provides the following totals:

BC = (.50) x (2) x (22.5) x (20) x (1.5)

= 675 TEUs per day or 245,700 TEUs per year for a single berth

For two berths, the total throughput capacity is 491,400 TEUs or approximately 500,000 TEUs per year.

New vessels suitable for Honolulu operations may be as long as 730 feet. With two vessels and the required spacing between, aft, and forward of the vessels, a total pier length of 1,870 feet will be sufficient. Calculations were then made on the required area for the container yard to service the throughput for two berths.[3]

TEUs per Acre / Year = (Storage Slots in TEUs per acre) x (365 days per year) x (Capacity Factor ÷ Dwell Time) x (Peaking Factor)

Storage Slots = Measured in TEUs per acre, storage slots depend on the technology employed in the container yard and the size of the yard. For Honolulu Harbor, an average of 135 TEUs per acre was used in anticipation that some facilities would have higher TEUs per acre storage slots and some lower, depending on percentage of wheeled containers and grounded stacked containers.[4] Storage slots are comprised of the required land area for either wheeled containers or stacked containers.

Capacity Factor = This is set at 80 percent to reflect the fact that the yard can never be full; otherwise there would be no room to unload a ship at berth or receive containers.

1 Berth occupancy below 40% creates few problems or delays to vessels, 40-60% forces some vessel re-scheduling that may sub-optimize vessel utilization and limit the ability to efficiently add more vessel calls, occupancy 60-80% leads to periodic berthing delays and sub-optimal vessel scheduling, while occupancy at or above 80% percent would involve a large number of vessels waiting in a queue and is in most cases not achievable as a practical matter. [Mercator Transport Group, 2005, p. 8]

2 Capacity analysis performed for Kapalama project by DOT-H Engineering Branch, February 2012.

3 *Oahu Commercial Harbors 2020 Master Plan*, prepared by DOT-H, September 1999.

4 For a pure wheeled container operation, a factor of 90 TEUs per acre can be used, whereas a straddle operation, a factor of twice that or 180 TEUs per acre is a reasonable estimate. For high stacking, such as 4 or 5 containers used by a current Sand Island operator, a figure of 360 TEUs can easily be obtained. For this calculation, an average of 135 TEUs per acre was used in anticipation that some container yards will have higher volume of stacked containers and some will have less. [*Oahu Commercial Harbors 2020 Master Plan*, 1999]

Dwell Time	=	Dwell time is set at 4 days, reflecting the reported situation in Honolulu Harbor.
Peak Factor	=	This is set at 1.2 to reflect the peak month over average month utilization.

The calculation below shows the volume of TEUs that can be typically stored annually in Honolulu Harbor on a per acre basis:

TEUs per acre/year = 135 x 365 x 0.8 ÷ 4 x 1.2
= 8,212 TEUs per acre capacity

For two berths, each with a throughput of 245,700 TEUs per year, the total yard area requirement will be 60 acres.

Acres required to support one berth
throughput of 245,700 TEUs = 245,700 ÷ 8,212
= 30 acres

Acres required to support two berths = 60 acres

In addition to the 60 acres calculated above, a 20 percent allowance is necessary to provide the operator to shift the proportion of stacked containers to wheeled containers and provide additional storage areas for other shipments such as autos, foreign deliveries, and dangerous/hazardous cargo.

For a two-berth container terminal that includes pier aprons with its gantry cranes, container loading and unloading zones, entry and exit gates, queuing lanes, container storage yard, reserve storage areas for specialty cargo handling, equipment repair and maintenance areas, internal roadways, administrative building, accessory facilities, and employee and public parking, and with the 20 percent allowance, the total berth and container yard area is at least 72 areas. A container terminal of this size would be sufficient to encompass a good balance between the berth operations and container storage area.

Further, a container terminal of this size could accommodate an annual throughput of approximately 500,000 TEUs. This additional capacity is slightly larger than the total projected demand anticipated by 2035.

APPENDIX C

Traffic Impact Assessment Report

C-1
Traffic Impact Report

TRAFFIC IMPACT REPORT

KAPĀLAMA CONTAINER TERMINAL

Honolulu, O‘ahu, Hawai‘i

STATE OF HAWAI‘I
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION

traffic impact report

KAPĀLAMA CONTAINER TERMINAL

Honolulu, O‘ahu, Hawai‘i

OCTOBER 2012

State of Hawai‘i
Department of Transportation
Harbors Division
Hale Awa Ku Moku Building
79 South Nimitz Highway
Honolulu, Hawai‘i 96813-4898

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Prepared by Julian Ng, Inc. and Belt Collins Hawaii LLC

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Appendix A	Peak Period Manual Counts
Appendix B	Traffic Generation Computations
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1 EXECUTIVE SUMMARY

1.1 SUMMARY

The State of Hawai'i, Department of Transportation is proposing to develop a new 94-acre container yard in Honolulu Harbor at the former Kapalama Military Reservation in Honolulu Harbor. Changes in traffic patterns and resultant changes in traffic volumes are expected as a result and a traffic study was done to identify these impacts to the roadways, as well as to pedestrians and bicyclists, and any mitigation measures that may be needed.

1.2 PROBABLE IMPACTS

The study included eight of the major intersections in the surrounding area and found that the project is not expected to have a significant traffic impact. Although volumes will increase slightly at many of the intersections, capacity of the existing intersections will not be exceeded at all of the study intersections as a result of the proposed development, except along Nimitz Highway. The intersections along Nimitz Highway were already close to capacity for existing conditions and are expected to reach capacity for the future no action alternative.

One intersection would see an improved level of service as a result of the project due to a decrease in truck traffic turning right onto Auiki Street from Sand Island Access Road. This can be attributed to providing a direct truck route on site to Young Brothers which provides cargo services destined for the neighbor islands. Currently, container trucks from the Sand Island terminal utilize Sand Island Access Road and Auiki Street for delivery of containers to Young Brothers. With the implementation of the proposed action, these container trucks will remain on site and not utilize the public roads.

1.3 RECOMMENDATIONS FOR ROADWAY IMPROVEMENTS

No roadway improvements are required as a result of project traffic, however consideration should be made to provide improvements to prepare the Sand Island Access Road and UH Snug Harbor Access intersection for future signalization, when needed and warranted, since it will be the main truck access into the site and requires trucks to make a left turn off Sand Island Access Road. Increases in traffic on the roadways surrounding the proposed action will see an increase in volumes, however it is not expected to significantly impact pedestrians and bicyclist, therefore no mitigation measures are being proposed.

2 INTRODUCTION

This traffic report was prepared to identify the potential traffic impacts of the proposed Kapālama Container Terminal project. The proposed action includes developing a 94-acre container terminal in Honolulu Harbor on O'ahu to support the principal port of entry for all container cargo entering and exiting the State of Hawai'i. Figure 1 shows the location of the project.

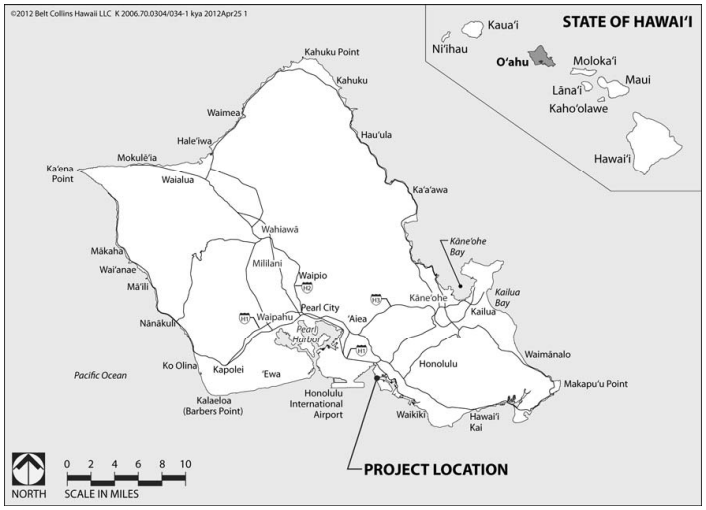


Figure 1 Project Location

This report is organized into several sections; Section 1 is an executive summary of the findings and recommendations; Section 2 is the introduction and provides definitions of traffic engineering terms; Section 3 provides information on existing conditions; Section 4 discusses future conditions, potential impacts, and identifies mitigation measures; and Section 5 provides the conclusion and recommendations.

2.1 TRAFFIC ANALYSES

This report includes the results of traffic analyses of the traffic impacts of the proposed action, including level-of-service analyses at signalized and unsignalized intersections at several locations along roadway segments where traffic volumes would be affected by the

proposed action. The level-of-service analyses and procedures are described in the *Highway Capacity Manual* published by the Transportation Research Board.

2.2 LEVELS OF SERVICE DEFINITIONS

Traffic engineers describe traffic conditions using a "level of service" (LOS) concept. Six levels of service, ranging from "A" to "F" in descending order (good to bad) are used; LOS A describes unimpeded flow with no congestion or delay, while LOS F describes congested conditions and excessive delays.

Levels of service at intersections are based on average delays from evaluations of conditions at the intersection. At an unsignalized intersection, delays are incurred by those vehicles that stop and wait for other traffic to clear before using the intersection, and by those vehicles that make left turns after yielding to oncoming traffic. At a signalized intersection, all traffic that is controlled by the traffic signal will have some delay as the traffic signal cycles through its various phases. Separate criteria are used for unsignalized and signalized intersection, as drivers' expectations differ when facing the two types of intersection control. Table 1 outlines the delays associated with Levels of Service at intersections.

Table 1. LOS Definitions

Level of Service	Average Delay Per Vehicle	
	At Unsignalized Intersections	At Signalized Intersections
A	Up to 10 seconds	Up to 10 seconds
B	>10 and ≤15 seconds	>10 and ≤20 seconds
C	>15 and ≤25 seconds	>20 and ≤35 seconds
D	>25 and ≤35 seconds	>35 and ≤55 seconds
E	>35 and ≤50 seconds	>55 and ≤80 seconds
F	>50 seconds	>80 seconds

Source: Highway Capacity Manual 2010

Level of Service D has traditionally been considered acceptable for peak hour traffic volumes in urban settings. However, in recognition of declining public resources and the various engineering and environmental challenges of implementing roadway improvements, peak hour conditions worse than Level of Service D are not necessarily "unacceptable" or require mitigation.

3 EXISTING TRAFFIC CONDITIONS

The following descriptions of existing traffic conditions are based on field observations and manual peak period traffic counts taken during the week of October 24, 2011 at eight intersections between Sand Island and Nimitz Highway. In addition, a manual traffic count was taken on November 17, 2011 at Sand Island Access Road and the main entry for Horizon Lines to determine the volume of trucks and cars generated from the existing container terminal on Sand Island. At this location, only entering and exiting vehicles were counted as well as the type of vehicle. The location of the counts is shown in Figure 2, Traffic Count Locations. Summaries of the traffic count data collected are shown in Appendix A.

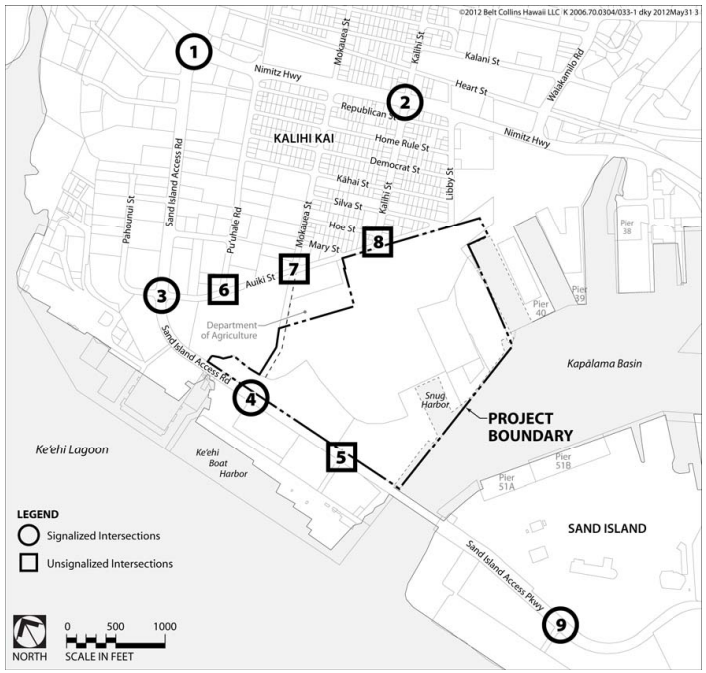


Figure 2 Traffic Count Locations

Traffic signal systems are located at 5 of the 9 studied intersections; two on Nimitz Highway and three others along Sand Island Access Road. At the other four unsignalized intersections, traffic is controlled by the use of "STOP" or "YIELD" signs placed on the minor street approaches to intersections, which allow traffic on the streets that have higher traffic flows to proceed with minimal delay.

Affected roadways in the area include primary arterials, collectors, and local streets. A brief description of each roadway in the study area is provided below:

- Nimitz Highway is an east-west roadway that serves as a major arterial from the Honolulu International Airport, past downtown Honolulu, and continues all the way into Waikiki as Ala Moana Boulevard. Within the project area Nimitz Highway has three travel lanes in each direction with left turn pockets at intersections and a raised median. Between the two study intersections there are sidewalks only along small portions of the roadway and no bicycle lanes, street parking, or roadside shoulders. The Keehi Interchange, located just west of Sand Island Access Road, includes ramps that connect to lanes on the H-1 Freeway (on viaduct) and on the frontage road below the viaduct (Nimitz Highway). One of these ramps is reserved for high-occupancy vehicle (HOV) use in the eastbound direction. On weekday mornings between 5:30am and 8:30am, this ramp connects to a contra-flow lane on Nimitz Highway. This lane is reserved for vehicles traveling in the eastbound direction on Nimitz Highway with three or more passengers from 5:30am to 8:00am and two or more passengers from 8:00am to 8:30am. A contra-flow lane is not used in the afternoon peak period. The speed limit for this highway is 35 miles per hour (mph).

- Sand Island Access Road (SIAR) is a north-south arterial roadway that intersects Nimitz Highway and provides access to Sand Island, a primarily industrial area that also includes recreational areas (beach parks). SIAR is the only access onto Sand Island and serves as the western border of the project. The roadway is a four-lane divided roadway with left turn pockets between Nimitz Highway and Auiki Street, and an undivided five-lane roadway south of Auiki Street. Access to the project site is through two intersections; the signalized crossing with Road No. 2 and the unsignalized crossing with the UH Snug Harbor access road. Fronting the project site, SIAR has a pavement width of 60 feet. There are bicycle lanes in each direction of travel, but only portions of roadway have sidewalks. Along sections of the paved roadway shoulder adjacent to the bike lane there is room for passenger cars to park in front of businesses. The posted speed limit is 25 mph between Nimitz Highway and just south of Auiki Street. The speed limit changes to 35 mph south of Auiki Street to the Sand Island bridge. Before crossing the bridge, the speed limit is 35 mph, except for trucks which have a posted speed limit of 25 mph.

- Auiki Street is a two-lane undivided east-west collector roadway that begins at SIAR and ends at Libby Street (Pahounui Drive, a local two-lane street, is located to the west of SIAR, forming a four-way intersection with Auiki Street). Auiki Street has approximately 45 feet of pavement, one lane of travel in each direction, street parking, curbs, gutters, and sidewalks. This street also serves as a portion of the northern boundary of the project site and additional access to the project site is located at the Libby Street intersection. The posted speed limit is 25 mph.

- Kalihi Street is an undivided north-south collector roadway that begins at Auiki Street and connects directly into Likelike Highway as it crosses over the H-1 Freeway. The street has four lanes of travel, two in each direction, street parking, and sidewalks on both sides between Auiki Street and Nimitz Highway. The posted speed limit is 25 miles per hour.

- Mokauea Street is an undivided north-south collector roadway that parallels Kalihi Street, begining at Auiki Street and ending at King Street. The street has two lanes, with one lane of travel in each direction, street parking, and sidewalks on both sides. An access driveway to the Department of Agriculture office is located opposite the south end of Mokauea Street, forming a four-way intersection at Auiki Street. The posted speed limit on Mokauea Street is 25 miles per hour.

- Puuhale Road is an undivided north-south collector roadway that parallels Kalihi and Mokauea Streets. It begins at Auiki Street and continues to King Street; however the portion of the roadway between Dillingham Boulevard and King Street carries one way traffic in the southbound direction only. Puuhale Road has one lane of travel in each direction. The portion between Auiki Street and Nimitz Highway also has street parking and sidewalks available on both sides of the road. A driveway serving the parcel south of Auiki Street is located opposite Puuhale Road, forming a four-way intersection. The posted speed limit on Puuhale Road is 25 mph.

3.1 ANALYSIS

Level of service analyses were conducted on the peak hour volumes using the methods described in the *Highway Capacity Manual*. Two weekday peak periods were identified for this study; the AM Peak Hour when the work day begins and the PM Peak Hour when the work day ends. Peak hour volumes from the eight intersections with the overall intersection level of service are shown on Figures 3 and 4. The peak hours of each of the intersections may not coincide within the same hour. This analysis reviews the heaviest volumes observed for each intersection within the morning and afternoon peaks to determine the project impacts when the intersection is at its peak.

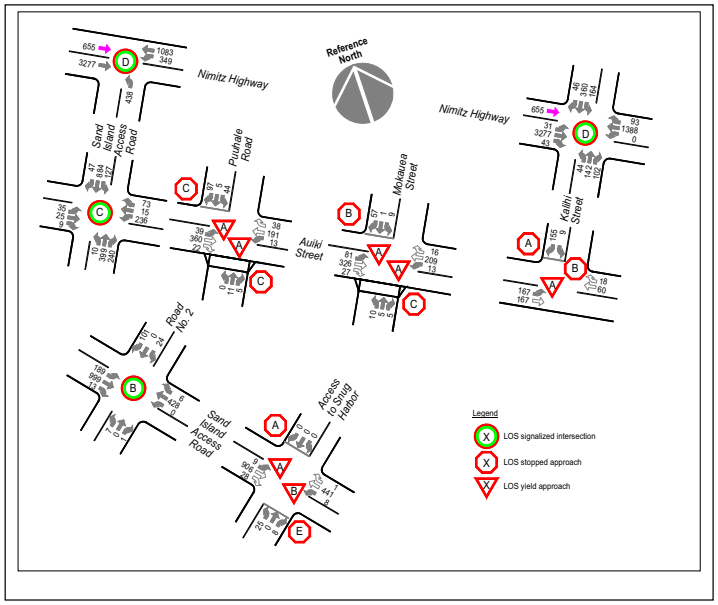


Figure 3 Existing AM Peak Hour Volumes (2011)

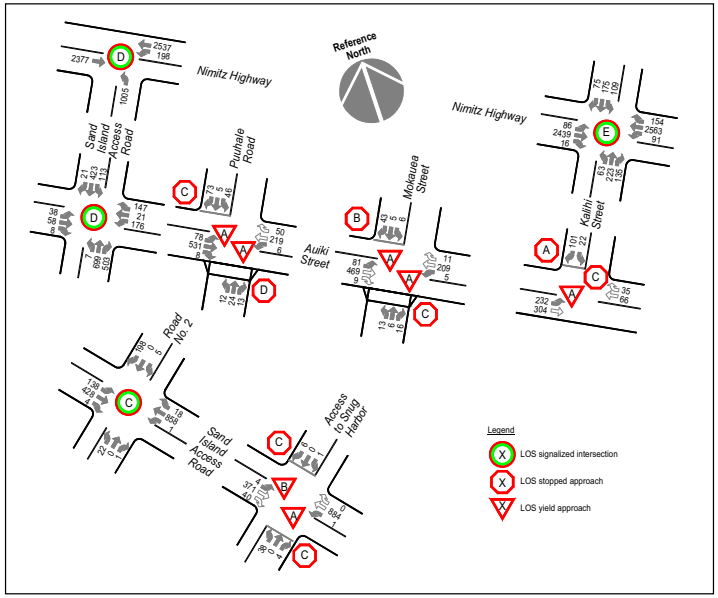


Figure 4 Existing PM Peak Hour Volumes (2011)

At the intersection with Nimitz Highway and SIAR a three-phase traffic signal controls vehicular and pedestrian flows across the intersection. The first phase allows the westbound traffic to turn left onto SIAR or to proceed straight ahead. The second phase allows the through movements of eastbound and westbound traffic to flow. The last phase allows the left turns from SIAR to turn onto Nimitz Highway and head westbound. (Right turns between SIAR and eastbound Nimitz Highway controlled by "YIELD" signs have less delay than the adjacent movements and have not been included.) The intersection of Nimitz Highway and SIAR operated at capacity in the AM Peak Hour. The long queues that developed on the eastbound and northbound approaches indicate that the counted volumes were limited by the capacity. The intersection of Nimitz Highway and Kalihi Street was also operating near capacity with long queues on the north and southbound approaches due to the very long cycle lengths. The very high delays for the left turn lanes and the side street approaches to Nimitz Highway are a direct result of the very long cycle lengths (four to five minutes) at the signalized intersections. However, the overall levels of service were better because most of the vehicles using these intersections were through movements on Nimitz Highway, and the overall level of service is based on average delay of all vehicles affected by the signal. Results are shown in Table 2.

Table 2. Existing Levels of Service at Signalized Intersections

Intersection	AM Peak Hour			PM Peak Hour		
	X	AD	LOS	X	AD	LOS
1. Nimitz Highway & Sand Island Access Road	**1.00**	**51.9**	**D**	**0.84**	**44.9**	**D**
Eastbound Contra-flow (Nimitz Hwy)	0.61	20.0	C	--	--	--
Eastbound Through (Nimitz Hwy)	1.00	50.5	D	0.81	38.0	D
Westbound Left Turn (Nimitz Hwy)	1.00	152.2	F	0.70	115.1	F
Westbound Through (Nimitz Hwy)	0.28	3.7	A	0.73	20.7	C
Northbound Left Turn (Sand Island Acc Rd)	1.00	149.5	F	0.97	108.3	F
2. Nimitz Highway & Kalihi Street	**0.95**	**45.2**	**D**	**0.88**	**58.7**	**E**
Eastbound Contra-flow (Nimitz Hwy)	0.54	19.5	B	--	--	--
Eastbound Left Turn (Nimitz Hwy)	0.74	190.3	F	0.87	199.1	F
Eastbound Through (Nimitz Hwy)	0.95	33.9	C	0.77	36.4	D
Westbound Left Turn (Nimitz Hwy)	--	--	--	0.90	205.3	F
Westbound Through (Nimitz Hwy)	0.65	21.7	C	0.86	42.4	D
Northbound Left Turn (Kalihi Street)	0.92	221.6	F	0.93	232.9	F
Northbound Through (Kalihi Street)	0.98	178.0	F	0.95	174.5	F
Northbound Right Turn (Kalihi Street)	0.87	160.7	F	0.45	104.4	F
Southbound Left Turn (Kalihi Street)	0.96	163.4	F	0.93	202.6	F
Southbound Through (Kalihi Street)	0.82	111.3	F	0.49	117.4	F
3. Sand Island Access Road and Auiki Street	**0.66**	**31.6**	**C**	**0.84**	**37.2**	**D**
Eastbound (Auiki Street)	0.17	29.8	C	0.23	29.9	C
Westbound (Auiki Street)	0.84	55.8	E	0.80	50.8	D
Northbound Left Turn (Sand Island Acc Rd)	0.20	64.4	E	0.24	77.0	E
Northbound Through (Sand Island Acc Rd)	0.50	25.9	C	0.86	36.1	D
Southbound Left Turn (Sand Island Acc Rd)	0.70	70.4	E	0.83	93.7	F
Southbound Through (Sand Island Acc Rd)	0.58	21.5	C	0.27	16.2	B
4. Sand Island Access Road and Road No. 2	**0.52**	**15.7**	**B**	**0.65**	**20.9**	**C**
Eastbound (Road No. 2)	0.04	28.8	C	0.08	20.2	C
Westbound (Road No. 2)	0.68	48.9	D	0.55	28.2	C
Northbound Left Turn (Sand Island Acc Rd)	0.00	36.5	D	0.04	37.6	D
Northbound Through (Sand Island Acc Rd)	0.27	11.0	B	0.70	20.7	C
Southbound Left Turn (Sand Island Acc Rd)	0.76	48.3	D	0.69	45.9	D
Southbound Through (Sand Island Acc Rd)	0.50	7.5	A	0.27	10.0	A

X = utilization (volume-to-capacity ratio) AD = Average Delay per vehicle (seconds) LOS = Level of Service

Four unsignalized intersections were also analyzed. Delays at unsignalized intersections are identified by movements that are controlled by stop signs or yield to other movements. The results of the analyses on the unsignalized intersections are provided in Table 3.

Table 3. Existing Levels of Service at Unsignalized Intersections

Intersection	AM Peak Hour			PM Peak Hour		
	X	AD	LOS	X	AD	LOS
5. UH Snug Harbor Access and Sand Island Acc Rd						
Northbound Left Turn (Sand Island Acc Rd)	0.01	10.9	B	<0.01	8.5	A
Southbound Left Turn (Sand Island Acc Rd)	0.01	8.6	A	0.01	10.9	B
Westbound Through (UH Snug Harbor Access)	0.00	0.0	A	0.04	22.7	C
Eastbound (UH Snug Harbor Access)	0.28	43.4	E	0.15	17.7	C
6. Puʻuhale Road and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.03	7.9	A	0.07	8.1	A
Westbound Left Turn (Auiki Street)	0.01	8.3	A	0.01	8.8	A
Northbound (Puʻuhale Road)	0.04	15.1	C	0.22	25.6	D
Southbound (Puʻuhale Road)	0.30	15.1	C	0.41	24.0	C
7. Mokauea Street and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.01	8.3	A	0.07	8.0	A
Westbound Left Turn (Auiki Street)	0.07	8.1	A	<0.01	8.5	A
Northbound (Mokauea Street)	0.07	18.6	C	0.12	18.6	C
Southbound (Mokauea Street)	0.13	12.7	B	0.11	12.5	B
8. Kalihi Street and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.12	7.9	A	0.18	8.0	A
Southbound Left Turn (Kalihi Street)	0.02	14.4	B	0.11	22.6	C
Southbound Right Turn (Kalihi Street)	0.17	9.5	A	0.12	9.3	A

X = utilization (volume-to-capacity ratio) AD = Average Delay per vehicle (seconds) LOS = Level of Service

3.2 PEDESTRIAN AND BICYCLE OBSERVATIONS

Field notes indicated that there were a few (less than 60 per hour) pedestrians observed crossing the roadways at all of the study intersections. The highest observations of pedestrians were seen crossing Nimitz Highway at SIAR and Kalihi Street. These pedestrians were observed going to or coming from bus stops or walking to nearby schools. Multiple bus routes travel down Nimitz Highway and have stops near SIAR and Kalihi Street. Kalihi Kai Elementary School as well as Kalākaua Intermediate School and Farrington High School are all located further mauka on Kalihi Street.

At the other two signalized intersections on SIAR pedestrians volumes were slightly less and the majority were walking to or from bus stops or street parking stalls to their place of work. There is one bus route in the Kalihi Kai neighborhood that uses Kalihi Street, Auiki Street, and SIAR.

Along Auiki Street less than 20 pedestrians were also observed walking to or from a bus stop or parking on the street and walking to their place of work. Since there are no crosswalks across Auiki Street, pedestrians would cross wherever they needed to cross. With only two lanes of travel on Auiki Street pedestrians were able to cross the street easily and without interrupting traffic. Along Kalihi Street most pedestrians utilized the crosswalks since it is a four lane roadway. Less than 5 bicyclists were observed commuting during each of the traffic count periods.

Field notes also indicated that even fewer bicyclists (less than 10 per hour) were observed at all of the intersections. While SIAR is the only roadway with a dedicated bike lane within the study area, only a few bicyclists were seen traveling in the lanes. Along Nimitz Highway, most bicyclists were observed traveling on the sidewalk instead of in the roadway since there is no bike lane or wide enough shoulder to ride. Along Auiki Street even fewer bicyclists were observed and most of them traveled in the roadway, sharing the road with vehicles instead of riding on the sidewalk.

4 FUTURE TRAFFIC CONDITIONS

4.1 FUTURE BASELINE CONDITIONS

Future conditions would normally be evaluated for the year 2039, when full operations of the expanded container terminal is expected. Port usage projections show an expected average annual increase in container yard activity in the range of +2.2%. Traffic in the area, however, consists of other vehicles and is not expected to increase at the same rate. A major study of future transportation demand in Honolulu projected a 17% increase in daily traffic volumes across Kapalama Canal in the 25 years from 2005 to 2030 (as reported in *Transportation Technical Report, Honolulu High-Capacity Transit Corridor Project,* August 15, 2008. Table 4-10). This increase is equal to an average annual increase of 0.64%, which over 30 years (2011 to 2039, rounded to nearest 5 years) would be an increase of 21%.

A future baseline condition assuming peak hour traffic increases by 21% and removal of non-maritime tenants within the proposed project was evaluated to illustrate the possible impacts to the study intersections if such growth in traffic volumes could occur. This is because the analyses of existing counts already show that the counts may represent a capacity-constrained condition and conditions at other nearby intersections and on freeway segments in the area will also limit the growth of peak hour volumes at the study intersections. Therefore, the future baseline condition should not be taken as a situation that could occur, but as an indication of future travel demand.

Figures 5 and 6 show the future baseline peak hour traffic assignments.

Table 4 shows the results of the level-of-service analyses for this future baseline traffic projection. For the signalized intersections, modifications to signal timing were made where necessary and cycle lengths were limited to a maximum of 240 seconds. While future conditions may be Level of Service E or F, or utilization exceeds 1.0, no mitigation measures are proposed in this report, whose purpose is to identify traffic impacts of the proposed new container yard. However, there are plans to improve signal optimization along Nimitz Highway and a study was completed two years ago by the City and County of Honolulu, Department of Transportation Services to help improve traffic flow along this corridor.

For the AM Peak Hour at the SIAR and Nimitz Highway intersection, the analysis done as part of this traffic study indicates that the increases in turning movements will require modifications to the signal timing. The major eastbound through movements on Nimitz Highway are expected to be congested, and increased use of the contraflow lane has been assumed to maintain person-carrying capacity with the mixed lanes at full utilization (one additional vehicle in the contraflow lane for every two vehicles removed from the mixed

traffic lane). These assumptions were made to be consistent with the goals of the long-range plans, which seek to increase person-carrying capacity with minimal construction of additional traffic lanes.

The assumption of increased use of the contraflow lane on Nimitz Highway in the AM Peak Hour was carried through to the Kalihi Street intersection.

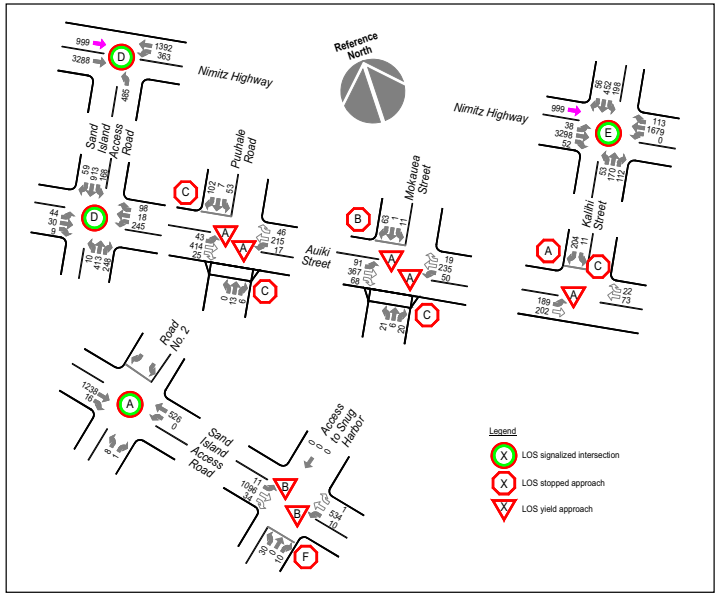


Figure 5 Future AM Peak Hour Baseline Volumes (2039)

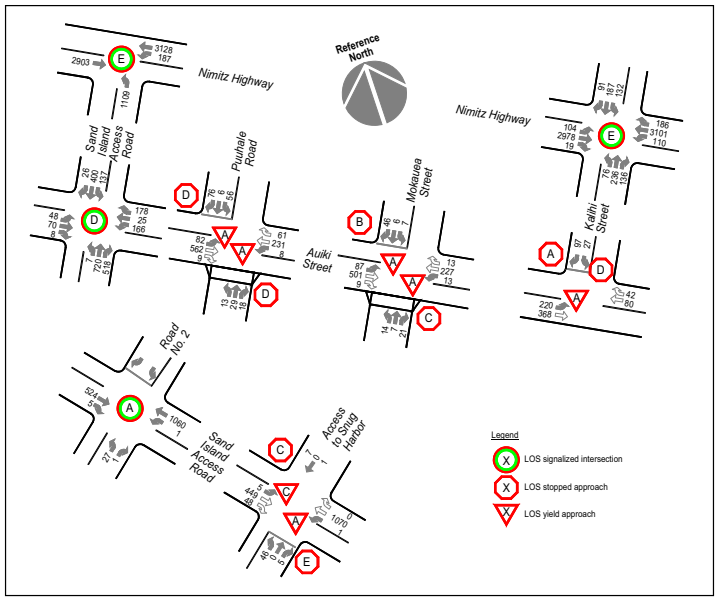


Figure 6 Future PM Peak Hour Baseline Volumes (2039)

Table 4. Future (2039) Baseline Conditions at Signalized Intersections

Intersection	AM Peak Hour			PM Peak Hour		
	X	AD	LOS	X	AD	LOS
1. Nimitz Highway & Sand Island Access Road	**0.96**	**45.6**	**D**	**0.97**	**58.3**	**E**
Eastbound Contra-flow (Nimitz Hwy)	0.89	38.4	D	n.a.	n.a	n.a.
Eastbound Through (Nimitz Hwy)	0.96	40.3	D	0.98	57.5	E
Westbound Left Turn (Nimitz Hwy)	0.98	147.0	F	0.90	153.3	F
Westbound Through (Nimitz Hwy)	0.34	4.4	A	0.92	36.3	D
Northbound Left Turn (Sand Island Acc Rd)	0.97	138.5	F	0.96	106.4	F
2. Nimitz Highway & Kalihi Street	**1.00**	**59.9**	**E**	**1.04**	**70.5**	**E**
Eastbound Contra-flow (Nimitz Hwy)	0.96	50.1	D	n.a.	n.a.	n.a.
Eastbound Left Turn (Nimitz Hwy)	0.93	234.4	F	1.04	213.7	F
Eastbound Through (Nimitz Hwy)	1.00	50.1	D	0.94	44.2	D
Westbound Left Turn (Nimitz Hwy)	n.a.	n.a.	n.a.	0.96	184.3	F
Westbound Through (Nimitz Hwy)	0.83	33.8	C	1.04	67.9	E
Northbound Left Turn (Kalihi Street)	0.86	192.2	F	0.89	181.8	F
Northbound Through (Kalihi Street)	0.98	169.1	F	1.04	176.6	F
Northbound Right Turn (Kalihi Street)	0.80	140.3	F	0.42	82.5	F
Southbound Left Turn (Kalihi Street)	0.99	165.3	F	1.02	196.2	F
Southbound Through (Kalihi Street)	0.89	113.0	F	0.57	99.4	F
3. Sand Island Access Road and Auiki Street	**0.73**	**36.0**	**D**	**0.86**	**47.9**	**D**
Eastbound (Auiki Street)	0.20	28.2	C	0.29	40.5	D
Westbound (Auiki Street)	0.86	56.0	E	0.87	69.8	E
Northbound Left Turn (Sand Island Acc Rd)	0.20	64.4	E	0.33	116.4	F
Northbound Through (Sand Island Acc Rd)	0.56	29.7	C	0.85	42.3	D
Southbound Left Turn (Sand Island Acc Rd)	0.86	86.8	F	0.95	134.7	F
Southbound Through (Sand Island Acc Rd)	0.64	24.6	C	0.24	18.5	B
4. Sand Island Access Road and Road No. 2	**0.51**	**9.0**	**A**	**0.41**	**9.4**	**A**
Eastbound (Road No. 2)	0.03	26.9	C	0.07	22.4	C
Westbound (Road No. 2)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Northbound Left Turn (Sand Island Acc Rd)	0.00	36.5	D	0.05	40.4	D
Northbound Through (Sand Island Acc Rd)	0.43	5.7	A	0.54	8.9	A
Southbound Left Turn (Sand Island Acc Rd)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Southbound Through (Sand Island Acc Rd)	0.64	10.3	B	0.31	9.7	A

X = utilization (volume-to-capacity ratio) AD = Average Delay per vehicle (seconds) LOS = Level of Service

Table 5. Future (2039) Baseline Conditions at Unsignalized Intersections

Intersection	AM Peak Hour			PM Peak Hour		
	X	AD	LOS	X	AD	LOS
5. UH Snug Harbor Access and Sand Island Acc Rd						
Northbound Left Turn (Sand Island Acc Rd)	0.02	12.3	B	0.00	8.9	A
Southbound Left Turn (Sand Island Acc Rd)	0.02	12.0	B	0.02	21.6	C
Westbound Through (UH Snug Harbor Access)	0.00	n.a.	n.a	0.03	18.4	C
Eastbound (UH Snug Harbor Access)	0.41	60.4	F	0.43	49.3	E
6. Pu'uhale Road and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.04	8.0	A	0.07	8.2	A
Westbound Left Turn (Auiki Street)	0.02	8.5	A	0.01	8.9	A
Northbound (Pu'uhale Road)	0.06	17.0	C	0.30	29.5	D
Southbound (Pu'uhale Road)	0.40	18.7	C	0.56	35.0	D
7. Mokauea Street and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.08	8.2	A	0.07	8.1	A
Westbound Left Turn (Auiki Street)	0.05	8.7	A	0.01	8.7	A
Northbound (Mokauea Street)	0.22	24.7	C	0.15	20.2	C
Southbound (Mokauea Street)	0.17	14.0	B	0.13	13.8	B
8. Kalihi Street and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.14	8.0	A	0.17	8.1	A
Southbound Left Turn (Kalihi Street)	0.03	16.1	C	0.14	25.1	D
Southbound Right Turn (Kalihi Street)	0.23	10.0	A	0.12	9.4	A

X = utilization (volume-to-capacity ratio) AD = Average Delay per vehicle (seconds) LOS = Level of Service

4.2 PROJECT TRAFFIC

4.2.1 Vehicular Access

Several alternatives for vehicular access to the site were considered. While maximizing use of the site was the primary factor in the site layout, minimizing adverse traffic impacts at the interfaces with the public roadways was also a factor. A separation of the truck traffic and the automobile (employees and visitors) traffic was determined to be important.

The site has frontages along SIAR and Auiki Street. SIAR has a pavement width of approximately 60 feet, no on-street parking, and is in an industrial setting. Auiki Street is narrower, approximately 45 feet in width, with on-street parking, and includes industrial, commercial, and residential properties on the opposite side from the project site. In

addition, several streets intersect Auiki Street at stop-controlled intersections that approach at an angle (rather than perpendicularly).

Truck access from Auiki Street was considered but would be less desirable than providing truck access from SIAR, for the following reasons:

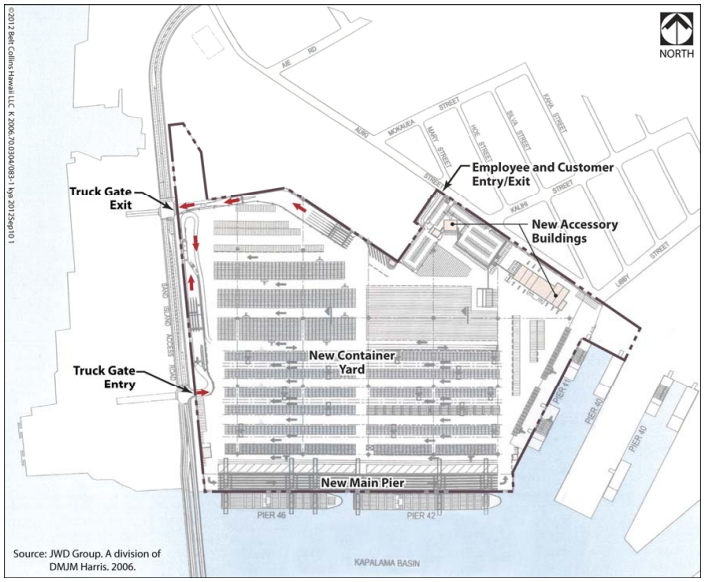
a. An access on Auiki Street would be located near Kalihi Street and result in increased traffic on Kalihi Street (or on the parallel Mokauea Street); residential properties along Auiki Street and Kalihi and Mokauea streets would be adversely affected by additional truck traffic.

b. Trucks that use Kalihi Street and arrive from or depart to the west on Nimitz Highway will have a greater effect on intersection capacity at the intersection of Kalihi Street and Nimitz Highway, as compared to the relatively minor effects with the large radii turns that are already available at the SIAR intersection. Limited right-of-way and the developed roadside at Kalihi Street constrain the mitigation measures that would be available.

Three alternatives for the arrangement of the truck access were considered. A single access point where trucks would enter and exit would be less desirable for controlling truck flows on the site. Two alternatives for separate in and out driveways would use the existing roadways into the site, located opposite the existing access roads that lead to the Keehi small boat harbor. If trucks were to enter at Road No. 2 and exit farther makai, entering trucks would cross paths with the trucks that exit the site. In addition, the location limits the length of the left turn lane that could be provided. Reversing these movements by having entering truck traffic routed to the makai driveway will allow for a longer left turn storage lane; in addition, entering truck movements and exiting truck movements could occur simultaneously, thereby lessening the impact to mauka-bound traffic from Sand Island. Converting the two-way left turn lane on SIAR into a left turn lane for the Snug Harbor Access would also provide the adequate storage length for the trucks turning into the Snug Harbor Access. Currently, the two-way left turn lane serves no purpose since the only driveways on the makai side of SIAR are secured by a locked gate.

The separation of automobile access to the site from truck access is proposed to be accomplished by providing automobile parking near Auiki Street. Alternatives for access to this parking lot include a new driveway directly opposite Kalihi Street and a new driveway directly opposite Mary Street, which is appoximately half way between the Kalihi Street and Mokauea Street intersections with Auiki Street. Locating an access driveway opposite Kalihi Street may result in long delays for traffic wishing to cross Auiki Street, due both to the volume of traffic on Auiki Street and the angle of the intersection. Traffic using a driveway opposite Mary Street, however, is expected to consist mostly of left turns in from Auiki Street and right turns out onto Auiki Street, relatively easy maneuvers at an unsignalized intersection or driveway.

For the reasons cited above, the desired access to the site includes truck access from SIAR, with truck traffic entering the site at an intersection closer to the channel and truck traffic exiting the site at the existing Road No. 2 intersection, and automobiles using a new driveway on Auiki Street located directly opposite Mary Street. The following Figure 7 shows the proposed site plan with the desired access points.



Source: JWD Group. A division of DMJM Harris. 2006.

Figure 7 Proposed Site Plan

4.2.2 Project Traffic Impacts

The proposed project will have three primary impacts to traffic conditions in the area. The site is currently used by month-to-month lessees, and traffic generated by these users and their visitors were included in the traffic counts and in the future baseline traffic estimates; with development of the proposed project the traffic generated by the displaced uses will no longer be on the surrounding streets.

The second impact is a reduction of project traffic on portions of SIAR and Auiki Street. Part of this project impact is due to the relocation of the vehicle access from the existing container terminal on Sand Island to the access points for the new site, further mauka on

SIAR. Many of these vehicle trips will be on the mauka portion of SIAR without or with the project, but would not be on the portion of SIAR between the existing and new entries/exits. In addition, due to the project's common boundary with the interisland barge shipper, a direct connection could be provided so that the truck traffic carrying containers bound for the neighbor islands would not be on the public roadway. Currently containers bound for the neighbor islands are off loaded at Sand Island and trucked along SIAR and Auiki Streets to Young Brothers at the end of Auiki Street. The project will provide a direct internal vehicular access to Young Brothers, thus eliminating the truck trips on the public roads between Sand Island and Young Brothers.

The third impact is due to the separation of truck and automobile traffic that is proposed by the project site plan. Truck traffic, which will access the site from SIAR, is expected to continue the existing access patterns mauka of Auiki Street. Automobiles, however, would avoid SIAR, opting instead to use Kalihi Street and Auiki Street between Nimitz Highway and the site.

The reduction in traffic due to the displaced uses is based on the turning movements in and out of Road No. 2, with a portion of that traffic assumed to use Auiki Street (based on the turning movement counts). The second and third impacts described above are discussed in the next section.

4.2.3 Trip Generation

The proposed project is a new container terminal that will add an approximate annual capacity of 550,000 TEUs (Twenty-foot Equivalent Units). Combined with the existing 950,000 TEU capacity on Sand Island, the total capacity will be increased to 1,500,000 TEUs. The container yards on Sand Island are currently used by two shipping companies; traffic counts on a day selected as a typical day with a ship in port were taken at the entrance to one of the container yards to be used to develop a method to estimate future traffic generated by the new container yard. With the existing (2011) use at that container yard estimated to be 250 kTEUs, and the future capacity 550 kTEUs, traffic due to operations at the new container yard is expected to be 2.2 times that of the count, as shown in Table 6 – Traffic at Container Yard Gates.

Table 6. Traffic at Container Yard Gates

		AM Peak Hour		PM Peak Hour	
	kTEUs	Enter	Exit	Enter	Exit
Existing	250	92	84	45	93
Proposed	550	203	185	99	205

kTEUs = One thousand twenty-foot equivalent units

The proposed layout of the container yard includes two gates to separate truck traffic from automobile traffic. Trucks would enter from and exit onto SIAR, while automobile traffic (employees and visitors) would access a separate parking lot located near Auiki Street, through a driveway located opposite Mary Street. While the automobile and truck traffic

volumes generated do not occur exactly at the same peak hour, they were assumed in this analysis to coincide in order to simplify the analysis and provide a conservative estimate of project trip generation. The counts of truck and car traffic were used to develop separate estimates of truck and car traffic, as shown in Table 7 – Project Trips.

Table 7. Project Trips

	AM Peak Hour			PM Peak Hour		
Vehicle Type	Enter	Exit	Total	Enter	Exit	Total
Trucks	97	154	251	66	119	185
Cars	106	31	137	33	86	119
TOTAL	203	185	288	99	205	304

4.2.4 Trip Distribution

The separation of truck and automobile traffic at the site would lessen the increase in traffic volumes on SIAR by dispersing the impact. Truck traffic would continue to use similar paths between the container yard and Nimitz Highway (but would not need to cross the Kalihi Channel and proceed onto Sand Island). Automobile traffic would be diverted to Auiki Street. Due to the location of the proposed driveway that would provide access in to and out of the automobile parking lot and the relative ease of making right turns, automobile traffic is expected to use Auiki Street and Kalihi Street to connect to Nimitz Highway.

The traffic count data was used as an indicator of the travel paths of traffic generated along SIAR. While much of this traffic remains on (or used) SIAR to connect to Nimitz Highway, an alternative path for traffic traveling from SIAR to the east is via Auiki Street and one of the streets parallel to SIAR.

The development of the site will also have a reduction in traffic, as traffic generated by the uses currently on the site will no longer be using the nearby roadways. Counts taken at the existing entrance (Road No. 2) were used to determine these reductions. Figures 8 and 9 show the project traffic effects on the existing roadways.

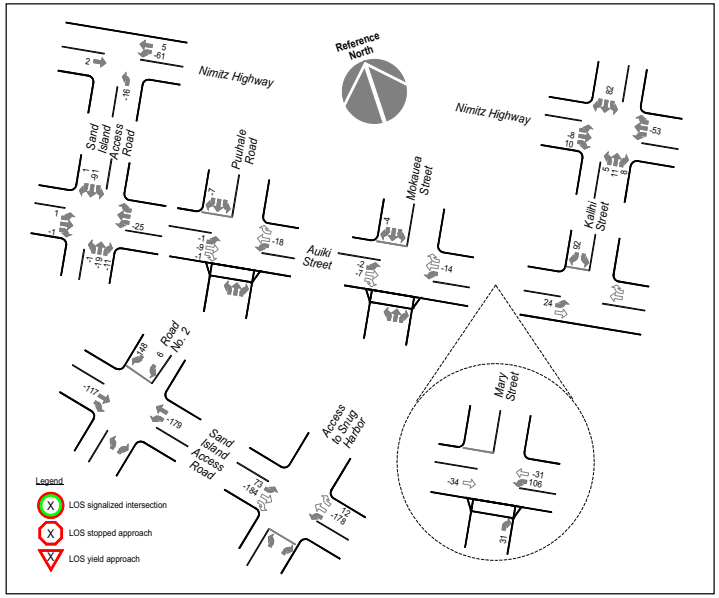


Figure 8 Impact of Project to AM Peak Hour Traffic Volumes

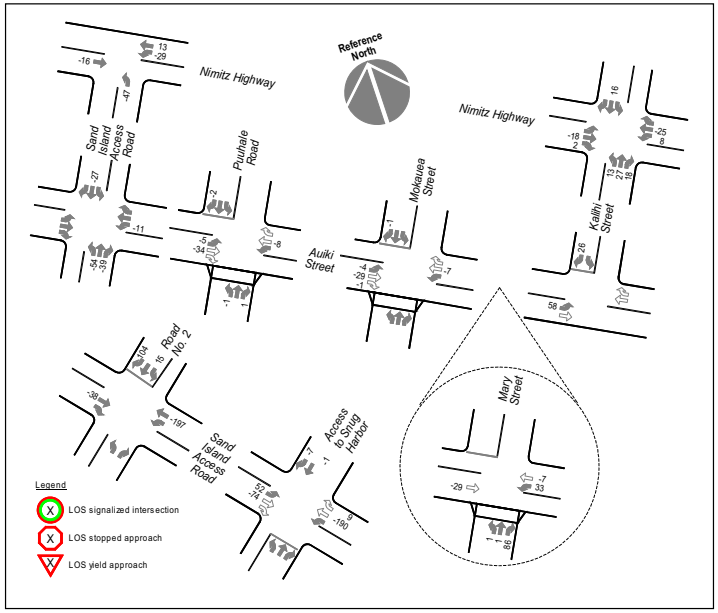


Figure 9 Impact of Project to PM Peak Hour Traffic Volumes

4.3 FUTURE WITH PROJECT TRAFFIC CONDITIONS

Figures 10 and 11 show the future with-project peak hour traffic assignments. The results of the analyses are shown in Tables 8 and 9. Existing layouts were used; for signalized intersections, modifications to signal timings were made where necessary and possible to optimize signal operation (minimize total delay) or to alleviate over-capacity conditions.

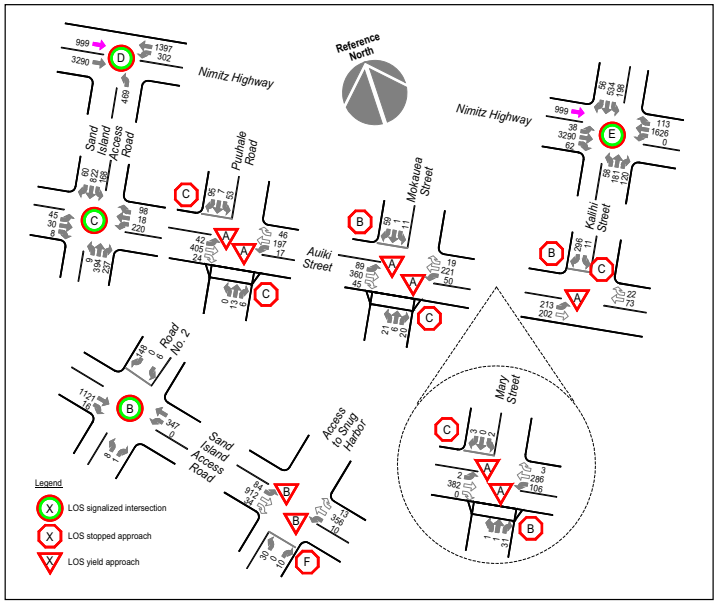


Figure 10 Future With Project Traffic Volumes – AM Peak Hour (2039)

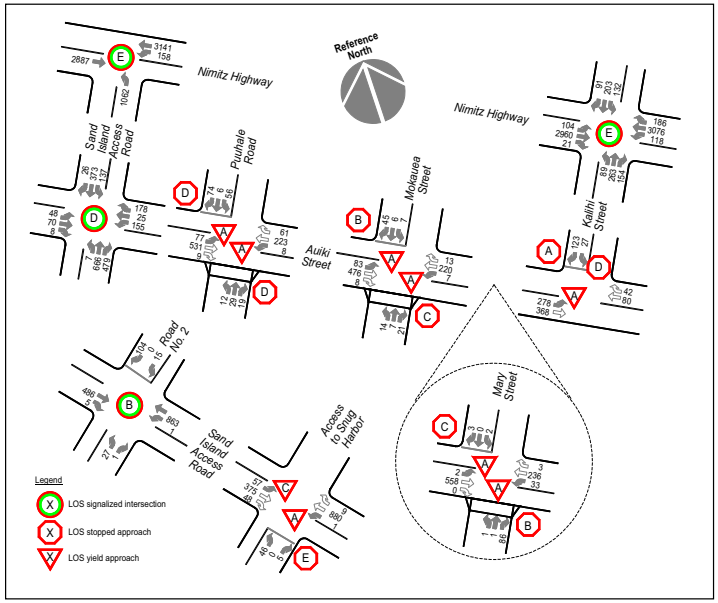


Figure 11 Future With Project Traffic Volumes – PM Peak Hour (2039)

Table 8. Future (2039) With Project Conditions at Signalized Intersections

Intersection	AM Peak Hour			PM Peak Hour		
	X	AD	LOS	X	AD	LOS
1. Nimitz Highway & Sand Island Access Road	**0.94**	**40.8**	**D**	**0.92**	**55.9**	**E**
Eastbound Contra-flow (Nimitz Hwy)	0.87	34.8	C	n.a.	n.a.	n.a.
Eastbound Through (Nimitz Hwy)	0.94	36.1	D	0.97	56.3	E
Westbound Left Turn (Nimitz Hwy)	0.91	138.4	F	0.77	133.8	F
Westbound Through (Nimitz Hwy)	0.34	4.4	A	0.93	36.7	D
Northbound Left Turn (Sand Island Acc Rd)	0.93	132.3	F	0.92	99.8	F
2. Nimitz Highway & Kalihi Street	**1.00**	**63.9**	**E**	**1.05**	**76.1**	**E**
Eastbound Contra-flow (Nimitz Hwy)	0.96	52.0	D	n.a.	n.a.	n.a.
Eastbound Left Turn (Nimitz Hwy)	0.93	234.4	F	1.04	213.7	F
Eastbound Through (Nimitz Hwy)	1.01	52.1	D	0.95	48.0	D
Westbound Left Turn (Nimitz Hwy)	n.a.	n.a.	n.a.	1.03	202.7	F
Westbound Through (Nimitz Hwy)	0.81	33.1	C	1.05	73.9	E
Northbound Left Turn (Kalihi Street)	0.92	207.0	F	1.03	220.2	F
Northbound Through (Kalihi Street)	1.00	173.0	F	1.06	177.0	F
Northbound Right Turn (Kalihi Street)	0.81	140.7	F	0.45	81.0	F
Southbound Left Turn (Kalihi Street)	0.99	165.3	F	1.02	196.2	F
Southbound Through (Kalihi Street)	1.00	134.7	F	0.55	96.5	F
3. Sand Island Access Road and Auiki Street	**0.69**	**34.4**	**C**	**0.82**	**45.8**	**D**
Eastbound (Auiki Street)	0.20	28.2	C	0.29	40.5	D
Westbound (Auiki Street)	0.80	49.4	D	0.84	65.7	E
Northbound Left Turn (Sand Island Acc Rd)	0.16	62.7	E	0.33	116.4	F
Northbound Through (Sand Island Acc Rd)	0.53	29.1	C	0.78	38.6	D
Southbound Left Turn (Sand Island Acc Rd)	0.85	85.3	F	0.95	134.7	F
Southbound Through (Sand Island Acc Rd)	0.58	23.2	C	0.23	18.3	B
4. Sand Island Access Road and Road No. 2	**0.59**	**13.8**	**B**	**0.55**	**18.2**	**B**
Eastbound (Road No. 2)	0.04	27.0	C	0.09	20.3	C
Westbound (Road No. 2)	0.68	44.3	D	0.60	34.8	C
Northbound Left Turn (Sand Island Acc Rd)	0.00	36.5	D	0.04	37.6	D
Northbound Through (Sand Island Acc Rd)	0.42	14.2	B	0.69	20.4	C
Southbound Left Turn (Sand Island Acc Rd)	0.00	26.5	C	0.00	26.6	B
Southbound Through (Sand Island Acc Rd)	0.58	9.4	A	0.31	10.3	B

X = utilization (volume-to-capacity ratio) AD = Average Delay per vehicle (seconds) LOS = Level of Service

Table 9. Future (2039) With Project Conditions at Unsignalized Intersections

Intersection	AM Peak Hour			PM Peak Hour		
	X	AD	LOS	X	AD	LOS
5. UH Snug Harbor Access and Sand Island Acc Rd						
Northbound Left Turn (Sand Island Acc Rd)	0.02	11.1	B	0.00	8.6	A
Southbound Left Turn (Sand Island Acc Rd)	0.14	11.3	B	0.23	20.8	C
Eastbound (UH Snug Harbor Access)	0.37	52.6	F	0.38	41.5	E
6. Pu'uhale Road and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.04	8.0	A	0.07	8.2	A
Westbound Left Turn (Auiki Street)	0.02	8.5	A	0.01	8.8	A
Northbound (Pu'uhale Road)	0.06	16.5	C	0.27	26.2	D
Southbound (Pu'uhale Road)	0.37	17.9	C	0.51	30.4	D
7. Mokauea Street and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.08	8.1	A	0.07	8.0	A
Westbound Left Turn (Auiki Street)	0.05	8.6	A	0.01	8.6	A
Northbound (Mokauea Street)	0.20	23.0	C	0.14	18.9	C
Southbound (Mokauea Street)	0.16	13.6	B	0.12	13.2	B
8. Kalihi Street and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.16	8.0	A	0.22	8.2	A
Southbound Left Turn (Kalihi Street)	0.04	17.2	C	0.18	31.4	D
Southbound Right Turn (Kalihi Street)	0.33	10.7	B	0.15	9.5	A
9 Mary Street and Auiki Street						
Eastbound Left Turn (Auiki Street)	0.00	8.0	A	0.00	7.8	A
Westbound Left Turn (Auiki Street)	0.11	8.7	A	0.04	8.9	A
Northbound (driveway)	0.07	12.0	B	0.19	14.2	B
Southbound (Mary Street)	0.02	16.1	C	0.01	15.9	C

X = utilization (volume-to-capacity ratio) AD = Average Delay per vehicle (seconds) LOS = Level of Service

Changes in traffic volumes due to the project did not significantly decrease the LOS at most of the study intersections, in fact there was at least one improvement in LOS for an intersection in the AM peak. At the SIAR and Auiki Street intersections a slight reduction in traffic due to relocating existing tenants and redirecting truck traffic on site improved the LOS, see Table 10 for a LOS Summary of the conditions.

Although the SIAR and UH Snug Harbor Access shows LOS E or F, it is only the eastbound approach that is operating at this LOS. However, with increased delays on that approach to the intersection, the alternative of accessing SIAR at the nearby Road No. 2 intersection,

would become more attractive, and the eastbound approach at that intersection has low utilization and would be able to accommodate any diverted traffic.

Table 10. LOS Summary

Intersection	AM Peak Hour			PM Peak Hour		
	2011	No Action	With Project	2011	No Action	With Project
1) Nimitz Highway & Sand Island Access Road	D	D	D	D	E	E
2) Nimitz Highway & Kalihi Street	D	E	E	E	E	E
3) Sand Island Access Road & Auiki Street	C	D	C	D	D	D
4) Sand Island Access Road & Road No. 2	B	A	B	C	A	B
5) Sand Island Access Road & UH Snug Harbor Access	E	F	F	C	E	E
6) Auiki Street & Pu'uhale Road	C	C	C	D	D	D
7) Auiki Street & Mokauea Street	C	C	C	C	C	C
8) Auiki Street & Kalihi Street	B	C	C	C	D	D

Further analysis on the SIAR and UH Snug Harbor access looked at signalization of the intersection since all trucks would be entering the site at this location. The analysis of the future with project conditions indicated LOS B and LOS C for the unsignalized intersection on the southbound left turn approach turning into the container yard; however this does not take into consideration that additional time may be needed for the trucks to make the sharp turn into the property or how quickly they process through the gate. Since signalization also requires a warrant analysis, which is based upon the volume of traffic on both the main road and the minor road, a modification to equate trucks to passenger car equivalent lengths would need to be included in order to meet the requirements.

Proposed improvements at this main entry gate should also consider installing traffic signal conduits for future use. If and when signalized, the signal timing at this intersection should be coordinated with the signal at Road No. 2 to provide less interruption to through traffic and better flow into and out of the project site.

At all entrances and exits to the site, appropriate intersection sight distances should be provided at all access points to the project site, which includes two driveways on SIAR and one driveway on Auiki Street. Parking restrictions may be required on Auiki Street to provide adequate site distance for vehicles at this access point.

Taking into consideration the traffic safety conditions, the proposed action provides separate entrances for passenger vehicle and truck traffic to minimize impacts to the existing roadways. Passenger vehicle traffic would utilize Kalihi Street and the Auiki Street entrance, which carries more passenger cars; while the trucks would utilize SIAR, which currently handles more truck traffic. Increases in traffic on these streets are expected,

however the increase in traffic volume is not expected to significantly impact pedestrian safety therefore no mitigation measures are being proposed.

4.3.1 Weigh Stations

To accommodate the proposed increase in truck traffic another weigh station will need to be built adjacent to Nimitz Highway, just north of the SIAR/Road No. 2 intersection to regulate overweight vehicles. The additional weigh station is necessary to handle the truck traffic coming from the proposed project; however it is not large enough to be able to accommodate all trucks including the ones coming over the bridge from Sand Island. Increasing the size of the existing weigh station would also not work logistically for the proposed project since the existing station is on Sand Island and would require trucks to back track from their normal route.

4.3.2 Relocation of Existing Harbor Tenants

In order to make way for the proposed project, existing tenants will be vacated from the site. Current tenants are on month-to-month leases and all have been notified that they will have to move to another location. Most of these tenants are expected to relocate somewhere within existing commercial or industrial areas within urban Honolulu and will be accounted for with the ambient growth in the area. Two of these tenants, Pacific Shipyards International (PSI) and the Atlantis Submarine will move to piers 24 through 28. Access to these piers is through the Nimitz Highway and Pacific Street intersection.

Significant traffic impacts are not expected as a result of this relocation because the site is already developed and is being used as temporary storage for tugs and barges that dock at piers 24 through 26 and a base for Sause Bros., a barge-oriented marine transportation service, which uses piers 27 and 28. Traffic generated by these activities will also total less than 100 vehicles per hour and are expected to occur at different times than the existing peak hours at that intersection (based on the traffic assessment in the Environmental Assessment of the *Construction of Pier 29 Container Yard*, which noted the peak hour of traffic occurred between 7:15 AM to 8:15 AM and 4:15 PM and 5:15 PM.

In addition, the The University of Hawai'i (UH), School of Ocean and Earth Science and Technology (SOEST) Marine Research Center (MRC) would also move to another pier within Honolulu Harbor, Pier 34 and 35. However, separate Environmental Assessments being prepared for these relocations will include traffic assessments.

5 CONCLUSION AND RECOMMENDATIONS

The changes in the number of trucks and passenger cars at the Kapalama site are expected to increase the traffic demands slightly at most of the study intersections, but the project impact will not require immediate mitigation measures. While the analyses show that capacity will be exceeded at two study intersections on Nimitz Highway, this situation is not project related since they are expected to reach capacity even without the proposed project. Improvements to prepare the SIAR and UH Snug Harbor Access intersection for future signalization, should be coordinated with the State DOT Highways division when needed for safety and/or warranted by the volume of traffic. Impacts to pedestrians and bicyclists are also not expected to be significant, therefore no mitigation measures are proposed.

