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JAN 23 2013

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

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: DRAFT ENVIRONMENTAL ASSESSMENT FOR PIERS 12 AND 15 IMPROVEMENTS, HONOLULU HARBOR, OAHU, HAWAII – JOB HMP 20907
TMK: 2-1-001:043, 044, 045, 055, 056

The State of Hawaii, Department of Transportation (DOT) has reviewed the Draft Environmental Assessment (DEA) for the subject project and the DOT anticipates a Finding of No Significant Impact under Chapter 343. The DEA has been prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200, Hawaii Administrative Rules. Please publish notice of this DEA in the next available issue of OEQC's *The Environmental Notice*.

We have enclosed one (1) each of the following items:

- Hardcopy of the OEQC publication form and DEA; and
- CD including the DEA in pdf format and publication form in MS word format.

Please contact Mr. Bert Toba, P.E., Harbors Modernization Program (HMP) Development Officer at 586-2455 if you have any questions.

Attachments

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

Project Name: Honolulu Harbor Pier 12 & 15 Improvements
Island: **O'ahu**
District: **Honolulu District**
TMK: **2-1-001:043, 044, 045, 055, 056**
Permits: **Department of the Army, Section 10**
Proposing/Determination Agency: **Department of Transportation, Harbors Division (DOT-H)**
Hale Awa Ku Moku Building
79 South Nimitz Highway
Honolulu, HI 96813-4898
Attn. Ms. Sharilyn Ikeda
(808) 586-2458
Consultant: Kimura International
1600 Kapiolani Boulevard, Suite 1610
Honolulu, HI 96814
Attn. Ms. Leslie Kurisaki
(808) 944-8848

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Status (check one only):

_X_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.
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__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.
__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.
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__ 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 Hawaii Department of Transportation, Harbors Division (DOT-H) proposes to construct new berthing and mooring improvements and utilities at Piers 12 and 15 in Honolulu Harbor. The improvements will accommodate two spill response boats and one spill response barge operated by the Marine Spill Response Corporation (MSRC) and the Clean Islands Council (CIC), non-profit entities that provide mandatory oil spill response, prevention, and training within the State. These three spill response vessels are being temporarily berthed at Pier 35, but a permanent location that allows quick access to potential incident areas is needed.

Piers 12 and 15 provide an optimal location in central Honolulu Harbor, the hub of the State's maritime industry with a high volume of ship traffic. By berthing the spill responders at Piers 12 and 15, they will also be in close proximity to other emergency responders (e.g., Hawaii Spill Response Center at Sand Island, fire boat at Pier 15, salvage divers at Pier 13, U.S. Coast Guard at Sand Island), enhancing overall response capability. The need for a permanent berthing location for MSRC and CIC has been accelerated by the State's proposed Kapālama Container Terminal project. This high priority project will result in a series of harbor relocations, including displacing MSRC and CIC from their temporary berth at Pier 35. As such, the proposed action also supports the timely implementation of other State harbor improvements.

The proposed improvements at Piers 12 and 15 will consist of new berthing and mooring structures with appropriate fendering systems. Due to the poor condition of the existing piers, a structural slab on piles will be constructed over the existing bulkhead. The structural slab will not be connected to and will not impose a load on the existing bulkhead. The slab will connect to pile-supported loading platforms and mooring dolphins used to berth the MSRC and CIC vessels. At Pier 12 and 15, the berthing structures will be located 20 feet and 35 feet, respectively, away from the existing bulkhead. This eliminates the need for dredging and minimizes impacts on the existing coral communities surrounding the pier. At Pier 15, the project will demolish a portion of an existing shed building in order to provide additional room for truck access. There will be no impact to the existing fire station and fire boat pier. The project will also remove a number of old concrete piles and debris located along the sea floor adjacent to Pier 15 in order to provide adequate draft clearance. The project does not include dredging.

The proposed action will require a Department of the Army (DA) permit in accordance with Section 10 of the Rivers and Harbors Act; and a National Pollutant Discharge Elimination System (NPDES) MS4 permit from the State of Hawai'i Department of Health.

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PIER 12 + PIER 15 IMPROVEMENTS

Oil Spill Response Vessel Piers

Honolulu Harbor, O‘ahu

Draft Environmental Assessment

State of Hawai‘i
Department of Transportation
Harbors Division

January 2013

PIER 12 + PIER 15 IMPROVEMENTS

Oil Spill Response Vessel Piers

Honolulu Harbor, O'ahu

Draft Environmental Assessment

State of Hawaii
Department of Transportation
Harbors Division

January 2013

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APPENDICES

A. Marine Water and Sediment Chemistry

B. Hazardous Materials Survey

C. Marine Biological Assessment

D. Archaeology

E. Historic Architecture

F. Traffic

LIST OF ACRONYMS

AIS	archaeological inventory survey
AMSL	above mean sea level
BMP	Best Management Practices
BLNR	Board of Land and Natural Resources
BWS	Board of Water Supply
CIC	Clean Islands Council
CSH	Cultural Surveys Hawai‘i
CWA	Clean Water Act
CZM	Coastal Zone Management
DA	Department of the Army
dB	decibels
dBA	A-weighted sound level
DLNR	Department of Land & Natural Resources
DNL	Day-Night Equivalent Sound Level
DOH	Department of Health
DOT-H	Department of Transportation, Harbors Division
DP	Development Plan
DPP	Department of Planning and Permitting
DTS	Department of Transportation Services
EA	Environmental Assessment
EAL	Environmental Action Level
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HAR	Hawai‘i Administrative Rules
HCDA	Hawai‘i Community Development Authority
HECO	Hawaiian Electric Company
HPD	Honolulu Police Department
HRS	Hawai‘i Revised Statutes
Leq	Equivalent Sound Level
Ldn	Day-Night Equivalent Sound Level
LOS	Level of Service
LUO	Land Use Ordinance
MAI	Mason Architects, Inc.
mgd	million gallons per day
MHHW	Mean higher high water
MLLW	Mean lower low water
MSL	mean sea level

MSRC	Marine Spill Response Corporation
NAC	Noise Abatement Criteria
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
OSRV	Oil Spill Response Vessel
PCB	polychlorinated biphenyl
RL	reporting limits
ROH	revised ordinances of Honolulu
SEL	sound energy level
SHPD	State Historic Preservation Division
SIHP	State Inventory of Historic Places
SLH	Session Laws of Hawai‘i
SMA	Special Management Area
SMP	Special Management Area Use Permit
TCLP	toxicity characteristic leaching procedure
TMK	tax map key
TRPH	Total Recoverable Petroleum Hydrocarbons
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WQLS	water quality limited segments

Prepared by:
Kimura International, Inc.
January 2013

Project Summary

Item	Description
Project Name	Honolulu Harbor Pier 12 & 15 Improvements
Proposing Agency	State of Hawai‘i Department of Transportation, Harbors Division (DOT-H)
Accepting Agency	State of Hawai‘i Department of Transportation, Harbors Division (DOT-H)
Anticipated Determination	Finding of No Significant Impact (FONSI)
Location	O‘ahu, Hawai‘i
Tax Map Key	TMK 2-1-001:056 and 045
Existing Uses	Pier 12-parking lot, unused berthing structure Pier 15-City and County of Honolulu fire station and storage shed, fire boat berth
Landowner	State of Hawai‘i Department of Transportation (DOT)
Project Description	Construct new mooring dolphins and loading platforms at Piers 12 and 15 with utility upgrades. Improvements will accommodate two spill response boats and one spill response barge operated by the Marine Spill Response Corporation (MSRC) and the Clean Islands Council (CIC). Vessels are being displaced from Pier 35 by other DOT-Harbors improvement projects. The project will also remove submerged debris from the area around Pier 15. The project does not include maintenance dredging.
Flood Insurance Rate Map	Zone AE, Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood (elevation 6 feet).
State Land Use	Urban District and Conservation District
Zoning	Pier 12: Aloha Tower Development District (land use regulated by the Aloha Tower Development Corporation (ATDC). Current proposed legislation to move responsibility for this area to the Hawai‘i Community Development Authority. Pier 15: I-3, Waterfront Industrial District
Special Management Area (SMA)	Not within SMA. DOT-H is exempted from City and County of Honolulu requirements per Chapter 266-2(b), HRS.

1 PROJECT DESCRIPTION

1.1 INTRODUCTION

The State of Hawai‘i Department of Transportation, Harbors Division (DOT-H) is proposing improvements to Piers 12 and 15 in Honolulu Harbor. The proposed action will provide new berthing and mooring structures and upgraded utilities to accommodate two spill response boats and one spill response barge.

The proposed action involves use of State-owned property and State funds, and as such, Chapter 343, Hawai‘i Revised Statutes (HRS) is triggered, requiring the preparation of an Environmental Assessment. This Draft Environmental Assessment (EA) meets the environmental guidelines and requirements of Chapter 343, HRS, as well as Act 241, Session Laws of Hawai‘i (SLH) 1992, and Chapter 200 of Title 11, Department of Health (DOH) Administrative rules, “Environmental Impact Statement Rules.”

As the action will involve work within waters of the U.S., a Department of the Army (DA) permit will be required from the U.S. Army Corps of Engineers (USACE). Therefore, this EA has also been prepared to address federal environmental policies and programs under the National Environmental Policy Act (NEPA).

1.2 PURPOSE AND NEED FOR THE PROJECT

The purpose and need for the proposed project are:

- To allow the Marine Spill Response Corporation (MSRC) and Clean Islands Council (CIC) to continue their ongoing pollution prevention and response operations, in accordance with applicable federal and State laws and regulations;
- To provide continued environmental protection for Honolulu Harbor, Hawai‘i’s primary port of entry for cargo and its economic lifeline to the rest of the world.
- To locate spill responders in an area that allows quick access to all parts of Honolulu Harbor and dispatch to other incident locations throughout the State, as needed;
- To consolidate the State’s spill and emergency response assets to the extent possible, to maximize operational efficiency;
- To support the State’s overall, long-range plans for harbor development and utilization.

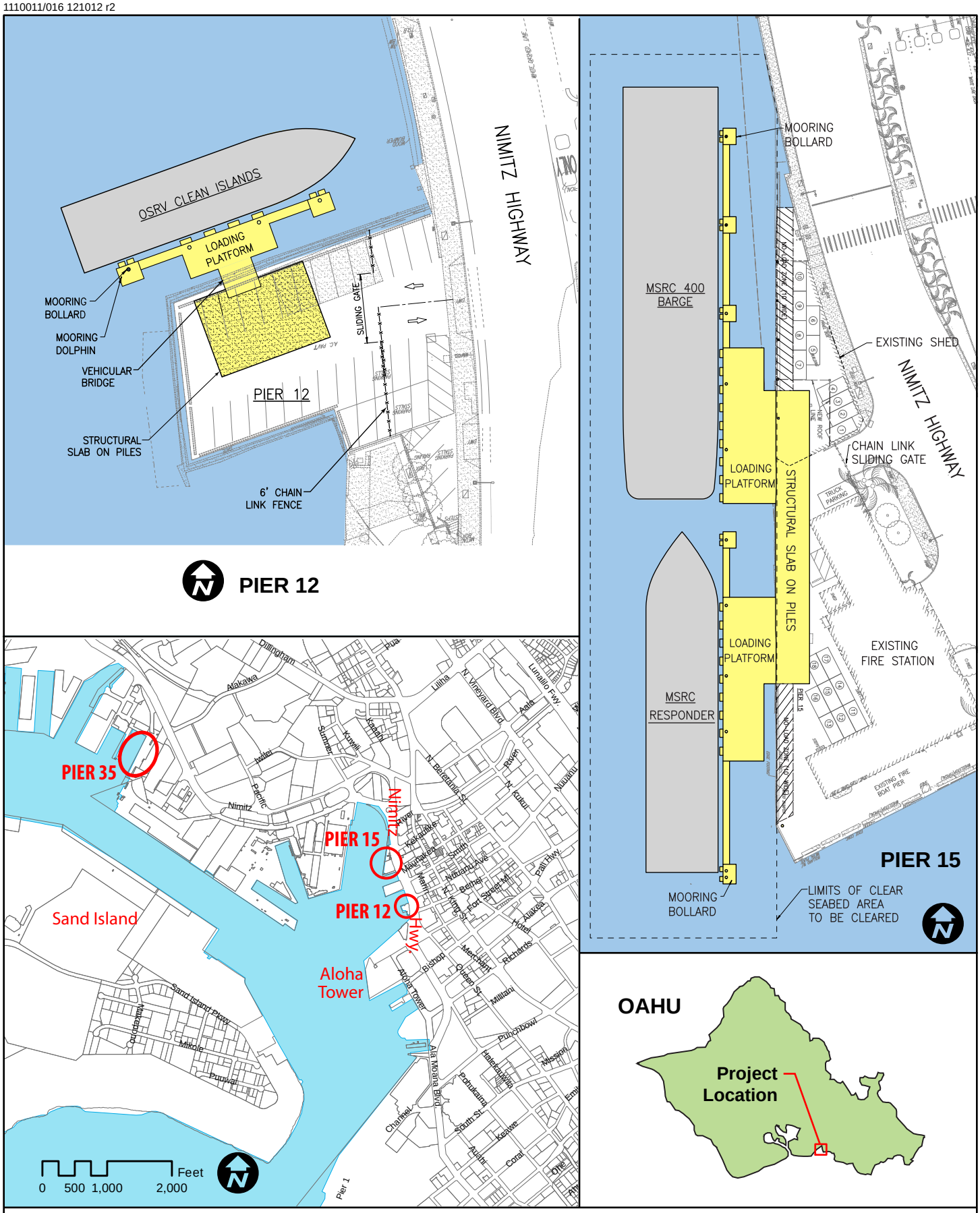


FIGURE 1

PROJECT LOCATION

Honolulu Harbor
Piers 12 and 15 Improvements

NOT TO SCALE

The proposed action (see Figure 1) will provide new berthing, mooring structures, and upgraded utilities at Piers 12 and 15 to accommodate two spill response boats and one spill response barge. The improvements will create approximately 500 linear feet (LF) of berthing space adjacent to the existing Pier 15 wharf face, and 300 LF of berthing at Pier 12. A new structural concrete slab will be installed over the existing bulkhead at each pier to support vessel loading and unloading. In the waters around Pier 15, some old concrete pier pilings and marine debris will also be removed to provide adequate clearance for the spill response boats. The proposed action does not include dredging.

The three vessels are owned by the Marine Spill Response Corporation (MSRC) and the Clean Islands Council (CIC), and are a critical component of Hawaii's overall oil spill response capability. The three vessels have been temporarily berthed at Pier 35 in Honolulu Harbor. Permanent berthing in a suitable location is needed as identified above. Piers 12 and 15 were selected because of their availability, their central location within Honolulu Harbor, and the proximity to other emergency responders in the harbor.

1.2.1 Project Background

1.2.1.1 Honolulu Harbor

The State of Hawai‘i is located over 2,000 miles from the nearest continental coast, and as a result of its geographic isolation, is nearly completely dependent on ocean surface transportation for its sustenance. Over 80 percent of all consumer goods are imported into Hawai‘i. Ocean transportation is Hawai‘i's lifeline to the world, supporting every facet of the local economy: tourism, construction, national defense, agriculture, and all other industries. Honolulu Harbor has served as Hawai‘i's primary 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. The Island of O‘ahu is where 70 percent of the State's population resides and 67 percent of the island's business activities are conducted (DOT, 2012).

1.2.1.2 Oil Spill Response in Hawai‘i

The federal Oil Pollution Act of 1990 (OPA-90) was signed into law in August 1990 in response to public concern following the 1989 *Exxon Valdez* incident, where the oil tanker *Exxon Valdez* struck a reef in Prince William Sound, Alaska, spilling more than 11 million gallons of crude oil. At that time, it was the largest spill in U.S. history. The resulting OPA provides for more stringent regulations affecting the handling, storage, and transport of oil and petroleum products, and establishes the capability for marine spill response. Hawaii has complied with OPA 90 by creating a Hawaii Area Contingency Plan.

The Marine Spill Response Corporation (MSRC) was established nationally in 1990 by the oil and shipping industry as an independent, non-profit, national spill response company dedicated to rapid response. Although MSRC was originally created to respond to catastrophic spills, its current scope of services has broadened, and its mission now includes response to oil spills of any size and shoreline cleanup, hazardous material spill response, and response to other

emergencies. Among other equipment, the MSRC operates the *MSRC Responder*, a 208-foot long response boat and the *MSRC 400*, a 274-foot long barge, both of which are planned for relocation from Pier 35 to Pier 15.

The Clean Islands Council (CIC) is a non-profit, Hawai‘i-based consortium of marine and shipping companies that provides spill response capability, training, and preparation. The CIC is comprised of about 120 members, including Tesoro, Chevron and Hawaiian Electric Company. The Oil Spill Response Vessel (OSRV) Clean Islands, a 130-ft long spill response vessel, is planned for relocation from Pier 35 to Pier 12.

The 208-ft *MSRC Responder* and 274-ft *MSRC 400* barge are currently berthed at Pier 35 and planned for relocation to Pier 15.

The CIC's 130-foot long *OSRV Clean Islands* is currently berthed at Pier 35 and planned for relocation to Pier 12.

The MSRC and CIC are part of a larger oil response community in Hawai‘i, a community that includes federal and State agencies, and other for-profit response organizations. The MSRC and CIC have established and funded the Hawai‘i Oil Spill Center (HSC), a training and control center dedicated to oil spill emergency response preparedness. The HSC is located on Sand Island Access Road in Honolulu, and includes a state-of-the-art communications center that serves as a central command during a spill event.

During a spill event, a critical part of a quick, efficient response is communication--collected data from the field gets to the unified command, then the decisions are relayed back out. That unified command would include input from numerous County, State and federal government agencies, as well as the party responsible for the spill. Chief among the parties are the U.S. Coast Guard and the Hawai‘i Department of Health[1] .

1.2.2 Need for a Centralized Location

The MSRC and CIC spill responders require a centralized berthing location which provides quick access to potential incident areas. Piers 12 and 15 provide an optimal location in central Honolulu Harbor, the hub of the State's maritime industry with a high volume of ship traffic. This location also consolidates the emergency response presence in Honolulu Harbor. In addition to the HSC at Sand Island, other responders located nearby include the fire boat Moku Ahi at Pier 15, salvage divers at Pier 13, and the U.S. Coast Guard at Sand Island. These responders are pre-positioned to react immediately to any incident in or around Honolulu Harbor. Their proximity to one another provides for optimal communication and coordination and efficient use of personnel and equipment.

[1] Levine, Michael, *"Is Hawaii Ready For 'Worst Case Scenario' Oil Spill?"*, Civil Beat.com, 5/11/2010, http://www.civilbeat.com/articles/2010/05/11/908-is-hawaii-ready-for-worst-case-scenario-oil-spill/

Piers 12 and 15 provide direct access to the main harbor entrance channel, allowing personnel and equipment to quickly dispatch to incident locations. Potential incident areas such as pipelines in and around Honolulu Harbor, Keʻehi Lagoon, and Pearl Harbor; shoreline recreational areas; Campbell Industrial Park, and tanker moorings off Barbers Point are only minutes away.

1.2.3 Relationship to Other Honolulu Harbor Projects

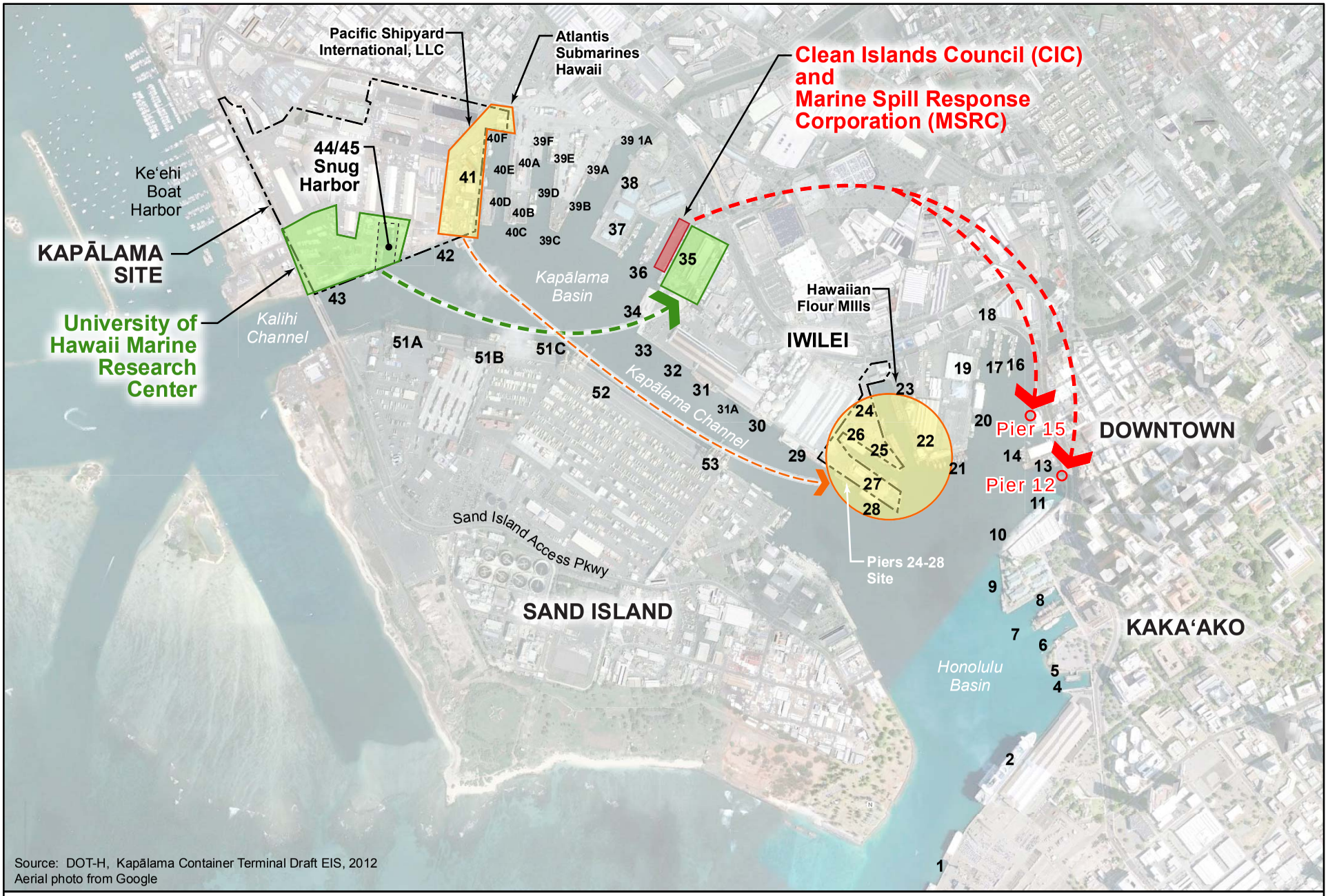
1.2.3.1 University of Hawaiʻi Marine Center (UHMC)

The current berthing location for MSRC and CIC at Pier 35 was always intended to be temporary. In recent years, the Pier 35 area has been envisioned by State harbor planners as a long-term site for the University of Hawaiʻi' Marine Center (UHMC). The UHMC is currently a tenant at Piers 44/45, a marine slip known as Snug Harbor. Plans to relocate the UHMC (originally to Pier 38 but more recently to Pier 35) and the development of new offices, labs and pier space date back to the 1989 Honolulu Waterfront Master Plan (DBEDT, 1989) and the Oʻahu Commercial Harbors 2020 Master Plan (DOT-H, 1997). The UHMC project is described in more detail in the University of Hawaiʻi Marine Center Relocation to Piers 34 and 35 Draft Environmental Assessment (DOT-H, 2012).

Knowing that Pier 35 was a temporary location for MSRC and CIC, the spill response community has for years looked for a suitable, long-term site. In 2008, American Marine Services Group presented a proposal to DOT-H for the long-term relocation of spill response assets to Keʻehi Lagoon[2]. The long-term relocation included an interim move to Piers 12, 13 and 15. At that time, interim improvements proposed included berthing dolphins and/or a fendering system at Pier 15. The interim plan for Pier 12 consisted of berthing a barge with ramp access, with smaller response vessels berthed around the barge perimeter. Pier 13 was proposed to accommodate MSRC and CIC's primary vessels. The plan was to utilize Piers 12, 13 and 15 until permanent improvements could be made at Keʻehi Lagoon. This 2008 proposal has been superseded in favor of the proposed action.

With the elapse of time, DOT-H has reassessed its long and short-term proposals in the *Oʻahu Commercial Harbors 2020 Master Plan*. When evaluating options for the MSRC and CIC, the decision was made to use Piers 12 and 15 as a permanent site, rather than as an interim site for a future Keʻehi Lagoon relocation (see further discussion in Chapter 2, Alternatives). For this reason, the proposed action is more extensive than the temporary improvements envisioned by American Marine Services Group in 2008. MSRC and CIC are fully on-board with the current plan for Piers 12 and 15, and its development as a permanent site. Future relocation of spill responders to Keʻehi Lagoon is no longer being considered.

[2] American Marine Services Group, "Interim Facility for Oil Spill Response Assets," 2008.



Source: DOT-H, Kapālama Container Terminal Draft EIS, 2012
Aerial photo from Google

0 500 1000 1500 2000
SCALE IN FEET

FIGURE 2
PROPOSED KAPĀLAMA CONTAINER TERMINAL RELOCATIONS
Honolulu Harbor
Piers 12 and 15 Improvements

1110011/015 121912 r3

1.2.3.2 Kapālama Container Terminal Project

The need for a relocation site for the three spill response vessels has been accelerated by the State's proposed Kapālama Container Terminal project (Figure 2). This DOT-H project involves redevelopment of the former Kapālama Military Reservation site into an overseas terminal to increase existing container terminal capacity in Honolulu Harbor. The project will develop a 94-acre container yard with necessary support, and berthing capacity for two container ships. The Kapālama Container Terminal is the cornerstone of the *Oahu Commercial Harbors 2020 Master Plan* (1997), and is the State's highest priority project to accommodate the anticipated demand on Hawai'i's commercial port facilities over the next 20 years. It is seen as critical to the State's economy and part of the State Administration's "New Day" initiative.

As illustrated in the figure, the proposed Kapālama Container Terminal project would involve use of Snug Harbor, the current location of UHMC. While the relocation of UHMC has been part of the State's master plans for Honolulu Harbor since 1989, it is only now occurring with the proposed Kapālama Container Terminal.

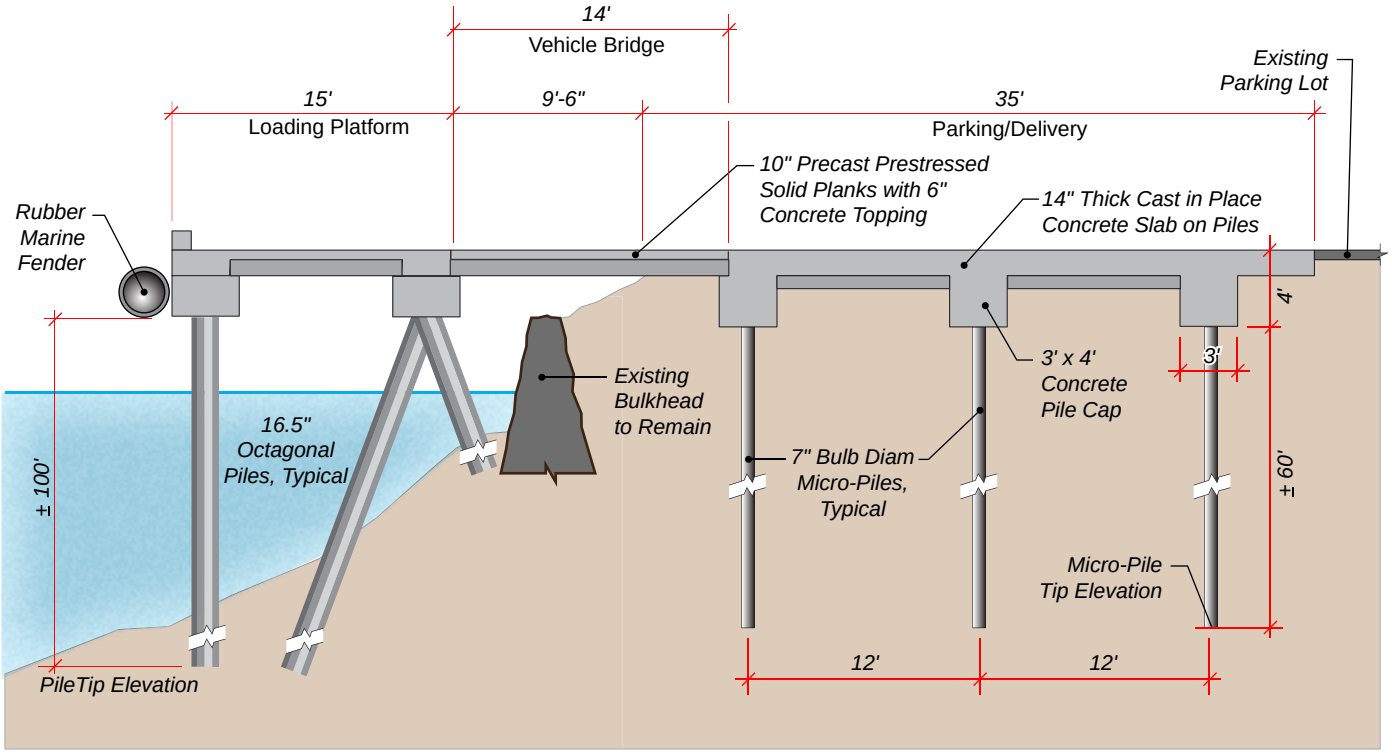
Relocation of UHMC to Pier 35, the temporary location of MSRC and CIC, has long been planned by UH to further the university's marine education and research programs. Likewise, a permanent site for MSRC and CIC has been planned by the spill response community to consolidate and increase the efficiency of the State's spill response capability.

1.3 PROPOSED ACTION AT PIER 12

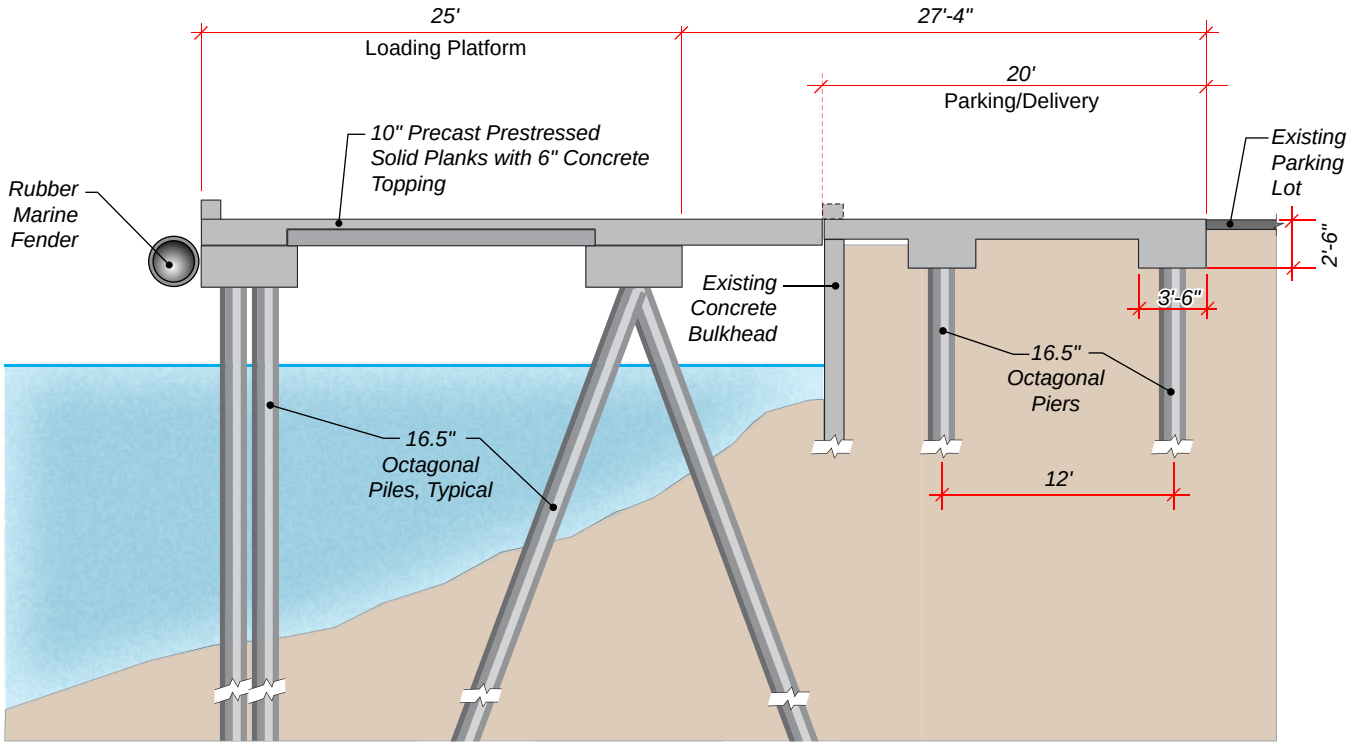
Pier 12, located off Nimitz Highway at the makai end of Bethel Street, is presently a concrete structure paved with asphalt, and surrounded by a chain link fence. The area was once used by the DOT-H as a for-fee parking lot. Vehicular access to the site is through an existing driveway off Nimitz Highway.

The proposed action will consist of new berthing and mooring structures with appropriate fendering systems to create approximately 200 linear feet of berthing space for the *OSRV Clean Islands.*

Figure 3 shows a proposed cross section of the Pier 12 improvements. Due to the poor condition of the existing bulkhead, a structural slab on piles will be constructed over the existing bulkhead. This structural slab will not be connected to and will not impose a load on the existing bulkhead. The slab will then be connected to a pile supported loading platform, allowing a fuel truck used by the CIC to service the ship. The OSRV Clean Islands will berth approximately 20 feet from the existing bulkhead with two pile supported mooring dolphins and the loading platform. Locating the vessel 20 feet from the bulkhead allows for adequate draft to accommodate the sloping harbor bottom that parallels the existing bulkhead. This design will also minimize impacts on the existing coral communities surrounding the pier. No dredging is proposed.



PIER 12 - CROSS SECTION



PIER 15 - CROSS SECTION

0 5 10

SCALE IN FEET

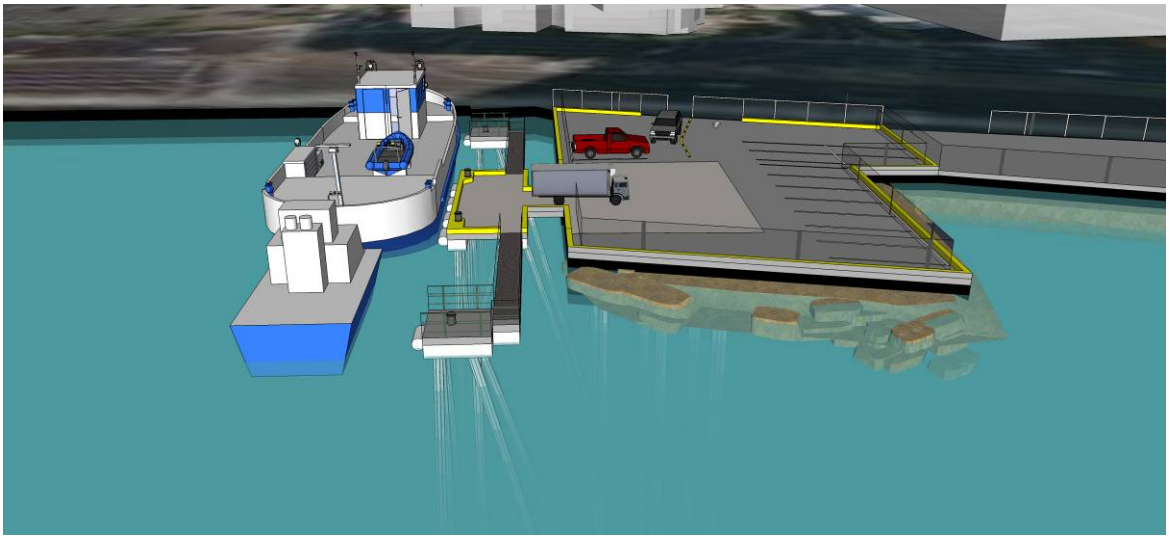
FIGURE 3

PIER CROSS SECTIONS

Honolulu Harbor

Piers 12 and 15 Improvements

A vehicular gate and security fencing will be constructed around Pier 12. The security gate will be located 30 feet from Nimitz Highway to allow for queuing space off the highway. Nine parking stalls for OSRV Clean Islands will be located on the remaining paved area of Pier 12.

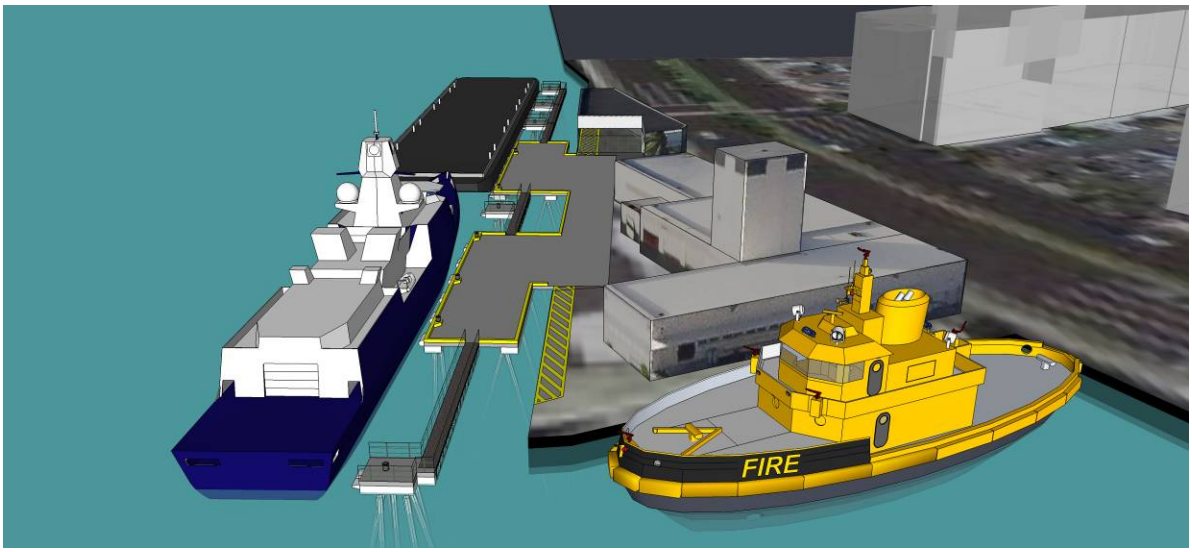


Proposed Action at Pier 12

1.4 PROPOSED ACTION AT PIER 15

Pier 15 is located off Nimitz Highway at the makai end of Maunakea Street. It is a triangular-shaped wharf structure which accommodates an existing fire station and fire boat pier along its south face. The entire wharf, including the fire station, is secured by a chain link fence with a sliding gate opening onto Nimitz Highway. Vehicular access to Pier 15 is through a driveway which is also used by the Fire Station.

The proposed action will improve the makai face of the triangular wharf, adding 500 linear feet of berthing to accommodate a 208-foot long MSRC spill response boat and a 274-foot long barge. Similar to Pier 12, the physical condition of the existing bulkhead is poor, and a pile supported structural slab is proposed to accommodate service vehicles (Figure 3). The structural slab will be connected to two loading platforms. One platform will be connected via catwalk to three mooring dolphins to accommodate the MSRC 400 barge. The second platform will be connected via catwalk to two mooring dolphins to berth the MSRC Responder. The two MSRC vessels will be berthed approximately 35 feet from the existing bulkhead.



Proposed Action at Pier 15

Because of difficult tractor/trailer ingress and egress from Nimitz Highway, MSRC has proposed using a 26,000 lb. stake bed truck to service their vessels. In order to allow truck access to the barge loading platform, a portion of the roof of an existing, open air shed on the northern end of the wharf will be removed. The shed is currently used by the fire department for personal vehicle parking. Vehicle parking will still be provided in the shed after project completion, and there will not be any impacts on fire station operations .The existing security fence and vehicular gate will be retained.

No improvements are planned for the existing fire station and fire boat pier, which will continue to be operated out of the south end of Pier 15.

The project also will remove a number of old concrete piles and debris located along the sea floor adjacent to the Pier 15 bulkhead, in order to provide adequate draft clearance for vessel berthing. Ten 24-inch diameter piles located parallel to the Pier 15 bulkhead will be cut at the mud line and removed. The area to be cleared is labeled in Figure 1 as *"Limits of seabed area to be cleared."* No dredging is proposed, as existing water depths are adequate in that area.

1.5 PROJECT SCHEDULE

Construction of the Pier 12 and 15 improvements will commence immediately after environmental permits and approvals (i.e., Department of the Army permit) are obtained, possibly by the third quarter of 2013. Construction will take approximately 12 months.

The schedule for both the proposed action and the project for Piers 34 and 35 Improvements are closely tied to the timetable for the Kapālama Container Terminal project. Currently, demolition of structures at Piers 34 and 35 are expected to begin in mid-2013, and take 12 months to complete. During much of this time, MSRC and CIC vessels can remain berthed at Pier 35, but the spill response vessels would need to relocate by mid 2014, when the UHMC improvements

are complete. An interim berthing location for MSRC and CIC may be required until the Pier 12 and 15 improvements are completed.

The Kapālama Container Terminal improvements will begin in early 2014 with building demolition and shoreside construction of the container yard starting by the end of 2014. Wharf construction and dredging is scheduled to start in early 2015. Prior to this in-water work, UHMC will be relocated from Snug Harbor to their new Pier 34/35 site.

1.6 POSSIBLE ENVIRONMENTAL PERMITS AND APPROVALS

The following is a summary of environmental approvals and consultations that may be required for the proposed action. Chapter 4 includes a more detailed discussion of the project's consistency with federal, State and local land use plans, policies and controls.

Table 1-1: Possible Environmental Permits and Approvals

Approval/Consultation	Agency
Federal	
Department of the Army (DA) Permit, Section 10, Rivers and Harbors Act	Department of the Army, U.S. Army Engineer District, Regulatory Branch
Coastal Zone Management Federal Consistency Determination (*done as part of DA permit process*)	Hawai‘i Coastal Zone Management Office
Section 7, Endangered Species Act Consultation	NOAA National Marine Fisheries Service U.S. Fish and Wildlife Service
Essential Fish Habitat (EFH) consultation, Magnuson-Stevens Act	NOAA National Marine Fisheries Service
Section 106, National Historic Preservation Act	State Historic Preservation Division
State of Hawai‘i	
Chapter 343 Hawai‘i Revised Statutes (*Environmental Assessment)*	State of Hawai‘i Department of Transportation
HRS Chapter 6E review (*Historic*)	Department of Land and Natural Resources, State Historic Preservation Division
National Pollutant Discharge Elimination System (NPDES) MS4	Department of Health, Clean Water Branch
City and County of Honolulu[3]	
Building permits, construction plan approval, etc. (*during design period*)	Department of Planning & Permitting

***Note**: The Hawai‘i Department of Land and Natural Resources, Office of Conservation and Coastal Lands (DLNR OCCL) confirmed that Conservation District Use Permit (CDUP) not required. See letter dated February 22, 2012 in Chapter 7.*

[3] *DOT-H is exempted from City and County of Honolulu requirements per Chapter 266-2(b), HRS. See further discussion in Chapter 4.*

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter discusses the alternatives considered, including the proposed action. The alternatives discussed here are not mutually exclusive; rather they are options that were considered regarding the project's location, general scope, structural type, and design. Alternatives were evaluated in terms of how well they met the project's Purpose and Need (as presented in Chapter 1), as well as operational, environmental and cost considerations.

2.1 ALTERNATIVES CONSIDERED

- No Action

- Alternative Locations
  - Relocate MSRC and CIC Elsewhere in Honolulu Harbor
  - Relocate MSRC and CIC Outside Honolulu Harbor
  - Pier 15 Only
  - Preferred Location: Piers 12 and 15

- Options for Project Scope
  - Minimal Improvement to Piers 12 and 15
  - Finger Piers (as proposed in O'ahu Commercial Harbors 2020 Plan)

- Alternative Structural Types of Berthing
  - Bulkhead with Sheetpiles and Backfill Alternative
  - Concrete Pile and Deck Alternative
  - Preferred Structural Type: Pile Supported Mooring Dolphins and Loading Platform

- Other Potential Design Modifications
  - Extend Pier 12 Berthing Structure Seaward
  - Eliminate One Mooring Dolphin at Pier 12

- Preferred Alternative: Pier 12 and 15 Improvements

2.2 NO-ACTION ALTERNATIVE

Under the "No Action" alternative, Piers 12 and 15 would not be improved. Both structures would remain in their current physical condition. Pier 12 would continue its use as a fenced parking area, but would be unusable for ship berthing. The triangular-shaped Pier 15 would continue to house the existing fire station with fire boat berthed along its south face, but the makai wharf face would continue to be unused.

Under a no action scenario, the MSRC and CIC vessels that are being displaced from Pier 35 would be without a berthing location, and an alternate site—either permanent or temporary--

would be needed. Because of the shortage of available berthing space, it is unlikely that another unused berth could be located as a permanent solution. The spill response vessels would likely be temporarily berthed wherever space is available. For example, berthing of these vessels at Piers 19 and 20 is possible as an interim measure, but would not be a permanent solution. Other berths may require double-berthing with other vessels or rotating between berths. Loading and unloading would occur at whatever open berths were available. This unsatisfactory situation would result in operational inefficiencies that could jeopardize the State's oil spill response capability, as well as violate the requirements of the federal Oil Pollution Act of 1990 (OPA 90).

2.3 ALTERNATIVE LOCATIONS

2.3.1 Long-Term Relocation to Keʻehi Lagoon

Long-term relocation of MSRC and CIC to Keʻehi Lagoon, adjacent to Honolulu Harbor, was once proposed by the spill response community. Like Honolulu Harbor, Keʻehi Lagoon is close to the Hawaiʻi Oil Spill Center (HSC) headquarters at Sand Island, and provides ready access to all island waters where spill response capability is needed. Use of Keʻehi Lagoon would also avoid using prime berthing space within busy Honolulu Harbor, reserving the main harbor for commercial boats and cruise ships. A long-term site in Keʻehi Lagoon that was proposed by spill responders is adjacent to the area currently used by Island Seaplane Service.

In 2008, the American Marine Service Group prepared a PowerPoint presentation entitled "Interim Facility for Oil Spill Response Assets" identifying Keʻehi Lagoon as a long-term site. That proposal, however, also included interim berthing at Piers 12, 13 and 15. Interim improvements at Pier 15 included installation of berthing dolphins and/or a fendering system at Pier 15. The interim plan for Pier 12 consisted of berthing a barge with ramp access, with smaller response vessels berthed around the barge perimeter. Pier 13 would be used to accommodate MSRC and CIC's primary vessels.

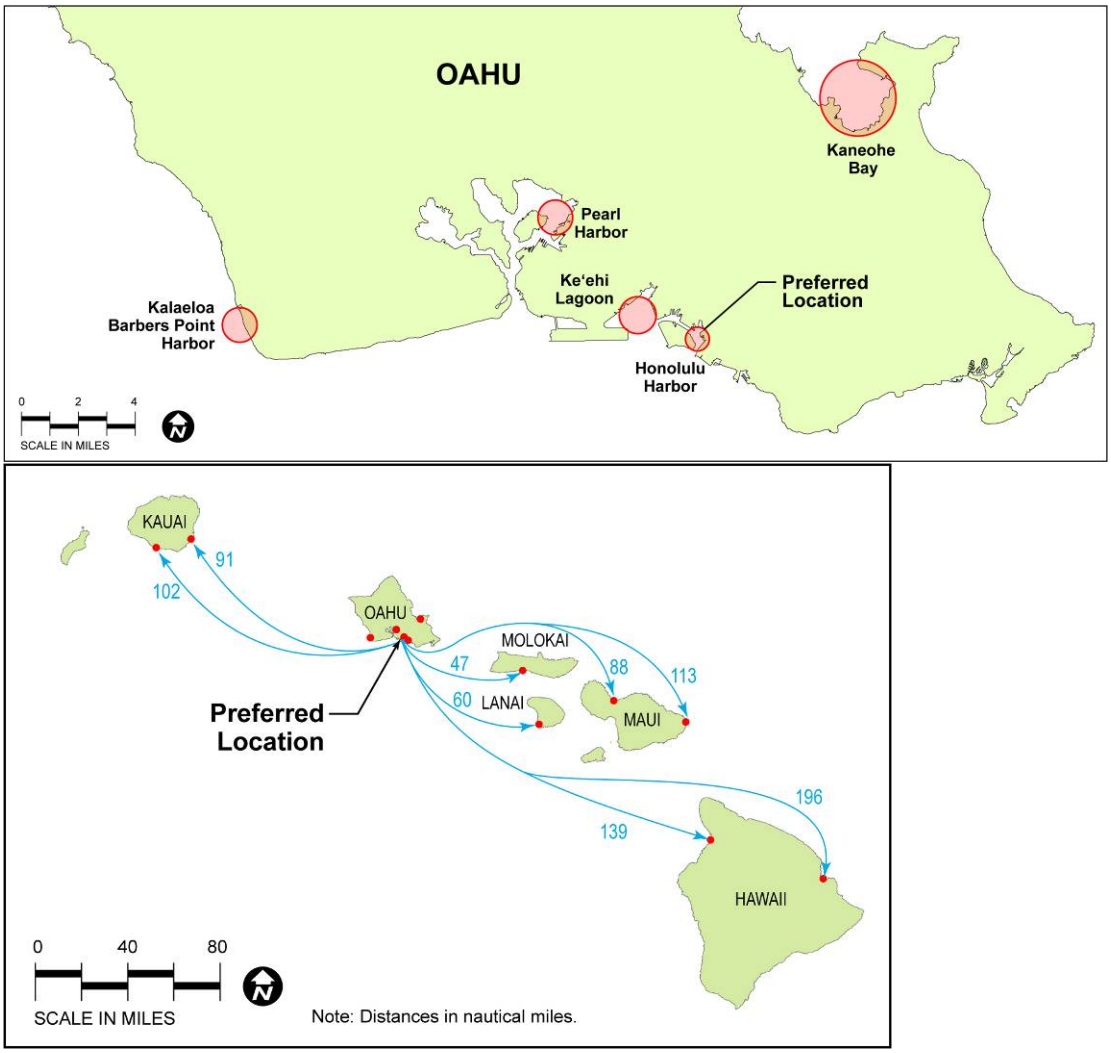
These concepts, initiated by the spill response community, were subsequently refined by DOT-H into the current project for Pier 12 and 15 Improvements. Rather than interim improvements at Pier 12 and 15, followed by future long-term improvements at Keʻehi Lagoon, the DOT-H proposes to convert Piers 12 and 15 to a permanent site for spill responders. As a result, the proposed improvements are more extensive than those proposed in 2008. The spill response community is fully on-board with the current plan for Piers 12 and 15, and future relocation to Keʻehi Lagoon is no longer proposed.