APPENDIX A

PEAK PERIOD MANUAL COUNTS

Intersection of Nimitz Highway and Sand Island Access Road (signalized) - Tuesday 25 October 2011

				Nimitz Highway			Sand Island Access Road			Nimitz Highway				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
AM Peak Period														
6:00 - 6:15				83	193		76				633		985	
6:15 - 6:30				79	204		112				759		1154	
6:30 - 6:45				**68**	**241**		**136**				**898**		**1343**	
6:45 - 7:00				**118**	**235**		**107**				**1096**		**1556**	**5038**
7:00 - 7:15				**78**	**266**		**87**				**1035**		**1466**	**5519**
7:15 - 7:30				**85**	**341**		**108**				**903**		**1437**	**5802**
7:30 - 7:45				108	337		139				729		1313	5772
7:45 - 8:00				124	298		89				844		1355	5571
8:00 - 8:15				108	314		84				795		1301	5406
8:15 - 8:30				80	290		120				749		1239	5208
8:30 - 8:45				86	295		98				600		1079	4974
8:45 - 9:00				73	305		68				309		755	4374
peak hour, *PHF*	*0.000*	*0.000*	*0.000*	*0.739*	*0.794*	*0.000*	*0.805*	*0.000*	*0.000*	*0.000*	*0.897*	*0.000*	*0.932*	
6:30 - 7:30	**0**	**0**	**0**	**349**	**1083**	**0**	**438**	**0**	**0**	**0**	**3932**	**0**	**5802**	

PM Peak Period														
15:00 - 15:15				31	591		255				440		1317	
15:15 - 15:30				56	591		274				608		1529	
15:30 - 15:45				53	617		277				619		1566	
15:45 - 16:00				48	670		247				562		1527	5939
16:00 - 16:15				41	659		207				588		1495	6117
16:15 - 16:30				32	659		153				624		1468	6056
16:30 - 16:45				36	750		193				632		1611	6101
16:45 - 17:00				32	738		121				611		1502	6076
17:00 - 17:15				32	652		157				594		1435	6016
17:15 - 17:30				38	685		136				575		1434	5982
17:30 - 17:45				42	664		91				514		1311	5682
17:45 - 18:00				26	696		99				426		1247	5427
peak hour, *PHF*	*0.000*	*0.000*	*0.000*	*0.884*	*0.947*	*0.000*	*0.907*	*0.000*	*0.000*	*0.000*	*0.960*	*0.000*	*0.977*	
15:15 - 16:15	**0**	**0**	**0**	**198**	**2537**	**0**	**1005**	**0**	**0**	**0**	**2377**	**0**	**6117**	

Intersection of Nimitz Highway and Kalihi Street (signalized) - Monday 24 October 2011

	Kalihi Street			Nimitz Highway			Kalihi Street			Nimitz Highway				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
AM Peak Period														
6:00 - 6:15	----------Counter reset----------						8	31	5	14	477	16	551	
6:15 - 6:30	20	61	8	0	264	20	6	27	18	10	665	14	1113	
6:30 - 6:45	38	93	8	0	300	14	14	28	18	12	954	10	1489	
6:45 - 7:00	**42**	**94**	**15**	**0**	**273**	**33**	**10**	**34**	**21**	**8**	**958**	**18**	**1506**	**4659**
7:00 - 7:15	**46**	**91**	**8**	**0**	**330**	**22**	**10**	**35**	**25**	**7**	**1008**	**9**	**1591**	**5699**
7:15 - 7:30	**34**	**81**	**8**	**0**	**390**	**22**	**11**	**45**	**33**	**7**	**1008**	**6**	**1645**	**6231**
7:30 - 7:45	**42**	**94**	**15**	**0**	**395**	**16**	**13**	**28**	**23**	**9**	**958**	**10**	**1603**	**6345**
7:45 - 8:00	34	93	16	0	343	16	19	41	17	12	763	8	1362	6201
8:00 - 8:15	32	105	17	0	309	25	9	37	36	17	769	3	1359	5969
8:15 - 8:30	15	55	16	0	375	23	10	40	30	17	545	4	1130	5454
8:30 - 8:45	35	72	8	0	349	26	12	24	28	14	635	10	1213	5064
8:45 - 9:00	29	74	18	0	311	29	20	31	31	17	502	8	1070	4772
peak hour, *PHF*	*0.891*	*0.957*	*0.767*	*0.000*	*0.878*	*0.705*	*0.846*	*0.789*	*0.773*	*0.861*	*0.975*	*0.597*	*0.964*	
6:45 - 7:45	**164**	**360**	**46**	**0**	**1388**	**93**	**44**	**142**	**102**	**31**	**3932**	**43**	**6345**	

	Kalihi Street			Nimitz Highway			Kalihi Street			Nimitz Highway				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
PM Peak Period														
15:00 - 15:15	19	46	17	23	564	36	25	56	17	16	466	5	1290	
15:15 - 15:30	31	50	17	31	594	40	19	56	28	16	554	4	1440	
15:30 - 15:45	32	52	29	21	586	38	23	53	23	21	573	2	1453	
15:45 - 16:00	**30**	**45**	**11**	**23**	**628**	**47**	**25**	**57**	**37**	**27**	**601**	**4**	**1535**	**5718**
16:00 - 16:15	**33**	**43**	**27**	**24**	**619**	**33**	**10**	**54**	**42**	**16**	**598**	**7**	**1506**	**5934**
16:15 - 16:30	**14**	**32**	**19**	**23**	**679**	**36**	**11**	**53**	**27**	**22**	**605**	**1**	**1522**	**6016**
16:30 - 16:45	**32**	**55**	**18**	**21**	**637**	**38**	**17**	**59**	**29**	**21**	**635**	**4**	**1566**	**6129**
16:45 - 17:00	28	37	19	18	639	34	14	56	30	19	589	7	1490	6084
17:00 - 17:15	15	39	13	27	651	37	15	52	26	29	571	2	1477	6055
17:15 - 17:30	25	32	17	17	588	35	10	41	20	25	556	3	1369	5902
17:30 - 17:45	24	19	11	18	651	27	11	50	13	18	471	3	1316	5652
17:45 - 18:00	19	25	9	18	519	28	6	39	11	13	437	3	1127	5289
peak hour, *PHF*	*0.826*	*0.795*	*0.694*	*0.948*	*0.944*	*0.819*	*0.630*	*0.945*	*0.804*	*0.796*	*0.960*	*0.571*	*0.978*	
15:45 - 16:45	**109**	**175**	**75**	**91**	**2563**	**154**	**63**	**223**	**135**	**86**	**2439**	**16**	**6129**	

Intersection of Sand Island Access Road and Auiki Street (signalized) - Monday 24 October 2011

	Sand Island Access Road			Auiki Street			Sand Island Access Road			Pahounui Drive				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
AM Peak Period														
6:00 - 6:15	22	252	12	46	2	7	1	40	39	18	4	1	444	
6:15 - 6:30	26	272	9	69	1	15	4	75	54	10	4	2	541	
6:30 - 6:45	26	241	7	66	7	20	0	109	61	10	4	0	551	
6:45 - 7:00	36	236	16	49	3	13	1	104	70	11	10	2	551	2087
7:00 - 7:15	39	135	15	52	4	25	5	111	55	4	7	5	457	2100
7:15 - 7:30	36	146	12	41	9	17	1	84	71	14	4	1	436	1995
7:30 - 7:45	45	118	11	51	4	21	1	81	54	7	9	0	402	1846
7:45 - 8:00	53	163	14	51	7	17	2	66	74	11	10	0	468	1763
8:00 - 8:15	36	162	15	64	4	22	0	76	96	12	4	2	493	1799
8:15 - 8:30	31	148	17	59	10	17	3	85	62	14	11	2	459	1822
8:30 - 8:45	25	120	7	44	3	21	0	86	73	13	7	6	405	1825
8:45 - 9:00	52	120	8	49	3	17	7	104	80	10	4	2	456	1813
peak hour, *PHF*	*0.814*	*0.813*	*0.734*	*0.855*	*0.536*	*0.730*	*0.500*	*0.899*	*0.857*	*0.795*	*0.625*	*0.450*	*0.953*	
6:15 - 7:15	**127**	**884**	**47**	**236**	**15**	**73**	**10**	**399**	**240**	**35**	**25**	**9**	**2100**	
PM Peak Period														
15:00 - 15:15	21	101	7	56	5	27	0	201	160	14	15	3	610	
15:15 - 15:30	35	108	4	44	6	38	2	174	98	3	12	2	526	
15:30 - 15:45	37	114	5	42	5	45	5	178	111	8	21	2	573	
15:45 - 16:00	20	100	5	34	5	37	0	146	134	13	10	1	505	2214
16:00 - 16:15	30	87	2	27	2	52	1	135	94	24	16	1	471	2075
16:15 - 16:30	23	90	4	27	3	21	2	129	97	6	10	0	412	1961
16:30 - 16:45	14	61	5	27	3	36	0	136	106	8	14	0	410	1798
16:45 - 17:00	16	63	1	28	3	27	0	97	91	9	16	1	352	1645
17:00 - 17:15	11	73	2	30	2	38	0	94	82	9	12	0	353	1527
17:15 - 17:30	9	58	3	34	1	22	2	83	87	3	6	0	308	1423
17:30 - 17:45	8	92	1	28	1	13	0	72	63	6	2	0	286	1299
17:45 - 18:00	4	69	5	15	25	1	0	69	50	4	6	0	248	1195
peak hour, *PHF*	*0.764*	*0.928*	*0.750*	*0.786*	*0.875*	*0.817*	*0.350*	*0.869*	*0.786*	*0.679*	*0.690*	*0.667*	*0.907*	
15:00 - 16:00	**113**	**423**	**21**	**176**	**21**	**147**	**7**	**699**	**503**	**38**	**58**	**8**	**2214**	

Intersection of Sand Island Access Road and Road No. 2 (signalized) - Monday 24 October 2011

	Road No. 2			Sand Island Access Road			Road No. 2			Sand Island Access Road				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
AM Peak Period														
6:00 - 6:15	**11**	**0**	**21**	**0**	**57**	**0**	**0**	**0**	**0**	**44**	**249**	**2**	**384**	
6:15 - 6:30	**3**	**0**	**14**	**0**	**124**	**1**	**1**	**0**	**1**	**42**	**276**	**5**	**467**	
6:30 - 6:45	**6**	**0**	**37**	**0**	**125**	**2**	**3**	**0**	**0**	**49**	**232**	**3**	**457**	
6:45 - 7:00	**4**	**0**	**29**	**0**	**122**	**3**	**3**	**0**	**0**	**54**	**242**	**3**	**460**	**1768**
7:00 - 7:15	1	0	44	0	126	2	1	0	0	32	153	0	359	1743
7:15 - 7:30	5	1	30	0	101	2	2	2	0	32	147	0	322	1598
7:30 - 7:45	5	0	25	0	94	1	3	5	0	33	120	2	288	1429
7:45 - 8:00	4	1	27	0	106	2	3	1	1	41	172	0	358	1327
8:00 - 8:15	3	0	29	0	129	0	0	0	1	33	165	0	360	1328
8:15 - 8:30	1	0	27	0	119	1	1	0	0	31	158	1	339	1345
8:30 - 8:45	1	0	16	1	117	2	0	0	0	27	137	0	301	1358
8:45 - 9:00	2	0	28	0	135	4	1	0	0	25	126	1	322	1322
peak hour, *PHF*	*0.545*	*0.000*	*0.682*	*0.000*	*0.856*	*0.500*	*0.583*	*0.000*	*0.250*	*0.875*	*0.905*	*0.650*	*0.946*	
6:00 - 7:00	**24**	**0**	**101**	**0**	**428**	**6**	**7**	**0**	**1**	**189**	**999**	**13**	**1768**	
	Road No. 2			Sand Island Access Road			Road No. 2			Sand Island Access Road				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
PM Peak Period														
15:00 - 15:15	**1**	**0**	**40**	**0**	**238**	**8**	**17**	**0**	**0**	**33**	**100**	**1**	**438**	
15:15 - 15:30	**2**	**0**	**50**	**0**	**195**	**2**	**2**	**0**	**1**	**45**	**119**	**1**	**417**	
15:30 - 15:45	**1**	**0**	**61**	**0**	**226**	**5**	**2**	**0**	**0**	**29**	**116**	**2**	**442**	
15:45 - 16:00	**1**	**0**	**47**	**1**	**199**	**3**	**1**	**0**	**0**	**31**	**93**	**0**	**376**	**1673**
16:00 - 16:15	3	0	49	0	192	1	0	0	0	29	70	0	344	1579
16:15 - 16:30	0	0	48	0	167	2	0	0	0	19	93	0	329	1491
16:30 - 16:45	0	0	51	0	178	2	0	0	0	14	59	0	304	1353
16:45 - 17:00	0	0	24	0	136	0	0	0	0	14	65	0	239	1216
17:00 - 17:15	0	0	16	0	135	0	0	0	0	19	76	0	246	1118
17:15 - 17:30	0	0	27	0	139	1	0	0	1	11	65	1	245	1034
17:30 - 17:45	2	0	9	0	114	0	0	0	0	12	104	0	241	971
17:45 - 18:00	1	0	23	0	88	1	0	0	0	14	73	0	200	932
peak hour, *PHF*	*0.625*	*0.000*	*0.811*	*0.250*	*0.901*	*0.563*	*0.324*	*0.000*	*0.250*	*0.767*	*0.899*	*0.500*	*0.946*	
15:00 - 16:00	**5**	**0**	**198**	**1**	**858**	**18**	**22**	**0**	**1**	**138**	**428**	**4**	**1673**	

Intersection of Sand Island Access Road and UH Snug Harbor (unsignalized) - Tuesday 25 October 2011

	Gate			Sand Island Access Road			UH Snug Harbor			Sand Island Access Road			
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
AM Peak Period													
6:00 - 6:15	**0**	**0**	**0**	**1**	**64**	**1**	**2**	**0**	**1**	**3**	**204**	**9**	**285**	
6:15 - 6:30	**0**	**0**	**0**	**2**	**136**	**0**	**6**	**0**	**0**	**2**	**246**	**7**	**399**	
6:30 - 6:45	**0**	**0**	**0**	**1**	**113**	**0**	**8**	**0**	**5**	**1**	**240**	**6**	**374**	
6:45 - 7:00	**0**	**0**	**0**	**4**	**128**	**0**	**9**	**0**	**2**	**3**	**216**	**6**	**368**	**1426**
7:00 - 7:15	0	1	0	1	79	0	10	0	3	3	151	14	262	1403
7:15 - 7:30	0	0	0	0	78	0	8	0	0	2	127	12	227	1231
7:30 - 7:45	0	0	2	0	104	0	5	0	1	2	130	9	253	1110
7:45 - 8:00	0	0	2	0	68	0	12	0	4	2	182	8	278	1020
8:00 - 8:15	0	0	0	1	105	0	10	0	0	9	162	12	299	1057
8:15 - 8:30	0	0	0	1	102	0	6	0	2	1	152	8	272	1102
8:30 - 8:45	0	0	1	1	100	0	6	0	3	0	152	7	270	1119
8:45 - 9:00	0	0	0	2	105	0	6	0	0	9	117	8	247	1088
peak hour, *PHF*	*0.000*	*0.000*	*0.000*	*0.500*	*0.811*	*0.250*	*0.694*	*0.000*	*0.400*	*0.750*	*0.921*	*0.778*	*0.893*	
6:00 - 7:00	**0**	**0**	**0**	**8**	**441**	**1**	**25**	**0**	**8**	**9**	**906**	**28**	**1426**	

PM Peak Period														
15:00 - 15:15	**0**	**0**	**2**	**0**	**272**	**0**	**15**	**0**	**1**	**2**	**101**	**4**	**397**	
15:15 - 15:30	**0**	**0**	**0**	**1**	**222**	**0**	**11**	**0**	**1**	**1**	**107**	**13**	**356**	
15:30 - 15:45	**1**	**0**	**3**	**0**	**194**	**0**	**7**	**0**	**2**	**0**	**96**	**14**	**317**	
15:45 - 16:00	**0**	**0**	**1**	**0**	**196**	**0**	**5**	**0**	**0**	**1**	**67**	**9**	**279**	**1349**
16:00 - 16:15	0	0	1	1	161	0	9	0	2	0	68	12	254	1206
16:15 - 16:30	0	0	3	0	141	0	10	0	3	0	62	5	224	1074
16:30 - 16:45	0	0	1	0	146	0	9	0	1	0	51	5	213	970
16:45 - 17:00	0	0	2	0	100	0	6	0	2	1	61	10	182	873
17:00 - 17:15	0	0	0	0	122	0	2	0	2	0	41	9	176	795
17:15 - 17:30	0	0	0	0	89	0	4	0	0	0	59	5	157	728
17:30 - 17:45	0	0	1	3	87	0	11	0	3	0	52	6	163	678
17:45 - 18:00	0	0	0	1	77	0	12	0	0	0	49	4	143	639
peak hour, *PHF*	*0.250*	*0.000*	*0.500*	*0.250*	*0.813*	*0.000*	*0.633*	*0.000*	*0.500*	*0.500*	*0.867*	*0.714*	*0.849*	
15:00 - 16:00	**1**	**0**	**6**	**1**	**884**	**0**	**38**	**0**	**4**	**4**	**371**	**40**	**1349**	

Intersection of Auiki Street and Puuhale Road (unsignalized) - Tuesday 25 October 2011

	Puuhale Road			Auiki Street			Servco Driveway			Auiki Street			
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
AM Peak Period													
6:00 - 6:15	7	1	27	0	31	12	2	0	1	6	53	4	144	
6:15 - 6:30	7	3	43	2	38	2	0	0	0	11	57	3	166	
6:30 - 6:45	6	0	36	4	52	7	0	0	1	7	67	5	185	
6:45 - 7:00	6	1	34	2	35	9	0	2	0	5	94	10	198	693
7:00 - 7:15	4	1	34	4	36	2	0	1	0	11	74	5	172	721
7:15 - 7:30	11	3	22	0	43	10	0	2	0	12	78	2	183	738
7:30 - 7:45	**20**	**1**	**17**	**5**	**42**	**8**	**0**	**0**	**0**	**8**	**80**	**7**	**188**	**741**
7:45 - 8:00	**6**	**1**	**27**	**4**	**55**	**7**	**0**	**1**	**1**	**9**	**87**	**6**	**204**	**747**
8:00 - 8:15	**9**	**1**	**26**	**2**	**42**	**12**	**0**	**6**	**3**	**11**	**92**	**7**	**211**	**786**
8:15 - 8:30	**9**	**2**	**27**	**2**	**52**	**11**	**0**	**4**	**1**	**11**	**101**	**2**	**222**	**825**
8:30 - 8:45	10	0	17	3	40	7	0	1	0	14	87	2	181	818
8:45 - 9:00	11	0	28	2	45	13	0	2	6	19	84	3	213	827
peak hour, *PHF*	*1.100*	*0.625*	*0.898*	*0.813*	*0.868*	*0.792*	*0.000*	*0.458*	*0.417*	*0.696*	*0.891*	*0.786*	*0.929*	
7:30 - 8:30	**44**	**5**	**97**	**13**	**191**	**38**	**0**	**11**	**5**	**39**	**360**	**22**	**825**	

PM Peak Period														
15:00 - 15:15	2	1	13	1	62	7	0	5	1	15	126	1	234	
15:15 - 15:30	**8**	**1**	**17**	**2**	**51**	**14**	**2**	**0**	**0**	**21**	**149**	**3**	**268**	
15:30 - 15:45	**15**	**0**	**15**	**2**	**69**	**9**	**8**	**8**	**5**	**12**	**138**	**3**	**284**	
15:45 - 16:00	**12**	**2**	**17**	**2**	**51**	**15**	**1**	**11**	**4**	**22**	**116**	**0**	**253**	**1039**
16:00 - 16:15	**11**	**2**	**24**	**0**	**48**	**12**	**1**	**5**	**4**	**23**	**128**	**2**	**260**	**1065**
16:15 - 16:30	10	1	16	1	43	4	1	5	1	19	121	0	222	1019
16:30 - 16:45	7	0	12	0	43	7	2	4	3	10	86	0	174	909
16:45 - 17:00	3	0	11	1	40	3	0	1	2	19	86	0	166	822
17:00 - 17:15	8	1	12	0	32	3	1	3	2	7	78	0	147	709
17:15 - 17:30	7	0	16	1	27	8	2	0	1	16	71	0	149	636
17:30 - 17:45	6	0	13	0	29	2	2	2	0	6	58	0	118	580
17:45 - 18:00	9	0	9	0	30	3	4	1	0	10	57	0	123	537
peak hour, *PHF*	*0.767*	*0.625*	*0.760*	*0.750*	*0.793*	*0.833*	*0.375*	*0.545*	*0.650*	*0.848*	*0.891*	*0.667*	*0.938*	
15:15 - 16:15	**46**	**5**	**73**	**6**	**219**	**50**	**12**	**24**	**13**	**78**	**531**	**8**	**1065**	

Intersection of Auiki Street and Mokauea Street (unsignalized) - Monday 24 October 2011

	Mokauea Street			Auiki Street			Driveway			Auiki Street				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
AM Peak Period														
6:00 - 6:15	0	0	7	7	47	3	0	1	1	1	23	2	92	
6:15 - 6:30	0	2	16	4	63	5	1	0	0	5	38	3	137	
6:30 - 6:45	0	4	14	19	58	4	2	1	2	5	54	2	165	
6:45 - 7:00	1	0	13	12	67	3	2	1	6	1	47	2	155	549
7:00 - 7:15	0	0	18	11	59	3	1	1	0	2	45	6	146	603
7:15 - 7:30	2	0	10	13	78	2	1	2	2	4	50	0	164	630
7:30 - 7:45	**2**	**0**	**17**	**20**	**65**	**12**	**2**	**0**	**1**	**2**	**49**	**5**	**175**	**640**
7:45 - 8:00	**2**	**0**	**15**	**21**	**82**	**6**	**1**	**0**	**1**	**5**	**48**	**4**	**185**	**670**
8:00 - 8:15	**2**	**1**	**13**	**23**	**92**	**4**	**4**	**0**	**0**	**2**	**65**	**2**	**208**	**732**
8:15 - 8:30	**3**	**0**	**12**	**17**	**87**	**5**	**3**	**5**	**3**	**4**	**47**	**5**	**191**	**759**
8:30 - 8:45	2	1	10	19	70	3	3	1	1	4	56	5	175	759
8:45 - 9:00	5	0	11	14	88	3	3	0	2	3	50	2	181	755
peak hour, *PHF*	*0.750*	*0.250*	*0.838*	*0.880*	*0.886*	*0.563*	*0.625*	*0.250*	*0.417*	*0.650*	*0.804*	*0.800*	*0.912*	
7:30 - 8:30	**9**	**1**	**57**	**81**	**326**	**27**	**10**	**5**	**5**	**13**	**209**	**16**	**759**	
PM Peak Period														
15:00 - 15:15	**2**	**1**	**11**	**2**	**62**	**5**	**5**	**0**	**1**	**13**	**118**	**5**	**225**	
15:15 - 15:30	**2**	**3**	**12**	**0**	**45**	**1**	**6**	**3**	**8**	**19**	**108**	**1**	**208**	
15:30 - 15:45	**1**	**0**	**7**	**1**	**56**	**5**	**1**	**1**	**3**	**26**	**126**	**2**	**229**	
15:45 - 16:00	**1**	**1**	**13**	**2**	**46**	**0**	**1**	**2**	**4**	**23**	**117**	**1**	**211**	**873**
16:00 - 16:15	6	0	14	1	41	1	5	1	3	21	104	0	197	845
16:15 - 16:30	4	0	10	5	34	1	4	1	3	10	104	1	177	814
16:30 - 16:45	2	0	13	2	33	0	6	4	4	20	122	0	206	791
16:45 - 17:00	1	2	9	0	33	0	1	1	3	16	90	1	157	737
17:00 - 17:15	3	0	11	0	37	5	2	3	4	16	87	1	169	709
17:15 - 17:30	0	1	9	3	26	0	2	0	1	11	86	3	142	674
17:30 - 17:45	2	0	4	0	23	2	0	1	1	9	66	2	110	578
17:45 - 18:00	1	0	8	0	23	2	0	0	0	12	47	0	93	514
peak hour, *PHF*	*0.750*	*0.417*	*0.827*	*0.625*	*0.843*	*0.550*	*0.542*	*0.500*	*0.500*	*0.779*	*0.931*	*0.450*	*0.953*	
15:00 - 16:00	**6**	**5**	**43**	**5**	**209**	**11**	**13**	**6**	**16**	**81**	**469**	**9**	**873**	

Intersection of Auiki Street and Kalihi Street (unsignalized) - Tuesday 25 October 2011

	Kalihi Street			Auiki Street						Auiki Street				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
AM Peak Period														
6:00 - 6:15	5		28		13	6				36	14		102	
6:15 - 6:30	4		30		5	4				27	21		91	
6:30 - 6:45	5		44		9	4				37	24		123	
6:45 - 7:00	4		37		7	2				58	20		128	444
7:00 - 7:15	1		29		11	4				40	21		106	448
7:15 - 7:30	0		42		5	3				29	29		108	465
7:30 - 7:45	**1**		**42**		**8**	**1**				**40**	**32**		**124**	**466**
7:45 - 8:00	**3**		**47**		**22**	**3**				**37**	**40**		**152**	**490**
8:00 - 8:15	**3**		**29**		**13**	**8**				**42**	**54**		**149**	**533**
8:15 - 8:30	**2**		**37**		**17**	**6**				**48**	**41**		**151**	**576**
8:30 - 8:45	0		26		21	4				39	33		123	575
8:45 - 9:00	2		21		29	6				36	50		144	567
peak hour, *PHF*	*0.750*	*0.000*	*0.824*	*0.000*	*0.682*	*0.563*	*0.000*	*0.000*	*0.000*	*0.870*	*0.773*	*0.000*	*0.947*	
7:30 - 8:30	**9**	**0**	**155**	**0**	**60**	**18**	**0**	**0**	**0**	**167**	**167**	**0**	**576**	
PM Peak Period														
15:00 - 15:15	4		46		15	3				54	54		176	
15:15 - 15:30	**7**		**36**		**8**	**5**				**64**	**73**		**193**	
15:30 - 15:45	**5**		**25**		**25**	**11**				**60**	**91**		**217**	
15:45 - 16:00	**3**		**21**		**18**	**8**				**47**	**72**		**169**	**755**
16:00 - 16:15	**7**		**19**		**15**	**11**				**61**	**68**		**181**	**760**
16:15 - 16:30	6		28		9	2				55	58		158	725
16:30 - 16:45	2		24		6	6				51	49		138	646
16:45 - 17:00	1		16		9	6				30	40		102	579
17:00 - 17:15	1		19		10	3				43	45		121	519
17:15 - 17:30	1		22		7	10				39	30		109	470
17:30 - 17:45	3		17		4	3				38	19		84	416
17:45 - 18:00	2		13		1	2				22	14		54	368
peak hour, *PHF*	*0.786*	*0.000*	*0.701*	*0.000*	*0.660*	*0.795*	*0.000*	*0.000*	*0.000*	*0.906*	*0.835*	*0.000*	*0.876*	
15:15 - 16:15	**22**	**0**	**101**	**0**	**66**	**35**	**0**	**0**	**0**	**232**	**304**	**0**	**760**	

Intersecion of Sand Island Access Road and Horizon Main Entry (signalized) - Thursday 17 November 2011

	Main Entry			Sand Island Access Road			To Boat Ramp			Sand Island Access Road				
	Southbound approach			Westbound approach			Northbound Approach			Eastbound approach				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
AM Peak Period														
5:30 - 5:45	0	0	1			0		0		22			23	
5:45 - 6:00	0	0	3			4		0		28			35	
6:00 - 6:15	0	0	9			8		0		29			46	
6:15 - 6:30	1	0	22			1		1		9			34	138
6:30 - 6:45	1	0	12			1		1		25			40	155
6:45 - 7:00	0	0	13			2		0		18			33	153
7:00 - 7:15	0	0	22			1		0		21			44	151
7:15 - 7:30	1	0	14			3		0		17			35	152
7:30 - 7:45	1	0	20			0		0		13			34	146
7:45 - 8:00	1	0	13			0		0		22			36	149
8:00 - 8:15	1	0	11			1		0		11			24	129
8:15 - 8:30	0	0	11			0		0		22			33	127
PM Peak Period														
14:00 - 14:15	3	0	12			4		0		12			31	
14:15 - 14:30	7	0	9			1		0		5			22	
14:30 - 14:45	3	0	12			2		0		9			26	
14:45 - 15:00	3	0	10			0		0		5			18	97
15:00 - 15:15	1	0	18			2		0		9			30	96
15:15 - 15:30	4	0	14			1		0		11			30	104
15:30 - 15:45	1	0	14			5		0		2			22	100
15:45 - 16:00	0	0	5			0		0		1			6	88
16:00 - 16:15	0	0	9			0		0		4			13	71
16:15 - 16:30	0	0	6			0		0		3			9	50
16:30 - 16:45	0	0	8			0		0		3			11	39
16:45 - 17:00	1	0	15			1		0		4			21	54

APPENDIX B

TRAFFIC GENERATION COMPUTATIONS

Kapalama Container Yard

Traffic Generation

	AM Peak Hour		PM Peak Hour	
	enter	exit	enter	exit
estimate of 2011 activity = 250 kTEUs				
Existing (2011) counts, Horizon Yard				
cars	48	14	15	39
trucks	44	70	30	54
total	92	84	45	93
Estimate of 2039 activity at Kapalama based on 550 kTEUs				
cars	106	31	33	86
trucks	97	154	66	119
total	203	185	99	205

APPENDIX C

INTERSECTION ANALYSIS SUMMARY WORKSHEETS – EXISTING (2011)

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	1
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	12/6/2011	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011 (EB RT = CFL)
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	1	2	3	0	3	0	0	0	0	0
Lane group		T	R	L	T		L					
Volume, V (vph)		3277	655	349	1083		438					
% Heavy vehicles, %HV		5	0	5	5		9					
Peak-hour factor, PHF		0.93	0.93	0.93	0.93		0.93					
Pretimed (P) or actuated (A)		P	P	P	P		P					
Start-up lost time, l_1		2.0	2.0	2.0	2.0		2.0					
Extension of effective green, e		2.0	2.0	2.0	2.0		2.0					
Arrival type, AT		3	3	3	3		3					
Unit extension, UE		3.0	3.0	3.0	3.0		3.0					
Filtering/metering, I		1.000	1.000	1.000	1.000		1.000	1.000				
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0		0.0					
Ped / Bike / RTOR volumes	0		0							0		
Lane width		12.0	12.0	12.0	12.0		12.0					
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0		0					
Min. time for pedestrians, G_p	3.2									3.2		

Phasing	WB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 27.0	G = 171.0	G =	G =	G = 25.0	G =	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		3524	704	375	1165		471					
Lane group capacity, c		3512	1151	376	4190		470					
v/c ratio, X		1.00	0.61	1.00	0.28		1.00					
Total green ratio, g/C		0.71	0.71	0.11	0.85		0.10					
Uniform delay, d_1		34.5	17.6	106.5	3.5		107.5					
Progression factor, PF		1.000	1.000	1.000	1.000		1.000					
Delay calibration, k		0.50	0.50	0.50	0.50		0.50					
Incremental delay, d_2		16.0	2.4	45.8	0.2		42.0					
Initial queue delay, d_3												
Control delay		50.5	20.0	152.2	3.7		149.5					
Lane group LOS		D	C	F	A		F					
Approach delay	45.4			39.9			149.5					
Approach LOS	D			D			F					
Intersection delay	51.9			X_c = 1.00			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	1
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	12/6/2011	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	0	2	3	0	3	0	0	0	0	0
Lane group		T		L	T		L					
Volume, V (vph)		2377		198	2537		1005					
% Heavy vehicles, %HV		5		5	5		9					
Peak-hour factor, PHF		0.98		0.98	0.98		0.98					
Pretimed (P) or actuated (A)		P		P	P		P					
Start-up lost time, l_1		2.0		2.0	2.0		2.0					
Extension of effective green, e		2.0		2.0	2.0		2.0					
Arrival type, AT		3		3	3		3					
Unit extension, UE		3.0		3.0	3.0		3.0					
Filtering/metering, I		1.000		1.000	1.000		1.000	1.000				
Initial unmet demand, Q_b		0.0		0.0	0.0		0.0					
Ped / Bike / RTOR volumes	0									0		
Lane width		12.0		12.0	12.0		12.0					
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0		0					
Min. time for pedestrians, G_p	3.2									3.2		

Phasing	WB Only	Thru Only	03	04	NB Only	06	07	08
Timing	G = 20.0	G = 139.0	G =	G =	G = 54.0	G =	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 230.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		2426		202	2589		1026					
Lane group capacity, c		2979		290	3536		1059					
v/c ratio, X		0.81		0.70	0.73		0.97					
Total green ratio, g/C		0.60		0.09	0.72		0.23					
Uniform delay, d_1		35.4		102.1	19.3		87.2					
Progression factor, PF		1.000		1.000	1.000		1.000					
Delay calibration, k		0.50		0.50	0.50		0.50					
Incremental delay, d_2		2.6		13.0	1.4		21.1					
Initial queue delay, d_3												
Control delay		38.0		115.1	20.7		108.3					
Lane group LOS		D		F	C		F					
Approach delay	38.0			27.6			108.3					
Approach LOS	D			C			F					
Intersection delay	44.9			X_c = 0.84			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	2
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	12/6/2011	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011 (EB TH 1/6 in CFL)
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	3	1	0	2	0	1	1	1	1	2	0
Lane group	L	T	R		TR		L	T	R	L	TR	
Volume, V (vph)	31	3320	655		1388	93	44	142	102	164	360	46
% Heavy vehicles, %HV	5	5	5		5	5	5	5	10	5	10	3
Peak-hour factor, PHF	0.96	0.96	0.96		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Pretimed (P) or actuated (A)	P	P	P		P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	
Arrival type, AT	3	3	3		3		3	3	3	3	3	
Unit extension, UE	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000	1.000		1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0	12.0		12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0		0		0	0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 6.0	G = 167.0	G =	G =	G = 7.0	G = 13.0	G = 20.0	G =
	Y = 5	Y = 7	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	32	3458	682		1543		46	148	106	171	423	
Lane group capacity, c	43	3656	1342		2375		50	151	122	179	516	
v/c ratio, X	0.74	0.95	0.51		0.65		0.92	0.98	0.87	0.96	0.82	
Total green ratio, g/C	0.03	0.74	0.74		0.70		0.03	0.08	0.08	0.10	0.16	
Uniform delay, d_1	116.2	26.8	12.9		20.3		116.2	109.8	108.7	106.9	97.7	
Progression factor, PF	1.000	1.000	1.000		1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.50	0.50		0.50		0.50	0.50	0.50	0.50	0.50	
Incremental delay, d_2	74.1	6.7	1.4		1.4		105.4	68.2	52.0	56.5	13.6	
Initial queue delay, d_3												
Control delay	190.3	33.6	14.2		21.7		221.6	178.0	160.7	163.4	111.3	
Lane group LOS	F	C	B		C		F	F	F	F	F	
Approach delay	31.6			21.7			178.6			126.3		
Approach LOS	C			C			F			F		
Intersection delay	44.5			X_c = 0.95			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	2
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	12/6/2011	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	3	0	1	3	0	1	1	1	1	2	0
Lane group	L	TR		L	TR		L	T	R	L	TR	
Volume, V (vph)	88	2439	16	91	2563	154	63	223	135	109	175	75
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	10	5	10	3
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Arrival type, AT	3	3		3	3		3	3	3	3	3	
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 18.0	G = 199.0	G =	G =	G = 12.0	G = 4.0	G = 40.0	G =
	Y = 5	Y = 7	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 300.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	90	2505		93	2772		64	228	138	111	256	
Lane group capacity, c	103	3266		103	3242		69	241	308	120	523	
v/c ratio, X	0.87	0.77		0.90	0.86		0.93	0.95	0.45	0.93	0.49	
Total green ratio, g/C	0.06	0.66		0.06	0.66		0.04	0.13	0.21	0.07	0.16	
Uniform delay, d_1	139.9	34.6		140.1	39.3		143.6	128.9	103.3	138.7	114.1	
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50	0.11	0.50	0.50	
Incremental delay, d_2	59.2	1.8		65.2	3.1		89.3	45.5	1.0	63.9	3.3	
Initial queue delay, d_3												
Control delay	199.1	36.4		205.3	42.4		232.9	174.5	104.4	202.6	117.4	
Lane group LOS	F	D		F	D		F	F	F	F	F	
Approach delay	42.0			47.7			160.7			143.2		
Approach LOS	D			D			F			F		
Intersection delay	58.7			X_c = 0.88			Intersection LOS			E		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	3
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	12/6/2011	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	35	25	9	236	15	73	10	399	240	127	884	47
% Heavy vehicles, %HV	10	10	10	10	10	10	10	10	10	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, I_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 39.0	G =	G =	G =	G = 4.0	G = 5.0	G = 52.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		72			341		11	673		134	980	
Lane group capacity, c		430			407		55	1345		191	1686	
v/c ratio, X		0.17			0.84		0.20	0.50		0.70	0.58	
Total green ratio, g/C		0.32			0.32		0.03	0.43		0.12	0.52	
Uniform delay, d_1		28.9			37.6		56.4	24.6		51.0	20.0	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		0.8			18.3		8.0	1.3		19.4	1.5	
Initial queue delay, d_3												
Control delay		29.8			55.8		64.4	25.9		70.4	21.5	
Lane group LOS		C			E		E	C		E	C	
Approach delay	29.8			55.8			26.6			27.4		
Approach LOS	C			E			C			C		
Intersection delay	31.6			X_c = 0.66			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	3
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	12/6/2011	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	38	58	8	176	21	147	7	699	503	113	423	21
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	10	5	10	3
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, I_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 40.0	G =	G =	G =	G = 2.0	G = 3.0	G = 57.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 122.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		108			358		7	1252		118	463	
Lane group capacity, c		469			437		28	1479		141	1745	
v/c ratio, X		0.23			0.82		0.25	0.85		0.84	0.27	
Total green ratio, g/C		0.33			0.33		0.02	0.47		0.08	0.53	
Uniform delay, d_1		29.8			37.7		59.3	28.6		55.2	15.5	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		1.1			15.7		20.2	6.2		41.7	0.4	
Initial queue delay, d_3												
Control delay		31.0			53.3		79.5	34.8		96.9	15.9	
Lane group LOS		C			D		E	C		F	B	
Approach delay	31.0			53.3			35.1			32.3		
Approach LOS	C			D			D			C		
Intersection delay	37.0			X_c = 0.84			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*4*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*12/7/2011*	Jurisdiction	*HDOT-HWY*
Time Period	*AM Peak Hour*	Analysis Year	*2011*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	7	0	1	24	0	101	0	428	6	189	999	13
% Heavy vehicles, %HV	10	10	10	10	10	10	10	10	10	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 10.0	G =	G =	G =	G = 1.0	G = 6.0	G = 38.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 75.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		8			131		0	457		199	1066	
Lane group capacity, c		182			192		22	1663		263	2144	
v/c ratio, X		0.04			0.68		0.00	0.27		0.76	0.50	
Total green ratio, g/C		0.13			0.13		0.01	0.51		0.16	0.65	
Uniform delay, d_1		28.3			31.0		36.5	10.6		30.1	6.7	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		0.5			17.9		0.0	0.4		18.2	0.8	
Initial queue delay, d_3												
Control delay		28.8			48.9		36.5	11.0		48.3	7.5	
Lane group LOS		C			D		D	B		D	A	
Approach delay	28.8			48.9			11.0			13.9		
Approach LOS	C			D			B			B		
Intersection delay	15.7			X_c = 0.52			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*4*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*12/7/2011*	Jurisdiction	*HDOT-HWY*
Time Period	*PM Peak Hour*	Analysis Year	*2011*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	22	0	1	5	0	198	1	858	18	138	428	4
% Heavy vehicles, %HV	10	10	10	10	10	10	10	10	10	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 18.0	G =	G =	G =	G = 1.0	G = 3.0	G = 28.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 70.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		24			213		1	922		145	455	
Lane group capacity, c		319			384		23	1312		211	1689	
v/c ratio, X		0.08			0.55		0.04	0.70		0.69	0.27	
Total green ratio, g/C		0.26			0.26		0.01	0.40		0.13	0.51	
Uniform delay, d_1		19.7			22.5		34.0	17.5		29.2	9.6	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		0.5			5.7		3.5	3.2		16.7	0.4	
Initial queue delay, d_3												
Control delay		20.2			28.2		37.6	20.7		45.9	10.0	
Lane group LOS		C			C		D	C		D	A	
Approach delay	20.2			28.2			20.7			18.7		
Approach LOS	C			C			C			B		
Intersection delay	20.9			X_c = 0.65			Intersection LOS			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*5 Harbor Access at SIAR*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*12/7/2011*	Analysis Year	*2011*
Analysis Time Period	*AM Peak Hour*		
Project Description	*Kapalama Container Yard*		
East/West Street:	*Snug Harbor Access Road*	North/South Street:	*Sand Island Access Road*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	8	441	1	9	906	28
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Hourly Flow Rate, HFR	8	495	1	10	1017	31
Percent Heavy Vehicles	10	--	--	10	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	25	0	8
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Hourly Flow Rate, HFR	0	0	0	28	0	8
Percent Heavy Vehicles	10	0	0	10	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (vph)	8	10		0			36	
C (m) (vph)	614	1010					129	
v/c	0.01	0.01					0.28	
95% queue length	0.04	0.03					1.06	
Control Delay	10.9	8.6					43.4	
LOS	B	A					E	
Approach Delay	--	--				43.4		
Approach LOS	--	--				E		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*5 Harbor Access at SIAR*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*12/7/2011*	Analysis Year	*2011*
Analysis Time Period	*PM Peak Hour*		
Project Description	*Kapalama Container Yard*		
East/West Street:	*Snug Harbor Access Road*	North/South Street:	*Sand Island Access Road*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	884	0	4	371	40
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Hourly Flow Rate, HFR	1	1039	0	4	436	47
Percent Heavy Vehicles	10	--	--	10	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	6	0	1	38	0	4
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Hourly Flow Rate, HFR	7	0	1	44	0	4
Percent Heavy Vehicles	10	0	0	10	10	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (vph)	1	4		8			48	
C (m) (vph)	1022	619		211			331	
v/c	0.00	0.01		0.04			0.15	
95% queue length	0.00	0.02		0.12			0.50	
Control Delay	8.5	10.9		22.7			17.7	
LOS	A	B		C			C	
Approach Delay	--	--		22.7			17.7	
Approach LOS	--	--		C			C	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*6 Puuhale Rd & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*12/8/2011*	Analysis Year	*2011*
Analysis Time Period	*AM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Puuhale Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	39	360	22	13	191	38
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate (veh/h)	41	387	23	13	205	40
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	11	5	44	5	97
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate (veh/h)	0	11	5	47	5	104
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	41	13		16			156	
Capacity, c_m (vph)	1276	1107		371			513	
v/c ratio	0.03	0.01		0.04			0.30	
Queue length (95%)	0.10	0.04		0.13			1.27	
Control Delay (s/veh)	7.9	8.3		15.1			15.1	
LOS	A	A		C			C	
Approach delay (s/veh)	--	--	15.1			15.1		
Approach LOS	--	--	C			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*6 Puuhale Rd & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*12/8/2011*	Analysis Year	*2011*
Analysis Time Period	*PM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Puuhale Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	78	531	8	6	219	50
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Hourly Flow Rate (veh/h)	82	564	8	6	232	53
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12	24	13	46	5	73
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Hourly Flow Rate (veh/h)	12	25	13	48	5	77
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	82	6		50			130	
Capacity, c_m (vph)	1233	962		224			317	
v/c ratio	0.07	0.01		0.22			0.41	
Queue length (95%)	0.21	0.02		0.83			1.93	
Control Delay (s/veh)	8.1	8.8		25.6			24.0	
LOS	A	A		D			C	
Approach delay (s/veh)	--	--	25.6			24.0		
Approach LOS	--	--	D			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	7 Mokauea St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	12/12/2011	Analysis Year	2011
Analysis Time Period	AM Peak Hour		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Mokauea Street*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	81	326	27	13	209	16
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	89	358	29	14	229	17
Proportion of heavy vehicles, P_{HV}	12	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	10	5	5	9	1	57
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	10	5	5	9	1	62
Proportion of heavy vehicles, P_{HV}	12	12	12	12	12	12
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	89	14		20			72	
Capacity, c_m (vph)	1264	1119		285			605	
v/c ratio	0.07	0.01		0.07			0.12	
Queue length (95%)	0.23	0.04		0.22			0.40	
Control Delay (s/veh)	8.1	8.3		18.6			11.8	
LOS	A	A		C			B	
Approach delay (s/veh)	--	--	18.6			11.8		
Approach LOS	--	--	C			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	7 Mokauea St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	12/8/2011	Analysis Year	2011
Analysis Time Period	PM Peak Hour		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Mokauea Street*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	81	469	9	5	209	11
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	85	493	9	5	220	11
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	13	6	16	6	5	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	13	6	16	6	5	45
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	85	5		35			56	
Capacity, c_m (vph)	1291	1022		300			533	
v/c ratio	0.07	0.00		0.12			0.11	
Queue length (95%)	0.21	0.01		0.39			0.35	
Control Delay (s/veh)	8.0	8.5		18.6			12.5	
LOS	A	A		C			B	
Approach delay (s/veh)	--	--	18.6			12.5		
Approach LOS	--	--	C			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*8 Kalihi St & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*12/8/2011*	Analysis Year	*2011*
Analysis Time Period	*AM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street*	North/South Street: *Kalihi Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	167	167	0	0	60	18
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	175	175	0	0	63	18
Proportion of heavy vehicles, P_{HV}	15	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	9	0	155
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	9	0	163
Proportion of heavy vehicles, P_{HV}	12	12	12	15	12	15
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
Volume, v (vph)	175					9		163
Capacity, c_m (vph)	1438					391		955
v/c ratio	0.12					0.02		0.17
Queue length (95%)	0.41					0.07		0.61
Control Delay (s/veh)	7.9					14.4		9.5
LOS	A					B		A
Approach delay (s/veh)	--	--	9.8					
Approach LOS	--	--	A					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*8 Kalihi St & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*12/8/2011*	Analysis Year	*2011*
Analysis Time Period	*PM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street*	North/South Street: *Kalihi Street*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	232	304	0	0	66	35
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate (veh/h)	263	345	0	0	75	39
Proportion of heavy vehicles, P_{HV}	5	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	22	0	101
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate (veh/h)	0	0	0	25	0	114
Proportion of heavy vehicles, P_{HV}	12	12	12	5	12	5
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
Volume, v (vph)	263					25		114
Capacity, c_m (vph)	1457					229		955
v/c ratio	0.18					0.11		0.12
Queue length (95%)	0.66					0.36		0.41
Control Delay (s/veh)	8.0					22.6		9.3
LOS	A					C		A
Approach delay (s/veh)	--	--	11.7					
Approach LOS	--	--	B					

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APPENDIX D

INTERSECTION ANALYSIS SUMMARY WORKSHEETS – FUTURE BASELINE (2039)

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*1 Nimitz - SIAR*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*10/31/2012*	Jurisdiction	*HDOT-HWY*
Time Period	*AM Peak Hour*	Analysis Year	*2011+21% baseline*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	1	2	3	0	3	0	0	0	0	0
Lane group		T	R	L	T		L					
Volume, V (vph)		3288	999	363	1397		485					
% Heavy vehicles, %HV		5	0	5	5		9					
Peak-hour factor, PHF		0.99	0.99	0.99	0.99		0.99					
Pretimed (P) or actuated (A)		P	P	P	P		P					
Start-up lost time, l_1		2.0	2.0	2.0	2.0		2.0					
Extension of effective green, e		2.0	2.0	2.0	2.0		2.0					
Arrival type, AT		3	3	3	3		3					
Unit extension, UE		3.0	3.0	3.0	3.0		3.0					
Filtering/metering, I		1.000	1.000	1.000	1.000		1.000	1.000				
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0		0.0					
Ped / Bike / RTOR volumes	0		0							0		
Lane width		12.0	12.0	12.0	12.0		12.0					
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0		0					
Min. time for pedestrians, G_p	3.2									3.2		

Phasing	WB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 27.0	G = 169.0	G =	G =	G = 27.0	G =	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		3321	1009	367	1411		490					
Lane group capacity, c		3471	1137	376	4149		507					
v/c ratio, X		0.96	0.89	0.98	0.34		0.97					
Total green ratio, g/C		0.70	0.70	0.11	0.84		0.11					
Uniform delay, d_1		32.2	28.0	106.2	4.2		106.0					
Progression factor, PF		1.000	1.000	1.000	1.000		1.000					
Delay calibration, k		0.50	0.50	0.50	0.50		0.50					
Incremental delay, d_2		8.1	10.4	40.8	0.2		32.5					
Initial queue delay, d_3												
Control delay		40.3	38.4	147.0	4.4		138.5					
Lane group LOS		D	D	F	A		F					
Approach delay	39.8			33.9			138.5					
Approach LOS	D			C			F					
Intersection delay	45.6			X_c = 0.96			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*1 Nimitz - SIAR*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*10/31/2012*	Jurisdiction	*HDOT-HWY*
Time Period	*PM Peak Hour*	Analysis Year	*2011+21% baseline*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	0	2	3	0	3	0	0	0	0	0
Lane group		T		L	T		L					
Volume, V (vph)		2903		187	3128		1109					
% Heavy vehicles, %HV		5		5	5		9					
Peak-hour factor, PHF		0.99		0.99	0.99		0.99					
Pretimed (P) or actuated (A)		P		P	P		P					
Start-up lost time, l_1		2.0		2.0	2.0		2.0					
Extension of effective green, e		2.0		2.0	2.0		2.0					
Arrival type, AT		3		3	3		3					
Unit extension, UE		3.0		3.0	3.0		3.0					
Filtering/metering, I		1.000		1.000	1.000		1.000	1.000				
Initial unmet demand, Q_b		0.0		0.0	0.0		0.0					
Ped / Bike / RTOR volumes	0									0		
Lane width		12.0		12.0	12.0		12.0					
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0		0					
Min. time for pedestrians, G_p	3.2									3.2		

Phasing	WB Only	Thru Only	03	04	NB Only	06	07	08
Timing	G = 15.0	G = 146.0	G =	G =	G = 62.0	G =	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		2932		189	3160		1120					
Lane group capacity, c		2998		209	3430		1165					
v/c ratio, X		0.98		0.90	0.92		0.96					
Total green ratio, g/C		0.61		0.06	0.70		0.26					
Uniform delay, d_1		45.4		111.8	30.9		87.8					
Progression factor, PF		1.000		1.000	1.000		1.000					
Delay calibration, k		0.50		0.50	0.50		0.50					
Incremental delay, d_2		12.0		41.5	5.3		18.6					
Initial queue delay, d_3												
Control delay		57.5		153.3	36.3		106.4					
Lane group LOS		E		F	D		F					
Approach delay	57.5			42.9			106.4					
Approach LOS	E			D			F					
Intersection delay	58.3			X_c = 0.97			Intersection LOS			E		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*2 Nimitz & Kalihi*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*10/31/2012*	Jurisdiction	*HDOT-HWY*
Time Period	*AM Peak Hour*	Analysis Year	*2011+21% baseline*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	3	1	0	2	0	1	1	1	1	2	0
Lane group	L	T	R		TR		L	T	R	L	TR	
Volume, V (vph)	38	3350	999		1679	113	53	170	112	198	452	56
% Heavy vehicles, %HV	5	5	5		5	5	5	5	10	5	10	3
Peak-hour factor, PHF	0.96	0.96	0.96		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Pretimed (P) or actuated (A)	P	P	P		P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	
Arrival type, AT	3	3	3		3		3	3	3	3	3	
Unit extension, UE	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000	1.000		1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0	12.0		12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0		0		0	0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 6.0	G = 159.0	G =	G =	G = 9.0	G = 15.0	G = 24.0	G =
	Y = 5	Y = 7	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	40	3490	1041		1867		55	177	117	206	529	
Lane group capacity, c	43	3491	1089		2261		64	181	147	208	597	
v/c ratio, X	0.93	1.00	0.96		0.83		0.86	0.98	0.80	0.99	0.89	
Total green ratio, g/C	0.03	0.71	0.71		0.66		0.04	0.10	0.10	0.12	0.18	
Uniform delay, d_1	116.8	35.0	31.6		30.2		114.9	107.7	105.6	105.4	95.6	
Progression factor, PF	1.000	1.000	1.000		1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.50	0.50		0.50		0.50	0.50	0.50	0.50	0.50	
Incremental delay, d_2	117.6	15.2	18.5		3.6		77.3	61.4	34.7	60.0	17.5	
Initial queue delay, d_3												
Control delay	234.4	50.1	50.1		33.8		192.2	169.1	140.3	165.3	113.0	
Lane group LOS	F	D	D		C		F	F	F	F	F	
Approach delay	51.8			33.8			163.1			127.7		
Approach LOS	D			C			F			F		
Intersection delay	59.9			X_c = 1.00			Intersection LOS			E		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*2 Nimitz & Kalihi*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*10/31/2012*	Jurisdiction	*HDOT-HWY*
Time Period	*PM Peak Hour*	Analysis Year	*2011+21%+project*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	3	0	1	3	0	1	1	1	1	2	0
Lane group	L	TR		L	TR		L	T	R	L	TR	
Volume, V (vph)	104	2978	19	110	3101	186	76	236	136	132	187	91
% Heavy vehicles, %HV	4	4	4	4	4	4	4	4	4	4	4	4
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Arrival type, AT	3	3		3	3		3	3	3	3	3	
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	WB Only	Thru & RT	EB Only	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 16.0	G = 135.0	G = 14.0	G =	G = 12.0	G = 1.0	G = 30.0	G =
	Y = 5	Y = 7	Y = 5	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	105	3027		111	3320		77	238	137	133	281	
Lane group capacity, c	101	3232		116	3207		87	228	330	130	496	
v/c ratio, X	1.04	0.94		0.96	1.04		0.89	1.04	0.42	1.02	0.57	
Total green ratio, g/C	0.06	0.65		0.07	0.65		0.05	0.13	0.21	0.08	0.15	
Uniform delay, d_1	113.0	37.6		111.7	42.0		113.3	105.0	81.6	111.0	94.8	
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50	0.11	0.50	0.50	
Incremental delay, d_2	100.7	6.7		72.6	25.9		68.5	71.6	0.8	85.2	4.6	
Initial queue delay, d_3												
Control delay	213.7	44.2		184.3	67.9		181.8	176.6	82.5	196.2	99.4	
Lane group LOS	F	D		F	E		F	F	F	F	F	
Approach delay	49.9			71.7			148.9			130.5		
Approach LOS	D			E			F			F		
Intersection delay	70.5			X_c = 1.04			Intersection LOS			E		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	3 Auiki & SIAR
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	10/31/2012	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011+21%+project
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	44	30	9	245	18	98	10	413	248	168	913	59
% Heavy vehicles, %HV	10	10	10	10	10	10	10	10	10	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 42.0	G =	G =	G =	G = 4.0	G = 6.0	G = 48.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		87			380		11	696		177	1023	
Lane group capacity, c		446			440		55	1242		205	1602	
v/c ratio, X		0.20			0.86		0.20	0.56		0.86	0.64	
Total green ratio, g/C		0.35			0.35		0.03	0.40		0.13	0.49	
Uniform delay, d_1		27.2			36.3		56.4	27.8		51.5	22.6	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		1.0			19.6		8.0	1.8		35.3	2.0	
Initial queue delay, d_3												
Control delay		28.2			56.0		64.4	29.7		86.8	24.6	
Lane group LOS		C			E		E	C		F	C	
Approach delay	28.2			56.0			30.2			33.7		
Approach LOS	C			E			C			C		
Intersection delay	36.0			X_c = 0.73			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	3 Auiki & SIAR
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	10/31/2012	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011+21% baseline
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	48	70	8	166	25	178	7	720	518	137	400	26
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	10	5	10	3
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 54.0	G =	G =	G =	G = 2.0	G = 7.0	G = 77.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 160.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		131			384		7	1290		143	444	
Lane group capacity, c		454			442		21	1524		150	1819	
v/c ratio, X		0.29			0.87		0.33	0.85		0.95	0.24	
Total green ratio, g/C		0.34			0.34		0.01	0.48		0.09	0.56	
Uniform delay, d_1		38.9			49.7		78.3	36.3		72.7	18.2	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		1.6			20.1		38.0	6.0		62.0	0.3	
Initial queue delay, d_3												
Control delay		40.5			69.8		116.4	42.3		134.7	18.5	
Lane group LOS		D			E		F	D		F	B	
Approach delay	40.5			69.8			42.7			46.8		
Approach LOS	D			E			D			D		
Intersection delay	47.9			X_c = 0.86			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*4 SIAR & Road #2*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*10/31/2012*	Jurisdiction	*HDOT-HWY*
Time Period	*AM Peak Hour*	Analysis Year	*2011+21% baseline*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	0	0	0	0	0	1	2	0	0	2	0
Lane group		LR					L	T			TR	
Volume, V (vph)	8		1				0	526			1238	16
% Heavy vehicles, %HV	10		10				100	100			10	10
Peak-hour factor, PHF	0.95		0.95				0.95	0.95			0.95	0.95
Pretimed (P) or actuated (A)	P		P				P	P			P	P
Start-up lost time, l_1		2.0					2.0	2.0			2.0	
Extension of effective green, e		2.0					2.0	2.0			2.0	
Arrival type, AT		3					3	3			3	
Unit extension, UE		3.0					3.0	3.0			3.0	
Filtering/metering, I		1.000					1.000	1.000			1.000	
Initial unmet demand, Q_b		0.0					0.0	0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0						0		0
Lane width		12.0					12.0	12.0			12.0	
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0					0	0			0	
Min. time for pedestrians, G_p	3.2			3.2						3.2		

Phasing	EB Only	02	03	04	NB Only	Thru & RT	07	08
Timing	G = 12.0	G =	G =	G =	G = 1.0	G = 47.0	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 75.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		9					0	554			1320	
Lane group capacity, c		261					12	1278			2057	
v/c ratio, X		0.03					0.00	0.43			0.64	
Total green ratio, g/C		0.16					0.01	0.71			0.63	
Uniform delay, d_1		26.6					36.5	4.7			8.7	
Progression factor, PF		1.000					1.000	1.000			1.000	
Delay calibration, k		0.50					0.50	0.50			0.50	
Incremental delay, d_2		0.2					0.0	1.1			1.6	
Initial queue delay, d_3												
Control delay		26.9					36.5	5.7			10.3	
Lane group LOS		C					D	A			B	
Approach delay	26.9						5.7			10.3		
Approach LOS	C						A			B		
Intersection delay	9.0			X_c = 0.51			Intersection LOS			A		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	*JN*	Intersection	*4 SIAR & Road#2*
Agency or Co.	*Julian Ng Incorporated*	Area Type	*All other areas*
Date Performed	*10/31/2012*	Jurisdiction	*HDOT-HWY*
Time Period	*PM Peak Hour*	Analysis Year	*2011+21%+ baseline*
		Project ID	*Kapalama Container Yard*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	0	0	0	0	0	1	2	0	0	2	0
Lane group		LR					L	T			TR	
Volume, V (vph)	27		1				1	1060			524	5
% Heavy vehicles, %HV	10		10				10	10			10	10
Peak-hour factor, PHF	0.95		0.95				0.95	0.95			0.95	0.95
Pretimed (P) or actuated (A)	P		P				P	P			P	P
Start-up lost time, l_1		2.0					2.0	2.0			2.0	
Extension of effective green, e		2.0					2.0	2.0			2.0	
Arrival type, AT		3					3	3			3	
Unit extension, UE		3.0					3.0	3.0			3.0	
Filtering/metering, I		1.000					1.000	1.000			1.000	
Initial unmet demand, Q_b		0.0					0.0	0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0						0		0
Lane width		12.0					12.0	12.0			12.0	
Parking / Grade / Parking	N	0	N	N		N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0					0	0			0	
Min. time for pedestrians, G_p	3.2			3.2						3.2		

Phasing	EB Only	02	03	04	NB Only	Thru & RT	07	08
Timing	G = 18.0	G =	G =	G =	G = 1.0	G = 41.0	G =	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 75.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		29					1	1116			557	
Lane group capacity, c		394					22	2061			1795	
v/c ratio, X		0.07					0.05	0.54			0.31	
Total green ratio, g/C		0.24					0.01	0.63			0.55	
Uniform delay, d_1		22.0					36.5	7.9			9.3	
Progression factor, PF		1.000					1.000	1.000			1.000	
Delay calibration, k		0.50					0.50	0.50			0.50	
Incremental delay, d_2		0.4					3.9	1.0			0.5	
Initial queue delay, d_3												
Control delay		22.4					40.4	8.9			9.7	
Lane group LOS		C					D	A			A	
Approach delay	22.4						9.0			9.7		
Approach LOS	C						A			A		
Intersection delay	9.4			X_c = 0.41			Intersection LOS			A		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	4 Road No2 @ SIAR
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2012	Analysis Year	2011+21% baseline
Analysis Time Period	AM Peak Hour		
Project Description	Kapalama Container Yard		
East/West Street:	Road No. 2	North/South Street:	Sand Island Access Road
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	0	526	0	0	1238	16
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Hourly Flow Rate, HFR	0	591	0	0	1391	17
Percent Heavy Vehicles	10	--	--	100	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	8	1	10
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Hourly Flow Rate, HFR	0	0	0	8	1	11
Percent Heavy Vehicles	10	0	0	10	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L					LTR	
v (vph)	0	0					20	
C (m) (vph)	442	531					134	
v/c	0.00	0.00					0.15	
95% queue length	0.00	0.00					0.51	
Control Delay	13.1	11.8					36.5	
LOS	B	B					E	
Approach Delay	--	--				36.5		
Approach LOS	--	--				E		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	4 Road No2 @ SIAR
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2012	Analysis Year	2011+21% baseline
Analysis Time Period	PM Peak Hour		
Project Description	Kapalama Container Yard		
East/West Street:	Road No. 2	North/South Street:	Sand Island Access Road
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	1060	0	0	524	5
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Hourly Flow Rate, HFR	1	1247	0	0	616	5
Percent Heavy Vehicles	10	--	--	100	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	1	0	7	27	0	1
Peak-Hour Factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Hourly Flow Rate, HFR	1	0	8	31	0	1
Percent Heavy Vehicles	10	0	0	10	10	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (vph)	1	0		9			32	
C (m) (vph)	903	225		276			123	
v/c	0.00	0.00		0.03			0.26	
95% queue length	0.00	0.00		0.10			0.97	
Control Delay	9.0	21.0		18.5			44.3	
LOS	A	C		C			E	
Approach Delay	--	--		18.5			44.3	
Approach LOS	--	--		C			E	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*5 Harbor Access at SIAR*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*10/31/2012*	Analysis Year	*2011+21% baseline*
Analysis Time Period	*AM Peak Hour*		
Project Description	*Kapalama Container Yard*		
East/West Street:	*Snug Harbor Access Road*	North/South Street:	*Sand Island Access Road*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*10*	*534*	*1*	*11*	*1096*	*34*
Peak-Hour Factor, PHF	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*
Hourly Flow Rate, HFR	*11*	*600*	*1*	*12*	*1231*	*38*
Percent Heavy Vehicles	*10*	--	--	*100*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*30*	*0*	*10*
Peak-Hour Factor, PHF	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*33*	*0*	*11*
Percent Heavy Vehicles	*10*	*0*	*0*	*10*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*					*LTR*	
v (vph)	*11*	*12*					*44*	
C (m) (vph)	*502*	*524*					*107*	
v/c	*0.02*	*0.02*					*0.41*	
95% queue length	*0.07*	*0.07*					*1.72*	
Control Delay	*12.3*	*12.0*					*60.4*	
LOS	*B*	*B*					*F*	
Approach Delay	--	--				*60.4*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*5 Harbor Access at SIAR*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*10/31/2012*	Analysis Year	*2011+21% baseline*
Analysis Time Period	*PM Peak Hour*		
Project Description	*Kapalama Container Yard*		
East/West Street:	*Snug Harbor Access Road*	North/South Street:	*Sand Island Access Road*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*1*	*1070*	*0*	*5*	*449*	*48*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR	*1*	*1258*	*0*	*5*	*528*	*56*
Percent Heavy Vehicles	*10*	--	--	*100*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*1*	*0*	*7*	*46*	*0*	*5*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR	*1*	*0*	*8*	*54*	*0*	*5*
Percent Heavy Vehicles	*10*	*0*	*0*	*10*	*10*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*LTR*			*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LTR*			*LTR*	
v (vph)	*1*	*5*		*9*			*59*	
C (m) (vph)	*934*	*222*		*277*			*138*	
v/c	*0.00*	*0.02*		*0.03*			*0.43*	
95% queue length	*0.00*	*0.07*		*0.10*			*1.88*	
Control Delay	*8.9*	*21.6*		*18.4*			*49.3*	
LOS	*A*	*C*		*C*			*E*	
Approach Delay	--	--		*18.4*			*49.3*	
Approach LOS	--	--		*C*			*E*	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*6 Puuhale Rd & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*10/31/2012*	Analysis Year	*2011+21% baseline*
Analysis Time Period	*AM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Puuhale Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	43	414	25	17	215	46
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate (veh/h)	46	445	26	18	231	49
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	13	6	53	7	102
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate (veh/h)	0	13	6	56	7	109
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	46	18		19			172	
Capacity, c_m (vph)	1238	1050		319			432	
v/c ratio	0.04	0.02		0.06			0.40	
Queue length (95%)	0.12	0.05		0.19			1.88	
Control Delay (s/veh)	8.0	8.5		17.0			18.7	
LOS	A	A		C			C	
Approach delay (s/veh)	--	--	17.0			18.7		
Approach LOS	--	--	C			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*6 Puuhale Rd & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*10/31/2012*	Analysis Year	*2011+21% baseline*
Analysis Time Period	*PM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Puuhale Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	82	562	9	8	231	61
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Hourly Flow Rate (veh/h)	87	597	9	8	245	64
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	13	29	18	56	6	76
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Hourly Flow Rate (veh/h)	13	30	19	59	6	80
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	87	8		62			145	
Capacity, c_m (vph)	1207	934		208			260	
v/c ratio	0.07	0.01		0.30			0.56	
Queue length (95%)	0.23	0.03		1.20			3.11	
Control Delay (s/veh)	8.2	8.9		29.5			35.0	
LOS	A	A		D			D	
Approach delay (s/veh)	--	--	29.5			35.0		
Approach LOS	--	--	D			D		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	7 Mokauea St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2012	Analysis Year	2011+21% baseline
Analysis Time Period	AM Peak Hour		

Project Description: Kapalama Container Yard

East/West Street: Auiki Street | North/South Street: Mokauea Street

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	91	367	68	50	235	19
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	99	403	74	54	258	20
Proportion of heavy vehicles, P_{HV}	12	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	21	6	20	11	1	63
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	23	6	21	12	1	69
Proportion of heavy vehicles, P_{HV}	12	12	12	12	12	12
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	99	54		50			82	
Capacity, c_m (vph)	1229	1035		232			483	
v/c ratio	0.08	0.05		0.22			0.17	
Queue length (95%)	0.26	0.16		0.80			0.61	
Control Delay (s/veh)	8.2	8.7		24.7			14.0	
LOS	A	A		C			B	
Approach delay (s/veh)	--	--	24.7			14.0		
Approach LOS	--	--	C			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	7 Mokauea St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2012	Analysis Year	2011+21% baseline
Analysis Time Period	PM Peak Hour		

Project Description: Kapalama Container Yard

East/West Street: Auiki Street | North/South Street: Mokauea Street

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	87	501	9	13	227	13
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	91	527	9	13	238	13
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	14	7	21	7	6	45
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	14	7	22	7	6	47
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	91	13		43			60	
Capacity, c_m (vph)	1269	993		279			471	
v/c ratio	0.07	0.01		0.15			0.13	
Queue length (95%)	0.23	0.04		0.54			0.43	
Control Delay (s/veh)	8.1	8.7		20.2			13.8	
LOS	A	A		C			B	
Approach delay (s/veh)	--	--	20.2			13.8		
Approach LOS	--	--	C			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	8 Kalihi St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2013	Analysis Year	2011+21% baseline
Analysis Time Period	AM Peak Hour		

Project Description	Kapalama Container Yard
East/West Street: Auiki Street	North/South Street: Kalihi Street
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	189	202	0	0	73	22
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	198	212	0	0	76	23
Proportion of heavy vehicles, P_{HV}	15	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	11	0	204
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	11	0	214
Proportion of heavy vehicles, P_{HV}	12	12	12	15	12	15
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
Volume, v (vph)	198					11		214
Capacity, c_m (vph)	1416					335		936
v/c ratio	0.14					0.03		0.23
Queue length (95%)	0.49					0.10		0.88
Control Delay (s/veh)	8.0					16.1		10.0
LOS	A					C		A
Approach delay (s/veh)	--	--				10.3		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	8 Kalihi St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2012	Analysis Year	2011+21% baseline
Analysis Time Period	PM Peak Hour		

Project Description	Kapalama Container Yard
East/West Street: Auiki Street	North/South Street: Kalihi Street
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	220	368	0	0	80	42
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate (veh/h)	250	418	0	0	90	47
Proportion of heavy vehicles, P_{HV}	5	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	27	0	97
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate (veh/h)	0	0	0	30	0	110
Proportion of heavy vehicles, P_{HV}	12	12	12	6	12	5
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
Volume, v (vph)	250					30		110
Capacity, c_m (vph)	1429					209		931
v/c ratio	0.17					0.14		0.12
Queue length (95%)	0.63					0.49		0.40
Control Delay (s/veh)	8.1					25.1		9.4
LOS	A					D		A
Approach delay (s/veh)	--	--				12.7		
Approach LOS	--	--				B		

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APPENDIX E

INTERSECTION ANALYSIS SUMMARY WORKSHEETS – FUTURE WITH PROJECT (2039)

HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	1 Nimitz - SIAR
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	10/31/2012	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011+21% excess in CFL+project
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	1	2	3	0	3	0	0	0	0	0
Lane group		T	R	L	T		L					
Volume, V (vph)		3290	999	302	1397		469					
% Heavy vehicles, %HV		5	0	5	5		9					
Peak-hour factor, PHF		0.99	0.99	0.99	0.99		0.99					
Pretimed (P) or actuated (A)		P	P	P	P		P					
Start-up lost time, l_1		2.0	2.0	2.0	2.0		2.0					
Extension of effective green, e		2.0	2.0	2.0	2.0		2.0					
Arrival type, AT		3	3	3	3		3					
Unit extension, UE		3.0	3.0	3.0	3.0		3.0					
Filtering/metering, I		1.000	1.000	1.000	1.000		1.000	1.000				
Initial unmet demand, Q_b		0.0	0.0	0.0	0.0		0.0					
Ped / Bike / RTOR volumes	0		0							0		
Lane width		12.0	12.0	12.0	12.0		12.0					
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0	0	0	0		0					
Min. time for pedestrians, G_p	3.2									3.2		

Phasing	WB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 24.0	G = 172.0	G =	G =	G = 27.0	G =	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		3323	1009	305	1411		474					
Lane group capacity, c		3532	1157	334	4149		507					
v/c ratio, X		0.94	0.87	0.91	0.34		0.93					
Total green ratio, g/C		0.72	0.72	0.10	0.84		0.11					
Uniform delay, d_1		29.6	25.7	107.0	4.2		105.6					
Progression factor, PF		1.000	1.000	1.000	1.000		1.000					
Delay calibration, k		0.50	0.50	0.50	0.50		0.50					
Incremental delay, d_2		6.5	9.2	31.4	0.2		26.7					
Initial queue delay, d_3												
Control delay		36.1	34.8	138.4	4.4		132.3					
Lane group LOS		D	C	F	A		F					
Approach delay	35.8			28.2			132.3					
Approach LOS	D			C			F					
Intersection delay	40.8			X_c = 0.94			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	1 Nimitz - SIAR
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	10/31/2012	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011+21%+project
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	3	0	2	3	0	3	0	0	0	0	0
Lane group		T		L	T		L					
Volume, V (vph)		2887		158	3141		1062					
% Heavy vehicles, %HV		5		5	5		9					
Peak-hour factor, PHF		0.99		0.99	0.99		0.99					
Pretimed (P) or actuated (A)		P		P	P		P					
Start-up lost time, l_1		2.0		2.0	2.0		2.0					
Extension of effective green, e		2.0		2.0	2.0		2.0					
Arrival type, AT		3		3	3		3					
Unit extension, UE		3.0		3.0	3.0		3.0					
Filtering/metering, I		1.000		1.000	1.000		1.000	1.000				
Initial unmet demand, Q_b		0.0		0.0	0.0		0.0					
Ped / Bike / RTOR volumes	0									0		
Lane width		12.0		12.0	12.0		12.0					
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N		N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0		0					
Min. time for pedestrians, G_p	3.2									3.2		

Phasing	WB Only	Thru Only	03	04	NB Only	06	07	08
Timing	G = 15.0	G = 146.0	G =	G =	G = 62.0	G =	G =	G =
	Y = 6	Y = 6	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		2916		160	3173		1073					
Lane group capacity, c		2998		209	3430		1165					
v/c ratio, X		0.97		0.77	0.93		0.92					
Total green ratio, g/C		0.61		0.06	0.70		0.26					
Uniform delay, d_1		45.1		110.8	31.2		86.6					
Progression factor, PF		1.000		1.000	1.000		1.000					
Delay calibration, k		0.50		0.50	0.50		0.50					
Incremental delay, d_2		11.2		23.1	5.6		13.2					
Initial queue delay, d_3												
Control delay		56.3		133.8	36.7		99.8					
Lane group LOS		E		F	D		F					
Approach delay	56.3			41.4			99.8					
Approach LOS	E			D			F					
Intersection delay	55.9			X_c = 0.92			Intersection LOS			E		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	2 Nimitz & Kalihi
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	10/31/2012	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011 (EB less CFL)+21% +project
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	3	1	0	2	0	1	1	1	1	2	0
Lane group	L	T	R		TR		L	T	R	L	TR	
Volume, V (vph)	38	3350	999		1626	113	57	181	119	198	534	56
% Heavy vehicles, %HV	5	5	5		5	5	5	5	10	5	10	3
Peak-hour factor, PHF	0.96	0.96	0.96		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Pretimed (P) or actuated (A)	P	P	P		P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e	2.0	2.0	2.0		2.0		2.0	2.0	2.0	2.0	2.0	
Arrival type, AT	3	3	3		3		3	3	3	3	3	
Unit extension, UE	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000	1.000		1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0	12.0		12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0	0		0		0	0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EB Only	Thru & RT	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 6.0	G =	G =	G =	G = 9.0	G = 15.0	G = 25.0	G =
	Y = 5	Y = 7	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	40	3490	1041		1812		59	189	124	206	614	
Lane group capacity, c	43	3471	1083		2246		64	189	153	208	612	
v/c ratio, X	0.93	1.01	0.96		0.81		0.92	1.00	0.81	0.99	1.00	
Total green ratio, g/C	0.03	0.70	0.70		0.66		0.04	0.10	0.10	0.12	0.19	
Uniform delay, d_1	116.8	35.5	32.5		29.9		115.1	107.5	105.2	105.4	97.5	
Progression factor, PF	1.000	1.000	1.000		1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.50	0.50		0.50		0.50	0.50	0.50	0.50	0.50	
Incremental delay, d_2	117.6	16.6	19.5		3.2		91.9	65.5	35.5	60.0	37.2	
Initial queue delay, d_3												
Control delay	234.4	52.1	52.0		33.1		207.0	173.0	140.7	165.3	134.7	
Lane group LOS	F	D	D		C		F	F	F	F	F	
Approach delay	53.7			33.1			167.6			142.4		
Approach LOS	D			C			F			F		
Intersection delay	63.9			X_c = 1.00			Intersection LOS			E		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	2 Nimitz & Kalihi
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	10/31/2012	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011+21%+project
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	1	3	0	1	3	0	1	1	1	1	2	0
Lane group	L	TR		L	TR		L	T	R	L	TR	
Volume, V (vph)	104	2960	21	118	3076	186	89	263	154	132	203	91
% Heavy vehicles, %HV	4	4	4	4	4	4	4	4	4	4	4	4
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Extension of effective green, e	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Arrival type, AT	3	3		3	3		3	3	3	3	3	
Unit extension, UE	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Filtering/metering, I	1.000	1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Initial unmet demand, Q_b	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width	12.0	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B	0	0		0	0		0	0	0	0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	WB Only	Thru & RT	EB Only	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 16.0	G = 132.0	G = 14.0	G =	G = 12.0	G = 1.0	G = 33.0	G =
	Y = 5	Y = 7	Y = 5	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 240.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	105	3011		119	3295		90	266	156	133	297	
Lane group capacity, c	101	3169		116	3145		87	251	349	130	539	
v/c ratio, X	1.04	0.95		1.03	1.05		1.03	1.06	0.45	1.02	0.55	
Total green ratio, g/C	0.06	0.64		0.07	0.64		0.05	0.14	0.22	0.08	0.16	
Uniform delay, d_1	113.0	40.0		112.0	43.5		114.0	103.5	80.1	111.0	92.4	
Progression factor, PF	1.000	1.000		1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.50		0.50	0.50		0.50	0.50	0.11	0.50	0.50	
Incremental delay, d_2	100.7	8.0		90.7	30.4		106.2	73.5	0.9	85.2	4.0	
Initial queue delay, d_3												
Control delay	213.7	48.0		202.7	73.9		220.2	177.0	81.0	196.2	96.5	
Lane group LOS	F	D		F	E		F	F	F	F	F	
Approach delay	53.6			78.3			155.3			127.3		
Approach LOS	D			E			F			F		
Intersection delay	76.1			X_c = 1.05			Intersection LOS			E		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	3 Auiki & SIAR
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	10/31/2012	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011+21%+project
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	45	30	8	220	18	98	9	394	237	166	822	60
% Heavy vehicles, %HV	10	10	10	10	10	10	10	10	10	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 42.0	G =	G =	G =	G = 4.0	G = 6.0	G = 48.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		87			354		9	664		175	928	
Lane group capacity, c		445			442		55	1242		205	1600	
v/c ratio, X		0.20			0.80		0.16	0.53		0.85	0.58	
Total green ratio, g/C		0.35			0.35		0.03	0.40		0.13	0.49	
Uniform delay, d_1		27.2			35.2		56.4	27.5		51.4	21.7	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		1.0			14.1		6.3	1.7		33.8	1.5	
Initial queue delay, d_3												
Control delay		28.2			49.4		62.7	29.1		85.3	23.2	
Lane group LOS		C			D		E	C		F	C	
Approach delay	28.2			49.4			29.6			33.1		
Approach LOS	C			D			C			C		
Intersection delay	34.4			X_c = 0.69			Intersection LOS			C		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	3 Auiki & SIAR
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	06/13/2012	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011+21%+project
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	48	70	8	155	25	178	7	666	479	137	373	26
% Heavy vehicles, %HV	5	5	5	5	5	5	5	5	10	5	10	3
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 54.0	G =	G =	G =	G = 2.0	G = 7.0	G = 77.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =
Duration of Analysis, T = 0.25						Cycle Length, C = 160.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		131			372		7	1193		143	416	
Lane group capacity, c		454			445		21	1524		150	1819	
v/c ratio, X		0.29			0.84		0.33	0.78		0.95	0.23	
Total green ratio, g/C		0.34			0.34		0.01	0.48		0.09	0.56	
Uniform delay, d_1		38.9			48.9		78.3	34.5		72.7	18.0	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		1.6			16.8		38.0	4.1		62.0	0.3	
Initial queue delay, d_3												
Control delay		40.5			65.7		116.4	38.6		134.7	18.3	
Lane group LOS		D			E		F	D		F	B	
Approach delay	40.5			65.7			39.1			48.1		
Approach LOS	D			E			D			D		
Intersection delay	45.8			X_c = 0.82			Intersection LOS			D		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	4 SIAR & Road #2
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	06/13/2012	Jurisdiction	HDOT-HWY
Time Period	AM Peak Hour	Analysis Year	2011+21%+project alt1
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	8	0	1	6	0	148	0	347	0	0	1121	16
% Heavy vehicles, %HV	10	10	10	10	10	10	100	100	100	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 12.0	G =	G =	G =	G = 1.0	G = 6.0	G = 36.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 75.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		9			162		0	365		0	1197	
Lane group capacity, c		218			238		12	868		263	2057	
v/c ratio, X		0.04			0.68		0.00	0.42		0.00	0.58	
Total green ratio, g/C		0.16			0.16		0.01	0.48		0.16	0.63	
Uniform delay, d_1		26.6			29.7		36.5	12.7		26.5	8.2	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		0.4			14.6		0.0	1.5		0.0	1.2	
Initial queue delay, d_3												
Control delay		27.0			44.3		36.5	14.2		26.5	9.4	
Lane group LOS		C			D		D	B		C	A	
Approach delay	27.0			44.3			14.2			9.4		
Approach LOS	C			D			B			A		
Intersection delay	13.8			X_c = 0.59			Intersection LOS			B		

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HCS2000™ DETAILED REPORT

General Information		Site Information	
Analyst	JN	Intersection	4 SIAR & Road#2
Agency or Co.	Julian Ng Incorporated	Area Type	All other areas
Date Performed	06/13/2012	Jurisdiction	HDOT-HWY
Time Period	PM Peak Hour	Analysis Year	2011+21%+project alt1
		Project ID	Kapalama Container Yard

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	1	2	0	1	2	0
Lane group		LTR			LTR		L	TR		L	TR	
Volume, V (vph)	27	0	1	15	0	104	1	863	0	0	486	5
% Heavy vehicles, %HV	10	10	10	100	100	100	10	10	10	10	10	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_1		2.0			2.0		2.0	2.0		2.0	2.0	
Extension of effective green, e		2.0			2.0		2.0	2.0		2.0	2.0	
Arrival type, AT		3			3		3	3		3	3	
Unit extension, UE		3.0			3.0		3.0	3.0		3.0	3.0	
Filtering/metering, I		1.000			1.000		1.000	1.000		1.000	1.000	
Initial unmet demand, Q_b		0.0			0.0		0.0	0.0		0.0	0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0			12.0		12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0		0	0		0	0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru & RT	08
Timing	G = 18.0	G =	G =	G =	G = 1.0	G = 3.0	G = 28.0	G =
	Y = 5	Y =	Y =	Y =	Y = 5	Y = 5	Y = 5	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 70.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		29			125		1	908		0	517	
Lane group capacity, c		329			209		23	1316		211	1689	
v/c ratio, X		0.09			0.60		0.04	0.69		0.00	0.31	
Total green ratio, g/C		0.26			0.26		0.01	0.40		0.13	0.51	
Uniform delay, d_1		19.8			22.8		34.0	17.4		26.6	9.8	
Progression factor, PF		1.000			1.000		1.000	1.000		1.000	1.000	
Delay calibration, k		0.50			0.50		0.50	0.50		0.50	0.50	
Incremental delay, d_2		0.5			12.0		3.5	3.0		0.0	0.5	
Initial queue delay, d_3												
Control delay		20.3			34.8		37.6	20.4		26.6	10.3	
Lane group LOS		C			C		D	C		C	B	
Approach delay	20.3			34.8			20.4			10.3		
Approach LOS	C			C			C			B		
Intersection delay	18.2			X_c = 0.55			Intersection LOS			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*5 Harbor Access at SIAR*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*06/13/2012*	Analysis Year	*2011+21%+project alt1*
Analysis Time Period	*AM Peak Hour*		
Project Description	*Kapalama Container Yard*		
East/West Street:	*Snug Harbor Access Road*	North/South Street:	*Sand Island Access Road*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*10*	*356*	*13*	*84*	*912*	*34*
Peak-Hour Factor, PHF	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*
Hourly Flow Rate, HFR	*11*	*400*	*14*	*94*	*1024*	*38*
Percent Heavy Vehicles	*10*	--	--	*100*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*30*	*0*	*10*
Peak-Hour Factor, PHF	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*	*0.89*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*33*	*0*	*11*
Percent Heavy Vehicles	*10*	*0*	*0*	*10*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*					*LTR*	
v (vph)	*11*	*94*					*44*	
C (m) (vph)	*606*	*667*					*118*	
v/c	*0.02*	*0.14*					*0.37*	
95% queue length	*0.06*	*0.49*					*1.53*	
Control Delay	*11.1*	*11.3*					*52.6*	
LOS	*B*	*B*					*F*	
Approach Delay	--	--				*52.6*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*5 Harbor Access at SIAR*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*06/13/2012*	Analysis Year	*2011+21%+project alt 1*
Analysis Time Period	*PM Peak Hour*		
Project Description	*Kapalama Container Yard*		
East/West Street:	*Snug Harbor Access Road*	North/South Street:	*Sand Island Access Road*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*1*	*880*	*9*	*57*	*375*	*48*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR	*1*	*1035*	*10*	*67*	*441*	*56*
Percent Heavy Vehicles	*10*	--	--	*100*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*46*	*0*	*5*
Peak-Hour Factor, PHF	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*	*0.85*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*54*	*0*	*5*
Percent Heavy Vehicles	*10*	*0*	*0*	*10*	*10*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*					*LTR*	
v (vph)	*1*	*67*					*59*	
C (m) (vph)	*1009*	*294*					*156*	
v/c	*0.00*	*0.23*					*0.38*	
95% queue length	*0.00*	*0.86*					*1.61*	
Control Delay	*8.6*	*20.8*					*41.5*	
LOS	*A*	*C*					*E*	
Approach Delay	--	--				*41.5*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*6 Puuhale Rd & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*10/31/2012*	Analysis Year	*2011+21%+project*
Analysis Time Period	*AM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Puuhale Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	42	405	24	17	197	46
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate (veh/h)	45	435	25	18	211	49
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	13	6	53	7	95
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Hourly Flow Rate (veh/h)	0	13	6	56	7	102
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	45	18		19			165	
Capacity, c_m (vph)	1259	1060		331			443	
v/c ratio	0.04	0.02		0.06			0.37	
Queue length (95%)	0.11	0.05		0.18			1.70	
Control Delay (s/veh)	8.0	8.5		16.5			17.9	
LOS	A	A		C			C	
Approach delay (s/veh)	--	--	16.5			17.9		
Approach LOS	--	--	C			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*6 Puuhale Rd & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*06/13/2013*	Analysis Year	*2011+21%+project*
Analysis Time Period	*PM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Puuhale Road*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	77	531	9	8	223	61
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Hourly Flow Rate (veh/h)	81	564	9	8	237	64
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12	29	19	56	6	74
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Hourly Flow Rate (veh/h)	12	30	20	59	6	78
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	81	8		62			143	
Capacity, c_m (vph)	1216	961		231			281	
v/c ratio	0.07	0.01		0.27			0.51	
Queue length (95%)	0.21	0.03		1.05			2.69	
Control Delay (s/veh)	8.2	8.8		26.2			30.4	
LOS	A	A		D			D	
Approach delay (s/veh)	--	--	26.2			30.4		
Approach LOS	--	--	D			D		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*7 Mokauea St & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*10/31/2012*	Analysis Year	*2011+21%+project*
Analysis Time Period	*AM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Mokauea Street*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	89	360	45	50	221	19
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	97	395	49	54	242	20
Proportion of heavy vehicles, P_{HV}	12	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	21	6	20	11	1	59
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	23	6	21	12	1	64
Proportion of heavy vehicles, P_{HV}	12	12	12	12	12	12
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	97	54		50			77	
Capacity, c_m (vph)	1246	1065		250			495	
v/c ratio	0.08	0.05		0.20			0.16	
Queue length (95%)	0.25	0.16		0.73			0.55	
Control Delay (s/veh)	8.1	8.6		23.0			13.6	
LOS	A	A		C			B	
Approach delay (s/veh)	--	--	23.0			13.6		
Approach LOS	--	--	C			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JN*	Intersection	*7 Mokauea St & Auiki St*
Agency/Co.	*Julian Ng Incorporated*	Jurisdiction	*HDOT-HWY*
Date Performed	*06/13/2012*	Analysis Year	*2011+21%+project*
Analysis Time Period	*PM Peak Hour*		

Project Description *Kapalama Container Yard*

East/West Street: *Auiki Street* | North/South Street: *Mokauea Street*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	83	476	8	7	220	13
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	87	501	8	7	231	13
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	14	7	21	7	6	45
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	14	7	22	7	6	47
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	87	7		43			60	
Capacity, c_m (vph)	1277	1016		302			497	
v/c ratio	0.07	0.01		0.14			0.12	
Queue length (95%)	0.22	0.02		0.49			0.41	
Control Delay (s/veh)	8.0	8.6		18.9			13.2	
LOS	A	A		C			B	
Approach delay (s/veh)	--	--	18.9			13.2		
Approach LOS	--	--	C			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	8 Kalihi St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2013	Analysis Year	2011+21%+project
Analysis Time Period	AM Peak Hour		

Project Description: Kapalama Container Yard

East/West Street: Auiki Street | North/South Street: Kalihi Street

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	213	202	0	0	73	22
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	224	212	0	0	76	23
Proportion of heavy vehicles, P_{HV}	15	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	11	0	296
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	11	0	311
Proportion of heavy vehicles, P_{HV}	12	12	12	15	12	15
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
Volume, v (vph)	224					11		311
Capacity, c_m (vph)	1416					305		936
v/c ratio	0.16					0.04		0.33
Queue length (95%)	0.56					0.11		1.47
Control Delay (s/veh)	8.0					17.2		10.7
LOS	A					C		B
Approach delay (s/veh)	--	--				11.0		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	8 Kalihi St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	06/13/2012	Analysis Year	2011+21%+project
Analysis Time Period	PM Peak Hour		

Project Description: Kapalama Container Yard

East/West Street: Auiki Street | North/South Street: Kalihi Street

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	278	368	0	0	80	42
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate (veh/h)	315	418	0	0	90	47
Proportion of heavy vehicles, P_{HV}	5	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	27	0	123
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate (veh/h)	0	0	0	30	0	139
Proportion of heavy vehicles, P_{HV}	12	12	12	5	12	5
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
Volume, v (vph)	315					30		139
Capacity, c_m (vph)	1429					166		931
v/c ratio	0.22					0.18		0.15
Queue length (95%)	0.84					0.64		0.52
Control Delay (s/veh)	8.2					31.4		9.5
LOS	A					D		A
Approach delay (s/veh)	--	--				13.4		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	9 Mary St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	10/31/2012	Analysis Year	2011+21%+project
Analysis Time Period	AM Peak Hour		

Project Description	Kapalama Container Yard
East/West Street: Auiki Street	North/South Street: Mary Street
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	2	382	0	106	286	3
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	2	419	0	116	314	3
Proportion of heavy vehicles, P_{HV}	12	--	--	12	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	1	31	2	0	3
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate (veh/h)	1	1	34	2	0	3
Proportion of heavy vehicles, P_{HV}	12	12	12	12	12	12
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	2	116		36			5	
Capacity, c_m (vph)	1189	1088		552			329	
v/c ratio	0.00	0.11		0.07			0.02	
Queue length (95%)	0.01	0.36		0.21			0.05	
Control Delay (s/veh)	8.0	8.7		12.0			16.1	
LOS	A	A		B			C	
Approach delay (s/veh)	--	--	12.0			16.1		
Approach LOS	--	--	B			C		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JN	Intersection	9 Mary St & Auiki St
Agency/Co.	Julian Ng Incorporated	Jurisdiction	HDOT-HWY
Date Performed	06/13/2012	Analysis Year	2011+21%+project
Analysis Time Period	PM Peak Hour		

Project Description	Kapalama Container Yard
East/West Street: Auiki Street	North/South Street: Mary Street
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	2	558	0	33	236	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	2	587	0	34	248	3
Proportion of heavy vehicles, P_{HV}	10	--	--	10	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	1	86	2	0	3
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	1	1	90	2	0	3
Proportion of heavy vehicles, P_{HV}	10	10	10	10	10	10
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume, v (vph)	2	34		92			5	
Capacity, c_m (vph)	1269	950		484			336	
v/c ratio	0.00	0.04		0.19			0.01	
Queue length (95%)	0.00	0.11		0.69			0.05	
Control Delay (s/veh)	7.8	8.9		14.2			15.9	
LOS	A	A		B			C	
Approach delay (s/veh)	--	--	14.2			15.9		
Approach LOS	--	--	B			C		

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APPENDIX D

Noise Studies

D-1
Noise Study-Kapālama Site

D-2
Noise Study-Pacific Shipyards International Site

D-3
Noise Study-Hawaiian Flour Mill Site

Report of Noise Measurement Results and Barrier Noise Study Proposed Kapalama Container Terminal Honolulu Harbor, Oahu, Hawaii

October 5, 2012

Department of Transportation
State of Hawaii
Harbors Division

A noise study was performed of the potential future noise levels associated with dockside and container yard activities at the proposed Kapalama Container Terminal Facility at Pier 42 and 46, Honolulu Harbor. The effectiveness of potential noise mitigation measures, such as a sound wall along the north (mauka) boundary, was also evaluated at the closest residence located approximately 80 feet mauka of the makai Right-of-Way along Auiki Street. A conceptual site plan depicting the location of the proposed container terminal improvements, sound wall, and closest residence are depicted in Figures 1 through 3. The overall objective of the noise mitigation measures was to minimize noise impacts associated with container loading and unloading operations during a typical busy day at the proposed container terminal.

Methodology. To determine the amount of sound attenuation of the noise from future container loading and unloading operations needed to approximate existing background ambient noise levels at the closest residence, existing nighttime background noise measurements were obtained at Locations A, B, C, and G where shown in Figure 2. Background ambient noise levels at the closest second floor residence near Location G are presently controlled by aircraft, local and distant traffic, mechanical equipment operating within Honolulu Harbor, and mechanical equipment operating at business establishments on Mary Street. The potential addition of noise from the container terminal during the nighttime period is considered to represent the greatest risk of adverse noise impacts at the closest residence to the proposed project.

Noise modeling of the sound levels of container handling and transporting equipment [gantry crane diesel engines, 45 Ton lifts (Top Handlers), tractor-trailer trucks, container terminal yard trucks (or Hustlers), banging, horns, and back-up alarms] was performed to predict the potential noise levels at the closest residence resulting from container handling operations at the proposed container terminal. In addition, the effectiveness of a sound barrier located along and near the north boundary of the proposed Container Terminal Facility for each type of equipment noise source was evaluated (see Figure 3). The effectiveness of 15 to 30 foot high walls in attenuating potential noise from future container loading and unloading operations were evaluated. Figure 3 depicts the assumed locations of the various container handling and transporting equipment (S1 through S8) from which resulting noise levels at the closest residence were calculated with and without a sound attenuating wall and for wall heights of 15 to 30 feet.

Source noise measurements (obtained at approximately 20 to 200 feet distance from the noise generating equipment) of 45 Ton container handling lifts, tractor-trailer trucks, banging, horns, and back-up alarms were obtained at Pier 40, Honolulu Harbor, since these were expected to be similar to the typical noise sources associated with future container loading and unloading operations at the proposed Kapalama Container Terminal Facility. Truck air brake release noise levels obtained from prior projects were also used during the current noise modeling effort. In addition, close-in source noise measurements of the gantry crane diesel engine and repositioning alarm, of a Top Handler loading empty containers onto a Hustler, and of a Top Handler performing

lifting operations at high engine rpm were obtained at the Horizon Lines facility on Sand Island during container ship loading and unloading operations on July 5, 2012. Nighttime noise measurements were also obtained during container ship loading and unloading operations at more distant off-site Locations D, E, and F shown in Figure 2.

The noise modeling was performed using inverse square law for hemispherical spreading of a sound from a source at or near the ground, with inclusion of molecular absorption and anomalous excess attenuation effects. The modeling equation used to predict sound levels at any given distance from a noise source was:

$$L_p = L_w - 20 \times \text{Log}(d) - [d \times a(f)] / 100 - 8$$

where:

L_p = Sound pressure level in decibels (re 2×10^{-5} Pa) at distance d (in meters),
L_w = Sound power level of noise source in decibels (re picowatt), and
a(f) = Molecular absorption plus anomalous excess attenuation in decibels per 100 meters. For the 9 standard Octave Bands from 31.5 Hz to 8,000 Hz, the a(f) values used were 0.1, 0.16, 0.27, 0.39, 0.66, 1.08, 1.9, 3.47, and 5.2.

The sound attenuation associated with a barrier or wall which obstructs the visual line of sight between the noise source and receptor (or listener) was modeled using the following equations:

$$\text{Barrier Attenuation} = 20 \times \text{Log}\{ [\text{sqrt}(G)] / \tanh(G)\} + 5 \text{ dB for } N \geq -0.2, \text{ or}$$
$$= 0 \text{ otherwise.}$$

where:

$$G = (2 \times Pi \times N)^{1/2}, \text{ and } N = \pm\ 2 \times (A + B - d) / L,$$

where:

L = wavelength of sound, in meters,
N = dimensionless Fresnel number,
Pi = 3.141593
A + B = shortest path length of wave travel over the barrier between source and receptor, in meters,
d = straight-line distance between source and receptor, in meters,
+ sign = used when receptor in shadow (attenuation) zone, and
- sign = used when receptor in bright (zero attenuation) zone.

Using the noise model, various heights of a sound barrier located along or near the north boundary were used to evaluate the effects of sound attenuation of container loading and unloading noise at the closest residence located approximately 50 feet

north of Location G. It was determined during these efforts that the banging noise would be the most difficult to attenuate because of their relatively high impulsive sound level and the potentially high elevation of the noise source. In addition, back-up alarms would also be difficult to attenuate due to their relatively high sound levels and the concentration of the sound in a narrow frequency band near 1,000 Hz. In addition, the required mobility of the banging and back-up alarm noise sources made them impossible to attenuate with additional walls located near the banging or back-up alarm sources.

Nevertheless, the heights of a sound attenuating wall along the north boundary were varied between 15 and 30 feet above the elevation of the hardened areas of the proposed Kapalama Container Terminal facility, and the sound levels from container handling and transporting equipment were predicted at the closest residence near Location G. A receptor ear elevation of 16 feet above the Kapalama Container Terminal hardened ground surface was used in performing the noise model calculations at the closest residence. The sound wall top elevations were assumed to be level at 15, 20, 25, and 30 feet above the elevation of the hardened ground surface of the container terminal. For noise modeling purposes, elevations of the 45 Ton Top Handlers and tractor-trailer trucks were assumed to range from 5 to 16 above the hardened ground level. Elevations of the back-up alarms and air brake noise sources were assumed to be 3 to 7 feet above hardened ground level. The diesel engines powering the gantry cranes were assumed to be 10 and 208 feet above the hardened ground level. Banging noise was assumed to originate at 24 feet above the hardened ground level.

Sound Attenuation Goals. Considering how noise affects residences in different ways and as a result are perceived differently, below is a description on various approaches to how noise could be attenuated to achieve different levels of desired noise conditions. These approaches establishes goals that range from reducing risks of adverse noise impacts to near zero replicating a condition of no effect to meeting the regulatory noise limits established by the State Department of Health. In order to reduce the risk of adverse noise impact at the closest noise sensitive receptor to near zero, the noise from container loading and unloading operations will need to be reduced to approximately 46 dBA This will be very difficult to do, even at noise buffer distances of 1,500 to 2,000 feet, since it will require sound attenuation in excess of 20 dBA from the sound attenuating wall. Sound attenuating walls should not be expected to provide more than 20 dBA of attenuation.

A second possible goal of the sound attenuating wall was to reduce the noise sources within the Container Terminal facility by at least 7 dBA. This sound attenuation reduction goal is equal to that used by the Hawaii State Department of Transportation (DOT), Highways Division, for roadway vehicle (cars, trucks, buses, motorcycles, etc.)

noise sources [see "Highway Noise Policy and Abatement Guidelines" (April 25, 2011 with corrections dated November 29, 2011)].

Another possible goal of the sound attenuation wall was to limit the maximum noise levels from the container terminal operations to less than the 70 dBA for steady sources and to less than 80 dBA for impulsive sources. The 70 and 80 dBA noise limits correspond to the State Department of Health (DOH) regulatory limits for fixed noise sources at or beyond the property boundaries of lands zoned for Industrial uses [see "Title 11, Administrative Rules, Department of Health, Chapter 46, Community Noise Control" (September 12, 1996)]. While the container handling equipment and vehicles are probably exempt from the 70 dBA (for steady noise) and 80 dBA (for impulsive noise) limits because they are mobile noise sources, the 70 dBA and 80 dBA benchmarks were used as another Not-To-Exceed design goal for the sound attenuation wall if feasible.

Other possible noise mitigation measures were discussed, such as quieting of the noise sources, use of broadband back-up alarms instead of high frequency beeper type alarms, restrictions on the operations within selected container stacking areas during the night; and sound attenuation treatment of the noise sensitive residences.

Predictions of the resulting sound levels from the proposed Container Terminal if selected noise mitigation measures were implemented without the sound attenuating wall shown in Figure 3 were also included in this study. These noise mitigation measures included: the replacement of the diesel engine power sources at the new gantry cranes with utility power from Hawaiian Electric Company (HECO); and the replacement of beeper type backup alarms with broadband noise backup alarms. These sound level predictions included expected sound levels at receptor locations mauka of Auiki Street, which would be shielded by existing two and three story buildings along Mary, Hoe, Silva, and Kahai Streets.

Noise Measurement Results. The measured A-Weighted background noise levels during the night at Locations A, B, C, and G are shown in Figures 4 through 7. A-Weighted sound levels were obtained using the A-Scale setting of the sound level meter, which best represents the response characteristics of the human ear. Locations A, B, and G surround the closest residence which is approximately midway between Locations A and G in Figure 2. Many 2-story residences are also located in the middle of Hoe Street near Location C. Location C was considered to be typical of the quieter locations which are removed from the major roadways and are shielded from distant noise sources by surrounding buildings. Location B was considered to be typical of the noisiest location, with the background noise controlled by nearby operating machinery. Locations A and G were considered to be typical of those locations which are exposed to the existing harbor noise sources as well as to intermittent local traffic. Based on these measurement results, it was concluded that unless the noise levels from nighttime container handling operations are less than 50 dBA along Auiki Street, they

will probably be audible at the closest residence near Location G. The high frequency beeper type backup alarms will need to be even lower and less than 35 dBA to be inaudible at the closest residence near Location G.

Measurements of nighttime container handling operations outside the existing Horizon Lines Container Terminal were obtained along Sand Island Access Road at Locations D, E, and F where shown in Figure 2. These results are shown in Figures 8, 9, and 10, and do not include the noise from vehicles traveling on Sand Island Access Road. At these three locations, the container handling activity within the Horizon Lines Container Terminal and the backup alarms from operating equipment were clearly audible. From these measurements, it was concluded that the spillover noise levels ranged from 55 dBA to 73 dBA.

Figures 11 through 14 depict the close-in measurement results within the existing Horizon Lines Container Terminal. Figure 15 depicts the noise levels associated with a tractor trailer reversing with backup alarm to a full stop at approximately 81 feet distance.

Noise Modeling Results. Predictions of container handling and transporting equipment noise levels at the closest residence mauka of Location G were performed and compared with the project sound attenuation goals and the measured background ambient noise levels for the nighttime time period. Container handling and transporting equipment were located at Locations S1 through S8 within the hardened pavement area of the proposed Container Terminal where shown in Figure 3. In addition, diesel engine power units for three gantry cranes were located at DE1, DE2, and DE3. The diesel engines at DE1 and DE3 were assumed to be 208 above the hardened pavement, and the diesel engine at DE2 was assumed to be 10 feet above the hardened pavement.

For noise modeling purposes, a solid wall of varying heights was located along or near the north boundary of the proposed Kapalama Container Terminal facility. Wall heights of 15, 20, 25, and 30 feet above the hardened pavement surface of the Kapalama Container Terminal facility were evaluated to determine their effectiveness in attenuating the noise from container handling and transporting equipment at the closest residence mauka of Location G. Because of the second floor elevation of the closest residence and the relatively tall heights of the project noise sources, walls of 15 feet in height or less would not provide any sound attenuation. It should be noted that the majority of the existing residences mauka of Auiki Street are 2 story structures.

Figures 16 through 19 present the predicted sound levels of the operating equipment within the proposed Kapalama Container Terminal facility at the closest residence mauka of Location G. The approximate slant distances to the noise source locations (S1 through S8) are indicated on the horizontal axes of the figures. From Figures 16 through 19, it is clear that it will be very difficult to reduce all noise sources to background noise levels of approximately 46 dBA at the closest residence, so

nighttime noise from the proposed Kapalama Container Terminal facility will probably be audible at the closest residence without mitigation measures. Therefore, this goal to attenuate all noise sources to inaudible levels at the closest residence was considered to be unattainable.

The other goal of achieving the State DOH noise limit of 70 dBA for steady noise sources and 80 dBA for impulsive noise sources should be achievable with or without a sound attenuating wall. Even though these DOH noise level limits are not technically applicable to mobile sources (such as trucks, Hustlers, and Top Handlers), they are achievable using the equipment that is anticipated to operate at the proposed Kapalama Container Terminal facility.

The third goal of achieving approximately 7 dBA of noise attenuation using the wall along or near the north boundary of the facility is achievable, but would require a continuous wall (without see-through openings) of approximately 25 feet height above the hardened ground surface. If this 25 foot high wall can be constructed where shown in Figure 3 within the available property boundaries; if one or more of the three closest residents does not object to the construction of the wall; and if the wall does not cost more than $60,000 times the total number benefited receptors north of Auiki Street, the 25 foot high wall shown in Figure 3 would qualify for inclusion in this project if the State DOT, Highways Division, noise policy guidelines for feasibility and reasonableness were applied to this DOT, Harbors Division, project. The total number of benefited residences north of Auiki Street were estimated to total approximately 35, and are all located no further north than the Silva/Kalihi or Kahai/Libby Street intersections. Using the State DOT, Highways Division, noise policy, if the total cost of the 25 foot high sound attenuating wall shown in Figure 3 exceeds $2,100,000, it should not qualify for inclusion in this project.

Predicted Sound Levels without Sound Attenuating Wall. If a sound attenuating wall is not constructed, the predicted sound levels at the closest residence mauka of Location G are shown in Figure 20. The predicted sound levels in Figure 20 assume no quieting measures such as the replacement of the diesel engines at the gantry cranes with utility power or the replacement of high frequency backup alarms with broadband backup alarms. With HECO power sources at the gantry cranes, it was assumed that the electric motor drives at the gantry cranes would not be audible along Auiki Street. The broadband backup alarms would be similar in overall sound level to the high frequency backup alarms, but would be much more difficult to aurally detect due their less distinctive aural characteristics.

Figure 21 depicts receptor Locations C, C2, and C3 which are shielded by existing two and three story buildings mauka of Auiki Street. Predictions of sound levels at these three receptor locations without the sound attenuating wall (shown in Figure 3) but with the HECO power sources at the gantry cranes and with broadband backup alarms are shown in Figures 22 through 24.

Recommendations. Noise generated by the container yard and its operating equipment will be within the State DOH noise level limits, however, to achieve the "inaudible" sound attenuating goal is impossible, and to implement the minimum "7 dBA sound attenuating" goal using State DOT, Highways Division noise policy definition of "reasonable" and "feasible" may not be possible. Hence, other suggested methods of minimizing potential noise impacts on residences mauko of the proposed Kapalama Container Terminal are available for application on the project.

- Require the replacement of high frequency beeper type backup alarms with broadband noise backup alarms. The primary reason for recommending the use of broadband noise backup alarms for Container Terminal vehicles is to reduce the distance at which the alarms would be audible within the neighboring communities. For the same sound emission level (in dBA) as the high frequency beeper type backup alarm, the audible distances within the surrounding community may be reduced by a factor of three because it is more difficult for the human ear and brain to detect a broadband noise source instead of a coherent and unique, high frequency, beeper type, noise source. The broadband noise sources should also be provided with automatic controls which adjust the sound emission level based on background noise level.

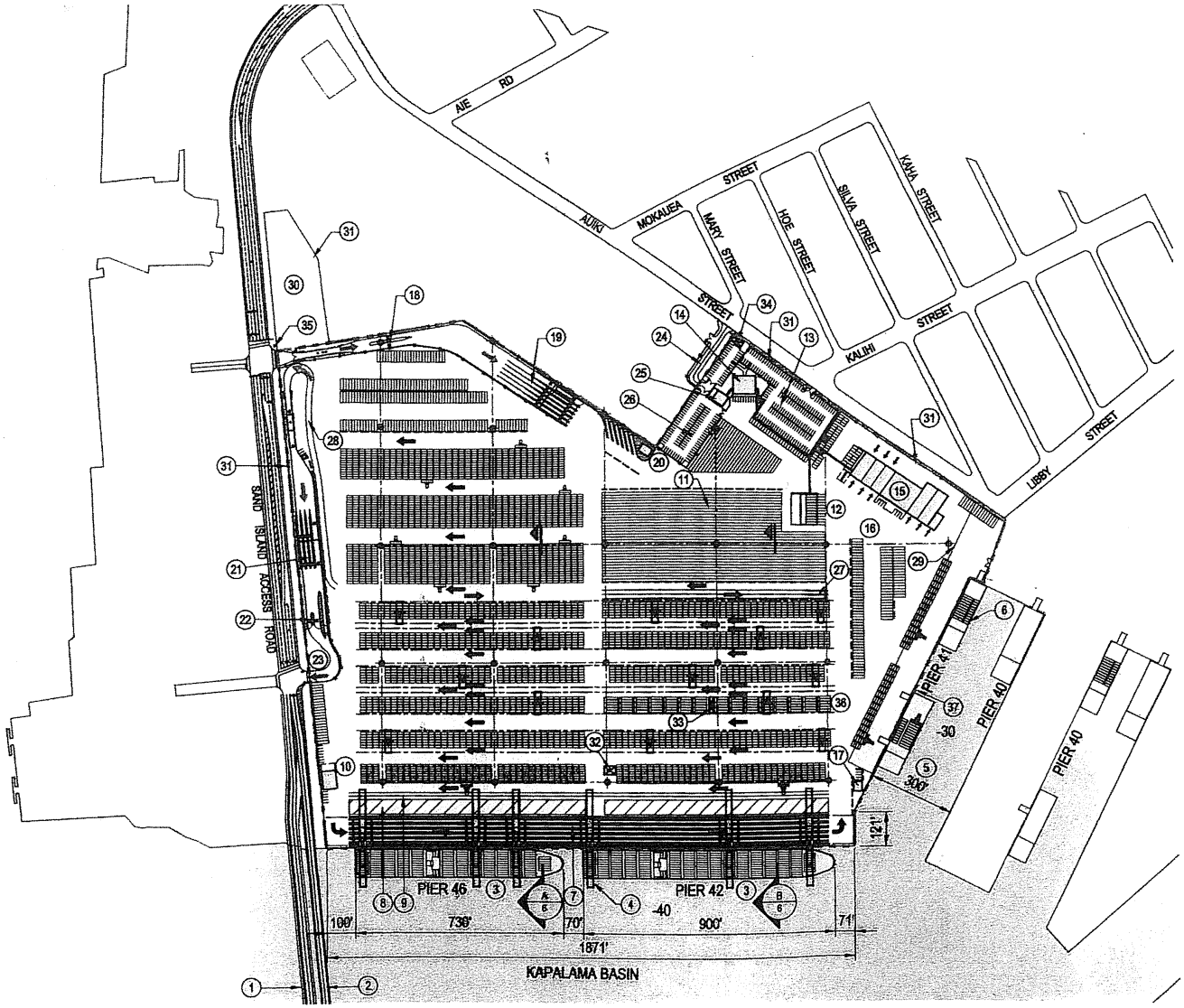
- Use the north section of the Container Terminal area closest to the existing residences for daytime loading (pickup) and unloading (delivery) by off-site tractor trailers, and not for overnight stacking of the empty and full containers which are moved at night to/from the cargo vessel.

- Require diesel engines with sound attenuation kits for the new gantry cranes which are planned for the Kapalama Container Terminal. Approximately 10 dBA of additional quieting beyond those provided by the existing diesel engine at the Horizon Lines facility should be required. Alternately, replace the diesel engines with utility (HECO) power sources.

- Require that the tenants at the Kapalama Container Terminal facility utilize the quietist equipment available which also meet their operational requirements.

- Following completion of the proposed Kapalama Container Terminal facility, and in response to any complaints regarding noise emissions from the facility at noise sensitive residences, perform sound level measurements at the complaint's residence similar to those obtained at Locations D, E, and F (see Figures 2, 8, 9, and 10) to determine if sound levels associated with the container terminal operations exceed the Federal Housing Administration / Housing and Urban Development (FHA/HUD) noise standard of 65 DNL (Day Night Average Sound Level) for residences. If the noise levels resulting from the Kapalama Container Terminal facility exceed 65 DNL at the residence, provide sound attenuation treatment in the form of closure and air conditioning for the affected residence.

- Include sound attenuation treatments to all fixed machinery such that the equipments' sound levels do not exceed 50 dBA at the closest residence.



CONTAINER YARD - BUILDOUT PLAN

1"=400'

KEYNOTES

1. BRIDGE - SOUTHBOUND LANES
2. BRIDGE - NORTHBOUND LANES
3. 12 WIDE CONTAINER SHIP
4. 100' GAGE CONTAINER CRANE, TYP
5. WIDENED BARGE SLIP
6. TRANS-SHIPPING BARGES
7. 5 WHARF LOAD LANES
8. HATCH COVER LAYDOWN AREA
9. CIRCULATION LANES
10. MARINE OPERATIONS BUILDING
11. AUTO STORAGE AREA (227,200 SF / 5.2 ACRES)
12. AUTO PROCESSING CANOPY
13. POV PARKING 165 STALLS
14. ADMINISTRATION BUILDING
15. MAINTENANCE AND REPAIR BUILDING
16. MAINTENANCE AND REPAIR BUFFER AREA
17. LABOR TOILET BUILDING
18. CONTAINER YARD ENTRY W/ GUARD BOOTH
19. ENTRY GATE
20. TROUBLE PARKING AND DRIVER SERVICE BUILDING
21. EXIT GATE
22. EXIT SECURITY BOOTH
23. CONTAINER YARD EXIT
24. ACCESS TO AUTO STAGING AREA
25. AUTO RECEPTION BUILDING
26. AUTO PROCESSING STAGING AREA
27. YARD QUEUE
28. OVERFLOW EXIT QUEUE
29. OPTIONAL FENCE BOUNDARY
30. POTENTIAL AUTO PARKING OR CHASSIS YARD
31. LOW MAST LIGHT POLES NEEDED IN BOUNDARY AREA
32. CRANE SWITCHGEAR
33. REEFER SUBSTATION
34. MAIN SUBSTATION
35. TERMINAL ENTRY SIGNAGE
36. REEFER AREA LOCATED MID-YARD FOR PURPOSE OF PHASING
37. WHARF STRUCTURE ADEQUATE FOR BARGES AND SMALL SHIPS

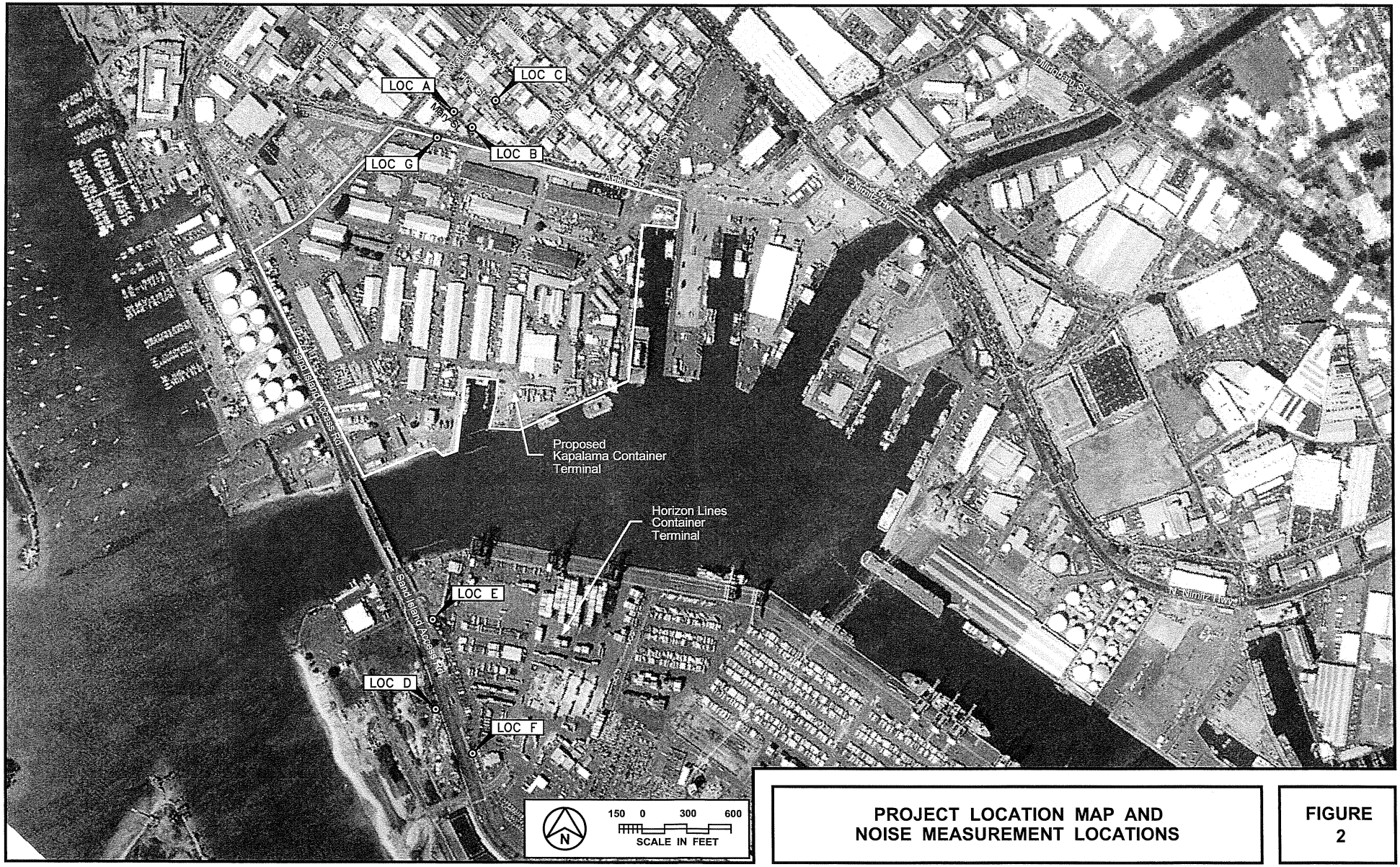
LEGEND

- TOP PICK 20' GROUNDED DRY CONTAINERS - 538 TGS
- RTG 20' GROUNDED CONTAINERS - 1,938 TGS
- RTG 40' GROUNDED REEFER CONTAINERS - 90 FGS
- SIDE PICK 20' GROUNDED EMPTY CONTAINERS - 1,612 TGS
- TOP PICK 20' GROUNDED TRANS-SHIPMENT CONTAINERS - 124 TGS
- 40' WHEELED CONTAINERS - 312 SLOTS
- BUILDING
- YOUNG BROTHERS PORTION OF TERMINAL - 2.5 ACRES
- LANDSCAPED AREA
- TERMINAL BOUNDARY - 86 ACRES
- CONCRETE BARRIER
- SECURITY FENCE
- ENTRY TRAFFIC FLOW
- EXIT TRAFFIC FLOW
- GENERAL TRAFFIC FLOW
- HIGH MAST LIGHT POLE

REF. N

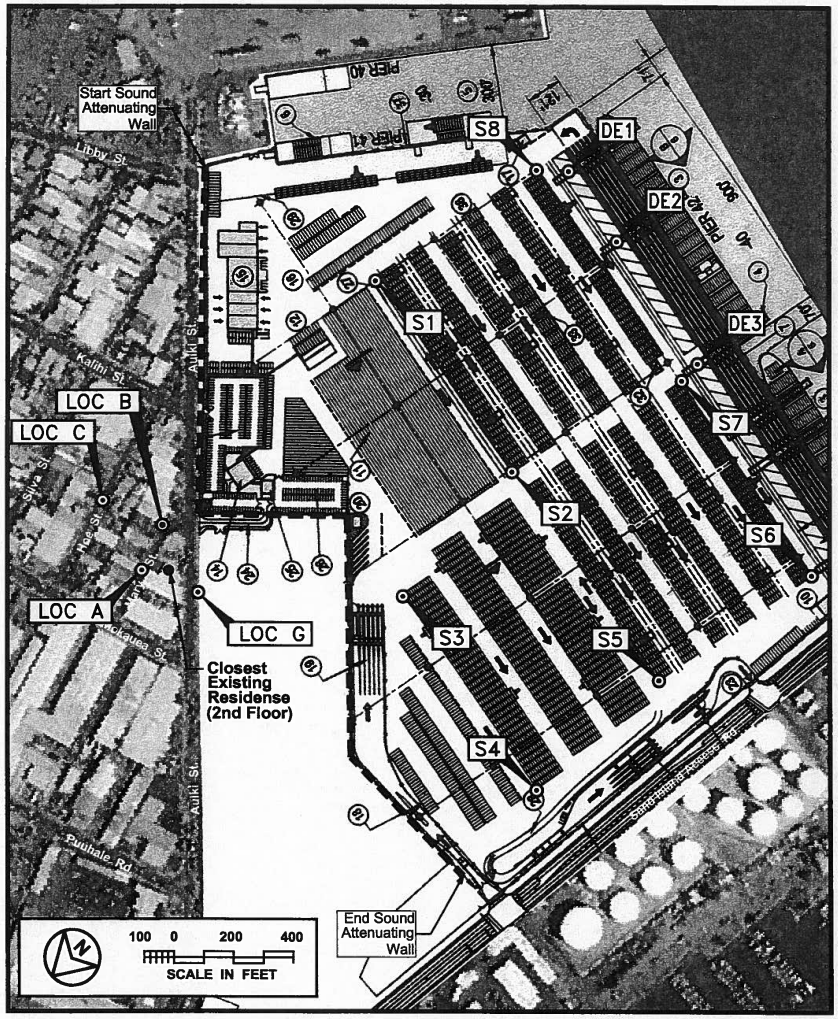
0' 200' 400' 600'
SCALE: 1" = 200' FULL SIZE
1" = 400' HALF SIZE

FIGURE 1



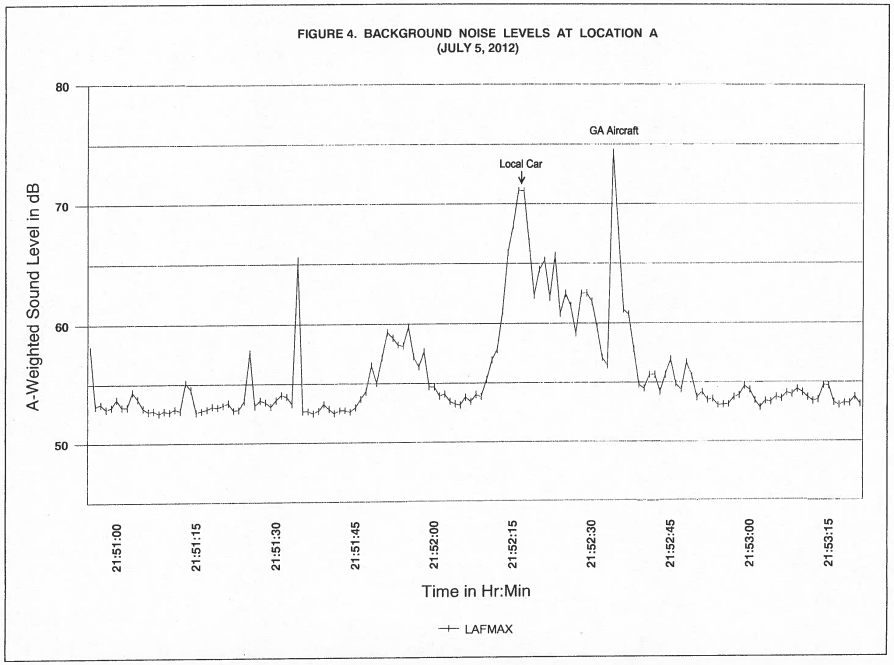
PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE 2



MODELED NOISE SOURCE LOCATIONS AND LOCATION OF SOUND ATTENUATING WALL

FIGURE 3



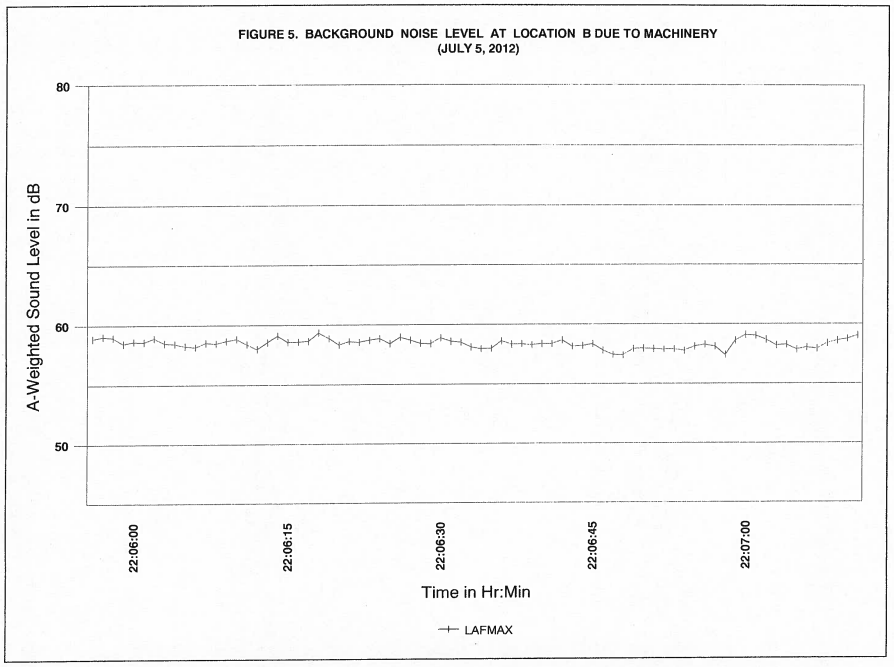


FIGURE 5. BACKGROUND NOISE LEVEL AT LOCATION B DUE TO MACHINERY
(JULY 5, 2012)
A-Weighted Sound Level in dB
80
70
60
50
22:06:00
22:06:15
22:06:30
22:06:45
22:07:00
Time in Hr:Min
LAFMAX

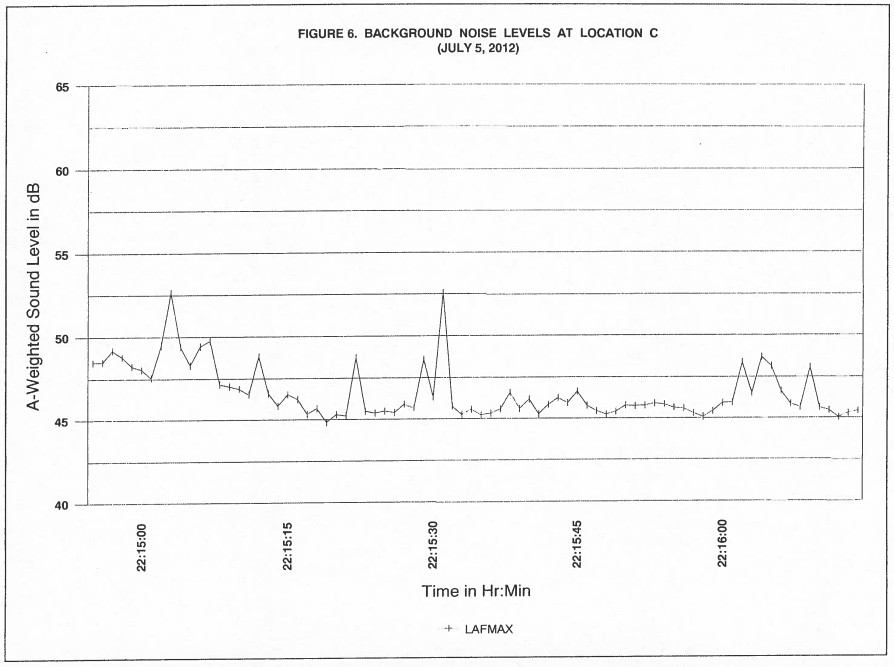


FIGURE 6. BACKGROUND NOISE LEVELS AT LOCATION C
(JULY 5, 2012)
A-Weighted Sound Level in dB
65
60
55
50
45
40
22:15:00
22:15:15
22:15:30
22:15:45
22:16:00
Time in Hr:Min
LAFMAX

FIGURE 7. BACKGROUND NOISE LEVELS AT LOCATION G
(JULY 5, 2012)

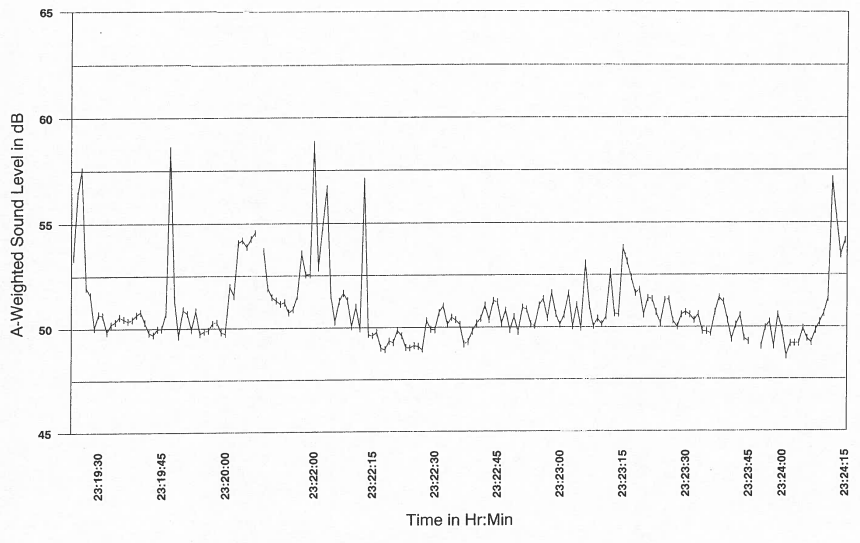
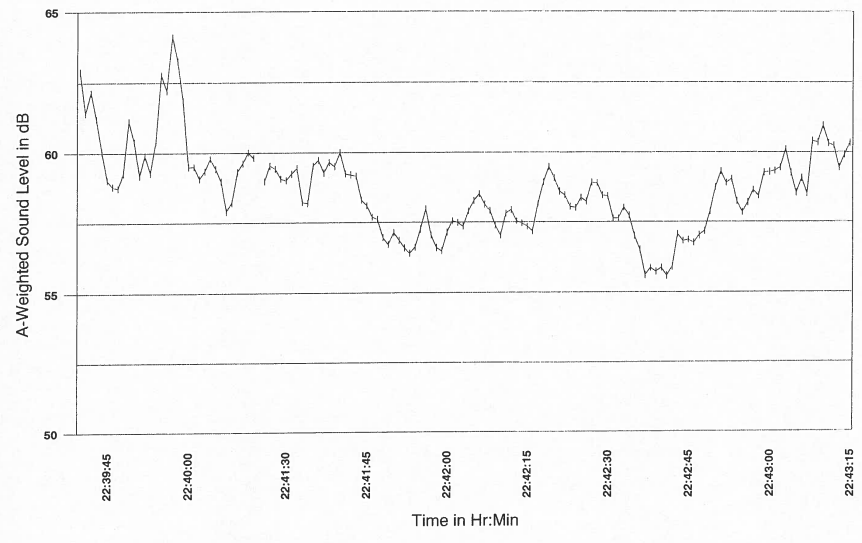


FIGURE 8. CONTAINER TERMINAL NOISE MEASURED AT LOCATION D
(JULY 5, 2012)



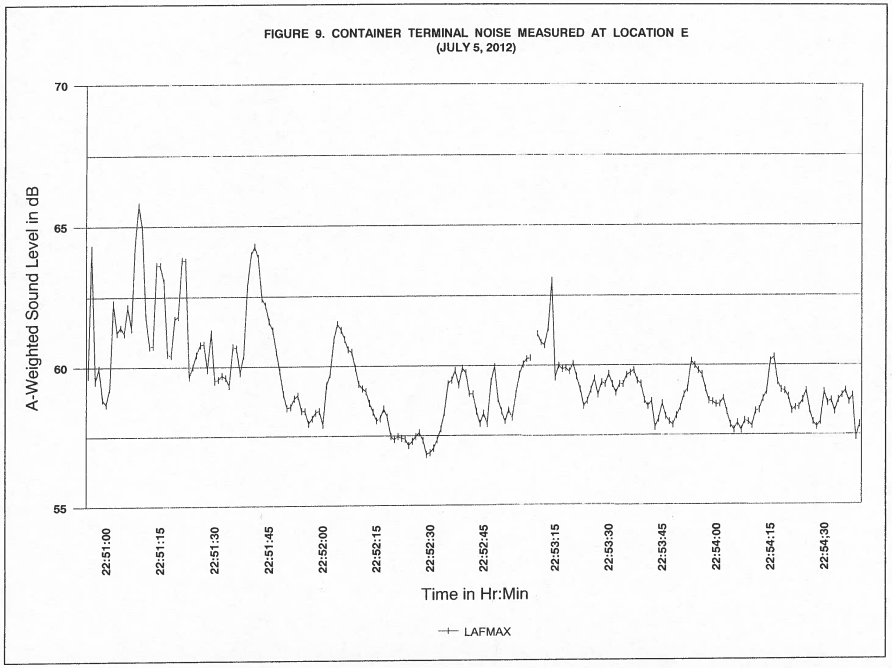


FIGURE 9. CONTAINER TERMINAL NOISE MEASURED AT LOCATION E
(JULY 5, 2012)
A-Weighted Sound Level in dB
70
65
60
55
22:51:00
22:51:15
22:51:30
22:51:45
22:52:00
22:52:15
22:52:30
22:52:45
22:53:15
22:53:30
22:53:45
22:54:00
22:54:15
22:54:30
Time in Hr:Min
LAFMAX

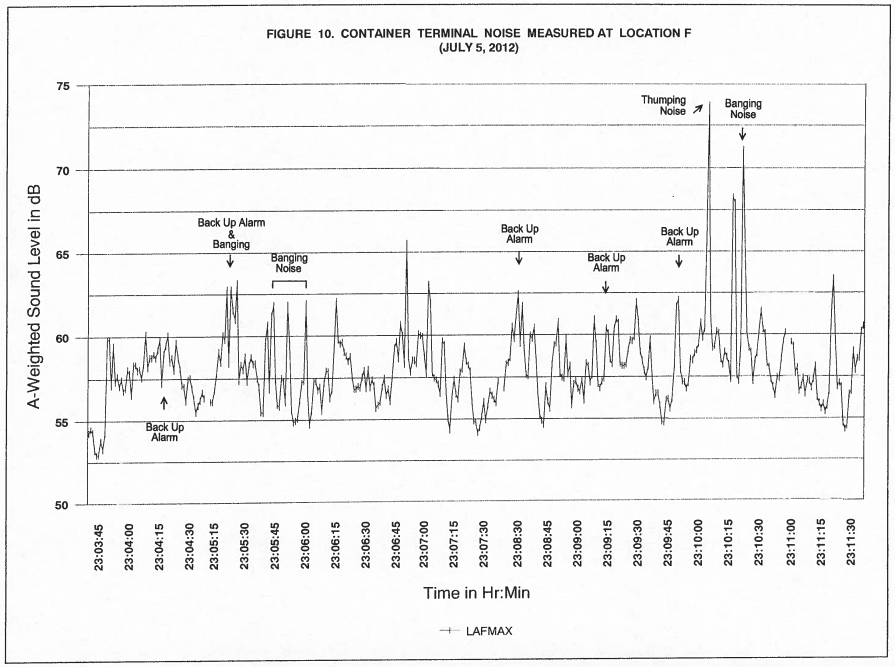


FIGURE 10. CONTAINER TERMINAL NOISE MEASURED AT LOCATION F
(JULY 5, 2012)
A-Weighted Sound Level in dB
75
70
65
60
55
50
Back Up Alarm
Back Up Alarm & Banging
Banging Noise
Back Up Alarm
Back Up Alarm
Back Up Alarm
Thumping Noise
Banging Noise
23:03:45
23:04:00
23:04:15
23:04:30
23:05:15
23:05:30
23:05:45
23:06:00
23:06:15
23:06:30
23:06:45
23:07:00
23:07:15
23:07:30
23:08:30
23:08:45
23:09:00
23:09:15
23:09:30
23:09:45
23:10:00
23:10:15
23:10:30
23:11:00
23:11:15
23:11:30
Time in Hr:Min
LAFMAX

FIGURE 11. TOP HANDLER CENTERED AT 87 FEET, TRANSFERING EMPTY CONTAINERS FROM STACK TO HUSTLERS
(HORIZON LINES FACILITY; JULY 5, 2012)

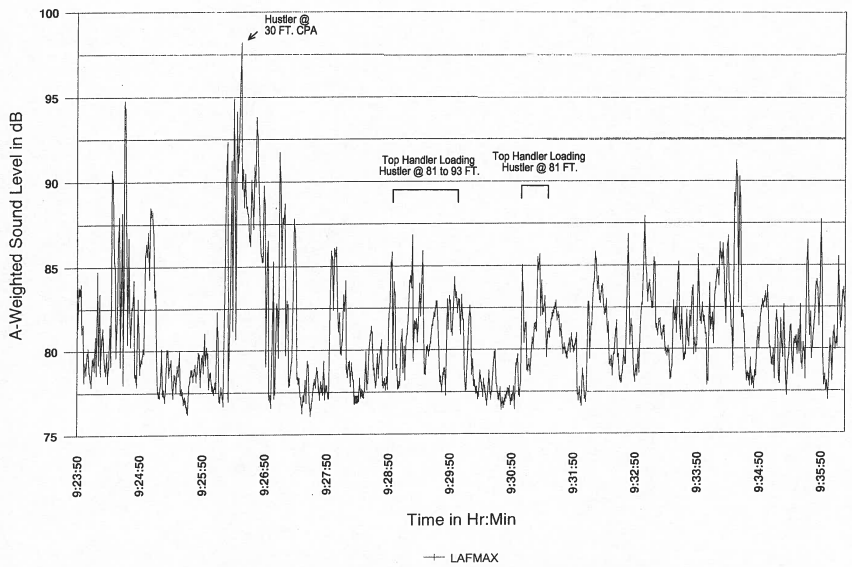


FIGURE 12. TOP HANDLER CENTERED AT 50 FEET; FORWARD, REVERSE, AND OPERATING LIFT
(HORIZON LINES FACILITY; JULY 5, 2012)

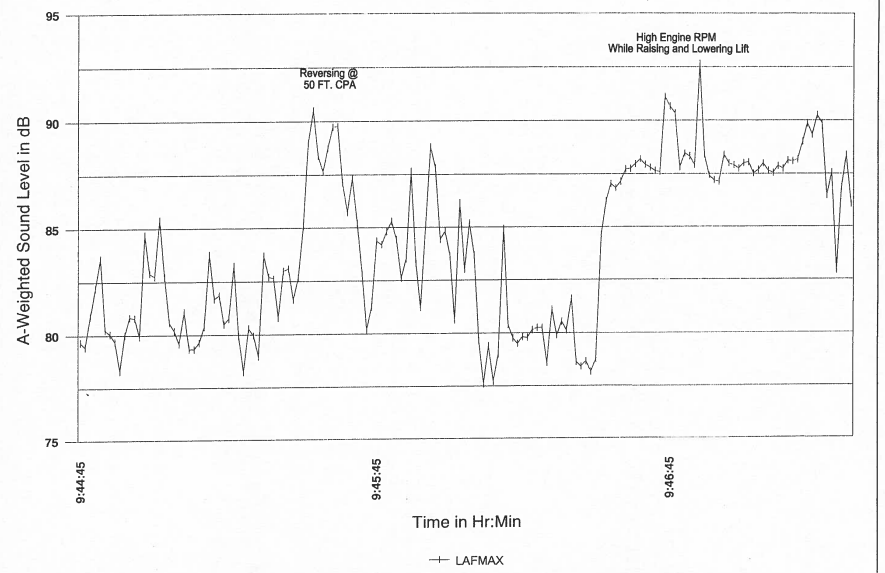


FIGURE 13. GANTRY CRANE (WITH HIGH DIESEL ENGINE) STOPPED AT 57 FEET CPA
(HORIZON LINES FACILITY; JULY 5, 2012)

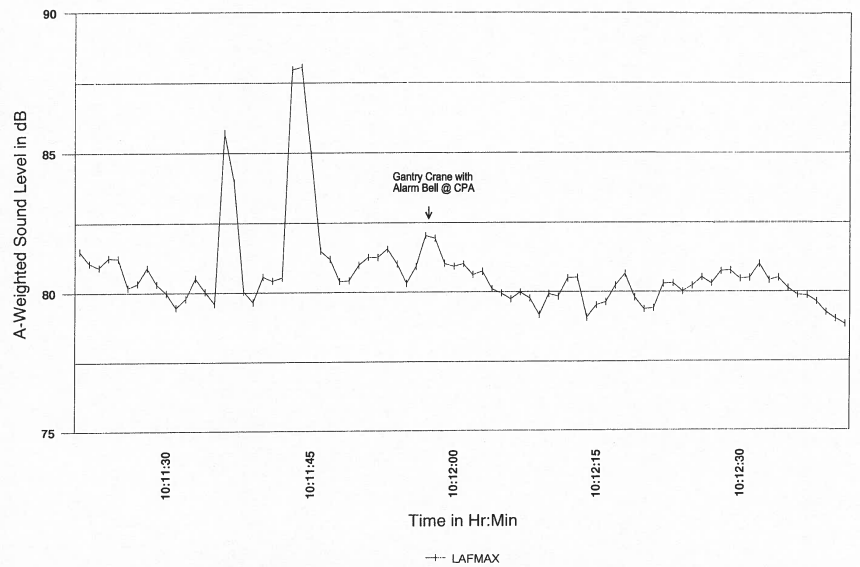


FIGURE 14. GANTRY CRANE (WITH HIGH DIESEL ENGINE) START AND STOP AT 57 FEET CPA AND BELL ALARM)
(HORIZON LINES FACILITY; JULY 5, 2012)