2.3.2 Other Locations Outside Honolulu Harbor

Other harbor areas around Oʻahu were considered but dismissed as infeasible or less desirable than Honolulu Harbor. The Kalaeloa Barbers Point Harbor is located on the southwestern tip of Oʻahu, and is located in close proximity to the offshore tanker moorings. These moorings are anchored about a mile and a half offshore of Barbers Point, and service between 55 and 95 tankers delivering a total of 40 million barrels of oil annually.

A possible spill at these tanker moorings has been identified as a "worst case potential discharge" according to the contingency plan developed by the spill response community. However, the plan notes that this worst case scenario is unlikely. The last "major" discharge of oil--one greater than 100,000 gallons in the coastal zone--occurred in 1987 when jet fuel leaked from a pipeline into Pearl Harbor. The contingency plan notes that there were 13 discharges of more than 10,000 gallons between 1984 and 2009, most of them linked to mechanical failures due to human error or weather[5]. Therefore, there appears to be little geographic advantage to relocating at Kalaeloa. In addition, an appropriate and available berthing site has not been identified.

Figure 4. Alternative Locations on O'ahu and Statewide



[5] Levine, Michael, *"Is Hawaii Ready For 'Worst Case Scenario' Oil Spill?"*, Civil Beat.com, 5/11/2010

Pearl Harbor would appear to be an appropriate site because of its proximity to several large, privately-owned (e.g., Chevron, HECO) and military fuel lines, which are a possible source of an oil spill. There are also several wildlife refuges around Pearl Harbor which could be adversely affected by a spill. However, because Pearl Harbor is a secured military installation controlled by the federal government, there would be challenges in obtaining site approval, finding an unused berth, and potential security, operational and logistics challenges.

Kane‘ohe Bay on the windward side of O‘ahu, or other State harbors on Maui, Moloka‘i, Kaua‘i and Hawai‘i Island would involve a longer response time because of the distance to likely spill areas on O‘ahu. Spill responders must be able to arrive on the scene within an hour of an incident, which would present challenges if vessels were berthed on Maui, Moloka‘i, Kaua‘i or Hawai‘i Island. Distances between these harbors and O‘ahu are shown in Figure 4.

The preferred location is in Honolulu Harbor. Honolulu Harbor has a high volume of ship traffic, and is close to several HECO, Tesoro and Chevron oil pipelines which run in and around the harbor and Ke‘ehi Lagoon. In any oil spill, the primary environmental concern is impact on coastal areas and shoreline habitat, including sensitive ecological areas, wetlands, coral reefs, and habitat for fish and marine life, birds and other wildlife. An oil spill could also have a devastating economic impact on commercial shipping, the fishing industry, tourism, and ocean recreation. Honolulu Harbor is within proximity to sensitive coastal ecosystems, important shipping and commercial activity, and the State’s primary tourist area of Waikiki. Honolulu Harbor is also close to the nearshore recreational areas most heavily used by the public. This central location will ensure timely dispatch of spill response assets.

2.3.3 Relocate MSRC and CIC Elsewhere in Honolulu Harbor

Another alternative was to relocate MSRC and CIC to an already usable berth within Honolulu Harbor, avoiding the cost of berthing upgrades. One potential site that has been mentioned is Pier 19 and 20, directly across from Pier 15 and the former temporary berth for the Hawai‘i Superferry. These berths are in good structural condition and provide more than adequate space for the three spill response vessels. No additional physical improvements would be required.

While the MSRC and CIC vessels could be permanently located at Piers 19 and 20, the location, physical condition, and available depth at these wharves make them better suited for larger vessels. For example, cruise ships have berthed at Piers 19 and 20 on days when multiple cruise ships are in port. While this is an uncommon event, having the berths available for overflow provides needed flexibility in managing the harbor. Permanently berthing two spill response vessels and a barge would not be the best use of a prime waterfront asset. Harbor managers would lose the ability to accommodate larger vessels when required. For these reasons, the permanent relocation of MSRC and CIC to Piers 19 and 20 was found to be a less than optimal alternative.

Another advantage of the Pier 12 and 15 vicinity is its proximity to other emergency responders, specifically the fire boat at Pier 15 and American Marine salvage divers at Pier 13. According to DOT-H, there have been ongoing discussions about CIC assuming responsibility for operation of the existing fire boat. Continued consolidation of emergency response functions in this general area would enhance emergency communication, coordination and efficiency.

2.3.4 Improvements to Pier 15 Only

One alternative explored during the design phase was to limit the proposed improvements to Pier 15 only. This alternative was considered in an effort to completely avoid physical impacts to the historic Pier 12 and to the coral resources offshore. The sloping limestone shelf off of Pier 12 appears to be part of the original submerged shelf not affected by past harbor dredging, and is well-populated with coral colonies.

By comparison, the area around Pier 15 is primarily silt-coated limestone and debris, with only sparse coral colonies. Pile driving and construction in this location would have less of an impact on coral resources than at Pier 12 (see Chapter 3, Section 3.3.3, Marine Biota). Avoiding use of Pier 12 would also avoid an adverse visual impact on the Chinatown Special District and on the historic pier itself (see Chapter 3, Section 3.4.3 on Historic Architecture).

Currently, the State's fire boat, *Moku Ahi*, is berthed along one side of the triangular-shaped Pier 15. The proposed action involves berthing two additional vessels, an MSRC ship and barge, on the makai side of the pier. By limiting pier improvements to Pier 15, the spill response vessels would either have to be nested/double berthed at Pier 15, and/or berthing spots reallocated between the American Marine barge and vessels at adjacent Piers 13 and 14. While less desirable from an operational point of view, this alternative would have fewer environmental impacts on coral and historic resources.

2.3.5 Preferred Location: Piers 12 and 15

After evaluating the alternative locations, DOT-H concluded that Piers 12 and 15 in Honolulu Harbor provided the most appropriate site for relocation of the MSRC and CIC vessels. This location is in close proximity to other emergency responders, such as the fireboat and salvage divers, and provides direct and timely access to the primary spill response service area. Piers 12 and 15 are centrally located and provide sufficient shoreside support areas. The proposed improvements would upgrade currently substandard, underutilized berthing assets, increasing berthing capability and optimizing the use of harbor resources.

2.4. OPTIONS FOR PROJECT SCOPE

2.4.1 Minimal Improvement to Piers 12 and 15

In scoping the proposed project, DOT-H evaluated options concerning the project scope, or extent and degree of physical improvements to pursue. For example, one option could be to make the minimum improvements needed to berth vessels in this location. The reason for a minimal approach would be to keep overall project cost to a minimum.

Minimal pier improvements could include installation of mooring dolphins only (no loading platform) or installation of fenders needed to make the existing piers usable for berthing. There would be no loading platform, and pile driving would be limited to the mooring dolphins. If mooring dolphins were installed, pile driving would still be needed, although not as many as are proposed for the preferred alternative which includes a loading platform. There is still a risk that coral resources could be impacted at Pier 12.

Installation of fenders could present a different challenge, as they would require the installation of a steel standoff box secured by deadman anchor bolts into the existing pier face. The structural integrity of the pier would need to be evaluated to confirm whether this option is feasible, but a preliminary assessment recommended against it. In addition, because Pier 12 is a historic structure, it is likely that modifications to the bulkhead would not be viewed favorably by the State Historic Preservation Division. The proposed pile supported slab, on the other hand, does not impose any structural load on the existing bulkhead and is self supporting.

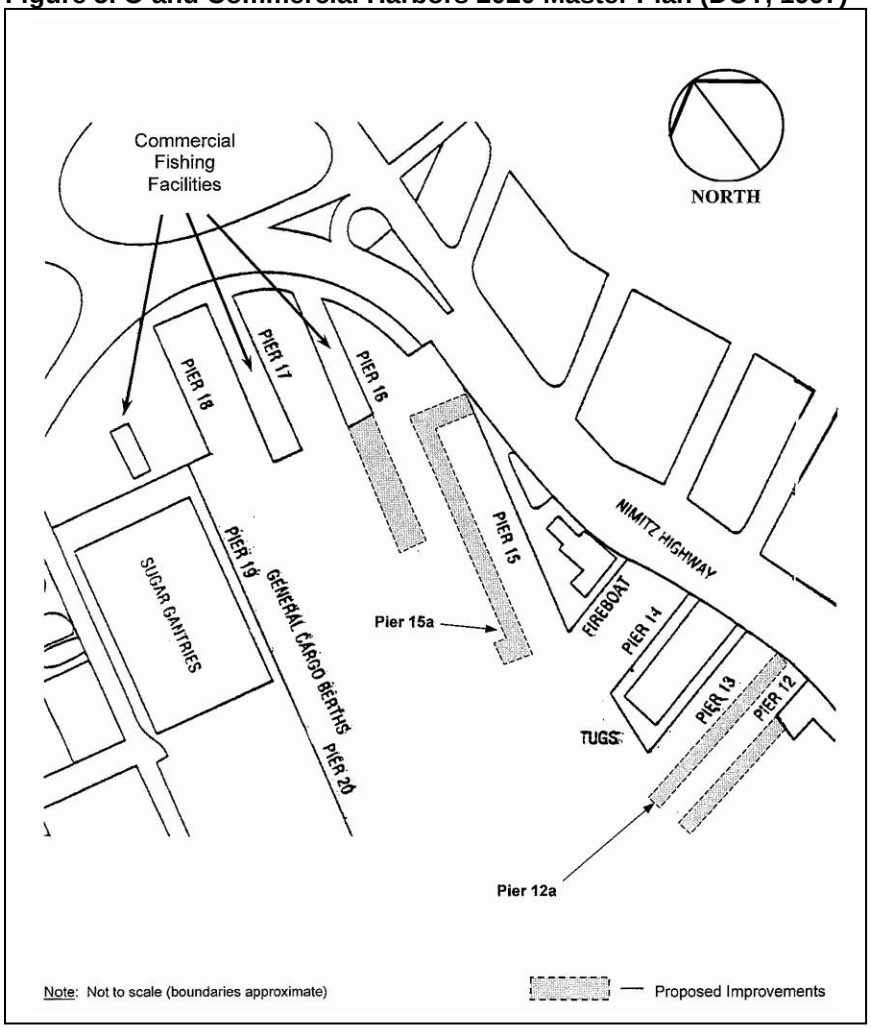
Even if fenders and other minimal improvements were installed, this option would allow the MSRC and CIC vessels to tie up at the berths, but would not provide a platform needed for the efficient loading and unloading of vessels. Spill response vessels would still need to go to another pier, such as Pier 13 for loading and unloading, maintenance, and fueling. Operations and maintenance would be inefficient and more time consuming.

While the Minimal Improvements alternative could meet the project purpose and need, it was found to be less desirable than the proposed alternative. There would be lower upfront capital costs, but this alternative would result in ongoing operational inefficiency. From an environmental standpoint, there appears to be some advantage to this alternative, as there would be fewer in-water piles required around the piers, and less impact on coral resources. However, there could be greater physical impact to the historic Pier 12, and it needs to be confirmed whether the existing pier bulkheads could support the improvements.

2.4.2 Finger Piers for Fishing Boats (as proposed in O‘ahu Commercial Harbors 2020 Plan)

The *O‘ahu Commercial Harbors 2020 Master Plan* (1997) (2020 Master Plan), prepared by DOT-H, looked at the potential development of finger piers at Piers 12 through 16. At the time, the intent was to create additional berthing for domestic commercial fishing vessels and possibly docking of commercial tour vessels.

Figure 5. O‘ahu Commercial Harbors 2020 Master Plan (DOT, 1997)



The 1997 Environmental Impact Statement (EIS) prepared for the master plan described the proposed improvements as follows:

> *"Finger Pier 12a will be constructed between Piers 12 and 13. Finger Pier 12a will be approximately 475 feet in length by 10 feet in width, extending directly into Honolulu Harbor.*
>
> *Finger Pier 15a will be constructed as an attachment to the northern end of Pier 15 and will provide an additional 10 berths. Finger Pier 15a will consist of a segment approximately 30' wide by 140' long which will extend westward into the harbor. At the end of this 30'x140' segment there will be an additional extension measuring approximately 20' in width by 450' in length. This additional section will extend southward in the direction of Pier 14."*

In the 15 years since the 2020 Master Plan was prepared, commercial fishing processing in Honolulu Harbor has consolidated in the Piers 37 and 38 area. Berthing of the fishing vessels are at Piers 16 and 17, and Pier 36 areas. Prohibitions and restrictions on long-line fishing since 1997 have significantly decreased the number of commercial fishing vessels operating out of Honolulu Harbor. As a result, there is not the same level of demand for commercial fishing piers in Honolulu Harbor, and existing facilities are adequate to support present and anticipated needs.

The 2020 Master Plan recommendation for finger piers is no longer current. In recent years, the development of the Kapālama Container Terminal (which was also identified in the 2020 Master Plan) has become the DOT-H's top priority for the harbor. The proposed improvements at Piers 12 and 15 support and are compatible with the long-range strategy to develop the Kapālama Container Terminal.

2.5 ALTERNATIVE STRUCTURAL TYPES OF BERTHING

In addition to alternative actions and alternative locations within and outside Honolulu Harbor, there are alternative structural types of piers and wharves that could be developed. Two general types are open and solid structures. These types of berthing structures vary by functionality, physical appearance, cost, and environmental impact.

Open-type structures are pile supported and allow water to flow underneath. The solid-type berth use a retaining structure such as an anchored sheet pile wall, behind which fill is placed. Water cannot flow under a solid-type structure. In proposing improvements to Piers 12 and 15, DOT-H had the option to pursue either open or solid type structures. These alternatives are described below.

2.5.1 Solid-Type Structure: Bulkhead with Sheet Piles and Backfill Alternative

This alternative is a solid-type berthing structure, consisting of a tied-back bulkhead wharf design, illustrated below. For this type of design, interconnected steel sheet piling is used to provide a solid, vertical bulkhead behind which backfill is placed to form a contiguous yard area. The sheet pile bulkhead consists of steel or concrete sheet piling with interlocking tongue and groove joints and a "cap" of steel or concrete construction. The sheet pile bulkhead is restrained from outward movement (due to lateral earth pressures) by installing below the top of the bulkhead an anchorage system usually consisting of steel anchor rods and concrete deadman anchors.

A solid wharf structure at Pier 12 and 15 would have both a higher development cost and greater environmental impacts than the preferred alternative. The installation of the sheet pile and large amount of backfill would completely destroy existing coral colonies immediately around the existing wharf. The existing shoreline, in particular the previously unmodified, historic shoreline at Pier 12, would be altered.

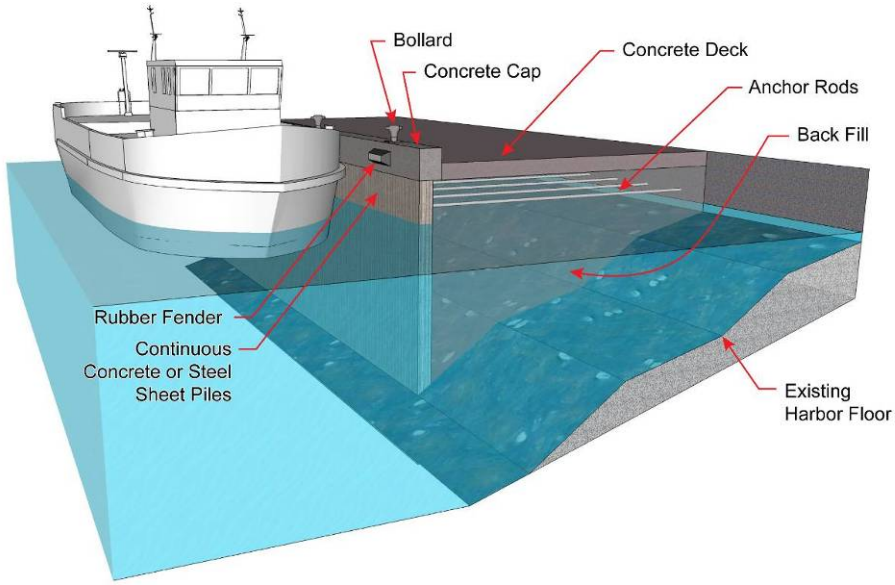


Figure 6. Solid-Type Structure: Bulkhead with Sheet Piles and Backfill

During construction, noise and water quality impacts would be greater than the proposed alternative. For these reasons, this type of structure was never seriously considered for this location.

2.5.2 Open-Type Structure

Pile-Supported Full Length Platform Alternative

As noted above, open wharf structures allow water to flow underneath. A common type of open wharf structure is a platform consisting of concrete slabs spanning between concrete (cap) beams that are supported by precast, prestressed concrete piles driven into the harbor floor, as illustrated below. This alternative provides for a continuous, full length concrete platform, equipped with mooring bollards and berthing fenders and other appurtenances and features required to service and support the berthed vessels. A pile supported full length platform open wharf structure would have less impact on marine resources (coral) and water quality than construction of a solid wharf structure.

Because at Piers 12 and 15 the water depths next to the shore are too shallow to berth the CIC and MSRC vessels respectively, under this alternative, the wharf platform would be located offshore in deeper water, and connected to the shore by an access ramp. The access ramp structure will not be connected to and supported by the existing bulkheads at Piers 12 and 15. At Pier 12, the CIC vessel will be berthed 20 feet from the existing bulkhead, and at Pier 15, the MRSC vessel and barge will be berthed 35 feet from the existing bulkhead.

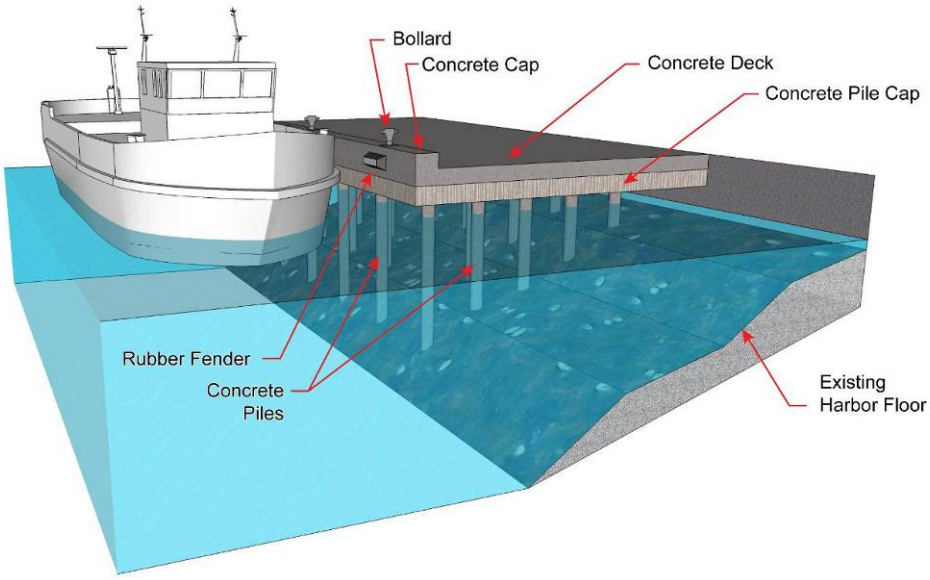


Figure 7. Open-Type Structure: Pile-Supported Full Length Platform

Pile Supported Mooring Dolphins and Loading Platform Alternative

A second variation of an open structure utilizes pile supported mooring dolphins in lieu of a concrete platform, in conjunction with a shorter length loading platform. The dolphins are small independent pile-supported concrete platforms, equipped with a bollard and a rubber fender system, that are accessed by grated catwalks connected to a loading platform. The locations of the dolphins at each wharf are based on the locations of the mooring line attachment points to the vessel.

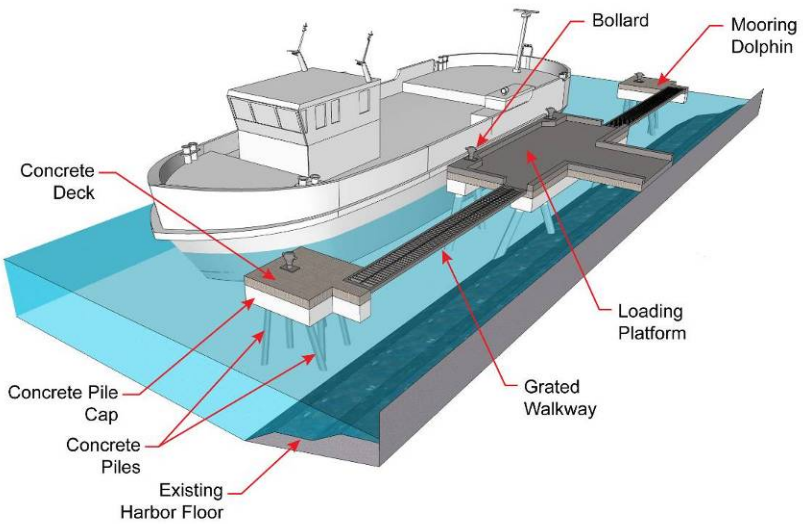


Figure 8. Open-Type Structure: Mooring Dolphins and Loading Platform

Comparison of Open-Type Structures

There were two variations of Open-Type berthing structures considered, one with a full length platform and the other with mooring dolphins. The proposed action is the second type, utilizing mooring dolphins.

A full-length platform provides greater versatility in berthing various types of vessels. For example, mooring dolphins may be adequate for berthing specific vessels, but may not be able to accommodate other, larger vessels. However, the primary advantage of utilizing dolphins is lower construction cost compared to a full length platform. For this reason, pile supported mooring dolphins was selected as the most cost effective and environmentally sound option that would fully meet the project's purpose and need.

The preferred alternative is an open wharf structure which will be located offshore, utilizing pile supported mooring dolphins in conjunction with a shorter length loading platform. The particular length and location of the loading platform for each wharf were selected based upon discussions with both CIC and with MSRC to insure that the storage, loading and unloading needs of each vessel were met.

Another potential benefit of utilizing dolphins is that they minimize the structure's in-water footprint and avoid the need for dredging or filling.

2.6 OTHER POTENTIAL DESIGN MODIFICATIONS

The preferred alternative involves pile supported berthing dolphins and loading platforms. During the environmental evaluation process, potential design modifications were considered in an effort to avoid or minimize the project's impact on coral resources at Pier 12. They are discussed below:

2.6.1 Extend Pier 12 Berthing Structure Further From Bulkhead

One option explored during the design phase was to extend the mooring dolphins and loading platform at Pier 12 further offshore, in order to minimize impact to the existing coral shelf. The marine biological surveys (AECOS, 2012) found abundant coral in the area around Pier 12 where the loading platform and mooring dolphins are proposed. The biologists noted that if the berthing structure at Pier 12 could be pushed out from the bulkhead an additional 15 feet (over currently proposed location), the pilings would avoid most of the coral shelf.

In evaluating this option, DOT-H consulted with the future Pier 12 user, Clean Islands Council (CIC), and users of adjacent Pier 13 (American Marine) to discuss whether the pier design could be modified. The pier users agreed that shifting the pier structure another 15 feet seaward would adversely impact adjacent operations at Pier 13. The American Marine barges and vessels along Pier 13 are often double berthed, or berthed perpendicular to the wharf. The reduced clearance between Piers 12 and 13 would impede safe ship movement, creating a safety hazard for both the CIC and American Marine vessels. As a result, this design modification was eliminated from further consideration.

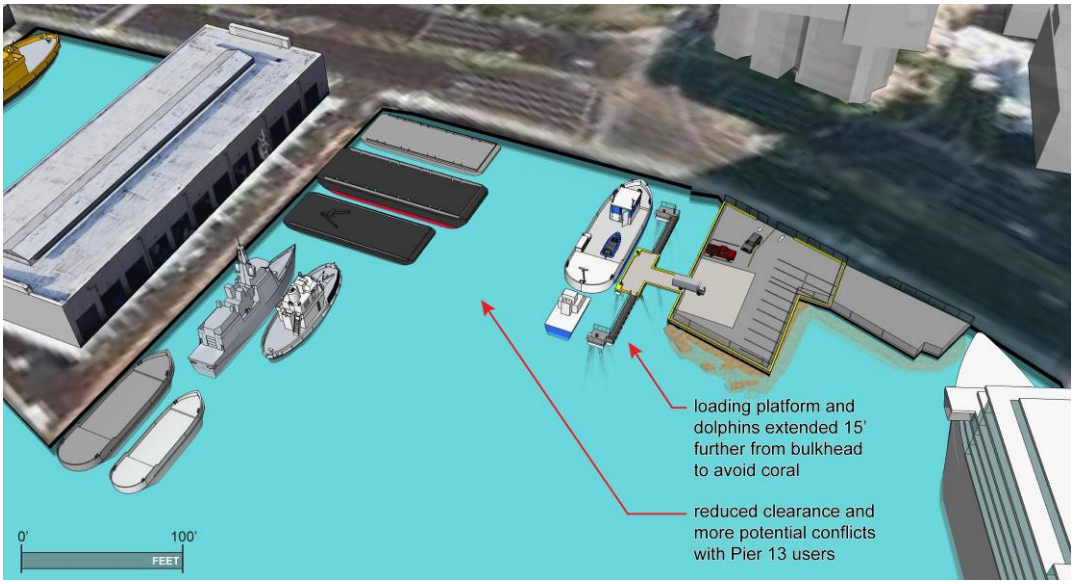


Figure 9. Extend Pier 12 Structure Further From Bulkhead

2.6.2 Eliminate One Mooring Dolphin at Pier 12

A second design modification that was investigated to minimize impacts to corals at Pier 12 was the elimination of the mauka-most (i.e., northern most) mooring dolphin and catwalk extending from the loading platform. This modification would eliminate 4+ piles in the water at the end of the berth which is closest to the coral shelf. The loading platform and makai-most mooring dolphin are located in deeper water which has less coral growth. To compensate for the eliminated dolphin, the CIC vessel would tie up to a landside bollard.

Investigation of this option required engineering of the multi-directional wave forces that would be imposed on the CIC vessel as it is berthed at Pier 12. The evaluation concluded that although a shore-side bollard could provide adequate stabilization for a moored ship, the absence of a dolphin in the water presented risks when maneuvering the vessel into the berth, particularly stern-first.

Without a dolphin as a visual and physical guide, there was an increased risk of the CIC vessel pivoting or drifting toward the pier, colliding with the bulkhead. This could cause damage to the vessel, the bulkhead, and the shallow coral shelf along the bulkhead. The risk of a collision would be lower when the vessel approaches the pier bow first (as would happen most of the time). However, during a stern-first approach, the risk of backing into or drifting into the bulkhead is higher. A stern-first approach may be used for certain loading and unloading operations. It was noted that during storm conditions, vessels are typically berthed stern-first, as pointing the bow out toward incoming waves offers less resistance.

DOT-H concluded that the elimination of one mooring dolphin, while reducing impacts to corals from pile driving, presented its own operational risks. As such, it was eliminated from further consideration.

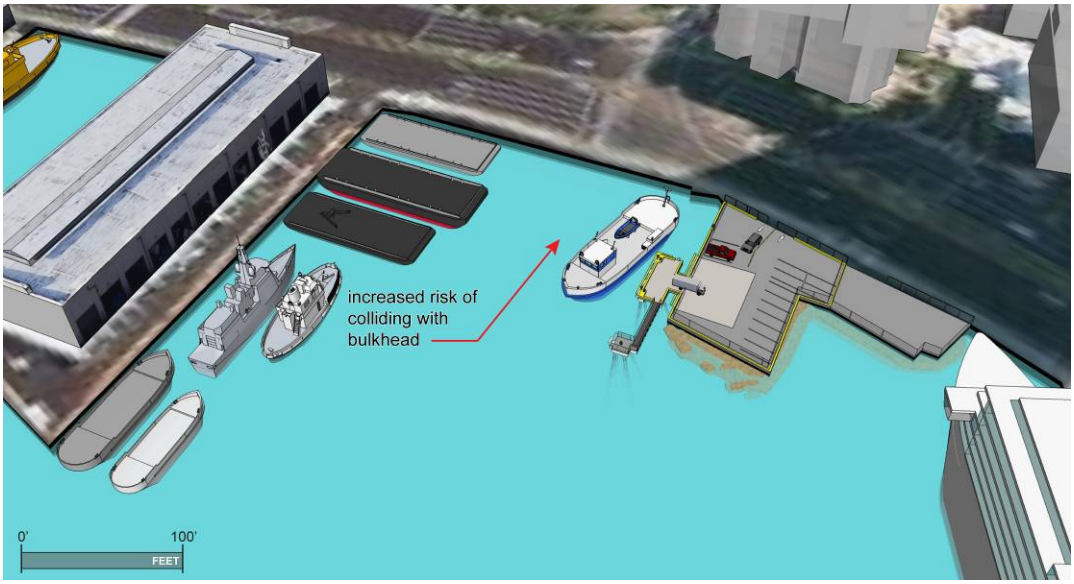


Figure 10. Eliminate One Mooring Dolphin at Pier 12

2.7 PREFERRED ALTERNATIVE: PIER 12 & 15 IMPROVEMENTS

The preferred alternative is the construction of permanent berthing facilities for MSRC and CIC vessels at Piers 12 and 15 in Honolulu Harbor. The preferred alternative, described in Chapter 1, consists of pile supported mooring dolphins and pile supported loading platforms that are not connected to or impose a load on the existing Pier 12 or Pier 15 bulkheads. At Pier 12, the CIC boat will be berthed 20 feet from the existing bulkhead, and at Pier 15, a MSRC boat and barge will be berthed 35 feet from the existing bulkhead.

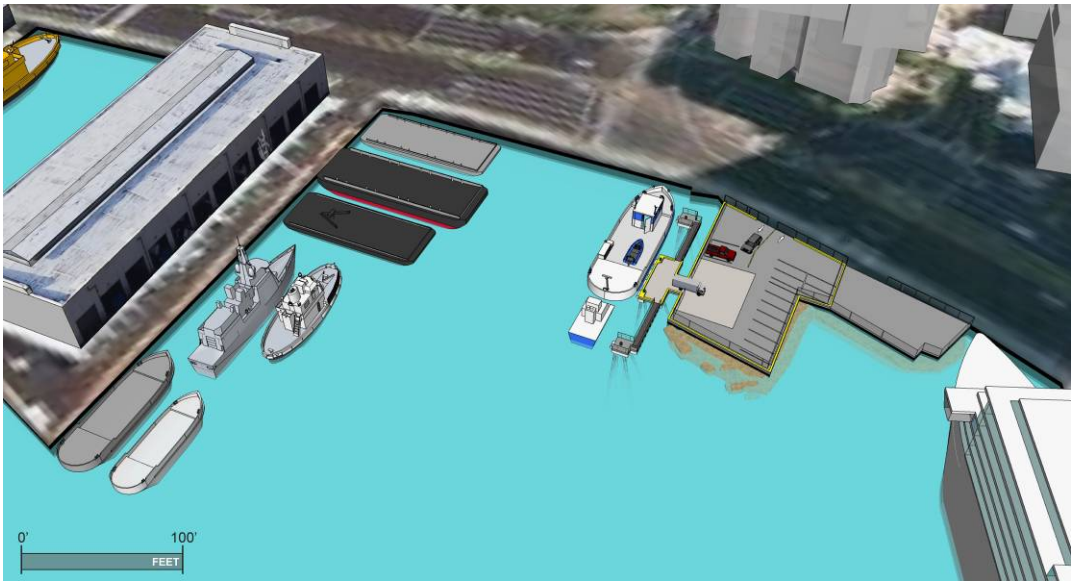


Figure 11. Preferred Alternative at Pier 12

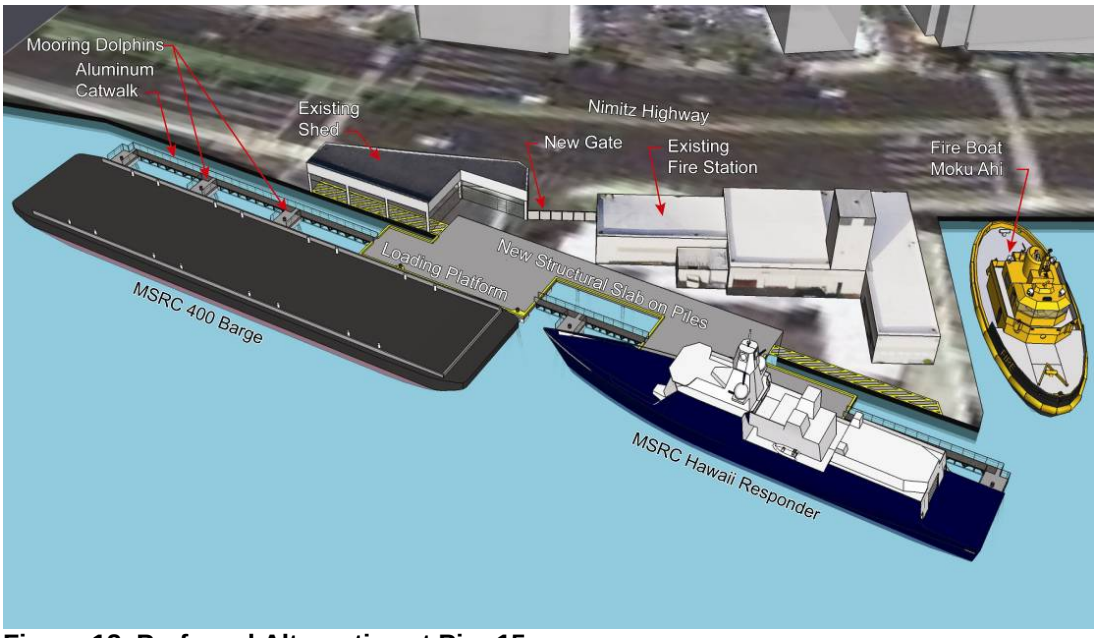


Figure 12. Preferred Alternative at Pier 15

The Pier 12 and 15 locations and the proposed design were selected after considering all of the alternatives described in this chapter. The preferred alternative was selected as the most operationally efficient, cost effective and environmentally sound option that would fully meet the project's purpose and need.

The proposed location near the mouth of Honolulu Harbor provides direct access out of the harbor, providing timely response to a spill incident. This location also consolidates spill response vessels with similar emergency responders; e.g., fire station, fire boat, and salvage divers (at Pier 13). Pier 12 is currently unused, and the fire station and fire boat at Pier 15 will not be impacted. The use is compatible with the fire station and the fire boat will continue to berth along one face of Pier 15. The shoreside area can accommodate the loading and unloading areas that are needed to support the spill response vessels and has direct access to Nimitz Highway. By upgrading two currently underutilized berths, the project will optimize the use of the State's waterfront resources.

As far as structural alternatives, an open-type structure has significantly fewer environmental impacts than a solid-type sheet pile and bulkhead structure which would require the placement of large amounts of fill. Among open structures, the proposed loading platform and mooring dolphins would have fewer in-water piles compared to a traditional concrete pile and deck pier.

The proposed structure will minimize both construction costs and environmental impact. A new structural slab on piles over the existing bulkhead, avoids physical impacts to the historic Pier 12 and potentially costly upgrades to both existing structures. Extending the berthing structures away from the existing pier bulkheads avoids dredging and minimizes impact to corals at Pier 12 that are along the bulkhead face. Although some coral resources will be lost, a loading platform and dolphins require fewer piles than a traditional pier design, reducing the environmental impact.

Based on the alternatives discussed in this chapter, the proposed project provides an optimal balance between operational efficiency, cost, flexibility, and safety for the proposed users and adjacent harbor tenants.

2.8 SUMMARY OF ALTERNATIVES CONSIDERED

Table 2-1: Comparison of Alternatives

Alternative	Description	Pros and Cons	Environmental Impacts
No Action	No improvement to Pier 12 & 15.Piers remain in current condition.	***Pros:*** No cost. ***Cons:*** Berthing site still needed for MSRC and CIC which are being displaced from Pier 35.	No construction-related impacts. Potential adverse effect on State's oil spill response capability if there is no permanent berth for spill response vessels.
Alternative Locations			
Keʻehi Lagoon	Locate MSRC & CIC to Keʻehi Lagoon. This was once proposed as long-term relocation site.	***Pros:*** Close to Hawaiʻi Oil Spill Center headquarters. Good access to Honolulu Harbor and other locations. ***Cons:*** May still require interim site.	Construction-related impacts to marine biota depends on local conditions; additional surveys are needed to determine. Noise, turbidity and potential impact to endangered species similar to proposed action, and similar construction BMPs are required.
Other Location Outside Honolulu Harbor	Oʻahu—Kalaeloa/Barbers Point, Pearl Harbor, Kaneʻohe Bay. Other islands--Maui, Molokaʻi, Kauaʻi, Hawaiʻi Island.	***Pros:*** Kalaeloa would provide timely response to fuel moorings near Barbers Point. ***Cons:*** Available berths needs to be identified at other locations. Pearl Harbor eliminated due to security and logistic issues. Kaneʻohe Bay and other islands would result in slower incident response due to distance from high activity Honolulu Harbor. May result in some logistical/coordination challenges with Sand Island-based control center and other emergency responders that are located in Honolulu Harbor.	Construction-related impacts to marine biota depends on local conditions; additional surveys are needed to determine. Noise, turbidity and potential impact to endangered species similar to proposed action, and similar construction BMPs are required.
Other Location in Honolulu Harbor	Piers 19 and 20	***Pros:*** Central harbor location in proximity to other emergency responders. No additional berthing improvements required. ***Cons:*** Would tie up a prime berth which is needed for overflow and flex space.	Construction-related impacts to marine biota depends on local conditions; additional surveys are needed to determine. Noise, turbidity and potential impact to endangered species similar to proposed action, and similar construction BMPs are required.
Pier 15 Only	Limit proposed improvements to Pier 15 only.	***Pros:*** Avoids impacts to historic Pier 12 and coral resources which are more	Would avoid adverse impacts to corals resources at Pier 12, where colonies are most

Alternative	Description	Pros and Cons	Environmental Impacts
		robust at Pier 12. ***Cons:*** Still some historic and coral impact. Vessels would have to double berth which is operationally inefficient and could hamper ship movement at adjacent Piers 13 & 14.	robust. Would avoid adverse impact to historic Pier 12. Noise, turbidity and potential impact to endangered species similar to proposed action, and similar construction BMPs are required.
Preferred Location: Pier 12 & 15	Proposed Action: improvements at Piers 12 & 15.	***Pros:*** Close to other emergency responders, provides quick access in and out of harbor. Productive use of underutilized berths. Does not displace other users. ***Cons***: Requires capital improvements to existing piers. Adverse impacts on historic structures and coral resources.	Adverse impacts to coral colonies, historic piers and shed at Pier 15. Extending berthing structures out from existing bulkhead reduces pile driving in areas near bulkhead where coral is more robust.
Options for Project Scope			
Minimal Improvements to Pier 12 & 15	Minimal improvements—mooring dolphins and fenders. No loading platforms.	***Pros:*** Minimizes project costs. No loading platform reduces impact on corals, but piles are still needed for dolphins. ***Cons:*** Fender installation with no new loading platform will require investigation into structural integrity of pier. Less operational efficiency than proposed action.	Elimination of loading platforms reduces the number of in-water piles and reduces impact on corals.
Finger Piers	Proposal from O‘ahu Commercial Harbors 2020 Master Plan (1997) for finger piers. Piers were intended primarily for commercial fishing vessels.	***Pros:*** None ***Cons:*** Conditions have changed since 2020 Master Plan; reduced demand for commercial fishing piers in Honolulu Harbor. DOT-H highest priority is now development of the Kapālama Container Terminal.	Pier structures and pilings would have similar construction period impacts on marine biota, including corals, as proposed action.
Alternative Structural Types			
Bulkhead with Sheet piles and Backfill	Installation of sheet pile bulkhead with backfill placed behind it.	***Pros:*** Will provide greater flexibility in berthing various types of vessels of different sizes. May have longer useful life and require less ongoing maintenance than other structural types. ***Cons:*** Higher initial construction cost. May require dredging to provide adequate depth.	Far greater environmental impact to marine resources due to filling and destruction of coral shelf along existing bulkhead. Higher potential for water quality impacts during construction. Greater physical impact to historic pier structures and historic district.

Alternative	Description	Pros and Cons	Environmental Impacts
Concrete Pile and Deck	Concrete slab placed over concrete piles providing for continuous berthing platform.	***Pros:*** Provides more flexibility than proposed action in types and sizes of vessels that can be accommodated. May have longer useful life than proposed action. ***Cons:*** Higher initial construction cost than proposed action. May require dredging to provide adequate depth.	More piles than proposed action needed to accommodate full length platform. Piles will also be closer to existing coral shelf, and may be greater adverse impact to corals. Continuous platform will have greater shading impact on corals.
Preferred Type: Pile Supported Mooring Dolphins and Loading Platform	Pile supported mooring dolphins with shorter loading platform, in lieu of continuous concrete platform. Grated catwalks connect dolphin to loading platform.	***Pros:*** Minimizes number of piles in water. Berthing structure can be extended out from existing bulkhead to provide adequate water depth and minimize impacts to corals. Lower construction cost than standard concrete pile and deck alternative. No dredging required. ***Cons:*** Design configuration tailored for MSRC and CIC, but may not be able to accommodate some other types of vessels.	Adverse impacts to corals particularly around Pier 12. Determined to have adverse impacts to historic piers, historic era shed, and Chinatown historic district.
Other Design Modifications			
Extend Pier 12 Structure Seaward	Use mooring dolphins and berthing platform but extend further offshore to reduce impact to existing coral shelf.	***Pros:*** Would reduce adverse impact to corals due to pile driving and vessel shading. ***Cons:*** Potential adverse impact to vessel movements at adjacent Pier 13.	Fewer direct impacts on corals compared to proposed action, because coral colonies are fewer in deeper waters away from existing bulkhead. Visual impact on Chinatown historic district needs to be evaluated.
Eliminate One Mooring Dolphin at Pier 12	Eliminate mauka-most dolphin and catwalk which would eliminate 4+ piles in the area with most abundant coral resources.	***Pros***: Reduced impact on corals. CIC vessel could tie up at landside bollard in lieu of dolphin. ***Cons:*** Provides somewhat less berthing stability against multi-directional wave forces. Increased risk of vessel collision with bulkhead because of absence of protective dolphin.	Fewer adverse impacts than proposed action on coral resources. Eliminated dolphin is in shallower water near existing bulkhead where coral colonies are most abundant.

3 AFFECTED ENVIRONMENT, IMPACTS AND MITIGATION

3.1 INTRODUCTION

This chapter describes the existing environment, potential project impacts and proposed mitigation. This chapter is organized by resource area, and is generally divided into: 1) Physical Environment, 2) Biological Environment, and 3) Human-Made Environment. The Human-Made Environment section covers topics such as socio-economic conditions, archaeological and cultural resources, utilities, traffic, and public services.

The discussion of environmental impacts includes both direct and indirect impacts. Direct impacts are those caused by the action and occur at the same place and time. Indirect effects may occur later in time or farther in distance, but are still reasonably foreseeable. The analysis in this chapter also identifies possible cumulative environmental impacts. Cumulative impacts are defined as the results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

This section also evaluates the environmental impacts of the alternatives to the proposed action, which were discussed in Chapter 2.

3.2 PHYSICAL ENVIRONMENT

3.2.1 Background

The proposed action involves improvements to two pier structures within Honolulu Harbor on O‘ahu’s south shore, within downtown Honolulu. The piers are immediately adjacent and makai of Nimitz Highway. Pier 12 is located along Nimitz Highway at the makai or seaward end of Bethel Street. Pier 15 is located ewa (north) of Pier 12 along Nimitz Highway, between Maunakea and Kekaulike Streets.

3.2.2 Climate and Air Quality

3.2.2.1 Existing Conditions

Climate

The climate of the Honolulu area is typical of the leeward coastal lowlands of O‘ahu. The area is characterized by abundant sunshine, persistent tradewinds, relatively constant temperatures, moderate humidity, and the infrequency of severe storms. Northeasterly tradewinds prevail throughout the year although its frequency varies from more than 90 percent during the summer months to 50 percent in January. The average annual wind velocity is approximately 10 miles per hour.

The mean temperature measured at Honolulu International Airport ranges from 70 degrees Fahrenheit in the winter to 80 degrees Fahrenheit in the summer. The temperatures at the waterfront project area may be slightly cooler due to increased wind velocities near the open waters.

The average annual precipitation is approximately 24 inches, with most of the rainfall occurring between November and April. Relative humidity ranges between 56 and 72 percent. As in most of Hawai‘i, the surface winds in the project area are influenced by northeast trade winds. However, the “normal” northeasterly trade winds tend to break down in the fall, giving way to light, variable wind conditions through the winter and early spring (DOT, 1999).

Climate Change

Impacts from global climate change are extensive and varied, from ocean and atmospheric warming to increased threats to public health and safety. In Hawai‘i, an interdisciplinary working group was established by the State Office of Planning, Coastal Zone Management (CZM) Program, with assistance from the University of Hawai‘i’s Center for Island Climate Adaptation and Policy (ICAP). The State of Hawai‘i’s Ocean Resources Management Plan (ORMP) Working Group subsequently prepared a document entitled *“A Framework for Climate Change Adaptation in Hawaii”* (2009). The purpose of this document was to encourage and facilitate state, local and federal agencies, policy makers, business, and community partners to plan ahead for the impacts of climate change. Potential impacts and planning considerations were identified by the document. Among the potential impacts identified for “Port and Harbor Management” are:

- Submersion of harbor infrastructure due to sea level rise and flooding
- Increased public safety risk at passenger terminals due to hazardous flooding conditions
- 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

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 Working Group) and considering climate change adaptation in its harbor master plans and designs.

In 2011, the O‘ahu Metropolitan Planning Organization (OMPO) held a two-day workshop addressing the climate change risk for major O‘ahu transportation assets, including Honolulu Harbor, Honolulu International Airport, Kalaeloa area, and bridges at Waikiki. A study was issued at the conclusion of the workshop (OMPO, 2011) which assessed the risk for these transportation assets 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). Honolulu Harbor was assessed as having a high risk level for both 2050 and 2100 based on its high vulnerability to storm surges and because of its high socioeconomic importance. The integrated risk assessment for Honolulu Harbor was rated high in both these years due to the O‘ahu’s dependence on imported goods, most of which enter through Honolulu Harbor (DOT, 2012).

Air Quality

National Ambient Air Quality Standards (NAAQS) have been established for seven major air pollutants: carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), particulate matter smaller than 10 microns (PM_{10}), particulate matter smaller than 2.5 microns ($PM_{2.5}$), sulfur oxides (SO_x), and lead. Air pollutant levels are monitored by the State Department of Health (DOH) at a network of sampling stations statewide, although there are no sampling stations in windward O‘ahu. Based on ambient air monitoring data, the U.S. Environmental Protection Agency has classified the island of O‘ahu and the entire State of Hawai‘i as being in attainment of the federal standards.

Air quality within the project area is good, as the surrounding general area is part of urban Honolulu with commercial, office and residential development, and its location near the ocean results in continuous on-shore breezes. There are no major sources of air pollution in the area.

3.2.2.2 Impacts and Mitigation

Demolition and construction activities will generate some dust in the immediate area. The construction contractor will employ fugitive dust emission control measures in compliance with provisions of the State DOH Rules and Regulations (Chapter 43, Section 10) and Hawai‘i Administrative Rules (HAR) Chapter 11-60.1, “Air Pollution Control,” Section 11-60.1-33 on Fugitive Dust. These measures to prevent dust from becoming air-borne will apply during non-working hours as well, including on weekends and holidays.

During site work, the contractor will sprinkle water, as necessary to control dust. In addition, the following measures will be implemented to minimize dust and air quality impacts:

- Provide an adequate water source at the site prior to start-up of construction activities;
- Pave work areas as soon as possible to reduce dust;
- Provide adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities
- Control dust from debris being hauled away from the project site;
- Move construction equipment to and from the work sites during non-peak traffic periods, to the extent possible, in order to minimize disruption to area traffic.

All best management practices shall not be removed until permanent erosion controls are in place and established. These construction-period air quality impacts will be temporary in duration.

Long-Term Impacts

The use of Piers 12 and 15 for the CIC and MSRC oil spill response vessels will not have a long-term adverse affect on air quality. These three spill response vessels are already operating in Honolulu Harbor, at Pier 35. Relocation of vessels, motor vehicles and equipment to Piers 12 and 15 will not cause a net increase in air pollutants.

Honolulu Harbor's vulnerability to climate change factors such as sea level rise and storm surge is a long-term issue that has been the subject of increased discussion by State and local government agencies and University of Hawai‘i scientists in recent years. The proposed action will not have an impact on climate change vulnerability, although the OMPO study noted that portions of Nimitz Highway may be vulnerable to storm surge flooding and ponding. Over the years, there is likely to be further consideration, discussion and planning for the impacts of climate change on Honolulu Harbor.

3.2.2.3 Impact of Alternatives to the Proposed Action

All of the alternatives to the proposed action, except for No Action, will result in temporary, construction period air quality impacts similar to the proposed action. With any alternative, construction best management practices to minimize fugitive dust would be employed, in accordance with State regulations. Once the proposed action is completed, emissions associated with operation of the spill response vessels, employee vehicles, and supply trucks would be similar regardless of where the berths were located or the type or design of the berths.

3.2.3 Geography and Soils

3.2.3.1 Existing Conditions

The Honolulu leeward coastal plain is stratified with late-Pleistocene coral reef substrate overlaid with calcareous marine beach sand, terrigenous sediments, and/or stream-fed alluvial deposits (Armstrong 1983:36). Terrigenous sediments are formed and deposited on land, or are materials derived from land mixed with purely marine material. The modern Hawaiian shoreline configuration, including Honolulu Harbor, is primarily the result of three factors: the rising sea level following the end of the Pleistocene; the 1.5-2.0 m- (4.9-6.6 ft) -high-stand of the sea during the mid to late Holocene; and prehistoric and historic human modification. (Cultural Surveys Hawai‘i, 2012).

Honolulu Harbor was created by the continual flow of fresh water from Nu‘uanu Valley into the ocean. The freshwater restricted the growth of coral, which resulted in the forming of a basin and the beginnings of the harbor. The freshwater flows also cut channels through the existing coral reef in which sand eventually began to accumulate. These sand accumulations grew over time, forming what would later become Sand Island.

Dredging of Honolulu Harbor over the years gradually increased the size and depth of the harbor basin and entrance channel. Dredged fill was used to create fast land, particularly on the seaward

reef at Sand Island (formerly Ānuenue Island). The Kāpalama Basin, also once a natural break in the reef, was eventually joined to the Main Harbor Basin by dredging a channel (Kāpalama Channel) between the two basins. In 1960, the western entrance channel (Kalihi Channel) was opened to Kāpalama Basin, substantially improving circulation within the latter basin and Honolulu Harbor as a whole.

A comparison of the existing and historic shorelines in the project area (CSH, 2012) shows that the existing shore near Pier 12 matches well with the original coastline. This indicates that this area has not been filled or dredged to the extent as most of Honolulu Harbor. The sloping limestone shelf at Pier 12, which remains well-populated with coral colonies today, appears to be the original natural submerged shelf. Pier 15 is located near the mouth of Nu‘uanu Stream. The historical shoreline here likely varied over time, influenced by deposition of sediment from the stream until the shore here was straightened and hardened.

Lands within the Pier 12 and 15 project area are relatively level with an elevation of approximately three feet above mean sea level (AMSL).

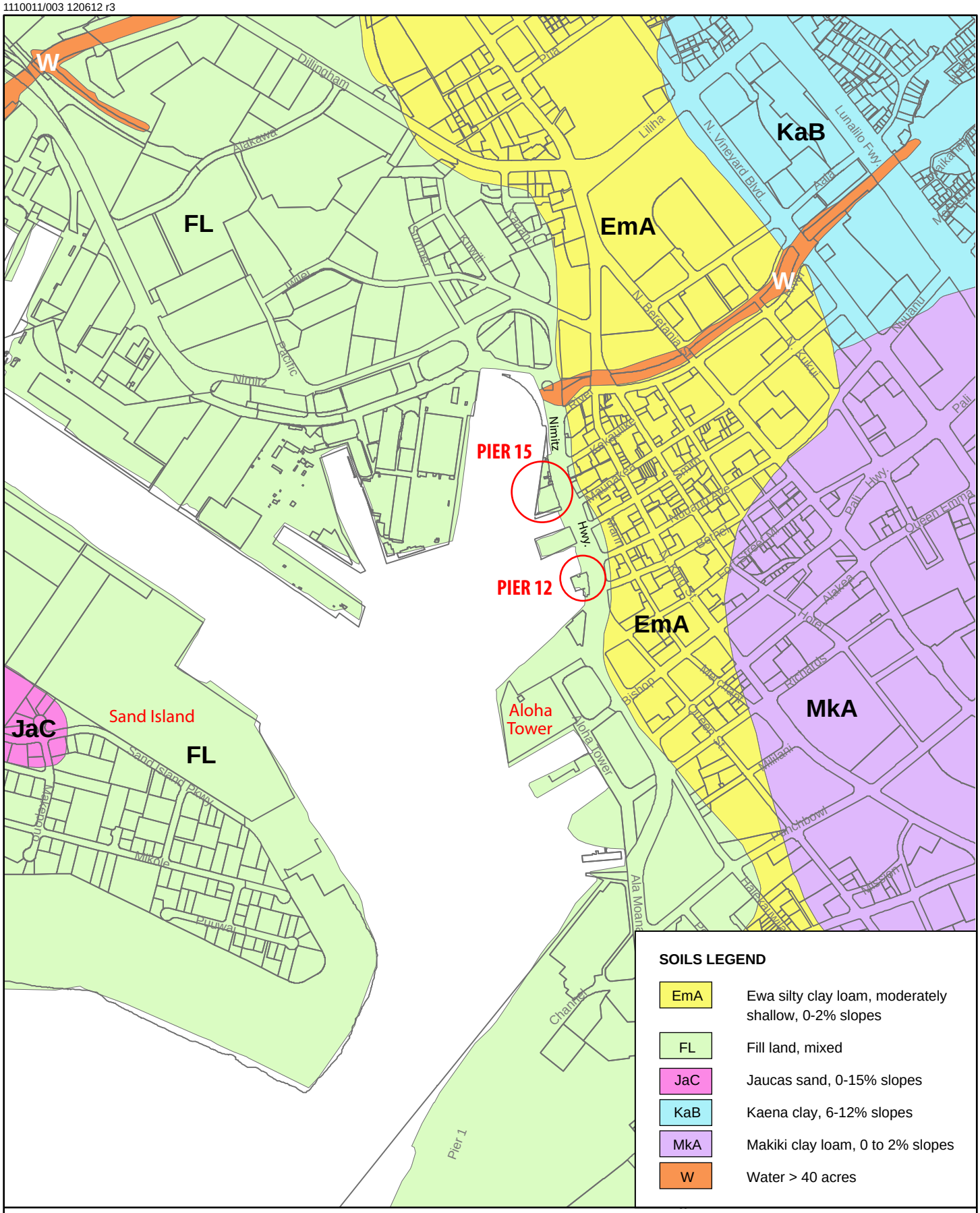
Soils

Project area soils are shown in Figure 13. According to U.S. Department of Agriculture (USDA) soil survey data (Foote et al. 1972) soils within the project area consist predominantly of Fill Land, Mixed (FL), with smaller pockets of Jaucas Sand (JaC) possibly in the *mauka* area of Pier 12. The area mauka of Nimitz Highway, outside the project area, contains Ewa Silty Clay Loam (EmA), moderately shallow, 0 to 2 percent slopes.

Fill Land is described as a land type occurring mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. (Foote et al. 1972). Jaucas series consists of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean…developed in wind and water deposited sand from coral and seashells…used for pasture, sugarcane, truck crops, alfalfa, recreational areas, wildlife habitat, and urban development.

3.2.3.2 Impacts and Mitigation

The existing Pier 12 and Pier 15 are currently paved in asphalt concrete. In order to install the new pile supported concrete slab, the existing asphalt concrete and concrete pavement will be saw cut and removed. There will be some removal of existing soil to install the new slab. At Pier 12, a new, 14-inch thick structural slab, 50 ft by 35 ft in size, will be placed over the existing bulkhead. The slab will be supported by 18 micropiles, each drilled to an approximate depth of 60 feet. At Pier 15, a new, 14-inch thick structural slab, 180 ft by 20 ft in size will be placed over the existing bulkhead. This structural slab will be supported by 20-inch octagonal piles. There will also be some trenching associated with installation of new utility lines.



SOILS LEGEND

EmA	Ewa silty clay loam, moderately shallow, 0-2% slopes
FL	Fill land, mixed
JaC	Jaucas sand, 0-15% slopes
KaB	Kaena clay, 6-12% slopes
MkA	Makiki clay loam, 0 to 2% slopes
W	Water > 40 acres

0 500 1000

SCALE IN FEET

FIGURE 13

SOILS MAP

Honolulu Harbor

Piers 12 and 15 Improvements

The fill soils within the project area would be disrupted by construction activities such as grading, pile driving, drilling, and excavations for utility and drainage improvements. Construction activities will employ best management practices to prevent soil loss and erosion. Any impact of construction activities on soils will be mitigated by measures outlined in the following regulations:

- Chapter 14, Articles 13-16 as related to Grading, Soil Erosion and Sediment Control, of the Revised Ordinance of Honolulu, 1990, as amended.
- Department of Planning and Permitting, Rules relating to Soil Erosion Standards and Guidelines, (1999);
- USDA Soil Conservation Services Erosion and Sediment Control Guide for Hawai‘i, (1968).

Best management practices for project construction are discussed below in Section 3.2.6, Marine Water Resources.

3.2.3.3 Impact of Alternatives to the Proposed Action

Any alternative involving construction of new berthing facilities will involve similar construction-period impacts to soils due to grading, pile driving, and utility installation. Most of the Honolulu Harbor shoreline consists of Fill Land, as does most of Ke‘ehi Lagoon. Of all the alternatives considered, a bulkhead structure with sheetpiles and backfill would result in the most significant modification of the existing shoreline, entail the greatest quantity of earth and soil movement, and would have the greatest potential for erosion and water quality impacts during construction. For any alternative, standard best management practices would be utilized to mitigate these impacts, and with these BMPs, no alternative would have an adverse impact on the environment.

3.2.4 Bathymetry and Marine Sediments

3.2.4.1 Existing Conditions

Bathymetry

At Pier 12, the sea floor varies in depth from minus 20 to minus 23 feet. At Pier 15, the depth varies under the MSRC barge from minus 13.5 to 20.5 feet and from minus 21.5 to minus 27.3 feet below the *MSRC Responder*. All sea floor elevations referenced mean lower low water (MLLW).

Sea Engineering Inc. conducted a bathymetric survey, side scan sonar survey and underwater inspection in the pier vicinities to ascertain if the proposed pier improvements could be accommodated. There is adequate water depth for vessel navigation and mooring at both piers provided the vessels are moored approximately 20 feet at Pier 12 and 35 feet at Pier 15 from the pier bulkhead.

Marine Sediment Chemistry

Methodology

An *Assessment of Marine Water and Sediment Chemistry* was conducted for the project (Appendix A) to evaluate the baseline conditions in the project area. Four sediment cores were taken in October 2012 by divers using hand-held 4" diameter Plexiglas coring tubes. Open ended tubes were pushed into the sediment to the 24" mark. Two samples were taken at Pier 12 and two at Pier 15. Sediment samples were analyzed for an extensive list of constituent that was supplied by the Department of Transportation, Harbors Division (DOT-H). The complete laboratory report, as well as the sampling locations, is contained in the report in Appendix A.

Results

Table 2 in Appendix A lists all sediment chemistry constituents that were detected in any of the four sediment samples, along with the reporting limits (RL) and minimum detection limits (MDL). Table 3 in Appendix A shows the chemical constituents that occurred at detectable levels, along with the applicable U.S. Environmental Protection Agency (USEPA) Region 9 Regional Screening Levels (RSLs), and the State of Hawai‘i Department of Health Environmental Action Levels (EALs).

Review of results indicated that all Oil and Grease was detected at both Pier 15 samples but not at Pier 12 samples. Total Recoverable Petroleum Hydrocarbons (TRPH), however, were not reported above the minimum detection limit in any of the samples. Of the twenty organochloride pesticides tested, two (Chlordane and Dieldrin) were found, with both compounds present at Pier 15 and only chlordane at Pier 12. Maximum concentrations of Chlordane and Dieldrin were above both the USEPA and DOH human health screening criteria. No Toxicity Characteristic Leaching Procedure (TCLP) organochloride pesticides were detected in any sample.

Numerous semivolatile organics were detected at both sampling sites in both surface and deep samples. Five semivolatile compounds (Benzo (a) Anthracene, Benzo (a) Pyrene, Benzo (b) Fluoranthene, Dibenz (a,h) Anthracene and Indeno (1,2,3-c-d) Pyrene) had maximum concentrations that exceeded the USEPA and DOH human health screening criteria. While no TCLP PCB's were detected were detected, numerous PCB congeners were detected in all samples using pressurized fluid extraction.

Of the compounds of tin, Tributytin was present in all samples, while Dibutyltin was present only in samples from Pier 12. Mercury was also present in all four samples at concentrations approximately an order of magnitude greater than the reporting limits and minimum detection limits.

TCLP Metals present in all samples included Antimony, Arsenic, Barium, Cobalt, Copper Lead, Molybdenum, Nickel Selenium, Vanadium and Zinc. Silver and Thallium only occurred in Sample P-15-S. Maximum concentrations of all metals exceeded the USEPA RSLs. No dissolved sulfides occurred in any samples, although volatile sulfides were present in all samples

with percentages ranging from 3.6 to 4.9%. Organic carbon comprised from 7.3 to 9.5% of samples at Pier 15, and 4.1 to 4.8% of sample weight at Pier 12.

3.2.4.2 Impacts and Mitigation

Bathymetry

The proposed action will not alter bathymetric conditions at Piers 12 and 15. The proposed action does not involve dredging or filling. The submerged lands will be modified by the installation of piles to support the berthing dolphins and loading platforms. At Pier 12, there will be a total of 20 piles under the loading platform and two mooring dolphins. Each octagonal pile will be 20-inches in diameter and placed in water depths ranging from four to 18 feet. At Pier 15, a total of 67 piles will be installed to support the two loading platforms and five mooring dolphins. In addition, the project will remove ten old concrete piles and other debris in the vicinity of Pier 15. The piles will be cut at the mud line to provide clearance for the future vessels, but not fully extracted from the harbor floor.

Sediment Chemistry

To assess the potential effects of materials found in sediments, comparisons were made to available documentation of composition of urban sediments. Several publications that examined levels of metals in the Ala Wai Canal and other areas of the Honolulu Watershed revealed levels of metals of the same magnitude as those found in sediments at Piers 12-15 (DeCarlo and Spencer 1997, DeCarlo and Anthony 2002, DeCarlo et al. 2004, 2005 in Marine Research Consultants, 2013). Organotins are common in harbors for use as antifouling coatings on vessels.

The *Assessment of Marine Water and Sediment Chemistry* (Appendix A) noted that several chemical components of sediment occurred in high concentrations relative to USEPA human health screening criteria. In particular, Chlordane, Dieldrin and metals occurred in elevated concentrations within the sediment column. Because the proposed action does not include dredging, there should be no considerations of ocean versus upland disposal with regard to toxicity potential. However, increased turbidity stemming from sediment resuspension will occur during in-water construction (pre-drilling, pile driving). As such, best management practices (BMPs) such as silt containment devices and extensive monitoring will be utilized.

Proposed BMPs during construction include the use of a full water depth silt curtain to enclose the work area during all in-water work. In water work includes pile extraction, probing, removal of obstructions, pre-drilling, pile driving, and pile cutting. If a plume is observed outside of the silt curtains and is caused by the construction activity, work will stop and corrective action taken immediately. Work will resume only after corrections have been made.

Once construction is completed, the new structures will be used by two spill response boats and one spill response barge. This will slightly increase vessel traffic compared to existing conditions. The increased vessel traffic may result in slight increases in sediment resuspension. However, ship movements to and from the berths will not be continuous, and high levels of CIC and MSRC vessel movement will occur mostly during spill response events. Moreover, the

project area is located in an existing working harbor, with existing vessels traffic and sediment resuspension. Marine organisms present in the area are tolerant of high turbidity levels. The slight increase in boat traffic as a result of the pier improvements is not likely to significantly reduce the quality of the marine environment.

3.2.4.3 Impact of Alternatives to the Proposed Action

All build alternatives would involve increases in ship traffic and water turbidity during operation of the spill response vessels. As with the proposed action, these increases will occur in a working harbor and are not expected to have an adverse impact on the marine environment.

During construction, all alternatives will entail modification to submerged lands by the installation of piles to support the berthing structures. The number and location of piles would vary by alternative design. The bulkhead with sheet piles alternative would have the greatest physical impact to the harbor floor, as it would fill in the area around the berth, essentially converting some submerged lands to fast lands. If another location in or outside Honolulu Harbor were selected, there is the possibility that dredging could be required to provide adequate water depth for the CIC and MSRC vessels. This would need to be determined by additional bathymetric investigation.

3.2.5 Ground and Surface Water

3.2.5.1 Existing Conditions

Honolulu Harbor is located over two groundwater aquifers. The overlying caprock aquifer is nonpotable and is not considered ecologically important. The general direction of groundwater flow is assumed to be seaward toward the harbor. The water table is approximately at sea level and fluctuates with the tide. The underlying basal aquifer is currently used for drinking water. The direction of groundwater flow is not known, but is presumed to be in a seaward direction. This aquifer is protected from surface contamination by the overlying caprock layer (Mink and Lau, 1990 in DOT, 1999).

The groundwater caprock layer is formed at the interface between upper sedimentary layers and the underlying basalt of the plain. The caprock forms a zone of low permeability which extends along the coastline, and in the project area, is believed to be between 800 to 900 feet thick. This impervious zone prevents the seaward movement of potable water from the basaltic aquifers (DOT, 1999).

The surface water resource in the immediate vicinity of Piers 12 and 15 is Nu‘uanu Stream, which discharges into Honolulu Harbor near Pier 15. Water quality of this stream is strongly influenced by surface runoff from surrounding industrial, commercial and residential areas. According to the State of Hawai‘i Department of Health *2004 Final List of Impaired Waters of Hawai‘i*, Nu‘uanu Stream is considered an impaired stream, and causes of impairment are listed as chlordane, dieldrin, nitrite/nitrate, nitrogen, trash and turbidity.

Other streams which discharge into Honolulu Harbor includes Kapālama Stream, which discharges at Piers 38-39, and Kalihi and Moanalua Streams which discharge into Keʻehi Lagoon.

3.2.5.2 Impacts and Mitigation

The project improvements will not adversely impact groundwater or surface water resources. The width and thickness of the caprock layer (800 to 900 feet) suggest that the basal potable groundwater will be relatively unaffected by the proposed modifications along the coastline (DOT, 1999).

The proposed action will have no impact on Nuʻuanu Stream or other surface water resources.

3.2.5.3 Impact of Alternatives to the Proposed Action

None of the project alternatives would have an adverse impact on groundwater or surface water resources.

3.2.6 Marine Water Resources

3.2.6.1 Existing Conditions

Marine waters in Hawaiʻi are divided into Class AA and Class A waters. Piers 12 and 15 are located within Honolulu Harbor, which is classified as Class A marine embayment. The harbor opens to Māmala Bay, also considered Class A marine waters. The Hawaiʻi Administrative Rules (HAR), Title 11 Chapter 54-Water Quality Standards defines Class A waters as those to be protected for recreational purposes and aesthetic enjoyment, propagation of fish, shellfish, and wildlife. These waters are not to receive any discharges that have not received the best degree of treatment or control compatible with the criteria established for this class.

The State of Hawaiʻi Department of Health (DOH) has identified Water Quality Limited Segments (WQLS) around the State, in accordance with Section 303(d) of the Clean Water Act. WQLS are defined as water bodies within the State, which without additional action to control non-point sources of pollution, cannot reasonably be expected to attain or maintain State Water Quality Standards. “Honolulu Harbor and Shore Areas” are listed on the Final 2004 List of Impaired Waters in Hawaiʻi. Cause of impairment in this location (Aloha Tower location) includes trash and turbidity.

Water Quality Analysis

An Assessment of Marine Water Quality and Sediment Chemistry was conducted for the project (see Appendix A). The water quality assessment included water samples collected at eight stations in the vicinity of Piers 12 and 15. Stations were located on three transects oriented from the shoreline nearest to Nimitz Highway and extending toward the center of the Harbor. Stations W-1, 2 and 3 were located between Piers 12 and 13; Stations W-4, 5 and 6 were located between Piers 14 and 15, and Stations W-7 and 8 were located off the central portion of Pier 15.

Surface samples were collected at a depth of 1 foot from the surface, while bottom samples were collected approximately 1 foot from the Harbor floor. All water samples were collected within a time interval of approximately 1½-hours so that temporal variability between locations was minimized. Analyses were performed for the following chemical constituents specified in DOH Water Quality Standards:

- ammonium (NH4+)
- nitrate + nitrite (NO3-+ NO2-, hereafter referred to as NO3-)
- total nitrogen (TN)
- total phosphorus (TP)
- turbidity
- Chl a
- pH
- dissolved oxygen
- temperature
- salinity

In addition, orthophosphate phosphorus (PO4-3) and dissolved silica (Si) are reported.

All samples were stored on ice following collection, and delivered to the analytical laboratory as soon as possible, where they were processed within 24 hrs of collection. All laboratory chemistry analyses were performed by Marine Analytical Services in Honolulu.

The results of the water chemistry analysis are shown in the report in Appendix A. Inspection of these data reveal several consistent trends throughout the sampling regime. At all stations, salinity of bottom water was constant at approximately 34.9‰. However, salinity of all surface samples was lower than the corresponding bottom sample. Similarly values of pH were consistently lower in surface samples. Conversely, values of Si, NO3- and NH4+ were substantially higher in all surface samples relative to bottom samples. These patterns of depressed salinity and elevated nutrients Si, NO3- and NH4+ suggest substantial input of groundwater or surface water to the section of the Harbor within the sampling area. The surface layer of low salinity, high nutrient water, is most pronounced at Stations W-7 and W-8, located off the center of Pier 15, while the stratification is least pronounced at Stations W-1, 2, and 3 between Piers 12 and 13. The gradient of decreasing nutrients and increasing salinity from north to south (Pier 15 toward Pier 12) suggest an effect of stream water input from Nu‘uanu Stream which discharges to the ocean in the area between Piers 15 and 16.

Other nutrients (PO43-, TP and TN) also display elevated concentrations in surface sample relative to bottom samples, however the gradients are much smaller than for Si, NO3- and NH4+. Values of Chlorophyll a also reveal a consistent pattern of slightly higher values in bottom water, while turbidity, temperature and dissolved oxygen show no consistency with respect to depth in the water column. All of these constituents are also similar in magnitude throughout the sampling regime with no obvious outliers.

State of Hawai‘i Department of Health (DOH) Water Quality Standards are based on statistical treatment of repetitive sampling events, in terms of both geometric means and “not to exceed more than 2% or 10% of the time” criteria. Hence, with a single sampling event, a data set cannot technically be applied to determination of any exceedance of State standards. However, comparison of data to values that comprise water quality criteria provide a general depiction of the status of an area of water with respect to applicable water quality standards.

The water chemistry data was compared to DOH geometric mean standards for embayments (Harbors are considered embayments) for both wet and dry conditions (differentiated by volume inflow relative to embayment volume). Comparison of the data to these standards indicates that all of the surface values of NO3- and NH4+ exceed all of the wet and dry geometric mean standards, and several of the “not to exceed” standards. However, most of the other constituents, including TP, TN, turbidity and Chlorophyll a are well below all of the standards. As discussed above, the elevated concentrations of NO3- and NH4+ in surface samples is likely a result of discharge of stream water which results in values above the most DOH limits.

3.2.6.2 Impacts and Mitigation

Construction Period

Shoreside construction activity has the potential to impact marine water quality. Construction activity will include cutting and removal of a portion of the pier slab and installation of replacement slab, pile driving, and building demolition. All have the potential to generate dust, construction debris, and oils that could enter the waters of the harbor.

Construction work in-water includes the placement of 20 piles at Pier 12 to support the two mooring dolphins and loading platform. At Pier 15, 67 piles will be installed to support five mooring dolphins and two loading platforms. At Pier 15, a number of old concrete piles will be extracted by cutting them at the mud line and removed. These activities will result in resuspension of sediments and elevated turbidity, temporarily impacting water quality.

These impacts will be temporary and controlled through the following Best Management Practices (BMPs) included on the project plans and specifications:

- The contractor shall use full water depth silt curtain to enclose the work area to control turbidity during all in-water work. In-water work shall include pile extraction, probing, removal of obstructions, pre-drilling, pile driving, and pile cutting. If a plume is observed out side of the silt curtains and is caused by the construction activity, the contractor shall stop the activity and take corrective action immediately. Work to resume only after corrections have been made.
- No debris shall be allowed to enter the water. The contractor shall provide a temporary platform or other suitable positive means of capturing debris from demolition operations.
- Fresh concrete shall be prevented from entering the harbor during all concreting work. Concrete shall not overflow formwork. Formwork and joints shall be sealed against concrete leakage.

- When working on sewer pipes and pipes that contain oil or other pollutants, contractor shall capture all pollutants and dispose of them off site.
- Erosion control measures shall be in place before any demolition is started. Erosion control measures include, but are not limited to silt fence, inlet protection, gravel ingress/egress and dust control.
- Gravel construction for ingress/egress shall be used to minimize off-site tracking of sediment by construction vehicles.
- Contractor shall prevent dust from work becoming airborne at all times, including non-working hours, weekends and holidays, in conformance with State Department of Health Administrative Rules, Title 11, Chapter 60-Air Pollution.
- All best management practices (BMPs) shall not be removed until all permanent erosion controls are in place and are established.
- Contractor shall maintain and clear blockage and debris from the erosion control measures as necessary and after heavy rain storms.
- The contractor shall submit a BMP plan to the contracting officer.

Site-specific BMPs will be developed in consultation with federal and State regulatory agencies to address the work proposed at the project site. A water quality monitoring plan will be developed during permit negotiations with the regulatory agencies. All construction activity will conform to the applicable permit conditions, and construction work will not result in violations of State water quality standards. The construction contractor will comply with all applicable local environmental protection standards, laws and regulations.

Operational Period

The purpose of the Pier 12 and 15 improvement project is to provide a permanent relocation site for spill response vessels operated by the Marine Spill Response Corporation (MSRC) and the Clean Islands Council (CIC). These two entities have primary responsibility for oil spill prevention and response in the State of Hawai‘i. The proposed action will consolidate these vessels close to other emergency responders, in a location that ensures rapid response statewide, and within proximity to areas where incidents are most likely to occur. The proposed action will support and enhance the State’s emergency spill response and prevention capabilities. As such, the proposed action will have a positive long-term impact on marine water quality.

3.2.6.3 Impact of Alternatives to the Proposed Action

All project alternatives involving construction on land and in the water would require and employ the BMPs listed above for the proposed action. The sheet pile and fill alternative involves more extensive earthwork, and thus has a greater potential to impact marine water quality due to erosion and runoff, and resuspension of harbor sediments. Alternatives involving less in-water work, such as the option for minimal improvements or improvements to Pier 15 only will require fewer piles. However, any alternative involving in-water construction or construction near the water will employ best management practices to contain erosion, runoff, and contain resuspended sediments.

3.2.7 Natural Hazards

3.2.7.1 Existing Conditions

Flood Insurance Rate Maps (FIRM) for the southern shore of O‘ahu were updated in 2011. As a result of the new maps, Honolulu Harbor and adjacent fastlands adjacent to the harbor are designated within Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (see Figure 14). The harbor waters and some adjacent bulkhead areas at Piers 12 and 15 are within Zone AE, (base flood elevation 6). Fastlands beyond are in Zone X, areas determined to be outside the 0.2% annual chance floodplain.

The project area, along with the entire Honolulu Harbor waterfront, is within the tsunami evacuation area identified by the O‘ahu Civil Defense Agency. In the event of a tsunami, individuals are advised to evacuate inland waterways and marinas. Vessels are typically advised to leave the harbor and deploy to deep water.

According to the Clean Islands Council, their protocol in the event of a hurricane is to stay in the harbor. They have indicated that they may request to move to a protected berth for a storm, but staying at Pier12 is an option.

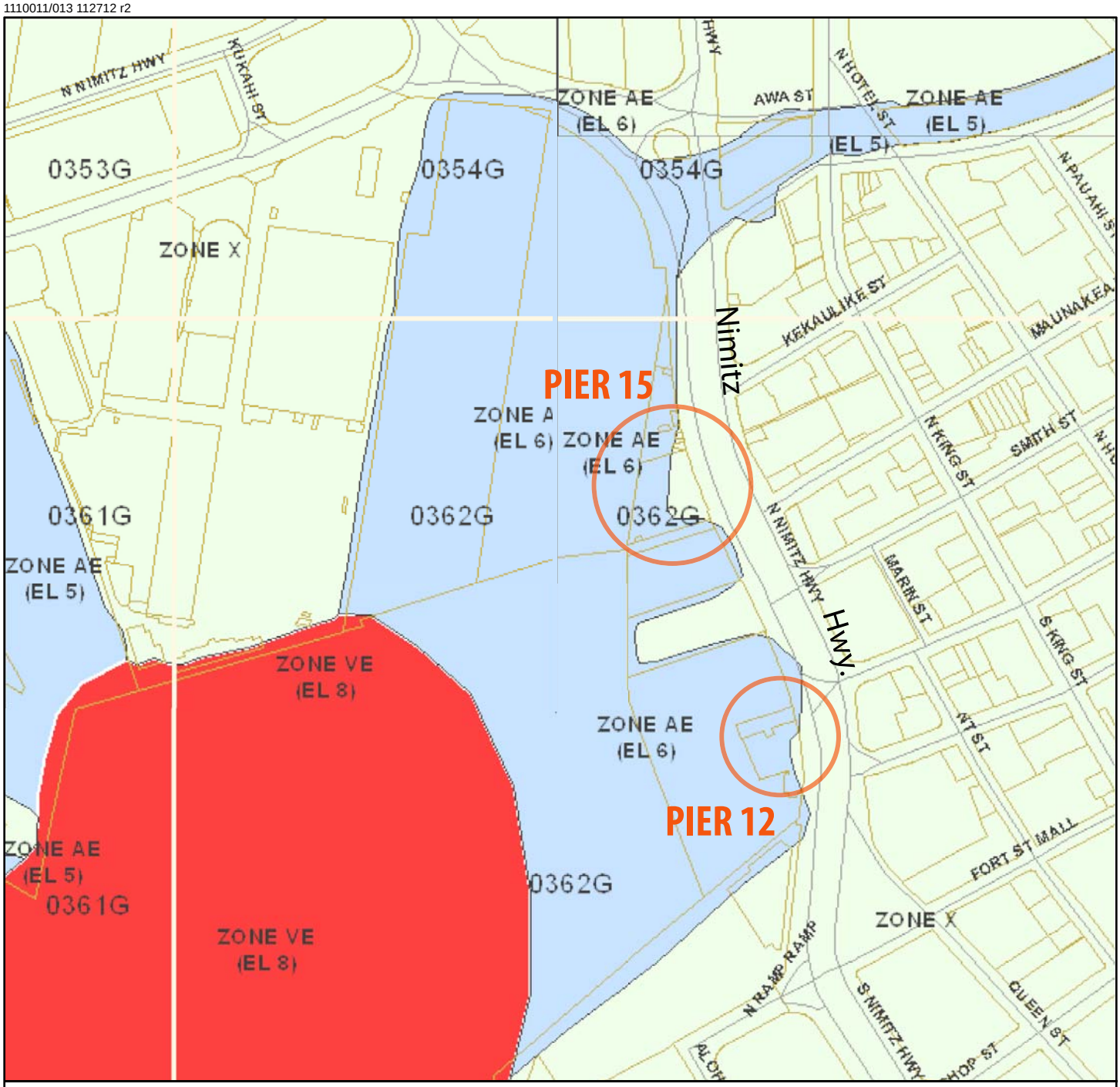
The Island of O‘ahu is in Seismic Zone 2A, and is not subject to volcanic eruptions or significant earth quakes.

3.2.7.2 Impacts and Mitigation

The proposed action will not impact the threat or occurrences of natural hazards such as flood or tsunami. The possibility of a tsunami is always present and their frequency and intensity are unpredictable. The proposed action will not increase the risk of human health or property damage due to natural hazards. The proposed action will not entail any reduction or increase in shoreline levels at Honolulu Harbor that would impact the extent of overland flooding as a result of tsunami. The pier improvements will conform to applicable seismic and flood standards for construction. All vessels berthed in the harbor will be subject to the same guidelines and recommendations for being secured, removed or put out to sea prior to storm surge events.

3.2.7.3 Impact of Alternatives to the Proposed Action

Given its waterfront location, all project alternatives would be similarly vulnerable to a tsunami, regardless of whether they are located within Honolulu Harbor, Ke‘ehi Lagoon, Barbers Point or elsewhere, and regardless of berth design. All alternative berths and supporting facilities would meet current design and building standards, but it is difficult to predict how well one location would withstand a natural disaster compared to another location.



FIRM LEGEND

A — **Zone A** is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

AE — **Zone AE** is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

VE — **Zone VE** is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

X — **Zone X** is an area determined to be outside of the 0.2% annual chance floodplain. No base flood elevations or depths are shown within this zones.

Source: Hawaii–National Flood Insurance Program Flood Hazard Assessment Tool, http://gis.hawaiinfip.org

NOT TO SCALE

FIGURE 4
FIRM MAP
Honolulu Harbor
Piers 12 and 15 Improvements

Alternative locations such as Ke‘ehi Lagoon or Barbers Point may result in a slower response time in the event of a natural disaster, because of the greater travel distance to Honolulu Harbor. However, depending on the location of the oil spill, a project location outside Honolulu Harbor may be able to respond as quickly as, or quicker than from the proposed location. Again, the occurrence and location of a natural hazard or environmental disaster is difficult to predict.

3.2.8 Noise

3.2.8.1 Land Based Noise

A noise study was conducted in 1999 for the O‘ahu Commercial Harbors 2020 Master Plan EIS by Y. Ebisu and Associates. The purpose of the noise study was to evaluate potential noise impacts associated with implementation of proposed harbor improvements, which included pier improvements at the current project area. The discussion of land based noise below is based on this 1999 noise study.

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

The noise descriptor 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 sound levels, with sound levels during nighttime hours increased by 10dB to account for their greater perceived impact. A value of 65 DNL or lower is considered to be an acceptable exterior noise level for residential receptors. This standard is applied nationally, including the State of Hawai‘i.

Existing Conditions

At the time of the 1999 Ebisu noise study, overall existing DNL levels in the Pier 12 and 15 vicinity ranged from 60 to 70 DNL. Major sources of noise were identified as “surf noise, motor vehicle traffic, aircraft, and harbor vessels and equipment.” Noise generated from harbor operations for the most part did not radiate beyond the harbor property boundary, with the exception of boat whistles and horns. Horns of large cruise ships were measured at 85 dB at 1,000 feet distance (Ebisu, 1999 in DOT, 1999).

Land uses in the project vicinity are primarily office, industrial and commercial, with some residential condominium development. Exterior noise levels as high as 75 DNL are generally considered acceptable for commercial, industrial, and other non-noise sensitive land uses. The majority of surrounding areas fall within the commercial and industrial categories, and are not considered to be noise sensitive.

However, there are several residential receptors, or residential condominium buildings, within 500 feet of the project area. The closest residential receptor to Pier 12 is the 41-story Harbor

Court condominium, located across Nimitz Highway, about 250 feet to the southwest. Residential receptors near Pier 15 include Marin Tower, a 28-story high rise affordable rental building situated on Smith Street, and the Harbor Village Condominium on the corner of Nimitz Highway and River Street. Marin Tower is located about 250 feet mauka, and Harbor Village is located about 400 feet from Pier 15.

At the time of the 1999 study, traffic noise levels were already determined to be in the "Significant Exposure, Normally Unacceptable" category for noise sensitive land uses at the lots which front Nimitz Highway and Ala Moana Boulevard. For commercial and industrial land uses, the existing noise level was in the "Compatible and Marginally Compatible" categories. It was noted that residual traffic noise levels typically remain steady (55 to 60 dB) during the daylight hours of 7:00 AM to 6:00 PM, and decline to their lowest levels (45 to 50 dB) at 4:00 AM the next morning (ibid).

Impacts and Mitigation

Operational Noise

The use and operation of the proposed piers for the CIC and MSRC oil spill response vessels will not result in a significant increase in existing noise levels. For the most part, the project provides a permanent berthing location, and there are no plans for regular noisy maintenance activities at the piers. There will not be frequent loading and unloading of the spill control vessels.

Most vehicular traffic to the site will be privately-owned cars and trucks of the boat crews, with occasional delivery vehicles. Several times a year, a large fuel tanker and large tractor/trailer combos will come to Pier 15, but this will occur during the day. Overall, project-related traffic was estimated at fewer than 15 vehicles per hour and less than 50 vehicle trips per day at each site. This represents less than one percent of the existing traffic volume on Nimitz Highway (Ng, 2012).

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

Short-Term Construction Impacts

Project construction will involve the presence of construction vehicles such as trucks, excavators, graders, rollers, backhoes, concrete delivery trucks, water tank trucks, hydraulic cranes and forklifts. Noisy construction activities will include saw cutting and removal of the existing concrete slab, driving of piles to support the replacement deck, installation of in-water piles to support the loading platforms and berthing dolphins, and removal of existing underwater piles at Pier 15. These activities will generate noise that will affect adjacent land uses including the

offices of the Department of Transportation Harbors Division, fire station at Pier 15, industrial and commercial uses, and the three residential buildings along Nimitz Highway.

Residents of Harbor Court, Marin Towers, and Harbor Village residential buildings will be impacted by construction-period noise, particularly during pile driving activity. According to the noise study for the *O'ahu Commercial Harbors 2020 Master Plan EIS*, pile driving operations generate noise levels ranging from 80 dB at 1,000 feet distance to 90 dB at 250 feet distance without mitigation measures. Indoors, typical pile driving noise levels range from approximately 70 to 80 dB for naturally ventilated structures and 58 to 68 dB for air conditioned structures (Ebisu, 1999 in DOT, 1999).

Complete mitigation of construction noise is not practical due to the intensity of construction noise sources and the exterior nature of the work (earth moving, pile driving, trenching, concrete pouring, hammering, etc.). However properly muffled construction equipment will be used. Other potential mitigations may include the use of pre-drilling techniques, vibratory pile driving equipment, and bored and cast-in-place piles to reduce the number of blows and impact from pile driving operations (DOT, 1999).

Exterior noise levels as high as 75 DNL are generally considered acceptable for commercial, industrial and other non-noise sensitive land uses. Most surrounding land uses fall within these categories and are not considered to be noise sensitive.

The closest residential building, Harbor Court, has central air conditioning in all units, which will mitigate construction period noise. All construction work will adhere to State of Hawai'i Department of Health (DOH) regulations controlling construction noise limits and construction hours. Under DOH permit procedures, noisy construction activities are restricted to the hours between 7:00 AM to 6:00 PM on weekdays, and on Saturdays between 9:00 AM to 6:00 PM. Construction is not permitted on Sundays. The majority of construction work will be performed during the day to minimize nighttime noise impacts on nearby residents.

All construction activities will comply with the DOH Administrative Rules Chapter 11-46 on Community Noise Control. In cases where construction noise exceeds, or is expected to exceed the DOH's "maximum permissible" noise levels at the property line, a permit will be obtained from the DOH to operate vehicles, construction equipment, power tools, etc. that emit noise levels in excess of "maximum permissible" levels.

3.2.8.2 Underwater Noise

Existing Conditions

For other DOT-H improvement projects, the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) has raised concerns about underwater noise impacts from construction activities on marine life. The main concern is ambient background noise in the harbor combined with additional underwater noise created by pile driving and other construction activities. In particular, the noise created by pile driving and other construction activities.

Certain marine animals are known to depend on their hearing from everything from protection from prey to feeding, mating and communicating. Essentially, all cetaceans (whales and dolphins) are in this category, as are sirenians (sea cows), some pinnipeds (seals, sea lions, walruses), and some sea turtles. It is widely believed that even temporary degradation in hearing ability may lead to injury or death. Species that have been known to appear in Honolulu Harbor in the project vicinity, albeit very infrequently, include monk seals, humpback whales, and sea turtles.

While there has been extensive research into the issue of underwater noise levels and their effect on marine wildlife, there is a wide range of opinions as to the exact levels of noise that will adversely harass or injure these species, and the state of knowledge is continuous changing and research in this field is ongoing.

The following in-water acoustic impact thresholds are currently used by the NOAA NMFS to assess potential impacts to marine mammals (NOAA, 2005; D. Hubner, Pers. Comm., 2011 in AECOS, Inc. 2012).

1. Onset of Injury (also known as Permanent Threshold Shift, specifically permanent hearing loss) would result from exposure to:
   - 180 dB for cetaceans (whales and dolphins)
   - 190 dB for pinnipeds (Hawaiian monk seals)

2. Onset of Behavioral Disturbance (also known as the Temporary Threshold Shift/Aerial Avoidance) would result from exposure to:
   - 160 dB for impulsive sound (e.g., impact pile driver) for all marine mammals or
   - 120 dB for continuous, non-impulsive sound (e.g., vibratory drivers or drills) for all marine mammals

NMFS have indicated to DOT-H staff that these thresholds were derived for marine mammals but are currently also used for sea turtles such as green sea turtles and hawksbill turtles.

The Pier 12 and 15 construction activity that would be of most concern is pile driving activity. At Pier 12, the installation of 20 concrete piles is required to support one loading platform and two mooring dolphins that will be built. At Pier 15, a total of 67 concrete piles will be needed to support two loading platforms and five mooring dolphins. Each of the piles will be a 20-inch precast concrete octagonal pile.

Impacts and Mitigation

Impacts

Pile driving during the construction period has the greatest potential for adverse noise impacts in the underwater environment, as it has the potential to adversely affect marine mammals and sea

turtles in nearshore waters. An underwater noise evaluation[6] was conducted in 2010 by Goody Consultants, Inc. for the Hawai‘i Community Development Authority's (HCDA) Kewalo Basin Repairs Project Final EIS[7]. The Kewalo Basin repairs project proposed drilling and driving piles in various configurations and locations. A screening level evaluation was undertaken to determine the likely effects of the pile driving on protected species. The general findings and conclusions of that study can be applied the current Pier 12 and 15 project.

In addition to using standard noise propagation calculations and published criteria values, the evaluation used procedures consistent with NOAA NMFS methodology for calculating noise spreading loss, and calculated radii within which sensitivity criteria would be exceeded for protected species.

The methodology first calculated Sound Energy Level (SEL) for various types of pile driving activity, based on the type of driver and diameter of piles. It included calculations for several sizes of piles, but among these were 20-inch (hexagonal) piles with cushion block, driven by diesel drop hammer. The piles are similar in size to those proposed at Pier 12 and 15. Published reference values derived from noise monitoring records from the California Department of Transportation[8] (CALTRANS, 2007) were used for the piles. The sound transmission loss then was modeled to estimate the accumulated decrease in sound intensity as the sound wave moves away from the source. Next, a radius was calculated, representing the area within which sound levels would exceed the "sensitivity criteria" for the various species of concern. The calculated radii would be applied to the locations where the piles will be driven. The sensitivity criteria were the NOAA NMFS published criteria for protected or listed species as described above.

As with the Pier 12 and 15 improvement project, the species of concern for the Kewalo Basin project included humpback whales and spinner dolphins (cetaceans), Hawaiian monk seals (pinnipeds) and green sea turtles. The study noted that definitive criteria on harassment level noise for sea turtles have not been published; however, as NMFS indicated above, it generally utilizes the same criteria and thresholds that are used for marine mammals.

The Goody noise evaluation calculated a radius around the underwater noise source (driven pile), within which the criteria SEL value of 160 dB for protected species would be exceeded (i.e., SEL within the radii would be >160 dB). For the 20-inch concrete piles (with cushion), the critical radius for protected species 54 meters (177 feet). That is, during active pile driving, noise levels would exceed the sensitivity criteria within a 177-foot radius. With 10 dB of noise mitigation, the critical radius is reduced to 11.66 meters (38.3 feet).

Mitigation

The Goody Consultants, Inc. Underwater Noise Evaluation prepared for the Kewalo Basin project noted that mitigation can take two general forms: 1) reducing the noise emitted by

[6] Goody Consultants, Inc. Technical Memorandum, Screening Level Evaluation, Underwater Noise from Pile Driving, Kewalo Basin Repairs Environmental Impact Statement, August 2010
[7] Hawai‘i Community Development Authority, March 2011
[8] CALTRANS, *Compendium of Pile Driving Sound Data*, 2007.

modifying pile driving methods, and 2) monitoring the potentially affected area for receptors of concern and managing work methods to avoid impacts to any protected species that are present.

The most appropriate and practical mitigations may be work management options. To ensure that no protected species are in the project area, surveys of the project area shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one-half hour. All work shall be postponed or halted when protected species are present, and shall only begin/resume after the animals have voluntarily departed the area (AECOS, 2012). For these procedures, the "project area" is typically considered to be within 50 yards (150 feet) of the work activity, but this radius could be increased to 177 feet to meet the sensitivity criteria above.

Another mitigation which has on occasion been utilized in Hawai‘i is the use of soft starts" for the pile driving. With this procedure, the pile installation begins with low impact, low energy velocities, and gradually builds up to full energy. The soft start will allow marine species, particularly turtles, to leave the area before the full impact of the activity is attained. Pile driving will also be limited to daylight hours, to facilitate the visual survey of the affected area for species of concern.

There are other mitigation measures available to reduce sound levels at the noise source, including pre-drilling, use of vibratory drivers, pile cushioning (which the Goody noise evaluation incorporated into the calculated SELs for the 20-inch concrete piles), and bubble curtains. Air bubble curtains infuse an area surrounding a pile with air bubbles, creating a bubble screen that inhibit the propagation of underwater sound from pile driving. Results on the effectiveness of air bubble curtains in reducing sound pressure waves are varied, but the data generally indicate that an air bubble curtain used on a steel or concrete pile with a maximum cross-section dimension of 24 inches or less (comparable to those proposed on this project) can provide about 5 dB of noise reduction (Oestman et al., 2009 in AECOS, 2012).

Another mitigation for pile driving noise is use of a vibratory hammer, which results in reduced sound levels compared to other pile driving methods. However, a disadvantage of this method is that pile driving may take longer, extending the time period where underwater noise is generated. Further investigation would also be needed to determine whether a vibratory hammer would be able to drive the piles to the specified depth or resistance.

The DOT-H will consult with NOAA NMFS and other resource agencies regarding the most appropriate mitigation measures and BMPs for the Pier 12 and 15 project. The USACE will determine what mitigations and BMPs shall be incorporated in the project during the forthcoming Department of the Army (DA) permit processes.

3.2.8.3 Impact of Alternatives to the Proposed Action

The No Action alternative would not involve any additional noise impacts from pile driving or construction. All other alternatives would involve pile driving and in-water construction, which would have similar on-land and underwater noise impacts. For alternatives that involve installation of sheet pile, noise would vary depending on the type of hammer utilized. During the start of driving a sheet pile, there tends to be a momentary peak in the noise level, and then the

noise is reduced as the sheet is driven further into the ground. A vibratory hammer typically is not as loud as pile driving with an impact hammer (Paulus, Sokolowki and Sartor Engineering, 2006 as cited in DOT, 2012). No attenuation systems for underwater noise have been documented for sheet pile installation in available literature (Ilinworth and Rodkin, 2007 as cited in DOT, 2012). Little information is known about the hammer or driving energies used to install sheet piles (ICF Jones and Stoles, 2009 as cited in DOT, 2012).

3.2.9 Solid and Hazardous Waste

3.2.9.1 Existing Conditions

Solid Waste

Solid commercial and industrial wastes generated at Honolulu Harbor are collected by private waste collection companies, and transported directly to the Waimanalo Gulch Landfill or to O‘ahu’s H-POWER facility.

Construction activities will involve removal of old piles, demolition of existing concrete slab, demolition of a portion of an existing shed structure, excavation, drilling, and pile driving. These activities will generate construction and demolition (C&D) waste, including wood , metal, asphalt, concrete, glass, brick, metal, soil, vegetation, and other materials. The only landfill on O‘ahu which accepts C&D solid waste is the PVT Land Company landfill in Nānākuli.

Hazardous Waste

When the existing concrete slabs at Piers 12 and 15 are removed to construct the new pile supported concrete slab, there will be some removal of existing soil. There is a possibility of encountering some contaminated soil under the existing pavement. The proposed action will also remove an existing wood bumper located on the exterior face of the existing bulkhead wall.

At Pier 15, a portion of the existing shed will be demolished. A Hazardous Materials Survey Report for the shed (Appendix B) found that there are lead containing materials and lead paint in portions of the shed proposed for demolition.

The United States Environmental Protection Agency (USEPA), under the National Emission Standards for Hazardous Air Pollutants (NESHAP), requires that all asbestos containing building materials be identified prior to any renovation or demolition work. In May and June 2012, a total of 24 samples of suspect asbestos containing building materials were tested. The samples were taken from portions of the shed that will be demolished or affected by the project. Laboratory results showed that nine of the 24 samples were identified as asbestos containing material. These samples were of the following materials: Silver mastic on roof (3 samples), Black mastic on roof (3 samples), and Gray/Off-white window caulking (3 samples).

Various painted exterior surfaces were also tested for lead, and all four samples were found to contain lead. These samples were of the off-white exterior paint at roof level, the green trim paint, the gray exterior paint on the ground level, and the yellow trim paint on the ground level.

3.2.9.2 Impacts and Mitigation

The asbestos containing materials (silver and black mastic found on the roof, and the off-white window caulking) in the Pier 15 shed must be removed by a qualified asbestos abatement contractor prior to the partial demolition of the shed. In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable regulations. Environmental specifications should be developed prior to the abatement work, to address proper work techniques, handling and disposal of asbestos contaminated items.

The lead-containing paints found in the Pier 15 shed do not pose a significant health threat in their present location and condition. However, as the demolition activities will disturb surfaces covered with lead-containing paint, the owner must notify workers and contractors of the presence of lead in the paints. Prior to demolition, environmental specifications should be produced to address proper work techniques in dealing with affected areas and will also address handling and disposal of lead contaminated items. In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable regulations pertaining to the handling of lead. Toxicity Characteristic Leaching Procedure (TCLP) analysis will be performed on all waste streams to determine proper disposal methods.

All soils excavated as part of the proposed action will be stockpiled and characterized as required by State and federal regulations. All soils will be stockpiled on site on polyethylene sheeting, surrounded with *Biosocks* (TM) and covered with additional polyethylene sheeting.

Any painted concrete pilings, pillars or other structures will be subject to TCLP analysis for lead prior to their disposal. Any existing wooden bumpers and piles will be subject to TCLP-Creosote analysis prior to their disposal. Materials failing these analyses will be treated as hazardous waste.

3.2.9.3 Impact of Alternatives to the Proposed Action

All project alternatives will involve some excavation of soils, painted surfaces and structures which would need to be handled, characterized and disposed as described above. Any project alternative that involves the use of Pier 15 and the partial demolition of the shed building will have similar hazardous materials impacts, and require the same mitigations. Project alternatives involving another site outside Honolulu Harbor or at another berthing location within Honolulu Harbor may impact other structures with asbestos containing materials, lead-based or lead-containing paint. A hazardous materials survey would need to be done for those sites and structures.

3.2.10 Visual Resources

3.2.10.1 Existing Conditions

Visual resources include scenic vistas, scenic overlooks, unique topography, or visual landmarks having scenic value. Honolulu Harbor in the Piers 12 and 15 area generally has a developed and industrial appearance with industrial buildings and warehouse structures, paved parking, container storage areas, heavy equipment, and minimal trees and other landscaping. This area is primarily an industrial waterfront area. Views across the harbor toward Sand Island are of ships, containers, large cranes, and warehouse buildings.

Currently, the paved area at Pier 12 is fenced but visible to the public from Nimitz Highway. At Pier 15, the fire boat is visible but the remaining sides of this triangular shaped wharf are obstructed by the fire station building and shed, which front Nimitz Highway. Both sites are fenced and are not accessible to the public.

3.2.10.2 Impacts and Mitigation

The images below provide a visual simulation of the Pier 12 and 15 improvements and with the presence of the three oil spill vessels. From Nimitz Highway, the changes at Pier 12 will be noticeable because the area is currently open, very visible and close to Nimitz Highway. The permanent presence of the OSRV Clean Islands will be a visible change from Nimitz Highway. However, the 130-foot long boat will still be dwarfed by the large cruise ships that dock at the adjacent Pier 10, and there will not be a significant change in the overall visual environment.