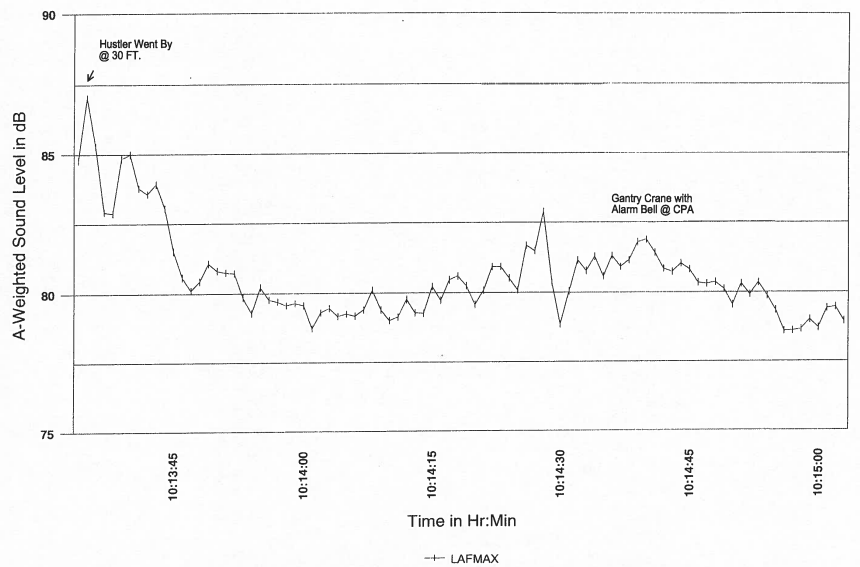
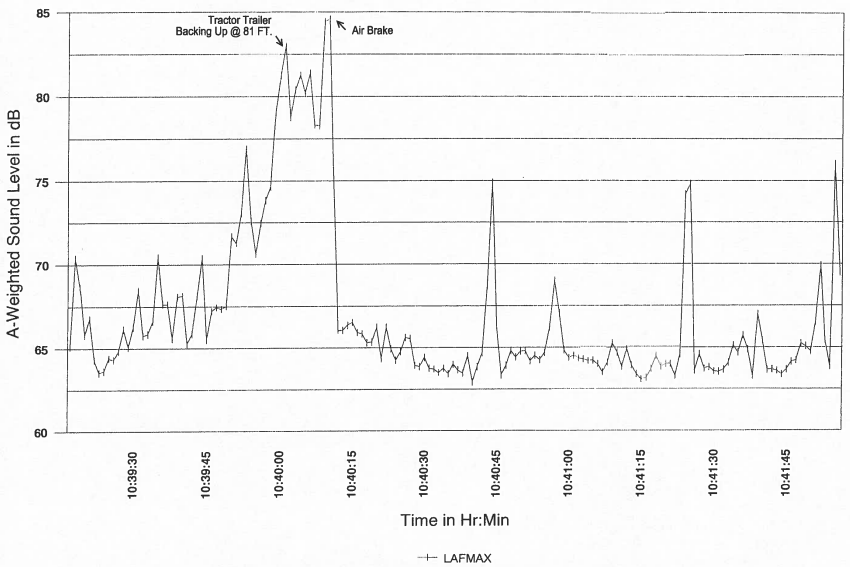
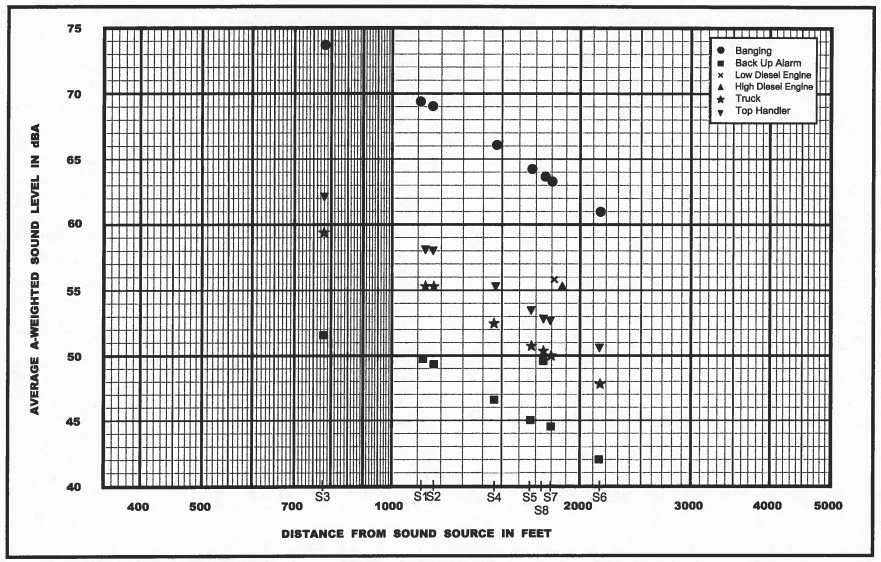


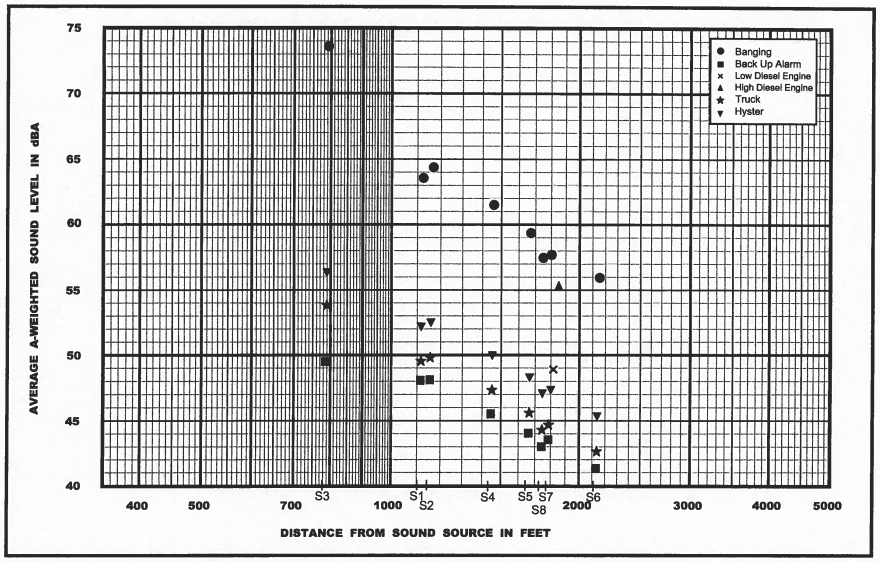
FIGURE 15. TRACTOR TRAILER AT 81 FEET WITH BACKUP ALARM, STOP, AIR BRAKE RELEASE
(YOUNG BROTHERS FACILITY; JULY 5, 2012)





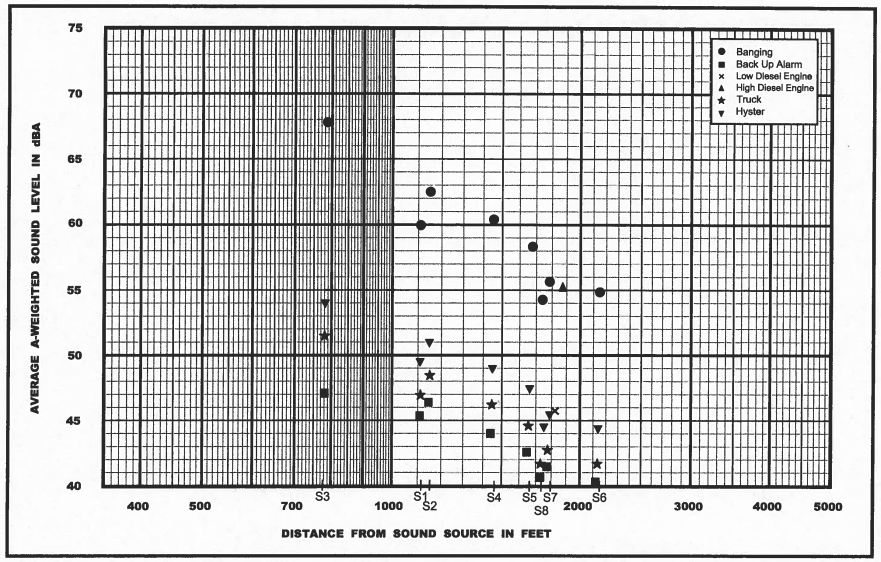
PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT CLOSEST NOISE SENSITIVE RECEPTOR WITH 15 FT HIGH WALL

FIGURE 16



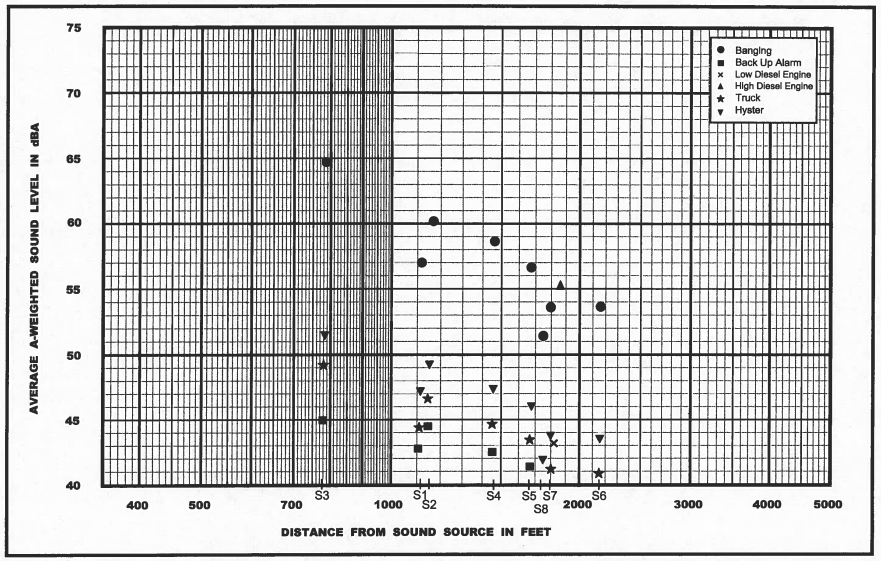
PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT CLOSEST NOISE SENSITIVE RECEPTOR WITH 20 FT HIGH WALL

FIGURE 17



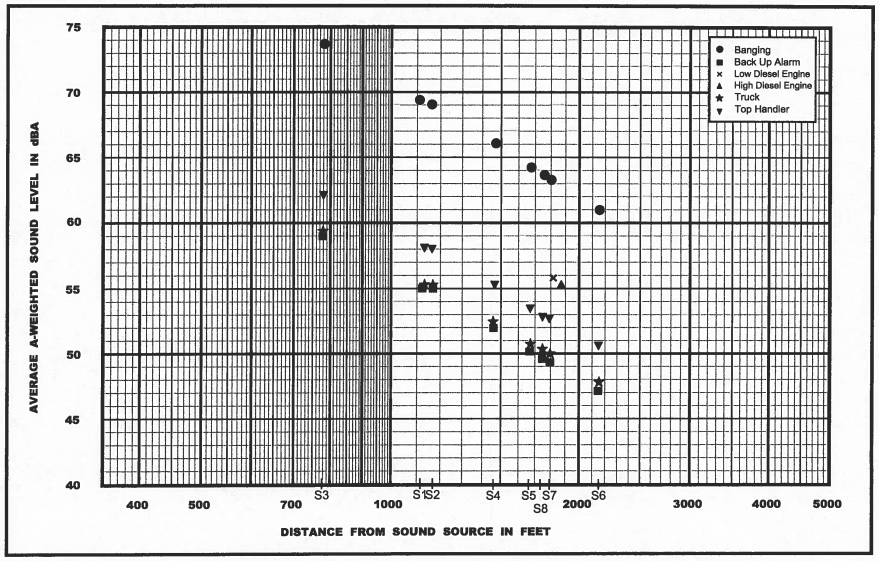
PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT CLOSEST NOISE SENSITIVE RECEPTOR WITH 25 FT HIGH WALL

FIGURE 18



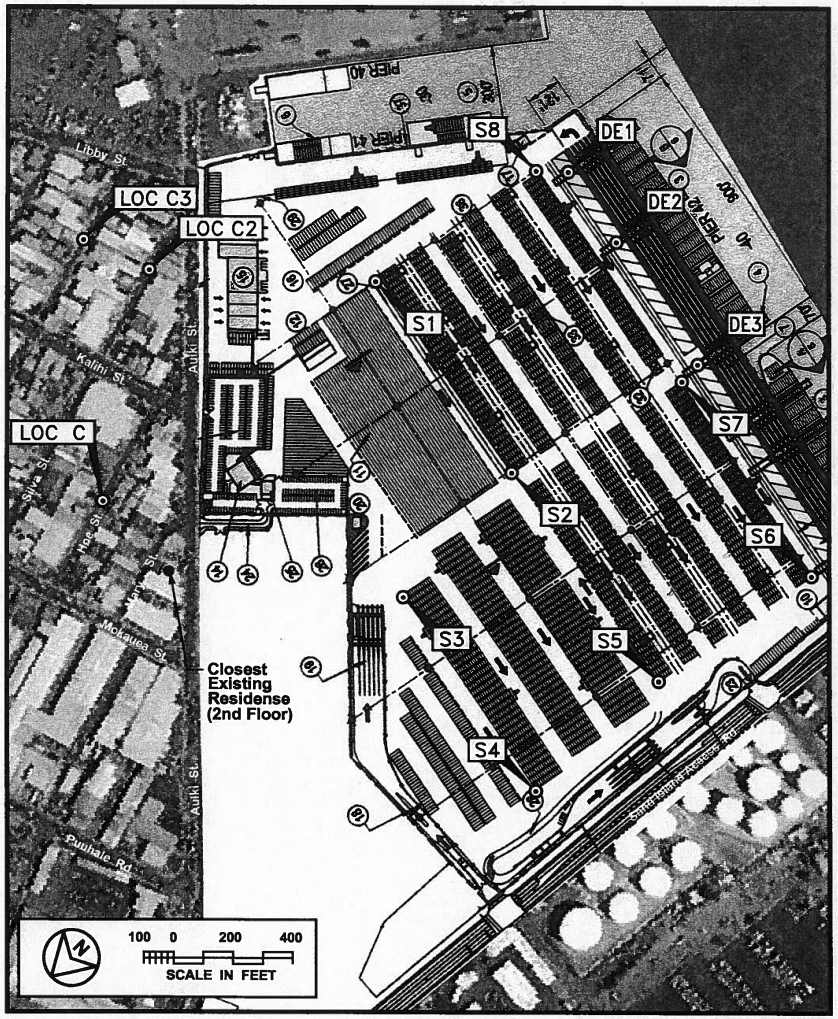
PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT CLOSEST NOISE SENSITIVE RECEPTOR WITH 30 FT HIGH WALL

FIGURE 19



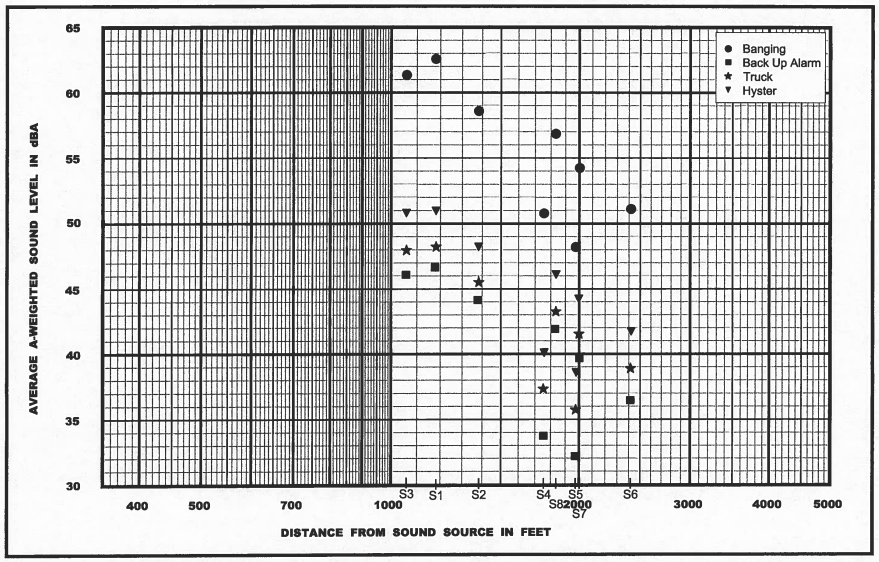
PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT CLOSEST NOISE SENSITIVE RECEPTOR WITHOUT WALL

FIGURE 20



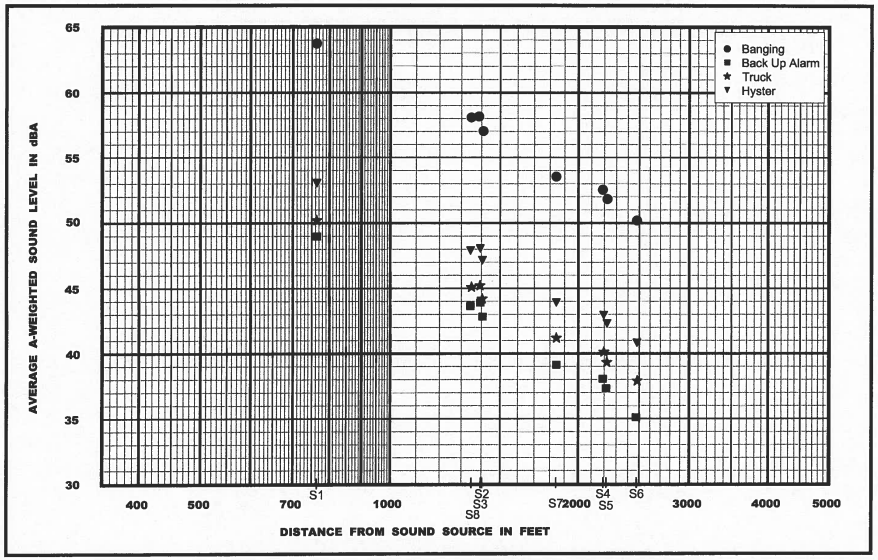
MODELED NOISE SOURCE LOCATIONS AND LOCATIONS OF NOISE SENSITIVE RECEPTORS MAUKA OF AUIKI STREET

FIGURE 21



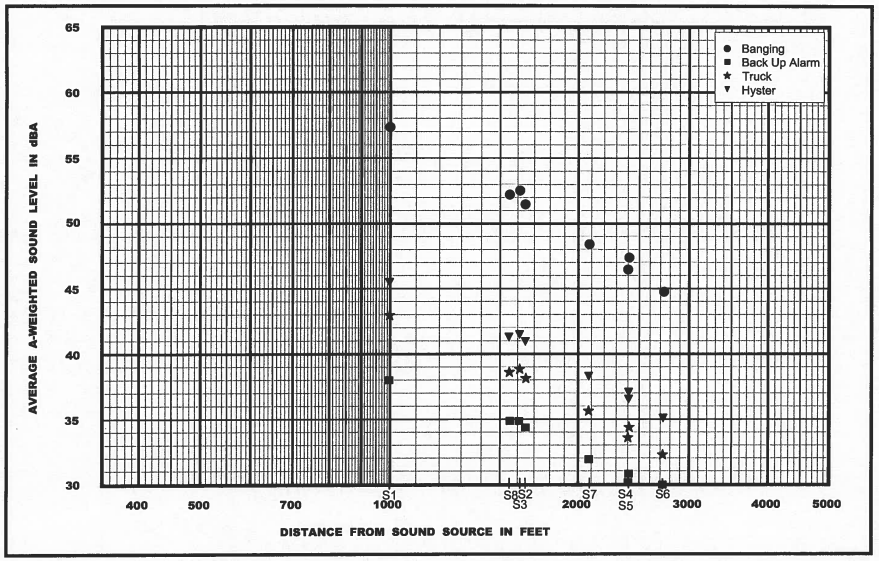
PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT RECEPTOR LOCATION C WITHOUT WALL

FIGURE 22



PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT RECEPTOR LOCATION C2 WITHOUT WALL

FIGURE 23



PREDICTED MAXIMUM SOUND LEVELS OF CONTAINER TERMINAL EQUIPMENT AT RECEPTOR LOCATION C3 WITHOUT WALL

FIGURE 24

Acoustic Study for the Pacific Shipyards International Relocation from Pier 41 to Piers 24 and 25, Honolulu Harbor

June 2012

Department of Transportation
State of Hawaii
Harbors Division

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CHAPTER I. SUMMARY

The future noise levels associated with the proposed relocation of the existing Pacific Shipyards International (or Pacific Shipyards) from Pier 41 to Piers 24 and 25 in Honolulu Harbor were evaluated for their potential impacts on noise sensitive receptors in the project environs. Future noise levels and potential impacts associated with the relocated shipyard operations were evaluated.

Along Nimitz Highway, which is expected to service the project traffic, traffic noise levels at noise sensitive receptors closest to the project site are not expected to change significantly. Due to the relatively low volumes of project traffic (100 vehicles per hour or less) when compared to the high volumes of non-project traffic (4,500 to 6,500 vehicles per hour) on Nimitz Highway, traffic noise level increases should be less then 0.1 dB and will be difficult to measure. Traffic noise level increases associated with the Pacific Shipyards relocation to Piers 24 and 25 should not result in adverse traffic noise impacts.

Noise from on site activities at the relocated Pacific Shipyards facility should not result in adverse noise impacts at the closest noise sensitive receptor (Harbor Village Apartments) if the noisy shipyard operations are limited to the daytime hours. Hammering and chipping operations may be audible and exceed existing nighttime and early morning background noise levels at the closest noise sensitive receptor. During the daytime hours, the background noise levels at the closest noise sensitive receptor will be higher than the noise levels from the relocated shipyard activities, and therefore, adverse noise impacts are not expected during daytime shipyard operations.

During the quieter nighttime hours, pneumatic chipping and hammering operations at Pacific Shipyards may be audible at noise sensitive receptors in Downtown Honolulu. This is due to the lower background noise levels, more favorable atmospheric propagation conditions during darkness, and the greater amount of low frequency noise components in pneumatic chipping and hammering operations.

Therefore, prior to scheduling nighttime work at the relocated shipyard facility, measurements of the noisy operations should be made at the closest noise sensitive receptor during the quietist periods of the nighttime and/or early morning hours when the shipyard work is anticipated to occur. If different types of equipment are used in the future, daytime noise measurements are also recommended to evaluate the risks of noise impacts during nighttime and early morning operations. If noise mitigation measures are required due to complaints regarding noise from nighttime shipyard operations, the total noise level associated with nighttime (between 10:00 pm and 7:00 am) shipyard work should be attenuated so as to not exceed 50 dBA at the closest noise sensitive residence.

Adverse impacts from construction noise are not expected to occur due to the large buffer distances (at least 1,800 feet) from the project site to the closest residences, and construction noise mitigation measures should not be required. The

This report prepared by Y. Ebisu & Associates.

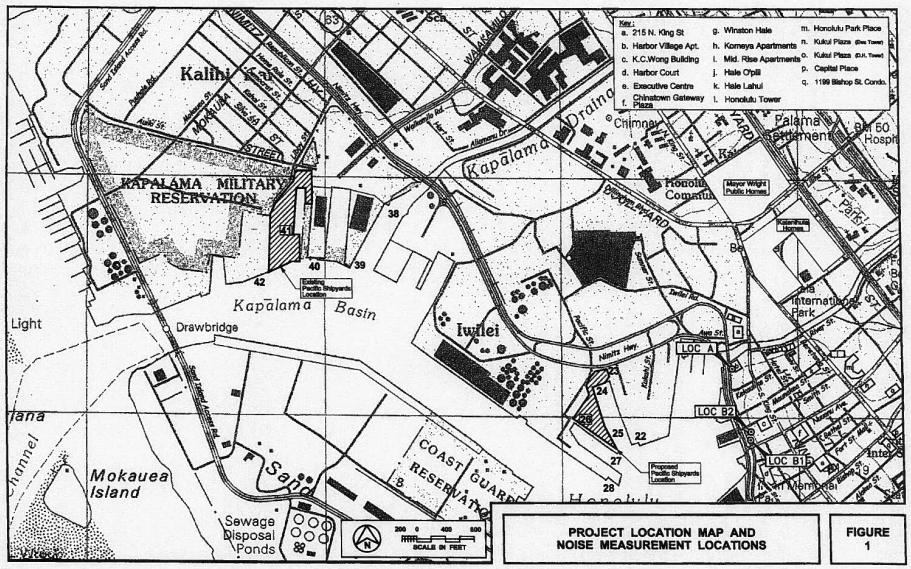
implementation of State DOH construction noise permit procedures will require that noisy construction activities do not occur during the nighttime, Sundays, and holidays. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the construction work sites.

CHAPTER II. PURPOSE

The primary objective of this study was to describe the future noise levels and potential noise impacts associated with the proposed relocation of the Pacific Shipyards International (or Pacific Shipyards) facility from Pier 41 in the Kapalama Terminal area to Piers 24 and 25 in Honolulu Harbor. The locations of the existing and proposed locations for Pacific Shipyards are shown in Figure 1. The relocation of Pacific Shipyards is part of the development of the proposed Kapalama Container Terminal project, which will displace the Pacific Shipyards from the area.

Roadway traffic noise levels and impacts associated with the relocation of Pacific Shipyards were to be determined along the primary access roadways which are expected to service the shipyard traffic. A specific objective was to determine future traffic noise levels associated with the relocation project traffic, and the potential noise impacts associated with relocation project traffic. Recommendations for minimizing traffic noise impacts were to be provided as required.

Assessments of possible noise impacts from on-site activities and as well as from short term construction noise at the proposed location for Pacific Shipyards were also included in the noise study objectives. Recommendations for minimizing these noise impacts were to be provided as required.



PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE 1

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. The maximum A-Weighted sound level occurring while a noise source such as a heavy truck or aircraft is moving past a listener (i.e., the maximum sound level from a "single event") is referred to as the "Lmax value". The mathematical product (or integral) of the instantaneous sound level times the duration of the event is known as the "Sound Exposure Level", or Lse, which is analogous to the energy of the time-varying sound levels associated with a single event.

The DNL values represent the average noise during a typical day of the year. DNL exposure levels of 55 or less are typical of quiet rural or suburban areas. DNL exposure levels of 55 to 65 are typical of urbanized areas with medium to high levels of activity and street traffic. DNL exposure levels above 65 are representative of densely developed urban areas and areas fronting high volume roadways.

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. Because of the averaging used, DNL values in urbanized areas typically range between 50 and 75 DNL. In comparison, the typical range of intermittent noise events may have maximum Sound Level Meter readings between 75 and 105 dBA. A more complete list of noise descriptors is provided in Appendix B to this report. In Appendix B, the Ldn descriptor symbol is used in place of the DNL descriptor symbol.

Table 1, extracted from Reference 1, categorizes the various DNL levels of outdoor noise exposure with severity classifications. Table 2, also extracted from Reference 1, presents the general effects of noise on people in residential use situations. Figure 2, extracted from Reference 2, presents suggested land use compatibility guidelines for residential and nonresidential land uses. A general consensus among federal agencies has developed whereby residential housing development is considered acceptable in areas where exterior noise does not exceed 65 DNL. This value of 65 DNL is used as a federal regulatory threshold for determining the necessity for special noise abatement measures when applications for federal funding assistance are made.

As a general rule, noise levels of 55 DNL or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, DNL levels generally range from 55 to 65 DNL, and are

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 DNL	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL But Not Above 65 DNL	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 DNL But Not Above 75 DNL	Above 65 Leq But Not Above 75 Leq	Normally 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) 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.

TABLE 2

EFFECTS OF NOISE ON PEOPLE
(Residential Land Uses Only)

EFFECTS[1] / DAY-NIGHT AVERAGE SOUND LEVEL IN DECIBELS	Hearing Loss	Speech Interference		Annoyance[2]	Average Community Reaction[4]	General Community Attitude Towards Area
		Indoor	Outdoor			
	Qualitative Description	%Sentence Intelligibility	Distance in Meters for 95% Sentence Intelligibility	% of Population Highly Annoyed[3]		
75 and above	May Begin to Occur	98%	0.5	37%	Very Severe	Noise is likely to be the most important of all adverse aspects of the community environment.
70	Will Not Likely Occur	99%	0.9	25%	Severe	Noise is one of the most important adverse aspects of the community environment.
65	Will Not Occur	100%	1.5	15%	Significant	Noise is one of the important adverse aspects of the community environment.
60	Will Not Occur	100%	2.0	9%	Moderate to Slight	Noise may be considered an adverse aspect of the community environment.
55 and below	Will Not Occur	100%	3.5	4%		Noise considered no more important than various other environmental factors.

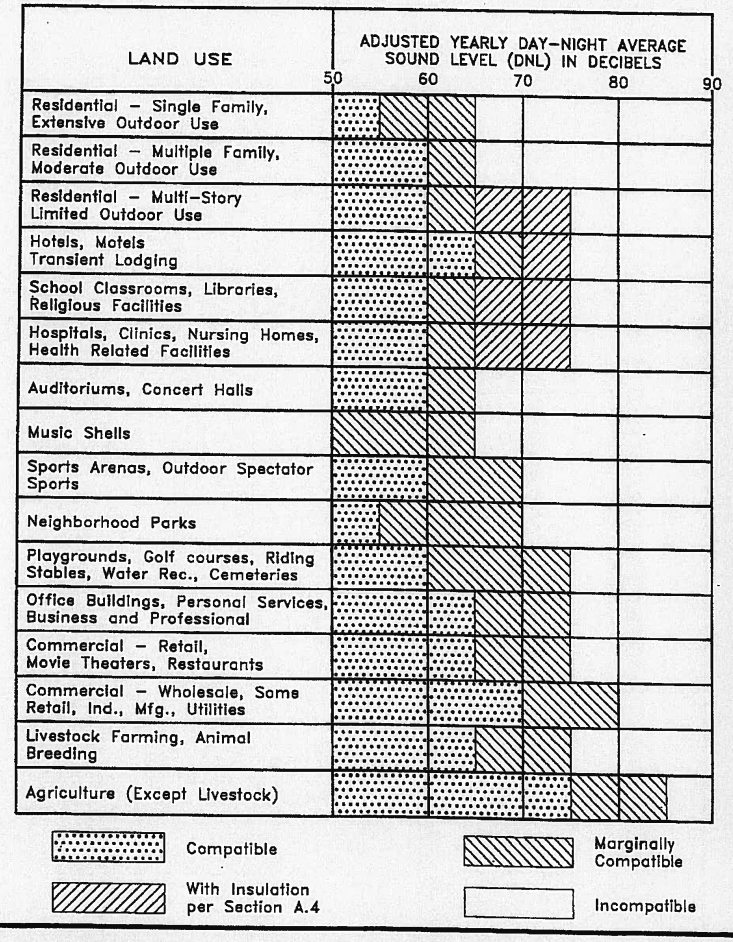
1. "Speech Interference" data are drawn from the following tables in EPA's "Levels Document": Table 3, Fig. D-1, Fig. D-2, Fig. D-3. All other data from National Academy of Science 1977 report "Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Evaluation of Environmental Impact of Noise."

2. Depends on attitudes and other factors.

3. The percentages of people reporting annoyance to lesser extents are higher in each case. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time.

4. Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

NOTE: Research implicates noise as a factor producing stress-related health effects such as heart disease, high-blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been quantified.



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 2

usually controlled by motor vehicle traffic noise. Residences which front major roadways can be exposed to levels of 65 DNL. Due to noise shielding effects from intervening structures, interior lots are usually exposed to 3 to 10 DNL lower noise levels than the front lots which are not shielded from the traffic noise.

For the purposes of determining an acceptable level of exterior noise for residences, federal agencies have determined that an exterior noise level of 65 DNL or lower is considered acceptable. These federal agencies include the Federal Aviation Administration (FAA), Department of Defense (DOD); Federal Housing Administration, Housing and Urban Development (FHA/HUD), and Veterans Administration (VA). This standard is applied nationally (see Reference 3).

For office, commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 70 to 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 State Department of Health (DOH) regulates the noise levels from fixed machinery by imposing maximum allowable sound levels at the property boundaries for various zoning categories (see Reference 4). Because of the Industrial Zoning of the project site, the allowable noise levels from fixed machinery at or beyond the project site boundaries is 70 dBA during the daytime and nighttime periods. The noise levels of portable or movable equipment (such as trucks, front end loaders, fork lifts, etc.) are not subject to the 70 dBA limit under DOH noise regulations.

Due to the relatively large (1,800+ feet) buffer distances between the proposed Pacific Shipyards site and noise sensitive receptors, regulation of the noise levels during construction of the shipyard facility is not as critical as it would be within an urban area. Construction noise levels are regulated by the State DOH using a curfew system (Reference 4) whereby noisy construction activities are not normally permitted during the nighttime periods, on Sundays, and on holidays. Construction activities are normally allowed during the normal daytime work hours on weekdays and on Saturdays using a system involving the issuance of construction noise permits.

CHAPTER IV. GENERAL STUDY METHODOLOGY

General. Computer noise modeling was used to describe the noise levels associated with shipyard activities at the closest noise sensitive receptors across Nimitz Highway. The noise levels of shipyard activities such as Needle Gun work; chipping and pounding; sandblasting; and water blasting were measured at the existing Pacific Shipyards facility at Pier 41, and were used to form a basis for modeling the noise levels from the relocated facility at Piers 24 and 25. The noise from these equipment and operations at the relocated facility and from motor vehicles traveling along the primary access roads to the relocated shipyard facility were evaluated. Risks of adverse noise impacts from shipyard operations, traffic, and short term construction noise were determined, and possible noise mitigation measures were provided as applicable.

Traffic Noise Measurements. Traffic noise measurements were obtained at Locations B1 and B2 along Nimitz Highway (see Figure 1) in March and April of 2012 to validate the traffic noise model, and to describe background ambient noise levels during low and high volume traffic conditions. The U.S. Federal Highway Administration Traffic Noise Model (TNM) Version 2.5 (Reference 5) was used to calculate existing and future traffic noise levels, with the traffic noise measurements used to validate the reasonableness of the traffic noise predictions provided by the TNM. The results of these traffic noise measurements and their comparison with TNM predictions are shown in Table 3.

Because background noise levels at the noise sensitive receptor locations closest to Piers 24 and 25 are controlled by traffic along Nimitz Highway, the lowest background noise levels at these receptor locations tend to occur during the early morning hours between 2:00 and 3:00 am. Background ambient noise measurements were obtained at Location A (see Figure 1) at 9:30 pm and 2:46 am on March 12-13, 2012. The minimum background noise level recorded was 49.4 dBA, when no traffic was on the highway near the measurement location. During the normal workday period, minimum background noise levels are approximately 7 to 10 dBA higher than 49.4 dBA.

Noise During Shipyard Activities. Measurements of noise levels associated with various shipyard activities were performed in June and July 2011. Major noise sources associated with the Pacific Shipyards operations were assumed to include Needle Guns, chipping and hammering, indoor sandblasting, and water blasting. Based on the measurements of these noise sources at the existing Pier 41 facility, noise level predictions were made at the closest noise sensitive receptors to the proposed Pier 24 and Pier 25 facility. The noise modeling was performed using inverse square law for hemispherical spreading of a sound from a source at or near the ground, with inclusion of molecular absorption and anomalous excess attenuation effects. The modeling equation used to predict sound levels at any given distance from an on-site noise source was:

$$L_p = L_w - 20 \times \text{Log}(d) - [d \times a(f)] / 100 - 8$$

TABLE 3

TRAFFIC AND BACKGROUND 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)
B1. 70 FT from the center-line of Nimitz Hwy. (3/24/12)	0143 TO 0243	47	468	9	5	66.2	66.1
B2. 100 FT from the center-line of Nimitz Hwy. (4/3/12)	1408 TO 1513	33	4,362	149	133	69.4	69.4

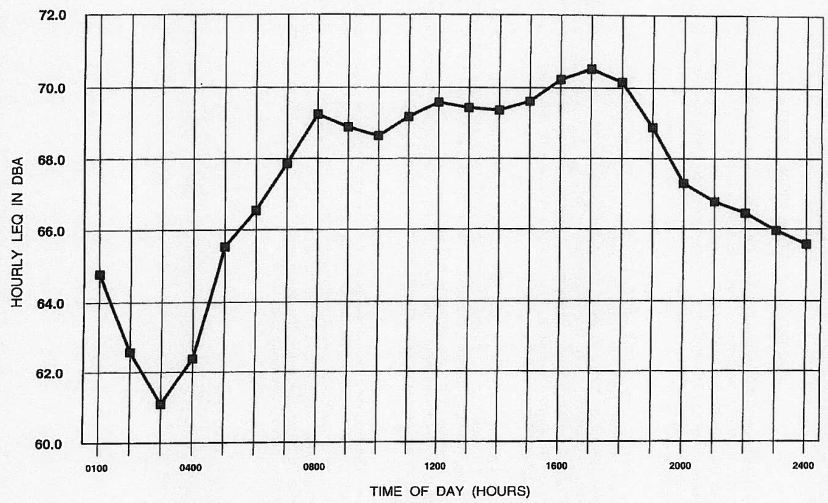
where:

L_p = Sound pressure level in decibels (re $2x10^{-5}$ Pa) at distance d (in meters),
L_w = Sound power level of noise source in decibels (re picowatt), and
a(f) = Molecular absorption plus anomalous excess attenuation in decibels per 100 meters. For the 9 standard Octave Bands from 31.5 Hz to 8,000 Hz, the a(f) values used were 0.1, 0.16, 0.27, 0.39, 0.66, 1.08, 1.9, 3.47, and 5.2.

Traffic Noise Level Predictions. The traffic noise study for the proposed Kapalama Container Terminal (Reference 6) estimates that traffic generated by the proposed Pacific Shipyards operations at Piers 24 and 25 should not exceed 100 vehicles per hour. It was assumed that Pacific Street and Nimitz Highway would be the primary access roadways to the relocated Pacific Shipyards facility. Traffic on Nimitz Highway is the primary background noise source in the vicinity of Piers 24 and 25. Using this information, the increase in traffic noise levels along Nimitz Highway associated with the addition of 100 vehicles per hour was estimated using the TNM Version 2.5. For existing and future traffic along the roadways servicing the project site, it was assumed that the average noise levels, or Leq(h), during the pm peak traffic hour were approximately 2.0 dBA less than the 24-hour DNL along those roadways. The relationships between the hourly noise levels along Nimitz Highway at 100 feet from the centerline and the resulting DNL values are shown in Figure 3. The graphs in the figures were developed using traffic counts provided by the Hawaii State Department of Transportation (Reference 7).

Construction Noise. Evaluations of potential construction noise impacts at noise sensitive properties closest to the proposed Pier 24 and Pier 25 shipyard facility were also provided. Risks of adverse noise impacts from construction activities at Pier 24 and Pier 25 were evaluated, and mitigation measures were recommended as required.

FIGURE 3. NIMITZ HIGHWAY HOURLY LEQ'S AT 100 FT. FROM C.L.; STA. B72009200586; AT NUUANU STREAM BRIDGE



NIMITZ HIGHWAY AT NUUANU STREAM BRIDGE, STA B72009200586 (8/10/09); 72.4 DNL

CHAPTER V. EXISTING NOISE LEVELS

Traffic on Nimitz Highway controls the background noise levels at noise sensitive receptors closest to the proposed Pacific Shipyards facility at Piers 24 and 25. Figure 3 shows the variations in traffic noise levels at 100 feet from the centerline of Nimitz Highway at Nuuanu Stream Bridge. Existing peak hour traffic noise levels along Nimitz Highway are estimated to range from 69 to 71 Leq(h) at 100 foot distance from the centerline.

Existing background ambient noise levels at the proposed shipyard relocation site are relatively high due to the proximity of the proposed shipyard facility site to Nimitz Highway. Nimitz Highway is also adjacent to the closest noise sensitive receptors to the east in Downtown Honolulu. For this reason, and particularly during the normal working hours, background ambient noise levels at the closest noise sensitive receptors are relatively high, and will tend to mask the noise emissions from the proposed shipyard facility.

Nighttime and early morning traffic noise level measurements at Locations A and B1 (see Tables 3 and 4) indicate that background ambient noise levels are relatively high during vehicle passbys, but drop to 48 or 51 dBA when no traffic is flowing on Nimitz Highway during the nighttime and early morning hours. This information was used to predict the audibility of the shipyard noise sources at the closest noise sensitive receptors on the mauka side of Nimitz Highway during the nighttime and early morning period.

Background ambient noise levels along Nimitz Highway are relatively high during periods of traffic flow as indicated by the hourly variations of traffic noise levels at 100 feet from the centerline of Nimitz Highway shown in Figure 3. In addition, background ambient noise levels when traffic is not present along Nimitz Highway typically remain above 56 to 59 dBA during the daytime and remain above 48 to 51 dBA during the nighttime and early morning hours.

TABLE 4
SUMMARY OF BACKGROUND AMBIENT NOISE LEVELS AT LOCATION A

LOCATION: CHINATOWN PARKING GARAGE

DATE: March 12-13, 2012 2250 DATA; VARIOUS MINUTE RECORDS AT 3RD FLOOR LOCATION

Start Time	End Time	LOC	Lmax	Lmin	Leq	L1	L5	L10	L50	L90	L95	L99	Event Description
21:20	21:40	A	87.9	51.1	71.7	79.0	76.6	75.4	69.4	57.8	55.5	53.1	2121 - Horn; 2140 - Cycle
02:30	02:35	A	81.3	47.8	64.4	75.6	70.6	68.5	54.3	49.4	49.1	48.6	Traffic on Nimitz
02:36	02:56	A	79.6	47.6	61.9	73.1	68.9	65.6	52.6	49.6	49.3	48.8	Traffic on Nimitz
02:58	02:59	A	53.1	49.4	50.9	52.9	52.6	52.2	50.7	50.0	49.9	49.6	No traffic on Nimitz

LOCATION: CHINATOWN PARKING GARAGE

DATE: March 14, 2012

2238 DATA: CONTINUOUS AT 3RD FLOOR LOCATION

Start Time	End Time	LOC	Lmax	Lmin	Leq	L1	L5	L10	L50	L90	L95	L99	Event Description
01:00	02:00	A	94.7	51.0	67.8	79.6	74.7	70.4	56.5	53.3	52.8	52.1	Traffic on Nimitz
02:00	03:00	A	88.0	51.2	65.7	77.7	72.4	68.8	56.2	52.8	52.5	52.0	Traffic on Nimitz
03:00	03:36	A	91.3	51.4	65.9	78.3	72.1	67.6	54.9	53.0	52.6	52.2	Traffic on Nimitz
03:42	04:00	A	86.3	49.8	68.8	80.8	75.8	72.7	59.9	53.6	52.9	51.6	Traffic on Nimitz

Notes:

a. Leq = Average A-Weighted Sound Level (in dBA)
b. Lmax = Maximum A-Weighted Sound Level (in dBA)
c. Lmin = Minimum A-Weighted Sound Level (in dBA)
d. L10 = A-Weighted Sound Level (in dBA) which was exceeded 10 percent of the time.
e. L90 = A-Weighted Sound Level (in dBA) which was exceeded 90 percent of the time.
f. Lxx = A-Weighted Sound Level (in dBA) which was exceeded xx percent of the time.

CHAPTER VI. FUTURE NOISE ENVIRONMENT

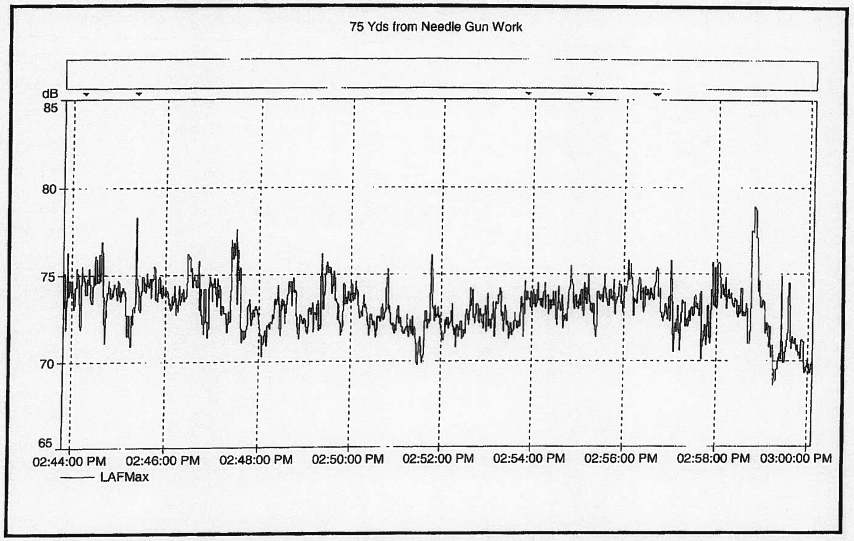
Motor Vehicle Traffic Noise. With or without the proposed relocation of Pacific Shipyards to Piers 24 and 25, future traffic noise levels along Nimitz Highway are expected to be similar to existing traffic noise levels. The non-project, peak hour traffic volumes on Nimitz Highway at Nuuanu Stream Bridge will probably range from 4,500 to 6,500 vehicles per hour based on August 2010 traffic counts by the Hawaii State Department of Transportation. The addition of 100 project vehicles per hour to these baseline traffic volumes will increase non-project traffic noise levels by less than 0.1 dB, which is not significant, and which will be very difficult to measure. Therefore, with or without the proposed shipyard relocation project, future traffic noise levels along the Nimitz Highway (and at the closest noise sensitive receptors to the shipyard facility) should not increase significantly.

Shipyard Facility Operations. Predictions of the noise levels associated with Pacific Shipyards operations at the proposed Pier 24 and Pier 25 facility were based on the measured noise levels during Needle Gun operations, chipping and hammering on a floating dry dock, sandblasting indoors with outdoor dust collector operating, and during water blasting operations. Samples of these measurements are shown in Figures 4 through 7. Spherical spreading plus molecular absorption and excess ground attenuation were used to calculate the sound levels at the closest noise sensitive receptors (Harbor Village Apartments) to the proposed shipyard facility.

Table 5 presents the predicted noise levels of the various shipyard operations at the closest noise sensitive receptor. The lower range of the predicted noise levels are more likely to occur during the daytime period (due to upward refraction of the sound rays from the sources and/or excess ground attenuation effects), while the higher noise levels are more likely to occur during the nighttime periods (due to the downward refraction of the sound rays from the sources and negligible excess ground attenuation effects). In addition to these sound propagation effects, the background ambient noise levels at the receptor locations are typically lower during the nighttime and early morning periods, so the risks of the shipyard noise sources being audible at the noise sensitive receptor locations are greater during the nighttime and early morning periods than during the normal daytime working periods.

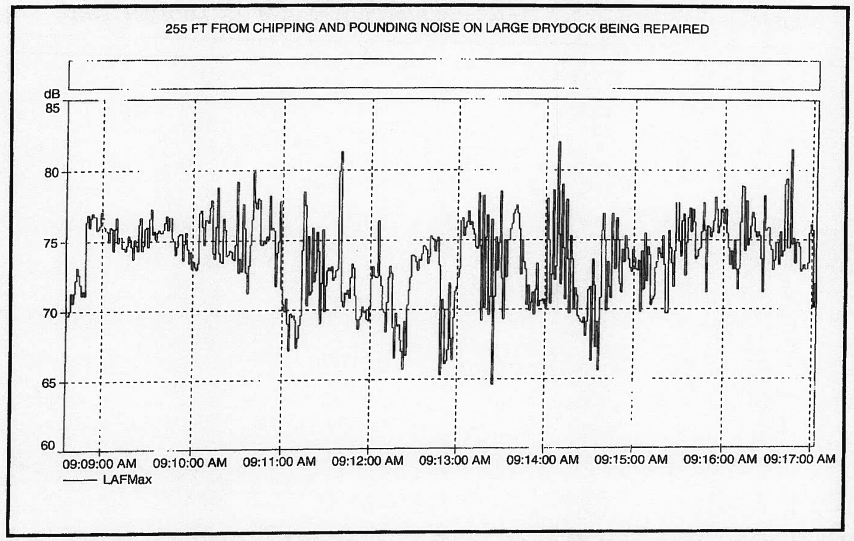
Minimum background ambient noise levels during the quiet nighttime and early morning periods are approximately 48 to 51 dBA at the closest noise sensitive receptor locations. Based on the results shown in Table 5, use of pneumatic chippers and hammers during the nighttime and early morning hours could cause complaints from noise sensitive receptors in Downtown Honolulu. Water blasting, sand blasting, needle gun, and dust collector operations would probably not cause complaints from noise sensitive receptors in Downtown Honolulu.

During the daytime working hours, background ambient noise levels at the closest noise sensitive receptor locations typically remain above 56 to 59 dBA. Based



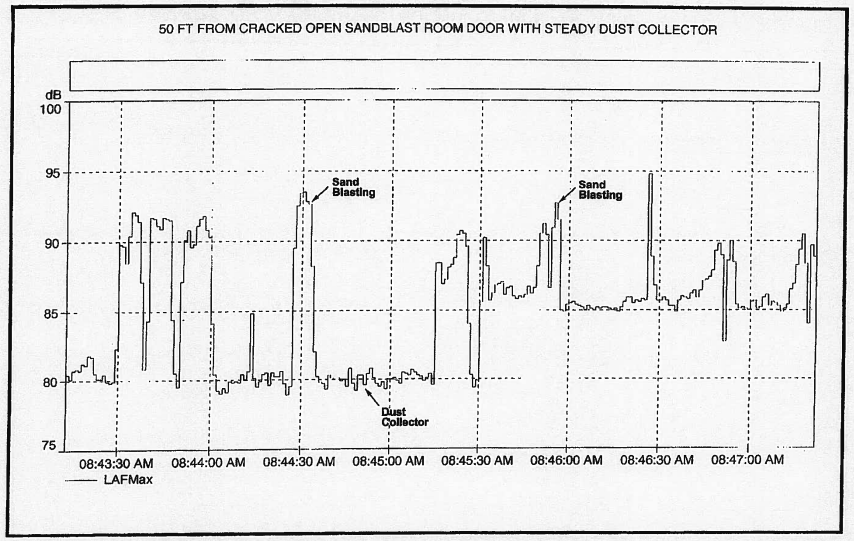
TIME HISTORY OF A-WEIGHTED SOUND LEVELS VS. TIME AT 225 FEET FROM NEEDLE GUN WORK (JUNE 23, 2011)

FIGURE 4



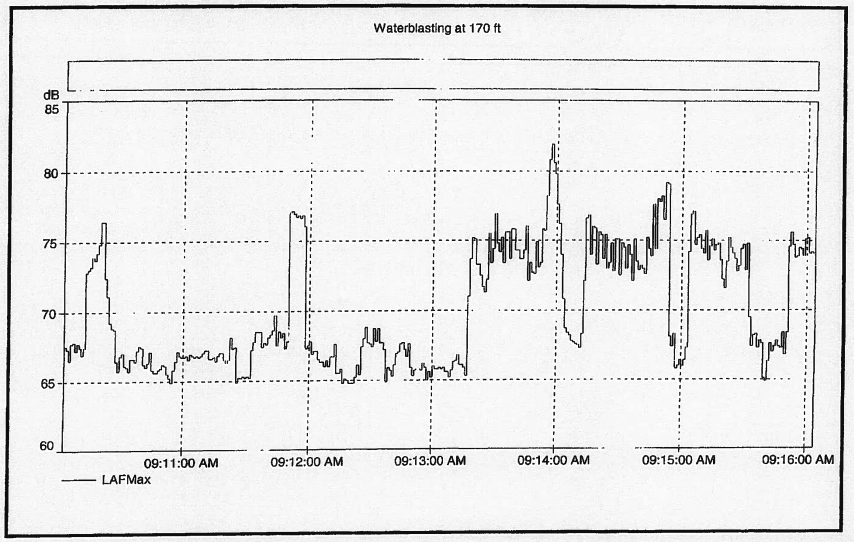
TIME HISTORY OF A-WEIGHTED SOUND LEVELS VS. TIME AT 255 FEET FROM CHIPPING AND POUNDING WORK ON LARGE DRY DOCK (JUNE 28, 2011)

FIGURE 5



TIME HISTORY OF A-WEIGHTED SOUND LEVELS VS. TIME AT 50 FEET FROM SANDBLAST ROOM DOOR WITH DUST COLLECTOR BACKGROUND NOISE (JUNE 28, 2011)

FIGURE 6



TIME HISTORY OF A-WEIGHTED SOUND LEVELS VS. TIME AT 170 FEET FROM WATER BLASTING OPERATIONS (JULY 9, 2011)

FIGURE 7

TABLE 5
SUMMARY OF SHIPYARD NOISE SOURCES

NOISE SOURCE	SOUND LEVEL AT 200 FEET (dBA)	DISTANCE (FEET) TO CLOSEST RECEPTOR	PREDICTED NOISE LEVEL @ RECEPTOR	------- SOURCE AUDIBLE? ------- DAYTIME	NIGHTTIME
Needle Gun	73.9	1,800	40.9 to 48.9 dBA	No	No
Chipping & Hammering	78.8	1,800	46.0 to 53.5 dBA	No	Yes
Dust Collector	71.4	1,688	41.2 to 48.1 dBA	No	No
Indoor Sandblasting	76.3	1,688	40.8 to 48.0 dBA	No	No
Water Blasting	76.8	1,800	38.0 to 45.8 dBA	No	No

on the results shown in Table 5, risks of noise complaints associated with shipyard operations from noise sensitive receptors in Downtown Honolulu should not be a concern during daytime working hours.

CHAPTER VII. POTENTIAL NOISE IMPACTS ASSOCIATED WITH THE PROPOSED PROJECT AND POSSIBLE MITIGATION MEASURES

Traffic Noise Impacts. The increases in noise levels attributable to Pacific Shipyards project traffic are predicted to be difficult to perceive and should not be significant along Nimitz Highway, which would service the relocated Pacific Shipyards facility. Because of the very small increases in traffic noise levels associated with this relocation project, risks of potential noise impacts from project traffic are considered to be very low at existing noise sensitive receptors along Nimitz Highway. For these reasons, existing noise sensitive buildings in the project area should not require sound attenuation measures as a result of increased traffic noise associated with the proposed project.

Noise Impacts Associated with Shipyard Operations. The noise levels from Pacific Shipyards operations at Pier 24 and Pier 25 should not exceed the daytime DOH noise limit for multifamily dwellings at the closest noise sensitive receptors in Downtown Honolulu. During the normal daytime working hours, the noise from shipyard operations should not be audible at these noise sensitive receptors. Therefore, risks of adverse noise impacts from daytime shipyard operations should be near zero.

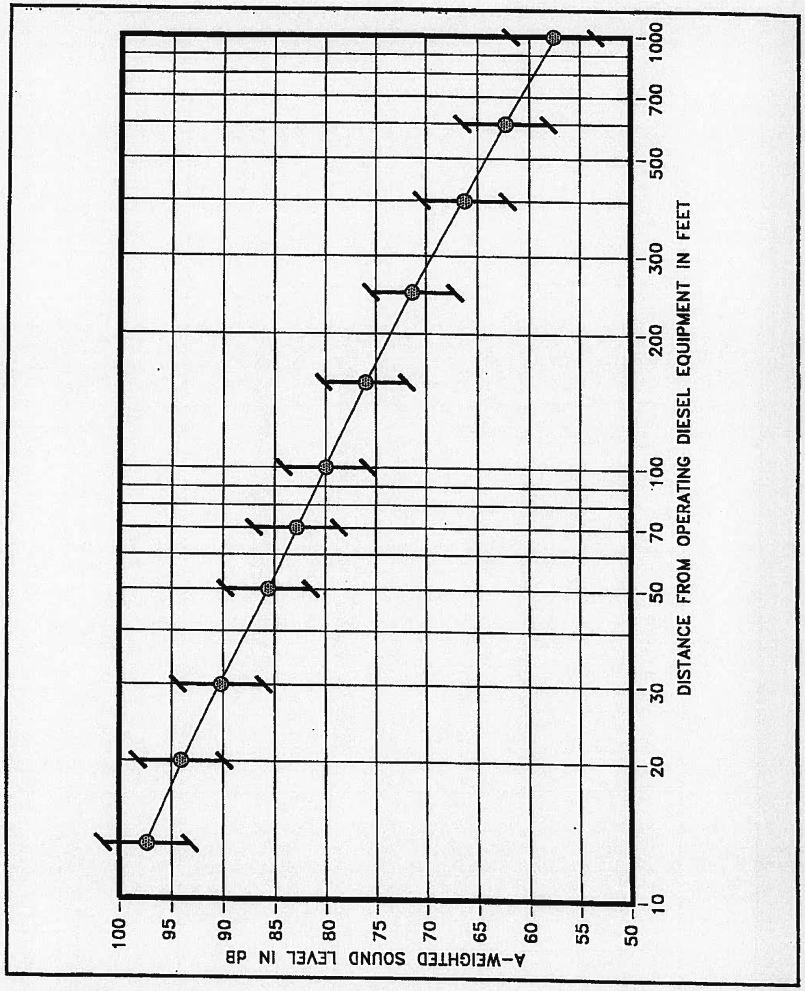
During the quieter nighttime hours, pneumatic chipping and hammering operations may be audible at noise sensitive receptors in Downtown Honolulu. This is due to the lower background noise levels, more favorable atmospheric propagation conditions during darkness, and the greater amount of low frequency noise components in pneumatic chipping and hammering operations. During the quieter nighttime hours, risks of noise complaints from water blasting operations are relatively low. If all of the operations shown in Table 5 occur simultaneously, risks of adverse noise impacts will increase due to the increase in total noise emissions from the shipyard. For example, if Needle Gun, Dust Collector, Indoor Sandblasting, and Water Blasting operations occur simultaneously, the total noise level at the closest noise sensitive receptor would range from 46.4 to 53.8 dBA, and be similar to the predicted noise levels of the pneumatic chipping and hammering operations.

The noise from indoor sandblasting operations at the new facility will need to be contained (or attenuated) to the same degree that is provided by the existing building at Pier 41. The use of lightweight fabric structures for the indoor sandblasting operations should be evaluated for their sound containment (or attenuation) properties prior to construction. In general, lightweight fabric structures will provide less sound attenuation than heavy (metal) structures.

It appears that the noise from shipyard operations at Pier 24 and Pier 25 should not exceed the DOH 60 dBA limit for the daytime (7:00 am to 10:00 pm) at multifamily residences or commercial establishments. Therefore, risks of adverse noise impacts from daytime shipyard operations should be low. However, there is some risk of exceeding the DOH 50 dBA limit during the nighttime (10:00 pm to 7:00 am).

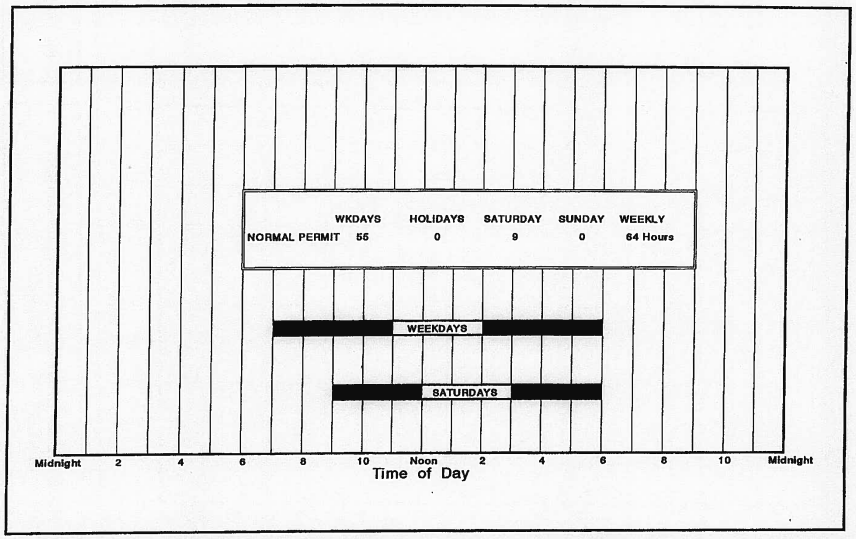
Therefore, prior to scheduling nighttime work at the relocated shipyard facility, measurements of the noisy operations should be made at the closest noise sensitive receptor during the quietist periods of the nighttime and/or early morning hours when the shipyard work is anticipated to occur. If different types of equipment are used in the future, daytime noise measurements are also recommended to evaluate the risks of noise impacts during nighttime and early morning operations. If noise mitigation measures are required due to complaints regarding noise from nighttime shipyard operations, the total noise level associated with nighttime (between 10:00 pm and 7:00 am) shipyard work should be attenuated so as to not exceed 50 dBA at the closest noise sensitive residence.

Construction Noise Impacts. Construction noise levels are anticipated to range between 44 to 56 dBA at the closest residences during the entire project construction period. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 8. Adverse impacts from construction noise are not expected to occur due to the large buffer distances (at least 1,800 feet) from the project site to the closest residences, and construction noise mitigation measures should not be required. The implementation of State DOH construction noise permit procedures (see Reference 4) will require that noisy construction activities do not occur during the nighttime, Sundays, and holidays (see Figure 9). Therefore, adverse noise impacts are not expected to occur from construction activities on the Pacific Shipyards project site.



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 8



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 9

APPENDIX A. REFERENCES

(1) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.

(2) American National Standard, "Sound Level Descriptors for Determination of Compatible Land Use," ANSI S12.9-1998/ Part 5; Acoustical Society of America.

(3) "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.

(4) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

(5) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

(6) Draft "Traffic Impact Report, Kapalama Container Terminal;' Julian Ng, Inc. & Belt Collins Hawaii LLC; May 2012.

(7) Traffic Counts for Station B72009200586; Nimitz Highway At Nuuanu Stream Bridge; Hawaii State Department of Transportation, Highways Division; August 10, 2009.

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.

Report of Noise Measurement Results and Grain Ship Noise Study Proposed Kapalama Container Terminal Honolulu Harbor, Oahu, Hawaii

September 7, 2012

Department of Transportation
State of Hawaii
Harbors Division

A noise study was performed of the potential future noise levels associated with dockside activities associated with future grain ship unloading activities at Pier 20, Honolulu Harbor. As a result of the proposed relocation of Pacific Shipyards International (PSI) to Pier 24 and 25, an end to the current grain ship unloading operations at the adjacent Pier 23 is anticipated.

Currently, Hawaiian Flour Mill (HFM) uses Piers 22 and 23 to berth grain ships at 4 to 5 month intervals, unloads the grain from the grain ships, and conveys the grain to its silos at Pier 23. Due to the size of the PSI drydocks to be berthed at PIers 24 and 25, the grain ships will probably use Pier 20 during grain unloading operations. It is anticipated that tractor trailer trucks will be used to haul the grain from Pier 20 to the HFM underground conveyor system located in the general vicinity of the HFM silos (see Figure 1). The grain ship's crane will be used to transfer the grain from the ship to the trucks on Pier 20; the trucks will transport the load to the HFM silo dumping area; and return to Pier 20 to receive another load of grain. A small front end loader will operate in the grain dumping area to transfer the grain to the underground conveyor system. The grain ship unloading operation (at at maximum rate of four truckloads per hour) is expected to occur continuously over multiple 24-hour periods until the grain ship is totally unloaded.

Methodology. Sound level measurements of current grain ship unloading operations were obtained at Pier 23 during the night of April 16, 2012. Figure 2 depicts the sound levels associated with unloading of the grain from the grain ship to a grain hopper located on the dock using a clamshell bucket attached to a shipboard crane. The large impulse noise events were caused by the banging of the clamshell bucket against the top of the grain hopper. The lower noise level floor was controlled by the noise from the grain ship's operating machinery. Additional measurements at 100 to 270 feet from the grain hopper were obtained to develop the source noise levels of the grain unloading operations from the ship to a hopper located on the pier.

Noise modeling of the sound levels of tractor-trailer trucks, front end loader, banging, horns, and back-up alarms were performed to predict the potential noise levels at the closest residence during grain unloading operations at Pier 20. Potential noise levels during the grain unloading and transporting operations at Pier 20 were calculated at the closest residential building at Harbor Village Apartments. The noise modeling was performed using inverse square law for hemispherical spreading of a sound from a source at or near the ground, with inclusion of molecular absorption and anomalous excess attenuation effects. The modeling equation used to predict sound levels at any given distance from a noise source was:

$$L_p = L_w - 20 \times \text{Log}(d) - [d \times a(f)] / 100 - 8$$

where:

L_p = Sound pressure level in decibels (re 2×10^{-5} Pa) at distance d (in meters),

L_w = Sound power level of noise source in decibels (re picowatt), and

a(f) = Molecular absorption plus anomalous excess attenuation in decibels per 100 meters. For the 9 standard Octave Bands from 31.5 Hz to 8,000 Hz, the a(f) values used were 0.1, 0.16, 0.27, 0.39, 0.66, 1.08, 1.9, 3.47, and 5.2.

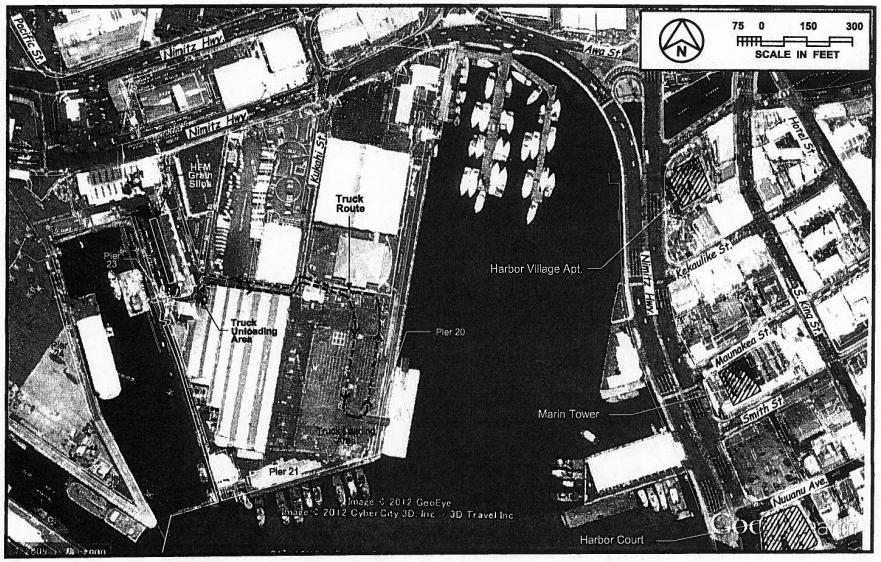
Results and Conclusions. A summary of the sound level predictions at the closest residences to the possible grain loading operations at Pier 20 are shown in Table 1. A minimum nighttime background noise level of 50 dBA was assumed for comparison with the predicted noise levels from the grain unloading and transporting operations between Pier 20 and the HFM grain silos. As indicated in Table 1, predicted noise levels during grain unloading and transporting operations are not expected to exceed the 70 dBA State Department of Health (DOH) noise limit for operations using fixed machinery on properties zoned for Industrial uses.

The louder noise sources, such as the banging of the clamshell bucket against the grain hopper, horns, and the backup alarms, will probably be audible at Harbor Village Apartments during the nighttime when background noise levels are lowest. Because of this, there is a risk of noise complaints occurring during grain unloading and transporting operations at Pier 20.

Recommended Noise Mitigation Measures. The following noise mitigation measures are recommended to reduce the risk of noise complaints during the grain unloading operations at Pier 20:

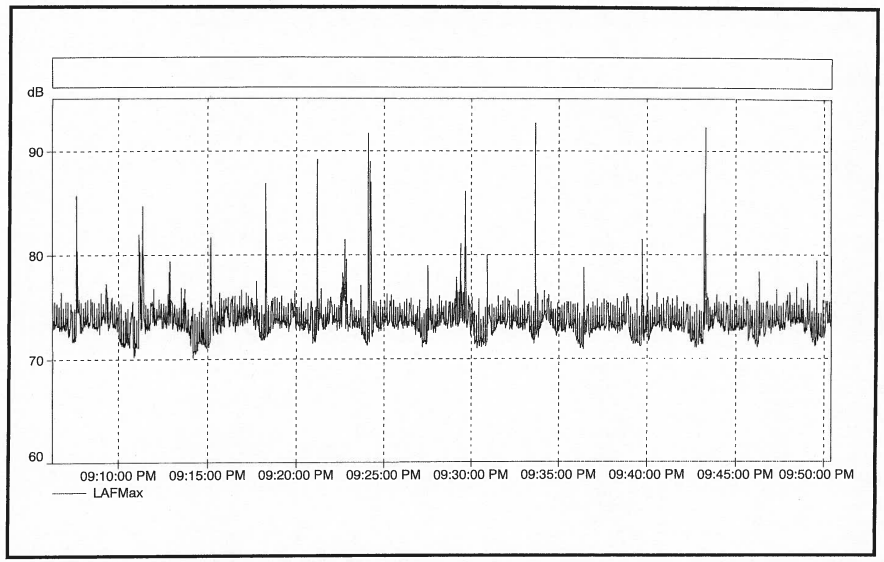
- The use of horns for signaling truck movements should be replaced with lights or radio frequency devices unless it can be demonstrated via sound tests that the horns are not audible during the quietist nighttime period at the closest residences.
- Beeper type backup alarms should be replaced with broadband noise backup alarms with automatically variable output level unless it can be demonstrated via sound tests that the beeper type backup alarms are not audible during the quietist nighttime period at the closest residences.
- The tractor trailer trucks should minimize engine speed to the lowest rpm possible, and attempt to not exceed a noise level of 80 dBA at 50 feet distance during the nighttime hours.
- The grain hoppers used on the pier or on the trucks should be outfitted with resilient bumpers to minimize the level of impact noise during contact between the hopper and the clamshell bucket.
- If noise complaints occur as a result of nighttime grain unloading operations at

Pier 20, and HFM is not able to reduce the noise levels to acceptable levels of approximately 50 dBA at the complainant, restrictions in the hours of the nighttime grain unloading operations may need to be considered.



HFM GRAIN UNLOADING AREAS AND SILOS (PIER 23 OR PIER 20)

FIGURE 1



MEASUREMENTS OF SOUND LEVELS DURING GRAIN UNLOADING OPERATIONS

FIGURE 2

TABLE 1
SUMMARY OF GRAIN UNLOADING NOISE SOURCES

NOISE SOURCE	SOUND LEVEL AT 200 FEET (dBA)	DISTANCE (FEET) TO CLOSEST RECEPTOR	PREDICTED NOISE LEVEL @ RECEPTOR	------- SOURCE AUDIBLE? ------- DAYTIME	NIGHTTIME
Steady Noise from Grain Ship	64.3	900	46 to 50 dBA	No	No
Maximum Impact Noise At Grain Hopper	82.7	1,000	62 to 66 dBA	No	Yes
Non-Impact Noise At Grain Hopper	73.1	1,250	53 to 57 dBA	No	Yes
Tractor Truck Moving In Que	68.3	1,600	41 to 50 dBA	No	No
Tractor Truck Dumping Load	67.9	1,600	37 to 45 dBA	No	No
Front End Loader	72.3	1,600	44 to 50 dBA	No	No
Beeper Type Back-Up Alarm	71.3	1,575	44 to 52 dBA	No	Yes
Broadband Noise Back-Up Alarm	76.1	1,575	46 to 53 dBA	No	Yes
Truck Horn	73.9	1,100	50 to 59 dBA	No	Yes

APPENDIX E

Marine Biological Community Structure Report

E-1
Marine Biological Community Structure Report

E-2
Marine Surveys of Pacific Shipyards Dock Areas

AN ASSESSMENT OF THE MARINE BIOLOGICAL COMMUNITY STRUCTURE IN THE VICINITY OF THE PROPOSED KAPALAMA CONTAINER TERMINAL HONOLULU, HAWAI'I

State of Hawaii
Department of Transportation
Harbors Division

October 15, 2012

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All surveys were performed by Marine Research Consultants, Inc.