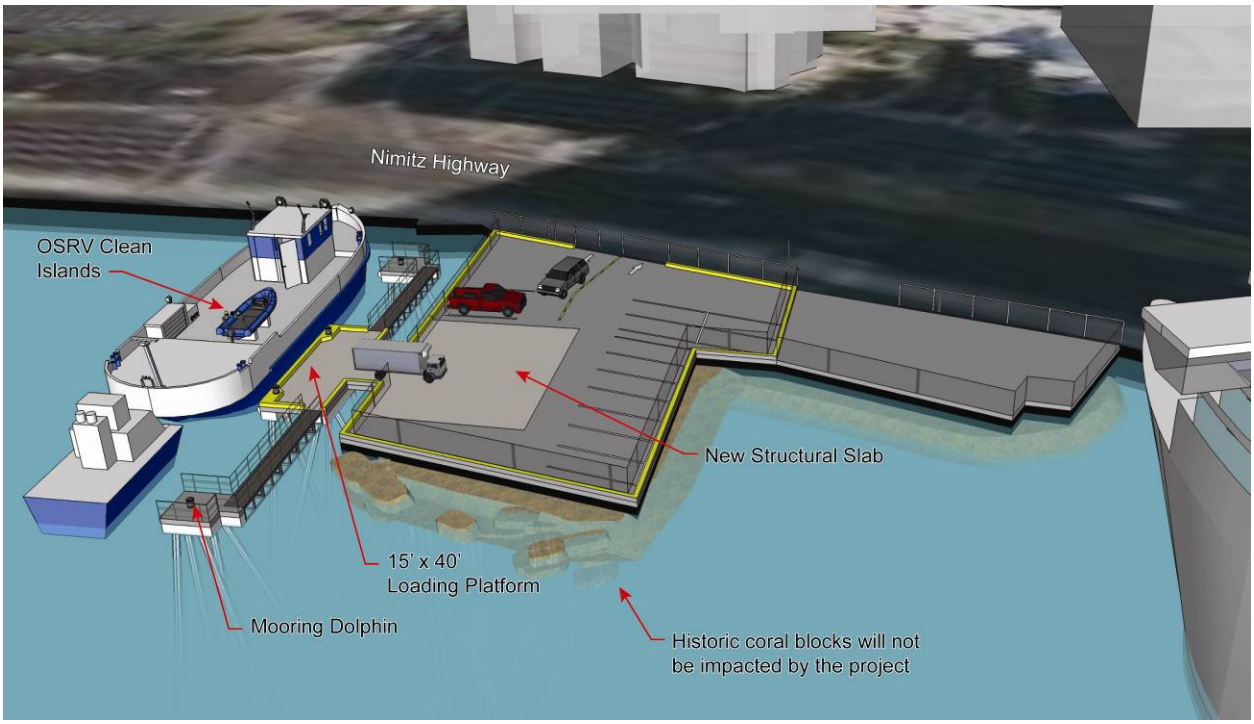
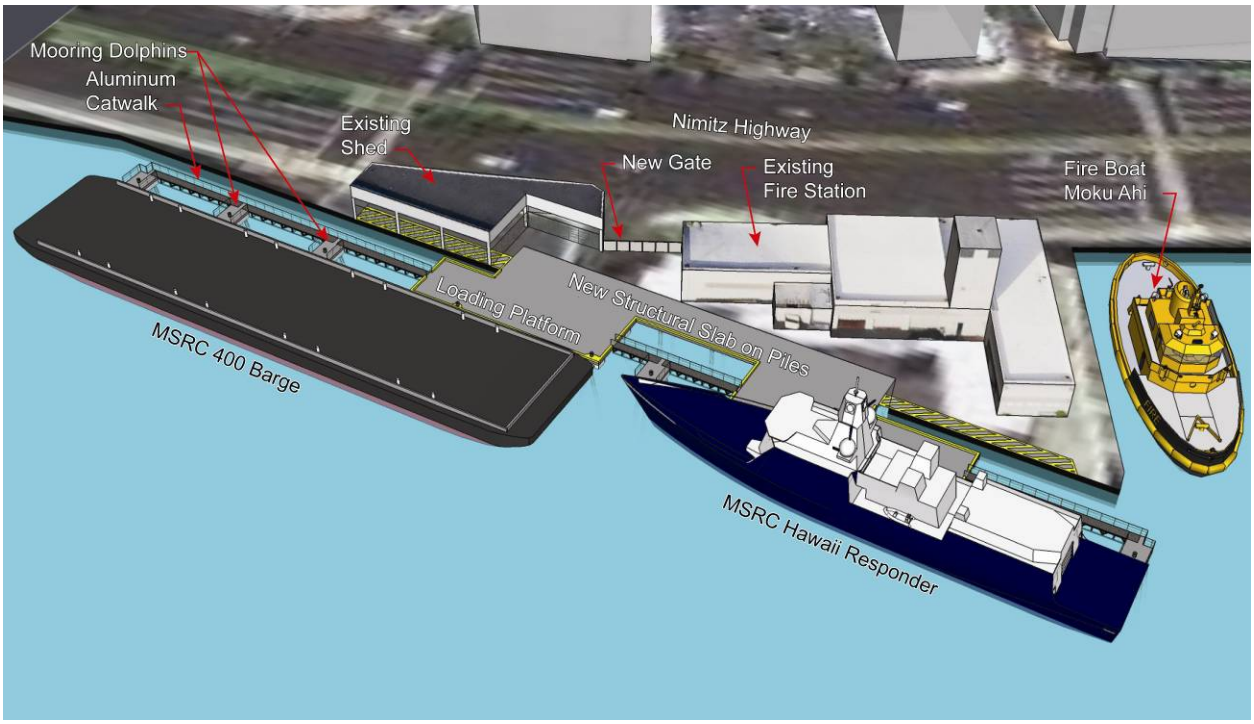


Figure 15. Visual Simulation of Pier 12 improvements with *OSRV Clean Islands*.

At Pier 15, the proposed loading platform, as well as the MSRC vessels will be larger in size than the boat at Pier 12. However, because of the presence of the fire station and shed buildings which block the harbor from public view, the improvements will be less visible from Nimitz Highway. The MSRC barge, in particular, will be clearly visible from the east-bound lanes of Nimitz Highway at the approach to Pier 15. The improvements will be visible from other surrounding piers, from Sand Island and looking down from the viewing platform at Aloha Tower. The new berthing improvements and spill response vessels will also be clearly visible to passengers on the City's proposed rail transit line, which will be elevated above Nimitz Highway.

No nighttime operations are planned, and outdoor lighting will only be provided at the sites for safety and security. At Pier 12 there will be four-15ft high light poles located around the fenced in area. At Pier 15, there will be four-15ft high light poles located on the two loading bridges, and three building wall-mounted lights. All new lighting structures will be designed to minimize light pollution by directing the light sources downward and reducing upward glare.

Overall, the proposed action will not have an adverse visual impact. Honolulu Harbor is a working commercial harbor and the visual environment is already dominated by boats, ships, large cranes, and watercraft of all sizes. The improvements will be visually compatible with the existing setting, and will not have an adverse impact on scenic vistas or areas with scenic value.



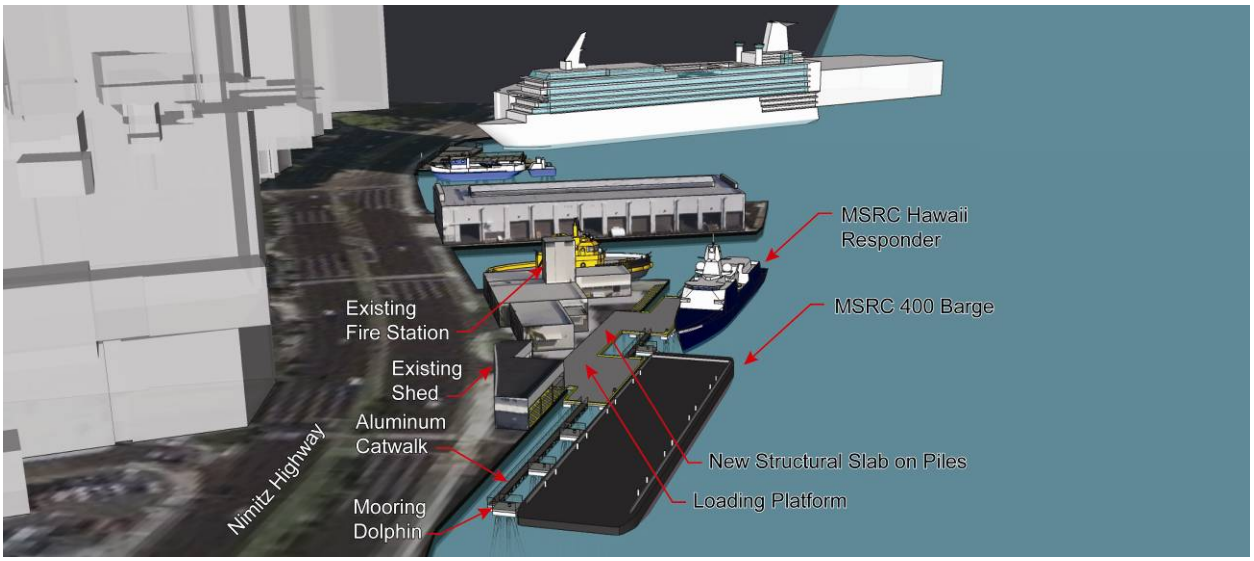


Figure 16. Visual Simulations of Pier 15 Improvements with *MSRC Responder* and *400 Barge*.

3.2.10.3 Impact of Alternatives to the Proposed Action

All alternatives would have similar visual impacts as the proposed action. The presence of the two ships and the barge in a different area of the harbor will be the most apparent visual change to the general public. The bulkhead with sheet piles alternative will appear as a more massive berthing structure than the loading platform and mooring dolphins.

3.3 BIOLOGICAL ENVIRONMENT

3.3.1 Terrestrial Biology

3.3.1.1 Existing Conditions

The Pier 12 and 15 project sites are located in Honolulu Harbor in an urbanized area. Existing land uses along the waterfront are industrial, office (Department of Transportation, Harbors) and commercial (Aloha Tower complex). Both project sites are existing berthing wharves. The sites have been highly disturbed and dominated by man-made structures and are paved over with asphalt or cement. Vegetation near Pier 12 is limited to six Singapore plumeria trees planted along the fence line fronting Nimitz Highway. The remainder of the site is covered in concrete.

At Pier 15, there is a grassy, landscaped area in front of the fire station, facing Nimitz Highway. The landscaping includes a Monterey cypress on the left side of the lawn, and on the right side, there is a *Cycas circinalis* (cycad), ti plants, two plumeria trees and two coconut palms.

Fauna that would likely be found within the project area include mammals that typically inhabit urban areas of Honolulu including feral cats (*Felis catus*) rats (Rattus sp), house mouse (Mus musculus) and Indian mongoose (*Herpestes a. auropunctatus*). The Pacific Golden Plover (*Pluvialis fulva*) is a migratory shorebird that could use the small grassy lawn fronting the fire station particularly during the late summer and winter months. Other species of migratory shorebirds may occasionally pass through but not settle at the proposed project sites.

Avifauna found on the project site would include alien species common to urban environments, such as the Common Mynah (*Acridotheres tristis*), Red crested Cardinal (*Paroaria coronata*), Northern Cardinal (*Cardinalis cardinalis*), House Finch (*Carpodacus mexicanus*), Java Sparrow (*Padda oryzivora*), Rock Pigeon (*Columba livia*), Spotted Dove (*Streptopelia chenensis*), Zebra Dove (*Geopelia striata*), Red-vented Bulbuls (*Pycnonotus cafer*), and Japanese White-eye (*Zosterops japonicus*).

There are no threatened or endangered species or their habitats within the project area.

3.3.1.2 Impacts and Mitigation

Neither of the landscaped areas at Piers 12 or 15 will be impacted by the project improvements, and there will be no adverse impact on terrestrial fauna. Project improvements are primarily limited to the paved areas of the existing wharves. There is no existing vegetation in the immediate project area.

Outdoor lighting at night has the potential to affect migratory shorebirds. At Pier 12, there will be four-15ft high light poles located around the fenced-in area. Pier 15 will have four-15ft high light poles located on the two loading bridges. The luminaire will face downward so the light only casts to the ground. Pier 15 will also have three building wall mounted lights. All lighting

will be designed to reduce light attraction to birds and minimize general light pollution by directing the light sources downward.

3.3.1.3 Impact of Alternatives to the Proposed Action

All of the project alternatives would take place within already developed areas of the harbor, and would not result in significant impact to terrestrial or avifauna or their habitat. There are no known threatened or endangered species inhabiting the terrestrial environment where improvements are proposed.

3.3.2 Marine Biota

Marine biological surveys of the Pier 12 and Pier 15 project areas were conducted in 2012. The first, or "Phase 1" assessment, conducted in February 2012, described and characterized the existing marine environment. The assessment identified and characterized coral reef resources (including essential fish habitat or EFH), listed and petitioned species and critical habitat. The data obtained from this Phase 1 survey were used by DOT-H to explore feasible alternatives and initiate discussions with federal permitting and resource agencies[9].

Upon completion of the project design, a follow-up "Phase 2" survey was conducted in October 2012 (Appendix C) to determine and quantify impacts from the construction footprint. In-water work consists of the placement of 20-inch octagonal piles to support the proposed loading platforms and mooring dolphins. The purpose of the Phase 2 survey was to quantify coral colony size-frequency distribution in areas that will be directly impacted by the footprint of the piles. The Phase 2 study also quantified coral colony size-frequency distribution directly under each loading platform, vehicular bridge, mooring dolphin, and moored vessel that would create a shading impact.

The sampling methodology for the Phase 2 study was based on the data collected during the Phase 1 survey, and was developed in close consultation with NOAA-NMFS staff.

The following information is a summary of the Phase 2 assessment findings (Appendix C). More detailed information can be found in the study.

[9] Meeting with NOAA NMFS, USFWS and USEPA held on March 2, 2012 to discuss Phase 1 study findings and subsequent Phase 2 study. Conference call with Allan Ota, USEPA Region 9, Sediment Management Team, held on February 27, 2012 to discuss sediment and water quality issues. During development of Phase 2 methodology, consultation was conducted with NOAA NMFS staff via email.

3.3.2.1 Existing Conditions

Project Description

Pier 12

- 20 piles to support one loading platform and two mooring dolphins
  - Piles are 51 cm diameter (0.20 m^2)
- One loading platform 4.6 m x 12.2 m (56.1 m^2)
  - Supported by 8 piles
- Two mooring dolphins, 3.0 m x 3.0 m (9.3 m^2) each.
  - Each mooring dolphin is supported by 6 piles.
- One vehicular bridge with approximately 1.8 m x 4.6 m (8.36 m^2) over water.
  - No piles
- 40 m x 10 m (400 m^2) OSRV Clean Islands vessel moored on-site

Pier 15

- 67 piles to support 2 loading platform and 5 mooring dolphins
  - Piles are 51 cm diameter (0.20 m^2)
- Two loading platform 29.0 m x 7.6 m (220.4 m^2) and 30.5 m x 7.6 m (231.8 m^2)
  - Each platform is supported by 16 piles each
- Five mooring dolphins, 3.7 m x 3.7 m (13.7 m^2) each.
  - Each mooring dolphin is supported by 7 piles.
- One barge and one ship (one 84 m by 18 m or 1512 m^2 and one 63 m by 13 m or 819 m^2) moored on-site
- 10 piles (61 cm diameter), in waters less than 9 ft to be removed at the mud line

Study Methods

Pier 12

According to the latest project plans for Pier 12, 20 piles are to be placed in water depths ranging from 4 to 18 ft. Four of the piles will be at approximately 4- to 6-ft depths, 5 of the piles will be between 10- to 12-ft depths, and 11 of the piles will be between 14- to 18-ft depths. The footprint of each pile has an area of 0.20 m^2 (2.2 ft^2), for a total direct impact area of 4 m^2 (43 ft^2).

An additional undetermined area surrounding the footprint of the piles will be directly impacted during construction, though the extent of this area is not known at this time. This additional area was not included in the calculation of the direct impacts, as presented in the Phase 2 report, although it could be calculated from the data presented in the report once the construction methodology is determined. Total shaded area from the loading platform (56.1 m^2; 603.9 ft^2), mooring dolphins (18.6 m^2; 200 ft^2), vehicular bridge (8.4 m^2; 90 ft^2) and docked vessels (400 m^2; 4,306 ft^2) is estimated to be 483.1 m^2 (5,200 ft^2).

The biologists conducted a survey consisting of 18 transects in the project vicinity: six along each of the depth contours described above. The survey locations can be found in Figure 5 of the Phase 2 assessment in Appendix C.

The stratified random approach was conducted by swimming to the start location of each transect using a randomly determined number of kicks (15 kicks between each point). Each coral head observed within a 5-m^2 belt transect (5 m in length by 1 m in width) survey area was identified, its growth form (branching, finger, mounding, or encrusting) noted, widest diameter recorded, and probable ease of removal from the bottom determined. Coral heads over 15 cm (6 in) in diameter with partial morbidity (areas of dead tissue) were noted as percent of colony with live tissue.

According to the latest project plans, most of the loading platform, vehicular bridge, and mooring dolphins are to be placed in water depths ranging from 4 to 18 ft, in the general vicinity of the area surveyed. The 18 transects described above were also used to determine coral cover under these structures. Additionally, the biologists surveyed the area under the vessel to be docked at Pier 12 (18- to 24-ft depths). Five transects, set parallel to the shoreline (10 m in length by 1 m in width), were located by swimming to a start point using a randomly determined number of kicks (stratified random method). Within each 10-m^2 belt transect, biologists recorded information for each coral colony as described above. Biologists also conducted a video survey of the project vicinity to identify and document all rare, protected, and invasive species encountered during the survey.

Pier 15

According to the latest project plans for Pier 15, 16 of the 67 piles are to be placed in the 4 to 6-ft depth contour, seven in the 9 to 12-ft depth contour, and 44 in deeper water (12 to 22 ft). The vessel and barge will also be docked over these deeper bottom areas (12 to 22-ft depth).

The biologists conducted a survey consisting of 12 transects in the vicinity of Pier 15: 6 along the 4- to 6-ft depth contours and 6 along the 10- to 12-ft contours. The survey locations can be found in Figure 6 of the Phase 2 assessment in Appendix C.

The stratified random approach was conducted by swimming to the start location of each transect using a pre-determined number of kicks (15 kicks between each start location). Within each 5-m^2 belt transect (5 m length by 1 m width), biologists recorded information for each coral colony. Additionally, the biologists surveyed each area under the vessel and barge to be docked at Pier 15. Ten transects (10 m length by 1 m width) were randomly placed in the area, five in each area under the vessel and the barge to be docked. Transects were placed parallel to the shoreline, and within each 10-m^2 belt transect, biologists recorded information for each coral colony, as described above.

Live coral cover within the footprint of piles was calculated as follows. The widest diameter of each coral was used to determine the area of each coral using the formula Πr^2 where r = 0.5 x diameter. The area of each coral head was then multiplied by the percent live tissue for each

coral. The sum of the measured area of individual corals (=total live coral) was divided by the total area surveyed to obtain percent live coral cover.

Relative abundances of marine plants, fishes, and macro-invertebrates were assessed in the field during the February 2012 Phase 1 survey, and the data were updated with observations made during the October 2012 survey.

Survey Findings

Pier 12

General Observations. Based on February 2012 surveys, almost all of the substratum on the sloping bottom of the remnant reef off Pier 12 is either living coral or limestone. Invertebrates (including tunicates, pearl oyster, sponges, sea urchins, hydroids, and bryozoans) are not common in the area, and make up less than 5% of benthic cover in the area. Several of the invertebrates are known or suspected non-native species introduced from outside of Hawai‘i including: sponges and bryozoans (*AECOS*, 2012a).

Coral Size Class Distribution. The total area surveyed for the pile locations (4- to 18-ft depths) at Pier 12 was 90 m^2 (969 ft^2). A total of 471 coral colonies of at least 8 different taxa were observed across the three depth survey areas. The most common corals observed are *Montipora patula* (31.6% of total), *Montipora capitata*, and *Leptastrea* spp. (each 26% of total). Also occurring are *Porites lobata* (8.1% of total), *P. compressa* (2.8% of total), *Pocillopora damicornis* (2.3% of total), *Cyphastrea ocellina* (1.5% of and *Pavona varians* (1.1% of total, combined).

Of the 471 coral colonies observed along the three depth contours off Pier 12, 38% are in the 1 to 5 cm size class; most of these smallest colonies are *Leptastrea* spp. Corals in the 21 to 40 cm and 41 to 80 cm size classes are common (17% and 16%, respectively), with *M. capitata* and *M. patula* colonies making up the majority of these size classes. A total of 41 large colonies (81-160 cm; 7% of total and >161 cm; 2% of total) was observed. The Phase 2 assessment report itemizes the number of coral colonies by size observed in each of the three depth survey areas (4 to 6 ft depth contour; 10 to 12 ft depth contour; 14 to 18 ft depth contour), as well as the area under the vessel to be docked at Pier 12 (18 to 24 depth contour).

More detailed information on the various corals by class size can be found in the Phase 2 assessment in Appendix C.

Coral Cover Estimates. The Phase 2 assessment estimates the percentage of live coral cover in each of the three depth contour survey areas. Live coral cover is 87% in depths ranging from 4 to 6 ft, 86% in depths ranging from 10 to 12 ft, and 11% in depths ranging from 14 to 18 ft. Based on these values, and the respective total footprint area of the piles in each depth range, the areas of live coral that could be directly destroyed by the piles is estimated at 0.70 m^2 (7.55 ft^2) in 4- to 6-ft depths, 0.86 m^2 (9.3 ft^2) in 10- to 12- ft depths, and 0.24 m^2 (2.6 ft^2) in 14- to 18-ft depths. The study notes that these values are likely to be underestimates, as they do not consider the

direct impacts to nearby corals. This additional direct impact can perhaps be estimated once construction methods are finalized.

The assessment estimated the percent live coral cover under the vessel, loading platform, mooring dolphins, and vehicular bridge off Pier 12. Live coral cover is 0.04% in the vessel survey area. An estimated 0.18 m^2 (1.9 ft^2) of live coral will be shaded by the footprint of the vessel. Live coral cover is estimated at 61% under the loading platform, 48% under the mooring dolphins, and 87% under the vehicular bridge. Based on these values, and the respective shaded area provided by each structure in each depth contour, the areas of live coral that would be shaded under the structures is estimated at 34.4 m^2 (370.3 ft^2) for the loading platform, 9.01 m^2 (97.0 ft^2) for the mooring dolphins, and 7.28 m^2 (78.4 ft^2) for the vehicular bridge.

The area of live *M. patula* that would be shaded under the loading platform is estimated at 7.7m2 (82.9 ft2), 0.92 m2 (9.9 $ft^2$2) for the mooring dolphins, and 2.6 m2 (29 ft^2) for the vehicular bridge. No colonies of *M. patula* were observed in the area under the proposed vessel.

Coral Morphology and Ease of Transplantation. The Phase 2 assessment (see Table 8 of Appendix C) summarizes the general coral growth forms and ease of transplantation by species across all depth contours off Pier 12. Growth forms include: encrusting, plating, branching, mounding, or multiple (many coral heads, particularly at Pier 12 exhibited both encrusting and plate or pillar growth forms). Most of the corals off Pier 12 have encrusting growth forms (343 colonies; 73% of the total), and most colonies (370; 79% of total) would be regarded as unsuitable for transplantation due to their encrusting morphologies. Many of the corals with mixed morphologies are large *Montipora* colonies. Of these colonies of mixed morphologies, it appears that portions (plates) of the large colonies could be easily removed and transplanted.

Rare, Protected or Invasive Species. No federally-listed threatened or endangered species (e.g., sea turtles, monk seal, cetaceans) were encountered during either the Phase 1 or Phase 2 surveys. One species of coral proposed for ESA listing was observed at Pier 12: *M. patula.* A total of 149 colonies of *M. patula* coral were observed in the survey area off Pier 12. Several pearl oyster, a State-protected species were encountered in the February and October 2012 surveys.

Pier 15

General Observations. Based on the February 2012 surveys, the bottom composition off Pier 15 is dominated by non-living substrata, primarily silt (43%), limestone pavement (23%), and debris (26%). Corals, tunicates and sponges are found growing attached to the debris and silt-coated limestone. Water visibility was low at all survey locations due to turbid conditions, particularly in deeper waters (12 to 24 ft) and in waters near the mouth of Nu‘uanu Stream. Debris-- metal scraps, bottles, bicycles, shopping carts, concrete blocks, etc.-- litters the seafloor at the 4- to 6-ft depths and 10- to 12-ft depths.

Coral Class Size Distribution. The total area surveyed for the pile locations (4-24 ft) at Pier 15 was 160 m^2 (1,722 ft^2). This area includes corals likely to be at indirect risk as well as heads directly at risk from placement of the piles. A total of 154 coral colonies of 4 different taxa were observed across the three depth contour survey areas. The most common corals observed are *P.*

lobata (70.1% of total) and, *M. capitata* (14.9% of total). Also occurring are *M. patula* (7.8% of total), and *Leptastrea spp.* (7.1% of total). Of the 154 coral colonies observed throughout the three depth contours off Pier 15, 79% are in the 1 to 5 cm size class; most are *P .lobata*. The frequency of corals decreases as size class increases. No large colonies (>81 cm) were observed.

More detailed information on the various corals by class size can be found in the Phase 2 assessment in Appendix C.

Coral Cover Estimates. Live coral cover is 5.1% in depths ranging from 4 to 6 ft and 0.98% in depths ranging from 10 to 12 ft. No corals were observed in surveyed 12 to 24 ft depths. Based on these values, and the respective total footprint area of each pile in each depth contour, the areas of live coral that would be buried under the piles is estimated at 0.07 m^2 (0.8 ft^2) along the 4 to 6 ft depth contour and 0.03 m^2 (0.3 ft^2) in the 10 to 12 ft depth contour.

The biological assessment estimated percent live coral cover under the vessels, loading platforms, and mooring dolphins off Pier 15. No corals occur in the area where the two vessels will be berthed. This area is silt bottom, with few scattered debris and extremely poor visibility. Live coral cover is 0.03% under the loading platforms and 0.05% under the mooring dolphins. Based on these values, and the respective sizes of each structure in each depth contour, the areas of live coral that would be shaded under the structures is estimated at 13.7m^2 (147.5 ft^2) for the loading platforms combined and 3.5 m^2 (37.7 ft^2) for the mooring dolphins.

The area of live *M. patula* that would be shaded under the loading platforms is estimated at 3.1 m2 (33.4 ft^2). No colonies of *M. patula* were observed in the areas under the mooring dolphins.

Coral Morphology and Ease of Transplantation. The Phase 2 assessment (Table 14) presents the general coral growth forms and ease of transplantation by species across all depth contours off Pier 15. Growth forms include: encrusting, plating, branching, mounding, or mixed (some coral heads exhibit both encrusting and plate or pillar growth forms). Most of the corals off Pier 15 have encrusting growth (132 colonies; 86% of the total). Over half (53%) of the colonies encountered were considered suitable for transplantation. Despite the high number of colonies of encrusting morphologies (which can make transplantation difficult), many of these encrusting colonies were attached to loose rubble or debris that can be moved away from pile locations.

Rare, Protected or Invasive Species. No federally-listed threatened or endangered species were encountered during the survey off Pier 15. One species of coral proposed for ESA listing was observed at Pier 15 (*M. patula*). A total of 12 colonies of *M. patula* coral colonies were observed in the survey area of Pier 15. No pearl oysters or other State-protected species were observed.

Pile Removal. The project will remove ten (10) 24-inch piles located along the sea floor off Pier 15. The piles will be cut at the mud line in order to provide adequate vessel clearance. These piles were not quantitatively surveyed in the 2012 biological surveys. Based on a qualitative assessment, these piles host a composition of biota similar to that found in the surrounding 4-6 ft depth contour survey area (see above; corals, tunicates, and sponges). Because the orientation and substrate of the piles are different from the surrounding sea floor, data from the quantitative surveys cannot be directly applied to the piles. A quantitative assessment, including coral size

class distribution, should be conducted prior to construction to quantify the impacts of the removal of the piles.

3.3.2.2 Direct Impacts

Direct impacts to marine biota will occur during project construction as a result of pile driving, construction period noise, and turbidity. These direct impacts are discussed below.

Direct Impact from Piles

Direct impacts to marine biological resources off Piers 12 and 15 would result from driving support piles (for the loading platform and mooring dolphins) into the harbor bottom. Predicted direct impacts at each pier are presented in Table 3-1 below. These values are underestimates, as the calculation assumes there would be no direct impacts to nearby corals. This additional direct impact can be estimated once construction methods are finalized.

Table 3-1: Predicted Direct Impacts to Corals at Pier 12 and 15

Location	Total # of piles	Total pile footprint	Area coverage of coral colonies in direct impact area	Area coverage of *M. patula** coral colonies in direct impact area
Pier 12	20	4.00 m^2 (43 ft^2)	1.80 m^2 (19.4 ft^2)	0.37 m^2 (4 ft^2)
Pier 15	67	13.4 m^2 (144 ft^2)	0.10 m^2 (1.1 ft^2)	0.02 m^2 (0.22 ft^2)

Source: AECOS, 2012
*species presently proposed to be listed as threatened under the Endangered Species Act

Pier 12

Twenty (20-inch octagonal) piles are to be placed at Pier 12. The footprint of each vertical has an area of 0.20 m^2 (2.2 ft^2), for a total direct impact area of 4.0 m^2 (43 ft^2). Total area coverage of coral colonies in the direct impact area of Pier 12 is 1.8 m^2, and 0.37 m^2 coral coverage of *M. patula* as indicated in the table above.

Within the 4 to 6-ft depth contours, where 4 piles are proposed to be placed, coral cover is estimated at 87% of the bottom and live coral cover that would be buried under the pile footprint is 0.70 m^2. At the 10 to 12-ft depths, where five piles are proposed to be placed, coral cover is estimated to be 86% and live coral that would be destroyed is estimated at 0.86 m^2. The remaining 11 piles are proposed for depths between 14 and 18 ft, where coral cover is estimated at 11%. Live coral that would be destroyed by these piles is estimated at 0.24 m^2. However, due to the overlapping, plate and encrusting growth forms of the colonies in the 4 to 6-ft and 10 to 12-ft depth ranges, collateral damage may be higher and direct impacts can be anticipated to extend beyond the actual footprint of a piling as nearby corals could be dislodged or broken.

Pier 15

A total of 67 (20-inch octagonal) piles are to be placed at Pier 15. The ends of the piles have an area of 0.20 m^2 (2.2 ft^2) for a total direct impact area of 13.4 m^2 (144 ft^2). Total area coverage of coral colonies in the direct impact area of Pier 15 is 0.10 m2 (1.1 ft^2), and 0.02 m^2 (0.22 ft^2) coral coverage of *M. patula*.

In the 4 to 6-ft depths, where 7 piles are proposed to be placed, coral cover is estimated at 5.1% and live coral that would be destroyed is estimated to be 0.07 m^2 (0.75 ft^2). At 10 to 12-ft depths, where 16 piles are proposed to be placed, coral cover is estimated at 0.98%, and area of live coral that would be destroyed is estimated to be 0.03 m^2 (0.32 ft^2). At the 12 to 24-ft depths where 44 piles are proposed, no corals were observed. It should be noted that the "direct" estimate provided below only includes a calculation of area under the pilings, and not adjacent colonies that may suffer incidental damage.

Pile-Driving Noise

Direct impacts to sea turtles, monk seals, and humpback whales may also result from pile driving sounds. This issue was discussed previously in Section 3.2.8.2, Underwater Noise. The most appropriate and practical mitigations may be work management options, such as surveying the project area to ensure no listed species are in the area. Other mitigations include "soft starts" for pile driving, pre-drilling, use of vibratory drivers, and bubble curtains. Appropriate mitigations will be determined by the U.S. Army Corps of Engineers (USACE), in consultation with federal resource agencies, during the Department of the Army (DA) permit process.

Turbidity

At both Pier 12 and Pier 15, direct impacts to the marine environment would occur during installation of the pilings, loading dock and shoreside infrastructure construction. Project construction may temporarily increase the amount of suspended sediment in the water column at each pier. This increased sediment load can negatively impact corals in several ways: inhibit coral recruitment, reduce light required by zooxanthellae, reduce the ability of coral polyps to feed, increase respiration rates, reduce growth rates, and increase mucus production for sloughing away sediment (Rogers, 1983; Hodgson, 1990; Te, 1992; ISRS, 2004; Piniak, 2004 in AECOS, 2012).

This issue and best management practices for mitigation is discussed in Sections 3.2.4, Bathymetry and Marine Sediments, and Section 3.2.6, Marine and Water Resources.

3.3.2.3 Indirect Impacts

Indirect impacts to marine biological resources off Piers 12 and 15 could result from shading from project structures (loading platforms, vehicular bridge, mooring dolphins and moored vessel) and a local increase in boat traffic. Predicted indirect impacts from shading at each pier is presented in Table 3-2.

Table 3-2: Predicted Indirect Impacts to Corals at Pier 12 and 15

Location	Total shaded area	Area coverage of coral colonies in shaded area
Pier 12		
Structures	83.1 m^2	50.7 m^2
Vessel	400 m^2	0.18 m^2
Total	483.1 m^2 (5,200 ft^2)	50.9 m^2
Pier 15		
Structures	520.7 m^2	17.2 m^2
Vessel	2331 m^2	0
Total	2851.7 m^2 (30,695 ft^2)	17.2 m^2

Source: AECOS, 2012

Shading from Structures

An indirect impact to benthic organisms dependent upon light level would come from shading by the loading docks, mooring dolphins, and semi-permanently moored vessels. Shading impacts to corals under the structures are likely to be variable and occur after project completion. The amount of available light is an important factor affecting survival, growth, and depth distribution of corals. Reduced light availability to coral zooxanthellae (symbiotic microalgae) can result in increased coral mortality. There are potential positive effects from the shading produced from the permanent loading docks. Shading may cause a slight decrease in the water temperature, which may reduce thermal stress in corals. Thermal stress can lead to the disruption of normal photosynthetic processes in the corals' zooxanthellae (i.e., bleaching) and coral disease (AECOS, 2012). The impact from shading of the bottom is a more subtle impact on light dependent corals and algae than driving piles, but will influence a larger area than that directly impacted by the latter. Total indirect impact to corals from shading is shown in Table 3-1 above.

Pier 12

The total area affected by shading at Pier 12 is 483.1 m^2 or 5,200 ft^2. The loading platform at Pier 12 is proposed to be located in depths of 4 to 18 ft and would shade an area of 56.1 m^2. Live coral under the shaded area is estimated to be 61%, for a total direct impact of 34.4 m^2 (370.3 ft^2) of coral permanently shaded. The two mooring dolphins are proposed to be located in depths of 10 to 18 ft, where coral cover is estimated to be 48%. Under the area of the mooring dolphins (18.6 m^2), an estimated 9.01 m^2 (97 ft^2) of coral would be permanently shaded. The vehicular bridge at Pier 12 is proposed to be located along the 4 to 6-ft depth contours and cover an area of 8.4 m^2. Live coral coverage in this area is 87%, for an area of 7.3 m^2 of coral permanently shaded from the vehicular bridge. The proposed location for the docked vessel is over depths of 18 to 24 ft, where coral cover is estimated at 0.04%. Under the vessel (400 m^2), an estimated 0.18 m^2 (1.9 ft^2) of coral would be periodically shaded.

Pier 15

The total shaded area at Pier 15 is 2,851.7 m^2 (30,695 ft^2). The two loading platforms at Pier 15 are proposed to extend across water depths of 4 to 18+ ft, and will shade an area of 452.2 m^2 (2715 ft^2). Coral cover under these structures is estimated to be 0.03%, for a total direct impact of 13.7 m^2 (147.5 ft^2) of coral permanently shaded. Five mooring dolphins are proposed for Pier 15, covering a total area of 68.5 m^2 (737 ft^2). Coral cover under the mooring dolphins is estimated at 0.05%, for an area of 3.5 m^2 (38 ft^2) of coral permanently shaded. No corals were observed in the areas under the two proposed vessels off Pier 15.

Increased Boat Traffic

Other indirect impacts would be caused by increased boat traffic in this part of Honolulu Harbor. Indirect impacts from boat traffic include resuspension of fine bottom sediment and increased damage to coral heads from boat-strikes (i.e., propeller scarring). Polluted surface runoff (fine sediments, soap, oil, fuel, and other chemicals), chemical contamination from treated wood surfaces, and fuel and oil leakage may also indirectly impact coral reef resources at Pier 12 and Pier 15.

Few fishes occur in Honolulu Harbor (AECOS, 2012a). The fishes that were observed during the biological surveys are common to the Hawaiian Islands. Fishing is prohibited in Honolulu Harbor. Frequent dredging, low benthic rugosity, silt bottom, high turbidity, and frequent boat traffic make Honolulu Harbor a generally poor environment for fishes. Even with the robust coral growth around Pier 12, fish abundance was low (AECOS, 1982, 2012a). Impacts to fishes from the project will be minimal, in part because the addition of piles can enhance some fish habitats.

3.3.2.4 Rare, Protected, or Invasive Species

No Endangered Species Act (ESA) listed species were encountered during the February or October 2012 marine surveys. One coral species proposed for ESA listing was observed at Pier 12 and at Pier 15. One marine protected species was observed in the project vicinity: black-lipped pearl oyster (*Pinctada margaritifera*).

Listed Species Known to Occur in General Vicinity

Black-lipped pearl oyster

The pearl oyster (*P. margaritifera*) is protected throughout the State of Hawai‘i, and it is prohibited to “catch, take, kill, possess, remove, sell or offer for sale.” Black-lipped pearl oysters were observed in low numbers at Pier 12 during the biological surveys.

Coral

Coral species are protected under Hawai‘i state law. State law prohibits the breaking or damaging, with any implement, any stony coral from the waters of Hawai‘i, including any reef or mushroom coral. It is also unlawful to take, break or damage, with any implement, any rock or coral to which marine life of any type is visibly attached.

In 2009, the National Oceanic and Atmospheric Administration (NOAA) received a petition to list 83 species of reef-building corals under the ESA. In February 2010, NOAA found substantial information from the petition indicating that listing as threatened or endangered under the ESA may be warranted for 82 of the 83 petitioned species. Following the initial finding, NOAA completed a status review report and a draft management report of the candidate species, which completed public review in July 2012. All information gathered from the review process was summarized in a Supplemental Information Report. Based on the Status Review, Supplemental Information and Final Management reports, NOAA Fisheries proposed listing for 66 coral on November 30, 2012. This proposal is currently undergoing a 90-day public review, after which NOAA will issue its final decision. Of the proposed species, one (*M. patula*) was observed in the Project areas of Pier 12 and Pier 15. Direct and indirect impacts to this species will occur from the project, as discussed and summarized in Table 3-1 above.

Sea Turtle

The threatened green sea turtle or *honu* (*Chelonia mydas*) is known to occur in the waters of Honolulu Harbor. The endangered hawksbill turtle or *honue‘a* (*Eretmochelys imbricata*) may also appear on rare occasions in the vicinity. There may be noise impacts to sea turtles from project pile driving.

Monk Seal

The endangered Hawaiian monk seal (*Monachus schauinslandi*) is rarely seen in Honolulu Harbor. The majority of monk seal sighting information collected in the main Hawaiian Islands is reported by the general public and is highly biased by location and reporting effort. Systematic monk seal count data come from aerial surveys conducted by the Pacific Islands Fisheries Science Center (PIFSC). Aerial surveys of all the main Hawaiian Islands were conducted in 2000-2001 and in 2008.

One complete survey of O‘ahu was conducted for each of these years. The 2000 survey was conducted from an airplane and the 2001 and 2008 surveys were both conducted by helicopter. No Hawaiian monk seals were sighted within Honolulu Harbor during these three surveys (PIFSC, 2009 in AECOS, 2012).

Currently, only the remote Northwestern Hawaiian Islands are considered critical habitat for monk seals. Recently, the waters surrounding the Main Hawaiian Islands (MHI) have been proposed as monk seal critical habitat, excluding coastal environments with hardened shorelines or developed areas that lack the features that would support Hawaiian monk seal use. Honolulu Harbor does not meet the definition of critical habitat for monk seal.

Reports by the general public, which are non-systematic and not representative of overall seal use of main Hawaiian Islands shorelines, have been collected in the main Hawaiian Islands since the early 1980s. A total of three Hawaiian monk seal sightings have been reported for Honolulu Harbor. These sightings occurred in 2002, 2004, and 2009. One of these sightings was reported as a dead seal floating in the harbor, but the carcass was never recovered (PIFSC, 2009 in AECOS, 2012).

Humpback Whale

The humpback whale or *koholā* (*Megaptera novaeangliae*) was listed as endangered in 1970 under the ESA. In 1993 it was estimated that there were 6,000 whales in the North Pacific Ocean, and that 4,000 of those regularly came to Hawai‘i annually from November through May with the peak between January and March. The population is estimated to be growing at between 4 and 7 percent per year. Today, as many as 10,000 humpback whales may visit Hawai‘i each year. The waters of Honolulu Harbor are not within the Hawaiian Islands Humpback Whale National Marine Sanctuary. However, sightings of whales in the harbor were made in January 2012, when two whales, a mother and calf, were seen at Piers 30, 52, and 53 of Honolulu Harbor (Yamada, 2012 in AECOS, 2012).

3.3.2.5 Mitigation

Mitigation for impacts to marine resources caused by the proposed action includes a sequential process: 1) avoiding impacts, 2) minimizing impacts, and 3) compensating for unavoidable impacts. The first step is to avoid impacts through project design or operational decisions. The second step, after avoidance measures have been incorporated, is to minimize impacts. If unavoidable impacts still exist after avoidance and minimization, then replacement of lost ecosystem functions and values is appropriate. This last step is called compensatory mitigation.

The proposed action has employed a range of avoidance and minimization strategies throughout the planning and design process. Additional avoidance and minimization, in the form of Best Management Practices, are proposed during construction. These and other potential mitigations are described below:

Avoidance through Project Design

The proposed action has incorporated a number of avoidance strategies through project design. The proposed use of mooring dolphins and pile-supported loading platforms has much less of a physical impact than other structural types of berthing, such as a bulkhead with sheet piles and backfill, or a pile-supported full length platform. As discussed in Chapter 2, Alternatives, a solid, backfilled bulkhead would completely obliterate coral communities immediately around the existing pier structures. A traditional solid platform pier would have pilings similar to the proposed action, but more would be needed and over a larger area to support the platform. In addition, the continuous platform would result in greater shading impacts to coral than the proposed action, which utilizes a grated catwalk to separate the mooring dolphins from the loading platform.

The proposed design at both piers offsets the loading platform (from 20 to 35 feet) away from the existing bulkhead. This offset design reduces direct impact (pile driving) in the area closest to the bulkhead. At Pier 12 in particular, this shelf area has the most abundant and largest coral colonies. During informal consultations with the federal resource agencies (NOAA NMFS and USFWS) conducted during the design phase, a question was raised whether the loading platform at Pier 12 could be extended out even farther. It was noted that extending the platforms an additional 15 feet into the harbor (or a distance of 35 feet from the bulkhead) could avoid nearly all direct impact to coral. This option was investigated, but eliminated because it would adversely impact the turning radius of the vessels, as well as hamper movement of ships located at adjacent berths. In addition, extending the berth into deeper water would entail much higher construction costs.

The data from the Phase 1 survey on coral location and abundance was utilized in the final design phase to determine the placement of piles. All effort was made to avoid areas with robust coral growth, and to avoid and minimize impact by locating piles in areas of lower coral cover.

Finally, the project will remove old concrete pilings and marine debris at Pier 15, such as shopping carts, metal scraps, concrete blocks, etc. This has the potential to improve the quality of the marine environment, though it was noted by the resource agencies that the existing debris may function as habitat to some species.

Minimization through Best Management Practices

During project construction, there is the potential for adverse impact to the marine environment, including to threatened and endangered species. Best Management Practices (BMP) will be utilized during construction to protect the environment and endangered species from harm. A BMP plan for the proposed action will be developed in consultation with the federal resource agencies during the Department of the Army (DA) permit process. The discussion below presents a range of possible mitigation measures which have been utilized on similar projects in Hawai‘i.

Potential BMPs for Environmental Protection

BMPs to minimize impacts to water quality were discussed in Section 3.2.6, Marine Water Resources. The following BMPs may be also considered to minimize the degradation of water quality and avoid adverse impacts to fishes, corals, and other aquatic resources (AECOS, 2012, modified from USACE, 2012):

- Minimize turbidity and sediment and contain it to the immediate vicinity through the use of effective sediment containment devices.
- To the extent practicable, schedule in-water work to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods.

- Inspect all project-related materials (fill, landscaping, etc.) and equipment (dredges, barges, backhoes, etc.) placed in the marine environment to ensure they are free of pollutants, organic matter, and invasive species.
- Do not stockpile project-related materials (fill, revetment rock, pipe etc.) in the marine environment or in close proximity where such that materials could be carried into the water by wind, rain, or high surf.
- Dispose all construction debris and material removed from the marine environment at an approved upland or alternative disposal site.
- No contamination (by trash, debris, sediment, non-native species introductions, attractions of non-native pests, etc.) of adjacent waters of the United States, including special aquatic sites, shall result from project-related activities. Special attention must be paid to fouling on barges, vessels, and equipment to minimize transport and potential introduction and spread of aquatic non-native species.
- Fuel project-related vehicles and equipment away from the water and develop a contingency plan to control petroleum products accidentally spilled during project activities. Absorbent pads and containment booms should be stored where and as appropriate to facilitate the clean-up of accidental petroleum releases.
- Install silt fences, silt curtains, or other diversion or containment structures to contain sediment and turbidity at the work site.

Potential BMPs for Endangered Species Protection

The following endangered species BMPs may be applicable during the proposed work (USACE, 2012 in AECOS, 2012). The most appropriate BMPs to protect threatened and endangered species will be identified in consultation with federal resource agencies during the DA permit process and the Section 7, Endangered Species Act (ESA) consultation.

- Perform survey of the project area just prior to commencement or resumption of construction activity to ensure that no protected species are in the project area. If protected species are detected, postpone construction activities until the animal(s) voluntarily leave the area.
- If any listed species enters the area during construction activities, cease all activities until the animals(s) voluntarily depart the area.
- Apprise on-site project personnel of the status of any listed species potentially present in the project area and the protections afforded to those species under federal law.
- Report any interaction with or incidental take of protected species immediately to the appropriate federal authorities.

Minimization through Coral Transplantation

One potential minimization strategy is to transplant corals from proposed pile placement locations to nearby transplantation locations in the harbor. At both piers, many of the coral

colonies (*Leptastrea spp*., *Cyphastrea ocellina, P. lobata, and Montipora spp*.) have encrusting and plate growth forms; a factor that could make coral transplantation labor intensive and may also limit survivorship due to stresses and breakage incurred by removal, transport, and reattachment. At Pier 12, *M. patula* and *M. capitata* colonies occur in encrusting, plate, and pillar morphologies.

Partial removal (individual plates or pillars) and relocation of these colonies may be feasible. Additionally, several large mound-forming *Porites* spp. colonies occur in shallow waters (4 to 8 ft) near the southwestern end of Pier 12. The mounding morphology of these large colonies makes them viable candidates for transplantation. Off Pier 15, the most common corals observed, *P. lobata,* are small and encrusting. Many of the colonies occur on loose rubble or substrate that could be rather easily relocated.

If determined to be an appropriate minimization/mitigation for this project, coral transplantation methodology should follow procedures outlined in the Kawaihae Small Boat Harbor Coral Transplant Plan (AECOS, 2012c) and Kaunakakai Ferry System Improvements Coral Transplantation Plan (AECOS, 2012d). The Phase 2 biological survey considered coral transplantation receiving sites, and additional surveys will be required to evaluate potential receiving sites if corals are to be moved for transplantation.

If applicable, a coral transplantation plan and monitoring program will be developed in consultation with federal resource agencies prior to project construction.

Compensatory Mitigation

Any compensatory mitigation required for the proposed action will be identified by the USACE, in consultation with the federal resource agencies, during the DA permit process.

3.3.2.6 Impact of Alternatives to the Proposed Action

All project alternatives, except No Action, would have impacts on the marine environment. If MSRC and CIC were relocated to another location within or outside Honolulu Harbor, impacts on coral resources would depend upon local conditions, and the extent of new construction required. Additional Phase 2 surveys of the selected area would be needed to determine existing conditions and probable impacts. As with the proposed action, the mitigation sequence of 1) avoidance through design, 2) minimization, and 3) mitigation would need to be followed.

Alternative berthing design at Piers 12 and 15, such as bulkhead with sheet piles and backfill would have a much greater impact on the marine environment and loss of coral resources. The construction period would be longer, structures in the water larger, and most of the coral colonies along the west side of Pier 12 would be destroyed. A design involving concrete pile and deck would require a greater number of piles than the proposed action, and a continuous deck would have greater shading impacts than the berthing dolphins and loading platform.

With any alternative involving in-water construction, there will be underwater noise and resuspension of sediments. The use of construction best management practices to mitigate impacts to water quality, noise, and endangered species would be similar to the proposed action.

3.4 HUMAN-MADE ENVIRONMENT

3.4.1 Socio Economic Characteristics

3.4.1.1 Existing Conditions

The Island of O‘ahu is the commercial, cultural and social center of Hawai‘i. O‘ahu and urban Honolulu have the highest resident population in the state. According to the 2010 U.S. census, O‘ahu’s resident population was 911,841, up 4 percent from the 2000 census. The residential neighborhood nearest the project site is the downtown area, with a 2010 population of 15,620.

Piers 12 and 15 are located in Honolulu Harbor, the primary commercial harbor serving the island of O‘ahu. Honolulu Harbor is administered by the Hawai‘i State Department of Transportation Harbors Division, and handles over 11 million tons of cargo annually. The services that the harbor provides are crucial as Hawai‘i imports over eighty percent of its required goods. Honolulu Harbor also receives over 500,000 cruise ship passengers annually. Pier 2 and Aloha Tower’s Piers 10 and 11, adjacent to the Pier 12 project area, serve as the island’s primary cruise ship terminals.

The surrounding area directly mauka of the Pier 12 and 15 waterfront is part of Honolulu’s Chinatown commercial and historic district. The surrounding downtown area is also a center of government, business, and commercial activity for Honolulu. Immediately to the east of the project area, adjacent to Piers 8 and 9 is the historic Aloha Tower, constructed in 1926, and the surrounding Aloha Tower Marketplace, a retail development of shops and restaurants built in 1994.

In November 2012, Hawai‘i Pacific University proposed to the State to assume management and redevelopment of the Aloha Tower Marketplace, with the intent of converting it to a mix of retail, student housing, and school facilities, including a sports and entertainment complex[10]. The status of that proposal and whether it is likely to proceed is unknown.