EXECUTIVE SUMMARY

The State of Hawai'i, Department of Transportation Harbors Division (DOT-H) is proposing to develop a new container terminal in Honolulu Harbor, O'ahu, which is the principal port of entry for all container cargo entering and exiting the State. Construction of a pier is proposed with berthing capacity for two container ships as well as cargo barges. The main pier (identified as Piers 42 and 43) will require dredging and filling in the harbor waters fronting the existing Kapalama site in order to accommodate docking of container ships. The present design of the project could involve complete infilling of a docking area known as Snug Harbor, which is presently occupied by the University of Hawai'i (UH), School of Ocean and Earth Science and Technology's (SOEST) Marine Center (MC).

At the eastern end of the Kapalama site, a second pier (identified as Pier 41) would be modified for use by an interisland barge cargo operator. The existing Pier would be demolished and rebuilt with a slip area widened from the existing 256 feet to 300 feet between Piers 40 and 41. In addition Pacific Shipyards, is planning to move two large dry-docks from Pier 41 to Piers 24-25 within the central region of Honolulu Harbor. At this point in time, the only activities planned for this move are pier side improvements with no in-water construction with the possible exception of placement of spuds (vertical rods) that are mechanically lowered to rest on the Harbor floor to stabilize the dry dock used for ship repairs.

To provide input to the Environmental Impact Statement (EIS) for this project, a qualitative and quantitative assessment was conducted that describes the existing marine biotic communities within the areas proposed for re-development. This report provides the requisite data for the Hawaii Revised Statutes (HRS) Chapter 343 EIS and the U.S. Army Corps of Engineers (USACE) National Environmental Policy Act (NEPA) requirement. The ultimate use of this information is for the Clean Water Act (CWA) Section 404 Permit from the U.S. Army Corps of Engineers.

Methods employed in the assessment follow to the extent possible the techniques set out in the "Draft Planning Aid Report-Marine Biological Survey Protocols" (DPAR) prepared for the Army Corps of Engineers (ACOE) by the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). In order to minimize the statistical uncertainty that is inherent in determining population structure from extrapolation of data that includes only partial coverage of the populations, the field effort included examination of the entirety of the area within the survey boundaries. The resultant data products consist of qualitative and quantitative censuses of the entire populations within the survey envelope.

Quantitative *in-situ* evaluation of stony corals was accomplished by measuring the length of the longest axis in centimeters (cm) of every coral colony resulting in a complete census of the coral community. During survey swims along the length of survey sector, all observed non-cryptic invertebrates and algae were identified to the lowest taxonomic level, and estimates of abundance were recorded. Numerical abundance of fish by species (or lowest possible taxonomic level) as well as body length were recorded during swims spanning the length of each survey sector.

All of the physical structures within the survey area can be considered "non-natural" as they are all created or modified by human activity. The physical structure of the survey area is composed of three distinct forms: 1) undeveloped dredged shorelines with narrow (several meters) nearly flat shelves

that abut the shoreline and terminate in a steep slope that extends to the mud/silt channel floor; 2) vertical concrete square pilings that support (or previously supported) pier decks, and 3) solid sheet pilings that support pier decks. A consistent characteristic of these areas is a ubiquitous coating of fine-grained silty sediment over all non-living surfaces.

Virtually all non-living surfaces of the concrete pilings and metal sheet-pilings that comprise the piers within Kapalama Basin are covered with an encrustation of remnant mollusk shells that form the substratum for settlement for other invertebrates. Quantitative evaluation of the coral community yielded a total count of 5,173 coral colonies among eleven species. Total counts in individual size-classes ranged from a low of 159 ($>80 \leq 160$ cm) to a high of 1,727 ($>2 \leq 5$ cm). Overall density of coral colonies within the entire survey area was 0.36 colonies per square meter (col m^{-2}).

Pocillopora damicornis accounted for the most colonies (1,840), followed by *Leptastrea purpurea* (1,497) and *Porites lobata* (1,039). These three species account for about 85% of the total observed colonies. *Montipora patula* and *M. capitata* also occurred throughout the Harbor in growth forms of thin overlapping plates growing on vertical pilings. Most of the large plating colonies contained areas of sediment accumulation abutting seemingly unaffected live tissue. No coral bleaching or diseases were noted during the course of the survey.

Qualitative surveys in the vicinity of Piers 24-28 in the central area of Honolulu Harbor revealed some very different community structure than observed in the Kapalama Basin area. In particular, the pilings comprising Piers 24 and 26 contained skeletal remains of large colonies that were either completely or nearly completely devoid of living tissue. The occurrence of these large dead colonies indicates that there has been either at least one event of extreme stress of sufficient magnitude to completely overwhelm coral defense mechanisms resulting in mortality of mature colonies. Such stress may result from episodic periods of high sediment input and deposition, or long-term mooring of vessels against the piers that block available light for a period sufficient to result in mortality. Also observed during the qualitative investigation was an area at the end of Piers 27-28 consisting of a dredged section of shallow reef platform populated with large corals and high numbers of reef fish.

At present, the Center for Biological Diversity is petitioning the National Oceanographic and Atmospheric Administration (NOAA) to list 82 species of reef building corals as endangered species. Contained in this list are two species that were observed during the Kapalama Basin surveys. Four hundred thirty six colonies of *Montipora patula* were counted, comprising about 8.4% of the total number of colonies, while only 5 colonies of *C. ocellina* were encountered, all of which were less than 5 cm in longest dimension.

Forty-five species of invertebrates were identified during surveys, including 20 sponges, 4 tunicates, 5 bryozoans, 5 annelids, 5 molluscs, 2 echinoderms, 2 arthropods and 2 sea slugs. Of the 45 species, 15 are identified as Introduced species. Overall, invertebrates were far more abundant on the vertical piers and pilings than on the flatter dredged shoreline shelves and slopes. Among the non-coral invertebrates abundance and diversity of sponges was highest with 10 species classed as "Abundant". In contrast to invertebrates, which occurred abundantly throughout the area of study, frondose algae were nearly absent at all survey locations.

A total of 1,902 fish were counted comprised of 38 species. Approximately half the number of fish consisted of two large schools of sardines that we observed transiting two of the survey sectors. Overall, numbers of fish observed in sectors composed of concrete piles were lower than counts on sectors consisting of dredged shorelines. While the entire survey area is a restricted access zone and likely experiences little on no direct recreational or commercial fishing pressure, there is some recreational fishing in neighboring areas. Total Biomass of fish in the survey area was calculated to be 1,902 grams.

Regulated species observed during the Kapalama Basin surveys consisted of several fish, including a school of aholehole (*Kuhlia xenura*), parrotfish (*Scarus psittacus*) and a single papio (*Caranx melamphygus*). The only regulated species of invertebrate observed were a single octopus (*Octopus cyanea*) and several sea urchins *Echinothrix diadema*. It is possible that burrows noted within the sediment floor of the basin may be from shrimp (`opae); however, no individuals were observed.

No endangered or protected species as recognized by the Federal and State of Hawaii Agencies were observed during surveys.

I. BACKGROUND and PROPOSED ACTION

The State of Hawai'i, Department of Transportation (DOT), Harbors Division (DOT-H) is proposing to develop a new container terminal in Honolulu Harbor, O'ahu, which is the principal port of entry for all container cargo entering and exiting the State. The proposed project would increase the existing container terminal capacity to accommodate anticipated future cargo volumes. The proposed development includes a container yard with necessary support buildings, entry and exit gates, security fencing, parking, gantry cranes and container-handling equipment, onsite utilities, outdoor lighting, and other ancillary features.

On the waterfront, a pier would be constructed with berthing capacity for two container ships and cargo barges. The main pier (identified as Piers 42 and 43) would be designed with a revetment and piling system (Figure 1). Based on Corps of Engineers soundings from 2007, existing depths in the area range from 13 to 30 feet, indicating that dredging would be necessary to achieve the required depth of 40 (mean lower low water (MLLW)) to accommodate container ships that would dock at the pier. The present design of the project would include filling in a docking area known as Snug Harbor, which is presently occupied by the University of Hawai'i (UH), School of Ocean and Earth Science and Technology's (SOEST) Marine Center (MC).

At the eastern end of the Kapalama site, a secondary pier (identified as Pier 41) would be reconstructed for future use by an interisland barge cargo operator. The existing structures of Pier 41 would be demolished and a new pier built that would increase the width of the slip area between Piers 40 and 41 from 256 feet to 300 feet (Figure 1). Such widening would maximize use of the slip area for barges that currently operate in the adjacent slips, as well as for larger barges that are expected to be brought into service to increase interisland transport efficiency. The reconstruction of Pier 41 would include either a revetment and piling system or a bulkhead wall.

In addition to the re-development of the Kapalama area, one of the present tenants, Pacific Shipyards Inc., is planning to move two existing dry-docks to the area of Piers 24-25 within the central region of Honolulu Harbor. At this point in time, the only activities planned for this move are pier side improvements with no in-water construction, with the possible exception of placement of temporary spuds (vertical rods) that are mechanically lowered to rest on the Harbor floor to stabilize one of the dry docks used for ship repairs. However, at a later date Pacific Shipyard Inc. may request refinements of the present plan that could require more involved in-water construction. To accommodate the proposed re-development, the Atlantis Submarine operation is also moving from the present location to the Pier 26-27 area. However, at this time there are no plans for dredging or infilling of any areas in the vicinity of Piers 24-27.

This report presents a detailed qualitative and quantitative assessment of the existing conditions within the areas proposed for re-development of the Kapalama area of Honolulu Harbor. These assessments provide the requisite data for the HRS Chapter 343 EIS and the USACE's NEPA requirement for the project. The ultimate use of this information is for the Clean Water Act (CWA) Section 404 Permit from the U.S. Army Corps of Engineers.

II. METHODS

A. Rationale for Selection of Sampling Area

A preliminary survey of the region of interest was conducted on April 5, 2012 in order to generally describe the level of colonization and ecological composition of the marine community that currently exists within the proposed project area. The preliminary survey consisted of underwater swims along the entirety of area proposed for re-development. While representative habitats and typical community assemblages within the survey envelope were documented by photography, no quantitative data was collected during the preliminary survey. Results of the preliminary survey revealed that the area to be assessed for the present project consists primarily of existing piers, pilings, and dredged channel walls. Macro-biota occurs extensively on vertical surfaces of these structures, and is not abundant on the surface of the soft sediment column that comprises the horizontal surfaces of the harbor floor.

Methods employed in the present assessment follow to the extent possible the techniques set out in the "Draft Planning Aid Report-Marine Biological Survey Protocols" prepared for the Army Corps of Engineers (ACOE) by the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). However, the Draft Planning Aid Report includes protocols specifically designed to evaluate community structure of horizontal reef surfaces, and does not include specific protocols for surveying vertical surfaces, and particularly vertical surfaces that are not continuous such as pilings. As a result, modification of some techniques presented in the Draft Planning Aid Report were deemed necessary in order to accurately census the existing communities.

Present plans for the re-development of the Kapalama Basin include elimination of all existing surfaces within the survey area. Hence, the major focus of the present assessment was to gather data on the total population of macro-benthos and fish on, and in the vicinity of these surfaces. To follow protocols in the Draft Planning Aid Report, preliminary planning for the survey included the utilization of transect methods to evaluate selected regions of the survey area. A transect can be defined as a sampling unit of surface area used to monitor distribution of populations within a given larger area. Representative transects are normally used in studies where the entire area of interest is so large that surveying the entire region is not practical. In these cases, the results of representative transect surveys are extrapolated using statistical methods to arrive at an estimate of population parameters for the entire area of interest. As stated in the Draft Aid Planning Protocols, "the number of sampling units should be based on a power analysis for large-scale impacts to reefs. Reference materials dealing with the same geographic region and taxa are used for reference purposes to facilitate determination of sampling effort. It is important to document how sample sizes are determined and the confidence interval it represents."

For the Kapalama Container Terminal survey, the occurrence of biota on vertical, rather than horizontal structures presents several problems with respect to designing survey protocols to follow transect methods described in the Draft Planning Aid Report. First, laying a tape or line on the floor of the ocean and enumerating organisms within a series of representative quadrats of equal area is not directly applicable to vertical surfaces. During the original planning stages of the present study, it was proposed that an alternate "vertical transect" technique would enumerate biotic composition on

the entirety of representative pilings, with subsequent extrapolation of transect results to provide estimates of the entire population within the re-development footprint. In addition, selection of the size of each sample unit based in power analysis based on large scale impacts to reefs was not applicable, as the areas of study are not technically reefs.

With these considerations, several points became apparent to the Principal Investigator with respect to developing a method to maximize the accuracy of censusing the populations of interest. The modified protocol consisted of including all pilings and other settleable surfaces in the quantitative and qualitative assessments, rather than random or stratified random selections. The decision to increase the survey area was deemed appropriate to alleviate concerns about selection of appropriate sample sizes, and because resources were available, both in terms of time and personnel, to easily complete the assessment of all available surfaces. As a result, the quantitative data gathered, particularly of coral colony size-frequency, can be considered a more precise representation of the entire population than extrapolation from representative samplings, and may be considered a complete census of the coral community. The method of characterizing the size-frequency distribution of the entire coral population of a survey area has been previously used in other studies. These studies include the evaluation of coral populations on the pier-breakwater of the North Kawaihae Small Boat Harbor in preparation of repairing damage to the pier from an earthquake that occurred in 2006 (Marine Research Consultants, 2009), and the evaluation of corals on the Barge Slip Ramp at Kwajalein Atoll in preparation for a program to relocate corals prior to rebuilding of the Ramp (National Marine Fisheries Service 2012).

B. Survey Sector Determination

To organize the field program, the area of Kapalama Basin under study was divided into twelve sectors, designated by letters A-L, based on either the "straight-line" faces of each Pier and dredged channel shelf (Figure 2). Several of the sectors were large enough to be divided into sub-sectors with the intent of evaluating spatial variability within a single pier face or dredged channel shelf. Figures 3-5, created from Google Earth images provide detailed views of Sectors A-B, C-G, and H-L, respectively. Figure 6 shows the area of central Honolulu Harbor that includes Piers 24-28. The area of Pier 24 shown in red in Figure 6 marks the proposed location of the Pacific Shipyards dry-docks. This specific area was evaluated quantitatively in a similar fashion as Sectors A-L in Kapalama Basin. The other areas of Piers 25-28 shown in yellow in Figure 6 were surveyed in a qualitative fashion for invertebrate abundance, although fish abundance was quantified.

Each of the sectors can be thought of as an area with a width dimension defined by the distance from the surface of the water to the harbor floor, and a length dimension equal to the distance from the start to the end of the sector. The latitude and longitude of the start and end of each sector are shown in Table 1.

Sector A, located on the southern shoreline of Kapalama Basin adjacent to the Sand Island Container Terminal, was included within the survey plan in order to gather baseline data that would be of use to determine potential effects of any sediment plumes created during the channel dredging phase of the re-development plan. Sector A is the only area within the Kapalama survey zone where the existing shoreline and piers are not planned for removal or modification. Sector H on Pier 41 is the present location of the Pacific Shipyards dry-docks, as well as other active marine repair facilities. Owing to

safety issues with continuous ongoing work on the dry-docks, as well as continuous permanent mooring of the dry-docks to the piers since 2000 (personal communication from PSI), pilings in this sector were not surveyed during either the preliminary survey or the present investigation. The omission of Sector 41 is not considered to result in a substantial under-estimation of total biotic resources as observations under vessels much smaller than the dry-docks that appear to have been moored for considerable periods of time revealed pilings barren of reef corals and most other macro-biota. The lack of macrobiota on these piers is presumably a result of prolonged shading from sunlight. As a result the only group of marine organisms that is likely to occur under the dry docks in sufficient number would motile organisms, primarily fish.

C. *In-situ* Survey Methods

In-water surveys were carried out during the period six days between June 29, 2012 to July 10, 2012 by a team of six people diving from a 21-foot boat using SCUBA gear. Dr. Steven Dollar supervised all field operations, assisted by Laura Birse, Leigh Kroeger, Stephen Matadobra, Catherine Harris and Caroline Dias. The latter four assistants are members of the University of Hawaii Marine Options Program (MOP), while two (LK and SM) are graduates of the Quantitative Underwater Ecological Survey Techniques (QUEST) program run by the University of Hawaii at Hilo, and are all students in fields of marine biology. Training through these academic activities has provided these assistants with the expertise to contribute to the data collection required for the present project. In addition to training on various field survey techniques, the QUEST training includes identification of coral diseases, and one of the assistant investigators (SM) is presently assisting in a project researching the status of coral diseases on reefs in Hawaii.

For evaluation of each sector, the boat was positioned at one end of the sector, and the investigator tasked with enumerating fish entered the water and swam along the pier face or reef shelf toward the distal end of the sector, recording number of individuals and body length. Substantial suspended particulate material throughout most of the survey area limited visibility to a distance of approximately 2-4 meters. Such limited sight paths likely resulted in an unavoidable underestimate of fish. After allowing a sufficient time to prevent scattering of fish, two investigators entered the water to conduct evaluation of non-coral invertebrates. Directly after, two other investigators entered to conduct quantitative surveys of coral colony abundance. The last investigator followed the survey crew with a camera and recorded photographically all aspects of the survey areas.

As described above the goal of the survey was to assess the entire benthic and fish communities within entire survey envelope. Such coverage was accomplished by all investigators moving in a slow vertical zigzag fashion up and down each piling, or along each dredged shoreline area. While water depth ranged from about 7-10 meters along the pier faces, biota was generally not abundant in the upper meter of the water column or within 2-3 meters of the Harbor floor. Hence, the zone of biotic colonization consisted of a vertical area ranging from approximately 3-6 meters wide. Similarly, on the dredged shorelines, biota occurred primarily on the upper horizontal shelves and not on the vertical channel walls. Total in-water survey time was logged as approximately 36 hours. With a linear survey dimension of approximately 1,800 meters, survey coverage averaged about 50 meters per team-hour in the water.

1. Coral Community Survey Metrics

a. Coral Colony Abundance and Size

Quantitative *in-situ* evaluation of stony corals was accomplished by measuring the length of the longest axis in centimeters of each coral colony. This method employed is used in the QUEST program and uses a 1.6 m PVC rod marked with colored tape to designate the boundaries of seven size-classes (<2 centimeters (cm), >2≤5 cm, >5≤10 cm, >10 ≤20 cm, >20≤40 cm, >40≤80 cm, and >80≤160 cm). A category of >160 cm was also included as extending beyond the end of the rod, but no corals of this size were encountered. Measurements were made by a two-person dive team, with one diver holding the rod over the longest axis of each colony, while another diver recorded presence within the size-class and species on waterproof data sheets. With replicate examination of all areas by two investigators, observation and measurements of all coral colonies was considered to be complete. In cases where multiple colonies appeared to have coalesced into a single amalgamated colony with no distinct margin, the amalgamated structure was considered a single colony. In cases where large colonies had experienced partial mortality creating bare areas between living tissue, the investigator determined by best judgment if the remaining living tissue was the remnants of the single older colony, or from recent settlement of multiple new colonies on the bared limestone substratum. Working in a team fashion to record size-class data proved to be an efficient method for rapid, yet thorough documentation of the whole survey area.

b. Morphological Growth Form and Evidence of Stress

Colonies were also classed into growth form categories (e.g., branching, encrusting, and plating). Also noted were visible signs of disease, sediment stress, bleaching, or necrotic tissue. As described in the Draft Planning Aid, "Percent of dead/live tissue is visually estimated within the same 10 m x 1 m belt" is interpreted to indicate that the overall percentage of dead/live within a survey unit was estimated. Evidence of fragmentation was not noted owing to growth primarily on vertical surfaces which did not retain fragments. Fission was also not noted, as all colonies were identified as single units of calcium carbonate deposition.

c. Rugosity

Rugosity is a measure of 3-dimensional structure defined as the ratio of chord length to surface contour length, ignores the composition of the substratum. However, owing to the vertical nature of the large majority of the subject area it is was not possible to measure rugosity using traditional methods of calculating the ratio of chord length to surface length.

d. Two-dimensional Area Cover

As noted above, water clarity throughout the majority of the survey area was limited to a maximum of several meters, owing to high concentrations of suspended particular material throughout the water column. As a result, photographs taken beyond a distance of about one meter from the subject resulted in consistently blurred images that would not have served well for post-processing to evaluate coral community abundance. Hence, photographs were not employed to estimate two-dimensional area cover, and were only used to record general views of the survey areas and to

provide documentation used for species identification. Numerous photographs are included as Figures in this report to provide the reader with visuals of the somewhat unique communities and habitats under study.

e. Coral Community Statistics

Following tabulation of all colonies by size-class per sector, several indices of community structural biodiversity were calculated. These include Species Richness, which is the number of species encountered, and Swartz's Index of Species Dominance, which is the number of species that accounts for 75% of the total number of coral colonies. The Shannon-Weiner Diversity Index (H') takes into account relative abundance of species and includes both species richness and evenness. Communities with a large number of species that are evenly distributed are the most diverse and communities with few species that are dominated by one species are the least diverse. The Shannon-Weiner index is defined as:

$H' = -\sum[(n_i/N) \times \ln(n_i/N)]$, where n_i =number of colonies of species I, N = total number of colonies, and ln = natural log.

In order to calculate densities of coral colonies, the area available for colonization was estimated. The dimensional components of surface area calculations shown in Table 1 consist of: 1) the lengths of each sector; 2) average water depths (derived from hydrographic survey data provided by DOT-H); 3) the widths of each of the dredged shoreline sectors, defined as the distance from the shoreline to the bottom of the channel wall; 4) the number of column pilings along each pier face, as counted on construction drawings provided by DOT-H, and 5) the light-exposed surface area of each piling based on the length of the piling from the water surface to the Harbor floor. Field observations indicated that macro-biotic colonization (particularly of corals) occurred only on the outer facing surfaces of the column piles exposed to light. Hence, light-exposed surface area was defined as the front and two sides of each square column (note that in Section E, where pilings were not covered by a pier structure, all four sides of each column are considered light-exposed). Total surface area of each sector, and the total survey area was calculated as the product of the number of pilings and the surface area of each piling (Table 1).

2. Non-Coral Macro-invertebrate Community Metrics

As is typical in most Harbors in Hawaii, sessile macro-benthos such as sponges, mollusks, bryozoans and hydroids occurred abundantly on most light-exposed submerged surfaces. During zigzag survey swims, all observed invertebrates inhabiting the area were identified to the lowest taxonomic level, and estimates of abundance were recorded. Following investigation of each sector each observed species was assigned an abundance class of RARE (less than 10 individuals or colonies observed), COMMON (~10-50 individuals or colonies observed) and ABUNDANT (greater than 50 individuals or colonies observed). As many of the common fouling community invertebrates exist in very high abundance throughout the Harbor, and many do not have discrete individual or colonial growth forms, the classification into abundance classes rather than exact numerical estimates provides an adequate database for evaluation of community structure.

3. Algae Community Metrics

In contrast to benthic invertebrates, the results of the preliminary baseline survey indicated that algae are not an abundant colonizer of the vertical structures comprising the subject area. As a result, algal transect-quadrat surveys were not deemed necessary. In the few instances where algae was observed, species were noted as part of the coral and invertebrate assessments.

4. Fish Community Metrics

Numerical abundance of individuals by species (or lowest possible taxonomic level) was recorded along with approximate length of each individual during swims spanning the length of each survey sector. As mentioned above, owing to poor water clarity and avoidance of divers, it is likely that estimates of fish abundance are likely skewed low.

Biomass of fish was calculated using the regression equation $W=aL^b$, where W = weight (grams), L = length (cm), and a and b are species-specific constants (Schneider et. al. 2000). A graph of log W versus log L forms a straight line with a slope of b and a Y-axis intercept (log W) of log a. Invariably, b is close to 3.0 for all species. For the calculation of W in this report, L was estimated during field surveys for all fish observed, and values of a and b were taken from Fishbase.us/search.php which lists these constants for 3,584 species.

5. Incidental Sightings of Threatened and Endangered Species

Incidental sightings of protected and endangered marine mammals and reptiles were noted, along with estimates of species, size, tumors, obvious injuries and any other distinguishing markings. However, during the course of fieldwork, no marine mammals or turtles were observed.

6. Regulated and Invasive Species

Data collection included notation of regulated and introduced species, as well as candidate species for endangered status.

III. RESULTS and DISCUSSION

A. Physical Structure

All of the physical structures within the survey area consist of either man-made materials (e.g., structural composition of piers and pilings), or natural resources that have been altered by human activity in the form of dredged channel walls and shoreline shelves.

Sectors A, B and F consist of undeveloped dredged shorelines with narrow (several meters wide) flat shelves that abut the shoreline and terminate in a steep nearly vertical slope that extends to the channel floor. A consistent characteristic of these areas is a coating of fine-grained silty sediment over all non-living surfaces, although the sediment cover was substantially higher in Sectors B and F than in Sector A. In Sector A, which borders the southern side of Harbor entrance channel, a portion

of the shoreline consists of large boulders that have probably been placed in the water to retard erosion of the shoreline. In Sector B, the shelf and slope structure grades into a rubble bed beyond the Sand Island Bridge. Biotic settlement in all areas of dredged shoreline, particularly settlement by stony corals, was far more prominent on the flat shelves than the slopes. Figures 7-8 show typical structural features of Sector A, while Figure 9-11 shows the shelf and slopes in Sector B.

The floor of the entire Harbor adjacent to all survey sites within Kapalama Basin consists of deposits of fine-grained silty mud that is pocked with openings from burrowing fauna. Throughout the Harbor, extensive metal and wood debris was noted on the harbor floor adjacent to piers (Figure 12). Observations of the Harbor floor throughout the survey area revealed no colonization by corals or other macro-benthos on the mud surface.

The physical structure of Sectors C, D, E, I, J, consist of square concrete pilings (0.489 m dimension of each side) that extend into the mud comprising the Harbor floor (Figure 12). Most of the surface area of the pilings not covered by living biota is encrusted with remnant mollusc shells. The coating of mollusc shell forms the settlement substratum for other invertebrates. Figures 13-20 provide views of concrete piles located in Sector C, along with typical colonizing organisms. In Sector D the vertical piles support a submerged horizontal concrete slab that supports the pier structure. As with the vertical piles, the horizontal slab is fully encrusted with remnant mollusc shells and living invertebrates (Figure 21).

Sector E consists of a matrix of approximately 180 partially submerged concrete piles extending from the shoreline (Figure 22). Exposed re-bar extending from the tops of these piles suggests that a pier was removed from the piling foundation. As a result, the submerged piles provide a relatively unique habitat in that light is not restricted within the matrix of columns as is the case on pilings overtopped by piers. Sector E contains some of the largest coral colonies within the Kapalama basin area (Figures 22-26). The seaward terminus of Sector E at the western origin of Sector F is also somewhat unique, consisting of a dredged shelf/slope region similar to areas A and B. The presence of the pilings as well as the dredged shelf and slope at the juncture of Sectors E and F results in higher structural habitat complexity than other regions of the Kapalama survey area, reflected in one of the more diverse aggregations of reef fish noted in the survey (Figure 27).

Further to the east, Sector F consists of an undeveloped dredged shoreline, although unlike Sectors A and B, the slope and shelf are nearly covered with extensive metal, wood and rubber debris (Figures 28-30).

Sectors K and L consist of solid vertical corrugated metal sheet piling that is also covered with a solid layer of remnant mollusk shells. While no quantitative measurements were conducted of suspended sediment in the water column, visibility in Sectors K and L of the Harbor appeared to be less than in the Sectors closer to Snug Harbor. The apparent lower suspended sediment loads within the water column may be a factor in the settlement and growth of an extensive array of corals and other invertebrates (Figures 33-38).

B. Biotic Community Structure

1. Coral Communities

Colonization of existing hard substratum by corals was observed throughout the survey area of Honolulu Harbor. It is generally assumed that reef-building corals require water conditions characterized by low suspended particulate loads and sediment deposition. While effects of high sedimentation are one of the most important physical stresses considered detrimental to corals, it is clear from the communities that exist within Kapalama Basin that several species of coral are able to successfully colonize habitats where high levels of suspended and settling particulate solids are typical conditions.

It was also evident that exposure to light is another important limiting factor regulating coral community structure within the Kapalama Basin and central region of Honolulu Harbor. Reef-building (hermatypic) corals by definition require light for the metabolic contribution of photosynthetic algae (zooxanthellae) that are mutualistic symbionts within coral tissues. As a result, corals, as well as most other macro-invertebrates, were generally limited to the outer facing surfaces of pilings that are exposed to direct solar insolation for at least part of the day. In addition, corals were generally limited to a vertical zone extending from about one meter below the surface of the water to a depth of approximately 6.1 m (20 feet). Above and below these boundaries, pilings were essentially devoid of coral colonization. Examination of piers and pilings under ships or other floating objects that were moored on a long-term basis revealed little or no live coral growth.

Table 2 shows results of all size-class measurements of each coral species collected at the twelve sampling sectors in the Kapalama Basin and Pier 24. Table 3 summarizes these data in terms of all species pooled within each sector. A total of 5,173 coral colonies were measured, with counts ranging from a low of 92 (Sector D) to a high of 1,201 (Sector K). Total counts in individual size classes ranged from 159 ($>80 \leq 160$ cm) to 1,727 ($>2 \leq 5$ cm). The number of coral species encountered within sectors ranged from 4 (Sector B) to 9 (Sector K). Shannon-Wiener diversity indices ranged from 0.67 (Sector C) to 1.61 (Sector K) (Table 3). Swartz's Species Dominance, defined as the number of species that account for 75% of the colonies, ranged from 1 (Sector F) to 4 (Sectors K) (Table 3). The peak number of colonies, highest diversity (H') and Swartz's Species Dominance in Sector K indicates that the sheet-piling comprising the submerged surface in this area provides the most suitable settling habitat for the largest number of corals.

Eleven species of coral were encountered over the course of the survey. Size-class counts of colonies in each sector are shown for eight species in Table 4 (3 species had observations of less than 5 colonies). Pooled data for each species in each size-class is shown in Table 5. When all sectors are pooled, the species with the most colonies is *Pocillopora damicornis* (1,840), followed by *Leptastrea purpurea* (1,497) and *Porites lobata* (1,039). These three species account for about 85% of the total observed colonies. *Pocillopora damicornis*, which occurs in a finely branching growth form, is restricted to habitats with limited wave stress. In Hawaii, such areas are primarily wave-protected embayments, where sedimentation is often high. The proliferation of this species throughout every sector of Kapalama Basin indicates that this species is indeed adapted to high sediment areas. In particular, the large coalescing colonies occurring on the dredged platform of Sector B are likely one of the densest populations, along with the largest colonies of this species found on Oahu (Figures 10-

11). Many of the large coalesced colonies of *P. damicornis* were observed with dead patches encrusted with calcareous algae. However, these areas also contained multiple small colonies that were either remaining living remnants or new recruits on available hard substratum (Figure 10).

The second most abundant species was *Leptastrea purpurea*, which occurs within the Harbor as small generally round or oval shaped encrustations (Figures 21 and 39). All colonies observed were less than 20 cm in longest diameter (Table 3). Few of the smaller size-classes of both *P. damicornis* and *L. purpurea* exhibited signs of sediment damage.

The third most abundant coral species, *Porites lobata*, is generally considered the most abundant coral on Hawaiian reefs. *Porites lobata* occurred in every sector within Kapalama Basin (as did *P. damicornis*). Within sectors A, B, and C, the growth form of *P. lobata* was restricted to small encrusting lobed colonies below 20 cm in dimension (Figure 8). In sectors E through K, however, large multi-lobed colonies of *P. lobata* were common on column piles and sheet-piling (Figures 25 and 35). Typically these large colonies of *P. lobata* contained areas covered with accumulated sediment with no living tissue underneath.

The fourth and fifth most abundant corals were *Montipora patula* and *M. capitata*. While these two species were sparse in occurrence in sectors B and C, they were both abundant in sectors E and K, occurring on vertical pilings often as expansive growth forms of thin overlapping plates. Such an overlapping growth form is likely an adaptation to maximize exposure to available light (Figures 22, 23, 24, 33 and 34). Without exception, these large plating colonies contained areas of sediment accumulation abutting healthy seemingly unaffected live tissue. In many cases, colonies of both species of *Montipora* occurred on the same piling, with touching colony margins. Similar growth forms of *Montipora* spp. have been observed by the author in other Harbor environments in Hawaii, particularly Kahului and Hana Harbors on Maui.

Other corals observed in the Kapalama Basin area are *Pavona varians*, with a growth form consisting of flat encrustations. *Pavona varians* occurred primarily on the sheet-piling of Sector K (Figure 37). *Porites compressa*, commonly referred to as "finger coral" is often one of the most abundant corals in wave-sheltered Hawaiian environments and on deep reef slopes. Only three colonies of *P. compressa* were observed in Kapalama Basin, all occurring in Sector D (Figure 36). One colony each of *Porites monticulosa* (Figure 37) and *Pocillopora eydouxi* were observed throughout the study area, both of which occurred in Sector K (Figure 38).

As the census of coral colony distribution comprised the entire surface area available for settlement, it was possible to calculate the density of coral colony occurrence in each survey sector (Table 6). Coral densities, defined as colonies per square meter (col m^{-2}) of available substratum provide a normalized index that can be used to compare distribution within both sectors and size classes. The overall density of coral for the entire survey area was 0.362 col m^{-2}. With respect to sectors, colony density ranged from 0.124 col m^{-2} in Sector E to 0.983 col m^{-2} in Sector F. With respect to size-class, density ranged from 0.011 col m^{-2} for the $>80 \leq 160$ cm class (there were no corals observed in the >160 m class) to 0.121 colonies in the $>2 \leq 5$ cm class. As with the number of colonies, the lowest density of corals occurs in the three largest size classes (Table 6).

In addition to measuring the long axis of each coral colony, qualitative notation of growth form was also a component of the survey. After noting growth forms during the initial surveys, it quickly became apparent that each species assumed a specific growth form that remained consistent throughout the survey. To this effect, it can be stated that *Pocillopora damicornis* always occurred in a hemisphere of fine branches; *Leptastrea purpurea* always occurred as circular or oval flat encrustations seldom larger than 10 cm; *Porites lobata* always occurred in rounded lumpy mounds, while *P. compressa* always occurred as amalgamated branching masses. *Montipora* spp. assumed the most plastic of growth forms with small colonies under 20 cm generally occurring as flat encrustations and larger colonies assuming combinations of overlapping plates, flat patches, and spires, often with all growth forms occurring on the same colony. Hence, there were no species that occurred in distinctly different growth forms.

A consistent characteristic of nearly every colony larger than approximately 20 cm was an area of deposited sediment with no underlying living tissue. As the number of such colonies would be in the thousands, a listing of the percentage of sediment cover for each colony was beyond the scope of the survey. Percentage cover of sediment ranged from less than 1% on some of the smaller corals to on the order of 90% on some of the larger corals. There were no observations of distinctly bleached coral or coral disease. Apparently healthy tissue abutted areas of sediment deposition with no harmful effect. Several of the larger heads of *Porites lobata* contained numerous white marks, but it was judged that these were the result of fish grazing rather than disease.

Part of the coral community assessment included a qualitative evaluation of Piers 24-28 which are proposed as areas where commercial operations that presently occupy Piers 40-42 will relocate. Qualitative surveys of these areas revealed some very different community structure than observed in the Kapalama Basin area. In particular, the pilings comprising Piers 24 and 26 contained skeletal remains of large colonies that were either completely or partially devoid of living tissue (Figures 40-42). The occurrence of these large dead colonies suggests that either there has been at least one event of sediment input and deposition of sufficient magnitude to completely overwhelm coral defense mechanisms, or that these areas were the locations of long-term mooring of vessels which restricted light for a period sufficient to result in complete mortality.

Also observed during the qualitative investigation was an area of the end of Piers 27-28 consisting of a dredged section of shallow reef platform. Large boulders on the edge of the platform provide a complex habitat for reef fish and coral settlement (Figure 45). The dredged edges of the platform provide a habitat for extensive growth of corals including large hemispherical colonies of *Porites lobata*, and vertical sheets of overlapping plates of *Montipora* spp. (Figures 46-47). The Harbor floor off the end of Piers 27-28 also consisted of a more solid sand-mud substratum than the silt-mud found elsewhere throughout the Kapalama Basin. Water clarity in this area was also noticeably higher than in the Kapalama region. Hence, the combination of physical factors of abundant substratum and enhanced water quality result in a richer biotic community off the end of Piers 27-28 than anywhere else in the survey area.

Of particular interest are the observations that in several survey areas there were skeletal remains of large colonies some of which contained what appeared to be new recruits, and some of which were completely devoid of coral. Such colonies were apparent for large colonies of *P. damicornis* at Sector B (Figure 10) and *Montipora* spp. at Pier 26 (Figures 40-42). The relevance of these observations is

that while the age of construction of original pier structures may be determined, it cannot necessarily be assumed that the ages of the colonizing coral community is commensurate. It is apparent from the existence of large, but completely dead skeletal remains that episodic events have occurred throughout the harbor that elevated stress levels to the point of complete mortality of living communities. Such catastrophic stresses typically occur on naturally occurring reefs in Hawaii, primarily through destructive forces of hurricanes or other severe wave events. Similar effects may occur within the Harbor when flood conditions deliver sediment loads to the Harbor which overwhelm physiological defenses.

At present, the Center for Biological Diversity is petitioning the National Oceanographic and Atmospheric Administration (NOAA) to list 82 species of reef building corals as endangered species. Contained in this list are two species that were observed during the Kapalama Basin surveys. Four hundred thirty six colonies of *Montipora patula* were counted, comprising about 8.4% of the total number of colonies. *Montipora patula* is only of the most common corals observed throughout Hawaii on naturally occurring reefs. The other species listed that was observed was *Cyphastrea ocellina*. While *M. patula* was commonly observed throughout the Harbor, often occurring in large colonies, only five colonies of *C. ocellina* were encountered, all of which were less than 5 cm in longest dimension.

In summary, census of size-classes of species abundance provides a comprehensive depiction of the coral community structure within the hard substratum areas of Kapalama Basin where re-development activities are planned. These data, including abundance, diversity and density provide a quantitative analysis that portrays the coral community within Kapalama Basin. While all species occurring in the area must be considered resistant to high loading of particulate material, it is apparent that individual coral species are adapted to particular sub-zones of physical conditions. In particular, *Pocillopora damicornis* proliferates on the dredged channel shelves of Sectors B and F, while large overlapping plating colonies of *Montipora* spp. thrive on the vertical surfaces of pilings on west-facing piers (Sectors E and K). Conversely, east facing piers C and I had relatively few large colonies.

2. Non-Coral Macro-Invertebrate Communities

Of Hawaii's invertebrates that have established communities in marine and brackish waters, 301 species are introduced (non-native) while 117 are cryptogenic (unknown origin) (Carlton and Eldredge 2009). This is particularly relevant to Hawaiian harbors, where shipping and fouling are the penultimate cause of invasive species growth on pilings and hull bottoms. Other sources of fouling are from ballast water and solid ballast taken on by ships. These species originated largely from the Indo-Pacific region, but also from the tropical western Atlantic and Caribbean regions (R. DeFelice, L. Eldredge and J. Carlton 2001).

Kapalama Basin is characterized by a high density of sponges, tunicates, bivalves and bryozoans. Forty-five species of non-coral macro-invertebrates were identified in the Kapalama Basin surveys, including 20 sponges, 4 tunicates, 5 bryozoans, 5 annelids, 5 molluscs, 2 echinoderms and 2 arthropods (Table 7). Of the 45 species, 15 are identified as Introduced species (Table 7) (Staples

and Cowie 2001). Overall, invertebrates were far more abundant on the piers and pilings than on the dredged shorelines of Sectors A and B.

Abundance and diversity of sponges was highest with 10 species classed as "Abundant." At least one these Abundant species occurred in every survey sector. The red encrusting sponge *Porbus amaranthus* was present in every sector of the harbor, where it occurred in larger colonies on pilings and smaller colonies on rock outcroppings (Table 5, Figure 15). The sponges *Leucetta* sp., *Mycale armata* and *Zygomycale parishii* were also commonly cited on the cement pilings. *Liosina paradoxa* formed large colonies, which were abundant in Sectors A- D, but was not recorded after this sector. *Sigmadocia* sp., *Chalinula* sp., *Dysidea* sp. and *Suberites zeteki* were very common, with small to medium colonies present on hard substrates throughout the survey.

Tunicates were the next most abundant group if invebrates, with the black sea squirt *Phallusia nigra*, the solitary ascidian *Herdmania momus*, and the gray sea squirt *Ascidia sydneiensis* occurring in large numbers throughout the sectors composed of pilings (Figures 13-20 show representative invertebrate species observed in Snug Harbor). Of note was the relative lack of living molluscs with only 3 species occurring abundantly. As noted above, virtually all of the exposed hard surfaces were encrusted with a layer of dead mollusc shells, although the living component of this class was very small. Also of note was the common occurrence of the banded coral shrimp *Stenopis hispidis*, which were routinely observed on large coral colonies.

Descriptive comparisons between sectors offer insight to the value of these harbor invertebrates and habitat function. Overall, the cement piling substratum showed little variation between sectors and sustained very high densities of macro-invertebrates, even with the layers of thick sedimentation. Sectors A, B, F, and G were habitats characterized by extensive sediment deposition on narrow rocky shelves and slopes, and typically contained smaller, compact colonies of sessile macroinvertebrates and lower abundances of macrofauna compared to vertical pilings. *Sabellastarte spectabilis* (Featherduster worms) were present in nearly every sector, but most prominent in rock outcroppings of these habitats.

3. Algal Communities

In contrast to invertebrates which occurred throughout the area of study, frondose algae were surprisingly scarce at all survey locations. Only three species of algae were observed, the most common of which was *Dictyosphaeria cavernosa*. Two small areas of *D. cavernosa* were observed, one on a concrete pile in Sector C, and the other on the sheet-piling of Sector K (Figure 38). The two other species observed were *Dictyota* sp. and *Codium edule*, both in Sector C. It is apparent that physical conditions within Honolulu Harbor are not conducive to algal growth.

While algal growth was essentially absent from the reef at the juncture of Piers 27 and 28, a small patch of the Hawaiian seagrass *Halophila hawaiiana* was observed on the harbor floor adjacent to the dredged channel wall (Figure 48). Halophila occurs as pairs of leaves on petioles along a continuous rhizome rooted in the sand. While this area was not within the region of quantitative surveys the patch of *H. hawaiiana* was estimated to be approximately 5 meters in longest dimension, with approximately 100 emergent leaf pairs per square meter. This was the only occurrence of the seagrass noted in the survey.

4. Fish Communities

While the fish assemblages found in Kapalama basin include species that are typical of Hawaiian reef ecosystems, there was substantial variability in both the number of species and individuals observed within different sectors of the survey area. A total of 1,902 individuals were counted comprised of 39 species (Table 8). When several large schools (~500 individual per school) of goldspot sardines (*Herklotsichthys quadrimaculatus*) that were observed transiting several of the survey areas are not included, the fish count is 902 individuals.

Overall, numbers of fish observed in sectors composed of concrete piles (C, E, I, J) were lower than counts on sectors consisting of dredged shorelines. Fish were most abundant in the "reef" area off the end of Pier 28, where 198 individuals were counted distributed between16 species (Table 8). Fish and corals flourished in this area, making it the region within the Harbor survey area most closely resembling a "natural" reef. Within the Kapalama Basin area, the largest numbers of fish were observed in Sectors B (149) and G (250). The lowest number of fish were observed in Sectors D(2), J (17) and L (17). The low numbers in sectors J and L are likely a result of the short span of the sectors.

The most frequently observed fish within Kapalama Basin (other than *H. quadrimaculatus*) was the ring-tailed surgeonfish (*Acanthurus blochii*) which occurred in all sectors (Table 9). Other common surgeonfish included the convict surgeonfish (*Acanthurus triostegus*) and the yellow tang (*Zebrasoma flavescens*). The Hawaiian whitespotted toby (*Canthigaster jactator*), the damselfish *Dasyllus ablisella*, were observed frequently at nearly every survey site. Of the butterflyfish, the threadfin butterflyfish (*Chaetodon auriga*) and raccoon butterflyfish (*Chaetodon lunula*) were the most frequently observed. Several barracuda (*Sphyraena barracuda*) were observed among the pilings of Sectors C, D and I.

Biomass of fish encountered during surveys by species in each sector are shown in Table 10 and summarized in Table 11. Total biomass for the entire project site is estimated at 97,652 g, with the highest biomass in Sector G (20,979 g), and the lowest in Sector D (21g) (Table 11). In terms of species, biomass ranged from 9 gm for *Chromis hanui* (Hawaiian bicolor chromis), with only a single individual encountered to 17,440 g for the 200 individuals of *Kuhlia xenura* (aholehole). Six species had biomass less than 100 g, 16 species had total biomass between 100 and 1,000 g, 13 species were between 1,000 and 10,000 g, while 3 species had biomass greater than 10,000 g.

Biomass density (biomass per square meter) was calculated at the total biomass per sector divided by the surface area of each sector as shown in Table 1 (Table 11). Biomass density ranged from 29.9 g/m^2 in Sector G to 0.18 g/m^2 in Sector A.

It is important to note that the entire survey area is a restricted access zone and likely experiences little or no direct fishing pressure, although fishing does occur in neighboring areas. Hence the fish communities observed are not likely substantially affected by direct fishing pressure at the site of the proposed Container Terminal. As a result, community structure is the area of the proposed redevelopment is largely in response to physical conditions. Only two areas observed were considered preferable habitats with relatively high densities of reef fish (off the end of Sectors E and

F), and off the end of Piers 27-28. In both of these areas, habitat consisted of a reef shelf and slope. None of the pilings observed in this study could be considered preferred habitats for reef fish.

The fish species found in Kapalama basin are typical of Hawaiian reef and harbor habitats. The harbor provides a three-dimensional structured habitat for the fish, noticeable in areas of dredged shorelines and associated debris fields and coral structures. Few or no fish were observed on the mud/silt habitats of the harbor floor. The most abundant fish communities were observed in the vicinity of the juncture of Piers 27 and 28, where structural composition of the channel floor most closely resembled natural reef. No construction action is currently proposed for the area at the terminus of Piers 27 and 28 where the most well developed reef structures occur.

5. Incidental Sightings of Threatened and Endangered Species

Several species of marine animals that occur in Hawaiian waters have been declared threatened or endangered by Federal jurisdiction. The threatened green sea turtle (*Chelonia mydas*) occurs commonly throughout the Hawaiian Islands, and are frequently observed throughout the south shore of Oahu. The endangered hawksbill turtle (*Eretmochelys imbricata*) is known infrequently from Hawaiian waters. No green sea or hawksbill turtles were observed during the course of underwater surveys within Kapalama Basin or the central area of Honolulu Harbor.

Populations of the endangered humpback whale (*Megaptera novaeangliae*) winter in the Hawaiian Islands from December to April. The present survey was conducted in June and July when whales are absent from Hawaiian waters. During the season when present, humpback whales, as well as other cetaceans may occasionally enter the Harbor. The Hawaiian monk seal, (*Monachus schauinslandi*) is an endangered earless seal that is endemic to the waters off the Hawaiian Islands. Monk seals commonly haul out of the water onto sandy beaches to rest. No seals were observed during survey work, and there are no beaches within the survey area that could serve as haul-out sites.

6. Regulated and Invasive Species,

The State of Hawai'i Department of Land and Natural Resources (DLNR) Division of Aquatic Resources lists a variety of "regulated" marine fishes and invertebrates. Marine invertebrates include primarily species valued as food sources, including abalone, various clams and oysters, crabs, shrimp, lobsters, and sea urchins (for complete list and scientific names of regulated species, see http://hawaii.gov/dlnr/dar/regulated_fish_names.html. No commercial or recreational fishing operations occur in the survey area.

The only regulated species within the Kapalama Basin observed during surveys were several fish, including a school of aholehole (*Kuhlia xenura*), parrotfish (*Scarus psittacus*) and a single papio (*Caranx melamphygus*). With regard to invertebrates, the only listed species observed was a single octopus (*Octopus cyanea*) and several sea urchins *Echinothrix diadema*. It is possible that burrows noted within the sediment floor of the basin may be from shrimp (`opae); however, no individuals were observed.

As noted above, of the 418 introduced and cryptogenic species, 15 introduced species were

identified during the surveys in Kapalama Basin and central Honolulu Harbor as part of the fouling communities on piers and pilings.

IV. CONCLUSIONS

Quantitative and qualitative results of field investigations of the areas of Honolulu Harbor that are proposed for re-development under the proposed Kapalama Container Terminal reveal a varied array of habitats, each with characteristic biotic composition. The varied community structure is likely a result of varied species physiological tolerances to sub-optimal physical condition, particularly sediment and light availability.

The *in-situ* census of marine organisms assembled during for this assessment provide a data base of coral, other macro-invertebrates and fish distribution throughout the potential impact area. Other functional attributes, such as recruitment and contribution to topographic complexity may be extracted from the data base in order to assess the recovery potential of the area. Abundance, form and size are basic parameters for determining size and age structure of coral communities. While the entirety of vertical substratum of the area is man-made and of known age, caution should be exercised when projecting age-population structure based on age of substratum.

The proposed actions will result in complete loss of existing hard substratum habitat occupied by existing invertebrate and fish assemblages. However, replacement of the existing structures will likely result in similar man-made habitats which will afford the same opportunity for settlement and growth. Dredging may temporarily increase sediment loading to the water column which will disperse with current and tidal flow. As noted at all areas throughout the survey, suspended and deposited sediment are a dominant component of the harbor habitats. As harbor communities are thus pre-adapted to sediment stress, the potential indirect impacts to biotic communities that are left in place during the re-development will likely not be as severe as it would be to communities that do not develop in an environment characterized by consistently high sediment.

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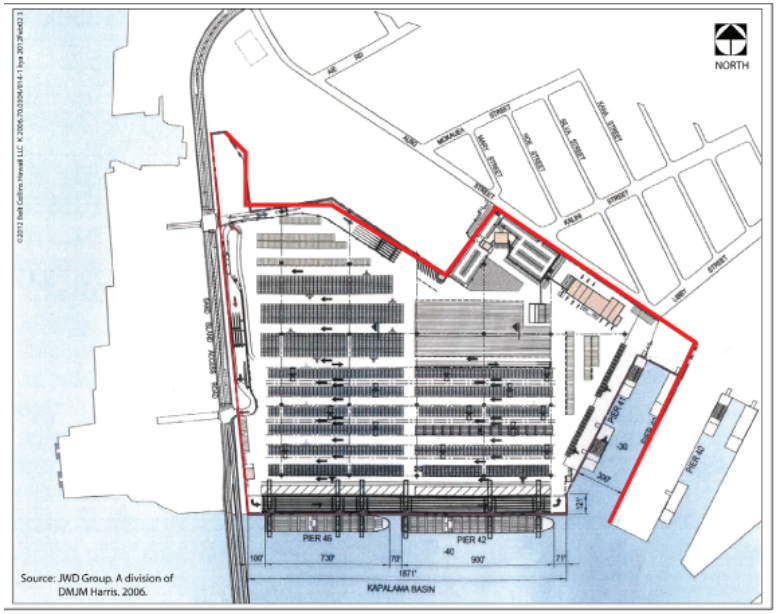

FIGURE 1. Proposed design plan of Kapalama Container Terminal, Honolulu Harbor, Hawaii. Red line delineates boundaries of proposed Kapalama Container Terminal. Proposed configuration includes filling in of existing berthing area of Snua Harbor. construction of new Piers 42 and 46. and modification of Piers 40 and 41.

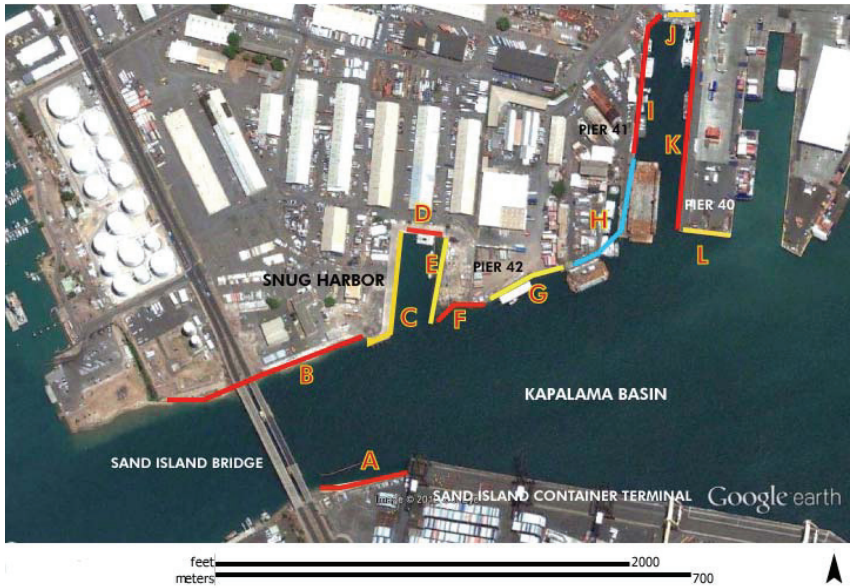

FIGURE 2. Aerial photograph of Kapalama Basin section of Honolulu Harbor showing survey sectors for A-L used in assessing marine biological composition.

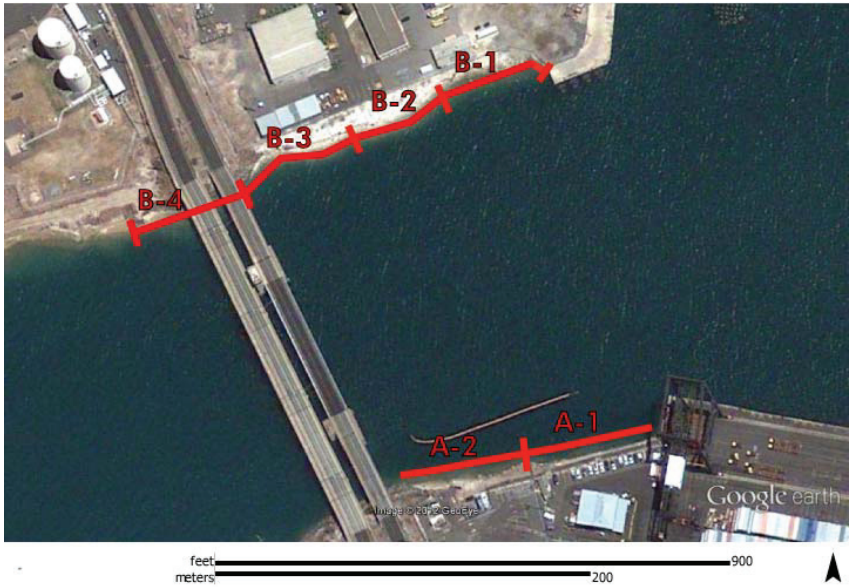

FIGURE 3. Locations of sampling areas A and B along the dredged shorelines on the south and north sides of the Kapalama Basin entrance channel to Honolulu Harbor. For location of area relative to entire survey region of Kapalama Basin, see Figure 1.

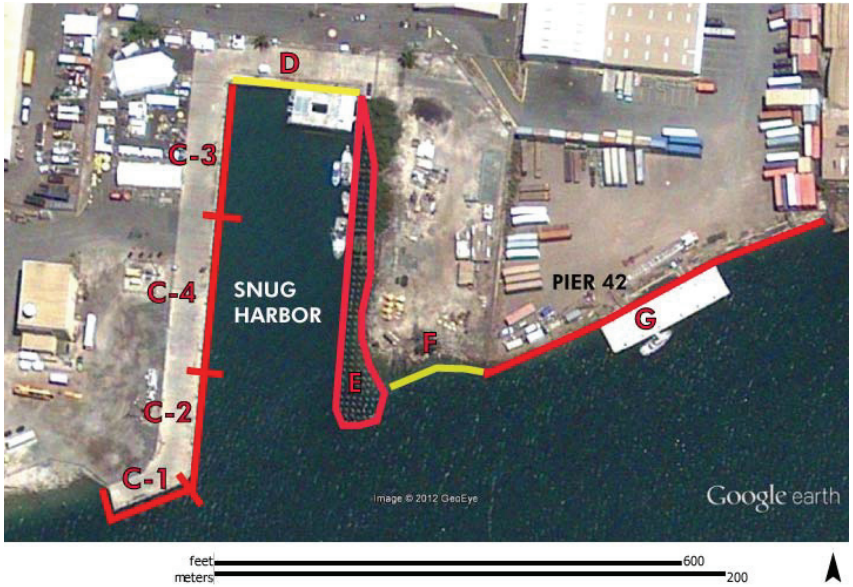

FIGURE 4. Locations of sampling areas C through G along Snug Harbor and Pier 42 adjacent to Kapalama Military Reservation. For location of area relative to entire survey region of Kapalama Basin, see Figure 1.

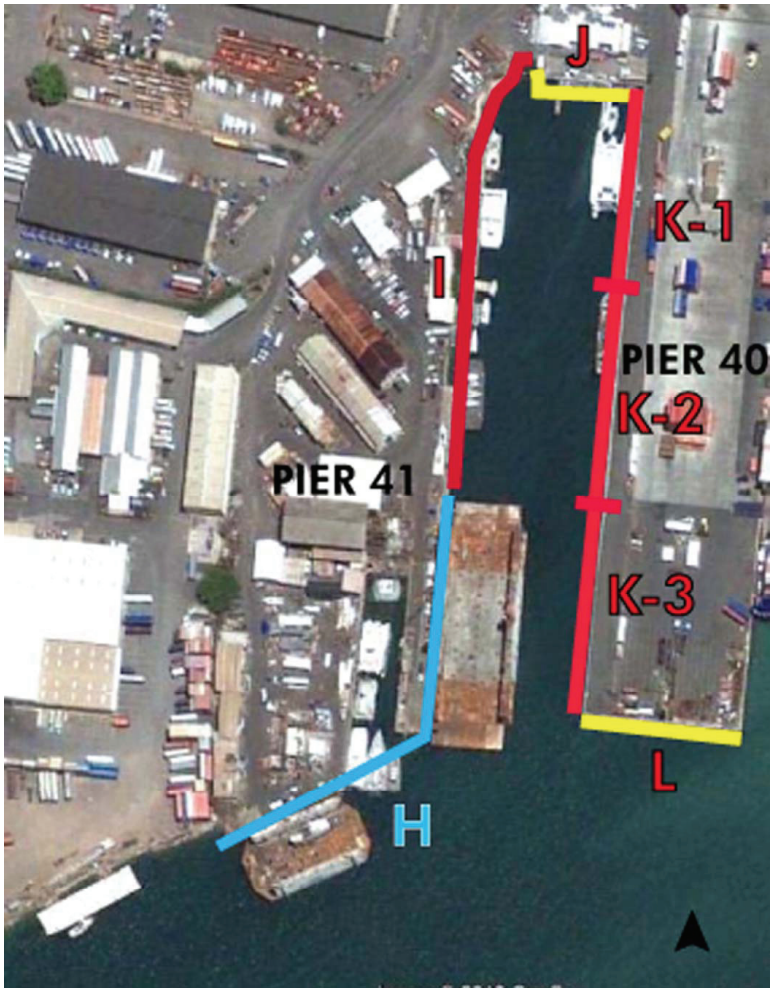

FIGURE 5. Locations of sampling sections H through L along Piers 40 and 41 adjacent to Kapalama Military Reservation. Section H, shown in blue, was not surveyed owing to permanent mooring of dry docks and other vessels along entire pier frontage. For location of area relative to entire survey region of Kapalama Basin, see Figure 1.

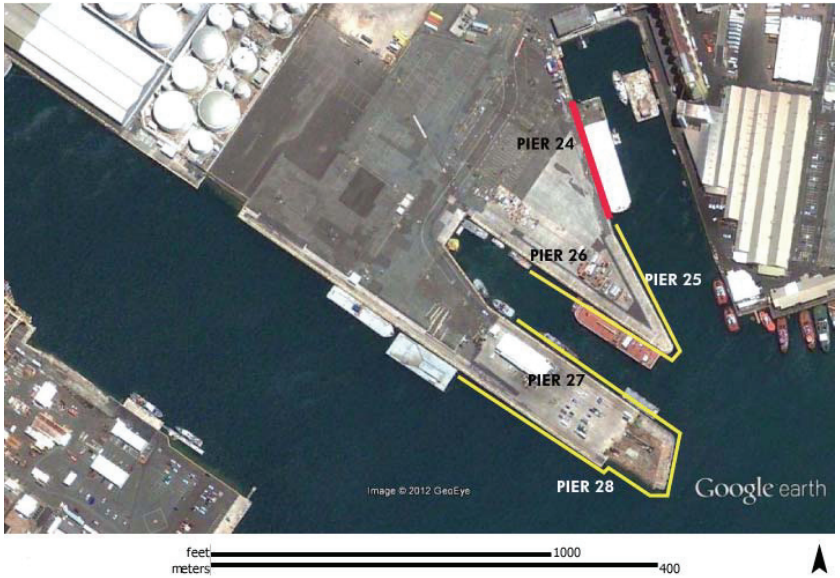

FIGURE 6. Aerial photograph of central portion of Honolulu Harbor showing Piers 24-28. Area depicted by red line is proposed mooring site of Pacific Shipyards Dry Dock. This area was quantitatively evaluated for coral abundance similar to survey area in Kapalama Basin. Piers 25-28, shown in yellow, were qualitatively described.

TABLE 1. Latitude and longitude of start and end, and linear length of each survey sector in Kapalama Basin and Pier 24, Honolulu Harbor. Linear width is distance from shoreline to channel wall on sectors with reef shelf. "Pilings" is count of column piles on outer edge of piers. Piling area is area of each submerged piling exposed to light. Sheet indicates solid sheet piling. Surface area is available substratum available for coral settlement in terms of reef shelves or exposed piling surfaces. For locations of survey sectors, see Figures 3-6.

SURVEY SECTOR		LATITUDE deg min	LONGITUDE deg min	LINEAR LENGTH (m)	LINEAR WIDTH (m)	WATER DEPTH (m)	PILINGS (number)	PILING AREA (m^2)	SURFACE AREA (m^2)
A-1	START	21° 18.844'	157° 53.166'	71	8				568
	END	21° 18.832'	157° 53.207'						
A-2	START	21° 18.832'	157° 53.207'	64	7				448
	END	21° 18.823'	157° 53.246'						
B-1	START	21° 18.942'	157° 53.201'	60	8				480
	END	21° 18.935'	157° 53.233'						
B-2	START	21° 18.935'	157° 53.233'	60	10				600
	END	21° 18.925'	157° 53.258'						
B-3	START	21° 18.925'	157° 53.258'	60	8				480
	END	21° 18.910'	157° 53.293'						
B-4	START	21° 18.910'	157° 53.293'	74	9				666
	END	21° 18.897'	157° 53.329'						
C-1	START	21° 18.944'	157° 53.200'	38		8.5	15	12	181
	END	21° 18.944'	157° 53.182'						
C-2	START	21° 18.944'	157° 53.182'	42		8.5	16	12	200
	END	21° 18.968'	157° 53.179'						
C-4	START	21° 18.968'	157° 53.179'	63		7.9	24	12	279
	END	21° 19.000'	157° 53.176'						
C-3	START	21° 19.000'	157° 53.176'	49		8.8	19	13	242
	END	21° 19.028'	157° 53.173'						
D	START	21° 19.028'	157° 53.173'	49		7.6	19	11	209
	END	21° 19.025'	157° 53.144'						
E	START	21° 19.025'	157° 53.144'	125	10	7.6	180	11	2736
	END	21° 18.955'	157° 53.146'						
F	START	21° 18.963'	157° 53.139'	41	10				410
	END	21° 18.967'	157° 53.115'						
G	START	21° 18.967'	157° 53.115'	142		8.8	55	13	702
	END	21° 18.993'	157° 53.056'						
I	START	21° 19.095'	157° 52.973'	214		7.9	82	12	949
	END	21° 19.185'	157° 52.953'						
J	START	21° 19.185'	157° 52.953'	58		9.1	sheet		528
	END	21° 19.192'	157° 52.920'						
K-1	START	21° 19.192'	157° 52.920'	98		9.7	sheet		951
	END	21° 19.142'	157° 52.926'						
K-2	START	21° 19.142'	157° 52.926'	109		10.7	sheet		1166
	END	21° 19.083'	157° 52.932'						
K-3	START	21° 19.083'	157° 52.932'	98		10.7	sheet		1049
	END	21° 19.029'	157° 52.936'						
L	START	21° 19.029'	157° 52.936'	77		10.7	sheet		824
	END	21° 19.024'	157° 52.893'						
P-24	START	21° 18.704'	157° 52.229'	108		10.1	42	15	613
	END	21° 18.648'	157° 52.212'						
TOTAL AVAILABLE SURFACE AREA FOR CORAL SETTLEMENT									14,281

TABLE 2. Counts of coral colonies according to size classes on survey sectors in Kapalama Basin and Pier 24. Only coral species occurring in each sector are shown for that sector. Species marked with an "*" are presently petitioned to be included under the Endangered Species Act. For location of sectors, see Figures 2-

SECTOR A-1	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites compressa					1				1
Porites lobata	4	37	21	1					63
Pocillopora meandrina				1					1
Pocillopora damicornis	13	26	31	2					72
Montipora capitata		6	5	1	4				16
*Montipora patula**	3	3	2	7	2				17
Leptastrea purpurea	10	17							27
Pavona varians		3	2						5
TOTAL	30	92	61	12	7	0	0	0	202

SECTOR A-2	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	12	53	14	9					88
Pocillopora meandrina		1							1
Pocillopora damicornis	21	43	25	2					91
Montipora capitata		12	17	12	2				43
*Montipora patula**	2	4	12	8	6				32
TOTAL	35	113	68	31	8	0	0	0	255

SECTOR B-1	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	14	12	3	11					40
Pocillopora damicornis	3	12	17	34	47	35		21	169
Leptastrea purpurea		1							1
TOTAL	17	25	20	45	47	35	0	21	210

SECTOR B-2	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	25	10							35
Pocillopora damicornis	16	18	13	17	7	2			73
Leptastrea purpurea	1	1							2
TOTAL	42	29	13	17	7	2	0	0	110

SECTOR B-3	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	4	2							6
Pocillopora damicornis	8	6	5		1				20
Montipora capitata		2							2
TOTAL	12	10	5	0	1	0	0	0	28

TABLE 2. Cont. (2)

SECTOR B-4	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	3								3
Pocillopora damicornis	14	10	8	3					35
Montipora capitata				1					1
TOTAL	17	10	8	4	0	0	0	0	39

SECTOR C-1	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	2	2		4		2			10
Pocillopora meandrina		1							1
Pocillopora damicornis		6	10	1					17
Montipora capitata				1	1				2
*Montipora patula**					1				1
Leptastrea purpurea	1	2							3
TOTAL	3	11	10	6	2	2	0	0	34

SECTOR C-2	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata			1						1
Pocillopora damicornis		4	9	8					21
Montipora capitata		1							1
Leptastrea purpurea	18	8							26
TOTAL	18	13	10	8	0	0	0	0	49

SECTOR C-3	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata		2	2	1					5
Pocillopora damicornis	1	14	16	1					32
*Montipora patula**	1	1	2						4
Leptastrea purpurea	171	132	30						333
TOTAL	173	149	50	2	0	0	0	0	374

SECTOR C-4	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata		1	4						5
Pocillopora damicornis	2	1	10	6					19
Montipora capitata			1						1
*Montipora patula**		4	2	1					7
Leptastrea purpurea	64	92	5						161
TOTAL	66	98	22	7	0	0	0	0	193

Table 2. cont. (3)

SECTOR D	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata			4						4
Pocillopora damicornis	2	2	5						9
Montipora capitata				1	1	2	1		5
*Montipora patula**		1	1		1				3
Leptastrea purpurea	16	54							70
*Cyphastrea ocellina**	1								1
TOTAL	19	57	10	1	2	2	0	0	91

SECTOR E	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata		5	6	7	7	8	3		36
Pocillopora damicornis	16	29	67	57	14	1			184
Montipora capitata		4	12	6	4	14	24		64
*Montipora patula**		2	1	8	2	10	12		35
Leptastrea purpurea	5	9							14
*Cyphastrea ocellina**	2	2							4
Pavona varians			1	1					2
TOTAL	23	51	87	79	27	33	39		339

SECTOR F	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Pocillopora meandrina		1							1
Pocillopora damicornis	42	40	94	131	25	2			334
Montipora capitata		16	4	3	3	1	1	0	28
*Montipora patula**		7	11	4	2	1			25
Leptastrea purpurea	1	2							3
Pavona varians				1					1
TOTAL	43	66	109	139	30	4	1	0	392

SECTOR G	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	6	46	38	10	3	11	2	0	116
Pocillopora meandrina			1	4					5
Pocillopora damicornis	12	64	107	205	5				393
Montipora capitata		2	9						11
*Montipora patula**		5	14	1	1	1			22
Leptastrea purpurea	12	12							24
Pavona varians			1		2				3
TOTAL	30	129	170	220	11	12	2	0	574

Table 2. cont. (4)

SECTOR I	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata		7	31	192	8	2			240
Pocillopora meandrina			2						2
Pocillopora damicornis		8	24	16					48
Montipora capitata		1		1	1				3
*Montipora patula**			1	14	1	7			23
Leptastrea purpurea	29	32	111						172
TOTAL	29	48	169	223	10	9	0	0	488

SECTOR J	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	20	48	16	2	1	2	1		90
Pocillopora damicornis	4	10	5						19
Montipora capitata			4	5	5	1	2		17
*Montipora patula**		26	3	3	1	1	1		35
Leptastrea purpurea	2	112	9						123
TOTAL	26	196	37	10	7	4	4	0	284

SECTOR K-1	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites compressa						1			1
Porites lobata		7	11	9	13	7	11		58
Pocillopora meandrina		2	1						3
Pocillopora damicornis	3	18	2	3	3	2			31
Montipora capitata		1	1	1	3	4	2		12
*Montipora patula**				2	5	4	6		17
Leptastrea purpurea	35	255	11						301
TOTAL	38	283	26	15	24	18	19	0	423

SECTOR K-2	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites compressa							2	0	2
Porites lobata		3	89	22	21	8	8		151
Pocillopora damicornis	12	91	4	1					108
Montipora capitata		1	3	1	6	9	21		41
*Montipora patula**		3	4	13	14	11	7		52
Leptastrea purpurea	16	63	2						81
Cyphastrea ocellina		1							1
Pavona varians			2	1	3	2	1		9
TOTAL	28	162	104	38	44	30	39	0	445

Table 2. cont. (5)

SECTOR K-3	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata		4	9	11	16	6	5		51
Porites duerdeni									0
Porites monticulosa							1		1
Pocillopora eydouxi				1					1
Pocillopora damicornis	8	56	10	5	2				81
Montipora capitata				4	6	12	3		25
*Montipora patula**			9	13	42	38	18		120
Leptastrea purpurea	6	21	3						30
*Cyphastrea ocellina**									0
Pavona varians			3	13	4	4			24
TOTAL	14	81	34	47	70	60	27	0	333

SECTOR L	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata			3	2	3	3	2		13
Pocillopora damicornis	22	52	4						78
Montipora capitata			1	1					2
*Montipora patula**			5	6	10	12	4		37
Leptastrea purpurea	2	6							8
Pavona varians						2			2
TOTAL	24	58	13	9	13	17	6	0	140

SECTOR P-24	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	1	3	3	4	1	1			13
Pocillopora meandrina			1						1
Pocillopora damicornis			4		1				5
Montipora capitata			1	3	2	3			9
*Montipora patula**			1		3	2			6
Leptastrea purpurea	13	42	46	17					118
Pavona varians				4	2				6
TOTAL	14	45	56	28	9	6	0	0	158

TABLE 3. Summary counts of total coral colonies of all species combined by size class on survey sectors in Kapalama Basin and Pier 24. Also shown are the percentage of total coral colonies from each sector, number of species per sector (Sp. #), Shannon-Wiener diversity index for total colony counts per species per sector (H'), and Swartz's Species Dominance (SSD) for each sector. For location of sectors, see Figures 2-6.

	SIZE CLASS (cm)													
SECTOR	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL	TOTAL	% TOT.	Sp. #	H'	SSD
A-1	30	92	61	12	7	0	0	0	202	457	8.83	8	1.48	3
A-2	35	113	68	31	8	0	0	0	255					
B-1	17	25	20	45	47	35	21	0	210	387	7.48	4	0.69	2
B-2	42	29	13	17	7	2	0	0	110					
B-3	12	10	5	0	1	0	0	0	28					
B-4	17	10	8	4	0	0	0	0	39					
C-1	3	11	10	6	2	2	0	0	34	650	12.57	6	0.67	2
C-2	18	13	10	8	0	0	0	0	49					
C-3	173	149	50	2	0	0	0	0	374					
C-4	66	98	22	7	0	0	0	0	193					
D	19	57	10	1	2	2	1	0	92	92	1.78	6	0.89	2
E	23	51	87	79	27	33	39	0	339	339	6.55	7	1.33	3
F	43	67	112	144	32	4	1	0	403	403	7.79	7	0.68	1
G	30	129	170	220	11	12	2	0	574	574	11.10	7	0.98	2
I	29	48	169	223	10	9	0	0	488	488	9.43	6	1.14	2
J	26	196	37	10	7	4	4	0	284	284	5.49	5	1.33	2
K-1	38	283	26	15	24	18	19	0	423	1201	23.22	9	1.61	4
K-2	28	162	104	38	44	30	39	0	445					
K-3	14	81	34	47	70	60	27	0	333					
L	24	58	13	9	13	17	6	0	140	140	2.71	6	1.18	2
P-24	14	45	56	28	9	6	0	0	158	158	3.05	7	0.98	2
TOTAL	701	1727	1085	946	321	234	159	0	5173	5173	100			

TABLE 4. Summary counts of coral colonies for eight most abundant species at each survey sector in the vicinity of Kapalama Basin and Pier 24. Species marked with an "*" are presently petitioned to be included under the Endangered Species Act. For locations of survey sectors, see Figures 2-6.

SPECIES	SIZE CLASS (cm)								
Porites lobata	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1	4	37	21	1					63
A-2	12	53	14	9					88
B-1	14	12	3	11					40
B-2	25	10							35
B-3	4	2							6
B-4	3								3
C-1	2	2		4		2			10
C-2			1						1
C-3		2	2	1					5
C-4		1	4						5
D			4						4
E		5	6	7	7	8	3		36
F		1	3	5	2				11
G	6	46	38	10	3	11	2		116
I		7	31	192	8	2			240
J	20	48	16	2	1	2	1		90
K-1		7	11	9	13	7	11		58
K-2		3	89	22	21	8	8		151
K-3		4	9	11	16	6	5		51
L			3	2	3	3	2		13
P-24	1	3	3	4	1	1			13
TOTAL	91	243	258	290	75	50	32	0	1039

SPECIES	SIZE CLASS (cm)								
Pocillopora damicornis	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1	13	26	31	2					72
A-2	21	43	25	2					91
B-1	3	12	17	34	47	35	21		169
B-2	16	18	13	17	7	2			73
B-3	8	6	5		1				20
B-4	14	10	8	3					35
C-1		6	10	1					17
C-2		4	9	8					21
C-3	1	14	16	1					32
C-4	2	1	10	6					19
D	2	2	5						9
E	16	29	67	57	14	1			184
F	42	40	94	131	25	2	1		335
G	12	64	107	205	5				393
I		8	24	16					48
J	4	10	5						19
K-1	3	18	2	3	3	2			31
K-2	12	91	4	1					108
K-3	8	56	10	5	2				81
L	22	52	4						78
P-24			4		1				5
TOTAL	199	510	470	492	105	42	22	0	1840

SPECIES	SIZE CLASS (cm)								
Montipora capitata	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1		6	5	1	4				16
A-2		12	17	12	2				43
B-1									0
B-2									0
B-3		2							2
B-4				1					1
C-1				1	1				2
C-2		1							1
C-3									0
C-4			1						1
D				1	1	2	1		5
E		4	12	6	4	14	24		64
F		16	4	3	3	1	1		28
G		2	9						11
I		1		1	1				3
J			4	5	5	1	2		17
K-1		1	1	1	3	4	2		12
K-2		1	3	1	6	9	21		41
K-3				4	6	12	3		25
L			1	1					2
P-24			1	3	2	3			9
TOTAL	0	46	58	41	38	46	54	0	283

SPECIES	SIZE CLASS (cm)								
*Montipora patula**	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1	3	3	2	7	2				17
A-2	2	4	12	8	6				32
B-1									0
B-2									0
B-3									0
B-4									0
C-1					1				1
C-2									0
C-3	1	1	2						4
C-4		4	2	1					7
D		1	1		1				3
E		2	1	8	2	10	12		35
F		7	11	4	2	1			25
G		5	14	1	1	1			22
I			1	14	1	7			23
J		26	3	3	1	1	1		35
K-1				2	5	4	6		17
K-2		3	4	13	14	11	7		52
K-3			9	13	42	38	18		120
L			5	6	10	12	4		37
P-24			1		3	2			6
TOTAL	6	56	68	80	91	87	48	0	436

TABLE 4. cont. (2)

SPECIES	SIZE CLASS (cm)								
Leptastrea purpurea	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1	10	17							27
A-2									0
B-1		1							1
B-2	1	1							2
B-3									0
B-4									0
C-1	1	2							3
C-2	18	8							26
C-3	171	132	30						333
C-4	64	92	5						161
D	16	54							70
E	5	9							14
F	1	2							3
G	12	12							24
I	29	32	111						172
J	2	112	9						123
K-1	35	255	11						301
K-2	16	63	2						81
K-3	6	21	3						30
L	2	6							8
P-24	13	42	46	17					118
TOTAL	402	861	217	17	0	0	0	0	1497

SPECIES	SIZE CLASS (cm)								
Pocillopora meandrina	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1				1					1
A-2		1							1
B-1									0
B-2									0
B-3									0
B-4									0
C-1		1							1
C-2									0
C-3									0
C-4									0
D									0
E									0
F		1							1
G			1	4					5
I			2						2
J									0
K-1		2	1						3
K-2									0
K-3									0
L									0
P-24			1						1
TOTAL	0	5	5	5	0	0	0	0	15

SPECIES	SIZE CLASS (cm)								
*Cyphastrea ocellina**	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1									0
A-2									0
B-1									0
B-2									0
B-3									0
B-4									0
C-1									0
C-2									0
C-3									0
C-4									0
D	1								1
E	2	2							4
F									0
G									0
I									0
J									0
K-1									0
K-2									0
K-3									0
L									0
P-24									0
TOTAL	3	2	0	0	0	0	0	0	5

SPECIES	SIZE CLASS (cm)								
Pavona varians	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
A-1		3	2						5
A-2									0
B-1									0
B-2									0
B-3									0
B-4									0
C-1									0
C-2									0
C-3									0
C-4									0
D									0
E			1	1					2
F				1					1
G			1		2				3
I									0
J									0
K-1									0
K-2			2	1	3	2	1		9
K-3			3	13	4	4			24
L						2			2
P-24				4	2				6
TOTAL	0	3	9	20	11	8	1	0	52

TABLE 5. Summary counts of coral colonies by species at each survey sector in the vicinity of Kapalama Basin and Pier 24. Species marked with an "*" are presently petitioned to be included under the Endangered Species Act. For locations of survey sectors, see Figures 2-6.

SPECIES	SIZE CLASS (cm)									
	<2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL	% TOTAL
Pocillopora damicornis	199	511	470	492	105	42	21	0	1840	35.57
Leptastrea purpurea	402	861	217	17	0	0	0	0	1497	28.94
Porites lobata	91	243	258	290	75	50	32	0	1039	20.09
*Montipora patula**	6	56	68	80	91	87	48	0	436	8.43
Montipora capitata	0	46	58	41	38	46	54	0	283	5.47
Pavona varians	0	3	9	20	11	8	1	0	52	1.01
Pocillopora meandrina	0	5	5	5	0	0	0	0	15	0.29
*Cyphastrea ocellina**	3	2						0	5	0.10
Porites compressa	0	0	0	0	1	1	2	0	4	0.08
Pocillopora eydouxi				1				0	1	0.02
Porites monticulosa							1	0	1	0.02
TOTAL	701	1727	1085	946	321	234	159	0	5173	100

TABLE 6. Summary counts of total coral colonies of all species combined by size class (No COL) on survey sectors in Kapalama Basin and Pier 24. Also shown are the densities of total coral colonies (DENSITY)) from each sector in terms of colonies per square meter of colonizable surface of each sector (DENSITY = NO. COL./m^2). Colonizable area (m^2) of each sector is shown in Table 1. For location of sectors, see Figures 2-6.

SECTOR	SIZE CLASS (cm)																TOTAL	
	≤2		>2≤5		>5≤10		>10≤20		>20≤40		>40≤80		>80≤160		>160			
	No COL	DENSITY	No COL	DENSITY	No COL	DENSITY	No COL	DENSITY	No COL	DENSITY	No COL	DENSITY	No COL	DENSITY	No COL	DENSITY	No COL	DENSITY
A-1	30	0.053	92	0.162	61	0.107	12	0.021	7	0.012	0	0	0	0	0	0	202	0.356
A-2	35	0.078	113	0.252	68	0.152	31	0.069	8	0.018	0	0	0	0	0	0	255	0.569
TOTAL A	65	0.064	205	0.202	129	0.127	43	0.042	15	0.015	0	0	0	0	0	0	457	0.450
B-1	17	0.035	25	0.052	20	0.042	45	0.094	47	0.098	35	0.073	21	0.044	0	0	210	0.438
B-2	42	0.070	29	0.048	13	0.022	17	0.028	7	0.012	2	0.003	0	0	0	0	110	0.183
B-3	12	0.025	10	0.021	5	0.010	0	0.000	1	0.002	0	0	0	0	0	0	28	0.058
B-4	17	0.026	10	0.015	8	0.012	4	0.006	0	0.000	0	0	0	0	0	0	39	0.059
TOTAL B	88	0.040	74	0.033	46	0.021	66	0.030	55	0.025	37	0.017	21	0.009	0	0	387	0.174
C-1	3	0.017	11	0.061	10	0.055	6	0.033	2	0.011	2	0.011	0	0	0	0	34	0.188
C-2	18	0.090	13	0.065	10	0.050	8	0.040	0	0.000	0	0	0	0	0	0	49	0.245
C-4	66	0.273	98	0.405	22	0.091	7	0.029	0	0.000	0	0	0	0	0	0	193	0.692
C-3	173	0.620	149	0.534	50	0.179	2	0.007	0	0.000	0	0	0	0	0	0	374	1.545
TOTAL C	260	0.288	271	0.300	92	0.102	23	0.025	2	0.002	2	0.002	0	0	0	0	650	0.721
D	19	0.133	57	0.399	10	0.070	1	0.007	2	0.014	2	0.014	1	0.007	0	0	92	0.440
E	23	0.008	51	0.019	87	0.032	79	0.029	27	0.010	33	0.012	39	0.014	0	0	339	0.124
F	43	1.049	67	1.634	112	2.732	144	3.512	32	0.780	4	0.098	1	0.024	0	0	403	0.983
G	30	0.062	129	0.268	170	0.353	220	0.457	11	0.023	12	0.025	2	0.004	0	0	574	0.818
I	29	0.045	48	0.074	169	0.260	223	0.343	10	0.015	9	0.014	0	0	0	0	488	0.514
J	26	0.049	196	0.371	37	0.070	10	0.019	7	0.013	4	0.008	4	0.008	0	0	284	0.538
K-1	38	0.040	283	0.298	26	0.027	15	0.016	24	0.025	18	0.019	19	0.020	0	0	423	0.445
K-2	28	0.024	162	0.139	104	0.089	38	0.033	44	0.038	30	0.026	39	0.033	0	0	445	0.382
K-3	14	0.013	81	0.077	34	0.032	47	0.045	70	0.067	60	0.057	27	0.026	0	0	333	0.317
TOTAL K	80	0.025	526	0.166	164	0.052	100	0.032	138	0.044	108	0.034	85	0.027	0	0	1201	0.379
L	24	0.029	58	0.070	13	0.016	9	0.011	13	0.016	17	0.021	6	0.007	0	0	140	0.170
P-24	14	0.023	45	0.073	56	0.091	28	0.046	9	0.015	6	0.010	0	0	0	0	158	0.258
TOTAL	**701**	**0.049**	**1727**	**0.121**	**1085**	**0.076**	**946**	**0.066**	**321**	**0.022**	**234**	**0.016**	**159**	**0.011**	**0**	**0**	**5173**	**0.362**

TABLE 7. Estimates of invertebrate abundance in survey sectors in the region of the proposed Kapalama Container Terminal. Abundance classes are grouped as follows: R=rare (less than 10 individuals or colonies observed per sector; C=common (10-50 individuals or colonies per sector), and A=abundant (greater than 50 individuals or colonies per sector). "I" indicates introduced species. For locations of survey sectors, see Figures 2-6.

	Sector	A	B				C				D	E	F
	Sector Number	1-2	1	2	3	4	1	2	3	4	1	1	1
SPONGES	*Batzella sp.*												
	Callyspongia diffusa												
	Chalinula pseudomolitba			R				C	R	C	R	R	R
	Chondrosia chucalla						R	R				R	
	Clathria sp.						R	R	R	R	R		
	Dactylospongia						R	R	C	C			
	Dysidea cf. avara						R	R	R	R	R	R	R
	Dysidea herbacea	R		R		R	A	A	R	R		C	C
	Gelloides fibrosa (I)	R			A		A	A	A	R	R	A	A
	Halichondria coerulea						R	R		R			
	Haliclona caerulea (I)			R			A		C	R		C	C
	Hyrtios sp.						A	A	R	A	R	R	A
	Leucetta sp.	A				A	A	A	R	A	R	R	C
	Liosina paradoxa	A				A	A	A	R	R		R	R
	Mycale armata (I)	A			A		A	A	R	A		A	C
	Phorbas amaranthus			A	A		A	A	C	A	A	A	A
	Sigmadocia sp.						C	C	C	C			
	Spirastrealla vagabunda						R	R	A	A		C	C
	Suberites zeteki (I)	R					R	R		R		C	C
	Zygomycale parishii (I)	R					A	A		R			A
TUNICATES	*Ascidia sydneiensis* (I)		R				R	C	A	R		R	A
	Didemnum sp.	R	R			A	R	R	R	R		C	R
	Herdmania momus		R		R	R		A	R	A		C	C
	Phallusia nigra (I)	A				R	A	A	C	A		A	A
SLUGS	*Plakobranchus ocellatus*		C	C	C	C	R	R		R			
	Tambja morosa		R		R		A	C		R		R	
BRYOZOANS	*Amathia distans* (I)		C	R	C	C	A	A	R	A		R	A
	Bugula stolonifera (I)							A		A	A	A	R
	Disporella violacea							R		A		R	
	Reteporellina denticulata							R		R		R	
	Schizoporella errata (I)	R											R
ANNELIDS	*Chaetopterus sp.* (I)						R	R		R		R	
	Loimia medusa		R		R	A						R	
	Sabellastarte spectabilis (I)	A	A	A	C	A			R	A		A	R
	Salmacina dysteri (I)		R	R		R	A	A		R		R	R
	Spirobranchus	R								R		R	
ECH*	*Echinothrix sp.*	R											
	Tripneutes gratilla		C	R	R	C							
MOLLUSCS	*Anomia nobilis* (I)						A	A		A		A	A
	Balanus amphitrite (I)						A	A	R	A	A	A	A
	Morula sp.				R								
	Octopus cyanea	R											
	Pinctada margaritifera						R	C	R	R	R	R	C
ARTH**	*Grapsus grapsus*		R	R		R						R	
	Stenopis hispidus							R		R		C	

* ECHINODERMS
** ARTHROPODS

TABLE 7. cont. (2).

	Sector	G	I	J	K			L	Pier 25	Pier 26	Pier 27	Pier 28
	Sector Number	1	1	1	1	2	3	1	1	1	1	1
SPONGES	*Batzella sp.*				R	R	R	C				
	Callyspongia diffusa								R			R
	Chalinula pseudomolitba	R	C	A	C	C	A	C	R		R	R
	Chondrosia chucalla								C	R	C	C
	Clathria sp.			R	R	R	R	R	R	R	R	R
	Dactylospongia				R	R	R	R	R	R	C	R
	Dysidea cf. avara			R	R	R	R		C	R	R	R
	Dysidea herbacea	R	A	C	A	R	R	C	R			C
	Gelloides fibrosa (I)	A	A	A	A	A	A	A	A	A	A	A
	Halichondria coerulea											
	Haliclona caerulea (I)	R		R	C	C	C	R				
	Hyrtios sp.	R	R	R		C		C	R			
	Leucetta sp.		C	A	A	A	A	A	C	R	R	R
	Liosina paradoxa		C					R		A	A	A
	Mycale armata (I)	A	A	C	A	A	C	C	A	C	A	A
	Phorbas amaranthus	A	A	A	A	A	A	A	A	C	A	A
	Sigmadocia sp.		C	C	R	R	R	R	A	A	R	C
	Spirastrealla vagabunda	R	A	A	A	A	A	A	A	A	A	A
	Suberites zeteki (I)		C						C	C	R	R
	Zygomycale parishii (I)	R		A		A	A	A	A	C	A	A
TUNICATES	*Ascidia sydneiensis* (I)		A	A	A	A	A	A	A	A	A	A
	Didemnum sp.	R	R			R						
	Herdmania momus	R	A	A	A	A	A	A	C	C	C	C
	Phallusia nigra (I)	C	A	A	A	A	A	A	A	C	C	C
SLUGS	*Plakobranchus ocellatus*											
	Tambja morosa							R		R	R	R
BRYOZOANS	*Amathia distans* (I)	R	A	A	R	R	C	C		C	R	A
	Bugula stolonifera (I)	R	X	C	C	R	R	R	R	C	R	A
	Disporella violacea											
	Reteporellina denticulata											
	Schizoporella errata (I)		E									
ANNELIDS	*Chaetopterus sp.* (I)										R	
	Loimia medusa											
	Sabellastarte spectabilis (I)	C	C	C	A	A	A	A		C	C	
	Salmacina dysteri (I)		E				C	R				A
	Spirobranchus											
ECH*	*Echinothrix sp.*											
	Tripneutes gratilla	R										
MOLLUSCS	*Anomia nobilis* (I)	A	A	A	A	A	A	A				
	Balanus amphitrite (I)	A	A	C	C	C	C	C				
	Morula sp.											
	Octopus cyanea											
	Pinctada margaritifera	A	C	C	C	C	C	R				
ARTH**	*Grapsus grapsus*	R			C	A	C	C				
	Stenopis hispidus			R	C	A	A	A			R	

* ECHINODERMS

** ARTHROPODS

TABLE 8. Reef fish abundance (NO.) and estimated length (size) counted in survey sectors in the vicinity of Kapalama Basin and Honolulu Harbors Piers 24-28. For locations of survey sectors, see Figures 2-6.

SECTOR	SPECIES	NO.	Size (cm)
A	*Acanthurus blochii*	2	8
	Chaetodon ornatissimus	1	8
		1	10
	Chromis hanui	1	8
	Dascyllus albisella	9	2
		3	5
	Gomphosus varius	2	8
	Scarus psittacus	1	6
		4	8
	Synodus dermatogenys	1	4
		1	12
	Zebrasoma flavescens	1	4
TOTAL		27	
B-1	*Acanthurus blochii*	1	12
		1	15
	Chaetodon auriga	1	8
	Dascyllus albisella	5	2
		6	4
		3	8
		2	12
	Scarus psittacus	2	12
B-2	*Canthegaster jactator*	1	12
	Dascyllus albisella	1	10
	Herklotsichthys quadrimaculatus	~500	6
B3	NONE		
B4	*Abudefduf vaigiensis*	12	8
		10	15
		12	18
		25	20
	Acanthurus blochii	9	15
	Acanthurus olivaceus	1	20
	Acanthurus triostegus	6	15
		8	22
	Canthecaster jactator	2	8
		2	10
	Chaetodon auriga	1	20
	Chaetodon lunulatus	1	20
	Myripristis kuntee	1	25
	Scarus psittacus	8	8
		4	15
	Synodus dermatogenys	1	25
	Zanclus cornutus	5	20
	Zebrasoma flavescens	12	10
		6	12
TOTAL		649	
C-1	*Acanthurus blochii*	2	10
	Canthegaster jactator	1	6
	Chaetodon auriga	8	8
	Chaetodon lunula	4	12
	Chaetodon lunulatus	2	10
	Chaetodon reticulatus	1	8
	Kyphosus spp.	6	20
	Ostracion meleagris	1	20
	Stegastes fasciolatus	1	20
	Zanclus cornutus	1	20
	Zebrasoma flavescens	2	10
C-2	*Acanthurus blochii*	1	25
	Canthegaster jactator	1	5
	Chaetodon lunula	1	10
	Sphyraena barracuda	1	50
C3	*Canthegaster jactator*	1	5
	Sphyraena barracuda	1	50
C4	*Diodon holocanthus*	1	35
TOTAL		36	

SECTOR	SPECIES	NO.	Size (cm)
TOTAL		38	
D	*Acanthurus blochii*	1	8
	Canthegaster jactator	1	5
TOTAL		2	
E	*Abudefduf vaigiensis*	10	8
		20	15
	Acanthurus blochii	4	25
	Acanthurus unicornis	1	35
	Chaetodon auriga	1	10
	Herklotsichthys quadrimacula	~500	5
	Sphyraena barracuda	1	50
	Sphyraena barracuda	1	30
TOTAL		538	
F	*Acanthurus blochii*	7	10
		1	12
	Canthegaster jactator	1	8
	Chaetodon auriga	1	15
	Dascyllus albisella	2	4
		3	12
	Herklotsichthys quadrimacula	40	5
	Lutjanus fulvus	6	20
	Zebrasoma flavescens	2	10
TOTAL		63	
G	*Acanthurus blochii*	1	8
		3	10
		5	12
	Acanthurus blochii	12	15
	Acanthurus triostegus	1	8
		6	10
		4	12
	Canthegaster jactator	1	8
	Chaetodon auriga	1	10
	Diodon histrix	1	20
	Gymnomuraena zebra	1	40
	Kuhlia xenura	200	20
	Lutjanus fulvus	1	15
	Naso lituratus	1	15
	Stegastes fasciolatus	1	15
	Zanclus cornutus	2	10
	Zebrasoma flavescens	1	8
		3	10
		5	12
TOTAL		250	
I	*Abudefduf vaigiensis*	2	8
		3	10
		2	12
	Acanthurus blochii	3	12
	Acanthurus triostegus	3	10
		1	12
	Canthegaster jactator	1	8
	Chaetodon auriga	1	10
	Chaetodon lunula	1	10
	Lutjanus fulvus	1	12
		2	25
	Scarus psittacus	2	6
		2	12
	Sphyraena barracuda	1	100
	Zanclus cornutus	2	15
TOTAL		27	
J	*Acanthurus blochii*	1	10
	Canthegaster jactator	2	8
	Chaetodon auriga	1	10
		3	15
	Chaetodon lunula	2	12
	Chaetodon lunula	6	15
	Chaetodon lunulatus	1	12
	Zanclus cornutus	1	15
TOTAL		17	

TABLE 8. cont. (2)

SECTOR	SPECIES	NO.	Size (cm)
K1	*Abudefduf vaigiensis*	30	20
	Canthegaster jactator	1	10
	Chaetodon lunulatus	1	8
	Dascyllus albisella	2	5
		1	8
	Zebrasoma flavescens	1	12
K2	*Canthecaster jactator*	1	5
		1	8
	Chaetodon auriga	2	10
K3	*Acanthurus blochii*	2	10
	Acanthurus dussumieri	1	15
	Acanthurus triostegus	1	10
	Canthegaster jactator	1	8
		2	8
		1	10
	Chaetodon lunula	1	25
	Zanclus cornutus	1	25
	Zebrasoma flavescens	1	15
TOTAL		51	
L	*Abudefduf vaigiensis*	4	12
	Acanthurus blochii	1	10
	Canthegaster jactator	3	8
	Chaetodon auriga	2	12
	Chaetodon ephippium	2	12
	Dascyllus albisella	1	8
		1	15
	Scarus psittacus	2	8
	Zebrasoma flavescens	1	5
TOTAL		17	
PIER 24	*Acanthurus dussumieri*	6	25
	Sphyraena barracuda	1	50
TOTAL		7	
PIER 26	*Canthegaster jactator*	1	8
	Chaetodon unimaculatus	2	12
	Dascyllus albisella	2	20
	Heniochus diphreutes	8	10
	Naso hexacanthus	1	25
	Thalassoma duperrey	1	15
TOTAL		15	
PIER 27	*Chaetodon auriga*	1	4
	Diodon holocanthus	1	20
	Ostracion meleagris	1	15
	Zanclus cornutus	1	18
TOTAL		4	

SECTOR	SPECIES	NO.	Size (cm)
SECTOR	SPECIES	NO.	Size (cm)
PIER 28	*Abudefduf vaigiensis*	6	12
		5	15
	Acanthurus blochii	6	15
		10	20
	Acanthurus dussumieri	20	5
		1	15
	Acanthurus triostegus	2	8
		4	10
		10	15
	Caranx melampygus	1	30
	Chaetodon auriga	1	25
	Chaetodon unimaculatus	1	20
	Dascyllus albisella	14	4
	Dascyllus albisella	10	5
		12	10
		6	15
	Lutjanus fulvus	10	18
		3	20
		4	25
	Mulloidichthys flavolineatus	30	28
	Scarus psittacus	8	8
	Stegastes marginatus	2	25
	Thalassoma duperrey	1	8
		2	28
	Zanclus cornutus	4	15
		1	18
		4	20
		3	25
	Zebrasoma flavescens	2	8
		10	15
		5	20
TOTAL		198	
GRAND TOTAL		1902	

TABLE 9. Reef fish abundance (NO.)and estimated length (size) in cm. by species counted in survey sectors in the vicinity of Kapalama Basin and Honolulu Harbors Piers 24-28. For locations of survey sectors, see Figures 2-6.

SPECIES	SECTOR	NO.	SIZE
Abudefduf vaigiensis	B	12	8
	B	10	15
	B	12	18
	B	25	20
	E	10	8
	E	20	15
	I	2	8
	I	3	10
	I	2	12
	K	30	20
	L	4	12
	PIER 28	6	12
	PIER 28	5	15
TOTAL		141	
Acanthurus blochii	A	2	8
	B	1	12
	B	1	15
	B	9	15
	C	2	10
	C	1	25
	D	1	8
	E	4	25
	F	1	8
	F	7	10
	F	1	12
	G	1	8
	G	3	10
	G	5	12
	G	12	15
	I	3	12
	J	1	10
	K	2	10
	L	1	10
	PIER 28	6	15
	PIER 28	10	20
TOTAL		74	
Acanthurus dussumieri	K	1	15
	PIER 25	6	25
	PIER 28	20	5
	PIER 28	1	15
TOTAL		28	
Acanthurus olivaceus	B	1	20
Acanthurus triostegus	B	6	15
	B	8	22
	G	1	8
	G	6	10
	G	4	12
	I	3	10
	I	1	12
	K	1	10
	PIER 28	2	8
	PIER 28	4	10
	PIER 28	10	15
TOTAL		46	
Acanthurus unicornis	E	1	35

SPECIES	SECTOR	NO.	SIZE
Caranx melampygus	PIER 28	1	30
Canthigaster jactator	B	1	12
	B	2	8
	B	2	10
	C	1	6
	C	1	5
	C	1	5
	D	1	5
	F	1	8
	G	1	8
	I	1	8
	J	2	8
	K	1	10
	K	1	5
	K	1	8
	K	1	8
	K	2	8
	K	1	10
	L	3	8
	PIER 26	1	8
TOTAL		25	
Chaetodon auriga	B	1	8
	B	1	20
	C	8	8
	E	1	10
	F	1	15
	G	1	10
	I	1	10
	J	1	10
	J	3	15
	K	2	10
	L	2	12
	PIER 27	1	4
	PIER 28	1	25
TOTAL		24	
Chaetodon ephippium	L	2	12
Chaetodon lunula	C	4	12
	C	1	10
	I	1	10
	J	2	12
	J	6	15
	K	1	25
TOTAL		15	
Chaetodon lunulatus	B	1	20
	C	2	10
	K	1	8
	J	1	12
TOTAL		5	
Chaetodon ornatissimus	A	1	8
	A	1	10
TOTAL		2	
Chaetodon reticulatus	C	1	8
Chaetodon unimaculatus	PIER 26	2	12
	PIER 28	1	20
TOTAL		3	
Chromis hanui	A	1	8

TABLE 9. continued (2)

SPECIES	SECTOR	NO.	SIZE
Dascyllus albisella	A	9	2
	A	3	5
	B	5	2
	B	6	4
	B	3	8
	B	2	12
	B	1	10
	F	2	4
	F	3	12
	K	2	5
	K	1	8
	L	1	8
	L	1	15
	PIER 26	2	20
	PIER 28	14	4
	PIER 28	10	5
	PIER 28	12	10
	PIER 28	6	15
TOTAL No.		83	
Diodon histrix	G	1	20
Diodon holocanthus	D	1	35
	PIER 27	1	20
TOTAL No.		2	
Gomphosus varius	A	2	8
Gymnomuraena zebra	G	1	40
Heniochus diphreutes	PIER 26	8	10
Herklotsichthys quadrimaculatus	B	~500	6
	E	~500	5
	F	40	5
TOTAL No.		1040	
Kyphosus spp.	C	6	20
Kuhlia xenura	G	~200	20
Lutjanus fulvus	F	6	20
	G	1	15
	I	1	12
	I	2	25
	PIER 28	10	18
	PIER 28	3	20
	PIER 28	4	25
TOTAL No.		27	
Mulloidichthys flavolineatus	PIER 28	30	28
Myripristis kuntee	B	1	25
Naso hexacanthus	PIER 26	1	25
Naso lituratus	G	1	15
Ostracion meleagris	C	1	20
	PIER 27	1	15
TOTAL No.		2	
Scarus psittacus	A	1	6
	A	4	8
	B	2	12
	B	8	8
	B	4	15
	I	2	6
	I	2	12
	L	2	8
	PIER 28	8	8
TOTAL No.		33	

SPECIES	SECTOR	NO.	SIZE
Sphyraena barracuda	C	2	50
	E	1	30
	E	1	50
	I	1	100
	PIER 24	1	50
TOTAL No.		6	
Stegastes fasciolatus	C	1	20
	G	1	15
TOTAL No.		2	
Stegastes marginatus	PIER 28	2	25
Synodus dermatogenys	A	1	4
	A	1	12
	B	1	25
TOTAL No.		3	
Thalassoma duperrey	PIER 26	1	15
	PIER 28	1	8
	PIER 28	2	28
TOTAL No.		4	
Zanclus cornutus	B	5	20
	C	1	20
	G	2	10
	I	2	15
	J	1	15
	K	1	25
	PIER 27	1	18
	PIER 28	4	15
	PIER 28	1	18
	PIER 28	4	20
	PIER 28	3	25
TOTAL No.		25	
Zebrasoma flavescens	A	1	4
	B	12	10
	B	6	12
	C	2	10
	F	2	10
	G	1	8
	G	3	10
	G	5	12
	K	1	12
	K	1	15
	L	1	5
	PIER 28	2	8
	PIER 28	10	15
	PIER 28	5	20
TOTAL No.		52	
GRAND TOTAL		1902	

TABLE 10. Calculations of fish biomass by species based on number of fish and estimated length determined during in-situ surveys in the vicinity of the proposed Kapalama Container Terminal in Honolulu Harbor. The length-weight relationship of $W=aL^b$, and coefficients a and b are from FishBase.com.

SPECIES	SECTOR	NO.	SIZE (L)	Coeff.a	Coeff.b	W(g) = aLb	W*NO. (g)	W/SECTOR (g)	
Abudefduf vaigiensis	B	12	8	0.00989	3.267	8.82	105.87	B	6692.67
	B	10	15	0.00989	3.267	68.78	687.84		
	B	12	18	0.00989	3.267	124.79	1497.45		
	B	25	20	0.00989	3.267	176.06	4401.51		
	E	10	8	0.00989	3.267	8.82	88.22	E	1463.90
	E	20	15	0.00989	3.267	68.78	1375.68		
	I	2	8	0.00989	3.267	8.82	17.64	I	138.87
	I	3	10	0.00989	3.267	18.29	54.87		
	I	2	12	0.00989	3.267	33.18	66.36		
	K	30	20	0.00989	3.267	176.06	5281.81	K	5281.81
	L	4	12	0.00989	3.267	33.18	132.72	L	132.72
	PIER 28	6	12	0.00989	3.267	33.18	199.08	PIER 28	543.00
	PIER 28	5	15	0.00989	3.267	68.78	343.92		
Acanthurus blochii	A	2	8	0.0251	3.144	17.34	34.68	A	34.68
	B	1	12	0.0251	3.144	62.03	62.03	B	1313.17
	B	1	15	0.0251	3.144	125.11	125.11		
	B	9	15	0.0251	3.144	125.11	1126.02		
	C	2	10	0.0251	3.144	34.97	69.94	C	693.38
	C	1	25	0.0251	3.144	623.44	623.44		
	D	1	8	0.0251	3.144	17.34	17.34	D	17.34
	E	4	25	0.0251	3.144	623.44	2493.77	E	2493.77
	F	1	8	0.0251	3.144	17.34	17.34	F	324.15
	F	7	10	0.0251	3.144	34.97	244.78		
	F	1	12	0.0251	3.144	62.03	62.03		
	G	1	8	0.0251	3.144	17.34	17.34	G	1933.77
	G	3	10	0.0251	3.144	34.97	104.90		
	G	5	12	0.0251	3.144	62.03	310.16		
	G	12	15	0.0251	3.144	125.11	1501.36		
	I	3	12	0.0251	3.144	62.03	186.10	I	186.10
	J	1	10	0.0251	3.144	34.97	34.97	J	34.97
	K	2	10	0.0251	3.144	34.97	69.94	K	69.94
	L	1	10	0.0251	3.144	34.97	34.97	L	34.97
	PIER 28	6	15	0.0251	3.144	125.11	750.68	PIER 28	3841.77
	PIER 28	10	20	0.0251	3.144	309.11	3091.09		
Acanthurus dussumieri	K	1	15	0.0426	2.868	100.56	100.56	K	100.56
	PIER 25	6	25	0.0426	2.868	435.21	2611.28	PIER 25	2611.28
	PIER 28	20	5	0.0426	2.868	4.31	86.12	PIER 28	186.68
	PIER 28	1	15	0.0426	2.868	100.56	100.56		
Acanthurus olivaceus	B	1	20	0.0384	3.055	362.22	362.22	B	362.22
Acanthurus triostegus	B	6	15	0.0213	3.081	89.52	537.12	B	2867.75
	B	8	22	0.0213	3.081	291.33	2330.63		
	G	1	8	0.0213	3.081	12.91	12.91	G	346.96
	G	6	10	0.0213	3.081	25.67	154.00		
	G	4	12	0.0213	3.081	45.01	180.05		
	I	3	10	0.0213	3.081	25.67	77.00	I	122.01
	I	1	12	0.0213	3.081	45.01	45.01		
	K	1	10	0.0213	3.081	25.67	25.67	K	25.67
	PIER 28	2	8	0.0213	3.081	12.91	25.81	PIER 28	1023.67
	PIER 28	4	10	0.0213	3.081	25.67	102.67		
	PIER 28	10	15	0.0213	3.081	89.52	895.19		
Acanthurus unicornis	E	1	35	0.0179	2.789	362.46	362.46	E	362.46
Caranx melampygus	PIER 28	1	30	0.0269	2.974	664.83	664.83	PIER 28	664.83

TABLE 10. continued (2).

SPECIES	SECTOR	NO.	SIZE (L)	Coeff.a	Coeff.b	W(g) = aLb	W * NO. (g)	W/SECTOR (g)	
Canthigaster jactator	B	1	12	0.0266	3	45.96	45.96	B	126.40
	B	2	8	0.0266	3	13.62	27.24		
	B	2	10	0.0266	3	26.60	53.20		
	C	1	6	0.0266	3	5.75	5.75	C	11.49
	C	1	5	0.0266	3	3.33	3.33		
	C	1	5	0.0266	3	3.33	3.33		
	D	1	5	0.0266	3	3.33	3.33	D	3.33
	F	1	5	0.0266	3	3.33	3.33	F	16.94
	F	1	8	0.0266	3	13.62	13.62		
	G	1	8	0.0266	3	13.62	13.62	G	13.62
	I	1	8	0.0266	3	13.62	13.62	I	13.62
	J	2	8	0.0266	3	13.62	27.24	J	27.24
	K	1	10	0.0266	3	26.60	26.60	K	111.00
	K	1	5	0.0266	3	3.33	3.33		
	K	1	8	0.0266	3	13.62	13.62		
	K	1	8	0.0266	3	13.62	13.62		
	K	2	8	0.0266	3	13.62	27.24		
	K	1	10	0.0266	3	26.60	26.60		
	PIER 26	1	8	0.0266	3	13.62	13.62	PIER 26	13.62
Chaetodon auriga	B	1	8	0.0312	2.953	14.49	14.49	B	231.31
	B	1	20	0.0312	2.953	216.82	216.82		
	C	8	8	0.0312	2.953	14.49	115.90	C	115.90
	E	1	10	0.0312	2.953	28.00	28.00	E	28.00
	F	1	15	0.0312	2.953	92.72	92.72	F	92.72
	G	1	10	0.0312	2.953	28.00	28.00	G	28.00
	I	1	10	0.0312	2.953	28.00	28.00	I	28.00
	J	1	10	0.0312	2.953	28.00	28.00	J	306.15
	J	3	15	0.0312	2.953	92.72	278.15		
	K	2	10	0.0312	2.953	28.00	56.00	K	56.00
	L	2	12	0.0312	2.953	47.97	95.94	L	95.94
	PIER 27	1	4	0.0312	2.953	1.87	1.87	PIER 27	1.87
	PIER 28	1	25	0.0312	2.953	419.06	419.06	PIER 28	419.06
Chaetodon ephippium	L	2	12	0.0225	3.061	45.24	90.49	L	90.49
Chaetodon lunula	C	4	12	0.0384	2.885	49.86	199.45	C	228.91
	C	1	10	0.0384	2.885	29.47	29.47		
	I	1	10	0.0384	2.885	29.47	29.47	I	29.47
	J	2	12	0.0384	2.885	49.86	99.72	J	669.24
	J	6	15	0.0384	2.885	94.92	569.52		
	K	1	25	0.0384	2.885	414.37	414.37	K	414.37
Chaetodon lunulatus	B	1	20	0.0409	2.791	174.94	174.94	B	174.94
	C	2	10	0.0409	2.791	25.28	50.55	C	50.55
	K	1	8	0.0409	2.791	13.56	13.56	K	13.56
	J	1	12	0.0409	2.791	42.05	42.05	J	42.05
Chaetodon ornatissimus	A	1	8	0.0384	2.885	15.48	15.48	A	44.95
	A	1	10	0.0384	2.885	29.47	29.47		
Chaetodon reticulatus	C	1	8	0.0468	2.758	14.49	14.49	C	14.49
Chaetodon unimaculatus	PIER 26	2	12	0.0533	2.833	60.82	121.64	PIER 26	121.64
	PIER 28	1	20	0.0533	2.833	258.55	258.55	PIER 28	258.55
Chromis hanui	A	1	8	0.0169	3	8.65	8.65	A	8.65
Dascyllus albisella	A	9	2	0.0303	3	0.24	2.18	A	13.54
	A	3	5	0.0303	3	3.79	11.36		
	B	5	2	0.0303	3	0.24	1.21	B	59.39
	B	6	4	0.0303	3	1.94	11.64		
	B	3	8	0.0303	3	15.51	46.54		
	F	2	4	0.0303	3	1.94	3.88	F	160.95
	F	3	12	0.0303	3	52.36	157.08		
	K	2	5	0.0303	3	3.79	7.58	K	23.09
	K	1	8	0.0303	3	15.51	15.51		
	L	1	8	0.0303	3	15.51	15.51	L	117.78
	L	1	15	0.0303	3	102.26	102.26		

TABLE 10. continued (3).

SPECIES	SECTOR	NO.	SIZE (L)	Coeff.a	Coeff.b	W(g) = aLb	W * NO. (g)	W/SECTOR (g)	
Dascyllus albisella	PIER 26	2	20	0.0303	3	242.40	484.80	PIER 26	484.80
	PIER 28	14	4	0.0303	3	1.94	27.15	PIER 28	1042.20
	PIER 28	10	5	0.0303	3	3.79	37.88		
	PIER 28	12	10	0.0303	3	30.30	363.60		
	PIER 28	6	15	0.0303	3	102.26	613.58		
Diodon histrix	G	1	20	0.532	2.276	486.47	486.47	G	486.47
Diodon holocanthus	PIER 27	1	20	0.119	2.63	314.24	314.24	PIER 27	314.24
Gomphosus varius	A	2	8	0.0099	3	5.07	10.14	A	10.14
Gymnomuraena zebra	G	1	40	0.0005	3.268	86.00	86.00	G	86.00
Heniochus diphreutes	PIER 26	8	10	0.0271	3.061	31.19	249.49	PIER 26	249.49
Herklotsichthys quadrimaculatus	B	500	6	0.0124	3.005	2.70	1351.25	B	1351.25
	E	500	5	0.0124	3.005	1.56	781.26	E	781.26
	F	40	5	0.0124	3.005	1.56	62.50	F	62.50
Kyphosus spp.	C	6	20	0.0179	3	143.20	859.20	C	859.20
Kuhlia xenura	G	200	20	0.0109	3	87.20	17440.00	G	17440.00
Lutjanus fulvus	F	6	20	0.0211	2.974	156.15	936.91	F	936.91
	G	1	15	0.0211	2.974	66.37	66.37	G	66.37
	I	1	12	0.0211	2.974	34.18	34.18	I	640.62
	I	2	25	0.0211	2.974	303.22	606.44		
	PIER 28	10	18	0.0211	2.974	114.15	1141.47	PIER 28	2822.79
	PIER 28	3	20	0.0211	2.974	156.15	468.45		
	PIER 28	4	25	0.0211	2.974	303.22	1212.87		
Mulloidichthys flavolineatus	PIER 28	30	28	0.0089	3.06	238.61	7158.38	PIER 28	7158.38
Myripristis kuntee	B	1	25	0.0206	3.151	523.33	523.33	B	523.33
Naso hexacanthus	PIER 26	1	25	0.0424	2.854	414.08	414.08	PIER 26	414.08
Naso lituratus	G	1	15	0.0497	2.839	108.46	108.46	G	108.46
Ostracion meleagris	C	1	20	0.373	2.229	296.28	296.28	C	296.28
	PIER 27	1	15	0.373	2.229	156.03	156.03	PIER 27	156.03
Scarus psittacus	A	1	6	0.0258	2.903	4.68	4.68	A	47.87
	A	4	8	0.0258	2.903	10.80	43.19		
	B	2	12	0.0258	2.903	35.03	70.07	B	424.28
	B	8	8	0.0258	2.903	10.80	86.37		
	B	4	15	0.0258	2.903	66.96	267.84		
	I	2	6	0.0258	2.903	4.68	9.37	I	79.43
	I	2	12	0.0258	2.903	35.03	70.07		
	L	2	8	0.0258	2.903	10.80	21.59	L	21.59
	PIER 28	8	8	0.0258	2.903	10.80	86.37	PIER 28	86.37
Sphyraena barracuda	C	2	50	0.05	2.517	944.66	1889.33	C	1889.33
	E	1	30	0.05	2.517	261.15	261.15	E	1205.81
	E	1	50	0.05	2.517	944.66	944.66		
	I	1	100	0.05	2.517	5407.17	5407.17	I	5407.17
	PIER 24	1	50	0.05	2.517	944.66	944.66	PIER 25	944.66
Stegastes fasciolatus	C	1	20	0.0296	3	236.80	236.80	C	236.80
	G	1	15	0.0296	3	99.90	99.90	G	99.90
	PIER 28	2	25	0.0296	3	462.50	925.00	PIER 28	925.00
Synodus dermatogenys	A	1	4	0.0067	3.201	0.57	0.57	A	19.64
	A	1	12	0.0067	3.201	19.08	19.08		
	B	1	25	0.0067	3.201	199.93	199.93	B	199.93
Thalassoma duperrey	PIER 26	1	15	0.0155	2.89	38.84	38.84	PIER 26	38.84
	PIER 28	1	8	0.0155	2.89	6.31	6.31	PIER 28	477.99
	PIER 28	2	28	0.0155	2.89	235.84	471.68		

TABLE 10. continued (4).

SPECIES	SECTOR	NO.	SIZE (L)	Coeff.a	Coeff.b	W(g) = aLb	W * NO. (g)	W/SECTOR (g)	
Zanclus cornutus	B	5	20	0.0147	3.37	356.28	1781.39	B	1781.39
	C	1	20	0.0147	3.37	356.28	356.28	C	356.28
	G	2	10	0.0147	3.37	34.46	68.92	G	68.92
	I	2	15	0.0147	3.37	135.13	270.26	I	270.26
	J	1	15	0.0147	3.37	135.13	135.13	J	135.13
	K	1	25	0.0147	3.37	755.74	755.74	K	755.74
	PIER 27	1	18	0.0147	3.37	249.80	249.80	PIER 27	249.80
	PIER 28	4	15	0.0147	3.37	135.13	540.51	PIER 28	4482.65
	PIER 28	1	18	0.0147	3.37	249.80	249.80		
	PIER 28	4	20	0.0147	3.37	356.28	1425.11		
	PIER 28	3	25	0.0147	3.37	755.74	2267.23		
Zebrasoma flavescens	A	1	4	0.0286	2.94	1.68	1.68	A	1.68
	B	12	10	0.0286	2.94	24.91	298.91	B	554.37
	B	6	12	0.0286	2.94	42.58	255.45		
	C	2	10	0.0286	2.94	24.91	49.82	C	49.82
	F	2	10	0.0286	2.94	24.91	49.82	F	49.82
	G	1	8	0.0286	2.94	12.93	12.93	G	300.53
	G	3	10	0.0286	2.94	24.91	74.73		
	G	5	12	0.0286	2.94	42.58	212.88		
	K	1	12	0.0286	2.94	42.58	42.58	K	124.62
	K	1	15	0.0286	2.94	82.05	82.05		
	L	1	5	0.0286	2.94	3.25	3.25	L	3.25
	PIER 28	2	8	0.0286	2.94	12.93	25.85	PIER 28	1802.14
	PIER 28	10	15	0.0286	2.94	82.05	820.49		
	PIER 28	5	20	0.0286	2.94	191.16	955.79		
TOTAL									97,562

TABLE 11. Summary of total fish biomass in the vicinity of proposed Kapalama Container Terminal by survey sector (left), species in alphabetical order (center), and species in order of descending biomass (right). Biomass density for each sector is calucated as biomass per square meter of area of available substratum shown in Table 1 (area was not calculated for Piers 25-28). For locations of sectors, see Figures 2-6.

SECTOR	TOTAL BIOMASS (g)	DENSITY (g/m^2)
A	181	0.18
B	16,662	7.49
C	4,803	5.32
D	21	0.10
E	6,335	2.32
F	1,644	4.01
G	20,979	29.88
I	6,916	7.29
J	1,215	2.30
K	6,976	2.20
L	497	0.60
Pier 24	945	1.54
Pier 25	2,611	NA
Pier 26	1,322	NA
Pier 27	722	NA
Pier 28	25,733	NA
TOTAL	97,562	

SPECIES	TOTAL BIOMASS (g)
Abudefduf vaigiensis	14,253
Acanthurus blochii	10,978
Acanthurus dussumieri	2,899
Acanthurus olivaceus	362
Acanthurus triostegus	4,386
Acanthurus unicornis	362
Canthigaster jactator	337
Caranx melampygus	665
Chaetodon auriga	1,403
Chaetodon ephippium	90
Chaetodon lunula	1,342
Chaetodon lunulatus	281
Chaetodon ornatissimus	45
Chaetodon reticulatus	14
Chaetodon unimaculatus	380
Chromis hanui	9
Dascyllus albisella	1,901
Diodon histrix	486
Diodon holocanthus	314
Gomphosus varius	10
Gymnomuraena zebra	86
Heniochus diphreutes	249
Herklotsichthys quadrimaculatus	2,195
Kuhlia xenura	17,440
Kyphosus spp.	859
Lutjanus fulvus	4,467
Mulloidichthys flavolineatus	7,158
Myripristis kuntee	523
Naso hexacanthus	414
Naso lituratus	108
Ostracion meleagris	452
Scarus psittacus	660
Sphyraena barracuda	9,447
Stegastes fasciolatus	1,262
Synodus dermatogenys	220
Thalassoma duperrey	517
Zanclus cornutus	8,100
Zebrasoma flavescens	2,886
TOTAL	97,562

SPECIES	TOTAL BIOMASS (g)
Chromis hanui	9
Gomphosus varius	10
Chaetodon reticulatus	14
Chaetodon ornatissimus	45
Gymnomuraena zebra	86
Chaetodon ephippium	90
Naso lituratus	108
Synodus dermatogenys	220
Heniochus diphreutes	249
Chaetodon lunulatus	281
Acanthurus olivaceus	362
Acanthurus unicornis	362
Canthigaster jactator	337
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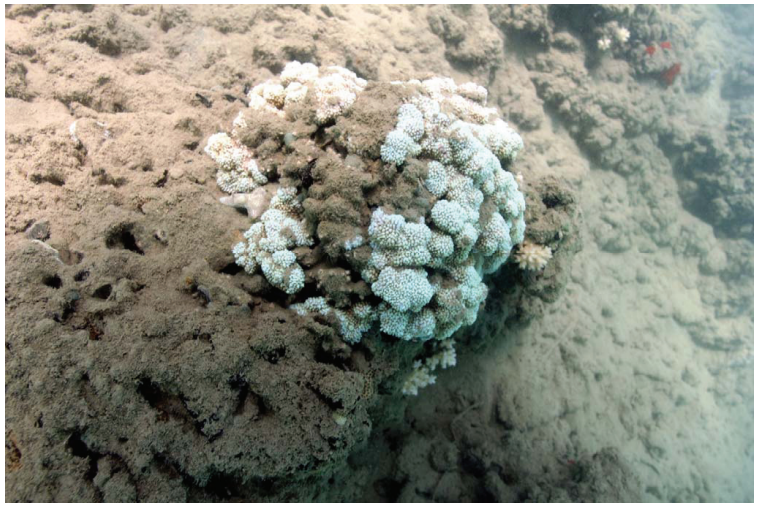
Kyphosus spp.	859
Stegastes fasciolatus	1,262
Chaetodon lunula	1,342
Chaetodon auriga	1,403
Diodon holocanthus	314
Dascyllus albisella	1,901
Herklotsichthys quadrimaculatus	2,195
Zebrasoma flavescens	2,886
Acanthurus dussumieri	2,899
Acanthurus triostegus	4,386
Lutjanus fulvus	4,467
Mulloidichthys flavolineatus	7,158
Zanclus cornutus	8,100
Sphyraena barracuda	9,447
Acanthurus blochii	10,978
Abudefduf vaigiensis	14,253
Kuhlia xenura	17,440
TOTAL	97,562



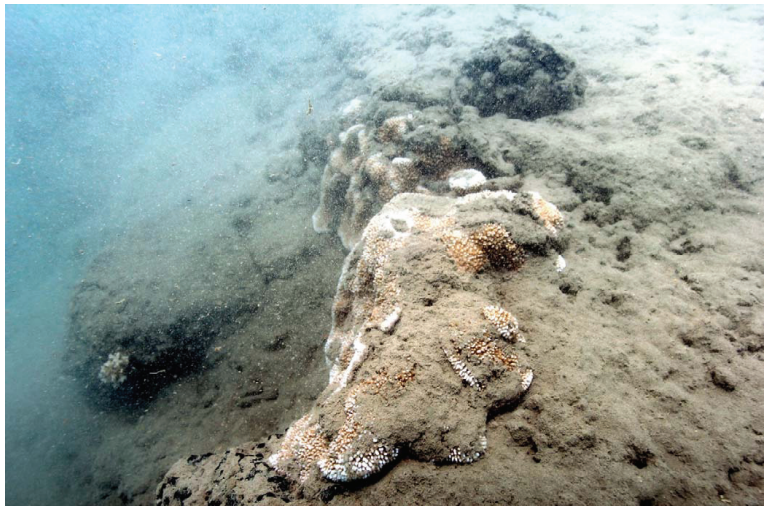
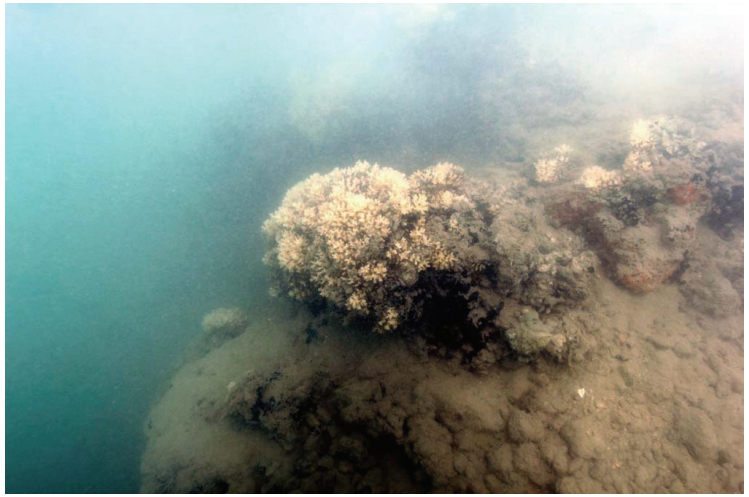


FIGURE 7. SECTOR A. Colonies of *Montipora capitata* on the edge of the dredged channel wall of Sector A-1. Note sediment cover over portions of colonies in both photos. For location of Sector A-1, see Figure 3.

FIGURE 8. SECTOR A. Colonies of *Porites lobata* on the edge of the dredged channel wall of Sector A-1. Numerous small blue colonies were abundant throughout Sector A (top). Sediment covers all sides of larger colony in lower photo. For location of Sector A-1, see Figure 3.



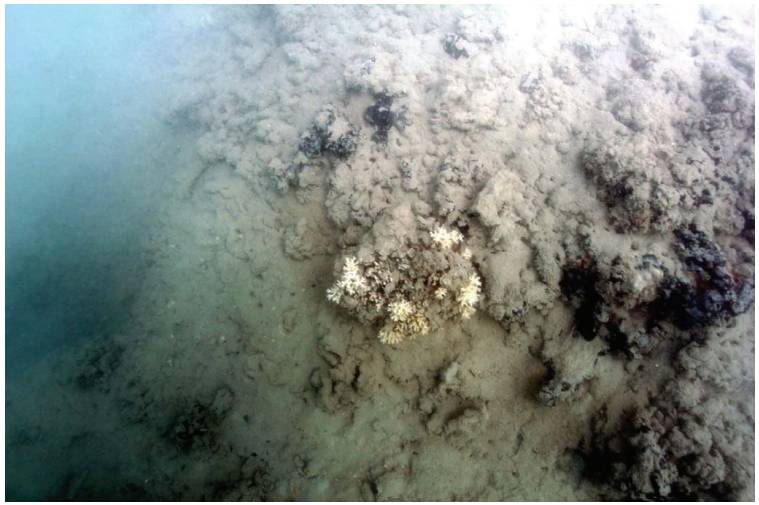
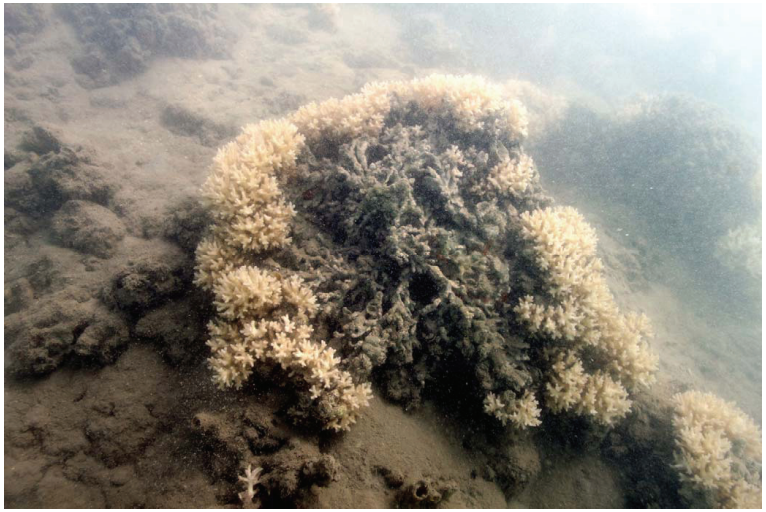


FIGURE 9. SECTOR B. Colonies of *Pocillopora damicornis* on the edge of the dredged channel wall of Sector B-2. Note extensive cover of fine-grained silt-mud over entire shelf and slope surface. For location of Sector B-2, see Figure 3.



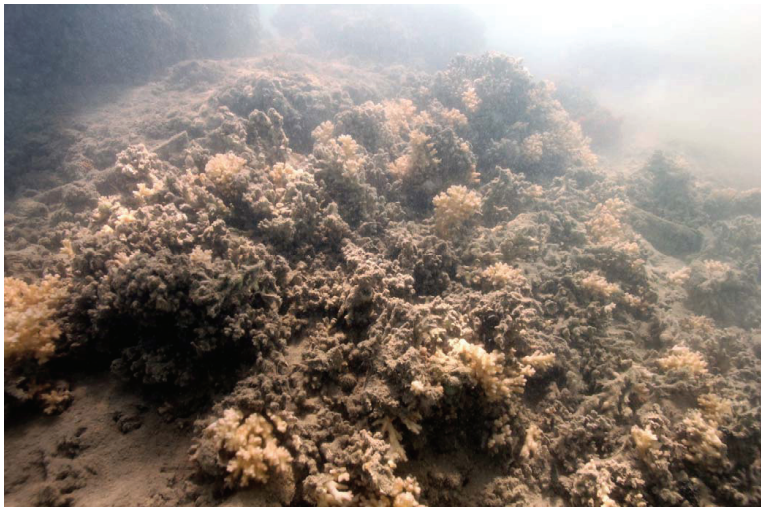


FIGURE 10. SECTOR B. Colonies of *Pocillopora damicornis* on the edge of the dredged channel wall of Sector B-1. In both photos, portions of the colonies are dead and encrusted with coralline algae. In both photos, it is not apparent if the living portions of the colonies are remnants from older larger colonies that have suffered partial mortality, or smaller individual colonies that have recolonized the older skeletal structure. For location of Sector B-1, see Figure 3.

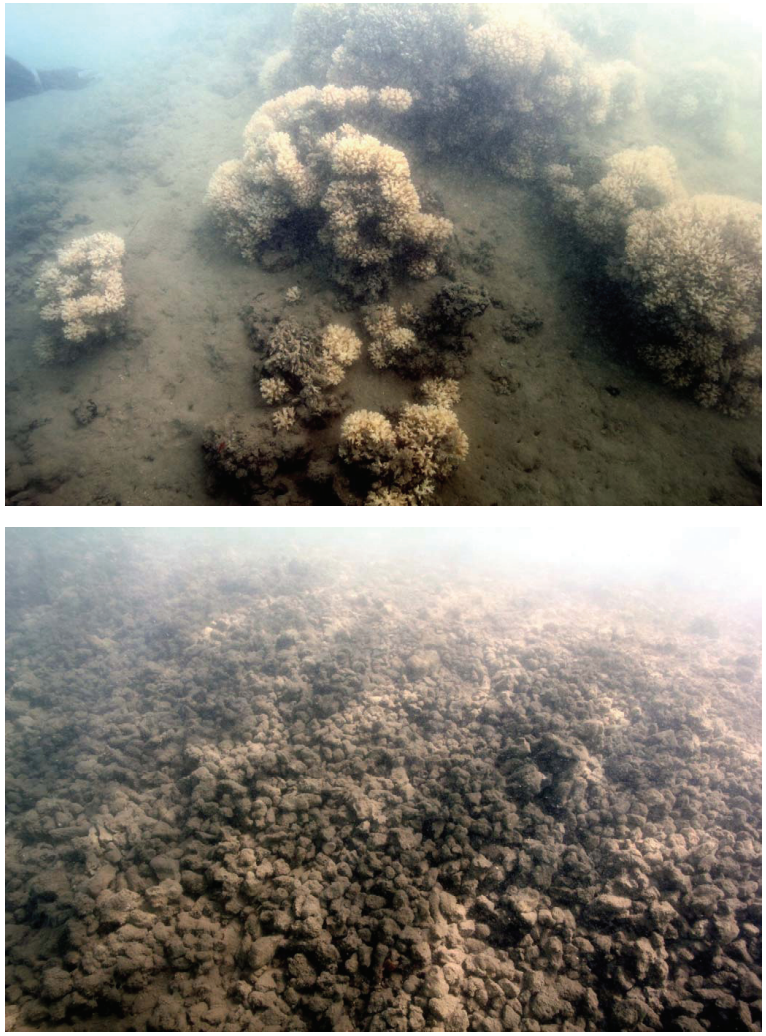


FIGURE 11. SECTOR B. Clustered colonies of *Pocillopora damicornis* on the top of the dredged channel shelf of Sector B-3. Bottom photo shows rubble bed that covers much of the top of the dredged channel shelf of Sector B-4. Colonies of P. damicornis were far less abundant in Sector B-4 compared to Sectors B1-3. For location of Sectors B-3 and B-4, see Figure 3.

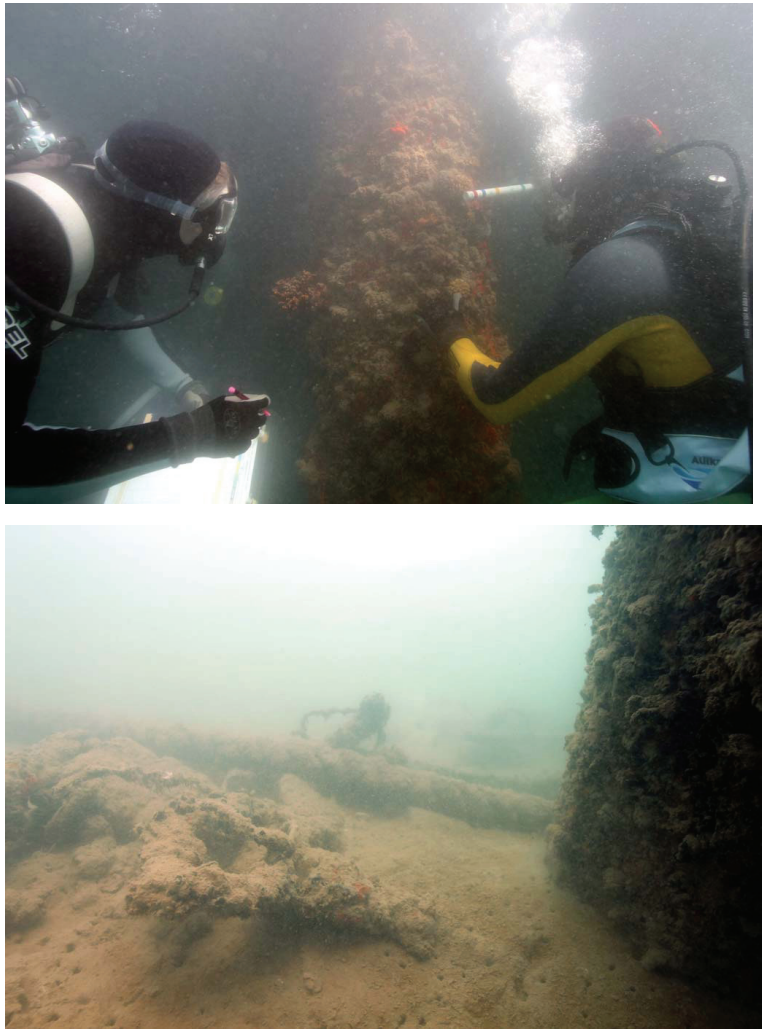


FIGURE 12. SECTOR C. Divers conducting benthic surveys measuring and recording size-class of corals on vertical pilings of Sector C-1using rod marked with size class designations (top). Juncture of piling and sediment surface along with discarded debris on floor of Snug Harbor (bottom). For location of Sectors C-1, see Figure 4.

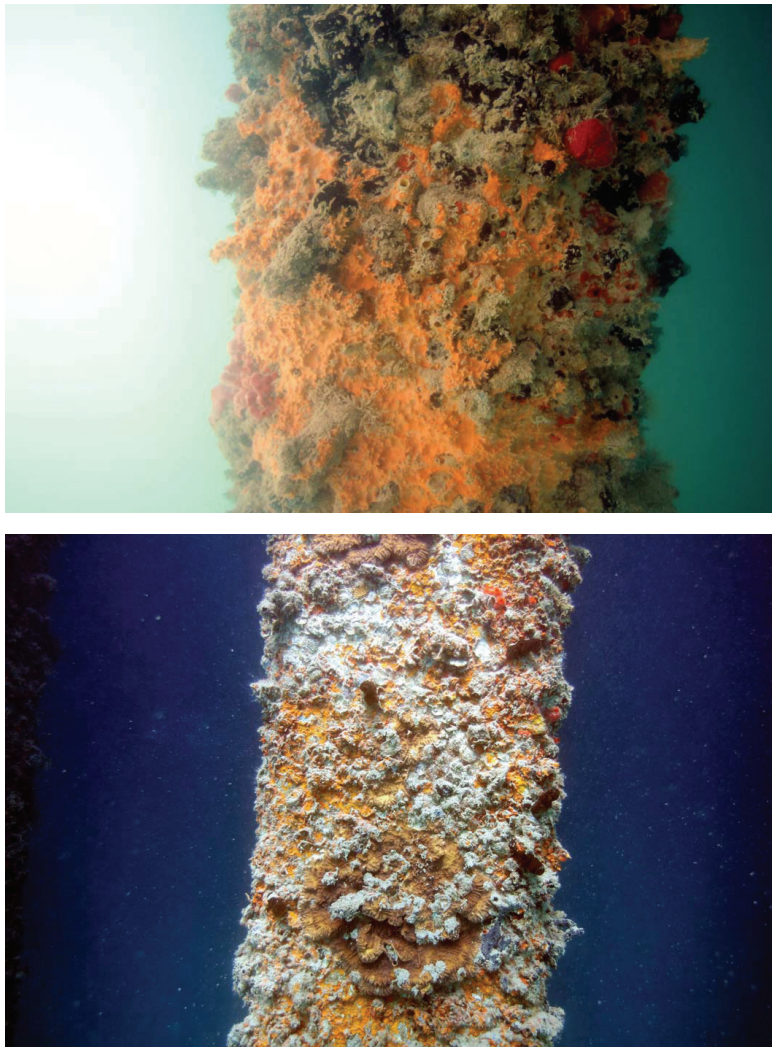


FIGURE 13. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include orange colored sponges *Mycale armata* (top) and *Dactyospongia* sp. (bottom). Piling in bottom photo is also encrusted with the coral *Pavona varians*. For location of Sector C, see Figure 4.