3.4.1.2 Impacts and Mitigation

The proposed improvement of Piers 12 and 15 will not directly affect ongoing cargo and commercial or cruise ship operations in Honolulu Harbor. The proposed action will not have a direct or obvious economic impact, as it supports an ongoing function mandated by federal law that does not generate revenue. However, the oil spill and emergency response function provides critical support to the entire maritime industry. As part of the larger emergency response community, MSRC and CIC help ensure the safety, environmental and economic well being of all commercial and recreational activities in Hawaiian waters. Though it exists “behind the

[10] *“HPU Seeks to Take Over Aloha Tower Redevelopment,”* Andrew Gomes in Honolulu Star Advertiser, November 22, 2012.

scenes" much of the time, the ability of emergency responders to provide rapid response to an incident will directly affect the social and economic welfare of the State.

The proposed action also indirectly supports the initiative to improve the State's commercial shipping capability. The relocation of MSRC and CIC was accelerated by the DOT-H's proposed Kapālama Container Terminal project, which will provide a new 90-acre container yard and deep draft wharf to support two container ships. The Kapālama Container Terminal is the cornerstone of the State's long-term, harbor modernization plan, and will accommodate the anticipated increase in cargo and passenger traffic through the year 2030. The proposed action and the Kapālama Container Terminal project are two, independent initiatives. However, the successful completion of the proposed action allows timely implementation of these modernization efforts. In that respect, the proposed action will have a long-term, positive economic impact on the State's economy.

3.4.1.3 Impact of Alternatives to the Proposed Action

All of the project alternatives, with the exception of no action, would provide necessary berthing for the MSRC and CIC vessels. All of these options would support the proposed Kapālama Container Terminal and the State's long-term harbor modernization efforts. However, there would be differences in construction costs of the other pier alternatives. It is expected that the other build alternatives would entail much higher construction costs than the proposed project.

3.4.2 Built Environment and Adjacent Land Uses

3.4.2.1 Existing Conditions

The *Archaeological Literature Review and Field Inspection* (Appendix D) and the *Impact Analysis on Piers 12 and 15, Hawai'i Capital Special District, and Chinatown Special District* (Appendix E) provide a history of the development of Piers 12 and 15. Development at the current Pier 12 site was initiated in 1823 with construction of small landing, 20 to 25 ft-wide, in a pyramid. In the 1830s and 1840s it became a true wharf, and by 1880, the wharf was approximately 80 ft-wide and 160-ft long. It was extended ten feet in 1881 and to an approximate length of 220 ft in 1888. The pier was used for most of the nineteenth century by the mercantile business Brewer and Co., and was called Brewer's Wharf into the twentieth century. In the early twentieth century it was used by the Interisland Steam Navigation Company, who transported goods and people between the islands.

In 1907, Pier 12 was reshaped as a long rectangle approximately 300 ft long. In 1963, the wharf was shortened to 125-ft-long. This truncation has led to the exposure of some of the original cut coral blocks and brick understructure, dating back a pre-1880 structure. A shed was present on the structure as early as 1886, was rebuilt in the early 1900's, and probably torn down in the 1950s. By 1950, the pier appears to have been used mainly for parking vehicles

Pier 15, triangular shaped pier 900 ft- (274.3 m)-long, was built around 1900, according to historic maps and photographs, completely on fill land built out from the shore. The pier was at first controlled by the Interisland Steam Navigation Company, then the Matson Navigation

Company by 1927, who operated ships that sailed from the mainland to the Hawaiian Islands. In the later 1910s, it was used for moorage of the sampan fleet, small fishing vessels used in the tuna industry, but these boats were moved in 1918-1919 to the newly dredged Kewalo Basin to the east. By 1925, the pier had multiple gable-roof frame buildings joined side-by-side. At this time, the pier was designated a place to unload lumber from ships. During WWII, it was also used to unload army freight. By 1950, it was used for auto parking.

In the early 1950s, Queen Street was widened to make way for the construction of the new multi-lane Nimitz Highway, and a portion of the *mauka* section of the pier was demolished and turned into part of the highway. It was at this time that the gable structure was removed. The southern portion of the pier was then designated for a new Fire Station, which was built on the pier in 1951. The ship *Abner T. Longley* acted as a fire boat for the Honolulu Fire Department from 1951 to 1990. It was replaced in 1990 with the fireboat *Moku Ahi*. In 1955, a shed was built north of the fire station; this shed contained rooms for a fish auction and for fish storage. In 1978, a timber apron that once extended from the gable-roofed complex was demolished. There are still pilings underwater in front of the wharf that once supported this apron. Several of the rooms in the shed were also demolished or remodeled at this time. The main use of the pier today is for support of the fire station.

3.4.2.2 Impacts and Mitigation

The proposed action will convert the parking lot at Pier 12 to an actively used berth for the CIC ship, *OSRV Clean Islands*. Adjacent land uses along the waterfront include the Department of Transportation-Harbors office, and Piers 10 and 11, which are used to berth passenger cruise ships. Pier 12 is located within the 300-foot security zone in effect whenever the cruise ships are in port, and restrict access to authorized personnel. The proposed action will result in the *OSRV Clean Islands* and CIC personnel being within the 300-foot security zone when a cruise ship is berthed.

Once the proposed improvements at Pier 12 are approved by DOT-H, the CIC will be required to complete a Facility Security Plan (FSP) which will address security issues when a cruise ship is at Piers 10 and 11. The FSP must be submitted to and approved by the U.S. Coast Guard (USCG) prior to project construction, and will follow USCG guidelines for the operation of the *OSRV Clean Islands*.

Adjacent users at Pier 15 include the existing fire station. The existing shed building is currently used by fire station personnel to park personal vehicles. The demolition of a portion of the existing shed will reduce parking capacity which will also need to be shared with MSRC personnel. However, between the shed and open areas next to the fire station, there will be adequate parking for all personal vehicles. MSRC operations will not adversely impact the fire station.

3.4.3 Archaeological, Historic, and Cultural Resources

An *Archaeological Literature Review and Field Inspection (LRFI)* for Piers 12 and 15 was conducted in September 2012 (Appendix D). The scope of work included historical research, limited field inspection to identify any surface archaeological features, and assessing the potential for impact to such sites. The assessment identified any sensitive areas requiring further investigation or mitigation before the project proceeds.

In addition, a historic architecture impact analysis was prepared (Appendix E) to assess the effects of the project on Piers 12 and 15, which are considered historic structures, as well as on the City and County of Honolulu's Hawai'i Capital Special District, and Chinatown Special District. The project area is within the Chinatown Special District and outside but adjacent to the boundaries of the Hawai'i Capital Special District.

The discussion below summarizes the findings, conclusions and recommendations from these two studies.

3.4.3.1 Existing Conditions

Archaeological and Cultural

The Honolulu Harbor area is comprised of recently created land formed by numerous dredging and filling operations. Most of what is currently Piers 12 and 15 is fill land, and only a small portion of Pier 12 overlaps the original, historic shoreline of Honolulu Harbor. There are no known archaeological sites at the proposed Pier 12 and 15 sites.

Archaeological

There are, however, a number of identified archaeological sites in the project vicinity. The Downtown Honolulu and Chinatown areas were intensively used by pre-Contact and early post-Contact Hawaiians for agriculture, aquaculture, and habitation. Within 300 feet of the piers, mauka of Nimitz Highway, are located three historic sites (SIHP #s 50-80-14-2456, -4494 and -5496). These sites have pre-Contact cultural deposits, including one at the Marin Tower property that includes some 28 historic burials. The LRFI notes that a traditional Hawaiian coastal trail most likely ran along the inland side of the Pier 12 and Pier 15 project area(s), at approximately the same location of Nimitz Highway. The project improvements are limited to the piers and will not impact this area.

The LRFI (CSH, 2012) includes descriptions of *wahi pana*, or storied places in the project vicinity. These places include Pākākā Heiau, known to have previously existed at the base of what is now Fort Street, but long since destroyed. Other storied places in the downtown area include the compound of Kamehameha the Great on the north side of Pākāka Point, residences of major historic figures, and the Honolulu Fort called Kekuanohu.

The Aloha Tower Complex, located approximately 600 feet southwest (and Diamond Head) of Pier 12, is a designated historic site, identified as State Site 50-80-14-9929, and also listed on the National Register of Historic Places. The Aloha Tower Complex was constructed between 1921 and 1926. The land that the tower sites on was filled with timber and coral blocks from the old Honolulu Fort. Honolulu Fort was dismantled in 1857, and the coral blocks were recycled to create the original harbor wall. Remnants of these coral blocks from the harbor wall can still be found partially submerged, on the makai side of Pier 12.

Remnants of the original coral blocks from Honolulu Fort and the original harbor wall are found on the makai side of Pier 12.

Cultural Resources

Prior to western contact, the coastal waters of Honolulu Harbor and its vicinity were used by native Hawaiians for fishing. Today, swimming, diving, and private fishing in the harbor are prohibited, and entering harbor waters requires permission from the State's harbor master. The DOT-Harbors has jurisdiction over the land and water up to the entrance of Honolulu Harbor. Security at Honolulu Harbor has limited cultural activities within the harbor for many decades, and as a result, there is a dearth of traditional activities occurring within the harbor.

A cultural impact assessment conducted for the Statewide Large-Capacity Inter-Island Ferry EIS noted that the only cultural activity in the harbor is shoreline fishing occurring from locations accessible to the public. The EIS mentioned several locations where this is occurring, including Sand Island Beach Park, Keʻehi Beach Park and the Keʻehi Boat ramp (DOT, December 2008).

Historic Architecture

The historic architecture impact analysis (Appendix E) evaluated the effects of the project on Piers 12 and 15, the Hawai‘i Capital Special District, and the Chinatown Special District. As noted above, the project area is located within the Chinatown Special District (*Makai* Precinct) and outside but adjacent to the Hawai‘i Capital Special District.

The ordinance for the Chinatown Special District states that buildings constructed from the 1880s to the 1940s are significant historic structures. There are no existing structures at Pier 12. The two buildings located on Pier 15--the Fire Station and the Pier 15 Shed--were built outside of this period of significance. The Fireboat Station was built in 1951, and the Pier 15 shed was built circa 1955. The study notes, however, that if the Chinatown Historic District nomination were to be updated, these buildings would likely be considered historically significant (Mason Architects, Inc. 2011:6). Both buildings are included in the Chinatown Special District’s list of “Historic and Architecturally Significant Structures.” The pier structures themselves are not specifically listed as historic and architecturally significant. Because the piers are included in the District and the two buildings are listed on the Historic and Architecturally Significant Structures list, they are historic resources (ibid).

3.4.3.2 Impacts and Mitigation

At both piers, a structural slab on piles will be constructed over the existing bulkhead. The structural slab will not be connected to or impose a load on the existing bulkhead. A loading platform and vehicular bridge will be pile supported. The pier improvements will require cutting and removal of a portion of the existing slab, excavation and installation of piles at the existing pier areas. At Pier 15, the Fire Station building will not be impacted. However, a portion of the existing shed building will be removed to allow truck access to the barge loading platform. The work will entail removal of the entire southwest corner of the building.

Archaeological and Cultural

Because of the extensive filling that occurred in the project area during the nineteenth and twentieth centuries, any surface archaeological historic properties in the immediate project area were likely destroyed or buried (CSH, 2012). Most of the current Pier 12 and 15 sites are comprised of fill land. Only a small portion of Pier 12 overlaps the original shoreline of Honolulu Harbor, and therefore the potential for pre-Contact cultural deposits and burials at Piers 12 and 15 are low. However, there is still a possibility that subsurface cultural deposits may be present beneath historic and modern fill layers.

The LRFI also indicates that it is possible that remnants of the original pre-1880 wharf are still beneath and surrounding the present Pier 12 dock. Although the history of Pier 15 is not as long as Pier 12, there is also the possibility of early twentieth century artifacts and construction material below Pier 15.

The project improvements will not impact the coral limestone blocks located on the east or makai side of Pier 12. The loading platform and berthing structure will be located on the north side of the existing Pier 12.

The proposed action will not impact any ongoing native Hawaiian or other group's cultural practices. The project area is a working commercial harbor, and no private fishing is permitted.

Historic Architecture

The impact analysis concluded that the project will not have an adverse effect to the Hawai'i Capital Special District, but the project was evaluated as having an adverse affect on the Chinatown Special District, and on Piers 12 and 15. Specifically, a new loading platform at Pier 12 was evaluated as a visual element that would reduce the integrity of the existing setting of Pier 12 since it would block historic characteristics from view. These adverse effects on the Chinatown Special District were determined to be indirect and relatively minor. It was noted that in the historic period, both Piers 12 and 15 had timber extensions ("piers" or "aprons") along their lengths that hid the underside area from view. The proposed new loading platforms will do the same thing, but to a lesser degree.

The proposed modification to the Pier 15 shed roof and overall footprint would reduce its integrity of design, although this building has already been altered multiple times since the 1950's. The shed is also considered to be a relatively minor element of the historic district, built after the District's period of significance (1880's to 1940's). Previous modifications to the shed building have already diminished its historic integrity, and it would not likely be individually eligible for listing as a historic structure.

Recommended Mitigation

The State of Hawai'i Department of Land and Natural Resources, State Historic Preservation Division (DLNR-SHPD) will determine the appropriate mitigation, if any, for this project. From an archaeological perspective, it is anticipated that an archaeological monitoring program will be recommended, because both piers are historic structures within the Chinatown Special District, and may have important remains related to early maritime history. In addition, Pier 12 may have Pre and Post-Contact deposits, artifacts, and structural remains.

An archaeological monitoring program would require a qualified archaeological monitor during any construction at the Piers that could possibly result in damage to the current structures or involving subsurface excavation below a certain depth. Should a monitoring program be recommended by the SHPD, an archaeological monitoring plan will be prepared and submitted for review and approval prior to initiation of construction.

The historic architecture impact analysis recommended consultation with SHPD prior to any proposed alterations to historic properties. Generally, any improvements to historic resources should be made in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties. Prior to any alternations that are not in accordance with these standards,

agreement should be reached with SHPD regarding mitigation. Documentation such as large format photography may be recommended.

3.4.3.3 Impact of Alternatives to the Proposed Action

Alternative project locations outside of Honolulu Harbor or elsewhere in the harbor would avoid impact to the Chinatown Special District, to historic Pier 12 and to the shed structure at Pier 15. Specific impacts to archaeological, cultural and historic resources would depend on the specific project site and proposed improvements, and would need to be assessed.

Limiting project improvements to Pier 15 only would reduce the likelihood of encountering subsurface cultural deposits, because this pier was built entirely on fill material. It would avoid modification of the historic Pier 12 structure. This alternative, however, would still impact the Pier 15 shed.

Use of an alternative structural type of berth—for example, a solid wharf structure, would have a greater potential to affect subsurface cultural resources, because it would involve backfilling a large area. The visual impact of this alternative on the Chinatown Historic District would be greater than with the currently proposed action. Other design modifications, such as extending the berthing structure seaward or eliminating one mooring dolphin would likely have similar impacts on historic resources as the proposed action. Subsurface excavation and modification of the Pier 15 shed would still be included.

3.4.3.4 HRS Chapter 6E Consultation

Both the Archaeological Literature Review and Field Investigation and the historic architecture Impact Analysis have been submitted to the SHPD for review and comment. Appropriate mitigation for the project will be determined by the SHPD, based on the information and recommendations in these two studies.

During the pre-assessment consultation period, a letter was received from the State of Hawai‘i Department of Land and Natural Resources, Historic Preservation Division during the pre-assessment consultation period (see Chapter 7). In a memo dated February 24, 2012, the SHPD noted that Pier 12 is historically important for several reasons:

1. The coral blocks along the makai side originated with Honolulu Fort, and in 1857 when the Fort was dismantled, the blocks were recycled to create the original harbor wall.
2. The present Pier 12 was immediately adjacent to the Robinson Wharf, the main shipbuilding and repair facilities for mid 19th century Honolulu Harbor. The pier stands between the Robinson Wharf and the original Customs House location and was the center of maritime activity during that time.
3. In 1893, American troops from the U.S. Boston landed at the Brewer Wharf, as Pier 12 was known at that time; those soldiers subsequently facilitated the overthrow of the Hawaiian Monarchy.

The SHPD letter noted that for these reasons, it considers Pier 12 to be historically significant under Criteria A (Events) and C (Architecture).

SHPD requested that any planning for use of Pier 12 include the following:

- The coral blocks are to be protected and retained and remain visible
- Public access be provided to view the coral block wall
- An interpretive marker placed on the site. The design and contents of the marker to be approved by SHPD.

The improvements at Pier 12 will not affect the existing coral blocks or block their visibility from Nimitz Highway (see visual simulation in Figure 15). From the Nimitz Highway sidewalk, the coral block remnants are only visible from the driveway of the Department of Transportation building, located directly south (Diamond Head) of Pier 12. The project will not affect access to this viewing area. The coral blocks are not visible from the ground level sidewalk immediately in front of Pier 12, partially because the pier is fenced and the public is not allowed onto the pier itself. The coral blocks may be visible, however, to passengers on the future Honolulu Rail Transit line. The transit vehicles will run on an elevated guideway above Nimitz Boulevard, in front of Pier 12.

As requested by SHPD, an interpretive marker for the coral blocks will be provided. The location and format for the interpretive marker will be developed in consultation with SHPD.

3.4.4 Utilities and Infrastructure

3.4.4.1 Existing Conditions

Piers 12 and 15 and their immediate vicinity are highly urbanized and served by a variety of public services and utilities. Water and sewer services are provided by the City and County of Honolulu, Hawaiian Electric Company (HECO) provides electrical services through overhead lines and underground conduits, and telephone services are provided by Hawaiian Telcom. There is currently no water, electrical, telephone or sewer service to Pier 12. Water, electrical, telephone and sewer service is provided to the Fire Station at Pier 15.

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

At Pier 12 the existing drainage generally flows from the east (Nimitz Hwy) side western perimeter of the parking area and then thru curb cuts into the harbor. At Pier 15 the drainage direction is similar, from the existing fire station on the east to the existing bulkhead on the west and into the harbor.

3.4.4.2 Impacts and Mitigation

Electrical and Telephone

At Pier 12, the project will include a new electrical transformer to the area to provide shore power. A new 4-inch line will bring water to the site from the 16-inch water main on Nimitz Highway. Water service will be provided to the berths via two 2-1/2 inch lines.

At Pier 15, underground electrical and telephone lines provide service to the existing fire station. These lines will not be impacted by the project, and service will be extended to the new berthing structures. The project includes installation of a new electrical transformer to provide shore power. The pad-mounted transformer will be sited in the lawn fronting the fire station.

In a pre-assessment consultation letter dated April 16, 2012 (see Chapter 7), the Hawaiian Electric Company (HECO) indicated it had no objections to the project. Hawaiian Telcom stated in a March 2, 2012 letter that it had no comments to the project. Oceanic Time Warner has no cable facilities in the project area.

Sewer

There will be no additional sewer service to the piers. Existing sewer service to the Fire Station will not be impacted.

Drainage

Site improvements will maintain the existing drainage flows as much as possible on the land side. The loading platforms will be sloped to drain water into the harbor. The new concrete loading platforms will increase impermeable surfaces at the harbor. A National Pollutant Discharge Elimination System (NPDES) permit will not be required during construction, as the total construction/staging area for the two sites is less than one acre in size.

3.4.4.3 Impact of Alternatives to the Proposed Action

All of the alternative project locations and alternative pier designs would require utility service to the berths similar to the proposed action. The utility requirements are based on the needs of the users, which would be the same regardless of whether the project is located outside Honolulu Harbor, elsewhere in Honolulu Harbor, or if a different berth design is used. The extent of utility improvements associated with any particular alternative would depend on whether there is existing service available and the existing capacity.

3.4.5 Traffic

A traffic impact assessment of the proposed new uses at Piers 12 and 15 was conducted (Appendix F). The project is being completed to allow the relocation of the Clean Islands Council (CIC) vessels to Pier 12 and the Marine Spill Response Corporation (MSRC) vessels to

Pier 15. Both project sites have access off Nimitz Highway, and the relocation of these users to these piers will affect driveway movements to and from Nimitz Highway in the downtown Honolulu area.

The traffic assessment found that the impacts of the additional traffic in the area due to these new uses will not be significant. The traffic impact at each site has been estimated to be less than 50 vehicle trips per day, with the peak hourly volume in one direction (in or out) being no more than 15 vehicles per hour. These traffic impacts will be less than 1% of the existing traffic volumes on the eastbound lanes of Nimitz Highway.

3.4.5.1 Existing Conditions

Nimitz Highway is an urban arterial that is part of State Route 92 as it passes through downtown Honolulu along the waterfront. In the vicinity of the project site, it is a divided eight-lane highway (four lanes of traffic in each direction) with auxiliary lanes for left turns at signalized intersections. Access to both Piers 12 and 15 is directly off Nimitz Highway. The site driveway ramps cross a concrete sidewalk. A bicycle lane, 3 to 4 feet in width, is striped between the curb and the adjacent traffic lane.

A 48-hour machine traffic count at the Nu‘uanu Stream bridge taken in August 2009 showed a total two-way weekday volume of nearly 72,000 vehicles per day; the volume in the eastbound direction (adjacent to the project site) was 35,400 vehicles per day. Traffic volumes on Nimitz Highway peaks during the morning and afternoon commute periods, but remains at a high level throughout the day. The traffic counts showed flow rates of at least 1,800 vehicles per hour in the eastbound direction between 6:30 AM and 6:30 PM.

Eastbound traffic on Nimitz Highway through the area is controlled by traffic signals at several intersections: at Pacific Street (0.5 mile west), at Nu‘uanu Avenue (700 feet east), at Fort Street (0.26 mile east), at Bishop Street (0.35 mile east), and at Alakea Street (0.45 mile east). The posted speed limit is 35 miles per hour and signal coordination has been observed to be fair-to-good during most hours of the day.

A network of local and collector streets connect to Nimitz Highway to provide access to other downtown properties and linkages to the rest of the street and highway network. Downtown streets that intersect Nimitz Highway generally are operated one-way, alternating directions to provide for efficient circulation. Pedestrian crossings of Nimitz Highway are permitted at marked midblock crosswalks and at signalized intersections, which are located where left turns onto or from the highway are permitted.

City bus service is available less than four blocks away on Hotel Street, serving numerous routes. Other bus stops are located nearby on King Street, Bishop Street, and Alakea Street. No City bus routes have stops on Nimitz Highway near the project site.

The Honolulu Rail Transit project proposes an elevated guideway along Nimitz Highway through this area. The transit guideway will be located within the Nimitz Highway median, and

be elevated above the existing roadway. A Chinatown transit station is proposed near Kekaulike Street, just west of Pier 15, and a Downtown transit station will be located east of Bishop Street, near the HECO substation.

Vehicular access to the Pier 12 site is over an existing driveway that serves the parking lot. Vehicular access to the Pier 15 site is through driveway that is shared with the service area behind the existing waterfront fire station.

3.4.5.2 Impacts and Mitigation

Operational Period Impacts

No new transportation improvements are proposed at Pier 12, and the existing driveway will be used. At Pier 15, the existing driveway will also be used, but inside the site, a corner of the existing shed building will be removed to improve truck access. The Traffic Impact Assessment found that the impacts of the additional traffic in the area due to these new uses will not be significant.

Traffic movements in or out of each driveway will be limited to right turns from or to the eastbound lanes of Nimitz Highway, since it is a divided facility and there are no median openings in front of the driveways. Traffic to or from the westbound lanes of Nimitz Highway can make U-turns at locations within a half-mile of both driveways, at the signalized intersection of Nimitz Highway and Alakea Street to the east and at a U-turn roadway just west of the Nu‘uanu Stream bridges.

The traffic impact at each site has been estimated to be less 50 vehicle trips per day, with the peak hourly volume in one direction (in or out) being no more than 15 vehicles per hour. These traffic impacts will be less than 1% of the existing traffic volumes on the eastbound lanes of Nimitz Highway.

Truck movements into the driveways could, however, affect traffic flow on the highway, as the driveways are narrow; turns by larger vehicles will need to be executed slowly and may require the use of two or more lanes. Operators of these vehicles, however, are trained and will have ample opportunity to warn other drivers of their intended movement, as these vehicles would be regular visitors to the site. Vehicles exiting each site would stop before crossing the sidewalk and proceed only when the sidewalk, adjacent bicycle lane, and vehicular traffic lanes are clear; each driveway has adequate sight distance and the upstream traffic signals provide a natural gap in traffic flow to facilitate safe entry into traffic.

The low volume and type of traffic expected to be generated by the site activity is not expected to result in any changes in demand for public transit service. The project-related traffic will not impact or be impacted by the proposed Honolulu Rail Transit project guideway, as it will be elevated above the Nimitz Highway median through this area.

Pier 12

At Pier 12, Clean Island Council's site-generated traffic was estimated to be less than 20 vehicles per day. Traffic generated will consist mostly of private vehicles (automobiles and small trucks) used by boat crews commuting to and from work. Because the CIC vessel berthed at this location is not a cargo vessel, loading or unloading activities will be infrequent, possibly once a month, generating two truck trips (one entering the site, one leaving the site) when that occurs. The largest vehicle expected to access the site is a flat deck semi-trailer carrying equipment that would be lifted onto the ship (using the ship's crane). Peak hour volumes on a typical day are estimated to be no more than 10 vehicles per hour (total of entering and exiting traffic). This represents an increase of less than 0.1% of the daily traffic, or less than 1% of the hourly volume if the site traffic occurs during daylight hours. If the site traffic occurs at other times, traffic volumes on the highway are much lower; the relative traffic volume impact may be higher, but the traffic impact of driveway movements would be minimal because traffic volumes are less.

Pier 15

At Pier 15, site-generated traffic was estimated to be less than 40 vehicles per day, also consisting mostly of private vehicles automobiles and small trucks used by employees. MSRC has estimated that large tractor-trailer truck access will occur less than ten times per year. Fuel deliveries may involve multiple trips over a two-day period, once per year. Peak hour volumes on a typical day are estimated to be no more than 15 vehicles per hour (total of entering and exiting traffic). The traffic impact, therefore, is an increase of less than 0.3% of the daily traffic, or less than 1% of the hourly volume.

Mitigation

During the project design phase, plans will be submitted to the State Department of Transportation (DOT) Highways Division for review and approval. Repairs or appropriate improvements to the sidewalk at Pier 12 may be required so that the sidewalk fronting the site conforms to existing standards. Plans will be developed in consultation with, and with the approval of, the DOT Highways Division.

Sight distances for drivers of entering and exiting vehicles at the driveway and vehicle turning paths will be checked during design in consultation with, and with the approval of, the DOT Highways Division.

There will not be a significant impact to Level of Service along Nimitz Highway. The normal daily operation of MSRC/CIC would be personal vehicles in bound in the morning and out bound in the afternoon. When large trucks occasionally visit the sites, they can be brought in at off peak times to minimize traffic disruption on Nimitz Highway.

Construction Period Impacts

There will be short-term traffic impacts on Nimitz Highway during the construction period, particularly when construction equipment and materials are brought to and from the site. Police escorts may be required during transport of large equipment, machinery or materials. Equipment will be transported during off-peak hours. No lanes of Nimitz Highway will be closed or obstructed during the construction period. All construction storage and staging will occur on site.

3.4.5.3 Impact of Alternatives to the Proposed Action

All project alternatives, with the exception of no-action, would have similar traffic volumes generated by CIC and MSRC as noted above. If an alternate location outside Honolulu Harbor or elsewhere in Honolulu Harbor were selected, these volumes would need to be evaluated in relation to existing traffic. However, regardless of location, traffic generated by the project would be far less than 100 trips an hour and/or 500 daily trips, the State Department of Transportation's guideline for a significant traffic impact. Alternative types of berthing structures or designs would not affect traffic volumes generated by the project.

All build alternatives would involve temporary construction period impacts due to the movement of construction vehicles, equipment and supplies to and from the site. This will slow traffic and inconvenience drivers. An alternative site such as Ke‘ehi Lagoon or a location with access off a less busy thoroughfare would affect fewer drivers than the proposed action. On the other hand, some alternatives, such as the construction of a bulkhead with backfill, could result in greater construction-period traffic impacts. Construction of a bulkhead would be more intensive, requiring more construction vehicles, including dump trucks transporting large quantities of fill material. Moreover, the construction period would likely extend over a longer period of time than with the proposed action.

3.4.6 Public Services and Facilities

3.4.6.1 Existing Conditions

The project area is within the Honolulu Department's District 5 (Kalihi), Sector 5 (Waiakamilo to Liliha, Iwilei).

There is an existing fire station at Pier 15 which operates the State's 110-foot fire boat, Moku Ahi, which is also berthed at Pier 15. The *Moku Ahi* fire boat is owned by the State of Hawai‘i but the boat and fire station are operated by the City and County of Honolulu. The station provides fire protection for marine areas from Diamond Head to Kalaeloa and up to three miles offshore. At any one time, there are five personnel on duty at the station. (Personal communication with Captain Mike Thompson, November 28, 2012).

In recent years, there have been discussions between the State, Honolulu Fire Department and the U.S. Coast Guard about the need to continue operating the fire station and dedicated fire boat. In a news report in March 2010, the Fire Department indicated that it is ultimately the State's decision whether to retain the fire station and fireboat and to determine the solution in the

best interest of safety and the needs of the harbor. It was noted that most commercial ships and many harbor users have their own firefighting capability[11].The long-term future of the Fire Station appears to remain under discussion. However, for the present, both the Fire Station, station personnel, and fire boat will remain at Pier 15.

3.4.6.2 Impacts and Mitigation

In an early consultation letter dated March 6, 2012 (see Chapter 7), the Honolulu Police Department stated that the project may cause an increase in calls for police service because of the anticipated vehicle traffic congestion during the construction phase. The letter noted that once the project is completed, it should have no significant impact on Police Department facilities or services.

The project improvements will not impact the existing fire station building or berthing of the *Moku Ahi*. The project will remove a section of the existing shed building at Pier 15 which is used by the Fire Department as a garage for parking private vehicles. The renovated shed will include parking which could be utilized by fire station personnel. Fire station personnel can also park along the western side of the existing fire station. The presence of MSRC vessels and personnel will not adversely impact the fire station operations.

3.4.6.3 Impact of Alternatives to the Proposed Action

Most project alternatives would have comparable impacts on public services, though alternatives that do not involve Pier 15 would have no effect on the existing fire station. All alternatives would result in construction period traffic congestion.

[11] Daryl Huff, *"Hawaii Considers Firing Fireboat"*, KITV 4 News, kitv.com, March 30, 2010

3.5 SUMMARY OF ENVIRONMENTAL IMPACTS

Table 3-3: Summary of Environmental Impacts

Resource Area (EA Section)	Impact of Proposed Action	Mitigation	Impact of Alternatives to Proposed Action
Physical Environment			
Air Quality *(Section 3.2.2)*	Demolition and construction will generate dust. No long term increase in emissions or air pollution.	▪ Best Management Practices (BMP)s for dust control during construction: water source, pave as soon as possible	All build alternatives will have similar construction-period impacts and mitigation.
Geography and Soils *(Section 3.2.3)*	Removal of existing pavement and installation of new slab supported by piles. Trenching for utility lines.	▪ BMPS to prevent soil loss and erosion	All build alternatives will have similar construction-period impacts and mitigation.
Bathymetry and Marine Sediments *(Section 3.2.4)*	No dredging is proposed; disposal of sediments is not an issue. Includes installation of piles to support berthing dolphins and loading platforms. Removal of old concrete piles and debris at Pier 15. Resuspension of sediments will cause increased turbidity during pile driving and in-water work. During pier operation, increased vessel traffic may slightly increase sediment resuspension in Pier 12 & 15 area.	▪ Use of BMPs including full water depth silt curtain during all in-water work.	All build alternatives will have similar construction-period impacts and mitigation.
Ground and Surface Water *(Section 3.2.5)*	No adverse impact to groundwater or surface water (Nu‘uanu Stream)	None required.	Impacts would depend on location of alternative.
Marine Water Resources *(Section 3.2.6)*	Shoreside construction debris could enter harbor waters. In-water work will resuspend sediments and increase turbidity.	▪ BMPs and erosion control during shoreside construction ▪ Use of full water depth silt curtain during all in-water work	All build alternatives will have similar construction-period impacts and mitigation.
Natural Hazards *(Section 3.2.7)*	Located within flood Zone AE and tsunami evacuation area. No impact to threat or occurrence of flood or tsunami. No increased risk to human health or property.	▪ Pier improvements will conform to applicable seismic and flood construction standards	All build alternatives with a waterfront location will have similar impacts and mitigation. Alternative locations may result in slower MSRC/CIC response time depending on location of emergency incident.
Land Based Noise *(Section 3.2.8)*	Construction period impacts on nearby residential condominiums (Harbor Court, Marin Tower, Harbor Village Condominium), especially	▪ Compliance with DOH Community Noise Control ▪ Construction limited to daytime	Impacts would depend on location and proximity of noise-sensitive land uses.

Resource Area (EA Section)	Impact of Proposed Action	Mitigation	Impact of Alternatives to Proposed Action
	during pile driving. No operational noise impacts.		
Underwater Noise *(Section 3.2.8)*	Noise impacts from pile driving on marine life; particular concern about impacts on listed species (whales, dolphins, monk seals, turtles).	▪ Visual survey of project area prior to work to ensure no protected species in the area ▪ Halt work if species are present ▪ Cushioned pile driving ▪ "Soft starts" for pile driving to allow species to leave the area before full pile driving impact is reached.	All build alternatives will have similar construction-period impacts and mitigation. Alternatives vary by number of underwater piles and extent of in-water construction required.
Solid and Hazardous Waste *(Section 3.2.9)*	Pier 15 shed has asbestos containing material and lead-containing paint which will be impacted during building modification.	▪ Lead containing materials and lead containing paint will be properly removed, handled and disposed.	Any alternative involving modification of shed at Pier 15 would have similar impacts. Impacts at alternative locations would depend on existing conditions at the site.
Visual Resources *(Section 3.2.10)*	Improvements at Pier 12 and presence of 130-ft long boat will be visible from Nimitz Highway. Berthing improvements and ship/barge will be visible but less obvious at Pier 15 because of presence of shed building and fire station. Improvements are compatible with surrounding waterfront industrial setting. No adverse impact to important scenic vistas.	None required.	All build alternatives will have similar visual impacts, as all would be located in an active, working harbor. A bulkhead with sheetpiles alternative would be a more visually massive structure.
Biological Environment			
Terrestrial biology *(Section 3.3.1)*	No threatened or endangered species. All terrestrial flora and fauna is introduced and common to urban environments.	None required.	
Marine Biota *(Section 3.3.2)*	Direct loss of coral due to pile driving at Piers 12 and 15. Potential noise impacts to turtle, monk seals and whales during pile driving. Increase in turbidity during construction will temporarily impact water quality. During operation, increased shading from loading docks and moored vessels may impact coral.	▪ Avoidance through project design: proposed mooring dolphin and pile supported platform minimizes pile driving and eliminates need for dredging. ▪ BMPs will reduce adverse impacts to water quality. ▪ Visual surveys to ensure no protected species are present in work area. ▪ Coral relocation where possible.	All alternatives involving in-water construction will impact corals directly by pile driving and indirectly by shading from vessels and structures. Extent varies by specific design and location. All alternatives involving pile driving will have similar noise impacts and mitigation.

Resource Area (EA Section)	Impact of Proposed Action	Mitigation	Impact of Alternatives to Proposed Action
Human Made Environment			
Socio-Economic *(Section 3.4.1)*	Supports oil spill response capability, a federally-mandated function. Indirectly supports State's Kapālama Container Terminal project by providing timely relocation site for a displaced harbor user.	▪ Best management practices for dust control: water source, paving a soon as possible, control	All build alternatives will have positive impact by providing a permanent site for the oil spill responders.
Built Environment and Adjacent Land Uses *(Section 3.4.2)*	Improvements at Pier 12 are within 300-foot security zone around Pier 10/11 when cruise ships are in port. Demolition of portion of Pier 15 shed will reduce parking stalls available to fire station personnel.	▪ CIC will prepare Facility Security Plan to address security issues when cruise ship is at Pier 10/11. ▪ MSRC and Fire Station to work out parking arrangements for shed. Open areas are also available for parking.	All alternatives at Piers 12 and 15 will have similar impact as proposed action. Impact at other locations depends on adjacent land uses there.
Archaeological *(Section 3.4.3)*	Majority of both sites are on fill land, low potential for pre-contact cultural deposits. No impact to coral limestone blocks at Pier 12 which are remnants from Honolulu Fort and original harbor wall.	▪ Archaeological monitoring program may be recommended by SHPD. ▪ Consultation with SHPD is pending.	All alternatives at Piers 12 and 15 will have similar impact as proposed action. Impact at other locations would need to be determined.
Historic Architecture *(Section 3.4.3)*	No adverse effect to Hawai'i Capital Special District. Adverse effect on Chinatown Special District, on Piers 12 and 15, and Pier 15 shed. Adverse effects are indirect and relatively minor. No impacts to coral blocks at Pier 12. Coral blocks are not readily visible from Pier 12 sidewalk at present.	▪ Consultation with SHPD will determine appropriate mitigation for impacts to Pier 15 shed. ▪ Interpretive marker for coral blocks at Pier 12 as recommended by SHPD. ▪ Consultation with SHPD is pending.	All alternatives at Piers 12 and 15 will have similar impact as proposed action. Impact at other locations would need to be determined.
Utilities and Infrastructure *(Section 3.4.4)*	Water and electrical service to be provided to the piers. No sewer service provided. No impacts to existing fire station.	▪ New electrical transformer at Pier 12	All alternatives would require utility service. Extent of improvements depends on location and existing service available.
Traffic (Section 3.4.5)	Minimal traffic impact to Nimitz Highway. Project-related traffic at each site is less than 50 vehicle trips/day; peak hourly volume less than 15 vehicles/hour. This is less than 1% of existing volumes on Nimitz Highway. Occasional truck movements into sites could affect traffic flow.	▪ Tractor-trailer access and fuel deliveries will occur during off-peak hours. ▪ During construction, police escorts may be required to transport large equipment and materials. ▪ All construction storage and staging will occur on site.	All alternatives at Piers 12 and 15 will have similar impact as proposed action. Impact at other locations would need to be determined

Resource Area (EA Section)	Impact of Proposed Action	Mitigation	Impact of Alternatives to Proposed Action
	During construction, short-term traffic impacts when equipment and materials brought to site.		
Public Services and Facilities *(Section 3.4.6)*	No adverse impacts to fire station at Pier 15. Possible increase in police calls during construction due to traffic congestion.	▪ Movement of construction vehicles and equipment to occur during off-peak hours.	All project alternatives would have construction period traffic impacts. Degree depends on project location.

4 CONSISTENCY WITH EXISTING PLANS, POLICIES AND CONTROLS

4.1 FEDERAL REGULATIONS

4.1.1 Section 404, Clean Water Act

Section 404 of the Clean Water Act (CWA) defines requirements for discharges of dredged or fill materials in waters of the United States and sets limits on such discharges. The U.S. Army Corps of Engineers (USACE) administers the permit. The proposed project does not involve dredging or filling activities. The USACE has determined that the project is not subject to Section 404 of the Clean Water Act.

4.1.2 Section 402, CWA National Pollutant Discharge Elimination System (NPDES)

Discharges of point sources of pollutants into surface waters of the U.S. are regulated under the NPDES program, pursuant to CWA, Section 402. The State Department of Health (DOH) administers the NPDES program under HAR 11-55. Construction activities, in particular discharges for storm water associated with construction activity will require a Best Management Practices plan and approval from the DOH.

4.1.3 Section 10, Rivers and Harbors Act

The Rivers and Harbors Act of 1899 gives the Army Corps of Engineers regulatory authority over virtually any construction, excavation or fill activities that has potential to impact navigable waters of the United States. Section 10 requires that a Department of the Army (DA) permit be obtained from the USACE prior to undertaking any construction, dredging, or other activity occurring in, over, or under or affecting navigable waters of the U.S. Construction activities at Piers 12 and 15 will occur within the area of USACE jurisdiction, i.e., below the Mean Higher High Water (MHHW) mark, thus requiring a DA permit pursuant to Section 10.

4.1.4 Endangered Species Act and Marine Mammal Protection Act

The Endangered Species Act of 1973 (ESA) was enacted to protect endangered species and also the ecosystems upon which they depend. Section 7 of the ESA requires all federal agencies to consult with the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USFWS) if they are proposing an action that may affect listed species or their designated habitat. *Action* is defined broadly to include funding, permitting and other regulatory actions. The USFWS has jurisdiction over certain federally listed endangered and threatened species that occur in terrestrial and marine environments. The NMFS has jurisdiction over marine mammals and fishes. The two agencies share responsibility for listed (threatened or endangered) species.

The Marine Mammal Protection Act of 1972 was enacted to protect essential habitats, including the rookeries, mating grounds, and areas of similar significance for each species of marine mammal from the adverse effect of man's actions.

Two marine biological surveys conducted for the project (AECOS, 2012) did not encounter any ESA-listed (endangered or threatened) species. Two coral species proposed to be listed (*M. patula* and *M. flabellata*) were observed at both Pier 12 and Pier 15. One marine protected species, the black-lipped pearl oyster, was observed in the Pier 12 vicinity. Listed species that have been known to occur in the waters of Honolulu Harbor include the threatened green sea turtle and endangered Hawaiian monk seal. There have also been rare sightings of humpback whales in the harbor, most recently in January 2012.

4.1.5 Magnuson-Stevens Act and "Essential Fish Habitat" (EFH)

In 1996, Congress passed the Sustainable Fisheries Act (Public Law 104-297) which amended the habitat provisions of the Magnuson-Stevens Act (Act), and called for direct action to stop or reverse the continued loss of fish habitats. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. The Act requires cooperation among the National Marine Fisheries Service (NMFS), the Fishery Management Councils, and Federal agencies to protect, conserve, and enhance "essential fish habitat' (EFH). Essential fish habitat for federally managed fish species are "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The waters and substrate of Honolulu Harbor are designated EFH for it "coral reef ecosystem."

As part of the DA permit process, NMFS will review the proposed action to ensure that it will not adversely affect EFH in Honolulu Harbor, and that it is compatible with the Magnuson-Stevens Act's resource management goals.

4.1.6 Section 106: National Historic Preservation Act

The National Historic Preservation Act (NHPA) was enacted to protect to provide for the protection and use of historic properties for the benefit of the public. In Hawai'i, the Department of Land and Natural Resources (DLNR) State Historic Preservation Division (SHPD) oversees the historic preservation compliance process. The SHPD determines whether any historic sites exist and their historical significance.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. The project does not involve use of federal lands or funds. However, a Department of the Army permit is required from the USACE. The Army, as a federal agency, must consider the effect of authorizing the undertaking in accordance with Section 106.

The *Archaeological Literature Review and Field Inspection* conducted by Cultural Surveys Hawai'i and the historic architecture *Impact Analysis* conducted by Mason Architects, Inc. have been sent to the SHPD for review in accordance with Section 106, NHPA and Chapter 6E, HRS, the State's historic review process.

4.2 STATE OF HAWAI'I

4.2.1 Hawai'i State Plan

The 1996 Hawai'i State Plan (Chapter 226, HRS) is the umbrella document in the statewide planning system. It serves as a written guide for the future long-range development of the state by describing a desired future for the residents of Hawai'i and providing a set of goals, objectives, and policies that are intended to shape the general direction of public and private development.

The project is consistent with the State plan objectives and policies for the physical environment land-based, shoreline, and marine resources.

> "(1) Prudent use of Hawai'i's land-based, shoreline, and marine resources…(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems…"

It is also consistent with the objectives and policies for facility systems - transportation.

> "(4) Provide for improved accessibility to shipping, docking and storage facilities, …(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment of storage needs..…"

Proposed improvements at Piers 12 and 15 are intended to provide berthing for oil spill response vessels, a mandatory component of the federal Oil Pollution Control Act in the ongoing operation of the State's harbors. Without adequate and well-positioned assets, responses to major incidents State-wide would be jeopardized. Improvements at Piers 12 and 15 are prudent use of the land and shoreline that are compatible with natural resources and ecological systems.

As the primary guideline for implementing the Hawai'i State Plan, State Functional Plans establish objectives for shorter-term actions. The project is consistent with the State Functional Plan for Transportation. Objective 1A: Expansion of the transportation system notes a stated policy to *"Increase transportation capacity and modernize transportation infrastructure in accordance with existing master plans and laws requiring accessibility for people with disabilities."* The proposed project supports the O'ahu Commercial Harbors 2020 Master Plan's Kapālama Container Terminal, the larger project that triggered the imminent displacement of the spill response vessels. The proposed improvements also support overall harbor infrastructure by maintaining it spill prevention and emergency response capability.

4.2.2 State Land Use Classification

The State Land Use Commission, pursuant to Chapter 205 and 205A, HRS and Chapter 15-15, Hawai'i Administrative rules, is empowered to classify all lands in the State into one of four land use districts: urban, rural, agricultural and conservation. The proposed improvements occur in the Urban and Conservation districts. Land side improvements such as the piers, parking and

ancillary structures are permissible within the Urban district. The City and County of Honolulu through its Land Use Ordinance regulates uses and activities within the Urban district. (See section on zoning).

The waters of Honolulu Harbor fall within the State Conservation District which is administered by the State Board of Land and Natural Resources (BLNR). An early consultation letter from the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL) dated February 22, 2012 (Chapter 7) stated the following:

> The Honolulu Harbor Pier 12 and Pier 15 Improvements are an identified land use pursuant to Hawai‘i Administrative Rules (HAR) §13-5-22, P-8 **Structure and Land Uses, Existing** (A-1), *Minor repair, maintenance, and operation to an existing structure, facility, use, land and equipment, whether it is nonconforming or permitted, that involves mostly cosmetic work or like-to-like replacement of component parts, and that result in negligible change to or impact to land, or a natural and cultural resource.*
>
> Similarly, the Honolulu Harbor was constructed prior to Conservation District designations and is considered a nonconforming structure. Pursuant to HAR §13-5-37, **Nonconforming Uses** *(a) this chapter shall not prohibit the continuance, or repairs and maintenance, of non-conforming land uses and structures as defined in this chapter.* Therefore, a Conservation District Use Permit is <u>not required</u> for the proposed construction, repair and maintenance to the Honolulu Harbor Piers 12 & 15.

4.2.3 Coastal Zone Management

Coastal Zone Management (“CZM”) objectives and policies (Section 205A-2, HRS) and the Special Management Area (“SMA”) guidelines (Section 25-3.2 ROH) have been developed to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawai‘i. All lands in the State of Hawai‘i and the area extending seaward from the shoreline are classified as valuable coastal resources within the State’s CZM area. Chapter 25, Revised Ordinances of Honolulu, outlines controls and polices for development within an area along the shoreline referred to as the Special Management Area (SMA) which is under the jurisdiction of the City and County of Honolulu.

The State of Hawai‘i Department of Transportation, Harbors Division (DOT-H) has authority over the planning, construction, operation, and maintenance of harbor facilities and is exempt from the County SMA requirements. Nonetheless, environmental concerns will be addressed through the CZM consistency review process through the State’s CZM program. A federal consistency review will take place as part of the DA permit process conducted by the USACE.

4.2.4 O‘ahu Commercial Harbors 2020 Master Plan

The O‘ahu Commercial Harbors 2020 Master Plan (1997) was developed by the DOT-H as an update to the Honolulu Waterfront Master Plan and the 2010 Master Plan for Barbers Point Harbor. The plan is a conceptual master plan that addresses Honolulu, Kewalo Basin, and

Kalaeloa Barbers Point Harbors as dependent harbors and functions as a long-range guide for the development and enhancement of these commercial ports.

Major objectives of the plan include: "provision of and access to terminals, and other harbor facilities in locations along the Honolulu waterfront… in a manner that best relates to and serves Hawai‘i's port system in an efficient, safe and secure manner… and minimization of impacts on environmental quality and recreation opportunities contiguous with port facilities".

The O‘ahu Commercial Harbors 2020 Master Plan looked at the potential development of finger piers at Piers 12 through 16 (see discussion of Alternatives in Chapter 2). At the time, the intent was to create additional berthing for domestic commercial fishing vessels and possibly docking of commercial tour vessels. In the 15 years since the 2020 Master Plan was prepared, harbor needs have changed, and there is not the same level of demand for commercial fishing piers. The development of the Kapālama Container Terminal is currently the DOT-H's top priority for Honolulu Harbor, and the improvements at Piers 12 and 15 directly support that priority. The project also furthers the larger goal of operating the State's harbors in an environmentally sound manner, by providing adequate and well positioned emergency response assets.

4.2.5 Aloha Tower Development Corporation

The Aloha Tower Development Corporation (ATDC) was established in 1981 by the State to redevelop land surrounding the historic Aloha Tower in downtown Honolulu. The Aloha Tower Complex was part of a master plan created as a stimulus for economic activities on the ocean front State lands within Honolulu Harbor. The land under the purview of the Aloha Tower Project Area encompassed Piers 5 and 6 to Pier 12 through 14. The Aloha Tower Complex boundaries extended further to include Piers 15 to 23 and part of the Iwilei industrial area.

In July 2011, Act 150 disbanded the Aloha Tower Development Corporation and turned over the management and control of this area to the Department of Transportation. In an early consultation letter dated April 18, 2012, the City and County of Honolulu Department of Planning and Permitting indicated that their attempts to contact the now-defunct ATDC were unsuccessful, and noted that there is current proposed legislation to move the responsibility for this area to the State's Hawai‘i Community Development Authority.

4.3 CITY AND COUNTY OF HONOLULU

In implementing the proposed action, the State of Hawai‘i Department of Transportation is exempted from City and County of Honolulu permits and approvals. According to Chapter 266-2(b), HRS:

> *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.*

The proposed action is generally consistent with the City and County plans and policies for the area, as discussed below.

4.3.1 County General Plan

General Plan Objectives and Policies

The project is in conformance with the following policies and guidelines of the City and County of Honolulu's *1992 General Plan Objectives and Policies.*

Chapter VI. Physical Development and Urban Design

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

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

4.3.2 Primary Urban Center Development Plan

The City and County of Honolulu's Development Plan (DP), 2004, program provides a relatively detailed framework for implementing General Plan objectives and policies for the growth and development of O'ahu at a regional level. The project site is located in the Primary Urban Center (PUC) Development Plan area (Figure 17).

The PUC Development Plan Land Use Map A.5 (PUC-Central) shows the project area as "District Commercial." The PUC Open Space Map A.2 designates the project area as "Harbors, Promenades, and Stream Green belts."