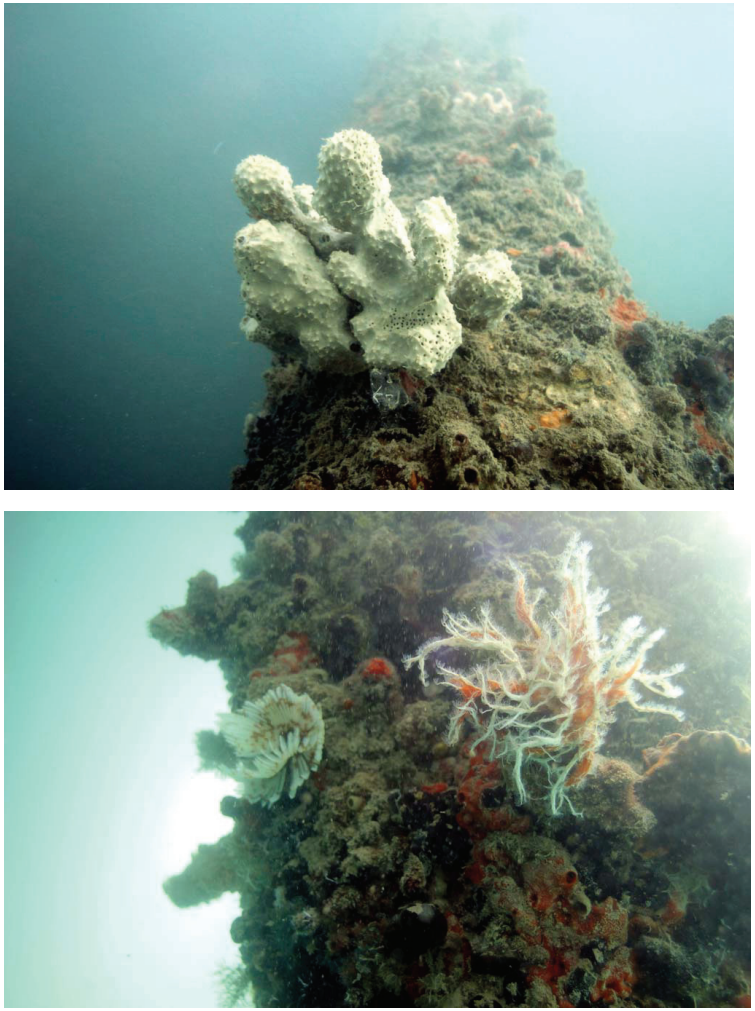


FIGURE 14. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include sponges *Liosina paradoxa* (top),the serpulid worm *Salmacina dysteri* (bottom right) and the polychaete worm *Sabellastarte spectabilis* (bottom left). For location of Sector C, see Figure 4.

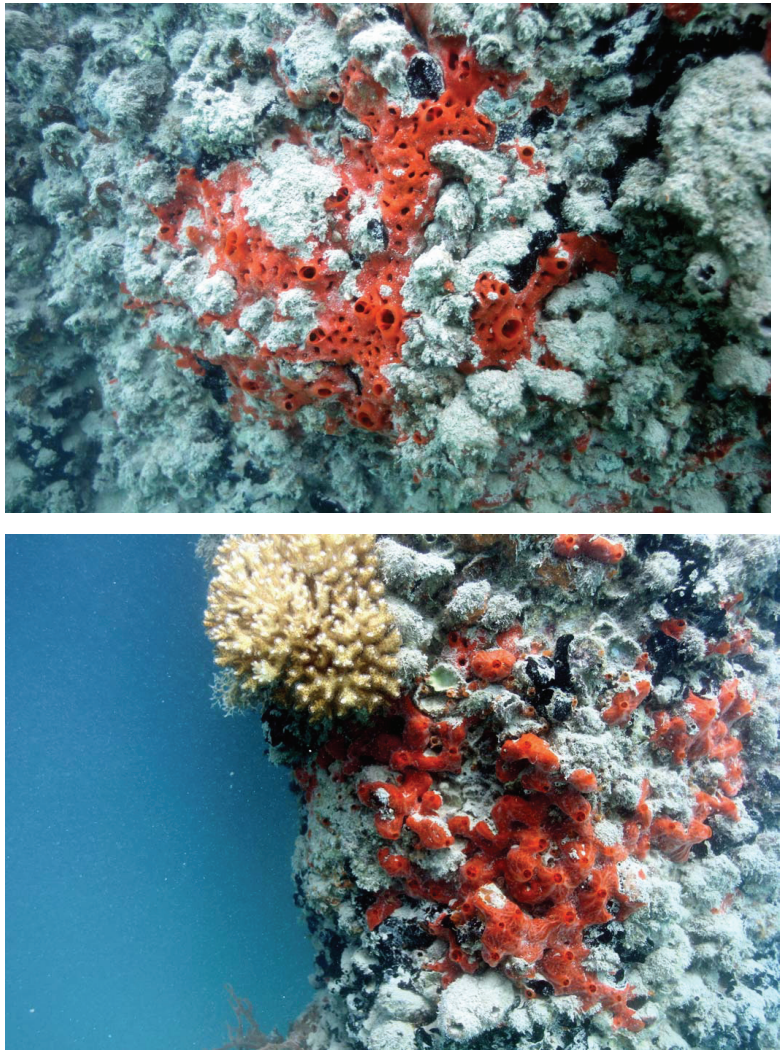


FIGURE 15. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include sponges *Mycale* sp. (top) and *Phorbas amaranthus* (bottom). For location of Sector C, see Figure 4.

FIGURE 16. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include sponges *Sigmadocia* sp. (top), *Chondrosia chucalla* (black), *Mycale* sp. (orange) in bottom photo. For location of Sector C, see Figure 4.

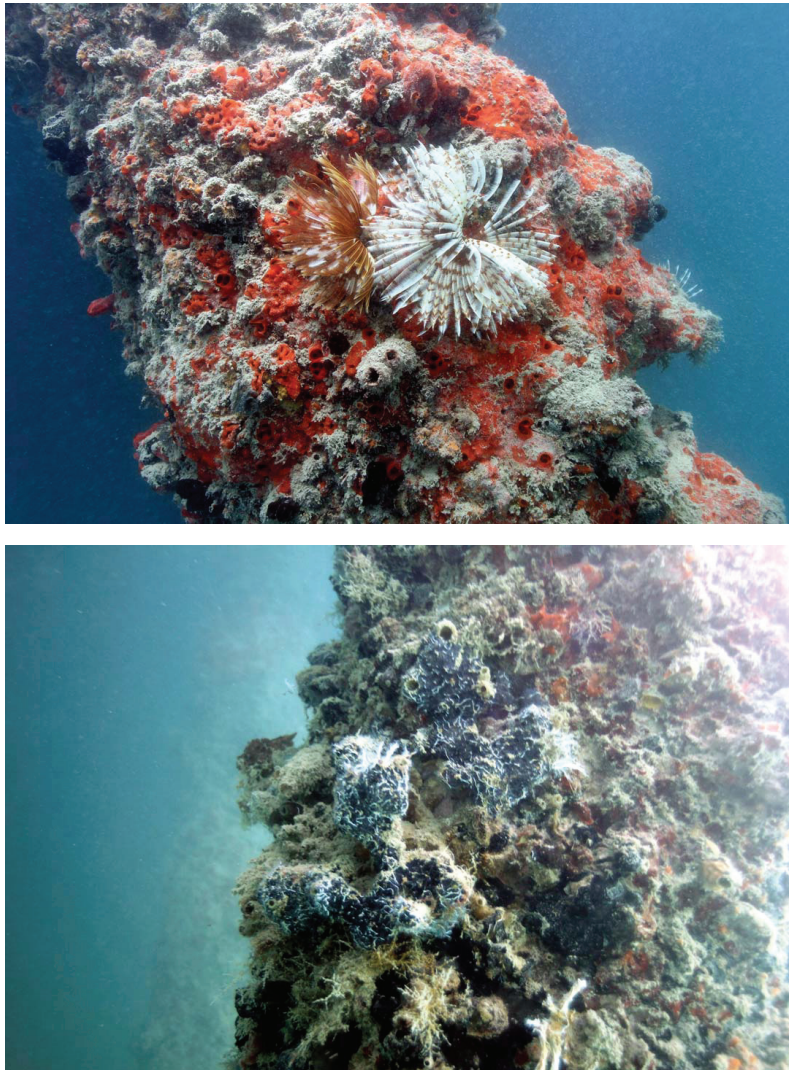
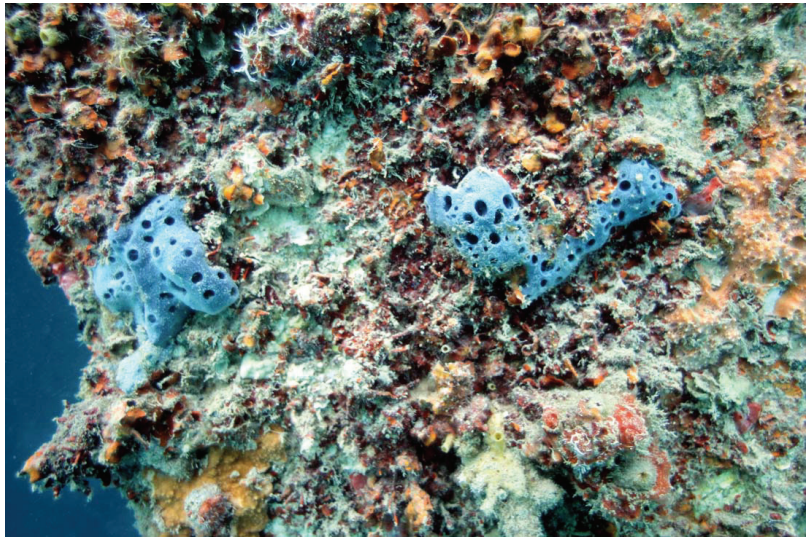


FIGURE 17. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include sponges *Clathria* sp. (top) and *Gelloides fibrosa* (bottom). For location of Sector C, see Figure 4.

FIGURE 18. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include the sponge *Callyspongia diffusa* (top) and the bivalve *Pinctada margaritifera* (bottom). For location of Sector C, see Figure 4.



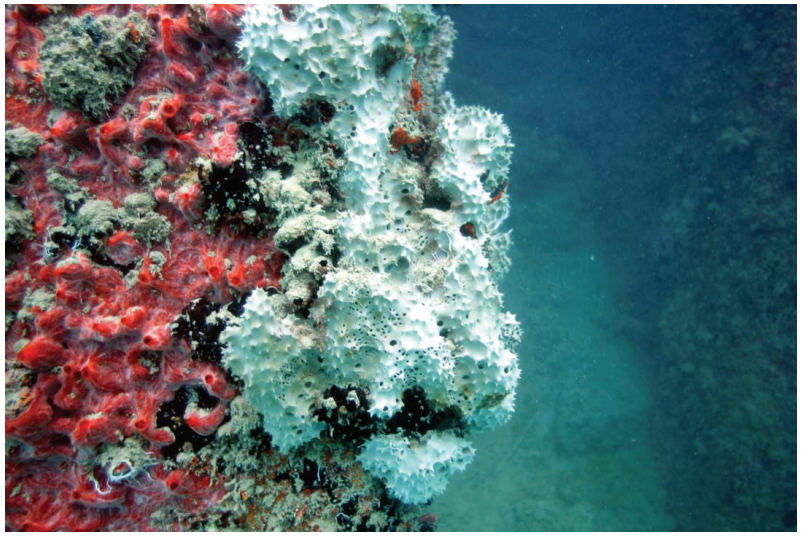
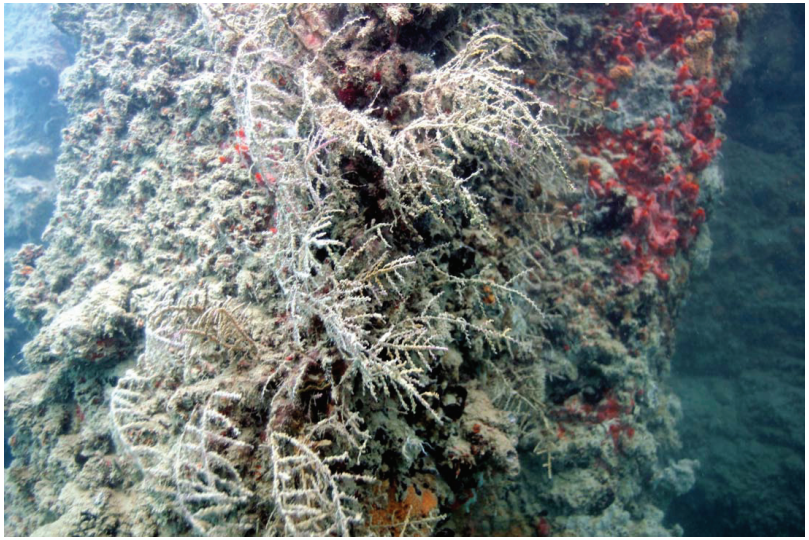


FIGURE 19. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include the sponges *Chalinula pseudomolitba* (top) and *Liosina paradoxa* (bottom). For location of Sector C, see Figure 4.



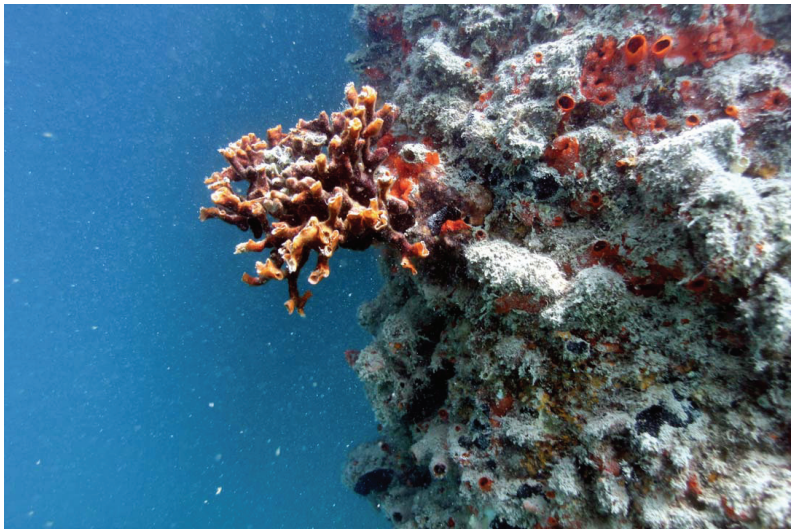


FIGURE 20. SECTOR C. Typical invertebrate colonizers on pilings comprising Snug Harbor include the bryozoans *Amansia distans* (top) and *Schizoporella errata* (bottom). For location of Sector C, see Figure 4.

FIGURE 21. SECTOR D. Various species of sponges (*Zygomycale parishii* (pink) and *Phorbas amaranthus* (red) colonizing submerged edge of Snug Harbor in Sector D (top). Several round colonies of *Leptastrea purpurea* on Pier edge (bottom). For location of Sector D, see Figure 4.

FIGURE 22. SECTOR E. Top photo shows field of 180 square concrete pilings on the east shoreline of Snug Harbor that comprise Sector E. Bottom photo shows multi-tiered colony of *Montipora capitata* growing on edge of dredged channel wall at juncture of Sectors D and E. For location of Sector E, see Figure 4.

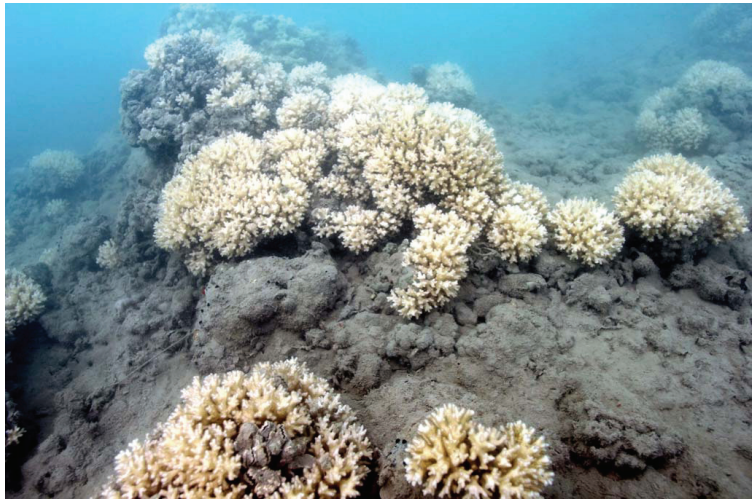
FIGURE 23. SECTOR E. Top photo shows branching colony of *Montipora capitata* encircling piling in Sector E. The branching growth form of *M. capitata* was rare throughout the survey area. Bottom photo shows more typical growth formof *M. capitata* observed in the survey area as a mass of overlapping thin plates. For location of Sector E, see Figure 4.

FIGURE 24. SECTOR E. Top and bottom photos show typical overlapping plating growth form of *Montipora patala* on pilings in Sector E. For location of Sector E, see Figure 4.

FIGURE 25. SECTOR E. Top and bottom photos show typical mounded growth form of *Porites lobata* on pilings in Sector E. For location of Sector E, see Figure 4.

FIGURE 26. SECTOR E. Top photos shows typical finely branched growth form of *Pocillopora damicornis* occurring on pilings in Sector E. Bottom photo shows flat encrusting colony of *Pavona varians* which occurred rarely within Sector E. For location of Sector E, see Figure 4.

FIGURE 27. SECTOR E. Two views of the southern terminus of the pilings comprising Sector E at the edge of Kapalama Basin. The sloping dredged face and array of pilings provides one of the only habitats within the Kapalama survey area where fish were considered abundant. Top photo shows school of blue-lined surgeonfish (*Acanthurus nigroris*). Fish in center of bottom photo are black-tailed snapper *(Lutjanus fulvus*). For location of Sector E, see Figure 4.



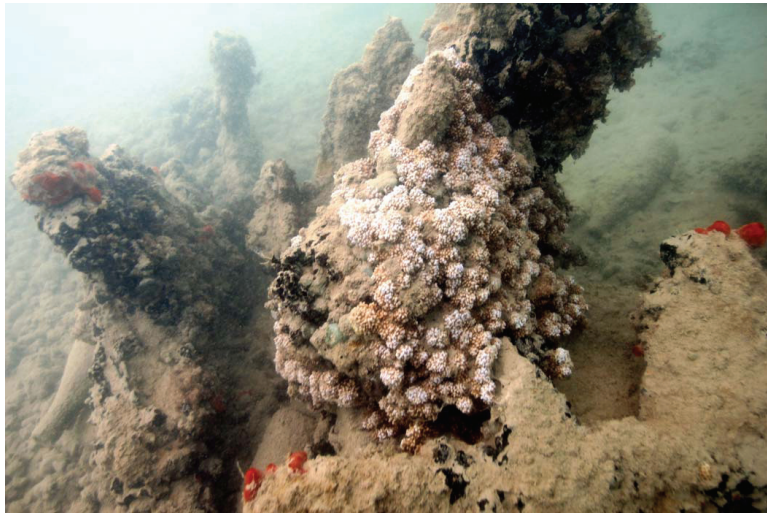
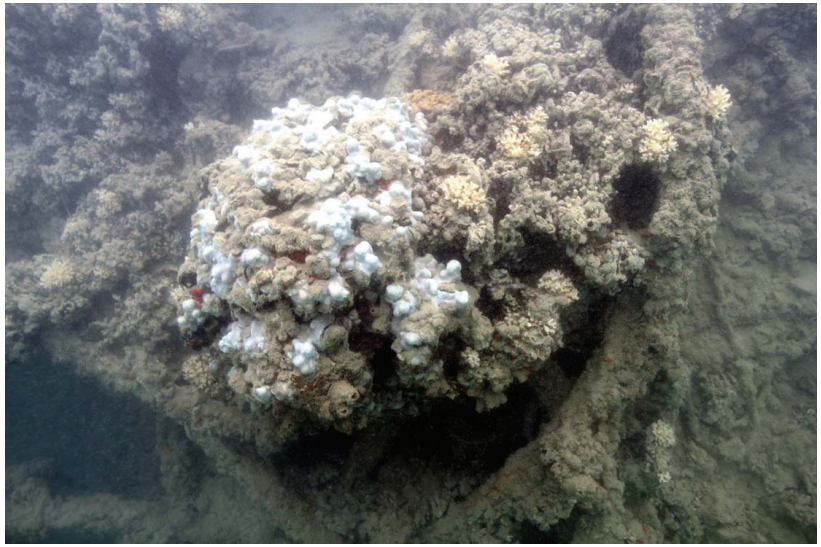


FIGURE 28. SECTOR F. Top photo shows typical assemblages of *Pocillopora damicornis* occurring on dredged shelf at western corner of Sector F. Bottom photo shows colony of *Montipora patula* encrusting metal debris on the dredged shelf within Sector F. For location of Sector F, see Figure 4.



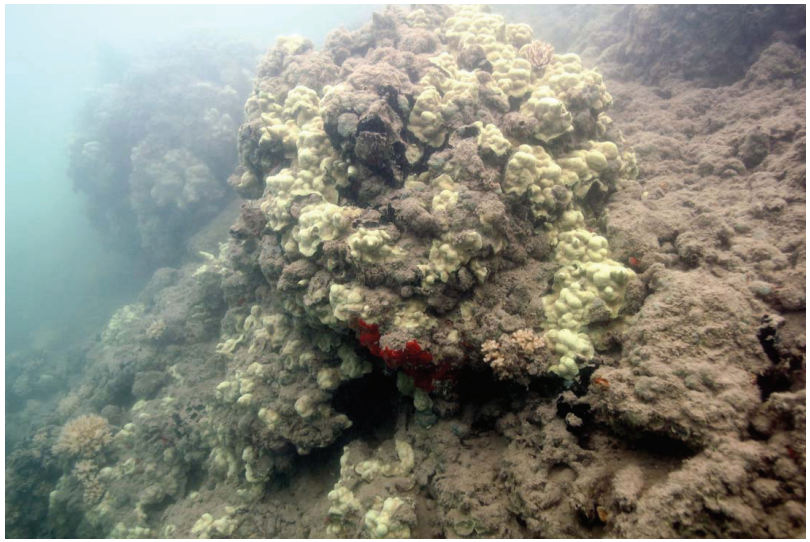


FIGURE 29. SECTOR F. Two photos showing large heads of *Porites lobata* occurring on dredged shelf comprising Sector F. Note partial mortality of all large coral colonies. For location of Sector F, see Figure 4.

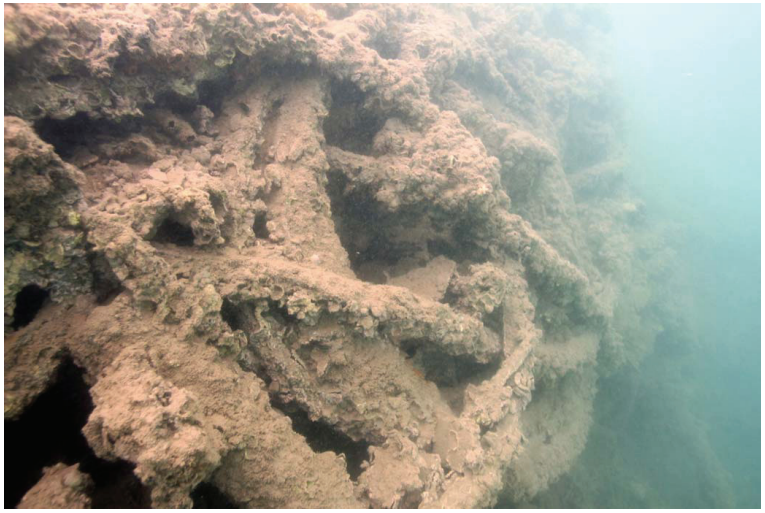


FIGURE 30. SECTOR F. Upper photo shows encrusted debris covering vertical channel wall at eastern end of Sector F. Numerous dead and sediment covered colonies of Porites lobata can be discerned on the debris. Bottom photo shows small colonies of *Pocillopora damicornis*, *Cyphastrea ocellina*, and *Leptastrea purpurea* on dredged shelf of Sector F. *Pocillopora damicornis* and *L. purpurea* were abundant throughout the survey area while *C. ocellina* was rarely observed. For location of Sector F, see Figure 4.

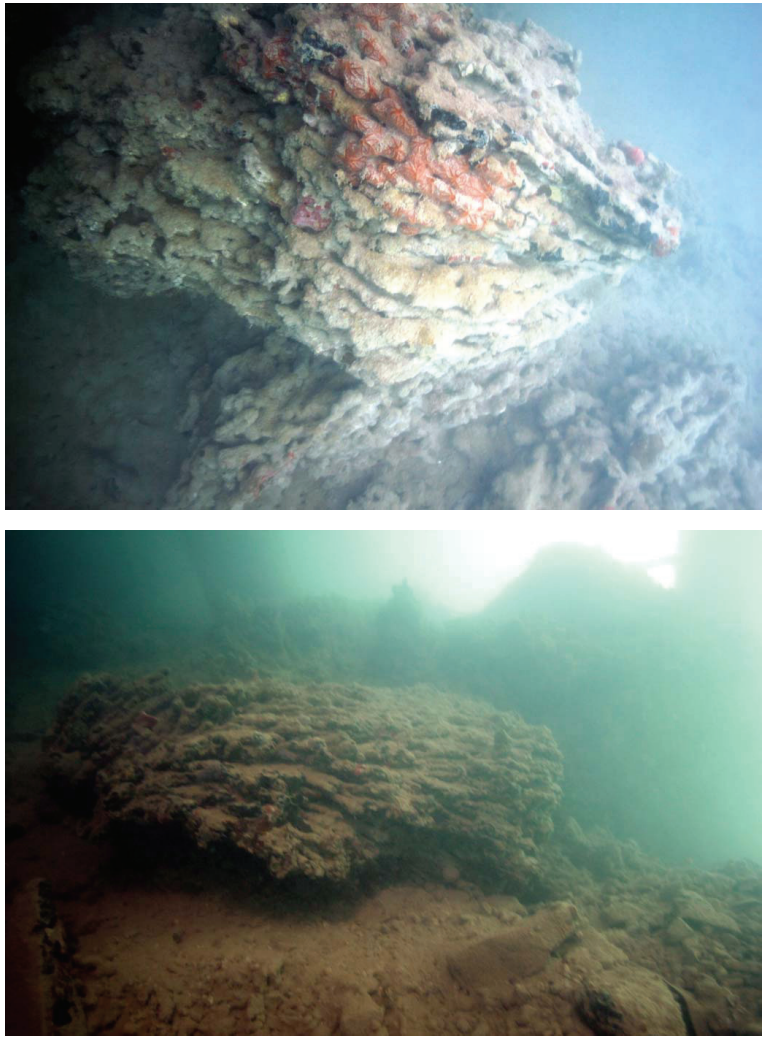


FIGURE 31. SECTOR I. Two photos showing large chunks of calved off sections of old reef that are likely remnants of dredging of Pier 41. For location of Sector I, see Figure 5.

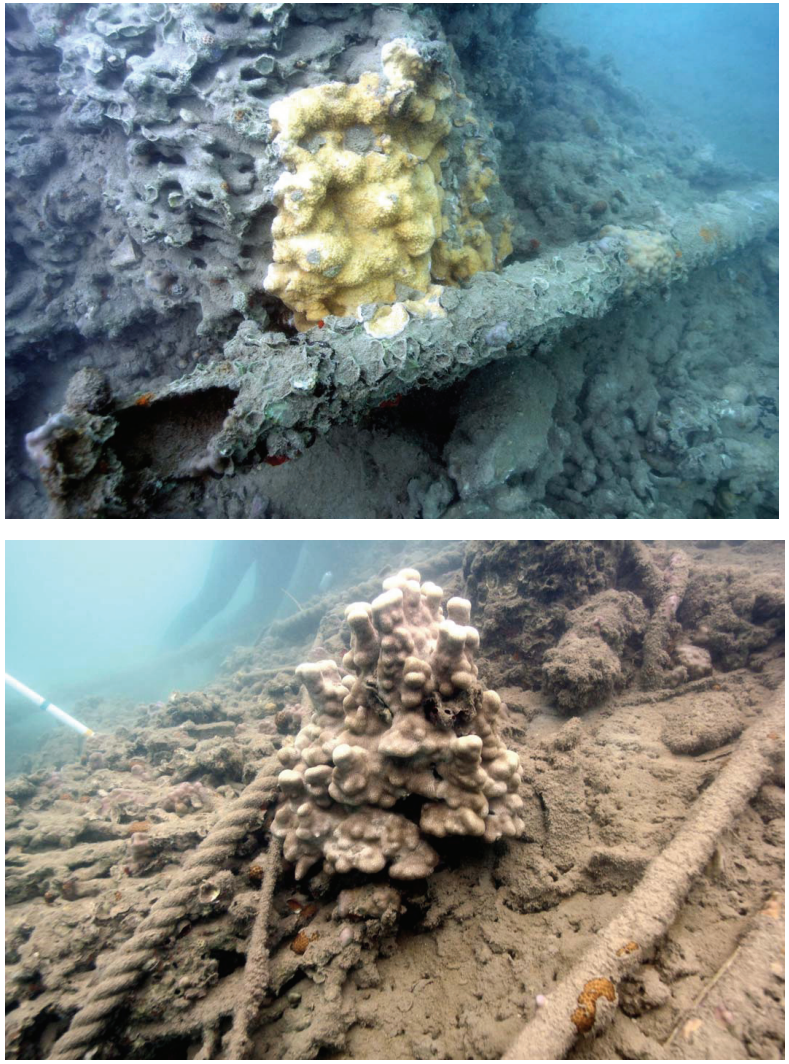


FIGURE 32. SECTOR I. Two photos showing coral colonies growing on dredged platform at inland end of Sector I. For location of Sector I, see Figure 5.

FIGURE 33. SECTOR K. Two photos showing large flat colonies of *Montipora patula* growing on vertical sheet piling comprising Sector K. For location of Sector K, see Figure 5.

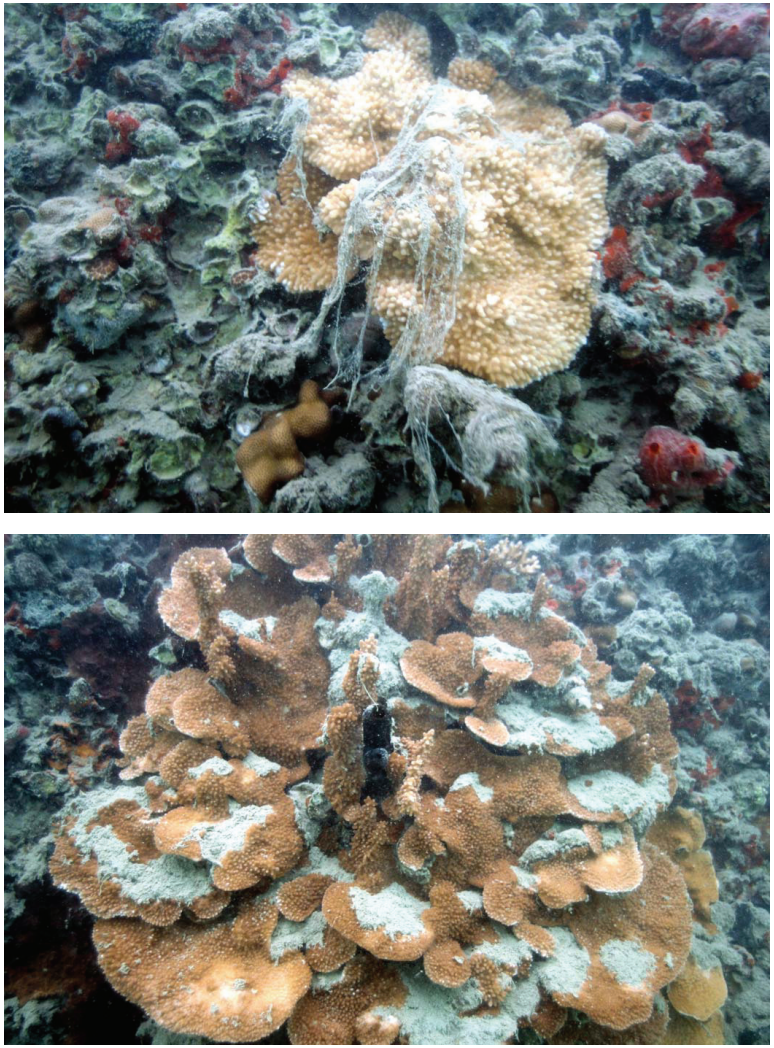


FIGURE 34. SECTOR K. Two photos of colonies of *Montipora capitata* growing on vertical sheet piling comprising Sector K. For location of Sector K, see Figure 5.

FIGURE 35. SECTOR K. Two photos of colonies of *Porites lobata* growing on vertical sheet piling comprisin Sector K. For location of Sector K, see Figure 5.

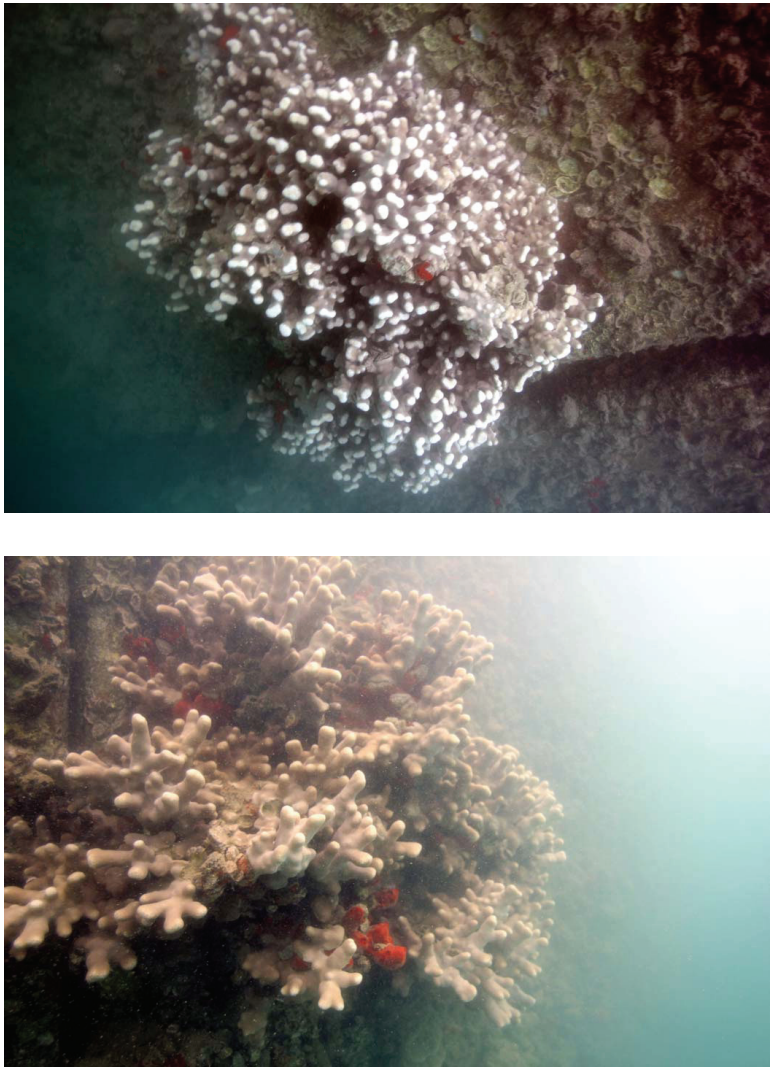


FIGURE 36. SECTOR K. Two photos of colonies of *Porites compressa* growing on vertical sheet piling comprising Sector K. This sector was the only location within the Kapalama Basin survey area where large colonies of *P. compressa* occurred. For location of Sector K, see Figure 5.

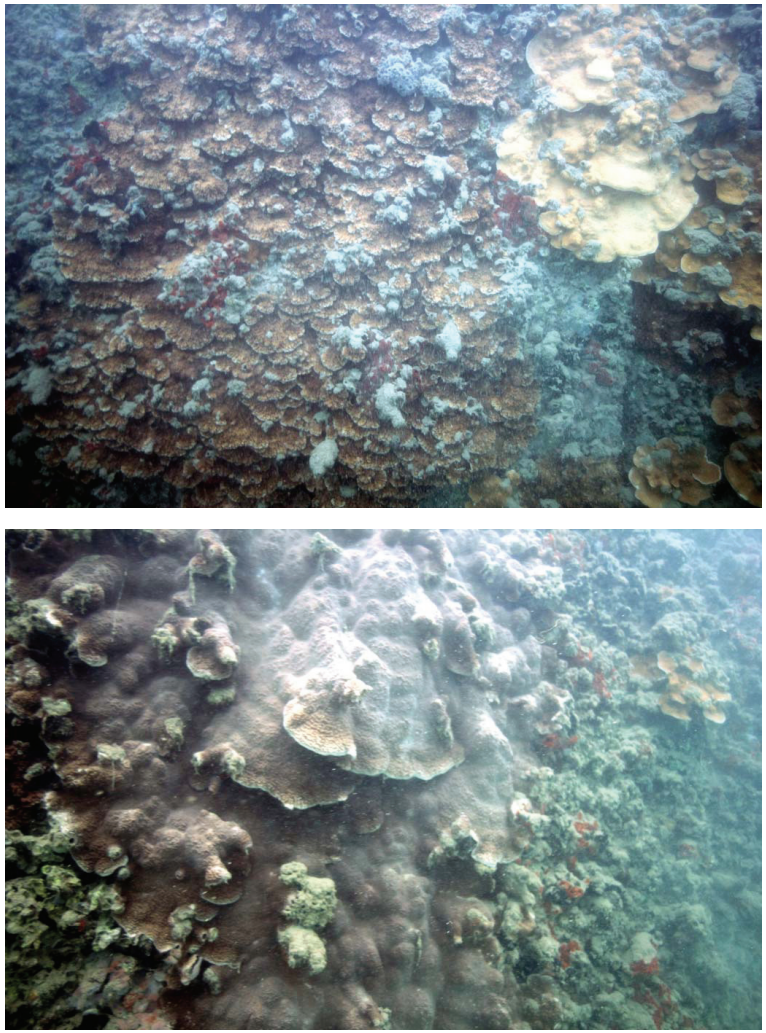


FIGURE 37. SECTOR K. Upper photo shows large colony of overlapping plates of *Pavona varians* on sheet piling comprising Sector K. While other colonies of *P. varians* was observed sporadically in other sectors of the Kapalama survey area, none were as large as the one shown. Lower photo shows a large encrusting colony of *Porites monticulosa*, which was the only colony of this species observed anywhere in the study area. For location of Sector K, see Figure 5.

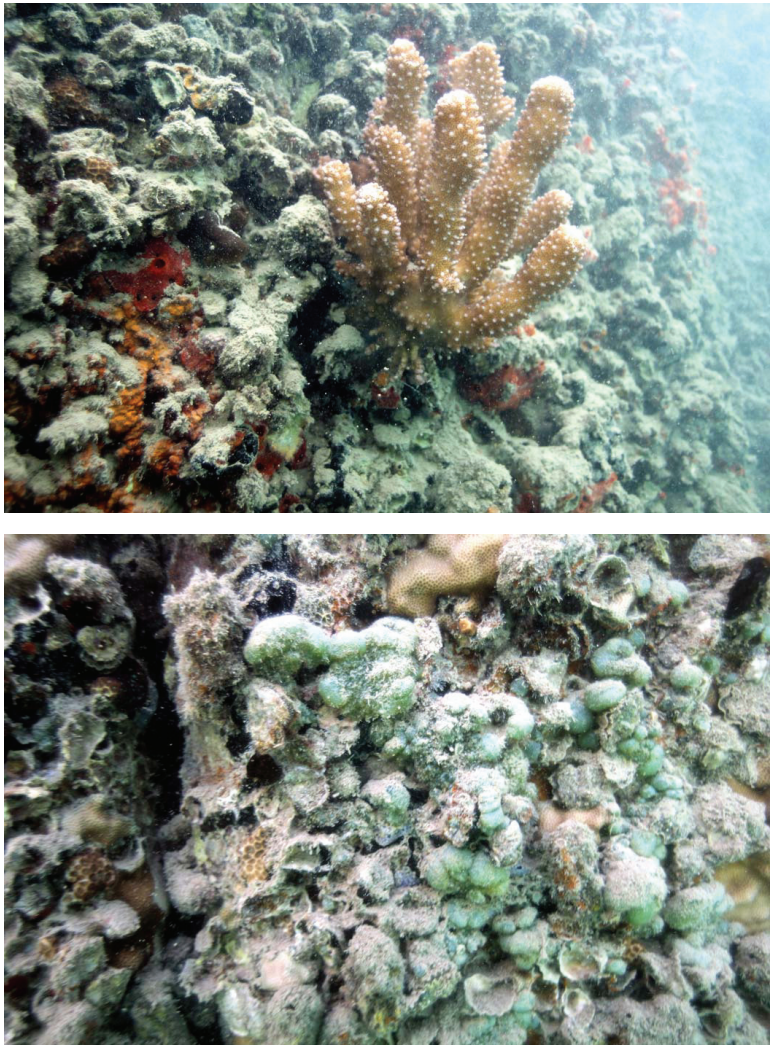


FIGURE 38. SECTOR K. Upper photo shows single colony of *Pocillopora eydouxi* on sheet piling comprising Sector K. This colony was the only one of the species observed in the Kapalama survey area. Lower photo shows encrustations of the green alga *Dictyosphaeria cavernosa* growing on the sheet piling of Sector K. Frondose algae were extremely rare throughout the Kapalama survey area. For location of Sector K, see Figure 5.

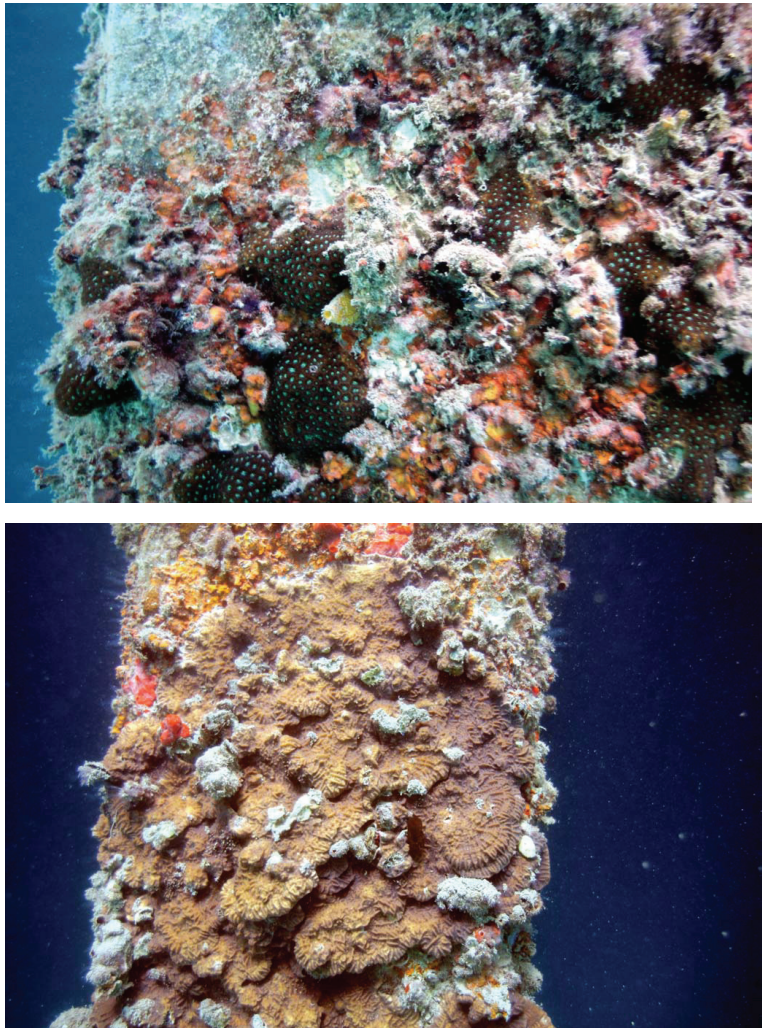


FIGURE 39. SECTOR P-24. Colonies of *Leptastrea purpurea* (top) and *Pavona varians* (bottom) on concrete piles on Pier 24 in area proposed for placement of PSI drydock. For location of Sector P-24, see Figure 6.

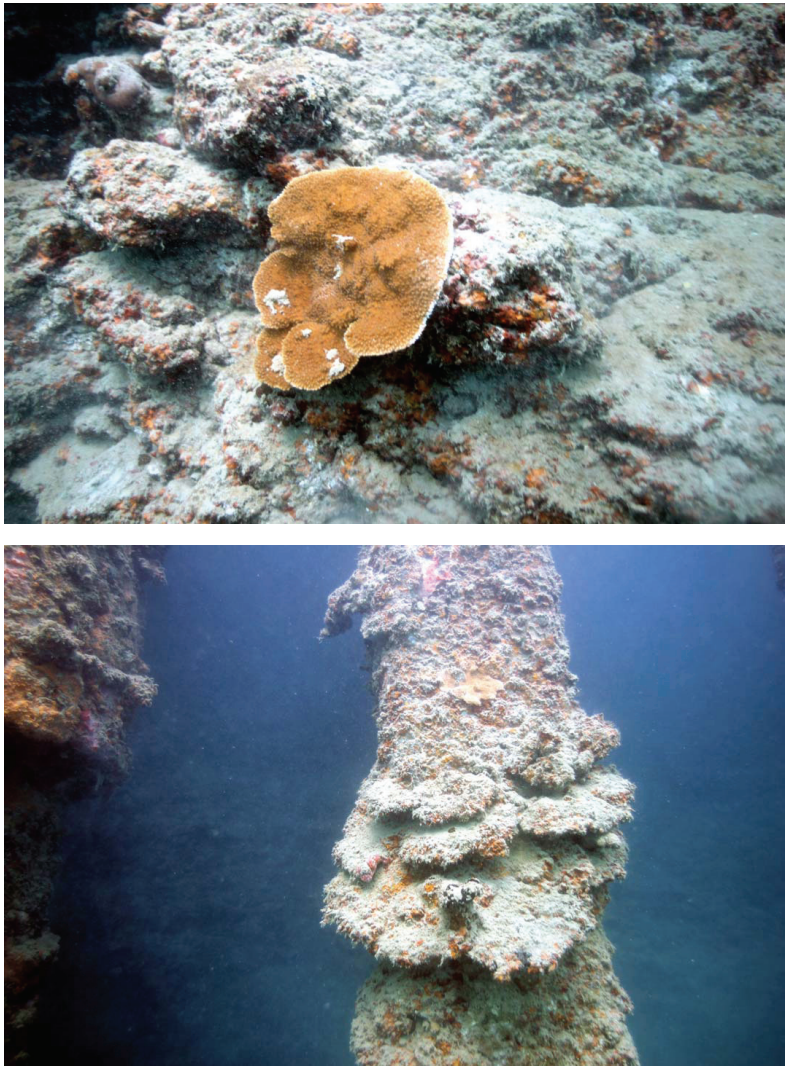


FIGURE 40 SECTOR P-24. Colony of *Montipora capitata* growing of dredged shoreline underneath Pier 24 (top). Bottom photo shows skeletal remnants of overlapping plating colony, likely *Montipora* spp., on concrete piles on Pier 24 in area proposed for placement of PSI dry dock. For location of Sector P-24, see Figure 6.

FIGURE 41. SECTOR P-26. Colonies of *Montipora* spp. on pilings comprising Pier 26. Note in bottom photo separation of plates in discrete "sub-colonies" that may be either the resulting remnants of partial mortality of a large colony or settlement of growth of multiple new colonies on older remnant structure. For location of Sector P-26, see Figure 6.

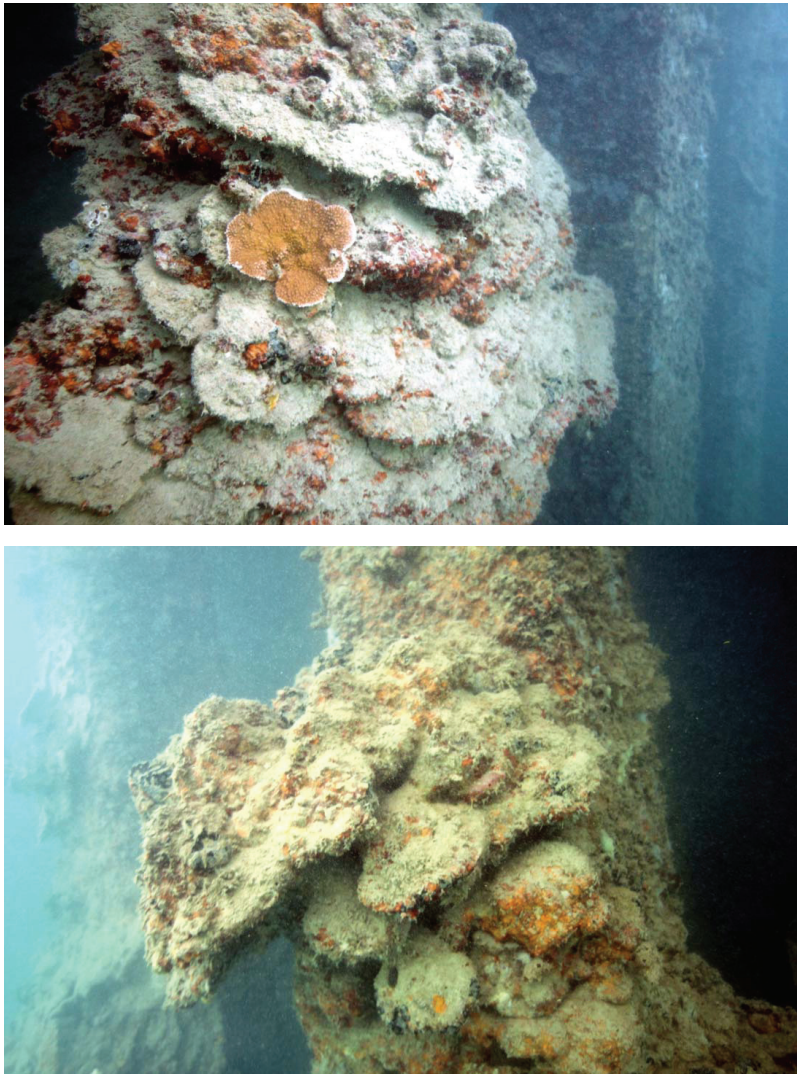


FIGURE 42. SECTOR P-26. Colonies of predominantly dead *Montipora* spp. on pilings comprising Pier 26. Small colony of *M. capitata* in top photo may be either the resulting remnants of partial mortality of a large colony or settlement of growth of multiple new colonies on older remnant structure. For location of Sector P-26, see Figure 6.

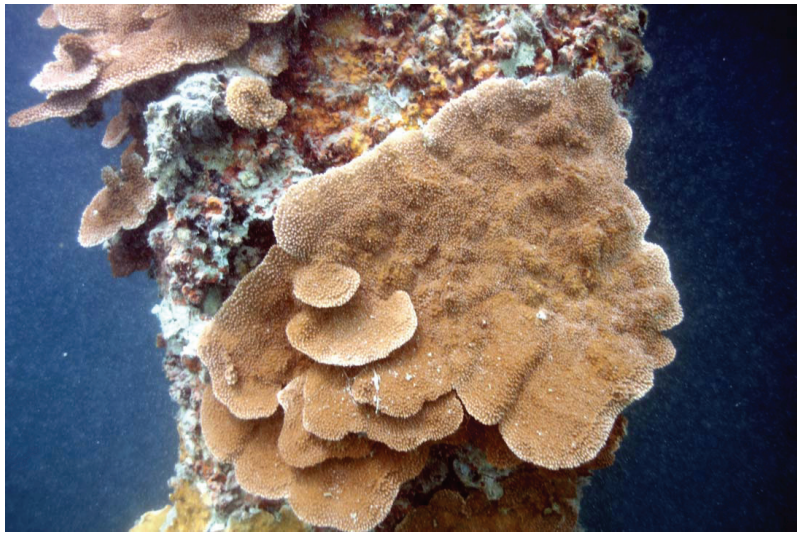


FIGURE 43. SECTOR P-27. Colonies of *Montipora capitata* on pilings comprising Pier 27. Note difference in appearance of colonies compared to those on Pier 26 (Figures 41 and 42) in terms of lack of dead portions of colonies. For location of Sector P-27, see Figure 6.

FIGURE 44. SECTOR P-27. Colonies of *Montipora patula* on pilings comprising Pier 27. Note difference in appearance of colonies compared to those on Pier 26 (Figures 41 and 42) in terms of lack of dead portions of colonies. For location of Sector P-27, see Figure 6.

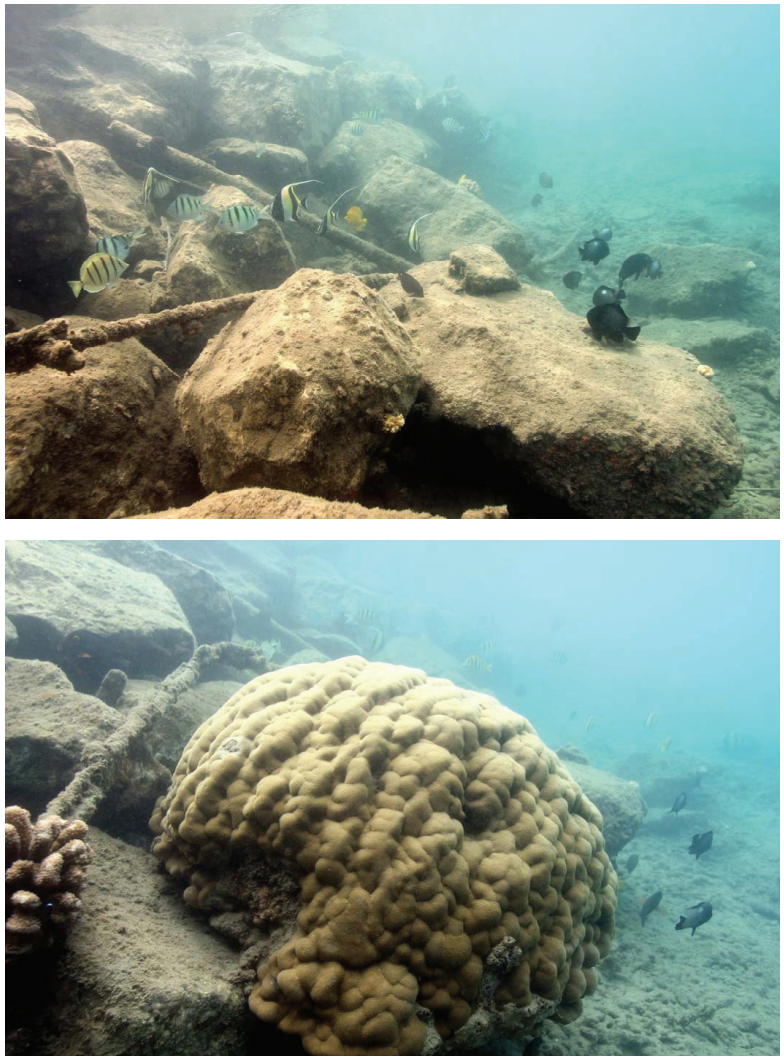


FIGURE 45. SECTOR P-28. Hemispherical colony *Porites lobata* approximately one meter in diameter on boulder shelf (bottom). Corals in this area showed less impact from sediment deposition than anywhere else in the survey region. For location of Sector P-28, see Figure 6.

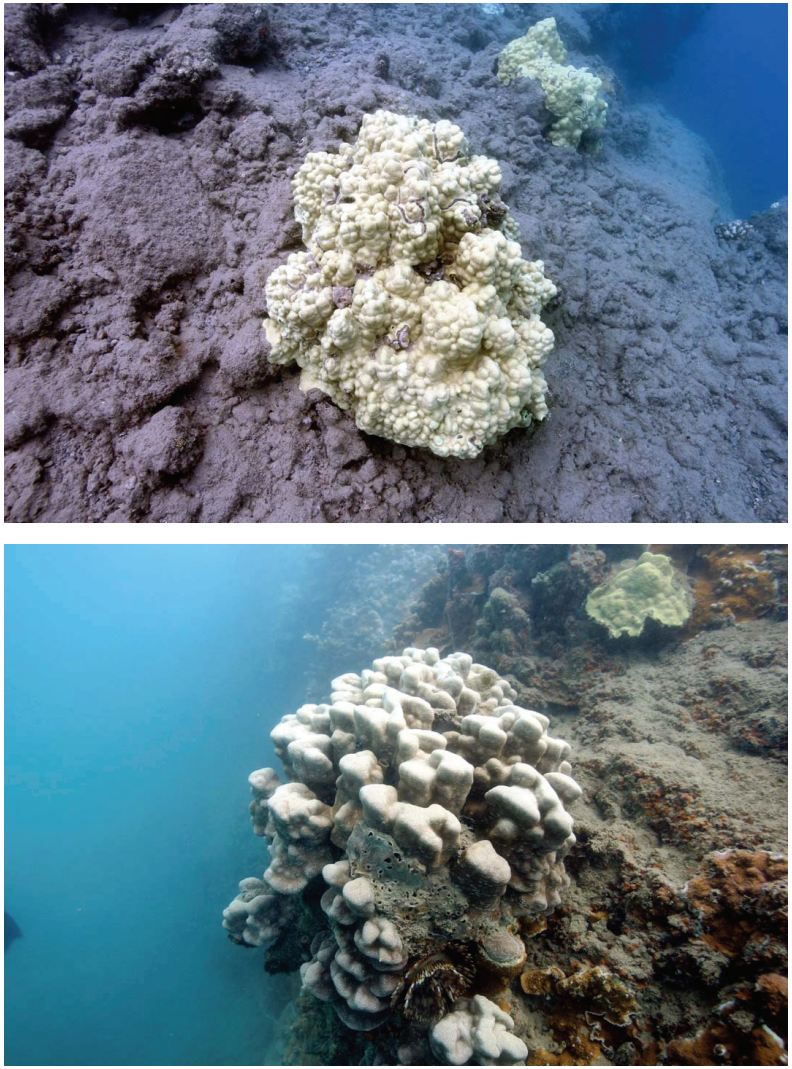


FIGURE 46. SECTOR P-28. Colonies of *Porites lobata* on dredged shelf near end of Pier 28 (top). Bottom photo shows colony of *Porites duerdeni*, which was not observed in any other survey sectors. Corals in this area showed less impact from sediment deposition than anywhere else in the survey region. For location of Sector P-28, see Figure 6.

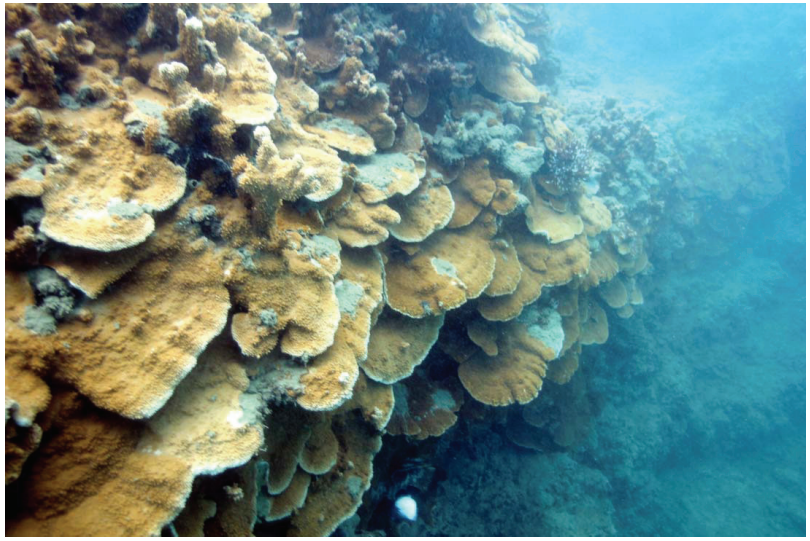
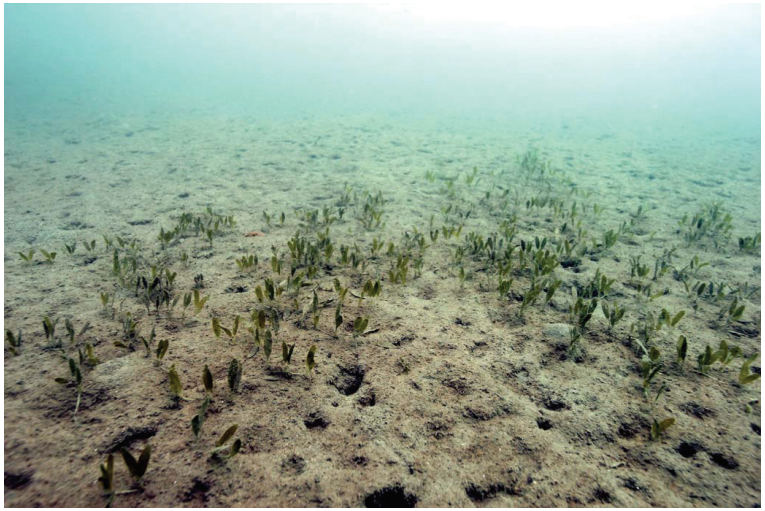


FIGURE 47. SECTOR P-28. Near solid cover of overlapping plates of *Montipora capitata* (top) and *Montipora patula* (bottom) lining dredged edge of Pier 28. For location of Sector P-28, see Figure 6.



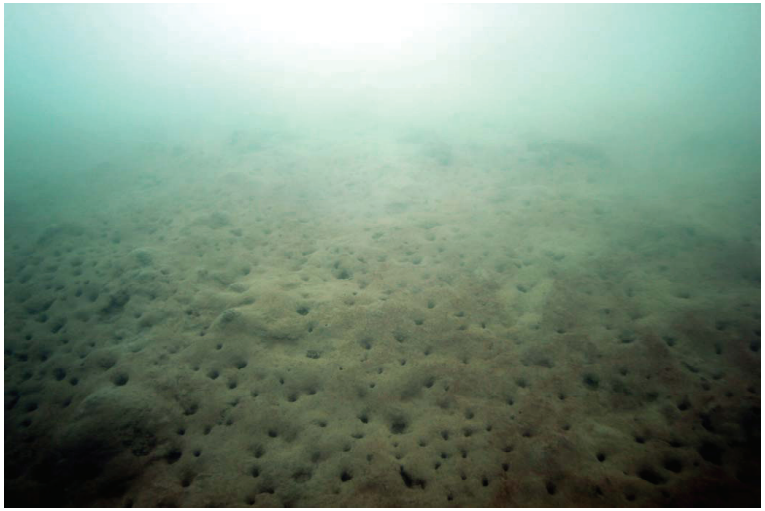


FIGURE 48. SECTOR P-28. Patch of seagrass *Halophila hawaiiana* on floor of Honolulu Harbor near the junction of Piers 27-28 (top). Seagrass was not observed in any other regions of the survey area. Bottom photo shows typical view of silt-mud bottom of Honolulu Harbor pocked with numerous openings from burrowing infauna. For locations of Piers 27-28, see Figure 6.

MARINE RESEARCH CONSULTANTS
1039 WAAKAUA PL. HON. HI 96822

December 4, 2012

Carter Luke, PE
Engineering Program Manager
Department of Transportation, Harbors Division
79 South Nimitz Highway
Honolulu, HI 967813

RE: Marine Surveys of Pacific Shipyards Dock Areas

Dear Mr. Luke;

Owing to hazardous diving conditions in the vicinity of the Pacific Shipyards International (PSI) working dry docks, the pier structures on Piers 41 and 42 were not included in the original biological assessments of the area of Honolulu Harbor that will be affected by the proposed Kapalama Container Terminal. On November 1, 2012 arrangements were made with PSI to allow divers to conduct an underwater survey of the docks to assess biotic populations inhabiting the area in order to provide complete coverage of the area that will potentially be affected by the proposed activity.

Piers 41 and 42 were designated as "Section H" for the Biological Assessment of the Kapalama Area. For the present evaluation, Section H was further divided into four subsections (H-1, H-2, H-3, H-4) (Figure 1). Sub-section H-1 is the berthing site for the PSI dry dock "KeKaulana", sub-sections H-2 and H-3 are the berthing site for numerous commercial boats, and sub-section H-4 is the berthing site for the PSI dry dock "Kapilipono."

Overall, the physical structure of the entirety of Sector H in Honolulu Harbor is similar to other sectors surveyed in Kapalama basin. The dredged silt bottom and vertical pier wall give very little three dimensional complexity for a reef habitat. As Sector H had the highest density of large vessels moored for extended periods of time, biotic colonization of the pier faces was lowest of any other survey sector of the Kapalama area. Summaries of the observations of each sub-sector are presented below; quantification of coral colony abundance by size-class is shown in Table 1, while fish abundance and biomass is shown in Table 2.

Sub-sector H-1

The pier face comprising Sub-sector H-1consists of corrugated concrete sheet-piling that extends the length of the dry dock KeKaulana, although the dry dock is separated from the pier by a distance of approximately 10 feet. The gap provides exposure to light for at least part of the day, resulting in colonization by some corals, consisting predominantly of small branching

colonies of *Pocillopora damicornis* (Figure 2). Other corals observed were small colonies of *Porites lobata* and *Montipora* spp., *Pavona varians* and *Leptastrea purpurea*. Other macro-invertebrate colonization consisted primarily of small sponges. The fishes observed during the survey were typical of other surveys in the harbor, although abundance was less than in most other sectors. The most abundant fish in Sector H-1 was damselfish *Abudefduf abdominalis*.

Sub-sector H-2

Sub-sector H-2 consists of sheet-piling similar to sub-sector H-1. The majority of the piers in this area are docking space for a number of commercial catamarans that appear to be semi-permanently moored. Coral colonies consisted primarily of small encrustations of *Porites lobata* and *Montipora* spp. (Figure 3, top). The innermost portion of the piers were colonized by numerous small encrustations of *Leptastrea purpurea* (Figure 3, bottom).

Sub-sector H-3

Sub-sector H-3 contains the fewest number of moored vessels which is reflected by the highest cover and diversity of coral of the sub-sectors comprising Sector H. The corrugated face of the pier is colonized primarily by numerous small encrusting colonies of Porites lobata and Montipora spp. Of particular interest is that at the outer facing end of Sub-sector H-3 near the juncture with sub-sector H-4 is the only area within Sector H with development of a community of larger coral colonies (Figure 5, top). This small community consists primarily of larger mound-shaped colonies of Porites lobata, as well as several branching colonies of P. compressa. As no vessels were moored in this area, and the orientation maximizes exposure to direct sunlight, the pier face provides a suitable combination of physical factors for settlement and prolonged growth of coral. Reef fish were also most abundant in this area with the occurrence of a school of ring-tailed surgeonfish (Acanthurus blochii), as well as several other species (Table 2).

Sub-sector H-4

Sub-sector H-4 consists of mooring area for the large PSI dry dock Kapilipono. The dry dock is moored securely against the pier resulting is no exposure to ambient light to the pier and pilings. Inspection of the exposed pier using underwater lights revealed no colonization of corals and only very minor coverage by other invertebrates (Figure 5). Within the arc of the underwater light, five fish were observed during the inspection of the length of the piers underlying the dry-dock (Table 2).

In summary, surveys of the submerged areas of Piers 41 and 42 occupied by PSI dry docks and other moored commercial vessels revealed somewhat similar biotic community structure as observed in other sectors of the piers within the Kapalama basin area of Honolulu Harbor. The principal difference between this sector and much of the other areas of the Harbor is that the continual presence of moored vessels appears to restrict available light, hence restricting the development of larger colonies which were found on piers and pilings in other areas of the Harbor. The extreme of this situation occurs along the expanse of Pier 41 where the dry dock Kapilipono is permanently moored flush against the pier, resulting in complete elimination of

conditions suitable for coral settlement and growth. The one area that represents an exception to the pattern is the small region at the end of the finger pier separating Piers 41 and 42. At this location, a small area is colonized by a larger, well developed coral structures. Observations of these corals, as well as all of the corals in the other regions of Sector H did not reveal the presence of coral disease. This observation is consistent with the results from inspection of the corals inhabiting the piers in the Kapalama Basin which were consistently free of coral disease.

Sincerely,

Steven Dollar, Ph.D

FIGURE 1. Aerial image of Piers 41 and 42 in Honolulu Harbor showing locations of Pacific Shipyards two floating dry-docks KeKaulana and Kapilipono. Yellow and red lines denotes sector H, and sub-sectors H-1, H-2, H-3 and H-4 used in marine assessment of Kapalama Basin.

TABLE 1. Counts of coral colonies according to size classes on survey sub-sectors of Sector H in Kapalama Basin. Only coral species occurring in each sector are shown for that sector. For location of sectors, see Figure 1.

SECTOR H-1	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata		5	3	1	1				10
Pocillopora damicornis	31	28	26	16					101
Montipora capitata		1	2	1					4
Montipora patula			2	1					3
Leptastrea purpurea	2	3							5
Pavona varians				2	2				4
TOTAL	33	37	33	21	3	0	0	0	127

SECTOR H-2	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	15	53	12	2					82
Pocillopora damicornis	12	26							38
Montipora capitata			1						1
Montipora patula		2							2
Leptastrea purpurea	87	15							102
TOTAL	114	96	13	2	0	0	0	0	225

SECTOR H-3	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata	76	64	37	10	11	12	2		212
Porites compressa						2			2
Pocillopora damicornis	12	6							18
Montipora capitata		2	4						6
Montipora patula		6	8	2					16
Leptastrea purpurea	21	23	3						47
TOTAL	109	101	52	12	11	14	2	0	301

SECTOR H-4	SIZE CLASS (cm)								
SPECIES	≤2	>2≤5	>5≤10	>10≤20	>20≤40	>40≤80	>80≤160	>160	TOTAL
Porites lobata									0
Pocillopora damicornis									0
Leptastrea purpurea									0
TOTAL	0	0	0	0	0	0	0	0	0

TABLE 2. Fish abundance and biomass in Sector H, Kapalama Basin, Honolulu Harbor.