The PUC Development Plan Section 3.4.1.4, Military, Airport, Harbor and Industrial Uses, discusses existing conditions and trends for these uses and provides a set of policies for development. Under Section 3.4.2.1, Honolulu and Pearl Harbor Waterfronts, the PUC DP advocates a policy to:

> …*"redevelop the Downtown/Iwilei waterfront by rerouting through traffic to a new Sand Island parkway and harbor tunnel thoroughfare, and replacing the makai portion of Nimitz Highway with a new shoreline pedestrian promenade and mixed-use commercial/recreational/residential complexes…By creating a new parkway across Sand Island and a tunnel beneath the Harbor entrance, Airport-to-Waikiki traffic (and all other through-traffic not destined for the Iwilei/Downtown area) will bypass this unsightly industrial section and significantly reduce the traffic demand on Nimitz Highway through town…".*

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FIGURE 17
PRIMARY URBAN CENTER DEVELOPMENT PLAN
Honolulu Harbor
Piers 12 and 15 Improvements

These far reaching policies aim to transform the waterfront, including the project area, into a mixed used waterfront with a radically new roadway and tunnel connecting the Ewa plain to Honolulu. Policies to modify Nimitz Highway by creating the pedestrian promenade on the shoreline and developing mixed use complexes along the waterfront need to be coordinated with the functional requirements of a commercial harbor. Piers 12 and 15 are both located adjacent to Nimitz Highway. The proposed pier improvements are intended to support the harbor's emergency response capability, an essential function that needs to be maintained as the City moves toward a mixed use waterfront.

Section 3.4.2.4, Military, Airport, Harbor, and Industrial areas policies are intended to assure the long-term viability of military, transportation, and industrial functions. The Policy to "Enhance Honolulu Harbor and harbor-related uses" recognizes the needs to reserve areas around Honolulu Harbor, particularly around Kapālama Basin and the Sand Island container yards, for harbor-related uses. This would include maintaining oil spill response capability, an essential component of all State commercial and recreational harbors.

4.3.3 County Land Use Ordinance and Zoning

The City and County of Honolulu's Land Use Ordinance (Section 21, ROH) is its zoning ordinance, which regulates land use in a manner that will encourage orderly development in accordance with adopted land use policies.

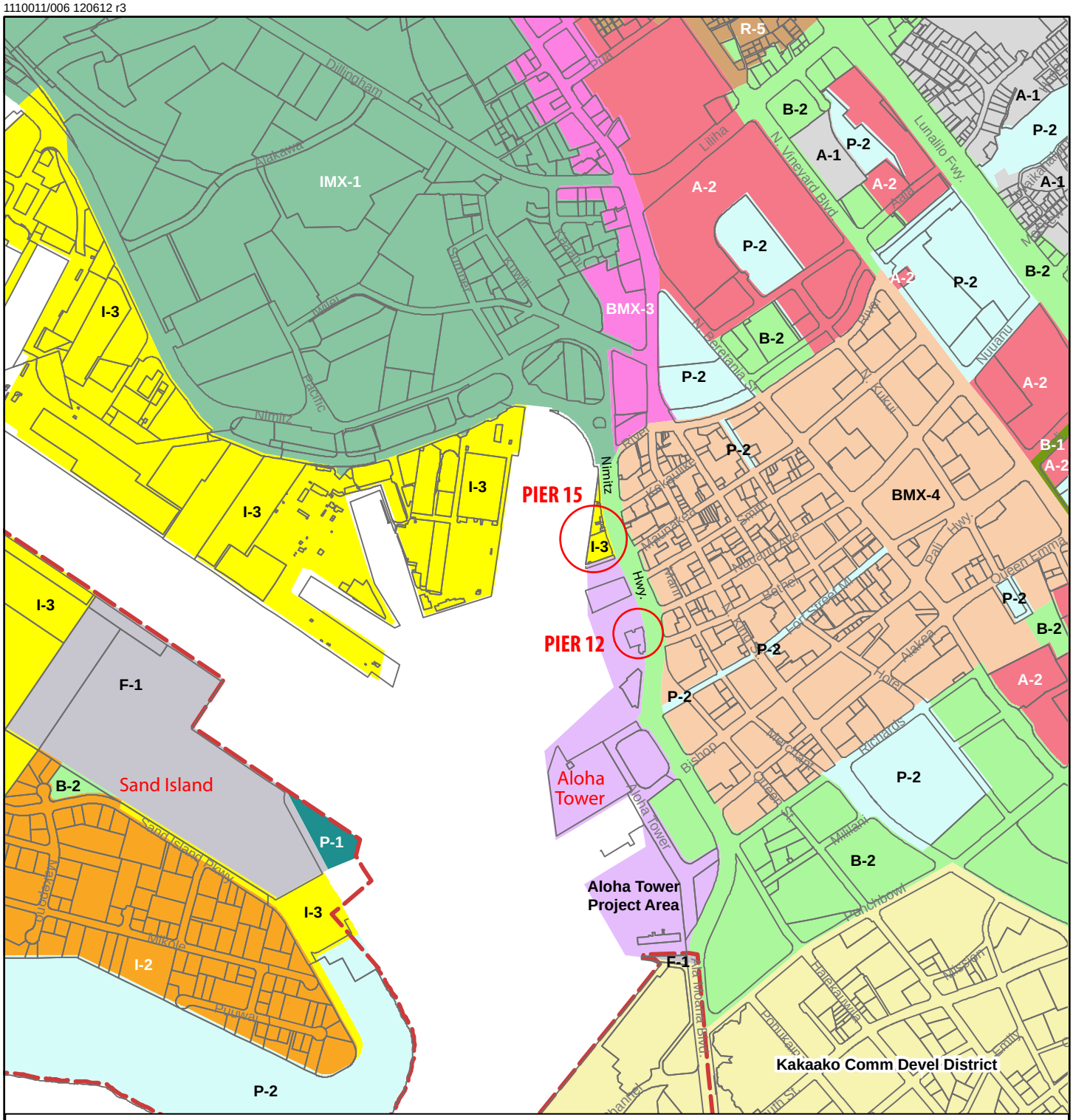
As shown in Figure 18, the City and County's zoning maps still designate the area around Pier 12 as part of the "Aloha Tower Project Area" despite the fact that the Aloha Tower Development Corporation has been disbanded. In its early consultation letter for this EA (see Chapter 7), the City and County of Honolulu Department of Planning and Permitting noted there is current proposed legislation to move the responsibility for this area to the Hawai‘i Community Development Authority.

The area around Pier 15 is zoned I-3 Waterfront Industrial. All improvements within the I-3 Waterfront Industrial district are normally subject to review by the Department of Planning and Permitting. However, pursuant to Chapter 266.2(7)(b), Hawai‘i Revised Statutes concerning Harbors, "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."

Although the project is not subject to County zoning regulations, the improvements are consistent with allowed uses within the I-3 Waterfront Industrial zone.

4.3.4 Chinatown Special District and Hawai‘i Capital Special District

Piers 12 and 15 are located within the boundaries of the City and County's Chinatown Special District, and the Chinatown Historic District. The Chinatown Special District is comprised of the Chinatown Historic District (listed on the National Register of Historic Places [NRHP] in 1973) and the Merchant Street Historic District (listed on the NRHP in 1972).



LEGEND

- A-1 Apartment
- A-2 Apartment
- Aloha Tower Project Area
- B-1 Neighborhood Business
- B-2 Community Business
- BMX-3 Community
- BMX-4 Central
- F-1 Military and Federal
- I-2 Intensive
- I-3 Waterfront
- IMX-1 Industrial Mixed Use
- Kakaako Comm Devel District
- P-1 Restricted
- P-2 General
- R-5 Residential
- SMA Line

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FIGURE 18

ZONING AND SPECIAL MANAGEMENT AREA MAP

Honolulu Harbor

Piers 12 and 15 Improvements

The Chinatown area is located immediately west (*mauka*) of Piers 12 and 15. The Chinatown Special District was established to preserve and enhance the historic character of Chinatown, while allowing moderate redevelopment at the edges of the district, compatible with the area's historic architecture and cultural significance. The Chinatown Special District is governed by a portion of the Land Use Ordinance, codified in the Revised Ordinances of Honolulu (ROH) as Section 21-9.60. The piers are located within the Special District's Makai Precinct. The importance of the harbor area to Chinatown is explained in the Historic District's National Register of Historic Places (NRHP) nomination form: "The major reason for its early development and continuous history as a commercial area was due to the close proximity to Honolulu Harbor."

The Chinatown Special District ordinance states that the period of significance for Chinatown is from the 1880s to the 1940s. The two buildings located on Pier 15, the Fire Station and Pier 15 Shed, are included in the Chinatown Special District's list of "Historic and Architecturally Significant Structures." However, the fire station was built circa 1951, and the Pier 15 Shed was built circa 1955, which means they were built outside the Chinatown Special District's period of significance.

The historic architecture impact analysis conducted for this project (Mason Architects, Inc., 2012, Appendix E) evaluated the proposed action as having an adverse affect on the Chinatown Special District, and on Piers 12 and 15. Specifically, a new loading platform at Pier 12 is evaluated as a visual element that would reduce the integrity of the existing setting of Pier 12 since it would block historic characteristics from view. However, it should be noted that in the historic period, both Piers 12 and 15 had timber extensions ("piers" or "aprons") along their lengths that also hid this underside area from view. The proposed modification to the Pier 15 Shed roof and overall footprint would reduce its integrity of design, although it was noted that this building has already been altered.

Piers 12 and 15 are located outside, but adjacent to, the boundaries of the Hawai‘i Capital Special District. The Hawai‘i Capital Special District was established to maintain the historic and architectural character and park-like setting of Hawai‘i's primary civic center. The Special District is largely based on the Hawai‘i Capitol Historic District, which was placed on the National Register of Historic Places [NRHP] in 1978.) The ewa/makai boundary of the District's Waterfront Precinct incorporates the Aloha Tower Market Place property, which is adjacent to Pier 12. The historic architecture impact analysis concluded that the project improvements will not have an adverse effect to the Hawai‘i Capital Special District.

4.3.5 Downtown Neighborhood Transit-Oriented Development (TOD) Plan

As part of its ongoing Honolulu Rail Transit project, the City and County of Honolulu is preparing a series of Neighborhood Transit-Oriented Development (TOD) Plans that integrate land use and transportation planning around the proposed rail stations. The plans have been developed over the past two years through a series of community visioning workshops.

The project area is located within the Downtown Neighborhood TOD Plan area (Figure 19). The proposed rail transit line will be elevated above the Nimitz Highway median adjacent to Piers 12 and 15. A Draft Downtown Neighborhood TOD Plan (City and County of Honolulu, September 2012) is currently under public review. The intent of the plan is to address land use, local transportation, public facilities and services, economics, infrastructure planning, and options for implementation around the three Downtown Neighborhood TOD Stations—Iwilei, Chinatown, and Downtown. All three stations will be within walking distance of Piers 12 and 15. The Iwilei Station will be about a half mile west of Pier 15. The Chinatown Station transit station is proposed near Kekaulike Street, across from Pier 15, and the Downtown transit station will be located east of Bishop Street about a quarter mile east of Pier 12.

The TOD Plan's land use plan shows Pier 15 as remaining in industrial use, while Pier 12 is shown as Downtown Mixed Use. The designated "TOD Zone" includes areas closest to the station, and represents the area with the greatest development or redevelopment potential, and the locations of transportation and community facilities. The plan states that "the TOD Zone is the area where special district regulations will apply."

Honolulu Harbor, including Piers 12 and 15, is a working, commercial harbor under the jurisdiction of the State of Hawai'i Department of Transportation, and will not be undergoing a change in land use because of the transit project. Still, the Downtown Neighborhood TOD plan provides a glimpse into future development potential and possible land use changes in the vicinity as a result of the proposed rail transit line.

4.4 OTHER CONSIDERATIONS

4.4.1 Unavoidable Adverse Effects

There will be an unavoidable loss of some coral as a result of pile driving required for the mooring dolphins and loading platforms. Efforts have been made through project design and placement of piles to avoid and minimize these impacts. However, any corals within the direct footprint of the piles will be lost. During construction, noise from pile driving and resuspension of sediments will have unavoidable, but temporary impacts on the marine environment.

The demolition of a portion of the Pier 15 shed will affect its historic integrity. The proposed modifications to Pier 12 were evaluated as having an indirect adverse effect on this historic pier. However, both the Pier 15 shed and Pier 12 have been modified in the past. All these and other impacts discussed in Chapter 3 can and will be minimized or mitigated to an extent that they would not be significant.

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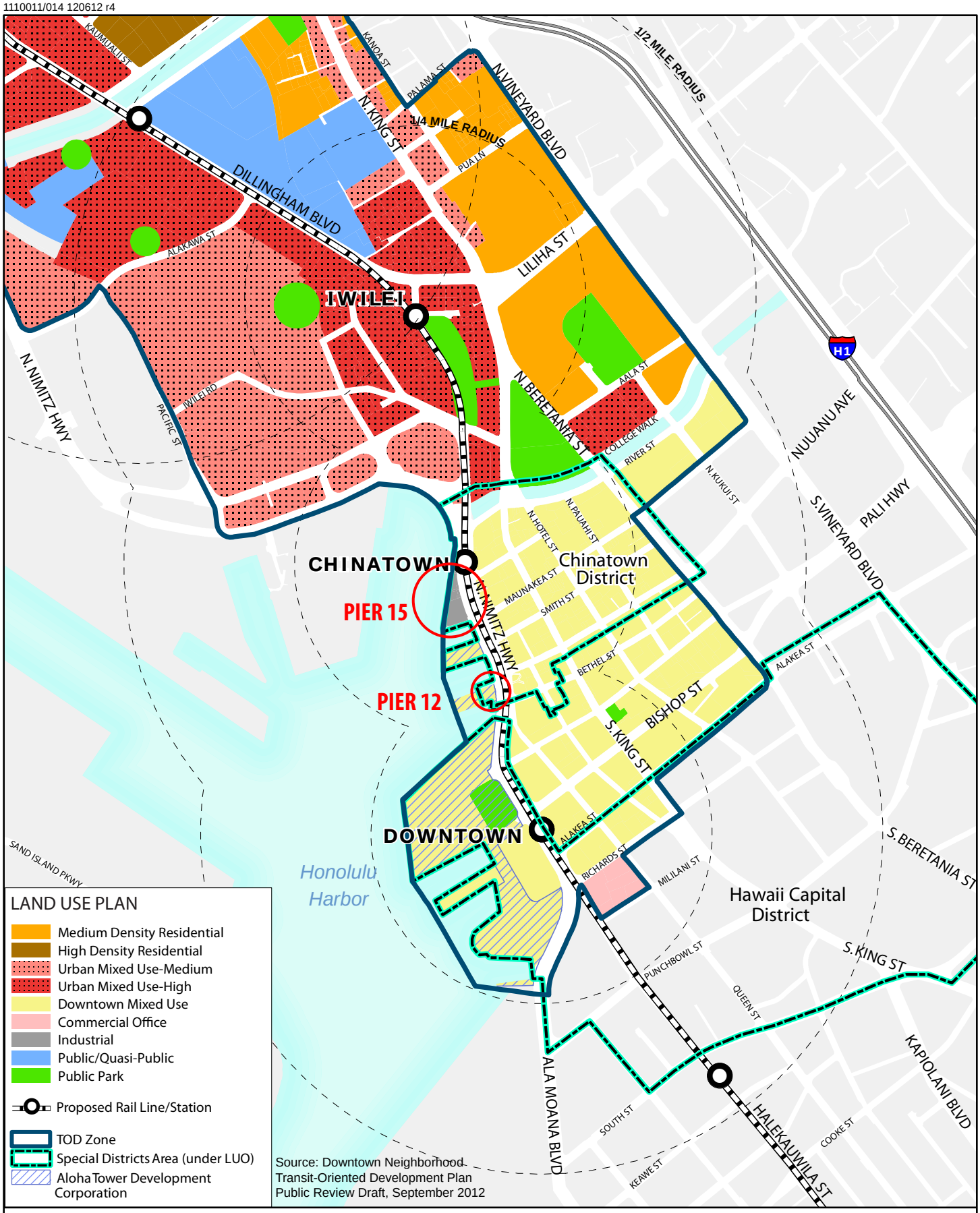

FIGURE 19

DOWNTOWN NEIGHBORHOOD TRANSIT ORIENTED DEVELOPMENT (TOD) PLAN

Honolulu Harbor, Piers 12 and 15 Improvements

4.4.2 Energy Requirements and Conservation Potential of Various Alternatives and Mitigation Measures

Construction and operation of the berthing facilities will involve energy requirements. However, oil spill prevention and response capability is a mandatory federal requirement for all commercial harbors, and is a function that is already occurring. Locating the oil spill response vessels at Piers 12 and 15 is energy and operationally efficient. It consolidates two major partners, MSRC and CIC, in proximity to other emergency response entities, such as the fire boat and salvage divers. This location is within close proximity to the Hawai‘i Oil Spill Center, the command and control center on Sand Island Access Road. Staging spill response equipment and vessels near the Honolulu Harbor entrance channel also enables quick deployment and access to other areas of O‘ahu and throughout the State.

4.4.3 Relationship of Short-Term uses and Long-Term Productivity

In the short-term, the project will have temporary impacts associated with the demolition and reconstruction of pavements, docks and structures. There will be noise and water quality impacts due to pile driving. There will be the loss of coral within the footprint of the piles for the mooring dolphins and loading platforms. The improvements will require a commitment of public construction funds. However, in the long term, supporting and maintaining the State’s oil spill response capability will have a substantial positive environmental impact. The trade off for the short-term impacts is a long-term capability to protect water quality and the environment of Honolulu Harbor and other waters of the State. The project also indirectly supports the State’s development of the Kapālama Container Terminal by providing a relocation site for tenants which are being displaced by the project. The Kapālama Container Terminal is the State’s highest priority harbor improvement project, and will enhance Hawai‘i’s long-term productivity in commercial shipping.

4.4.4 Irretrievable and Irreversible Resource Commitments

Resources that are committed irreversibly or irretrievably are those that cannot be recovered if the project is implemented. The proposed project will involve the commitment of capital, labor, fuels and equipment. General industrial resources will be spent during project construction and for long-term operation and maintenance of piers, structures and facilities. Piers 12 and 15 are already waterfront berthing assets, and will continue to be committed to this use. Use of these piers by MSRC and CIC is consistent with the long range plan for the harbor and with continued safe, efficient, and environmentally sound operation within Hawaiian waters.

4.4.5 Cumulative Impacts

Overview

Cumulative impacts are those that result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. Such impacts can result from individually minor but collectively significant actions taking place over a period of time (HAR §11-200-2).

The proposed action is one of many past, present and future actions by humans that have substantially modified the physical form and environmental conditions at Honolulu Harbor and its vicinity. At the time of first western contact in the late 1700s, Honolulu Harbor was only 200 feet wide and about three to 30 feet deep, and ships had to be towed in by canoe because of its narrow passage. The harbor was first dredged around 1840, and major modification of its natural form began with the dredging of the main channel in 1890. Dredged material was used to fill the coastal tidelands, creating new fast lands (CSH, 2012). Over the years, the harbor has continued to be dredged and filled, piers, wharves and seawalls constructed, and surrounding lands created and developed.

Currently, the DOT-H is undertaking a long-range plan to upgrade and expand the State's harbors infrastructure over the next 20 years. Honolulu Harbor is one of ten commercial harbors in Hawai‘i managed by the DOT-H. As the hub of the State's commercial harbor system, Honolulu Harbor receives, consolidates and distributes practically all of Hawai‘i's overseas cargo shipments, and plays a major role in the growing cruise ship industry. Plans are underway to modernize and expand this important transportation facility and to increase its long-term functional efficiency. Figure 2 in Chapter 1 showed several current DOT-H projects and proposals, including the proposed action. Recent past, present and future projects include:

- Kāpālama Container Terminal Project (development of new cargo facility)
- Pier 29 Container Yard Reconstruction (completed in 2012)
- Piers 34 and 35 Improvements (for relocation of UH Marine Research Center)
- Relocation of Pacific Shipyard and Atlantis Submarines (from Pier 41 to Pier 23)
- Expansion and renovation of the Domestic Commercial Fishing Village at Piers 36-38
- Construction of a warehouse building for A‘ala Ship Service
- Renovation and upgrade of other piers and facilities throughout Honolulu Harbor

Other development proposals outside Honolulu Harbor that are reasonably foreseeable include the Honolulu Marine Ship Repair in Ke‘ehi Lagoon, and the Honolulu Rail Transit Project which will run along Nimitz Highway past Piers 12 and 15. The likely land use changes as a result of the rail transit project were discussed in Section 4.3.5 above.

Impacts and Mitigation

The implementation of the DOT-H projects and proposals listed above will collectively and over time have significant impacts on the operation of Honolulu Harbor, and ultimately on the State's economic and social well being. Cumulatively, these harbor improvements will result in:

1. increased cargo capacity and more efficient container handling operations to accommodate future growth in containerized cargo;
2. continued and unimpeded movement of cargo in and out of the State and within the State;
3. more efficient harbor operations, by optimizing underutilized assets and relocating malpositioned or poorly located operations;
4. optimal land use, by locating higher intensity, waterfront dependent uses in appropriate locations;
5. improved functional relationships between users, resulting in fewer conflicts between users; i.e., automobile traffic, ship traffic, pedestrian traffic; and
6. a more efficiently operating commercial harbor system, supporting Honolulu Harbor as the hub of ocean transportation activities for the State.

The proposed action is an independent and relatively minor action that does not introduce a new use or activity to the harbor. Rather, its intent is to relocate three spill response vessels, part of a federally-mandated function, to a more suitable berthing location. Despite its limited scope, cumulatively with other proposed DOT-H projects, the proposed action will result in significant long-term improvement of harbor operations.

The proposed action also has a theoretical potential to contribute to cumulative environmental impacts. Cumulative impacts on the environment that have resulted from human activity in and around Honolulu Harbor over time include:

- Modification of the natural physical form of the harbor due to dredging, filling, and construction of piers, wharves and seawalls
- Hazardous material and waste contamination in the soil
- Poor drainage practices degrading harbor water quality
- Non-point source pollution from upland areas which degrade harbor water quality and introduce potentially hazardous materials into harbor sediments
- Introduction of alien species into Hawaiian waters due to discharge of ship's ballast water
- Loss of archaeological and historic sites due to ground disturbance, excavation, demolition and new construction
- Traffic congestion on Nimitz Highway and surrounding roadways due to more intensive development at and around the waterfront
- Increased ambient noise levels due to industrial and commercial uses and traffic

The impact of the proposed action in these areas have been discussed in Chapter 3. Mitigation measures have been identified to reduce impacts due to the proposed action to levels that are not significant.

Best management practices will be utilized to avoid hazardous material contamination of soil and harbor waters. There will not be an increase in operations or regional traffic. Construction of the berthing improvements will result in temporary noise (on land and under water) and resuspension of sediments, but these will be limited to the construction period and will not result in adverse cumulative impacts. Modification of the historic piers will not have adverse cumulative impacts on the Chinatown Historic District. The loss of coral resources due to installation of pilings will be an adverse impact. The Kapālama Container Terminal project will also involve piling and a loss of coral resources. Given that these projects will occur within a three to five-year time span, there may be a cumulative impacts on coral resources in the harbor. However, there is not expected to be an adverse cumulative impact on the long-term viability or survival of the affected species, either in Honolulu Harbor or Statewide. Mitigation measures for the loss of coral due to the proposed action will be developed during the forthcoming Department of the Army permit process.

The Kapālama Container Terminal project and Pier 34 and 35 Improvements project are undergoing separate environmental reviews. Those documents will assess the potential significance of that action, and identify appropriate mitigation measures.

In summary, the incremental impact to various resources due to the proposed action is expected to be insignificant. Most impacts are temporary, will be mitigated, and will not have an adverse cumulative effect on the resource. The long-term benefit of enhanced oil spill response capability outweighs the incremental or cumulative harm to the environment during construction. Combined with other past, present and future DOT-H projects, particularly the Kapālama Container Terminal, the proposed action will contribute to a substantial, long-term positive impact on the operation of Honolulu Harbor and on the State's economy.

4.4.6 Secondary Impacts

Secondary impacts include those that are caused by the project and occur later in time or farther removed in distance but are still reasonably foreseeable. They may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rates, regardless of who initiates the action. The proposed action will not cause any secondary impacts.

There is a foreseeable change in land use in the project area due to proximity of the Honolulu Rail Transit project line and downtown stations. Over the next 20 years, there will be additional pressure for redevelopment and higher and more intensive mixed use in areas mauka of Nimitz Boulevard. It is likely that the residential population and commercial activity within a one-mile radius of the project area will increase. However, this land use change is not caused by the proposed action, and is not expected to impact operations in this working harbor.

5 ANTICIPATED DETERMINATION, FINDINGS AND REASONS SUPPORTING THE CHAPTER 343 HRS DETERMINATION

5.1 ANTICIPATED CHAPTER 343 HRS DETERMINATION

Based on the information and analysis in this Environmental Assessment, the State of Hawai‘i Department of Transportation, Harbors Division (DOT-H) anticipates a determination that the proposed action will not result in a significant impact on the environment. The DOT-H expects to issue a Finding of No Significant Impact (FONSI), pursuant to the State of Hawai‘i HRS Chapter 343, and an Environmental Impact Statement (EIS) is not required.

5.2 CHAPTER 343 HAWAI‘I REVISED STATUTES (HRS) SIGNIFICANCE CRITERIA

In determining whether an action may have significant impact on the environment, the applicant or agency must consider all phases of the proposed action, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. The State of Hawai‘i Department of Health Rules Section 11-200-12 (Hawai‘i Administrative Rules, revised 1996) establish 13 “Significance Criteria” to be used as a basis for identifying whether significant environmental impact will occur.

An agency will determine an action may have a significant impact on the environment if it meets any of the following criteria:

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

The proposed action will not result in an irrevocable commitment to loss of destruction of any natural or cultural resources. There will be alteration to historic Pier 12 and removal of portion of a shed at Pier 15. Because of its location, the shed is considered to be a component of the adjacent Chinatown Historic District, but is a relatively minor element and would not likely be historic on its own. In addition, there have been prior modifications to both Pier 12 and the Pier 15 shed. The historic architecture assessment determined that there will be adverse effect on the Chinatown Special District, but that it would be indirect and relatively minor. Photo documentation may be an appropriate mitigation. There will be no impact to the historic coral blocks located on the makai side of Pier 12. The project improvements will not obstruct existing public views of the coral blocks.

There will be loss of some coral colonies located within the footprint of the pier pilings. A Phase 2 biological survey has been completed to estimate and quantify the impact. Mitigation is being developed in consultation with the Department of the Army (DA) and federal resource agencies (NOAA NMFS and USFWS) as part of the ongoing DA permit process.

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

The proposed action does not curtail the range of beneficial uses of the environment. The project improvements will occur at two existing piers within an existing commercial/industrial waterfront area. There are few, if any, alternative beneficial uses.

3. Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders;

The proposed action is consistent with the environmental policies in Chapter 344, HRS, which establishes a state policy to encourage productive and enjoyable harmony between people and their environment promotes efforts to prevent or eliminate damage to the environment and stimulate community health and welfare. The primary purpose of the pier improvements is to accommodate three oil spill response vessels and support the MSRC and CIC, whose primary mission is to prevent and minimize damage to the environment due to oil spills.

4. Substantially affects the economic or social welfare of the community or state;

The proposed action will not directly affect the economic or social welfare of the community or State. Construction will have minor, short-term air and noise impacts. In-water construction and pile driving will temporarily cause increased water turbidity. These impacts will be mitigated and will be temporary, and are outweighed by the substantial environmental benefit provided by the presence of CIC and MSRC and continuation of emergency response capability. Moreover, the proposed action will have beneficial indirect and long-term economic impact, as it supports the implementation of the Kapālama Container terminal.

5. Substantially affects public health;

The proposed action has a positive effect on public health and a clean environment by supporting the State's oil spill response capability. A healthy marine environment in turn supports public health. The temporary construction-period noise and dust impacts will be minor and short-term, and are insignificant when weighed against the proposed action's overall, long-term positive impacts.

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

The proposed action will not result in population changes or effects on public facilities. There are likely to be population changes and redevelopment in the surrounding areas due to the City's proposed rail transit line and transit stations. This will occur with or without the proposed action, and is not caused by or accelerated by the pier improvements.

7. Involves a substantial degradation of environmental quality;

Construction period impacts related to noise, air quality, and resuspension of sediments will be temporary and short-term. Short-term impacts will be mitigated through equipment noise attenuation, and use of best management practices to control erosion, runoff, and to contain resuspended sediments. The purpose of the MSRC and CIC vessels that will be berthed at Piers 12 and 15 are to prevent and minimize any degradation of environmental quality resulting from oil spills. The long-term objective of the Pier 12 and 15 improvements is to support MSRC and CIC operations, which will enhance environmental quality.

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

The proposed action does not involve a commitment for larger action or have a considerable effect on the environment. The proposed action will provide a relocation site for three oil spill response vessels that are being displaced by the Kapālama Container Terminal. However, plans for a permanent site for MSRC and CIC have been discussed for years, independent of the Kapālama project. The imminent displacement of MSRC and CIC from Piers 34 and 35 have accelerated the timetable for this project, which would otherwise have occurred years in the future.

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

No rare, threatened or endangered species or its habitat will be adversely impacted by the proposed action. Two coral species proposed for ESA listing as well as the protected black-lipped pearl oyster were observed in the project vicinity. There will be some loss of coral colonies due to installation of piles, but this will not have an adverse impact on the long-term survival or sustainability of the species. There will be no adverse impact to the threatened green sea turtle, endangered hawksbill turtle, Hawaiian monk seal or humpback whale. Best management practices will be employed to minimize potential impacts to these species.

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

In-water pile driving will temporarily resuspend bottom sediments and generate underwater noise. Best management practices will be used to minimize and mitigate these construction-period impacts on land and in the water. The proposed action will have a long-term positive effect on water quality by providing for continued oil spill prevention and response capability.

11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters;

The proposed action is located in Honolulu Harbor in a shoreline area designated as a flood hazard area and tsunami evacuation zone. Given that the project's intent is to provide ship berthing, this location could not be avoided. The occurrence of a natural disaster such as tsunami cannot be predicted, and the proposed improvements will not increase the risk to life or property.

The pier improvements will occur within a working, commercial harbor that has been modified over many years through dredging, shoreline modification, and construction of piers and wharves.

12. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies; or

The proposed action will not impact scenic vistas or viewplanes identified in county or state plans or studies. The State Historic Preservation Division (SHPD), in a pre-assessment consultation letter, recommended that the historic coral blocks on the makai side of Pier 12 be protected and remain visible. The SHPD also recommended that public access be provided to view the coral block wall. The proposed improvements will not alter or obstruct public view of the coral blocks. The blocks are currently only visible from a sidewalk area adjacent to the Department of Transportation-Harbors office. This view will not be affected by the proposed pier improvements. Public access to this viewing point from the sidewalk will not be affected.

13. Requires substantial energy consumption.

The proposed action will not require substantial energy consumption. Energy resources will be consumed during project construction. In the long-term, the new berthing structures will increase energy efficiency by consolidating emergency response vessels in this area of the harbor.

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U.S. Department of Transportation, Federal Transit Administration. *Honolulu High-Capacity Transit Corridor Project Final Environmental impact Statement/Section 4(f) Evaluation*. June 2012.

7 PERSONS AND AGENCIES INVOLVED IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT

7.1 AGENCIES AND ORGANIZATIONS CONSULTED

The following agencies and organizations were contacted during the early consultation for the Draft EA. The comments received during the early consultation are summarized in Section 7.2 and copies of the letters are included at the end of this chapter.

Federal

U.S. Environmental Protection Agency
- Region 9 Office

U.S. Environmental Protection Agency
- 300 Ala Moana Blvd., Room 5-152

U.S. Fish & Wildlife Service,
- Pacific Islands Office

NOAA National Marine Fisheries Service
- Pacific Islands Regional Office

U.S. Army Engineer Division
- Civil Works Technical Branch
- Regulatory Branch

U.S. Coast Guard
- Fourteenth Coast Guard District

State

Department of Agriculture
Department of Business, Economic Development & Tourism
- Office of Planning

Department of Hawaiian Home Lands
Department of Land and Natural Resources
- Office of Conservation and Coastal Lands
- State Historic Preservation Division

Department of Health
- Environmental Planning Office
- Office of Environmental Quality Control

Office of Hawaiian Affairs
Department of Transportation
UH Environmental Center

City and County of Honolulu

Department of Design and Construction
Department of Environmental Services
Department of Facility Maintenance
Economic Development Office
Honolulu Fire Department
Department of Planning & Permitting
Department of Parks and Recreation
Honolulu Police Department
Department of Transportation Services

Other Organizations

Neighborhood Board #13, Downtown

Hawaiian Electric Company, Inc.
- Environmental Department

Hawaiian Telcom
- Network Engineering and Planning

Oceanic Time Warner Cable

American Marine Services Group
Pacific Environmental Corporation (PENCO)
Clean Islands Council
Marine Spill Response Corporation (MSRC)
- Pacific Northwest Region

Elected Officials

Honolulu City Council District 6
- Councilmember Tulsi Gabbard

28th Representative District
- Representative Karl Rhodes

12th Senatorial District
- Senator Brickwood Galuteria

7.2 COMMENTS RECEIVED DURING PRE-ASSESSMENT CONSULTATION

Letters soliciting comments were sent to the agencies and organizations listed above in February 2012, and a total of 13 written responses were received. A summary of the comments is included in the table below, and copies of the letters are included at the end of this chapter.

Table 7-1: Summary of Comments Received During Pre-Assessment Consultation

Agency or Individual	Format/Date/Reference	Comments	Action/Response
Federal			
Department of the Army, Corps of Engineers, Regulatory Branch	Letter dated March 6, 2012	Honolulu Harbor at Piers 12 and 15 is a navigable water of the U.S. subject to Corps jurisdiction. A DA permit pursuant to Section10 of the Rivers and Harbors Act of 1899, and a Section 404 Clean Water Act permit may be required pending submission of the draft EA, plans, drawings and detailed information.	Information included in EA.
State of Hawai‘i			
DLNR, Office of Conservation and Coastal Lands	Letter dated February 22, 2012	Proposed improvements are identified land uses, HAR Sec. 13-5-22, P-8, Structures and Land Uses, Existing (A-1), allows “minor repair, maintenance, and operation to an existing structure, facility, use, land and equipment… involves mostly cosmetic work or like-to-like replacement of component parts…” and HAR Sec. 13-5-37, Nonconforming Uses (a) allows “… continuance, or repairs and maintenance, of non-conforming land uses and structures…” Conservation District Use Permit is not required.	Information included in EA. No action required.
DLNR State Historic Preservation Division	Letter dated February 24, 2012 LOG#2012.0440, DOC# 1202RS32	Pier 12 is historically significant under Criteria A (Events) and C (Architecture). SHPD requests that at Pier 12, coral blocks are to be protected and retained and remain visible, public access be provided to view the coral block wall, and an interpretive marker, design and content approved by SHPD, placed on site.	Added information to EA. Engineers notified of design requests.

Agency or Individual	Format/Date/Reference	Comments	Action/Response
Department of Health, Environmental Planning Office	Letter dated February 17, 2012	No comments, refer to EPO standard comments	No action required.
City & County of Honolulu			
Dept. of Design and Construction	Letter dated March 14, 2012	No comments	No action required.
Department of Facility Maintenance	Letter dated March 2, 2012	No issues. Should have minimal affect to City roads	No action required.
Dept. of Planning and Permitting	Letter dated April 18, 2012	Pier 12 under jurisdiction of Aloha Tower Development Corp whose status is unknown because of pending legislation to place responsibility under HCDA. Pier 15 is within LUO I-3 Waterfront Industrial District, however DOT under Chapter 266, HRS, can exempt project.	Added information to EA.
Honolulu Fire Department	Letter dated March 5, 2012	Project will have no significant impact to fire dept services.	Added information to EA.
Dept. of Parks & Recreation	Letter dated March 2, 2012	No comment. Project will not impact any DPR program or facility. You may remove us as consulted party.	Added information to EA.
Police Department	Letter dated March 6, 2012	Project may cause increase in calls due to construction related traffic. No significant impact after project completion.	Added information to EA.
Dept. of Transportation Services	Letter dated March 12, 2012, TP2/12-454327R	DEA should include traffic impact assessment, apprise area Neighborhood Board of project details and impacts to local streets during construction, transportation of equipment and materials to project should be conducted outside peak traffic. Public Transit Division requests DEA describe Public Transit and impact on public transit during construction, only few AM express routes traverse area and no bus stops near project. DEA should evaluate impact project relative to AM express routes.	Added information to EA.

Agency or Individual	Format/Date/Reference	Comments	Action/Response
Board of Water Supply	Letter dated March 5, 2012	Existing water system is adequate to accommodate proposed development but final decision will be confirmed when building permit is submitted. Water System Facilities Charges apply, and BWS Cross-Connection Control and Backflow Prevention required.	Added information to EA.
Other			
Hawaiian Electric Company	Letter date April 16, 2012	HECO has no objections to project. HECO will need continued access for maintenance of their facilities if they have any existing easements and facilities on the project sites.	Added information to EA.
Hawaiian Telcom	Letter dated March 2, 2012	Hawaiian Telcom has no comments	Added information to EA.
Oceanic Time Warner Cable	Letter dated February 21, 2012	Oceanic Time Warner has no facilities within Piers 12 and 15	Added information to EA
Marine Spill Response Corporation (MSRC)	Email dated February 27, 2012	Has no early input at this time regarding Pier 15. Received clarification on entities and responsibilities	Added information to EA

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

REPLY TO
ATTENTION OF:

March 6, 2012

RECEIVED MAR 0 8 2012

Regulatory Branch

File Number **POH-2012-00026**

Kimura International, Inc.
Attention: Leslie Kurasaki
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Ms. Kurasaki:

This responds to your letter dated February 16, 2012 requesting early comments for the forthcoming Draft Environmental Assessment (dEA) for the improvements proposed for Piers 12 and 15 located at Honolulu Harbor, Oahu Island, Hawaii. We have assigned the project the reference number **POH-2012-00026**. Please cite the reference number in any future correspondence concerning this project.

We have reviewed the information you submitted for the proposed project pursuant to Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and Section 404 of the Clean Water Act (Section 404). For your information, Section 10 requires that a Department of the Army (DA) permit be obtained from the U.S. Army Corps of Engineers (Corps) prior to undertaking any construction, dredging, or other activity occurring in, over, or under or affecting navigable waters of the U.S. For tidal waters, the shoreward limit of the Corps' jurisdiction extends to the Mean High Water Mark (MHWM). Section 404 requires that a DA permit be obtained for the discharge (placement) of dredged and/or fill material into waters of the U.S., including wetlands. For tidally influenced waters, in the absence of adjacent wetlands, the shoreward limit of the Corps' jurisdiction extends to the High Tide Line, which in Hawai'i may be approximated by reference to the Mean Higher High Water Mark (MHWWM). For non-tidal waters, the lateral limits of the Corps' jurisdiction extend to the Ordinary High Water Mark (OHWM) or the approved delineated boundary of any adjacent wetlands.

The **Honolulu Harbor** at Piers 12 and 15 is subject to the ebb and the flow of the tides, and is therefore; **a navigable water of the U.S.** subject to Corps jurisdiction. Based on the limited information was provided, it appears a DA permit will be required for any proposed work activities in, over, or under navigable waters of the U.S. pursuant to Section 10. Additional detailed information is required to determine whether a DA permit pursuant to Section 404 would also be required.

To obtain a DA permit determination, we advise you submit a request letter along with the forthcoming dEA, plans/drawings, and a detailed project description identifying all in, over, under water activities for our review and evaluation. Be sure to indicate whether the proposed project will or will not involve the placement and/or discharge of dredged and/or fill material

into the Honolulu Harbor below the MHWWM, and identify the type and quantities of dredged/fill material(s), either temporary or permanent, that would be used for the proposed undertaking, if applicable.

This does not relieve you of the responsibility to obtain any other permits, licenses, or approvals that may be required under County, State, or Federal law for your proposed work.

Thank you for providing us with the opportunity to comment on this project. Should you have any questions, please contact Ms. Joy Anamizu at (808) 438-7023 or via e-mail at *Joy.N.Anamizu@usace.army.mil*. You are encouraged to provide comments on your experience with the Honolulu District Regulatory Branch by accessing our web-based customer survey form at *http://per2.nwp.usace.army.mil/survey.html*.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

RECEIVED FEB 24 2012

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: AJR

COR: OA-12-192

Glenn T. Kimura
c/o Kimura International
1600 Kapiolani Blvd, Suite 1600
Honolulu, HI 96814

FEB 22 2012

SUBJECT: **Early Consultation for Honolulu Harbor Pier 12 and Pier 15 Improvements**
Nimitz Highway, Honolulu Harbor, Island of Oahu
TMK: (1) 2-1-001:056, (1) 2-1-001:045

Dear Mr. Kimura,

The Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL) is in receipt of your letter regarding an early consultation for the *Honolulu Harbor Pier 12 and Pier 15 Improvements, Draft Environmental Assessment*. According to the proposal the project will include a new berthing, mooring structures and upgraded utilities at the Honolulu Harbor Pier 12 and Pier 15 which will accommodate two (2) spill response boats and one (1) spill response barge; together these vessels comprise Hawaii's *marine oil spill response team*. The proposed project will also involve the removal of dilapidated pilings from the sea floor and the construction of pile supported structural slabs on both Pier 12 and Pier 15. At this time no dredging is being proposed at the project site.

A comprehensive report titled the *Oahu Commercial Harbors Master Plan 2020* include proposed improvements to the Pier 12 and Pier 15 structures and proposed improvements to the Oil Spill Response Vessel (OSRV) berthing facility. The subsequent Final Environmental Impact Statement (FEIS) outlined potential effects associated with the Honolulu Harbor Master Plan including impacts to water quality, and storm water management.

The Honolulu Harbor Pier 12 and Pier 15 Improvements are an identified land use pursuant to Hawaii Administrative Rules (HAR) §13-5-22, P-8 **STRUCTURES AND LAND USES, EXISTING** (A-1), *Minor repair, maintenance, and operation to an existing structure, facility, use, land and equipment, whether it is nonconforming or permitted, that involves mostly cosmetic work or like-to-like replacement of component parts, and that results in negligible change to or impact to land, or an natural and cultural resource.*

Similarly, the Honolulu Harbor was constructed prior to Conservation District designations and is considered a nonconforming structure. Pursuant to HAR §13-5-37, **NONCONFORMING USES** *(a) this chapter shall not prohibit the continuance, or repairs and maintenance, of non-conforming land uses and structures as defined in this chapter*. Therefore a Conservation District Use Permit <u>is not required</u> for the proposed construction, repair and maintenance to the Honolulu Harbor Piers 12 & 15.

The applicant should consult with the United States Army Corps of Engineers Regulatory Branch for any project that proposes work or discharges material in US navigable waters to demonstrate compliance with federal laws and regulations, including, but not limited to, *Section 10* of the *Rivers and Harbors Appropriation Act*.

Should you have any further questions, please contact Alex J. Roy of the Office of Conservation and Coastal Lands at 808-587-0316.

Sincerely,

Samuel J. Lemmo, Administrator
Office of Conservation of Coastal Lands

CC: *ODLO*
City and County of Honolulu
DOT
USACOE

NEIL ABERCROMBIE
GOVERNOR OF 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

HISTORIC PRESERVATION DIVISION
KAHUHIHEWA BUILDING
601 KAMOKILA BLVD, KAPOLEI HI 96707

DATE: February 24, 2012

LOG: 2012.0440
DOC: 1202RS32

TO: Glenn Kimura
President
Kimura International, Inc.
1600 Kapiolani Blvd., Unit 1610
Honolulu, HI 96814

RECEIVED MAR 0 6 2012

SUBJECT: **Section 6E-42 Historic Preservation Review**
Project: Bulkheads, berthing and mooring structures
Permit # (None)
Owner: Harbors Division, State of Hawaii
Location: Honolulu Harbor, Piers 12 and 15
Tax Map Key: (1) 2-1-001:045 and :056

This letter is in response to materials dated February 16, 2012, received by SHPD on February 21, 2012, regarding improvements proposed to Piers 12 and 15 at Honolulu Harbor. Pier 12 would have new berthing and mooring units with fendering systems to create 200 lineal feet of berthing space. A structural slab on piles would be constructed over the existing bulkhead of Pier 12. A loading platform and vehicular bridge would also be pile supported. At Pier 15, 500 lineal feet of berthing would be created along the makai side to accommodate boats and barges. Ships would be berthed approximately 35 feet from the existing bulkhead with pile supported mooring dolphins and loading platforms. Numerous old piles located along the sea floor adjacent to the bulkheads would be removed. The Area of Potential Effect (APE) would be both piers and their immediate vicinities.

Pier 12 is historically important for several reasons:

1. The coral blocks along the makai side originated with Honolulu Fort, and in 1857 when the Fort was dismantled, the blocks were recycled to create the original harbor wall.
2. The present Pier 12 was immediately adjacent to the Robinson Wharf, the main shipbuilding and repair facility for mid 19th century Honolulu Harbor. The pier stands between the Robinson Wharf and the original Customs House location and was the center of maritime activity during that time.
3. In 1893 American troops from the USS Boston landed at the Brewer Wharf, as Pier 12 was known at that time, and those soldiers subsequently facilitated the overthrow of the Hawaiian Monarchy.

For the above reasons, SHPD considers Pier 12 to be historically significant under Criteria A (Events) and C (Architecture).

SHPD requests that any planning for use of Pier 12 include the following:

1. The coral blocks are to be protected and retained and remain visible
2. Public access be provided to view the coral block wall
3. An interpretive marker placed on the site. The design and contents of the marker to be approved by SHPD.

We look forward to your response. 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.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
File:12-026

February 17, 2012

RECEIVED FEB 22 2012

Mr. Glenn T. Kimura, President
KIMURA INTERNATIONAL, Inc.
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura;

SUBJECT: Honolulu Harbor Piers 12 & 15 Improvements
TMK 2-1-001:056 and 045
Environmental Assessment – Early Consultation

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter, dated **February 16, 2012.** Thank you for allowing us to review and comment on the subject document. The document was routed to the Clean Water Branch of the Environmental Health Administration for more specific comments. EPO has no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

The same website also features a Healthy Community Design Smart Growth Checklist (Checklist). The Hawaii State Department of Health, Built Environment Working Group, recommends that State and county planning departments, developers, planners, engineers and other interested parties apply the healthy built environment principles in the Checklist whenever they plan or review new developments or redevelopments projects. We also ask you to share this list with others to increase community awareness on healthy community design.

For your information Mr. Kelvin Sunada has retired. If there are any questions about these comments please contact the Environmental Planning Office at 586-4337.

Sincerely,

Laura McIntyre AICP
Manager
Environmental Planning Office

Environmental Planning Office Standard Comments / Areas of Concern

Updated 9/15/05

The Environmental Planning Office (EPO) is responsible for several surface water quality management programs mandated by the federal Clean Water Act or dictated by State policy. (http://www.state.hi.us/doh/eh/epo/wqm/wqm.htm). Among these responsibilities, EPO:

- maintains the *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)* (http://www.state.hi.us/doh/eh/epo/wqm/303dpcfinal.pdf);
- develops and establishes Total Maximum Daily Loads (TMDLs) for listed waters (suggesting how much existing pollutant loads should be reduced in order to attain water quality standards, please see http://www.epa.gov/owow/tmdl/intro.html);
- writes TMDL Implementation Plans describing how suggested pollutant load reductions can be achieved; and
- conducts assessments of stream habitat quality and biological integrity.

Standard Comments / Areas of Concern

To facilitate TMDL development and implementation, and to assist with our assessment of the potential impact of proposed actions upon water quality, pollutant loading, and biological resources in receiving waters, we suggest that environmental review documents, permit applications, and related submittals include the following standard information and analyses:

Waterbody type and class

1. Identify the waterbody type and class, as defined in Hawaii Administrative Rules Chapter 11-54 (http://www.state.hi.us/health/about/rules/11-54.pdf), of all potentially affected water bodies[1].

Existing water quality management actions

2. Identify any existing National Pollutant Discharge Elimination System (NPDES) permits and related connection permits (issued by permittees) that will govern the management of water that runs off or is discharged from the proposed project site or facility. Please include NPDES and other permit numbers; names of permittees, permitted facilities, and receiving waters (including waterbody type and class as in 1. above); diagrams showing drainage/discharge pathways and outfall locations; and note any permit conditions that may specifically apply to the proposed project.

3. Identify any planning documents, groups, and projects that include specific prescriptions for water quality management at the proposed project site and in the potentially affected waterbodies. Please note those prescriptions that may specifically apply to the proposed project.

Pending water quality management actions

4. Identify all potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)* including the listed waterbody, geographic scope of listing, and pollutant(s) (See Table 5 at http://www.hawaii.gov/health/environmental/env-planning/wqm/303dpcfinal.pdf).

5. If the proposed project involves potentially affected water bodies that appear on the current *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)*, identify and quantify expected changes in the following site and watershed conditions and characteristics:
   - surface permeability
   - hydrologic response of surface (timing, magnitude, and pathways)
   - receiving water hydrology
   - runoff and discharge constituents
   - pollutant concentrations and loads in receiving waters
   - aquatic habitat quality and the integrity of aquatic biota

Where TMDLs are already established they include pollutant load allocations for the surrounding lands and point source discharges. In these cases, we suggest that the submittal specify how the proposed project would contribute to achieving the applicable load reductions.

Where TMDLs are yet to be established and implemented, a first step in achieving TMDL objectives is to prevent any project-related increases in pollutant loads. This is generally accomplished through the proper application of suitable best management practices in all phases of the project and adherence to any applicable ordinances, standards, and permit conditions. In these cases we suggest that the submittal specify how the proposed project would contribute to reducing the polluted discharge and runoff entering the receiving waters, including plans for additional pollutant load reduction practices in future management of the surrounding lands and drainage/discharge systems.

Proposed Action and Alternatives Considered

We suggest that each submittal identify and analyze potential project impacts at a watershed scale by considering the potential contribution of the proposed project to cumulative, multi-project watershed effects on hydrology, water quality, and aquatic and riparian ecosystems.

We also suggest that each submittal broadly evaluate project alternatives by identifying more than one engineering solution for proposed projects. In particular, we suggest the consideration of "alternative," "soft," and "green" engineering solutions for channel modifications that would provide a more environmentally friendly and aesthetically pleasing channel environment and minimize the destruction of natural landscapes.

If you have any questions about these comments or EPO programs, please contact Jiacai Liu at 586-4346.

---

[1]"Potentially affected waterbodies" means those in which proposed project activity would take place and any others that could receive water discharged by the proposed project activity or water flowing down from the proposed project site. These waterbodies can be presented as a chain of receiving waters whose top link is at the project site upslope and whose bottom link is in Pacific Ocean "oceanic waters," with all receiving waters named according to conventions established by Chapter 11-54 and the *List of Impaired Waters in Hawaii Prepared under Clean Water Act §303(d)*. For example, a recent project proposed for Nuhelewai Stream, Oahu (a tributary of Kapalama Canal) might potentially affect Nuhelewai Stream, Kapalama Canal, Honolulu Harbor and Shore Areas, and the Pacific Ocean.

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

PETER B. CARLISLE
MAYOR

LORI M.K. KAHIKINA, P.E.
DIRECTOR

CHRIS TAKASHIGE, P.E.
DEPUTY DIRECTOR

March 14, 2012

RECEIVED MAR 15 2012

Mr. Glenn T. Kimura, President
Kimura International
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Honolulu Harbor Piers 12 & 15 Improvements
Environmental Assessment – Early Consultation

The Department of Design and Construction has no comments on this project.

Thank you for the opportunity to review and comment. Should you have any questions, please contact me at 768-8480.

Sincerely,

Chris Takashige

Lori M.K. Kahikina, P.E.
Director

LMKK:pg(454256)

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

PETER B. CARLISLE
MAYOR

WESTLEY K.C. CHUN, Ph.D., P.E., BCEE
DIRECTOR & CHIEF ENGINEER

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 12-195

March 2, 2012

RECEIVED MAR 0 8 2012

Mr. Glenn Kimura
Kimura International, Inc.
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawaii 96814

Dear Ms. Nishikawa:

Subject: Honolulu Harbor Piers 12 & 15 Improvements
TMK: 2-1-001:056 and 045
Environmental Assessment – Early Consultation

Thank you for your letter dated February 16, 2012 soliciting our input regarding issues that should be addressed in the forthcoming Draft Environmental Assessment. At the present time we know of no issues. Most of the construction will be on State DOT Harbors and minimal affect to City roads.

Should you have any further 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 & Chief Engineer

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
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

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

2012/ELOG-329(st)

April 18, 2012

RECEIVED APR 19 2012

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Early Consultation for a Draft Environmental Assessment
Honolulu Harbor Piers 12 and 15 Improvements
Department of Transportation, Harbors Division
111 N. Nimitz - Honolulu Harbor
Tax Map Key 2-1-1: 56 and 45

This is in response to your request for comment on the above project transmitted by your letter dated February 16, 2012. We apologize for the late response.

1. Pier 12: This area is located within the Aloha Tower Development District where land use is regulated by the Aloha Tower Development Corporation (ATDC). We note that our staff attempts to contact the ATDC were unsuccessful (i.e., the telephone number was not in service) and we are aware that there is current proposed legislation to move the responsibility for this area to the Hawaii Community Development Authority.

2. Pier 15: This site is within the I-3 Waterfront Industrial District of the Land Use Ordinance (LUO). Although development is technically subject to the requirements of the LUO, which is administered by the Department of Planning and Permitting, we note that the State Department of Transportation can exempt harbor related development from City requirements pursuant to Chapter 266, Hawaii Revised Statutes.

Should you have any questions, please contact Steve Tagawa our staff at 768-8024.

Very truly yours,

Elizabeth Ch

for David K. Tanoue, Director
Department of Planning and Permitting

DKT:rk

cc: Hawaii Community Development Authority

G:\Zoning Inquiry\EarlyHonH.com

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.honolulu.gov/hfd

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

EMMIT A. KANE
DEPUTY FIRE CHIEF

March 5, 2012

RECEIVED MAR 0 8 2012

Mr. Glenn Kimura, President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Environmental Assessment - Early Consultation
Honolulu Harbor Piers 12 and 15 Improvements
Tax Map Keys: 2-1-001: 056 and 045

In response to your letter dated February 16, 2012, regarding the above-mentioned subject, the Honolulu Fire Department reviewed the material provided and determined that there will be no significant impact to fire department services.

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:jl

DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

PETER B. CARLISLE
MAYOR

GARY B. CABATO
DIRECTOR

ALBERT TUFONO
DEPUTY DIRECTOR

March 2, 2012

RECEIVED MAR 07 2012

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Environmental Assessment-Early Consultation
Honolulu Harbor Piers 12 & 15 Improvements
TMK: 2-1-001:056 & 045

Thank you for the opportunity to review and comment at the early consultation phase of the Environmental Assessment for the Honolulu Harbor Piers 12 & 15 Improvements.

The Department of Parks and Recreation has no comment, as the proposed project will not impact any program or facility of the department. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

Gary B. Cabato

GARY B. CABATO
Director

GBC:jr
(454358)

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE BH-LS

March 6, 2012

RECEIVED MAR 07 2012

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

This is in response to your letter dated February 16, 2012, regarding the Early Consultation, Environmental Assessment, for the Honolulu Harbor Piers 12 and 15 Improvements project.

This project may cause an increase in calls for police service because of the anticipated vehicle 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 Sean Naito of District 1 (Central Honolulu) at 723-3327.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
BART S. HUBER
Assistant Chief of Police
Support Services Bureau

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

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

TP2/12-454327R

March 12, 2012

RECEIVED MAR 14 2012

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: Pre-Consultation for Draft Environmental Assessment (DEA) Honolulu Harbor Piers 12 & 15 Improvements; Honolulu, Oahu, Hawaii; Tax Map Key (TMK): 2-1-001:056 and 045

This responds to your letter of February 16, 2012, requesting our comments concerning this proposed project.

Our Traffic Engineering Division (TED) has the following comments.

- The DEA should include a traffic impact assessment report that should discuss traffic impacts on the surrounding City roadways, as a result of the project, including short-term impacts during construction and proposed mitigating measures.

- The area Neighborhood Board, as well as the area residents, businesses, etc., should be kept apprised of the details of the proposed project and the impacts, particularly during construction, the project may have on the adjoining local street area network.

- The transportation of equipment and materials to the project sites should be conducted outside of peak traffic hours, which are 6:00 a.m. – 8:00 a.m., and 2:30 p.m. – 7:00 p.m., to minimize any traffic delays or obstructions to local City roadways.

Our Public Transit Division (PTD) has the following comments:

- Your DEA should include a description of Public Transit, and the impact of your project on Public Transit bus and paratransit 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.

- There are only a few AM express bus routes that go by the project area, but there are no bus stops near the project. The DEA should have an evaluation of whether or not project activities will affect these AM express routes in any way.

We reserve further comment pending submission of the DEA.

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

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
MAHEALANI CYPHER, Vice Chair
THERESIA C. McMURDO
DUANE R. MIYASHIRO
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

March 5, 2012

Mr. Glenn T. Kimura, President
Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814

RECEIVED MAR 07 2012

Dear Mr. Kimura:

Subject: Your Letter Dated February 16, 2012 Requesting Comments on the Honolulu Harbor Piers 12 & 15 Improvements Environmental Assessment—Early Consultation, TMK: 2-1-1: 56, 45

Thank you for the opportunity to comment on the proposed improvements at Piers 12 and 15.

The existing water system is adequate to accommodate the proposed development. 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 the 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 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

SUSAN UYESUGI
Program Administrator
Customer Care Division

RECEIVED APR 18 2012

Hawaiian Electric Company
Engineering Department
PO Box 2750 • Honolulu, HI 96840

April 16, 2012

Mr. Glenn T. Kimura
President
Kimura International, Inc.
1600 Kapiolani Blvd., Suite 1610
Honolulu, Hawaii 96814

Dear Mr. Kimura:

Subject: **Honolulu Harbor Piers 12 and 15 Improvements**
TMK 2-1-001:056 and 045
Environmental Assessment-Early Consultation

Thank you for the opportunity to comment on the subject project. Hawaiian Electric Company has no objections to the project. Should HECO have existing easements and facilities on the subject property, we will need continued access for maintenance of our facilities.

We appreciate your efforts to keep us apprised of the subject project in the planning process. As the Honolulu Harbor Piers 12 and 15 Improvements project comes to fruition, please continue to keep us informed. Further along in the design, we will be better able to evaluate the effects on our system facilities.

If you have any questions, please contact me at 543-7245.

Sincerely,

Rouen Q. W. Liu
Permits Engineer

Attachment: Kimura International Letter dated 2-16-12

Hawaiian Telcom

March 2, 2012

Kimura International, Inc.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814
Attention: Mr. Glenn T. Kimura

RECEIVED MAR 06 2012

Dear Mr. Kimura:

Subject: **Honolulu Harbor Piers 12 & 15 Improvements**
TMK 2-1-001:056 and 045
Environmental Assessment – Early Consultation

Thank you for the opportunity to review and comment on the subject project in preparation of the Environmental Assessment.

Hawaiian Telcom does not have any comments to offer at this time.

If you have any questions or require assistance in the future on this project, please call me at 546-7761.

Sincerely,

Les Loo
Network Engineer – Outside Plant Engineering
Network Engineering & Planning

Enclosures

cc: File [Alakea]

200 Akamainui Street
Mililani, Hawaii 96789-3999
Tel 808-625-2100
Fax 808-625-5888

OCEANIC TIME WARNER CABLE

RECEIVED FEB 22 2012

February 21, 2012

Kimura International
1600 Kapiolani Blvd. , Suite 1610
Honolulu, Hawaii 96814

Attention: Glenn T. Kimura

Project: Honolulu Harbor Piers 12 & 15 Improvements

Subject: CATV locations piers 12 & 15

Mr. Kimura,

Oceanic Time Warner cable does not have any facilities within piers 12 and 15 along Nimitz Hwy. If you have any questions, contact me at #625-8576.

Sincerely,

Lionel Aguiar
OSP Engineer
Oceanic Time Warner cable

Leslie Kurisaki

From: Kris Calvin
Sent: Monday, February 27, 2012 12:32 PM
To: lkurisaki@kimurainternational.com
Cc: John Seltenright
Subject: Pier 15 Environmental Assessment

Leslie,

Per our conversation, at this time MSRC does not have any early input regarding the Environmental Assessment for the HI Harbors Pier 15 project.

However, I would like to offer a recommendation regarding your reference to MSRC's response assets in the draft EA document. Your initial letter dated February 16 indicates "The vessels are owned by two companies, Marine Spill Response Corporation (MSRC) and CIC, which together comprise the State of Hawai'i's oil spill response team." Speaking for MSRC only, if you intend on using a similar reference in the final document I would suggest the following;

"Marine Spill Response Corporation (MSRC) and Clean Islands Council (CIC) provide equipment and personnel critical to oil spill response in the state of Hawaii.

To provide a bit more background; MSRC and CIC are two separate not for profit entities, with an excellent cooperative relationship, that are part of a larger response community in Hawaii, a community that also includes Federal, State and other for profit response organizations. I wanted to ensure you understood both that we are separate organizations and that we are part of that larger community.

I appreciate your time today and look forward to the review of the draft EA.

Regards,
Kris Calvin
Contracts Administrator
Marine Spill Response Corporation (MSRC)
Office: 425-304-1542
Cell: 425-308-0178
calvin@msrc.org

APPENDIX A.
MARINE WATER AND SEDIMENT CHEMISTRY

ASSESSMENT OF MARINE WATER AND SEDIMENT CHEMISTRY IN THE VICINITY OF PIERS 12 AND 15, HONOLULU HARBOR OAHU, HAWAII

State of Hawaii
Department of Transportation
Harbors Division

January 2013

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I. INTRODUCTION

As part of the relocation associated with the development of the former Kapalama Military Reservation site to a new Container Terminal, the Marine Spill Response Corporation (MSRC) and Clean Islands Council (CIC) primary spill response vessels and barge presently berthed at Pier 35 is proposed to be relocated to Pier 12 (CIC) and Pier 15 (MSRC). Improvements to Piers 12 and 15 are anticipated to consist of, but not be limited to, new berthing and mooring structures with appropriate fendering systems to create approximately 500 linear feet of berthing space adjacent to the existing Pier 15 wharf face and approximately 130 linear feet of berthing space adjacent to the Pier 12. No dredging is planned as part of the improvements.

As part of the planning process for the proposed actions, a set of water samples and sediment samples were collected an analyzed in order to provide a baseline of environmental constituents in the area proposed for re-development. Presented below are the methods and results of these baseline assessments.

II. METHODS

Water Quality Analysis

Water samples were collected at 8 stations in the vicinity of Piers 12 and 15 (Figure 1). Stations were located on three transects oriented from the shoreline nearest to Nimitz Highway and extending toward the center of the Harbor. Stations W-1, 2 and 3 were located between Piers 12 and 13; Stations W-4, 5 and 6 were located between Piers 14 and 15, and Stations W-7 and 8 were located off the central portion of Pier 15 (Figure 1).

All sampling was conducted using a 25-foot boat, and performed on April 5, 2012. Stations were located using a Furuno 1650 GPS fixed on the boat. Water samples were collected in 2.8-liter Niskin-type oceanographic sampling bottles. These bottles are lowered to the desired depth with spring-loaded end-caps cocked in an open position allowing free flow of water through the bottle. At the desired depth, a messenger released from the surface trips the endcaps to close, isolating a water sample from depth. Surface samples were collected at a depth of 1 foot from the surface, while bottom samples were collected approximately 1 foot from the Harbor floor. All water samples were collected within a time interval of approximately 1½-hours so that temporal variability between locations was minimized. Analyses were performed for the following chemical constituents specified in DOH Water Quality Standards:

- ammonium (NH_4^+),
- nitrate + nitrite ($NO_3^- + NO_2^-$, hereafter referred to as NO_3^-),
- total nitrogen (TN),
- total phosphorus (TP),
- turbidity,
- Chl a,

- pH,
- dissolved oxygen
- temperature, and
- salinity.

In addition, orthophosphate phosphorus (PO_4^{-3}) and dissolved silica (Si) are reported.

Salinity, dissolved oxygen and temperature were measured as vertical profiles in situ using an RBR Model XR-60-CTD calibrated to factory specifications.

All samples were stored on ice following collection, and delivered to the analytical laboratory as soon as possible, where they were processed within 24 hrs of collection. All laboratory chemistry analyses were performed by Marine Analytical Services in Honolulu, HI (EPA Lab. No. HI00009). Marine Analytical Services possess "acceptable" ratings from EPA-compliant proficiency and quality control testing. Analysis for inorganic nutrients (NH_4^+, PO_4^{-3}, NO_3^- and Si) were performed by Marine Analytical Services using a continuous flow Technicon Autoanalyzer according to published methods of seawater and wastewater analysis (Strickland and Parsons 1968, Technicon 1973, Clesceri et al. 1989). TN and TP were analyzed in a similar fashion following alkaline oxidative digestion using potassium persulfate. The EPA and Standard Methods (SM) methods that were employed for chemical analyses, as well as detection limits, are listed in the Code of Federal Regulations (CRF) Title 40, Chaper 1, Part 136, are as follows:

- NH_4^+ EPA 350.1, detection limit 0.14 μg/L,
- NO_3^- EPA 353.2, detection limit 0.14 μg/L,
- PO_4^{-3} EPA 365.2, detection limit 0.31 μg/L,
- TP EPA 365.4, detection limit 3.1 μg/L,
- TN SM 4500-N C., detection limit 1.4 μg/L. and
- Si, EPA 370.1, detection limit 2.8 μg/L.
- Chlorophyll a, SM 10200, detection limit 0.001 μg/L
- pH, EPA 150.1, detection limit 0.001 pH units
- Turbidity, EPA 180.1, detection limit 0.01 ntu
- Temperature, EPA 170.1, detection limit 0.01 degress centigrade
- Salinity, SM 2520, detection limit 0.001ppt
- Dissolved Oxygen, EPA 360.1, detection limit 0.01% sat.

Turbidity was determined on subsamples analyzed with a Hach 2100P Turbidimeter, with results reported in nephelometric turbidity units (ntu) (EPA Method 180.1, limit of detection 0.01 ntu).

B. Sediment Chemistry

All sampling was conducted using a 25-foot boat, and performed on October 5, 2012. Sediment cores were collected by divers using hand-held 4" diameter Plexiglas coring tubes. Open ended tubes were pushed into the sediment to the 24" mark. The top of the tube was then capped, and the tube slowly extracted from the sediment column. Prior to exposure of the

deep end of the tube, another cap was inserted through the upper sediment column to seal the bottom end of the tube isolating the sediment sample. The full core tube was then carried to the boat remaining in an upright orientation. On the boat deck, the bottom cap was removed and the lower portion of the sediment sample was deposited by gravity into a 1-liter glass jar and sealed, thus comprising the "deep" sample. The core tube was then inverted, and the top section of sediment was slid into another 1-liter jar to comprise the surface sample. All samples were immediately placed on ice, sealed in a cooler, and shipped to Calsciences Analytical Labs on the same day as collection.

Sediment samples were analyzed for an extensive list of constituent that was supplied by DOT-Harbors. The complete laboratory report is contained in Appendix A.

III. RESULTS

A. Water Chemistry

Table 1 shows results of water chemistry analyses from the 8 stations shown in Figure 1. Inspection of these data reveal several consistent trends throughout the sampling regime. At all stations, salinity of bottom water was constant at approximately 34.9‰. However, salinity of all surface samples was lower than the corresponding bottom sample. Similarly values of pH were consistently lower in surface samples. Conversely, values of Si, NO_3^- and NH_4^+ were substantially higher in all surface samples relative to bottom samples. These patterns of depressed salinity and elevated nutrients Si, NO_3^- and NH_4^+ suggest substantial input of groundwater or surface water to the section of the Harbor within the sampling area. The surface layer of low salinity, high nutrient water, is most pronounced at Stations W-7 and W-8, located off the center of Pier 15, while the stratification is least pronounced at Stations W-1, 2, and 3 between Piers 12 and 13. The gradient of decreasing nutrients and increasing salinity from north to south (Pier 15 toward Pier 12) suggest an effect of stream water input from Nuuanu Stream which discharges to the ocean in the area between Piers 15 and 16.

Other nutrients (PO_4^{3-}, TP and TN) also display elevated concentrations in surface sample relative to bottom samples, however the gradients are much smaller than for Si, NO_3^- and NH_4^+. Values of Chlorophyll *a* also reveal a consistent pattern of slightly higher values in bottom water, while turbidity, temperature and dissolved oxygen show no consistency with respect to depth in the water column. All of these constituents are also similar in magnitude throughout the sampling regime with no obvious outliers.

State of Hawaii Department of Health (DOH) Water Quality Standards are based on statistical treatment of repetitive sampling events, in terms of both geometric means and "not to exceed more than 2% or 10% of the time" criteria. Hence, with a single sampling event, a data set cannot technically be applied to determination of any exceedance of State standards. However, comparison of data to values that comprise water quality criteria provide a general depiction of the status of an area of water with respect to applicable water quality standards.

Shown in Table 1 are the three sets of DOH geometric mean standards for embayments

(Harbors are considered embayments) for both wet and dry conditions (differentiated by volume inflow relative to embayment volume). Comparison of the data to these standards indicates that all of the surface values of NO_3^- and NH_4^+ exceed all of the wet and dry geometric mean standards, and several of the "not to exceed" standards. However, most of the other constituents, including TP, TN, turbidity and Chlorophyll *a* are well below all of the standards. As discussed above, the elevated concentrations of NO_3^- and NH_4^+ in surface samples is likely a result of discharge of stream water which results in values above the most DOH limits.

B. Sediment Chemistry

Table 2 lists all sediment chemistry constituents that were detected in any of the four sediment samples, along with the reporting limits (RL) and minimum detection limits (MDL). Note that concentrations of some constituents with values greater than the minimum detection limit, but less than the reporting limit are listed (marked with an "*"). Constituents that were not detected are not shown in Table 2 but are listed in Appendix A.

Table 3 also shows the chemical constituents that occurred at detectable levels, along with the applicable EPA Region Screening Levels (RSL's) for Region 9, as well as the State of Hawaii Department of Health Environmental Action Levels (EAL's). For each detectable constituent, the Maximum Concentration (Max. Conc.) among the four sampling locations is shown, as well as Minimum concentration among the RSLs and EALs. The last column in Figure 3 indicates whether the Max. Conc.. exceeds the minimum screening criteria.

Review of results indicated that all Oil and Grease was detected at both P-15 samples but not at P-12 samples. Total Recoverable Petroleum Hydrocarbons (TRPH), however, were not reported about the minimum detection limit in any of the samples. Of the twenty organochoride pesticides tested, two (Chlordane and Dieldrin) were found, with both compounds present at P-15 and only chordane at P-12. Maximum concentrations of Chlordane and Dieldrin were both above the EPA and DOH human health screening criteria (Table 3). No TCLP organochloride pesticides (EPA Method 1311) were detected in any sample.

Numerous semivolatile organics were detected at both sampling sites in both surface and deep samples (EPA method 8270C SIM). Five semivolatile compounds (Benzo (a) Anthracene, Benzo (a) Pyrene, Benzo (b) Fluoranthene, Dibenz (a,h) Anthracene and Indeno (1,2,3-c-d) Pyrene) had maximum concentrations that exceeded the EPA and DOH human health screening criteria (Table 3). While no TCLP PCB's were detected were detected (EPA Method 8270C, SIM PCB Congeners, Prep. 1311), numerous PCB congeners were detected in all samples using pressurized fluid extraction (EPA Method 8270C, SIM PCB Congeners, Prep. 3545) (Table 2).

Of the compounds of tin, Tributytin was present in all samples, while Dibutyltin was present only in samples from Pier 12. Mercury was also present in all four samples at concentrations approximately an order of magnitude greater than the reporting limits and minimum detection limits (Table 2).

TCLP Metals present in all samples included Antimony, Arsenic, Barium, Cobalt, Copper Lead, Molybdenum, Nickel Selenium, Vanadium and Zinc. Silver and Thallium only occurred in Sample P-15-S. Maximum concentrations of all metals exceeded the EPA RSLs (Table 3). (No dissolved sulfides occurred in any samples, although volatile sulfides were present in all samples with percentages ranging from 3.6 to 4.9%. Organic carbon comprised from 7.3 to 9.5% of samples at Pier 15, and 4.1 to 4.8% of sample weight at Pier 12.

To assess the potential effects of materials found in sediments, comparisons were made to available documentation of composition of urban sediments. Several publications that examined levels of metals in the Ala Wai Canal and other areas of the Honolulu Watershed revealed levels of metals of the same magnitude as those found in sediments at Piers 12-15 (DeCarlo and Spencer 1997, DeCarlo and Anthony 2002, DeCarlo et al. 2004, 2005). Organotins are common in Harbors for use as antifouling coatings on vessels.

In conclusion, while sampling of water and sediment in the vicinity of Piers 12 and 15 was limited in both time (single sample events) and scope (particularly for sediment constituents), several trends are apparent. Water quality is largely dominated by input from nearby streams that drain into Honolulu Harbor creating a strong vertical stratification of the water column. Several chemical components of sediment occurred in high concentrations relative to EPA human health screening criteria. In particular, Chlordane, Dieldrin and metals occurred in elevated concentrations within the sediment column. As there will be no dredging for the proposed project, there should be no considerations of ocean versus upland disposal with regard to toxicity potential. However, because turbidity stemming from sediment resuspension may be increased during improvement activities,, BMPs, such as silt containment devices and extensive monitoring may be important considerations for the construction phase of the project.

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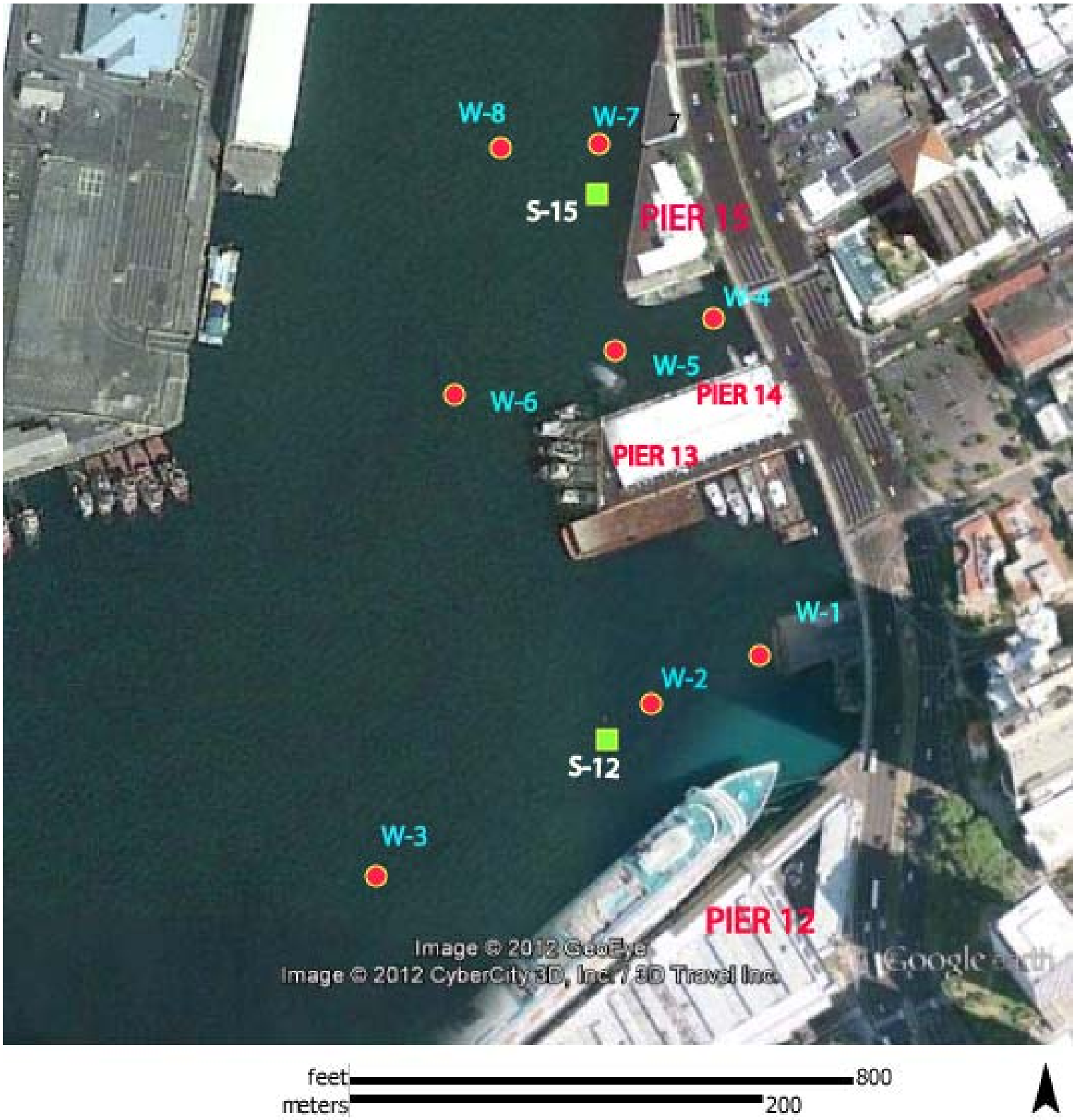

FIGURE 1. Aerial image of portion of Honolulu Harbor containing Piers 12 and 15. Also shown are locations where water samples were collected (W-1 through W-8) and sediment samples were collected (S-12 and S-15).

TABLE 1. Results of water chemistry analyses for samples collected on April 5, 2012 at eight stations in the vicinity of Piers 12 and 15 in central Honolulu Harbor (see Figure 1 for locations of sampling stations). At each station a surface sample (S) was collected within the upper 20 cm of the water column, and a bottom sample (B) was collected within 50 cm of the Harbor floor. Also shown are State of Hawaii Water Quality geometric mean standards for embayments under "wet" and "dry" conditions. "bdl" indicates below detection limit.

SAMPLE ID	PO_4^{3-} (µg/L)	NO_3^- (µg/L)	NH_4^+ (µg/L)	Si (µg/L)	TP (µg/L)	TN (µg/L)	TURBIDITY (ntu)	SALINITY (o/oo)	pH (rel)	Chl-a (µg/l)	Temp (deg. C.	Diss. O_2 (% sat.)
1-S	5.58	12.32	37.66	211.96	14.88	167.44	0.30	34.694	8.08	0.105	24.82	99.49
1-B	11.16	1.82	8.12	105.00	18.91	126.28	0.31	34.887	8.10	0.126	24.58	98.99
2-S	7.44	19.32	10.92	397.04	16.43	132.44	0.22	34.577	8.09	0.084	24.67	98.79
2-B	6.82	bdl	3.08	83.16	15.50	102.34	0.26	34.929	8.11	0.126	24.53	98.15
3-S	7.75	11.76	7.84	269.92	15.81	118.58	0.22	34.662	8.10	0.105	24.48	99.52
3-B	7.13	bdl	bdl	87.08	15.19	93.80	0.24	34.922	8.12	0.115	24.51	102.04
4-S	10.54	21.98	7.00	312.48	17.36	125.58	0.21	34.148	8.08	0.073	24.35	99.87
4-B	8.06	2.66	5.74	117.32	16.74	118.16	0.37	34.900	8.10	0.178	24.52	97.13
5-S	9.61	15.26	10.36	355.04	17.67	118.44	0.23	33.920	8.08	0.105	24.64	99.98
5-B	6.82	3.08	8.96	123.76	14.26	114.66	0.42	34.906	8.10	0.189	24.53	98.96
6-S	9.92	16.24	10.78	376.88	17.05	120.12	0.34	33.825	8.09	0.115	24.46	100.40
6-B	6.51	bdl	1.54	81.48	14.88	92.54	0.24	34.950	8.12	0.147	24.52	101.26
7-S	18.29	38.92	27.86	1,074.64	28.52	168.70	0.55	31.000	8.05	0.126	24.57	99.49
7-B	12.09	2.10	33.74	146.16	20.77	147.56	0.43	34.891	8.08	0.178	24.54	96.01
8-S	15.19	26.18	23.80	867.44	22.94	137.90	0.40	31.797	8.08	0.178	24.43	99.58
8-B	8.68	4.20	10.50	101.92	18.60	117.60	0.33	34.933	8.11	0.199	24.54	99.52
DOH WQS: Geometric means												
WET*	-	8.00	6.00	-	25.00	200.00	1.50			1.50		
DRY**	-	5.00	3.50	-	20.00	150.00	0.40			0.50		
DOH WQS: Not to exceed more than 10% of the time												
WET*	-	20.00	13.00	-	50.00	350.00	3.00			4.50		
DRY**	-	14.00	8.50	-	40.00	250.00	1.00			1.50		
DOH WQS: Not to exceed more than 2% of the time												
WET*	-	35.00	20.00	-	75.00	500.00	5.00			8.50		
DRY**	-	25.00	15.00	-	60.00	350.00	1.50			3.00		

* Wet criteria apply when the average fresh water inflow from land equals or exceeds 1% of the embayment volume.

** Dry criteria apply when the average fresh water inflow from land is less tha 1% of the embayment volume.

TABLE 2. Summary table of sediment chemistry analyses from samples collected off of Piers 12 and 15 in Honolulu Harbor. At each sample site, a surface (S) and deep (D) sample was collected, with the deep sample coming from approximately 24 inches below the sediment surface. Only those constituents with a numerical result are listed below. Concentrations greater than miniminum dectection limits (MDL) but less than reporting limit (RL) are marked with an "*". For location of sampling sites, see Figure 1. The complete laboratory report of sediment analyses is contained in Appendix A.

SAMPLE SITE - P-15S				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
OIL & GREASE	mg/kg	42	35	32
EPA 8081A				
(Organocloride Pesticides)				
Chordane	µg/kg	62	35	11
Dieldrin	µg/kg	3.8	3.5	1.1
EPA 8270C SIM				
(semivolatile organics)				
2-4-Dimethylphenol	µg/kg	6.1*	35	5.7
3/4-Methylphenol	µg/kg	36	35	5.6
Acenaphthene	µg/kg	12*	35	6.4
Acenaphthylene	µg/kg	ND		
Anthracene	µg/kg	34*	35	6.4
Benzo (a) Anthracene	µg/kg	140	35	5.7
Benzo (a) Pyrene	µg/kg	270	35	6.1
Benzo (a) Fluoranthene	µg/kg	210	35	6.2
Benzo (g,h,i) Perylene	µg/kg	290	35	6.4
Benzo (k) Fluoranthene	µg/kg	220	35	8.7
Bis(2-Ethylhexyl) Phthalate	µg/kg	370	35	11
Butyl Benzyl Phthalate	µg/kg	42	35	11
Chrysene	µg/kg	210	35	7.1
Di-n-Butyl Phthalate	µg/kg	19*	35	7.1
Dibenz (a,h) Anthracene	µg/kg	47	35	6.8
Diethyl Phthalate	µg/kg	9.4*	35	6.9
Flouranthene	µg/kg	330	35	6.1
Fluorene	µg/kg	7.8*	35	6.1
Indeno (1,2,3-c-d) Pyrene	µg/kg	240	35	6.2
Napthalene	µg/kg	20*	35	6.4
Phenanthrene	µg/kg	100	35	6.6
Pyrene	µg/kg	400	35	8.7
Benzo (e) Pyrene	µg/kg	190	35	4.9
Perylene	µg/kg	79	35	4.9
2,6-Dimethylnaphthalene	µg/kg	30*	35	4.5
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB008	µg/kg	0.45*	1.7	0.29
PCB018	µg/kg	1.6*	1.7	0.55
PCB028	µg/kg	0.55*	1.7	0.35
PCB031	µg/kg	0.85*	1.7	0.4
PCB033	µg/kg	3.0	1.7	0.38
PCB037	µg/kg	0.55*	1.7	0.45
PCB044	µg/kg	0.76*	1.7	0.46
PCB049	µg/kg	0.81*	1.7	0.41
PCB052	µg/kg	1.3*	1.7	0.34
PCB056	µg/kg	0.54*	1.7	0.48
PCB066	µg/kg	0.83*	1.7	0.32
PCB070	µg/kg	0.71*	1.7	0.28
PCB074	µg/kg	0.35*	1.7	0.28
PCB087	µg/kg	0.46	1.7	0.35
PCB095	µg/kg	1.20*	1.7	0.58
PCB097	µg/kg	0.75*	1.7	0.47
PCB099	µg/kg	1.0*	1.7	0.30
PCB101	µg/kg	1.5*	1.7	0.28
PCB105	µg/kg	0.85*	1.7	0.36
PCB110	µg/kg	1.4*	1.7	0.36
PCB114	µg/kg	1.6*	1.7	0.35
PCB118	µg/kg	1.7*	1.7	0.46
PCB119	µg/kg	ND	1.7	0.3
PCB128	µg/kg	.96*	1.7	0.48
PCB132	µg/kg	ND	1.7	0.57

SAMPLE SITE - P-15D				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
OIL & GREASE	mg/kg	36	38	35
EPA 8081A				
(Organocloride Pesticides)				
Chordane	µg/kg	75	38	12
Dieldrin	µg/kg	4.5	3.8	1.3
EPA 8270C SIM				
(semivolatile organics)				
2-4-Dimethylphenol	µg/kg	6.5*	38	6.3
3/4-Methylphenol	µg/kg	31*	38	6.1
Acenaphthene	µg/kg	12*	38	7.0
Acenaphthylene	µg/kg	33*	38	6.3
Anthracene	µg/kg	40	38	6.8
Benzo (a) Anthracene	µg/kg	170	38	8.2
Benzo (a) Pyrene	µg/kg	340	38	6.7
Benzo (b) Fluoranthene	µg/kg	280	38	6.8
Benzo (g,h,i) Perylene	µg/kg	340	38	7.0
Benzo (k) Fluoranthene	µg/kg	270	38	9.5
Bis(2-Ethylhexyl) Phthalate	µg/kg	320	38	12
Butyl Benzyl Phthalate	µg/kg	62	38	12
Chrysene	µg/kg	240	38	7.8
Di-n-Butyl Phthalate	µg/kg	20	38	8.0
Dibenz (a,h) Anthracene	µg/kg	62	38	7.4
Diethyl Phthalate	µg/kg	11*	38	7.6
Flouranthene	µg/kg	330	38	7.2
Fluorene	µg/kg	ND	38	6.7
Indeno (1,2,3-c-d) Pyrene	µg/kg	290	38	6.8
Napthalene	µg/kg	28*	38	7.0
Phenanthrene	µg/kg	110	38	7.2
Pyrene	µg/kg	420	38	9.5
Benzo (e) Pyrene	µg/kg	230	38	5.3
Perylene	µg/kg	91	38	5.3
2,6-Dimethylnaphthalene	µg/kg	26	38	4.9
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB008	µg/kg	0.43*	1.9	0.49
PCB018	µg/kg	0.99*	1.9	0.6
PCB028	µg/kg	ND	1.9	0.38
PCB031	µg/kg	0.69*	1.9	0.44
PCB033	µg/kg	1.8*	1.9	0.41
PCB037	µg/kg	ND	1.9	0.5
PCB044	µg/kg	0.51*	1.9	0.5
PCB049	µg/kg	0.80*	1.9	0.45
PCB052	µg/kg	1.2*	1.9	0.37
PCB056	µg/kg	ND	1.9	0.52
PCB066	µg/kg	0.67*	1.9	0.35
PCB070	µg/kg	0.49*	1.9	0.31
PCB074	µg/kg	ND	1.9	0.37
PCB087	µg/kg	0.44	1.9	0.38
PCB095	µg/kg	1.00*	1.9	0.63
PCB097	µg/kg	0.92*	1.9	0.52
PCB099	µg/kg	1.1*	1.9	0.31
PCB101	µg/kg	1.5*	1.9	0.31
PCB105	µg/kg	0.88*	1.9	0.40
PCB110	µg/kg	1.5*	1.9	0.39
PCB114	µg/kg	1.9*	1.9	0.38
PCB118	µg/kg	1.8*	1.9	0.5
PCB119	µg/kg	1.8*	1.9	0.33
PCB128	µg/kg	0.77*	1.9	0.39
PCB132	µg/kg	0.77*	1.9	0.39

TABLE 2. (continued 2)

SAMPLE SITE - P-12S				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
OIL & GREASE	mg/kg	ND	27	25
EPA 8081A				
(Organocloride Pesticides)				
Chordane	µg/kg	16*	27	8.8
Dieldrin	µg/kg	ND	1.1	3.8
EPA 8270C SIM				
(semivolatile organics)				
2-4-Dimethylphenol	µg/kg	5.7*	27	4.4
3/4-Methylphenol	µg/kg	22*	27	3.8
Acenaphthene	µg/kg	17	27	5.0
Acenaphthylene	µg/kg	38	27	4.4
Anthracene	µg/kg	49	27	4.8
Benzo (a) Anthracene	µg/kg	180	27	5.8
Benzo (a) Pyrene	µg/kg	370	27	4.7
Benzo (b) Fluoranthene	µg/kg	280	27	4.8
Benzo (g,h,i) Perylene	µg/kg	330	27	5.0
Benzo (k) Fluoranthene	µg/kg	290	27	6.7
Bis(2-Ethylhexyl) Phthalate	µg/kg	370	27	8.3
Butyl Benzyl Phthalate	µg/kg	38	27	8.5
Chrysene	µg/kg	250	27	5.5
Di-n-Butyl Phthalate	µg/kg	13*	27	5.6
Dibenz (a,h) Anthracene	µg/kg	67	27	5.2
Diethyl Phthalate	µg/kg	6.0*	27	5.4
Flouranthene	µg/kg	350	27	5.1
Fluorene	µg/kg	12*	27	4.7
Indeno (1,2,3-c-d) Pyrene	µg/kg	310	27	4.7
Napthalene	µg/kg	33	27	5.1
Phenanthrene	µg/kg	140	27	5.1
Pyrene	µg/kg	430	27	6.7
Benzo (e) Pyrene	µg/kg	240	27	3.8
Perylene	µg/kg	89	27	3.8
2,6-Dimethylnaphthalene	µg/kg	28	27	3.5
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB008	µg/kg	0.87*	1.3	0.32
PCB018	µg/kg	2.8	1.3	0.42
PCB028	µg/kg	0.56*	1.3	0.27
PCB031	µg/kg	1.6	1.3	0.31
PCB033	µg/kg	3.6	1.3	0.29
PCB037	µg/kg	ND	1.3	0.5
PCB044	µg/kg	1.8	1.3	0.35
PCB049	µg/kg	2.3	1.3	0.32
PCB052	µg/kg	3.3	1.3	0.26
PCB056	µg/kg	0.40*	1.3	0.37
PCB066	µg/kg	1.5	1.3	0.25
PCB070	µg/kg	1.5	1.3	0.22
PCB074	µg/kg	0.67*	1.3	0.25
PCB087	µg/kg	1.5	1.3	0.27
PCB095	µg/kg	3.70	1.3	0.45
PCB097	µg/kg	0.92*	1.3	0.52
PCB099	µg/kg	2.5	1.3	0.23
PCB101	µg/kg	4.8	1.3	0.22
PCB105	µg/kg	2	1.3	0.28
PCB110	µg/kg	4.1	1.3	0.28
PCB114	µg/kg	1.8	1.3	0.27
PCB118	µg/kg	4.2	1.3	0.36
PCB119	µg/kg	4.2	1.3	0.23
PCB128	µg/kg	1.2*	1.3	0.37
PCB132	µg/kg	ND	1.3	0.44

SAMPLE SITE - P-12D				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
OIL & GREASE	mg/kg	ND	26	24
EPA 8081A				
(Organocloride Pesticides)				
Chordane	µg/kg	39	26	8.4
Dieldrin	µg/kg	ND	2.6	0.85
EPA 8270C SIM				
(semivolatile organics)				
2-4-Dimethylphenol	µg/kg	4.5*	26	3.5
3/4-Methylphenol	µg/kg	23*	26	4.1
Acenaphthene	µg/kg	13*	26	4.7
Acenaphthylene	µg/kg	41	26	4.2
Anthracene	µg/kg	47	26	4.2
Benzo (a) Anthracene	µg/kg	170	26	5.5
Benzo (a) Pyrene	µg/kg	380	26	4.5
Benzo (b) Fluoranthene	µg/kg	300	26	4.6
Benzo (g,h,i) Perylene	µg/kg	330	26	4.7
Benzo (k) Fluoranthene	µg/kg	270	26	6.4
Bis(2-Ethylhexyl) Phthalate	µg/kg	270	26	7.9
Butyl Benzyl Phthalate	µg/kg	33	26	8.1
Chrysene	µg/kg	250	26	5.3
Di-n-Butyl Phthalate	µg/kg	13*	26	5.4
Dibenz (a,h) Anthracene	µg/kg	67	26	5.0
Diethyl Phthalate	µg/kg	ND	26	5.1
Flouranthene	µg/kg	340	26	4.9
Fluorene	µg/kg	7.7*	26	4.5
Indeno (1,2,3-c-d) Pyrene	µg/kg	300	26	4.6
Napthalene	µg/kg	33	26	4.7
Phenanthrene	µg/kg	130	26	4.9
Pyrene	µg/kg	440	26	6.4
Benzo (e) Pyrene	µg/kg	240	26	3.6
Perylene	µg/kg	93	26	3.6
2,6-Dimethylnaphthalene	µg/kg	34	26	3.3
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB008	µg/kg	0.48*	1.3	0.31
PCB018	µg/kg	0.97*	1.3	0.4
PCB028	µg/kg	2.1	1.3	0.26
PCB031	µg/kg	1.3*	1.3	0.3
PCB033	µg/kg	2.1	1.3	0.28
PCB037	µg/kg	1.2*	1.3	0.34
PCB044	µg/kg	8.5	1.3	0.34
PCB049	µg/kg	4.9	1.3	0.3
PCB052	µg/kg	8.1	1.3	0.25
PCB056	µg/kg	5.2	1.3	0.35
PCB066	µg/kg	9	1.3	0.23
PCB070	µg/kg	4.7	1.3	0.21
PCB074	µg/kg	3.9	1.3	0.24
PCB087	µg/kg	2.8	1.3	0.26
PCB095	µg/kg	5.20	1.3	0.43
PCB097	µg/kg	3.3	1.3	0.35
PCB099	µg/kg	3.9	1.3	0.22
PCB101	µg/kg	6.3	1.3	0.21
PCB105	µg/kg	3.2	1.3	0.27
PCB110	µg/kg	6.3	1.3	0.26
PCB114	µg/kg	0.86*	1.3	0.26
PCB118	µg/kg	6.4	1.3	0.34
PCB119	µg/kg	.57*	1.3	0.22
PCB128	µg/kg	0.85*	1.3	0.26
PCB132	µg/kg	ND	1.3	0.44

TABLE 2. (continued 3)

SAMPLE SITE - P-15S				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB138/158	µg/kg	2.9*	3.5	0.70
PCB141	µg/kg	0.60	1.7	0.39
PCB149	µg/kg	1.9	1.7	0.31
PCB151	µg/kg	0.45*	1.7	0.36
PCB153	µg/kg	2.8	1.7	0.36
PCB156	µg/kg	ND	1.7	0.34
PCB157	µg/kg	ND	1.7	0.33
PCB170	µg/kg	1.5*	1.7	0.32
PCB174	µg/kg	0.75*	1.7	0.37
PCB177	µg/kg	ND	1.7	0.43
PCB180	µg/kg	1.7	1.7	0.21
PCB183	µg/kg	ND	1.7	0.39
PCB187	µg/kg	1.0*	1.7	0.36
PCB194	µg/kg	0.69*	1.7	0.33
PCB203	µg/kg	0.51*	1.7	0.37
PCB206	µg/kg	0.51*	1.7	0.29
PCB209	µg/kg	0.51*	1.7	0.37
ORGANOTINS				
(EPA 3550B (M)				
Tributyltin	µg/kg	10*	10	2.0
Dibutyltin	µg/kg	ND	10	2.3
EPA 7471A TOTAL				
Mercury	mg/kg	0.483	0.0696	0.0204
EPA 1631E				
Mercury	µg/L	ND	0.00500	0.00146
EPA 1640				
Antimony	µg/L	0.412*	0.500	0.154
Arsenic	µg/L	14.0	0.300	0.122
Barium	µg/L	123	0.500	0.252
Beryllium	µg/L	ND	5.00	0.635
Cadmium	µg/L	ND	0.300	0.0567
Chromium	µg/L	ND	2.00	1.64
Cobalt	µg/L	11.3	0.500	0.0486
Copper	µg/L	0.160*	0.300	0.0898
Lead	µg/L	0.783	0.300	0.135
Molybdenum	µg/L	0.780	0.500	0.243
Nickel	µg/L	12.7	0.500	0.0607
Selenium	µg/L	0.194*	0.500	0.121
Silver	µg/L	0,0982*	0.500	0.0822
Thallium	µg/L	0.0999*	0.300	0.0870
Vanadium	µg/L	2.19	0.500	0.332
Zinc	µg/L	81.0	5.00	0.736
EPA 6020 (ICP-MS)				
Arsenic	mg/kg	18.4	0.347	0.303
Cadmium	mg/kg	1.13	0.347	0.199
Chromium	mg/kg	114	0.347	0.216
Copper	mg/kg	150	0.347	0.146
Lead	mg/kg	95.5	0.347	0.229
Nickel	mg/kg	106	0.347	0.176
Selenium	mg/kg	0.824	0.347	0.254
Silver	mg/kg	0.498	0.347	0.109
Zinc	mg/kg	306	3.47	2.76
Solids	%	3.6	0.10	0.10
Sulfide, Dissolved	mg/kg	ND	0.10	0.084
Sulfide, Total	mg/kg	9.0	0.35	0.29
Carbon, Total Organic	%	7.3	0.17	0.042
Solids, Total	%	28.8	0.100	0.100
Ammonia (as N)	mg/kg	12	0.69	0.38

SAMPLE SITE - P-15D				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB138/158	µg/kg	3.3*	3.8	0.77
PCB141	µg/kg	0.52*	1.9	0.42
PCB149	µg/kg	1.8*	1.9	0.34
PCB151	µg/kg	0.55*	1.9	0.36
PCB153	µg/kg	3.1	1.9	0.4
PCB156	µg/kg	0.6	1.9	0.37
PCB157	µg/kg	ND	1.9	0.36
PCB170	µg/kg	1.6*	1.9	0.35
PCB174	µg/kg	0.74*	1.9	0.41
PCB177	µg/kg	ND	1.9	0.47
PCB180	µg/kg	1.7	1.9	0.23
PCB183	µg/kg	ND	1.9	0.42
PCB187	µg/kg	1.2*	1.9	0.4
PCB194	µg/kg	0.69*	1.9	0.36
PCB203	µg/kg	ND	1.9	0.41
PCB206	µg/kg	ND	1.9	0.32
PCB209	µg/kg	0.83*	1.9	0.41
ORGANOTINS				
(EPA 3550B (M)				
Tributyltin	µg/kg	12*	11	2.2
Dibutyltin	µg/kg	ND	11	2.5
EPA 7471A TOTAL				
Mercury	mg/kg	0.629	0.0762	0.0224
EPA 1631E				
Mercury	µg/L	0.00268*	0.00500	0.00146
EPA 1640				
Antimony	µg/L	0.329*	0.500	0.154
Arsenic	µg/L	16.1	0.300	0.122
Barium	µg/L	181	0.500	0.252
Beryllium	µg/L	ND	5.00	0.635
Cadmium	µg/L	ND	0.300	0.0567
Chromium	µg/L	1.93	2.00	1.64
Cobalt	µg/L	6.23	0.500	0.0486
Copper	µg/L	0.337	0.300	0.0898
Lead	µg/L	0.599	0.300	0.135
Molybdenum	µg/L	1.760	0.500	0.243
Nickel	µg/L	10.1	0.500	0.0607
Selenium	µg/L	0.0133*	0.500	0.121
Silver	µg/L	ND	0.500	0.0822
Thallium	µg/L	ND	0.300	0.0870
Vanadium	µg/L	1.27	0.500	0.332
Zinc	µg/L	90.0	5.00	0.736
EPA 6020 (ICP-MS)				
Arsenic	mg/kg	21.9	0.380	0.332
Cadmium	mg/kg	1.5	0.380	0.218
Chromium	mg/kg	132	0.380	0.236
Copper	mg/kg	176	0.380	0.159
Lead	mg/kg	117	0.380	0.251
Nickel	mg/kg	116	0.380	0.192
Selenium	mg/kg	0.695	0.380	0.278
Silver	mg/kg	0.677	0.380	0.229
Zinc	mg/kg	370	3.8	3.02
Solids	%	4.9	0.10	0.10
Sulfide, Dissolved	mg/kg	ND	0.10	0.084
Sulfide, Total	mg/kg	35.0	1.90	1.60
Carbon, Total Organic	%	9.5	0.19	0.046
Solids, Total	%	26.3	0.100	0.100
Ammonia (as N)	mg/kg	13	0.76	0.42

TABLE 2. (continued 4)

SAMPLE SITE - P-12S				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB138/158	µg/kg	7.7	2.7	0.55
PCB141	µg/kg	1.40	1.3	0.55
PCB149	µg/kg	4.8	1.3	0.24
PCB151	µg/kg	1.2*	1.3	0.28
PCB153	µg/kg	7.5	1.3	0.28
PCB156	µg/kg	1.3	1.3	0.26
PCB157	µg/kg	ND	1.3	0.26
PCB170	µg/kg	2.3	1.3	0.25
PCB174	µg/kg	1.8	1.3	0.29
PCB177	µg/kg	0.8*	1.3	0.33
PCB180	µg/kg	4.7	1.3	0.16
PCB183	µg/kg	1.2	1.3	0.3
PCB187	µg/kg	2.7	1.3	0.28
PCB194	µg/kg	1.6	1.3	0.26
PCB203	µg/kg	1.4	1.3	0.29
PCB206	µg/kg	1.4	1.3	0.22
PCB209	µg/kg	ND	1.3	0.29
ORGANOTINS				
(EPA 3550B (M)				
Tributyltin	µg/kg	11	8.1	1.5
Dibutyltin	µg/kg	8.3	8.1	1.8
EPA 7471A TOTAL				
Mercury	mg/kg	0.446	0.0539	0.0158
EPA 1631E				
Mercury	µg/L	0.00198*	0.00500	0.00146
EPA 1640				
Antimony	µg/L	0.489*	0.500	0.154
Arsenic	µg/L	14.7	0.300	0.122
Barium	µg/L	175	0.500	0.252
Beryllium	µg/L	ND	5.00	0.635
Cadmium	µg/L	ND	0.300	0.0567
Chromium	µg/L	1.66*	2.00	1.64
Cobalt	µg/L	10.3	0.500	0.0486
Copper	µg/L	0.606	0.300	0.0898
Lead	µg/L	1.26	0.300	0.135
Molybdenum	µg/L	0.656	0.500	0.243
Nickel	µg/L	10.4	0.500	0.0607
Selenium	µg/L	0.121*	0.500	0.121
Silver	µg/L	ND	0.500	0.0822
Thallium	µg/L	ND	0.300	0.0870
Vanadium	µg/L	3.32	0.500	0.332
Zinc	µg/L	154	5.00	0.736
EPA 6020 (ICP-MS)				
Arsenic	mg/kg	23.3	0.269	0.235
Cadmium	mg/kg	0.76	0.269	0.154
Chromium	mg/kg	85.4	0.269	0.167
Copper	mg/kg	128	0.269	0.133
Lead	mg/kg	103	0.269	0.177
Nickel	mg/kg	71.4	0.269	0.136
Selenium	mg/kg	0.466	0.269	0.196
Silver	mg/kg	0.432	0.269	0.0841
Zinc	mg/kg	277	2.69	2.14
Solids	%	4.1	0.10	0.10
Sulfide, Dissolved	mg/kg	ND	0.10	0.084
Sulfide, Total	mg/kg	3.0	0.27	0.23
Carbon, Total Organic	%	4.8	0.13	0.033
Solids, Total	%	37.2	0.100	0.100
Ammonia (as N)	mg/kg	6	0.54	0.30

SAMPLE SITE - P-12D				
CONSTITUENT	**UNITS**	**RESULT**	**RL**	**MDL**
EPA 8270C SIM PCB Congeners				
(Method 3545 extraction)				
PCB138/158	µg/kg	4.3	2.6	0.52
PCB141	µg/kg	1.00	1.3	0.28
PCB149	µg/kg	2.9	1.3	0.23
PCB151	µg/kg	0.69*	1.3	0.27
PCB153	µg/kg	4.4	1.3	0.27
PCB156	µg/kg	0.71	1.3	0.25
PCB157	µg/kg	0.39*	1.3	0.25
PCB170	µg/kg	1.7	1.3	0.24
PCB174	µg/kg	1.1*	1.3	0.27
PCB177	µg/kg	0.8*	1.3	0.33
PCB180	µg/kg	2.8	1.3	0.16
PCB183	µg/kg	0.77	1.3	0.29
PCB187	µg/kg	1.7	1.3	0.27
PCB194	µg/kg	0.81*	1.3	0.25
PCB203	µg/kg	0,82*	1.3	0.28
PCB206	µg/kg	1.6	1.3	0.27
PCB209	µg/kg	4.6	1.3	0.27
ORGANOTINS				
(EPA 3550B (M)				
Tributyltin	µg/kg	9.3	7.7	1.5
Dibutyltin	µg/kg	5.9*	7.7	1.7
EPA 7471A TOTAL				
Mercury	mg/kg	0.609	0.0514	0.0151
EPA 1631E				
Mercury	µg/L	0.00368*	0.0050	0.0015
EPA 1640				
Antimony	µg/L	0.711	0.500	0.154
Arsenic	µg/L	17.7	0.300	0.122
Barium	µg/L	173	0.500	0.252
Beryllium	µg/L	0.859*	5.00	0.635
Cadmium	µg/L	ND	0.300	0.0567
Chromium	µg/L	ND	2.00	1.64
Cobalt	µg/L	6.65	0.500	0.0486
Copper	µg/L	0.239*	0.300	0.0898
Lead	µg/L	0.377	0.300	0.135
Molybdenum	µg/L	1.27	0.500	0.243
Nickel	µg/L	10.9	0.500	0.0607
Selenium	µg/L	0.197*	0.500	0.121
Silver	µg/L	ND	0.500	0.0822
Thallium	µg/L	ND	0.300	0.0870
Vanadium	µg/L	1.1	0.500	0.332
Zinc	µg/L	44.8	5.00	0.736
EPA 6020 (ICP-MS)				
Arsenic	mg/kg	23.2	0.256	0.224
Cadmium	mg/kg	0.946	0.256	0.147
Chromium	mg/kg	108	0.256	0.159
Copper	mg/kg	143	0.256	0.107
Lead	mg/kg	500	0.256	0.169
Nickel	mg/kg	70.5	0.256	0.13
Selenium	mg/kg	0.437	0.256	0.187
Silver	mg/kg	0.475	0.256	0.0803
Zinc	mg/kg	351	2.56	2.04
Solids	%	4.2	0.10	0.10
Sulfide, Dissolved	mg/kg	ND	0.10	0.084
Sulfide, Total	mg/kg	3.8	0.26	0.22
Carbon, Total Organic	%	41	0.13	0.031
Solids, Total	%	39	0.100	0.100
Ammonia (as N)	mg/kg	3.6	0.51	0.28

TABLE 3. Concentrations of chemical constituents detected in sediment samples collected at two sites in Honolulu Harbor off Piers 12 and 15. Also shown are human health screening criteria from EPA Region Screening Levels (RSL's) for residential and industrial soils, and Hawaii State Department of Health Environmental Action Levels (EAL's) for soils. Chemical constituents highlighted in green indicate that detection values from at least one of the sample measurements exceeded the minimum screening criteria.