Sub-Sector	Species	Abundance	Size (cm)	Biomass (g)
H-1	*Mulloidichthys flavolineatus*	1	20	85.2
	Canthecaster jactator	2	10	53.2
	Chaetodon lunula	1	10	29.5
	Chaetodon auriga	1	10	28.0
	Abudefduf abdominalis	20	8	176.4
	Zanclus cornutus	1	10	34.5
H-2	*Abudefduf abdominalis*	10	9	129.6
	Abudefduf vaigiensis	5	10	91.4
	Acanthurus blochii	9	15	1126.0
	Stegastes marginatus	1	15	99.9
	Chaetodon auriga	2	10	56.0
H-3	*Acanthurus blochii*	40	12	2481.3
	Chaetodon auriga	2	10	56.0
	Zebrasoma veliferum	1	10	24.9
	Abudefduf vaigiensis	12	10	219.5
	Naso lituratus	2	18	364.0
	Zebrasoma flavescens	1	8	12.9
H-4	*Chaetodon auriga*	4	12	191.9
	Acanthurus blochii	1	15	125.1
TOTAL		116		5385.4

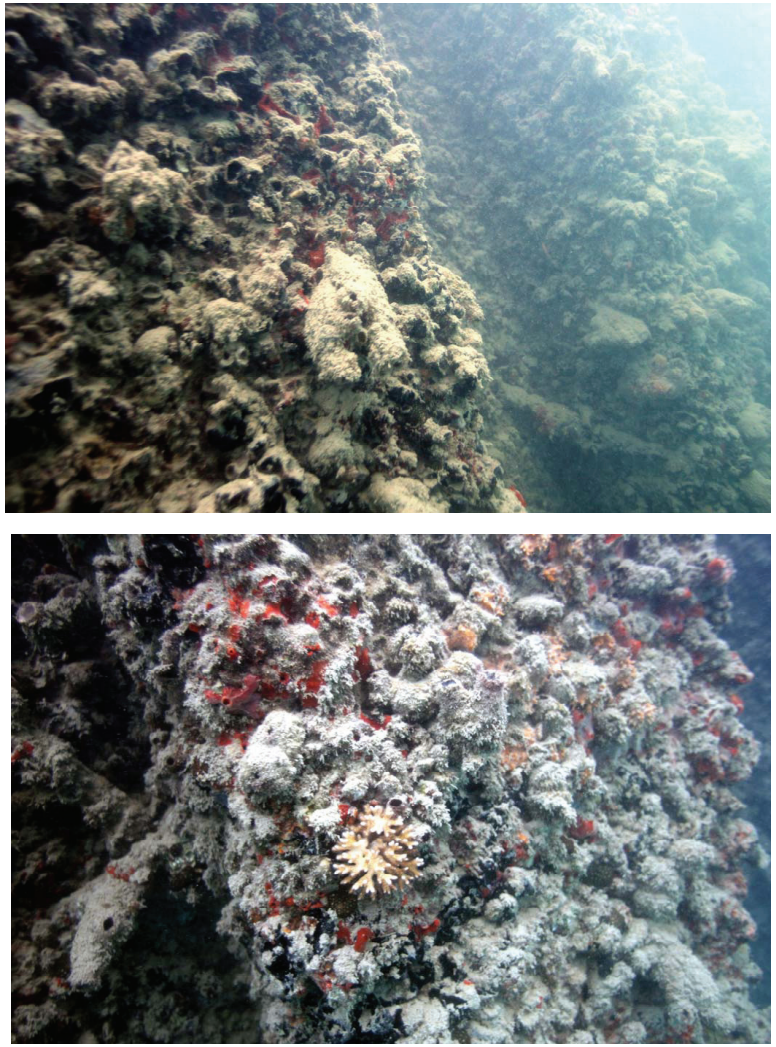


FIGURE 2. Two photos of sheet-piling wall of Pier 42 designated as Section H-1 in Figure 1 inshore of PSI dry-dock KeKaulana. Predominant corals in this section were small branching colonies of *Pocillopora damicornis* as seen in bottom photo.

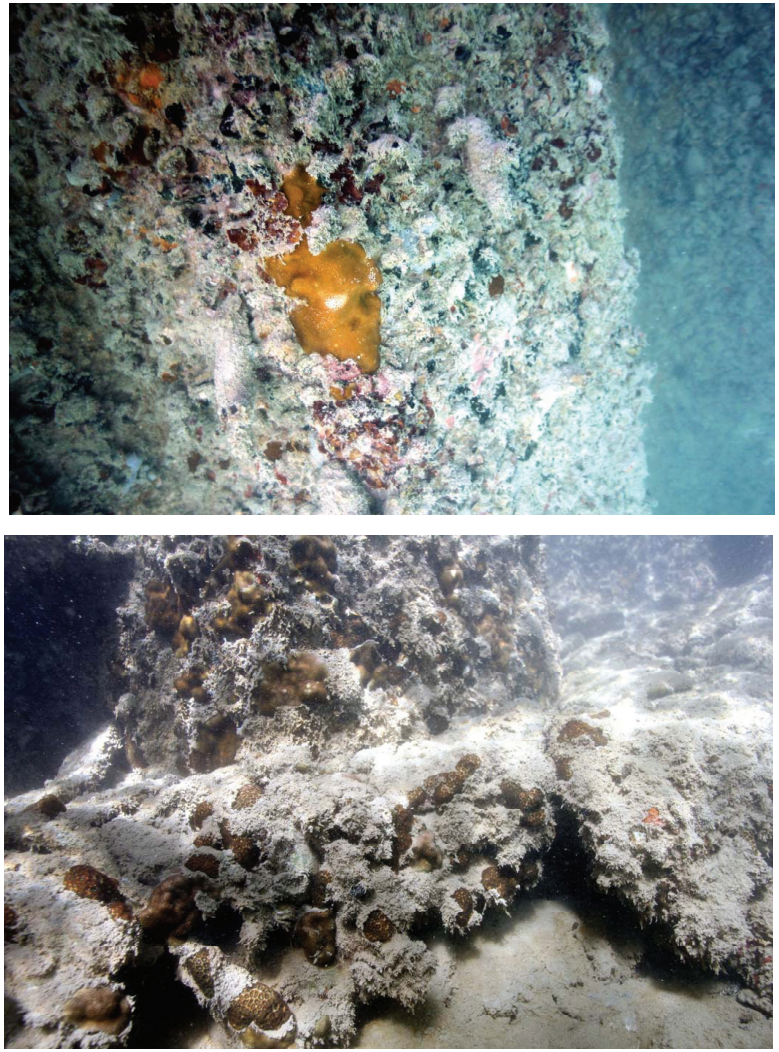


FIGURE 3. Two photos of sheet-piling wall of Pier 42 designated as Section H-2 in Figure 1 under moored commercial boats. Predominant corals in this section were small encrusting colonies of *Porites lobata* (top photo) *and Leptastrea purpurea* (bottom photo).

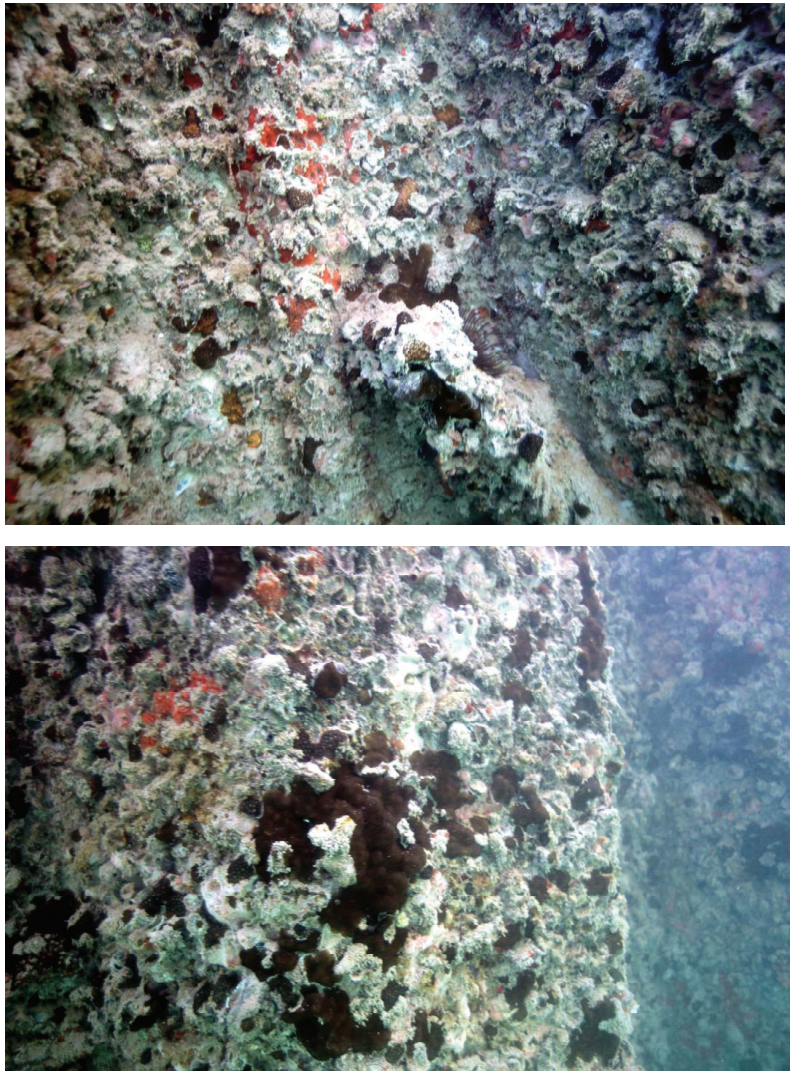


FIGURE 4. Two photos of sheet-piling wall of Pier 41 designated as Section H-3 in Figure 1 under moored commercial boats. Predominant corals in this section were small encrusting colonies of *Porites lobata* in both top and bottom photos.

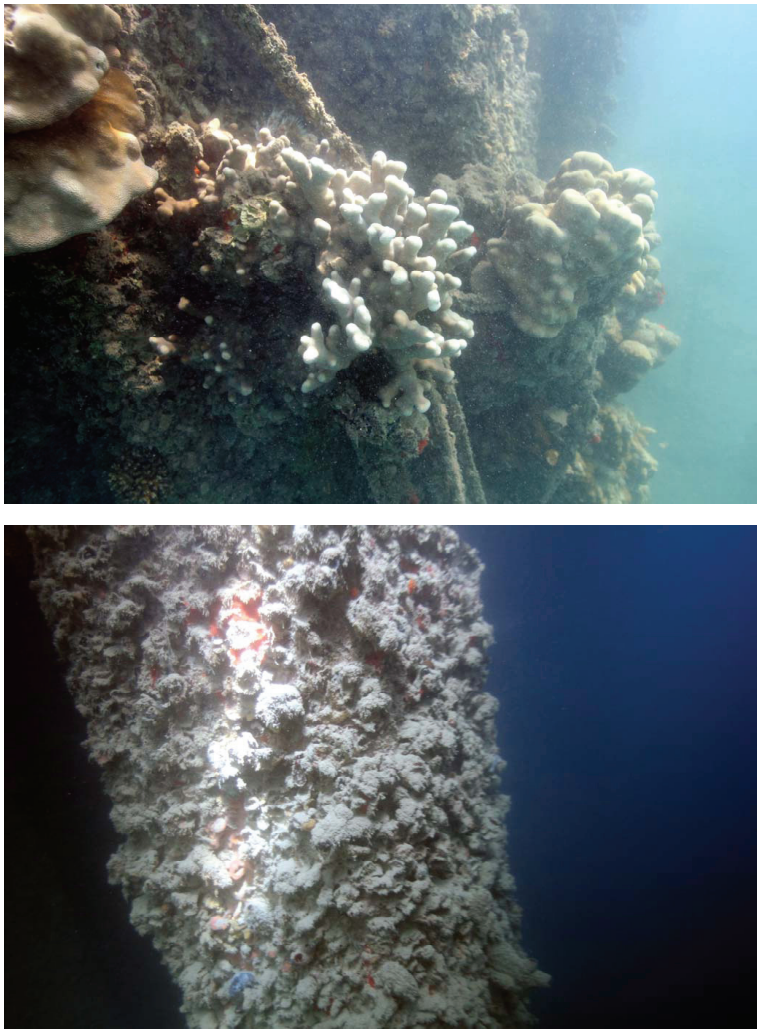


FIGURE 5. Top photo shows end of Pier 41 at juncture of sub-sections H-3 and H-4 in Figure 1 adjacent to PSI dry-dock Kapilipono. This was the only area of Section H with what can be considered large coral colonies of *Porites lobata* and *P. compressa*. Lower photo shows one of the pilings in sub-section H-4 under dry-dock that does not contain any coral colonization.

APPENDIX F

Flora and Fauna Survey

F-1
Flora and Fauna Survey

Flora and Fauna Survey for the Proposed Kapalama Container Terminal and Pacific Shipyards International Relocation Site

Hawaii Department of Transportation (HDOT)
Harbors Division
October 2012

Introduction

In support of the Kapalama Container Terminal Environmental Impact Statement (EIS) at Kapalama, O'ahu, SWCA Environmental Consultants[1] conducted a flora and fauna survey of the proposed Kapalama Container Terminal and the Pacific Shipyards International Relocation Site (see Appendix A).

This report summarizes the findings of the flora and fauna survey conducted by SWCA biologists Tiffany Thair and Ling Ong on June 19, 2012. An additional fauna survey at Pier 44/45 was conducted on the evening of June 20, 2012. The objectives of the flora and fauna survey were:

1. Identify and document the presence and distribution of plant species and vegetation communities within the project sites;
2. Identify and document the presence of bird, mammal, amphibian, reptile, and invertebrate macrofauna which occur at the project sites;
3. Identify any state or federally listed candidate, threatened, or endangered species, species of concern and/or rare (either locally or state-wide) species found or known to occur at the project site; and
4. Describe any known resource issues and conflicts unique to the project sites.

Project Description:
Hawai'i Department of Transportation (DOT)-Harbors is proposing to redevelop the former Kapalama Military Reservation (KMR) property at Honolulu Harbor into the new Kapalama Container Terminal to handle current and projected cargo volumes. If new capacity is not developed in the near future, major reductions in service time and increases in cost at the Sand Island terminals are expected. By 2020, the movement and handling of cargo will effectively be constrained with significant impacts on Hawai'i's economy. Expansion of container terminal capacity in Honolulu Harbor is a high priority to assure that continuing growth in cargo volumes entering the state is accommodated. As part of this expansion, Pacific Shipyard International is being relocated from its current premises to Piers 24-28.

Methods:
Pedestrian surveys of the two project sites were conducted on June 19, 2012. The biologists documented all vascular plant and animal species (birds, mammals, amphibians, and reptiles) observed within the project sites. Ornamental species planted in pots were not documented because it is assumed these plants will be taken to relocated sites. Areas more likely to support native plants (i.e., rocky outcrops, shady areas) were more intensively examined. For the avian surveys, approximately 10 minutes of observation time was spent at the end of each pier in order to document seabirds flying over the waters adjacent to the piers. An evening survey was conducted at Piers 44/45 (SNUG Harbor) from 7:30 – 8:30 pm. This evening survey was conducted because users of the pier (Port Operations Manager Ross Barnes and Hawaii Institute of Marine Biology employee Warren Cortez) reported unidentified seabirds roosting in the mangrove trees and concrete pilings at Piers 44/45.

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Results and Discussion:
The two project sites are heavily disturbed due to ongoing industrial activities. The 90 acre Proposed Kapalama Container Terminal site is mostly covered in asphalt and concrete with numerous buildings and warehouses. Similarly, nearly the entire relocated Pacific Shipyards International site is paved and cars, equipment, boats, and containers are spread throughout the area.

Flora (Proposed Kapalama Container Terminal):
No state or federally listed threatened, endangered, or candidate endangered plant species (USFWS 2012), or rare native Hawaiian plant species, were observed at the Proposed Kapalama Container Terminal during the survey. The Proposed Kapalama Container Terminal does not contain critical habitat for threatened or endangered plants, as designated by the U.S. Fish and Wildlife Service.

One hundred and five (105) plant species were recorded at the Kapalama site during the survey. Of these, five species are considered native to the Hawaiian Islands. The indigenous species include: moa (*Psilotum nudum*), kīpūkai (*Heliotropium curassavicum*), milo (*Thespesia populnea*), and ʻuhaloa (*Waltheria indica*). All of these species are common in disturbed coastal areas throughout the Hawaiian Islands (Wagner et al. 1999). The endemic ʻākia (*Wikstroemia uva-ursi*) that was observed was planted and is often used in landscaping (Staples and Herbst 2005). A list of all plant species observed by SWCA biologists within the proposed Kapalama Container Terminal is included as an Appendix (Appendix B) to this letter report.

Large areas of the site are paved and therefore devoid of vegetation. The minimal vegetation within the project site is comprised of ornamental plants maintained near buildings or weedy non-native grasses and herbaceous plants that are common in disturbed coastal areas. Naturally growing plants are mostly confined to cracks in the concrete and shady areas near equipment and buildings. Buffelgrass (*Cenchrus ciliaris*), swollen fingergrass (*Chloris barbata*), and Natal redtop (*Melinis repens*) are particularly abundant in these areas. Non-native herbaceous species found scattered sparsely throughout the site or in isolated patches include *Bidens alba* var. *radiata*, *Flaveria trinervia*, coat buttons (*Tridax procumbens*), *Heliotropium procumbens*, hairy spurge (*Euphorbia hirta*), prostrate spurge (*Euphorbia prostrata*), Florida beggarweed (*Desmodium tortuosum*), and creeping indigo (*Indigofera hendecaphylla*). The shoreline at Piers 44/45, contains a dense thicket of red mangrove (*Rhizophora mangle*) and scattered ironwood trees (*Casurina equisetifolia*) bordering the pier.

Fauna (Proposed Kapalama Container Terminal):
Twelve birds species were observed during the surveys (Table 1). Two of these are native (white tern (*Gygis alba*), and the cosmopolitan black-crowned night heron (*Nycticorax nycticorax*)) and one is a migratory bird (ruddy turnstone (*Arenaria interpres*)). All three species are protected by the Migratory Bird Treaty Act (MBTA), and the white tern is state-listed as threatened on the island of Oahu (see Appendix C for species description of listed birds). No **federally** listed threatened, endangered, or candidate bird, mammal, or insect species were observed during at the Proposed Kapalama Container Terminal or in the vicinity. The project site does not contain critical habitat and is not near critical habitat for any listed vertebrate or invertebrate species. The proposed project is not likely to impact nesting or feeding habitat of any native bird species.

Table 1. Bird Species Observed at the Proposed Kapalama Container Terminal and PSI Relocation Site.
E= endemic; I = indigenous, M=Migrant, NN = non-native permanent resident; *T*= State threatened; MBTA = Migratory Bird Treaty Act

Common Name	Scientific Name	Status[1]	MBTA	Proposed Kapalama Container Terminal	PSI Site
Great frigatebird	*Fregata minor*	I	X		X
Cattle egret	*Bubulcus ibis*	NN	X	X	X
Black-crowned night heron	*Nycticorax nycticorax*	I	X	X	X
Domestic chicken	*Gallus gallus*	NN			
Ruddy turnstone	*Arenaria interpres*	M	X	X	
White tern	*Gygis alba*	I, *T*	X	X	X
Rock pigeon	*Columbia livia*	NN			X
Spotted dove	*Streptopelia chinensis*	NN		X	X
Zebra dove	*Geopelia striata*	NN		X	X
Red-vented bulbul	*Pycnonotus cafer*	NN		X	
Red-whiskered bulbul	*Pycnonotus jocosus*	NN		X	
Common myna	*Acridotheres tristis*	NN		X	
Red-crested cardinal	*Paroaria coronata*	NN		X	
House finch	*Carpodacus mexicanus*	NN	X	X	X
House sparrow	*Passer domesticus*	NN		X	
	Total species			**12**	**8**

Two white terns were observed flying in the distance from Pier 44/45 approximately 800 m away. Approximately 30 ruddy turnstones were observed roosting on the concrete pilings of the disused pier at Pier 44/45 in the evening of June 20, 2012. A black-crowned night heron was also seen flying overhead that evening. These bird species are typical of coastal environments on the south shore of Oʻahu. The other nine introduced bird species that were seen during the survey are species commonly found within urban environments. Cattle egrets (*bubulcus ibis*) were often observed transiting overhead, while the other species were mostly associated with the trees at the project site. No seabirds were observed roosting at the site, and the identity of the birds observed by operators could not be verified.

Other native seabirds that could occasionally be present at the site include the wedge-tailed shearwater (*Puffinus pacificus*), and state and federally threatened Newell's shearwater (*Puffinus auricularis newelli*). See Appendix C for a description of listed bird species. Both species are also protected by the Migratory Bird Treaty Act. Wedge-tailed and Newell's shearwaters flying over the project site may become attracted by lights, become disoriented and grounded. These birds are then highly susceptible to predation by introduced

mammals, collision with vehicles or other structures, or die of exhaustion. Although no known breeding colonies of either of these species are present along the south shore of Oahu, downed birds of both species are occasionally reported from the area. Other migratory birds that could also be present at the Kapalama Container Terminal include the Pacific golden plover (*Pluvialis fulva*), wandering tattler (*Heteroscelus incanus*) and sanderling (*Calidris alba*). These birds may occasionally use the short stretch of natural shoreline along between Sand Island Access road and Pier 44/45.

The state and federally listed endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) was not observed during the evening survey at Piers 44/45. There is a possibility that Hawaiian hoary bats could roost in the trees on site, but given the level of disturbance within the area, the possibility of bats roosting or breeding in the trees appears to be small. Therefore, no impacts to this species are anticipated. Several cats (*Felis catus*) and mongooses (*Herpestes javanicus*) were observed within the proposed Kapalama Container Terminal site. An operator at the site mentioned to SWCA biologists that she feeds the cats every day. Although not observed during this survey, rats (*Rattus* spp.) and mice (*Mus musculus*) and also likely present at the site. Non-native geckos (Gekkonidae) were heard during the evening survey. The only insects seen during the survey were an unidentified wasp (order Hymenoptera and suborder Apocrita) and the Sonoran carpenter bee (*Xylocopa sonorina*).

Flora (Pacific Shipyards International Relocation Site):

No state or federally listed threatened, endangered, or candidate endangered plant species (USFWS 2012), or rare native Hawaiian plant species, were observed at the project site during the survey. The Pacific Shipyards International Relocation site does not contain critical habitat for threatened or endangered plants, as designated by the U.S. Fish and Wildlife Service.

Forty-six (46) plant species were recorded at the Pacific International Relocation site during the survey. Of these, only two species (moa and ʻuhaloa) are native to the Hawaiian Islands. These two indigenous species are common in disturbed coastal areas throughout the Hawaiian Islands (Wagner et al. 1999). A list of all plant species observed by SWCA biologists within the relocated Pacific International Relocation site is included as an Appendix (Appendix D) to this letter report.

The majority of the site is devoid of vegetation with about 5% of the site having vegetative cover. Buffelgrass, swollen fingergrass, and Natal redtop are among the grasses scattered throughout the area, particularly in concrete cracks and shadier areas. Pigweed (*Portulaca oleracea*) occurs widely within concrete cracks and love-in-a-mist (*Passiflora foetida*) is found climbing along fences. A small patch of vegetation occurs at the end of Pier 27 and is dominated by buffelgrass, koa haole (*Leucaena leucocephala*), and sourbush (*Pluchea carolinensis*). Several ornamental plants are present outside the Harbor Police building.

Fauna (Pacific Shipyards International Relocation Site):

Eight bird species were observed during the site visit (Table 1), of which three are native (great frigate bird, white tern, black-crowned night heron). All three native species are protected by the Migratory Bird Treaty Act (Table 1), and the white tern is state listed as threatened on the island of Oahu. No **federally** listed threatened, endangered, or candidate

endangered animal species (USFWS 2012), were observed at the Pacific Shipyards International Relocation Site during the survey. The Pacific Shipyards International Relocation Site does not contain critical habitat for threatened or endangered plants as designated by the U.S. Fish and Wildlife Service.

Two white tern flocks, consisting of two to five individuals each, were observed flying in the distance from Piers 25 and 27at a distance of approximately 400 - 800 m. A black-crowned night heron and great frigate bird were seen flying overhead during the survey. The great frigate bird was foraging approximately 100-200 m off the pier. These birds are typical of coastal environments along the south shore of Oahu. The six introduced bird species observed during this survey are commonly found within urban environments on Oahu.

Other native seabirds that could occasionally be present at the site include the wedge-tailed shearwater (*Puffinus pacificus*), and state and federally threatened Newell's shearwater (*Puffinus auricularis newelli*). See Appendix C for a description of listed bird species. Both species are also protected by the Migratory Bird Treaty Act. Wedge-tailed and Newell's shearwaters flying over the project site may become attracted by lights, become disoriented and grounded. These birds are then highly susceptible to predation by introduced mammals, collision with vehicles or other structures, or die of exhaustion. Although no known breeding colonies of either of these species are present along the south shore of Oahu, downed birds of both species are occasionally reported from the area.Due to the lack of natural (non-cemented) shoreline and vegetation at the Pacific Shipyards International Relocation Site, no migratory birds are expected to be present on-site.

Hawaiian hoary bats are not expected to roost on-site due to the lack of trees in the area.

The only mammal observed at the site was a mouse (*Mus musculus*). Although not observed during this survey rats (*Rattus* spp.) are likely present at the site. No insects, reptiles or amphibians were observed.

Discussion and Recommendations:
The proposed modifications at the Proposed Kapalama Container Terminal and Pacific Shipyards International Relocation Site are not expected to have a significant adverse impact on any state or federally listed candidate, threatened, or endangered species, species of concern, and/or rare plants. The entire site has been intensively disturbed and highly altered by human activity since the late 18th Century (Wil-Chee Planning Inc 1999). The flora within the project site is predominantly non-native (95% non-native at Kapalama and 96% non-native at Pacific Shipyards International Relocation). The native plants found at the sites are commonly found on Oahu, as well as the other main Hawaiian Islands.

The native birds that were observed during the survey or that could potentially be using the site or flying overhead are seabirds and shorebirds. The great frigate bird and the state-threatened white tern were observed foraging at some distance from the affected piers. If measures are emplaced to maintain water quality during the construction of the project, there should be no effect on the distribution of their prey or the foraging abilities of these species.

Other seabirds such as the wedge-tailed shearwater or the state and federally threatened Newell's shearwater may occasionally fly overhead. These birds are susceptible to fallout due to light attraction, particularly during the fledgling season (October and November for

both species). One Newell's shearwater was turned in to Sea Life Park from Honolulu Harbor in 2007 (Sea Life Park Unpublished data) and a wedge-tailed shearwater was found at Pier 7 as recently as in 2011 (SWCA, Ong, personal observations). If the modifications proposed for either site result in a significant increase in lighting, additional impacts to these species in terms of increased fallout probability could occur. Shielding lights to prevent upward radiation has been shown to reduce seabird attraction (Reed et al. 1985, Telfer et al. 1987) and could be used to prevent additional impacts to Newell's and wedge-tailed shearwaters from occurring.

Other birds such as the black-crowned night heron may also fly overhead but do not appear to use either project site and are not susceptible to light attraction, therefore this species is not expected to be impacted by the modifications. Shorebirds such as the ruddy turnstone will be displaced when the shoreline between Sand Island Access Road and Piers 44/45 is modified. It is unlikely that suitable roosting habitat for the ruddy turnstone will remain after the modifications, but the displaced individuals are anticipated to be able to find alternate roost sites in the vicinity, particularly around Keehi Lagoon which is less than 0.5 mi (0.8 km) from the project sites.

SWCA recommends that native Hawaiian plants be used for landscaping at the project sites to the maximum extent practicable. Potential coastal native plants that may be appropriate for landscaping include: naupaka (*Scaevola taccada*), ʻākulikuli (*Sesuvium portulacastrum*), ʻilima (*Sida fallax*), and pōhinahina (*Vitex rotundifolia*). If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive may be substituted. Additional information on selecting appropriate plants for landscaping can be obtained from the following sites:

- http://www.botany.hawaii.edu/faculty/daehler/wra/default2.htm
- http://nativeplants.hawaii.edu/
- http://www.hear.org/alternativestoinvasives/

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Appendices

Appendix A – Location of project sites

Appendix B - List of plant species observed within the Proposed Kapalama Container Terminal

Appendix C – Species descriptions of state or federally threatened or endangered species

Appendix D - List of plant species observed within the Pacific Shipyards International Relocation Site

Appendix A

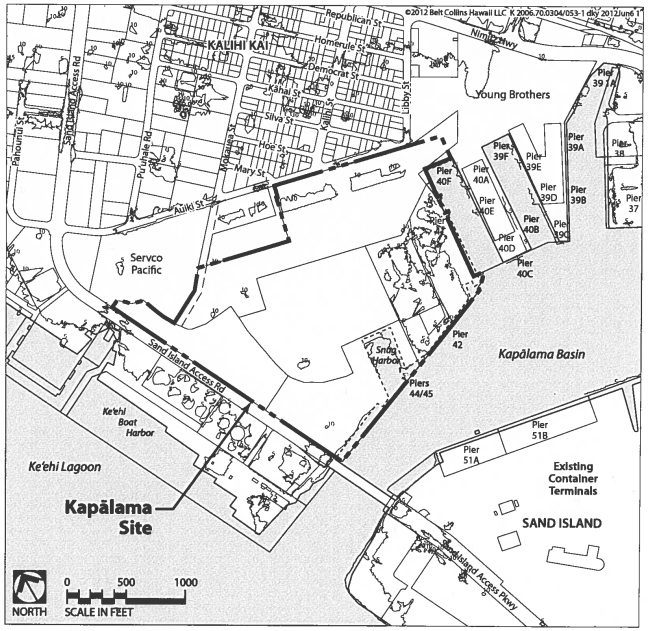

Figure 1-X
Kapalama Site Topography

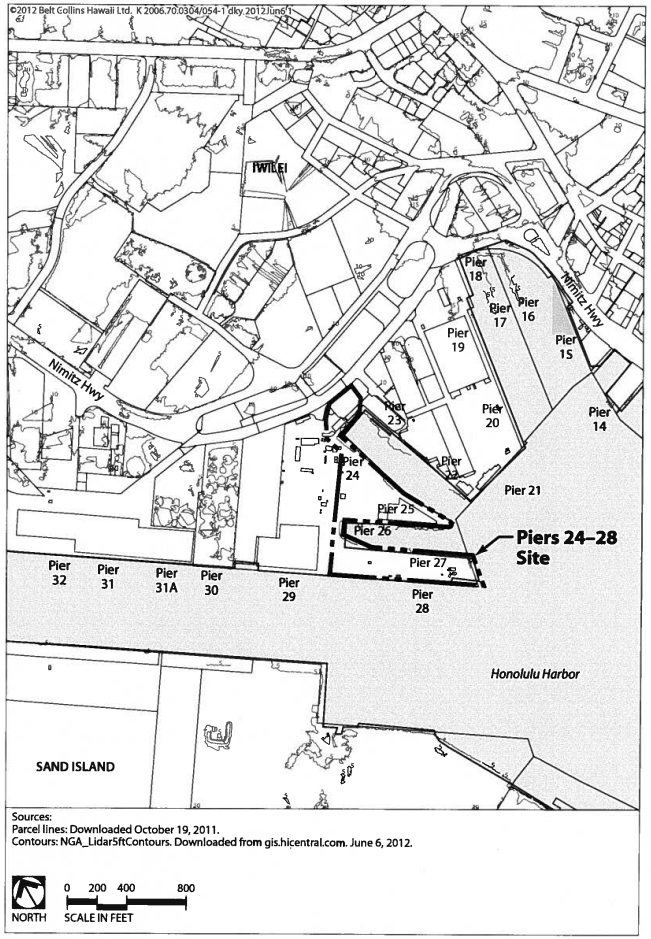

Figure X-X
Relocation Site Topography

APPENDIX B
CHECKLIST OF PLANTS OBSERVED AT KAPALAMA SITE LOCATED WEST OF SAND ISLAND ACCESS ROAD ON JUNE 19, 2012.

The following checklist is an inventory of all the plant species observed by SWCA biologists on June 19, 2012 during the survey of the Kapalama site located west of Sand Island Access Road, as designated by Belt Collins, on the Island of O'ahu, Hawai'i. The plant names are arranged alphabetically by family and then by species into four groups: Gymnosperms, Ferns & Lycophytes, Monocots and Dicots. The taxonomy and nomenclature of the ferns and lycophytes is in accordance with Palmer (2003) and Evenhuis and Eldredge (2011). The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012).

Status:
E = endemic = native only to the Hawaiian Islands.
I = indigenous= native to the Hawaiian Islands and elsewhere.
P = Polynesian = introduced by Polynesians.
X =introduced/ alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's arrival in the islands in 1778).

Relative Site Abundance:
A = Abundant = forming a major part of the vegetation within the survey area.
C = Common = widely scattered throughout the area or locally abundant within a portion of it.
U = Uncommon = scattered sparsely throughout the area or occurring in a few small patches.
R = Rare = only a few isolated individuals within the survey area.

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
GYMNOSPERMS			
Araucaria columnaris (G. Forster) J. D. Hooker	Cook pine	X	R
FERNS AND LYCOPHYTES			
Lomariopsidaceae			
Nephrolepis brownii (Desv.) Hovenkamp & Miyam.		X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Polypodiaceae			
Phymatosorus grossus (Langsd. & Fisch.) Brownlie	laua'e	X	U
Psilotaceae			
Psilotum nudum (L.) P. Beauv.	moa, moa nahele	I	R
Pteridaceae			
Pteris vittata L.	ladder brake, cliff brake	X	R
Pityrogramma calomelanos (L.) Link	silver fern	X	R
Thelypteridaceae			
Cyclosorus parasiticus (L.) Farw.	--	X	R
MONOCOT			
Agavaceae			
Dracaena angustifolia Roxburgh	--	X	U
Dracaena sp.		X	R
Araceae			
Monstera deliciosa	monstera, swiss cheese plant	X	R
Epipremnum pinnatum (L.) Engl.	taro vine, pothos, golden pathos	X	R
Pritchardia sp.	loulu	X	R
Syngonium podophyllum Schott	nephthytis	X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Arecaceae			
Cocos nucifera L.	niu, ololani, coconut	P	R
Dypsis lutescens (H. Wendland) Beentje & J. Dransfield	areca palm, butterfly palm	X	U
Veitchia merrillii (Beccari) H. E. Moore	Christmas palm, Manila palm	X	R
Asparagaceae			
Cordyline fruticosa (L.) A. Chev.	ti, kī	X	R
Sansevieria trifasciata Prain	mother-in-law's tongue, bowstring-hemp	X	R
Poaceae			
Bothriochloa pertusa (L.) A. Camus	pitted beardgrass	X	U
Cenchrus ciliaris L.	buffelgrass	X	A
Chloris barbata Sw.	swollen fingergrass	X	A
Chloris radiata (L.) Sw.	radiate fingergrass	X	R
Cynodon dactylon (L.) Pers.	Bermuda grass	X	U
Eragrostis amabilis (L.) Wight & Arn.	--	X	U
Melinis repens (Willd.) Zizka	Natal redtop, Natal grass	X	A
Sporobolus indicus (L.) R.Br.	West Indian dropseed, smutgrass	X	U
Urochloa maxima (Jacq.) R.D. Webster	Guinea grass	X	R
Strelitziaceae			
Ravenala madagascariensis Sonnerat	traveler's palm	X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
DICOT			
Acanthaceae			
Asystasia gangetica (L.) T. Anderson	Chinese violet	X	R
Pseuderanthernurn carruthersii (Seemann) Guillaumin	--	X	R
Aizoaceae			
Sesuvium verrucosum Raf.	verrucose seapurslane, western sea purslane	X	U
Trianthema portulacastrum L.		X	R
Amaranthaceae			
Alternanthera pungens Kunth	khaki weed	X	U
Amaranthus spinosus L.	spiny amaranth	X	R
Amaranthus viridis L.	slender amaranth, pakai	X	R
Anacardiaceae			
Schinus terebinthifolius Raddi	Christmas berry, wilelaiki	X	U
Apocynaceae			
Adenium obesum (Forsskal) J. Roemer & J. A. Schultes	desert-rose	X	R
Carissa macrocarpa (Ecklon) A. de Candolle	Natal plum	X	R
Plumeria rubra L.	plumeria	X	R
Plumeria sp.	plumeria	X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Asteraceae			
Bidens alba var. *radiata* (Sch.Bip.) Ballard ex Melchert	--	X	C
Bidens pilosa L.	kī, kī nehe	X	U
Calyptocarpus vialis Less.	--	X	R
Emilia fosbergii Nicolson	pualele	X	R
Flaveria trinervia (Spreng.) C. Mohr	--	X	C
Conyza bonariensis (L.) Cronq.	hairy horseweed	X	U
Lactuca sativa L.	prickly lettuce	X	R
Pluchea carolinensis (Jacq.) G. Don	sourbush	X	U
Pluchea indica (L.) Less.	Indian fleabane, Indian pluchea	X	R
Sonchus oleraceus L.	sow thistle, pualele	X	R
Tridax procumbens L.	coat buttons	X	C
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	X	U
Bataceae			
Batis maritima L.	pickleweed	X	U
Bignoniaceae			
Spathodea campanulata P. Beauv.	African tulip tree, fountain tree	X	R
Tabebuia heterophylla (A. P. de Candolle) Britton	pink tacoma	X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Boraginaceae			
Heliotropium curassavicum L.	kīpūkai, nena, seaside heliotrope	I	U
Heliotropium procumbens Mill. var. *depressum* (Cham.) Fosberg	--	X	C
Tournefortia argentea L.f.	tree heliotrope	X	R
Brassicaceae			
Lepidium virginicum L.	--	X	R
Caricaceae			
Carica papaya L.	papaya	X	R
Casuarinaceae			
Casuarina equisetifolia L.	common ironwood	X	R
Clusiaceae			
Clusia rosea Jacq.	autograph tree	X	R
Convolvulaceae			
Ipomoea obscura (L.) Ker Gawl.	morning glory	X	U
Cucurbitaceae			
Momordica charantia L.	balsam pear, bitter melon	X	R
Euphorbiaceae			
Breynia disticha J. R. & G. Forster	foliage flower, snowbush	X	R
Codiaeum variegatum (L.) Blume	croton	X	U

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Euphorbia hirta L.	hairy or garden spurge	X	C
Euphorbia leucocephala Lotsy	flor-de-nino	X	R
Euphorbia prostrata Aiton	prostrate spurge	X	C
Fabaceae			
Crotalaria incana L.	fuzzy rattlepod	X	R
Mimosa pudica L. subsp. *unijuga* (Duchass. & Walp.) Griseb.	sensitive plant, sleeping grass	X	R
Desmanthus pernambucanus (L.) Thell.	slender or virgate mimosa	X	U
Desmodium tortuosum (Sw.) DC.	Florida beggarweed	X	C
Erythrina variegata L.	Indian coral tree	X	R
Indigofera hendecaphylla Jacq.	creeping indigo	X	C
Leucaena leucocephala (Lam.) de Wit	koa haole	X	U
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe, algaroba, mesquite	X	R
Samanea saman (Jacq.) Merr.	monkeypod, rain tree	X	R
Lamiaceae			
Hyptis pectinata (L.) Poit.	comb hyptis	X	U
Leonotis nepetifolia (L.) R. Br.	lion's ear	X	R
Lauraceae			
Persea americana Mill.	avocado, alligator pear	X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Malvaceae			
Abutilon grandifolium (Willd.) Sweet	hairy abutilon, ma'o	X	R
Hibiscus rosa-sinensis L.	Chinese hibiscus	X	R
Malvastrum coromandelianum subsp. *coromandelianum* (L.) Garcke	false mallow	X	R
Sida acuta N.L. Burm.	--	X	R
Sida ciliaris L.	--	X	U
Sida rhombifolia L.	--	X	R
Thespesia populnea (L.) Sol. Ex Corrêa	milo	I	R
Waltheria indica L.	'uhaloa	I	U
Moraceae			
Ficus benjamina L.	weeping fig	X	R
Ficus microcarpa L.f.	Chinese banyan	X	R
Nyctaginaceae			
Boerhavia coccinea Mill.	--	X	U
Bougainvillea sp.		X	U
Oxalidaceae			
Oxalis corniculata L.	yellow wood sorrel, 'ihi 'ai	P?	R
Portulacaceae			
Portulaca oleracea L.	pigweed, 'ākulikuli kula	X	U

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Rhizophoraceae			
Rhizophora mangle L.	red mangrove	X	C
Rubiaceae			
Oldenlandia corymbosa L.	--	X	R
Spermacoce assurgens Ruiz & Pav.	buttonweed	X	R
Rutaceae			
Murraya paniculata (L.) W. Jack	Chinese-box, mock orange	X	R
Solanaceae			
Nicotiana glauca R.C. Graham	tree tobacco	X	R
Solanum lycopersicum var. *cerasiforme* (Dunal) D.M. Spooner, G.J. Anderson & R.K. Jansen	tomato	X	R
Thymelaeaceae			
Wikstroemia uva-ursi A. Gray	ʻākia	E	R
Urticaceae			
Pilea microphylla (L.) Liebm.	artillery plant, rockweed	X	U
Verbenaceae			
Duranta erecta L.	duranta, golden dewdrop	X	R
Vitex trifolia L.	blue vitex	X	R
Zygophyllaceae			
Tribulus terrestris L.	puncture vine	X	R

Appendix C Species Descriptions of State or Federally Threatened or Endangered Species

White Tern or Manu-o-Ku (*Gygis alba*)

Status: Not federally listed but the Oʻahu population was listed as threatened by the State of Hawaiʻi in 1986 (Hawaii Administrative Rules, Title 13, Part 2, Chapter 124). The species is also federally protected by the Migratory Bird Treaty Act (MBTA) and it is also the official bird of the City and County of Honolulu.

Species description: The white tern is entirely white with a black ring around the eye, black bill with a blue base, and dark gray legs and feet. This species is common in the Northwestern Hawaiian Islands (NWHI) with an estimated 15,000 breeding pairs. Of the main Hawaiian island, the white tern is only found on the island of Oʻahu and was first breeding pair was documented in 1961 at Koko Head (Ord 1961). The species has since spread along the south-east coast of Oahu (Morgan 2007) and has increased to an estimated 250 breeding pairs in 2002. Nesting occurs year round with a most eggs laid between January and April. On Oahu, these birds nest in many species of large trees and banyans *(Ficus* spp.), monkeypod *(Samanea saman,*), mahogany *(Swietenia mahogany*), and kukui *(Aleurites moluccana*) are the most often used (Vanderwerf 2003). The Oahu population is considered to be increasing and robust (Vanderwerf 2003).

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Newell's Shearwater or ʻAʻo(*Puffinus auricularis newelli*)

Status: Federally and state listed as Threatened. The species is also federally protected by the Migratory Bird Treaty Act (MBTA).

Species description: The Newell's shearwater is an endemic Hawaiian sub-species of the nominate species, Townsend's shearwater (*Puffinus a. auricularis*) of the eastern Pacific. Based on data collected in the 1990's the population of Newell's shearwater was estimated to be approximately 84,000 breeding and non breeding birds, with a possible range of 57,000 to 115,000 birds (Ainley et al. 1997). Radar studies on Kauaʻi showed a 63% decrease in detections of shearwaters between 1993 and 2001 (Day et al. 2003). More recently, Holmes (Planning Solutions Inc. 2010) suggest a 75% population decrease between 1993 and 2008, based on radar surveys and Save Our Shearwater (SOS) data. This puts the 2008 total population estimate on the order of 21,000 birds. Recent radar studies suggest the species may also nest on Oʻahu in small numbers (Day and Cooper 2008). The Newell's shearwater breeding season begins in April, when birds return to prospect for nest sites. A pre-laying exodus follows in late April and possibly May; egg laying begins in the first two weeks of June and likely continues through the early part of July. Pairs produce one egg, and the average incubation period is thought to be approximately 51 days (Telfer 1986). The fledging period is approximately 90 days, and most fledging takes place in October and November, with a few birds still fledging into December (NESH Working Group 2005).

Declines in Newell's shearwater populations are attributed to loss of nesting habitat, predation by introduced mammals (mongoose, feral cats, rats and feral pigs) at nesting sites, collision with powerlines and other anthropogenic structures, and fallout of juvenile birds associated with disorientation from urban lighting (Ainley et al. 1997; Mitchell et al. 2005; Hays and Conant 2007).

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Hawaiian Hoary Bat or ʻŌpeʻapeʻa (*Lasiurus cinereus semotus*)

Status: The Hawaiian hoary bat is state and federally listed as Endangered.

Species description: The Hawaiian hoary bat is the only land mammal native to the Hawaiian Islands. The species has been recorded on Kauaʻi, Oʻahu, Molokaʻi, Maui, and Hawaiʻi, but no historical population estimates or information exist for this subspecies. Population estimates for all islands in the state in the recent past have ranged from hundreds to a few thousand bats (Menard 2001).

Hawaiian hoary bats roost in native and non-native vegetation from 3 to 29 ft. (1-9 m) above ground level. They have been observed roosting in ʻōhiʻa (*Metrosideros polymorpha*), hala (*Pandanus tectorius*), coconut palms (*Cocos nucifera*), kukui (*Aleurites moluccana*), kiawe (*Prosopis pallida*), avocado (*Persea*

americana), mango (*Mangifera indica*), shower trees (*Cassia javanica*), pūkiawe *(Leptecophylla tameiameiae*), and fern clumps. They are also suspected to roost in eucalyptus (*Eucalyptus* spp.) and Sugi pine (*Cyrptomeria japonica*) stands. Hawaiian hoary bats have been known to use both native and non-native habitats for feeding and roosting (Mitchell et al. 2005). Water courses and edges (e.g., coastlines and forest/pasture boundaries) appear to be important foraging areas (Grindal et al. 1999, Francl et al. 2004, Brooks and Ford 2005, Morris 2008, Menzel et al. 2002).

It is suspected that breeding primarily occurs between April and August. Lactating females have been documented from June to August, indicating that this is the period when non-volent young are most likely to be present. Breeding has only been documented on the Islands of Hawai'i and Kaua'i (Baldwin 1950; Kepler and Scott 1990; Menard 2001). It is not known whether bats observed on other islands breed locally or only visit these islands during non-breeding periods.

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APPENDIX D
CHECKLIST OF PLANTS OBSERVED AT RELOCATED PACIFIC SHIPYARDS INTERNATIONAL (PSI) SITE ON JUNE 19, 2012.

The following checklist is an inventory of all the plant species observed by SWCA biologists on June 19, 2012 during the survey of the relocated Pacific Shipyards International site located near Piers 24-26, as designated by Belt Collins, on the Island of O'ahu, Hawai'i. The plant names are arranged alphabetically by family and then by species into three groups: Ferns & Lycophytes, Monocots and Dicots. The taxonomy and nomenclature of the ferns and lycophytes is in accordance with Palmer (2003) and Evenhuis and Eldredge (2011). The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012).

Status:
E = endemic = native only to the Hawaiian Islands.
I = indigenous= native to the Hawaiian Islands and elsewhere.
P = Polynesian = introduced by Polynesians.
X =introduced/ alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's arrival in the islands in 1778).

Relative Site Abundance:
A = Abundant = forming a major part of the vegetation within the survey area.
C = Common = widely scattered throughout the area or locally abundant within a portion of it.
U = Uncommon = scattered sparsely throughout the area or occurring in a few small patches.
R = Rare = only a few isolated individuals within the survey area.

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
FERNS AND LYCOPHYTES			
Psilotaceae			
Psilotum nudum (L.) P. Beauv.	moa, moa nahele	I	R
Pteridaceae			
Adiantum raddianum C. Presl	--	X	R

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Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
MONOCOT			
Aloeaceae			
Aloe vera (L.) Burm. f.	aloe	X	R
Asparagaceae			
Cordyline fruticosa (L.) A. Chev.	ti, kī	X	R
Cyperaceae			
Cyperus rotundus L.	nut grass, kili'o'opu	X	R
Poaceae			
Bothriochloa pertusa (L.) A. Camus	pitted beardgrass	X	U
Cenchrus ciliaris L.	buffelgrass	X	C
Chloris barbata Sw.	swollen fingergrass	X	C
Eragrostis amabilis (L.) Wight & Arn.	--	X	U
Melinis repens (Willd.) Zizka	Natal redtop, Natal grass	X	C
Urochloa maxima (Jacq.) R.D. Webster	Guinea grass	X	R
DICOT			
Aizoaceae			
Trianthema portulacastrum L.	--	X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Amaranthaceae			
Amaranthus viridis L.	slender amaranth, pakai	X	R
Asteraceae			
Bidens alba var. *radiata* (Sch.Bip.) Ballard ex Melchert	--	X	R
Bidens pilosa L.	kī, kī nehe	X	R
Calyptocarpus vialis Less.	--	X	R
Conyza bonariensis (L.) Cronq.	hairy horseweed	X	R
Emilia fosbergii Nicolson	pualele	X	R
Hypochoeris radicata L.	smooth cat's-ear	X	R
Pluchea carolinensis (Jacq.) G. Don	sourbush	X	R
Tridax procumbens L.	coat buttons	X	U
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	X	R
Boraginaceae			
Heliotropium procumbens Mill. var. *depressum* (Cham.) Fosberg	--	X	R
Brassicaceae			
Lepidium virginicum L.	--	X	R
Convolvulaceae			
Ipomoea obscura (L.) Ker Gawl.	morning glory	X	R

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Euphorbiaceae			
Codiaeum variegatum (L.) Blume	croton	X	R
Euphorbia hirta L.	hairy or garden spurge	X	U
Euphorbia hypericifolia (L.)	graceful spurge	X	R
Euphorbia prostrata Aiton	prostrate spurge	X	U
Fabaceae			
Desmanthus pernambucanus (L.) Thell.	slender or virgate mimosa	X	R
Indigofera hendecaphylla Jacq.	creeping indigo	X	R
Leucaena leucocephala (Lam.) de Wit	koa haole	X	U
Lamiaceae			
Hyptis pectinata (L.) Poit.	comb hyptis	X	R
Malvaceae			
Sida ciliaris L.	--	X	U
Waltheria indica L.	ʻuhaloa	I	U
Moraceae			
Ficus microcarpa L.f.	Chinese banyan	X	R
Ficus sp.	banyan, fig	X	R
Nyctaginaceae			
Boerhavia coccinea Mill.	--	X	U

Scientific Name	Common & Hawaiian Name(s)	Status	Abundance
Oxalidaceae			
Oxalis corniculata L.	yellow wood sorrel, ʻihi ʻai, ʻihi ʻawa	P?	R
Passifloraceae			
Passiflora foetida L.	love-in-a-mist	X	C
Phyllanthaceae			
Phyllanthus debilis Klein ex Willd.	niruri	X	R
Portulacaceae			
Portulaca oleracea L.	pigweed, ʻākulikuli kula	X	C
Nicotiana glauca R.C. Graham	tree tobacco	X	R
Rubiaceae			
Oldenlandia corymbosa L.	--	X	U
Spermacoce assurgens Ruiz & Pav.	buttonweed	X	R
Urticaceae			
Pilea microphylla (L.) Liebm.	artillery plant, rockweed	X	R

APPENDIX G

Invasive Species Report

Recommendations for Terrestrial And Marine Invasive Species Control During Construction Of The Proposed Kapalama Container Terminal And Pacific Shipyards International Relocation Site

Hawaii Department of Transportation (HDOT)

Harbors Division

October 2012

Introduction

Hawai‘i Department of Transportation (HDOT)-Harbors is proposing to redevelop the former Kapalama Military Reservation (KMR) property at Honolulu Harbor into the new Kapalama Container Terminal to handle current and projected cargo volumes. In support of the Kapalama Container Terminal Environmental Impact Statement (EIS), SWCA Environmental Consultants (SWCA)[1] was tasked to provide recommendations on how to minimize the unintentional introduction or spread of terrestrial and marine invasive species during construction of the proposed project.

The U.S. Presidential Executive Order 13112 signed by President Clinton on February 3, 1999, calls for Federal agencies not to “authorize, fund or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States…”, an invasive species is defined as “an alien species (a species that is not native to the region or area) whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Alien species may consist of weeds (plants), pests (vertebrates and invertebrates) or pathogens. This Executive Order was signed to prevent the introduction of invasive species and provide for their control. Hawai‘i Revised Statutes (HRS), Chapter 152 (Noxious Weed Control) prohibits the introduction or transport of “specific noxious weeds or their seeds or vegetative reproductive parts into any area designated pursuant to section 152-5 as free or reasonably free of those noxious weeds” (§152-3). The objectives of Hawai‘i Administrative Rules (HAR), Title 4, Chapter 68 are to implement the requirements of HRS Chapter 152, and to establish criteria for designation, control, or eradication of noxious weeds (§4-68-1). HAR Title 4, Chapter 68 contains a list of plant species designated as noxious weeds by the Department of Agriculture for eradication or control purposes.

Most introduced marine species arrive in Hawaii through hull fouling, or solid ballast or ballast water. Several species such the algae *Kappaphycus spp.* and the black snapper (*Lutjantus fulvus*) were deliberately introduced for food or economic reasons. DLNR is legislatively authorized to manage the aquatic resources of the State (HRS. § 187A- 2(1)) and is designated as the lead State agency for preventing the introduction of alien aquatic organisms and carrying out the destruction of them through the regulation of ballast water discharges and hull fouling organisms (HRS § 187A-32 (a)). As for the deliberate introduction of new species into Hawaii waters, no species of aquatic life or wildlife may be deliberately introduced by the department into the State of Hawai‘i, whether it be from outside the State into the State or from one area within the State to another area in the State, unless the introduction is recommended by the DLNR and authorized by its rules (HRS §197-3). In addition, no person shall release any live non-native fish or other live non-native aquatic life being held in an aquarium or other confinement for scientific study, exhibition, display, sale, or for any other purpose, into any waters of the State, except as provided in Section 187A-2(4) HRS (HRS. § 187A-6.5).

[1] SWCA Consultants , Honolulu Office, Bishop Square ASB Tower, 1001 Bishop Street, Suite 2800, Honolulu, Hawaii 96813

Measures to Minimize the Spread of Terrestrial Invasive Species

Weedy non-native grasses and herbaceous plants are common throughout the project area (SWCA 2012). Because these weedy non-native grasses and herbaceous plants are also widespread on Oahu, their control is not expected to result in a significant decrease in their number or distribution. Therefore, the primary goal is to minimize the potential for introducing new invasive species to the project area. Particularly attention should be paid to prevent the introduction of invasive species that are not currently documented on Oahu. SWCA recommends the following invasive species minimization measures.

Decontamination of off-island/out-of-country construction equipment, vehicles, and materials
To avoid the unintentional introduction or transport of new terrestrial invasive species to Oahu all construction equipment and vehicles arriving from outside of the Island of Oahu should be washed and inspected prior to entering the project area. In addition, construction materials arriving from outside of Oahu should also be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species (plants, amphibians, reptiles and insects). When possible, raw materials (gravel, rock, soil) should be purchased from a local supplier on Oahu to avoid introducing non-native species not present on the island. Inspection and cleaning activities should be conducted at a designated location. HDOT-Harbors should document all inspection and cleaning activities using inspection forms.

The inspector needs to be a qualified botanist/entomologist that is able to identify invasive species that are of concern relevant to the point of origin of the equipment, vehicle or material (e.g. brown treesnakes (*Boiga irregularis*) are of concern if materials are originating from Guam). Invasive species that should be checked for during inspections for the Island of Oahu can be found at:

- Hawaii State-listed Noxious Weeds
  http://plants.usda.gov/java/noxious?rptType=State&statefips=15
- Department of Agriculture (DOA) Plant Pest Control
  http://hawaii.gov/hdoa/pi/ppc
- Coordinating Group on Alien Pest Species (CGAPS)
  http://www.hawaiiinvasivespecies.org/cgaps/terrestrial.html
- Oahu Invasive Species Committee
  http://www.hawaiiinvasivespecies.org/iscs/oisc/

SWCA also recommends training all construction personnel on the identification and reporting of Oahu Invasive Species Committee Priority Target Species (http://www.hawaiiinvasivespecies.org/iscs/oisc/).

Revegetation/Landscaping
If HDOT intends to revegetate or landscape portions of the project area by hydroseeding and/or outplanting, SWCA recommends that off-site sources of revegetation materials (seed mixes, mulches, etc.) are certified weed-free or inspected prior to revegetation. All areas that are hydroseeded should be monitored for six months after hydroseeding by a qualified botanist to enable early detection/rapid response of any new problematic and/or invasive species inadvertently introduced as part of the seed mixes. Problematic and/or invasive species include Oahu Invasive Species Committee's (OISC) priority target species, species listed as noxious by HAR, Title 4, Chapter 68, and other species considered to be potentially problematic by the qualified project botanist. If a problematic and/or invasive species is detected during this monitoring, appropriate remedial actions should be undertaken as needed to facilitate containment or eradication of the target species.

SWCA recommends that native Hawaiian plants be employed for landscaping to the maximum extent practicable. Potential coastal native plants that may be appropriate for landscaping include: naupaka (*Scaevola taccada*), ilima (*Sida fallax*), akulikuli (*Sesuvium portulacastrum*), and pohinahina (*Vitex rotundifolia*). If native plants do not meet landscaping objectives, plants with a low risk of becoming invasive may be substituted. Additional information on selecting appropriate plants for landscaping can be obtained from the following sites:

- http://nativeplants.hawaii.edu/
- http://www.botany.hawaii.edu/faculty/daehler/wra/default2.htm
- http://www.hear.org/alternativestoinvasives/

Measures to Minimize the Spread of Marine Invasive Species

A survey of marine species within the project area was conducted by Marine Research Consultants in June and July 2012 (MRC Inc. 2012). All algae, coral, fish and other macroinvertebrate species encountered were identified. The introduced species identified in the report are the primary focus of the discussion below.

Algae
No introduced or invasive marine algae were found during the marine surveys of the project site (MRC 2012). *Kappaphycus spp.,* an invasive algal species was recorded in Honolulu Harbor in 2002 (Smith et al. 2002) but WAS not seen during the marine survey conducted for this project. This species spreads mainly by fragmentation and regeneration and research has documented the species overgrowing and killing coral (Global Invasive Species Database 2005).

Fish
Only one species of introduced fish was observed during the survey – the black snapper (*Lutjantus fulvus*). This species is established in the coastal waters of Hawaii but not abundant. The black snapper is classified under Management Class 4 (Species that are: Established; Impacts Unclear) under the State of Hawaii Aquatic Invasive Species (AIS) Management Plan (DAR 2003). The proposed construction activities are not expected to increase the populations of the black snapper or increase its range of occurrence.

Invertebrates
The introduced invertebrate species found during the marine survey by MRC Inc. (2012) are listed below (Table 1) along with their current distribution in Hawaii and potential ecosystem impacts. All the introduced species were considered abundant or common in the survey areas. Aside from the sponges, almost all the recorded introduced species are already widespread in the main Hawaiian Islands. Introduced sponges are mainly confined to several harbors on the islands and in embayments such as Kaneohe Bay (Eldredge and Smith 2001). While not recorded during

the marine surveys for this project, the invasive barnacle *Chthamalus proteus* was recorded in SNUG harbor (which is part of the project site) in 2006 (USGS 2006, see also Eldredge and Smith 2001). *C. proteus* is considered invasive and has been reported on all the main Hawaiian Islands, mostly in harbors and along the south shore of O'ahu (Global Invasive Species Database 2007). *C. proteus* potentially threatens to alter natural substrates through dense colonization, which could lead to habitat conversion, a change in settlement patterns of native species and could exclude benthic algal grazers such as opihi (limpets). *C. proteus* is also classified as Management Class 3 (for species classified as: Established, Potential for Impacts, No Known Effective or Practical Control Techniques) in the State of Hawaii Aquatic Invasive Species (AIS) Management Plan (DAR 2003). Four other invertebrate species documented during the marine surveys, two sponges (*Mycale armata, Haliclona caerulea*) and two bryozoans (*Amathia distans, Schizoporella errata*) are classified under Management Class 4 (Species that are: Established; Impacts Unclear) under the State of Hawaii Aquatic Invasive Species (AIS) Management Plan (DAR 2003).

Table 1. List of Introduced Invertebrate Species Found During the MRC Inc. Survey (MRC 2012)

Invertebrate Species	Fragmentation or Regeneration?	Distribution in Hawaii	Impact (adapted from Eldredge and Smith 2001)
Sponges			
Gelloides fibrosa	Y	Harbors (Oahu, Maui, Kauai), Kaneohe Bay (Oahu)	observations suggest competition for space with native invertebrates. Possible threat to corals in protected habitats, such as Kaneohe Bay.
Haliclona caerulea	Y	Harbors (Oahu, Maui, Kauai, Midway), Kaneohe Bay, Keehi Lagoon (O'ahu)	some competition for space with native species likely
Mycale armata	Y	Harbors (Oahu, Maui), Kaneohe Bay (Oahu)	observations suggests competition for space with native species including reef building corals
Suberites zeteki	Y	Harbors (Oahu, Kauai), Kaneohe Bay (Oahu)	some competition for space with native species likely
Zygomycale parishii	Y	Harbors (Oahu, Maui), Kaneohe Bay, Keehi Lagoon, Barber's Point (O'ahu)	observations suggests competition for space with native species
Tunicates			
Ascidia sydneiensis	N	Throughout the main islands and Midway Atoll in harbors and embayments.	probably competes with other shallow-water invertebrates for space, especially in the fouling community.
Phallusia nigra	N	Throughout the main islands, primarily in harbors	probably competes with other shallow-water invertebrates for space, especially in the fouling community.
Bryozoans			
Amathia distans	N	Throughout main Hawaiian Islands and also Midway Atoll.	presumed minimal
Bugula stolonifera	N	unknown	unknown

Schizoporella errata	N	Throughout the main islands and Midway Atoll	probably competes with other shallow-water invertebrates for space, especially in the fouling community.
Annelids			
Chaetopterus sp.	Y	Throughout main Hawaiian Islands, especially in harbors and embayments	observations suggest competition for space with other invertebrates
Sabellastarte spectabilis	Y	Shallow water throughout main islands	most likely minimal
Salmacina dysteri	Y	global species, Hawaiian waters at depths to 200-600 meters and as being found across a wide variety of habitat facies in the Islands	assumed to be minimal
Molluscs			
Anomia nobilis	N	Widespread Indo-Pacific and Hawaiian Islands	observations suggest competition for space with other fouling invertebrates
Balanus amphitrite	N	Throughout the main Hawaiian Islands	unstudied

Techniques to Prevent the Spread of Invasive/Introduce Marine Species

The dredging and filling activities proposed for this project are most likely to result in the fragmentation of biological material. Hence, the introduced or invasive species that are able to disperse and regenerate from fragments are the most likely to have negative impacts on the marine environment during the construction phase of this project. These fragments, if allowed to move through the water column or along sea floor, have the potential to disperse to areas outside of the harbor and could colonize areas where they are currently not present.

Therefore invasive or introduced species that should be targeted during construction would be those that:

1) can regenerate through fragmentation; and
2) are currently are restricted in distribution in Hawaii.

Based on these two criteria, target species would include all five introduced sponge species documented during the marine surveys and the invasive marine algae *Kappaphycus spp.* which has been recorded in Honolulu Harbor, but not within the survey area.

Suggested measures to reduce fragmentation and to prevent the dispersal of fragments are listed as follows.

Operational Controls (reducing fragmentation) - Practices that reduce the suspension of sediment into the water column will tend to reduce fragmentation of invasive species as well (e.g. by reducing the speed of operations). Some examples include:

- Reduce the falling velocity of buckets on mechanical dredges, especially before seafloor impact, to minimize both fragmentation and dispersion of invasive species
- Reduce the travel speed of buckets to prevent spillage of dredged sediment
- When using a hydraulic dredge, do not move the head faster than it can pump sediment to prevent suspension of fragments into the water column

Engineering Controls (prevention of the dispersal of fragments)
Silt curtains

- Silt curtains must be deployed and maintained around areas where dredging and filling will occur for the full duration of all dredging and filling related work to prevent fragments from migrating out of the immediate area.
- Silt curtains must cover the full depth of the water column, from the surface to having the ballast chain rest on the seafloor, to effectively contain the dispersion of fragments of introduced/invasive species. Sponges are negatively buoyant and are likely to fall to the sea floor and roll with the water movement. However, the fragments of algae *Kappaphycus spp.* float and could be found on the water surface.
- Prior to silt curtain retrieval, biological fragments should be removed from the seafloor and surface along the silt curtains. This may be achieved, for example, by having a diver use a suction pump to remove biological fragments (sponges, algae etc.) from the sea floor and surface. Surface fragments may also be scooped up with a fine mesh net.

Disposal of dredged materials (prevention of re-introduction)
Until properly disposed of, dredged sediments should be stored in a way that prevents both runoff and biological fragments from being washed back into coastal areas.

References:

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SWCA 2012. Flora and Fauna Survey for the Proposed Kapalama Container Terminal and Pacific Shipyards International Relocation Site. Letter Report to Belt Collins, Hawaii.

United States Geological Survey (USGS). 2006. *Chthamalus proteus*. USGS Nonindigenous Aquatic Species Database.

APPENDIX H

State Historic Preservation Division Letters

H-1
State Historic Preservation Division Letters

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

PETER T. YOUNG
DEPUTY DIRECTOR

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

June 20, 2007

Ms. Sandra Pfund, Project Director
Hawai'i Harbors Project
Pier 10 Terminal, 2nd Floor, 600 Fort Street
Honolulu, Hawai'i 96813

LOG NO: 2007.2090
DOC NO: 0706BF09
Architecture

Dear Ms. Pfund:

SUBJECT: Chapter 6E-8 (HRS) Review
Redevelopment of the Former Kapalama Military Reservation - Demolition of Remaining Portion
Hawai'i Harbors Project (HHP) – Master Plan for Harbor Infrastructure Improvement and Expansion
Honolulu, Hawai'i
TMK: (1) 1-2-025:002

Thank for the submission of the historic architectural survey of the former KMR site.

After reviewing the survey (LOG NO.:2006.0829, DOC NO.: 0603ST32) the SHPD finds the survey to meet the proposed mitigation from our letter dated April 3, 2006.

We believe that the determination for the proposed demolition is "no adverse effects" per Chapter 6E-8 (HRS). Thank you for the opportunity to comment. Should you have any questions regarding architectural concerns please call Susan Tasaki in our Oahu office at (808) 692-8032.

Aloha,

Melanie A. Chinen, Administrator
State Historic Preservation Division

BTF:jen

cc: Tonia Moy, Fung Associates, 1833 Kalakaua Ave., Suite 1008, Honolulu, HI 96815

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

RECEIVED
2012 DH
~~2011~~ JAN -6 PM 1:07
BELT COLLINS HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAHUHIHEWA BUILDING
601 KAMOKILA BLVD, KAPOLEI HI 96707

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

DATE: December 12, 2011

LOG: 2011.3125
DOC: 1112RS23

TO: Glen T. Koyama
Project Manager
Belt Collins Hawaii Ltd.
2153 North King Street, Unit 200
Honolulu, HI 96819-4554

SUBJECT: **Section 6E-42 Historic Preservation Review**
National Historic Preservation Act (NHPA) Section 106 Review
Project: Environmental Impact Statement Preparation Notice
Permit # (None)
Owner: Harbors Division, Department of Transportation, Hawaii State Government
Location: Former Kapalama Military Reservation
Tax Map Key: (1) 1-2-025:002

This letter is in response to materials dated November 21, 2011 and received by SHPD on November 23, 2011, regarding submission of an *Final Environmental Assessment/Environmental Impact Statement Preparation Notice Kapalama Container Terminal Honolulu Harbor* to be located at the former Kapalama Military Reservation. The project would remove existing ex-military warehouses, relocate existing tenants, pave the former building footprints, dredge the harbor, and alter the shoreline for construction of new container piers. The Area of Potential Effect (APE) would be the parcel and the harbor immediately adjacent.

The property was created in the early part of the 20th century by filling in a series of fishponds along the makai side of Kalihi-Kapalama-Palama. A cargo container terminal was first proposed as early as 1989. The former Kapalama Military Base buildings could potentially be eligible under Criterion C (Military Architecture during World War II and Korea).

However, as part of an earlier mitigation, SHPD agreed to documentation of the Kapalama Military Reservation before demolition. SHPD in 2007 received the report entitled *Historic Architectural Survey of Former Kapalama Military Reservation and Hawaiian Dredging Sites* (Fung and Associates for the Department of Transportation).

In a letter dated June 20, 2007, SHPD's Architecture Branch concurred with a determination of "no adverse effect" for the *Master Plan for Harbor Infrastructure Improvement and Expansion*. Our architectural office continues to hold that position. As for archaeology concerns covering alteration of the shoreline, our Oahu Archaeologist, Nona Naboa, also concurs with a determination of "no adverse effect" for archaeology.

Thus **SHPD accepts the report.** Please provide a hardcopy to this office for the SHPD Library.

Any questions should be addressed to Ross W. Stephenson, SHPD Historian, at (808) 692-8028 (office), (808) 497-2233 (cell) or ross.w.stephenson@hawaii.gov.

Mahalo for the opportunity to comment.

Angie Westfall
Architecture Branch Chief, Hawaii Historic Preservation Division

In the event that historic resources, including human skeletal remains, lava tubes, and lava blisters/bubbles are identified during construction activities, all work should cease in the immediate vicinity of the find, the find should be protected from additional disturbance, and the State Historic Preservation Division should be contacted immediately at (808) 692-8015.