	SAMPLING STATION									EPA RSL		DOH EAL	Minimum Human Health Screening Criteria	Does Max Exceed Min Screening Criteria?
	P-15S		P-15D		P-12S		P-12D			Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Final Soil Action Level (Table B-2) (mg/kg)		
CONSTITUENT	UNITS	CONC.	UNITS	CONC.	UNITS	CONC.	UNITS	CONC.	MAX CONC.					
OIL & GREASE	mg/kg	42	mg/kg	36	mg/kg	ND	mg/kg	ND	42	--	--	--	--	--
EPA 8081A														
(Organocloride Pesticides)														
Chordane	mg/kg	62	mg/kg	75	mg/kg	16*	mg/kg	39	75	1.60	6.50	16.20	1.60	Yes
Dieldrin	mg/kg	3.8	mg/kg	4.5	mg/kg	ND	mg/kg	ND	4.5	0.03	0.11	1.53	0.03	Yes
EPA 8270C SIM														
(semivolatile organics)														
2-4-Dimethylphenol	mg/kg	0.0061	mg/kg	0.0065	mg/kg	0.0057	mg/kg	0.0045	0.0065	1200	12000	8.98	8.98	No
3/4-Methylphenol	mg/kg	0.036	mg/kg	0.031	mg/kg	0.022	mg/kg	0.023	0.036	6100	62000	--	6100	No
Acenaphthene	mg/kg	0.012	mg/kg	0.012	mg/kg	0.017	mg/kg	0.013	0.017	3400	33000	118	118	No
Acenaphthylene	mg/kg	ND	mg/kg	0.033	mg/kg	0.038	mg/kg	0.041	0.041	--	--	12.72	12.72	No
Anthracene	mg/kg	0.034	mg/kg	0.04	mg/kg	0.049	mg/kg	0.047	0.049	17000	170000	4.26	4.26	No
Benzo (a) Anthracene	mg/kg	0.14	mg/kg	0.17	mg/kg	0.18	mg/kg	0.17	0.18	0.15	2.10	1.48	0.15	Yes
Benzo (a) Pyrene	mg/kg	0.27	mg/kg	0.34	mg/kg	0.37	mg/kg	0.38	0.38	0.02	0.21	0.15	0.02	Yes
Benzo (b) Fluoranthene	mg/kg	0.21	mg/kg	0.28	mg/kg	0.28	mg/kg	0.3	0.3	0.15	2.10	1.48	0.15	Yes
Benzo (g,h,i) Perylene	mg/kg	0.29	mg/kg	0.34	mg/kg	0.33	mg/kg	0.33	0.34	--	--	26.56	26.56	No
Benzo (k) Fluoranthene	mg/kg	0.22	mg/kg	0.27	mg/kg	0.29	mg/kg	0.27	0.29	1.5	21	14.76	1.5	No
Bis(2-Ethylhexyl) Phthalate	mg/kg	0.37	mg/kg	0.32	mg/kg	0.37	mg/kg	0.27	0.37	35	120	34.68	34.68	No
Butyl Benzyl Phthalate	mg/kg	0.042	mg/kg	0.062	mg/kg	0.038	mg/kg	0.033	0.062	260	910	--	260	No
Chrysene	mg/kg	0.21	mg/kg	0.24	mg/kg	0.25	mg/kg	0.25	0.25	15	210	10.49	10.49	No
Di-n-Butyl Phthalate	mg/kg	0.019	mg/kg	0.02	mg/kg	0.013	mg/kg	0.013	0.02	6100	62000	--	6100	No
Dibenz (a,h) Anthracene	mg/kg	0.047	mg/kg	0.062	mg/kg	0.067	mg/kg	0.067	0.067	0.02	0.21	0.15	0.02	Yes
Diethyl Phthalate	mg/kg	0.0094	mg/kg	0.011	mg/kg	0.006	mg/kg	ND	0.011	49000	490000	0.03	0.03	No
Flouranthene	mg/kg	0.33	mg/kg	0.33	mg/kg	0.35	mg/kg	0.34	0.35	2300	22000	86.53	86.53	No
Fluorene	mg/kg	0.0078	mg/kg	ND	mg/kg	0.012	mg/kg	0.0077	0.012	2300	22000	104.06	104.06	No
Indeno (1,2,3-c-d) Pyrene	mg/kg	0.24	mg/kg	0.29	mg/kg	0.31	mg/kg	0.3	0.31	0.15	2.10	1.48	0.15	Yes
Napthalene	mg/kg	0.02	mg/kg	0.028	mg/kg	0.033	mg/kg	0.033	0.033	3.60	18	4.48	3.6	No
Phenanthrene	mg/kg	0.1	mg/kg	0.11	mg/kg	0.14	mg/kg	0.13	0.14	--	--	68.63	68.63	No
Pyrene	mg/kg	0.4	mg/kg	0.42	mg/kg	0.43	mg/kg	0.44	0.44	1700	17000	44.03	44.03	No
Benzo (e) Pyrene	mg/kg	0.19	mg/kg	0.23	mg/kg	0.24	mg/kg	0.24	0.24	--	--	--	--	--
Perylene	mg/kg	0.079	mg/kg	0.091	mg/kg	0.089	mg/kg	0.093	0.093	--	--	--	--	--
2,6-Dimethylnaphthalene	mg/kg	0.03	mg/kg	0.026	mg/kg	0.028	mg/kg	0.034	0.034	--	--	--	--	--
EPA 8270C SIM PCB Congeners														
(Method 3545 extraction)														
PCB008	mg/kg	0.0005	mg/kg	0.00043	mg/kg	0.00087	mg/kg	0.00048	0.00087	--	--	--	--	--
PCB018	mg/kg	0.0016	mg/kg	0.00099	mg/kg	0.0028	mg/kg	0.00097	0.0028	--	--	--	--	--
PCB028	mg/kg	0.0006	mg/kg	ND	mg/kg	0.00056	mg/kg	0.0021	0.0021	--	--	--	--	--
PCB031	mg/kg	0.0009	mg/kg	0.00069	mg/kg	0.0016	mg/kg	0.0013	0.0016	--	--	--	--	--
PCB033	mg/kg	0.003	mg/kg	0.0018	mg/kg	0.0036	mg/kg	0.0021	0.0036	--	--	--	--	--
PCB037	mg/kg	0.0006	mg/kg	ND	mg/kg	ND	mg/kg	0.0012	0.0012	--	--	--	--	--
PCB044	mg/kg	0.0008	mg/kg	0.00051	mg/kg	0.0018	mg/kg	0.0085	0.0085	--	--	--	--	--
PCB049	mg/kg	0.0008	mg/kg	0.0008	mg/kg	0.0023	mg/kg	0.0049	0.0049	--	--	--	--	--
PCB052	mg/kg	0.0013	mg/kg	0.0012	mg/kg	0.0033	mg/kg	0.0081	0.0081	--	--	--	--	--
PCB056	mg/kg	0.0005	mg/kg	ND	mg/kg	0.0004	mg/kg	0.0052	0.0052	--	--	--	--	--
PCB066	mg/kg	0.0008	mg/kg	0.00067	mg/kg	0.0015	mg/kg	0.009	0.009	--	--	--	--	--
PCB070	mg/kg	0.0007	mg/kg	0.00049	mg/kg	0.0015	mg/kg	0.0047	0.0047	--	--	--	--	--
PCB074	mg/kg	0.0004	mg/kg	ND	mg/kg	0.00067	mg/kg	0.0039	0.0039	--	--	--	--	--
PCB087	mg/kg	0.0005	mg/kg	0.00044	mg/kg	0.0015	mg/kg	0.0028	0.0028	--	--	--	--	--
PCB095	mg/kg	0.0012	mg/kg	0.001	mg/kg	0.0037	mg/kg	0.0052	0.0052	--	--	--	--	--
PCB097	mg/kg	0.0008	mg/kg	0.00092	mg/kg	0.00092	mg/kg	0.0033	0.0033	--	--	--	--	--
PCB099	mg/kg	0.001	mg/kg	0.0011	mg/kg	0.0025	mg/kg	0.0039	0.0039	--	--	--	--	--
PCB101	mg/kg	0.0015	mg/kg	0.0015	mg/kg	0.0048	mg/kg	0.0063	0.0063	--	--	--	--	--
PCB105	mg/kg	0.0009	mg/kg	0.00088	mg/kg	0.002	mg/kg	0.0032	0.0032	0.11	0.38	--	0.11	No
PCB110	mg/kg	0.0014	mg/kg	0.0015	mg/kg	0.0041	mg/kg	0.0063	0.0063	--	--	--	--	--
PCB114	mg/kg	0.0016	mg/kg	0.0019	mg/kg	0.0018	mg/kg	0.00086	0.0019	0.11	0.38	--	0.11	No
PCB118	mg/kg	0.0017	mg/kg	0.0018	mg/kg	0.0042	mg/kg	0.0064	0.0064	0.11	0.38	--	0.11	No
PCB119	mg/kg	ND	mg/kg	0.0018	mg/kg	0.0042	mg/kg	0.00057	0.0042	--	--	--	--	--
PCB128	mg/kg	0.001	mg/kg	0.00077	mg/kg	0.0012	mg/kg	0.00085	0.0012	--	--	--	--	--
PCB132	mg/kg	ND	mg/kg	0.00077	mg/kg	ND	mg/kg	ND	0.00077	--	--	--	--	--

TABLE 3. (continued 2)

	SAMPLING STATION									EPA RSL		DOH EAL		
	P-15S		P-15D		P-12S		P-12D			Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Final Soil Action Level (Table B-2) (mg/kg)	Minimum Human Health Screening Criteria	Does Max Exceed Min Screening Criteria?
CONSTITUENT	UNITS	CONC.	UNITS	CONC.	UNITS	CONC.	UNITS	CONC.	MAX CONC.					
EPA 8270C SIM PCB Congeners														
(Method 3545 extraction)														
PCB138/158	mg/kg	0.0029	mg/kg	0.0033	mg/kg	0.0077	mg/kg	0.0043	0.0077	--	--	--	--	--
PCB141	mg/kg	0.0006	mg/kg	0.00052	mg/kg	0.0014	mg/kg	0.001	0.0014	--	--	--	--	--
PCB149	mg/kg	0.0019	mg/kg	0.0018	mg/kg	0.0048	mg/kg	0.0029	0.0048	--	--	--	--	--
PCB151	mg/kg	0.0005	mg/kg	0.00055	mg/kg	0.0012	mg/kg	0.00069	0.0012	--	--	--	--	--
PCB153	mg/kg	0.0028	mg/kg	0.0031	mg/kg	0.0075	mg/kg	0.0044	0.0075	--	--	--	--	--
PCB156	mg/kg	ND	mg/kg	0.0006	mg/kg	0.0013	mg/kg	0.00071	0.0013	0.11	0.38	--	0.11	No
PCB157	mg/kg	ND	mg/kg	ND	mg/kg	ND	mg/kg	0.00039	0.00039	0.11	0.38	--	0.11	No
PCB170	mg/kg	0.0015	mg/kg	0.0016	mg/kg	0.0023	mg/kg	0.0017	0.0023	--	--	--	--	--
PCB174	mg/kg	0.0008	mg/kg	0.00074	mg/kg	0.0018	mg/kg	0.0011	0.0018	--	--	--	--	--
PCB177	mg/kg	ND	mg/kg	ND	mg/kg	0.0008	mg/kg	0.0008	0.0008	--	--	--	--	--
PCB180	mg/kg	0.0017	mg/kg	0.0017	mg/kg	0.0047	mg/kg	0.0028	0.0047	--	--	--	--	--
PCB183	mg/kg	ND	mg/kg	ND	mg/kg	0.0012	mg/kg	0.00077	0.0012	--	--	--	--	--
PCB187	mg/kg	0.001	mg/kg	0.0012	mg/kg	0.0027	mg/kg	0.0017	0.0027	--	--	--	--	--
PCB194	mg/kg	0.0007	mg/kg	0.00069	mg/kg	0.0016	mg/kg	0.00081	0.0016	--	--	--	--	--
PCB203	mg/kg	0.0005	mg/kg	ND	mg/kg	0.0014	mg/kg	0.00082	0.0014	--	--	--	--	--
PCB206	mg/kg	0.0005	mg/kg	ND	mg/kg	0.0014	mg/kg	0.0016	0.0016	--	--	--	--	--
PCB209	mg/kg	0.0005	mg/kg	0.00083	mg/kg	ND	mg/kg	0.0046	0.0046	--	--	--	--	--
Total PCBs	--	--	--	--	--	--	--	--	--	0.22	0.74	1.12	0.22	--
ORGANOTINS (EPA 3550B (M)														
Tributyltin	mg/kg	10	mg/kg	12	mg/kg	11	mg/kg	9.3	12	--	--	--	--	--
Dibutyltin	mg/kg	ND	mg/kg	ND	mg/kg	8.3	mg/kg	5.9	8.3	--	--	--	--	--
EPA 7471A TOTAL														
Mercury	mg/kg	0.483	mg/kg	0.629	mg/kg	0.446	mg/kg	0.609	0.629					
EPA 1631E														
Mercury	µg/L	ND	µg/L	0.00268	µg/L	0.00198	µg/L	0.00368	0.00368		0.043			
EPA 1640														
Antimony	µg/L	0.412	µg/L	0.329	µg/L	0.489	µg/L	0.711	0.711	0.031	0.0041		0.0041	YES
Arsenic	µg/L	14	µg/L	16.1	µg/L	14.7	µg/L	17.7	17.7	0.022	0.0026		0.0026	YES
Barium	µg/L	123	µg/L	181	µg/L	175	µg/L	173	181	0.00015	0.000019		0.000019	YES
Beryllium	µg/L	ND	µg/L	ND	µg/L	ND	µg/L	0.859	0.859	0.0016	0.0002		0.0002	YES
Cadmium	µg/L	ND	µg/L	ND	µg/L	ND	µg/L	ND	0	0.07	0.008		0.008	YES
Chromium	µg/L	ND	µg/L	1.93	µg/L	1.66	µg/L	ND	1.93	0.002	0.00031		0.00031	
Cobalt	µg/L	11.3	µg/L	6.23	µg/L	10.3	µg/L	6.65	11.3	0.023	0.003		0.003	YES
Copper	µg/L	0.16	µg/L	0.337	µg/L	0.606	µg/L	0.239	0.606	0.0031	0.00041		0.00041	YES
Lead	µg/L	0.783	µg/L	0.599	µg/L	1.26	µg/L	0.377	1.26	0.004	0.008		0.008	YES
Molybdenum	µg/L	0.78	µg/L	1.76	µg/L	0.656	µg/L	1.27	1.76	0.0039	0.00053		0.00053	YES
Nickel	µg/L	12.7	µg/L	10.1	µg/L	10.4	µg/L	10.9	12.7	0.00015	0.0002		0.0002	YES
Selenium	µg/L	0.194	µg/L	0.0133	µg/L	0.121	µg/L	0.197	0.197	0.0039	0.00051		0.00051	YES
Silver	µg/L	0.0982	µg/L	ND	µg/L	ND	µg/L	ND	0.0982	0.0039	0.00051		0.00051	YES
Thallium	µg/L	0.0999	µg/L	ND	µg/L	ND	µg/L	ND	0.0999	0.078	0.01		0.01	YES
Vanadium	µg/L	2.19	µg/L	1.27	µg/L	3.32	µg/L	1.1	3.32	0.0039	0.0052		0.0052	YES
Zinc	µg/L	81	µg/L	90	µg/L	154	µg/L	44.8	154	0.00023	0.00005		0.00005	YES
EPA 6020 (ICP-MS)														
Arsenic	mg/kg	18.4	mg/kg	21.9	mg/kg	23.3	mg/kg	23.2	23.3	0.022	0.0026		0.0026	YES
Cadmium	mg/kg	1.13	mg/kg	1.5	mg/kg	0.76	mg/kg	0.946	1.5	0.07	0.008		0.008	YES
Chromium	mg/kg	114	mg/kg	132	mg/kg	85.4	mg/kg	108	132	0.002	0.00031		0.00031	YES
Copper	mg/kg	150	mg/kg	176	mg/kg	128	mg/kg	143	176	0.0031	0.00041		0.00041	YES
Lead	mg/kg	95.5	mg/kg	117	mg/kg	103	mg/kg	500	500	0.004	0.008		0.008	YES
Nickel	mg/kg	106	mg/kg	116	mg/kg	71.4	mg/kg	70.5	116	0.004	0.008		0.008	YES
Selenium	mg/kg	0.824	mg/kg	0.695	mg/kg	0.466	mg/kg	0.437	0.824	0.0039	0.00051		0.00051	YES
Silver	mg/kg	0.498	mg/kg	0.677	mg/kg	0.432	mg/kg	0.475	0.677	0.0039	0.00051		0.00051	YES
Zinc	mg/kg	306	mg/kg	370	mg/kg	277	mg/kg	351	370	0.00023	0.00005		0.00005	YES
Solids	%	3.6	%	4.9	%	4.1	%	4.2	4.9					
Sulfide, Dissolved	mg/kg	ND	mg/kg	ND	mg/kg	ND	mg/kg	ND	ND					
Sulfide, Total	mg/kg	9	mg/kg	35	mg/kg	3	mg/kg	3.8	35					
Carbon, Total Organic	%	7.3	%	9.5	%	4.8	%	41	41					
Solids, Total	%	28.8	%	26.3	%	37.2	%	39	39					
Ammonia (as N)	mg/kg	12	mg/kg	13	mg/kg	6	mg/kg	3.6	13					

APPENDIX A.

Results of Sediment Analysis

Piers 12 and 15
Honolulu Harbor

Calsciences Environmental Laboratories, Inc.
Work Order No. 12-10-0512

Calscience Environmental Laboratories, Inc.

CALSCIENCE

WORK ORDER NUMBER: 12-10-0512

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Analytical Report For

Client: Marine Research Consultants, Inc.

Client Project Name: DOT-Harbor Piers 12-15

Attention: Steve Dollar
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Approved for release on 11/5/2012 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Calscience Environmental Laboratories, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Calscience Environmental Laboratories, Inc.

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Work Order Number: 12-10-0512

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Calscience Environmental Laboratories, Inc.

CASE NARRATIVE

Calscience Work Order No.: 12-10-0512
Project ID: DOT- Harbor Piers 12-15

Provided below is a narrative of our analytical effort, including any unique features or anomalies encountered as part of the analysis of the sediment samples.

Sample Condition on Receipt

Four sediment samples (housed in 16-oz glass containers) were received for this project on October 6, 2012. The samples were transferred to the laboratory in an ice-chest with wet ice, following strict chain-of-custody (COC) procedures. The temperature of the samples upon receipt at the laboratory was 2.0°C. All samples were given laboratory identification numbers, logged into the Laboratory Information Management System (LIMS) and then stored under refrigeration pending sediment chemistry and TCLP testing.

Tests Performed

TCLP analyses:

Mercury by EPA 1631E (M)
Metals by EPA 1640
Semi-Volatiles by EPA 8270C SIM
Chlorinated Pesticides by EPA 8081A
PCB Congeners by EPA 8270C SIM

Sediment analyses:

Ammonia by SM 4500-NH3 B/C (M)
Total Solids by SM 2540B
Volatile Solids by EPA 160.4 (M)
Total and Dissolved Sulfide by EPA 376.2 (M)
Oil and Grease by EPA 413.2 (M)
TRPH by EPA 418.1 (M)
TOC by EPA 9060A
Pesticides by EPA 8081A
PCB Congeners by EPA 8270C SIM
PAHs, Phenols and Phthalates by EPA 8270C SIM
Metals by EPA 6020/7471A
Particle Size by ASTM D4464M
Organotins by Krone et al.

Dioxins/Furans by EPA 8290 were subcontracted to Maxxam Analytical in Ontario, Canada, and the results follow the Calscience report.

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Data Summary

The sample results and reporting limits were dry weight corrected.

All samples were homogenized prior to preparation and analysis.

Holding times

All holding times were met.

Calibration

Frequency and control criteria for initial and continuing calibration verifications were met.

Reporting Limits

All Method Detection Limits were met.

Blanks

Concentrations of target analytes in the method blank were found to be below reporting limits for all testing with the following exceptions.

Trace levels (below the RL, but above the MDL) of Bis (2-ethylhexyl) phthalate was found in the EPA 8270C SIM Method Blank. The sample results have been flagged with B-qualifiers.

Several metals were detected in the EPA 1640 Method Blank due to contamination from the TCLP filter. If detected in the samples, the results have been flagged with the appropriate qualifiers and are released with no further action.

Arsenic was found in the EPA 6020 Method Blank and the results have been released with the appropriate qualifiers.

Laboratory Control Samples

A Laboratory Control Sample (LCS) analysis was performed at the required frequencies, and unless otherwise noted, all parameters were within the established control limits.

Matrix Spikes

Matrix spike analyses were performed for each applicable analysis on project samples P-15-S or P-12-D. All parameters for the project sample matrix spikes were within the established control limits with the following exceptions.

For EPA 6020 and EPA 1640 TCLP matrix spiking, the MS recoveries, MSD recoveries and/or RPDs for one or more metals were outside the control limits due to matrix

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interference or the sample concentrations exceeding the matrix spike concentrations by four times or more. However, since the LCS/LCSD recoveries and RPDs were in control, the results are released with no further action.

The MS and/or MSD recoveries for four Chlorinated Pesticides were outside the control limits by EPA 8081A, but the results are released with no further action since the LCS/LCSD recoveries were in control.

The RPD for 2-Nitrophenol (by EPA 8270C SIM) was outside the established control limits due to matrix interference. The results have been flagged with the appropriate qualifiers and are released with no further action since the associated LCS/LCSD RPD was in control.

Surrogates

Surrogate recoveries for all applicable tests and samples were within the established control limits.

Acronyms

LCS/LCSD- Laboratory Control Sample/Laboratory Control Sample Duplicate
PDS/PDSD- Post Digestion Spike/Post Digestion Spike Duplicate
MS/MSD- Matrix Spike/Matrix Spike Duplicate
RPD- Relative Percent Difference

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Calscience Environmental Laboratories, Inc.

Analytical Report

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	N/A
		Method:	EPA 413.2M

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:20**	**121017L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Oil and Grease	42	35	32	1		mg/kg

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:20**	**121017L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Oil and Grease	36	38	35	1	J	mg/kg

P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:20**	**121017L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Oil and Grease	ND	27	25	1		mg/kg

P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:20**	**121017L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Oil and Grease	ND	26	24	1		mg/kg

Method Blank	**099-07-019-127**	**N/A**	**Solid**	**IR 2**	**10/17/12**	**10/17/12 19:20**	**121017L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
Oil and Grease	ND	10	9.2	1		mg/kg

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Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	Extraction
		Method:	EPA 418.1M

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:30**	**121017L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
TRPH	ND	35	29	1		mg/kg

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:30**	**121017L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
TRPH	ND	38	32	1		mg/kg

P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:30**	**121017L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
TRPH	ND	27	22	1		mg/kg

P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**IR 2**	**10/17/12**	**10/17/12 19:30**	**121017L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
TRPH	ND	26	21	1		mg/kg

Method Blank	**099-07-015-1,883**	**N/A**	**Solid**	**IR 2**	**10/17/12**	**10/17/12 19:30**	**121017L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TRPH	ND	10	8.3	1		mg/kg

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3545
Method:	EPA 8081A
Units:	ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**GC 51**	**10/09/12**	**10/11/12 16:31**	**121009L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	3.5	1.1	1		Endosulfan I	ND	3.5	0.91	1	
Alpha-BHC	ND	3.5	1.1	1		Endosulfan II	ND	3.5	0.97	1	
Beta-BHC	ND	3.5	0.92	1		Endosulfan Sulfate	ND	3.5	1.2	1	
Delta-BHC	ND	3.5	0.89	1		Endrin	ND	3.5	1.2	1	
Gamma-BHC	ND	3.5	1.2	1		Endrin Aldehyde	ND	3.5	0.85	1	
Chlordane	62	35	11	1		Endrin Ketone	ND	3.5	1.2	1	
Dieldrin	3.8	3.5	1.1	1		Heptachlor	ND	3.5	1.1	1	
4,4'-DDD	ND	3.5	1.1	1		Heptachlor Epoxide	ND	3.5	1.2	1	
4,4'-DDE	ND	3.5	1.0	1		Methoxychlor	ND	3.5	1.1	1	
4,4'-DDT	ND	3.5	1.2	1		Toxaphene	ND	69	22	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,5,6-Tetrachloro-m-Xylene	98	50-130		Decachlorobiphenyl	107	50-130	

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**GC 51**	**10/09/12**	**10/11/12 16:45**	**121009L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	3.8	1.2	1		Endosulfan I	ND	3.8	1.0	1	
Alpha-BHC	ND	3.8	1.2	1		Endosulfan II	ND	3.8	1.1	1	
Beta-BHC	ND	3.8	1.0	1		Endosulfan Sulfate	ND	3.8	1.3	1	
Delta-BHC	ND	3.8	0.97	1		Endrin	ND	3.8	1.4	1	
Gamma-BHC	ND	3.8	1.3	1		Endrin Aldehyde	ND	3.8	0.93	1	
Chlordane	75	38	12	1		Endrin Ketone	ND	3.8	1.3	1	
Dieldrin	4.5	3.8	1.3	1		Heptachlor	ND	3.8	1.2	1	
4,4'-DDD	ND	3.8	1.2	1		Heptachlor Epoxide	ND	3.8	1.4	1	
4,4'-DDE	ND	3.8	1.1	1		Methoxychlor	ND	3.8	1.2	1	
4,4'-DDT	ND	3.8	1.3	1		Toxaphene	ND	76	24	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,5,6-Tetrachloro-m-Xylene	93	50-130		Decachlorobiphenyl	103	50-130	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3545
Method:	EPA 8081A
Units:	ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**GC 51**	**10/09/12**	**10/11/12 17:00**	**121009L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	2.7	0.85	1		Endosulfan I	ND	2.7	0.70	1	
Alpha-BHC	ND	2.7	0.87	1		Endosulfan II	ND	2.7	0.75	1	
Beta-BHC	ND	2.7	0.71	1		Endosulfan Sulfate	ND	2.7	0.91	1	
Delta-BHC	ND	2.7	0.69	1		Endrin	ND	2.7	0.96	1	
Gamma-BHC	ND	2.7	0.93	1		Endrin Aldehyde	ND	2.7	0.66	1	
Chlordane	16	27	8.8	1	J	Endrin Ketone	ND	2.7	0.93	1	
Dieldrin	ND	2.7	0.89	1		Heptachlor	ND	2.7	0.86	1	
4,4'-DDD	ND	2.7	0.85	1		Heptachlor Epoxide	ND	2.7	0.96	1	
4,4'-DDE	ND	2.7	0.80	1		Methoxychlor	ND	2.7	0.87	1	
4,4'-DDT	ND	2.7	0.90	1		Toxaphene	ND	54	17	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,5,6-Tetrachloro-m-Xylene	72	50-130		Decachlorobiphenyl	83	50-130	

P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**GC 51**	**10/09/12**	**10/11/12 17:14**	**121009L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	2.6	0.81	1		Endosulfan I	ND	2.6	0.67	1	
Alpha-BHC	ND	2.6	0.83	1		Endosulfan II	ND	2.6	0.72	1	
Beta-BHC	ND	2.6	0.68	1		Endosulfan Sulfate	ND	2.6	0.87	1	
Delta-BHC	ND	2.6	0.66	1		Endrin	ND	2.6	0.92	1	
Gamma-BHC	ND	2.6	0.89	1		Endrin Aldehyde	ND	2.6	0.63	1	
Chlordane	39	26	8.4	1		Endrin Ketone	ND	2.6	0.89	1	
Dieldrin	ND	2.6	0.85	1		Heptachlor	ND	2.6	0.82	1	
4,4'-DDD	ND	2.6	0.81	1		Heptachlor Epoxide	ND	2.6	0.91	1	
4,4'-DDE	ND	2.6	0.77	1		Methoxychlor	ND	2.6	0.83	1	
4,4'-DDT	ND	2.6	0.86	1		Toxaphene	ND	51	16	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,5,6-Tetrachloro-m-Xylene	77	50-130		Decachlorobiphenyl	90	50-130	

Return to Contents

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3545
		Method:	EPA 8081A
		Units:	ug/kg
Project: DOT-Harbor Piers 12-15			Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-858-161**	**N/A**	**Solid**	**GC 51**	**10/09/12**	**10/11/12 12:09**	**121009L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	1.0	0.31	1		Endosulfan I	ND	1.0	0.26	1	
Alpha-BHC	ND	1.0	0.32	1		Endosulfan II	ND	1.0	0.28	1	
Beta-BHC	ND	1.0	0.26	1		Endosulfan Sulfate	ND	1.0	0.34	1	
Delta-BHC	ND	1.0	0.26	1		Endrin	ND	1.0	0.36	1	
Gamma-BHC	ND	1.0	0.35	1		Endrin Aldehyde	ND	1.0	0.24	1	
Chlordane	ND	10	3.3	1		Endrin Ketone	ND	1.0	0.35	1	
Dieldrin	ND	1.0	0.33	1		Heptachlor	ND	1.0	0.32	1	
4,4'-DDD	ND	1.0	0.32	1		Heptachlor Epoxide	ND	1.0	0.36	1	
4,4'-DDE	ND	1.0	0.30	1		Methoxychlor	ND	1.0	0.32	1	
4,4'-DDT	ND	1.0	0.33	1		Toxaphene	ND	20	6.3	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,5,6-Tetrachloro-m-Xylene	96	50-130		Decachlorobiphenyl	95	50-130	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 1311
Method:	EPA 8081A
Units:	ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**GC 44**	**10/08/12**	**10/15/12 15:08**	**121010L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	0.10	0.016	10		4,4'-DDT	ND	0.10	0.015	10	
Alpha-BHC	ND	0.10	0.017	10		Delta-BHC	ND	0.10	0.016	10	
Beta-BHC	ND	0.10	0.039	10		Dieldrin	ND	0.10	0.016	10	
Chlordane	ND	0.25	0.052	10		Endrin	ND	0.10	0.016	10	
2,4'-DDD	ND	0.10	0.016	10		Heptachlor	ND	0.10	0.018	10	
4,4'-DDD	ND	0.10	0.015	10		Heptachlor Epoxide	ND	0.10	0.017	10	
4,4'-DDE	ND	0.10	0.022	10		Methoxychlor	ND	0.10	0.024	10	
2,4'-DDE	ND	0.10	0.017	10		Toxaphene	ND	1.2	0.23	10	
2,4'-DDT	ND	0.10	0.016	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	104	50-150		2,4,5,6-Tetrachloro-m-Xylene	80	50-150	

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**GC 44**	**10/08/12**	**10/15/12 15:22**	**121010L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	0.10	0.016	10		4,4'-DDT	ND	0.10	0.015	10	
Alpha-BHC	ND	0.10	0.017	10		Delta-BHC	ND	0.10	0.016	10	
Beta-BHC	ND	0.10	0.039	10		Dieldrin	ND	0.10	0.016	10	
Chlordane	ND	0.25	0.052	10		Endrin	ND	0.10	0.016	10	
2,4'-DDD	ND	0.10	0.016	10		Heptachlor	ND	0.10	0.018	10	
4,4'-DDD	ND	0.10	0.015	10		Heptachlor Epoxide	ND	0.10	0.017	10	
4,4'-DDE	ND	0.10	0.022	10		Methoxychlor	ND	0.10	0.024	10	
2,4'-DDE	ND	0.10	0.017	10		Toxaphene	ND	1.2	0.23	10	
2,4'-DDT	ND	0.10	0.016	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	106	50-150		2,4,5,6-Tetrachloro-m-Xylene	72	50-150	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 1311
Method:	EPA 8081A
Units:	ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**GC 44**	**10/08/12**	**10/15/12 15:36**	**121010L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	0.10	0.016	10		4,4'-DDT	ND	0.10	0.015	10	
Alpha-BHC	ND	0.10	0.017	10		Delta-BHC	ND	0.10	0.016	10	
Beta-BHC	ND	0.10	0.039	10		Dieldrin	ND	0.10	0.016	10	
Chlordane	ND	0.25	0.052	10		Endrin	ND	0.10	0.016	10	
2,4'-DDD	ND	0.10	0.016	10		Heptachlor	ND	0.10	0.018	10	
4,4'-DDD	ND	0.10	0.015	10		Heptachlor Epoxide	ND	0.10	0.017	10	
4,4'-DDE	ND	0.10	0.022	10		Methoxychlor	ND	0.10	0.024	10	
2,4'-DDE	ND	0.10	0.017	10		Toxaphene	ND	1.2	0.23	10	
2,4'-DDT	ND	0.10	0.016	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	104	50-150		2,4,5,6-Tetrachloro-m-Xylene	76	50-150	

P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**GC 44**	**10/08/12**	**10/15/12 15:51**	**121010L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	0.10	0.016	10		4,4'-DDT	ND	0.10	0.015	10	
Alpha-BHC	ND	0.10	0.017	10		Delta-BHC	ND	0.10	0.016	10	
Beta-BHC	ND	0.10	0.039	10		Dieldrin	ND	0.10	0.016	10	
Chlordane	ND	0.25	0.052	10		Endrin	ND	0.10	0.016	10	
2,4'-DDD	ND	0.10	0.016	10		Heptachlor	ND	0.10	0.018	10	
4,4'-DDD	ND	0.10	0.015	10		Heptachlor Epoxide	ND	0.10	0.017	10	
4,4'-DDE	ND	0.10	0.022	10		Methoxychlor	ND	0.10	0.024	10	
2,4'-DDE	ND	0.10	0.017	10		Toxaphene	ND	1.2	0.23	10	
2,4'-DDT	ND	0.10	0.016	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	107	50-150		2,4,5,6-Tetrachloro-m-Xylene	88	50-150	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 1311
		Method:	EPA 8081A
		Units:	ug/L
Project: DOT-Harbor Piers 12-15			Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-435-67**	**N/A**	**Aqueous**	**GC 44**	**10/10/12**	**10/15/12 13:56**	**121010L04**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Aldrin	ND	0.10	0.016	10		4,4'-DDT	0.019	0.10	0.015	10	J
Alpha-BHC	ND	0.10	0.017	10		Delta-BHC	ND	0.10	0.016	10	
Beta-BHC	ND	0.10	0.039	10		Dieldrin	ND	0.10	0.016	10	
Chlordane	ND	0.25	0.052	10		Endrin	ND	0.10	0.016	10	
2,4'-DDD	ND	0.10	0.016	10		Heptachlor	ND	0.10	0.018	10	
4,4'-DDD	ND	0.10	0.015	10		Heptachlor Epoxide	ND	0.10	0.017	10	
4,4'-DDE	ND	0.10	0.022	10		Methoxychlor	ND	0.10	0.024	10	
2,4'-DDE	ND	0.10	0.017	10		Toxaphene	ND	1.2	0.23	10	
2,4'-DDT	ND	0.10	0.016	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	97	50-150		2,4,5,6-Tetrachloro-m-Xylene	74	50-150	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 1311
Method:	EPA 8270C SIM
Units:	ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**GC/MS MM**	**10/08/12**	**10/16/12 16:23**	**121009L10**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	10	0.34	10		Pentachlorophenol	ND	100	41	10	
2,4-Dichlorophenol	ND	10	0.34	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	75	24-152		2-Fluorobiphenyl	45	33-144	
2-Fluorophenol	69	31-142		Nitrobenzene-d5	74	28-139	
p-Terphenyl-d14	79	23-160		Phenol-d6	58	30-136	

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**GC/MS MM**	**10/08/12**	**10/16/12 16:49**	**121009L10**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	10	0.34	10		Pentachlorophenol	ND	100	41	10	
2,4-Dichlorophenol	ND	10	0.34	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	86	24-152		2-Fluorobiphenyl	50	33-144	
2-Fluorophenol	76	31-142		Nitrobenzene-d5	73	28-139	
p-Terphenyl-d14	85	23-160		Phenol-d6	63	30-136	

P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**GC/MS MM**	**10/08/12**	**10/16/12 14:40**	**121009L10**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	10	0.34	10		Pentachlorophenol	ND	100	41	10	
2,4-Dichlorophenol	ND	10	0.34	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	88	24-152		2-Fluorobiphenyl	50	33-144	
2-Fluorophenol	79	31-142		Nitrobenzene-d5	76	28-139	
p-Terphenyl-d14	83	23-160		Phenol-d6	66	30-136	

Return to Contents

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 1311
		Method:	EPA 8270C SIM
		Units:	ug/L
Project: DOT-Harbor Piers 12-15			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**GC/MS MM**	**10/08/12**	**10/16/12 15:06**	**121009L10**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	10	0.34	10		Pentachlorophenol	ND	100	41	10	
2,4-Dichlorophenol	ND	10	0.34	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	90	24-152		2-Fluorobiphenyl	51	33-144	
2-Fluorophenol	77	31-142		Nitrobenzene-d5	74	28-139	
p-Terphenyl-d14	82	23-160		Phenol-d6	64	30-136	

Method Blank	**099-12-430-172**	**N/A**	**Aqueous**	**GC/MS MM**	**10/09/12**	**10/16/12 15:57**	**121009L10**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	10	0.34	10		Pentachlorophenol	ND	100	41	10	
2,4-Dichlorophenol	ND	10	0.34	10							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	98	24-152		2-Fluorobiphenyl	58	33-144	
2-Fluorophenol	85	31-142		Nitrobenzene-d5	83	28-139	
p-Terphenyl-d14	85	23-160		Phenol-d6	69	30-136	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3545
Method:	EPA 8270C SIM
Units:	ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**GC/MS MM**	**10/10/12**	**10/13/12 19:58**	**121010L16**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	35	4.5	1		Chrysene	210	35	7.1	1	
2,4-Dichlorophenol	ND	35	4.7	1		Di-n-Butyl Phthalate	19	35	7.3	1	J
2,4-Dimethylphenol	6.1	35	5.7	1	J	Di-n-Octyl Phthalate	ND	35	10	1	
2,4-Dinitrophenol	ND	1700	190	1		Dibenz (a,h) Anthracene	47	35	6.8	1	
2-Chlorophenol	ND	35	5.7	1		Diethyl Phthalate	9.4	35	6.9	1	B,J
2-Methylphenol	ND	35	5.6	1		Dimethyl Phthalate	ND	35	6.1	1	
2-Nitrophenol	ND	35	5.2	1		Fluoranthene	330	35	6.6	1	
3/4-Methylphenol	36	35	5.6	1		Fluorene	7.8	35	6.1	1	J
4,6-Dinitro-2-Methylphenol	ND	1700	240	1		Indeno (1,2,3-c,d) Pyrene	240	35	6.2	1	
4-Chloro-3-Methylphenol	ND	35	4.9	1		Naphthalene	20	35	6.4	1	J
4-Nitrophenol	ND	1700	220	1		Pentachlorophenol	ND	1700	190	1	
Acenaphthene	12	35	6.4	1	J	Phenanthrene	100	35	6.6	1	
Acenaphthylene	30	35	5.7	1	J	Phenol	ND	35	6.2	1	
Anthracene	34	35	6.2	1	J	Pyrene	400	35	8.7	1	
Benzo (a) Anthracene	140	35	7.5	1		1,6,7-Trimethylnaphthalene	ND	35	12	1	
Benzo (a) Pyrene	270	35	6.1	1		2,6-Dichlorophenol	ND	35	8.7	1	
Benzo (b) Fluoranthene	210	35	6.2	1		Dibenzothiophene	ND	35	11	1	
Benzo (g,h,i) Perylene	290	35	6.4	1		Benzo (e) Pyrene	190	35	4.9	1	
Benzo (k) Fluoranthene	220	35	8.7	1		Perylene	79	35	4.9	1	
Bis(2-Ethylhexyl) Phthalate	370	35	11	1		2,6-Dimethylnaphthalene	30	35	4.5	1	J
Butyl Benzyl Phthalate	42	35	11	1							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	68	32-143		2-Fluorobiphenyl	53	14-146	
2-Fluorophenol	54	15-138		Nitrobenzene-d5	44	18-162	
p-Terphenyl-d14	74	34-148		Phenol-d6	66	17-141	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3545
Method:	EPA 8270C SIM
Units:	ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**GC/MS MM**	**10/10/12**	**10/13/12 20:42**	**121010L16**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	38	4.9	1		Chrysene	240	38	7.8	1	
2,4-Dichlorophenol	ND	38	5.1	1		Di-n-Butyl Phthalate	20	38	8.0	1	J
2,4-Dimethylphenol	6.5	38	6.3	1	J	Di-n-Octyl Phthalate	ND	38	11	1	
2,4-Dinitrophenol	ND	1900	200	1		Dibenz (a,h) Anthracene	62	38	7.4	1	
2-Chlorophenol	ND	38	6.3	1		Diethyl Phthalate	11	38	7.6	1	B,J
2-Methylphenol	ND	38	6.1	1		Dimethyl Phthalate	ND	38	6.7	1	
2-Nitrophenol	ND	38	5.7	1		Fluoranthene	330	38	7.2	1	
3/4-Methylphenol	31	38	6.1	1	J	Fluorene	ND	38	6.7	1	
4,6-Dinitro-2-Methylphenol	ND	1900	260	1		Indeno (1,2,3-c,d) Pyrene	290	38	6.8	1	
4-Chloro-3-Methylphenol	ND	38	5.3	1		Naphthalene	28	38	7.0	1	J
4-Nitrophenol	ND	1900	240	1		Pentachlorophenol	ND	1900	210	1	
Acenaphthene	12	38	7.0	1	J	Phenanthrene	110	38	7.2	1	
Acenaphthylene	33	38	6.3	1	J	Phenol	ND	38	6.8	1	
Anthracene	40	38	6.8	1		Pyrene	420	38	9.5	1	
Benzo (a) Anthracene	170	38	8.2	1		1,6,7-Trimethylnaphthalene	ND	38	13	1	
Benzo (a) Pyrene	340	38	6.7	1		2,6-Dichlorophenol	ND	38	9.5	1	
Benzo (b) Fluoranthene	280	38	6.8	1		Dibenzothiophene	ND	38	12	1	
Benzo (g,h,i) Perylene	340	38	7.0	1		Benzo (e) Pyrene	230	38	5.3	1	
Benzo (k) Fluoranthene	270	38	9.5	1		Perylene	91	38	5.3	1	
Bis(2-Ethylhexyl) Phthalate	320	38	12	1		2,6-Dimethylnaphthalene	26	38	4.9	1	J
Butyl Benzyl Phthalate	62	38	12	1							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	61	32-143		2-Fluorobiphenyl	48	14-146	
2-Fluorophenol	54	15-138		Nitrobenzene-d5	37	18-162	
p-Terphenyl-d14	69	34-148		Phenol-d6	70	17-141	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 · TEL:(714) 895-5494 · FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3545
		Method:	EPA 8270C SIM
		Units:	ug/kg
Project: DOT-Harbor Piers 12-15			Page 3 of 5

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**GC/MS MM**	**10/10/12**	**10/13/12 21:26**	**121010L16**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	27	3.5	1		Chrysene	250	27	5.5	1	
2,4-Dichlorophenol	ND	27	3.6	1		Di-n-Butyl Phthalate	13	27	5.6	1	J
2,4-Dimethylphenol	5.7	27	4.4	1	J	Di-n-Octyl Phthalate	ND	27	7.8	1	
2,4-Dinitrophenol	ND	1300	140	1		Dibenz (a,h) Anthracene	67	27	5.2	1	
2-Chlorophenol	ND	27	4.4	1		Diethyl Phthalate	6.0	27	5.4	1	B,J
2-Methylphenol	ND	27	4.3	1		Dimethyl Phthalate	ND	27	4.7	1	
2-Nitrophenol	ND	27	4.0	1		Fluoranthene	350	27	5.1	1	
3/4-Methylphenol	22	27	4.3	1	J	Fluorene	12	27	4.7	1	J
4,6-Dinitro-2-Methylphenol	ND	1300	190	1		Indeno (1,2,3-c,d) Pyrene	310	27	4.8	1	
4-Chloro-3-Methylphenol	ND	27	3.8	1		Naphthalene	33	27	5.0	1	
4-Nitrophenol	ND	1300	170	1		Pentachlorophenol	ND	1300	150	1	
Acenaphthene	17	27	5.0	1	J	Phenanthrene	140	27	5.1	1	
Acenaphthylene	38	27	4.4	1		Phenol	ND	27	4.8	1	
Anthracene	49	27	4.8	1		Pyrene	430	27	6.7	1	
Benzo (a) Anthracene	180	27	5.8	1		1,6,7-Trimethylnaphthalene	ND	27	9.1	1	
Benzo (a) Pyrene	370	27	4.7	1		2,6-Dichlorophenol	ND	27	6.7	1	
Benzo (b) Fluoranthene	280	27	4.8	1		Dibenzothiophene	13	27	8.6	1	J
Benzo (g,h,i) Perylene	330	27	5.0	1		Benzo (e) Pyrene	240	27	3.8	1	
Benzo (k) Fluoranthene	290	27	6.7	1		Perylene	89	27	3.8	1	
Bis(2-Ethylhexyl) Phthalate	370	27	8.3	1		2,6-Dimethylnaphthalene	28	27	3.5	1	
Butyl Benzyl Phthalate	38	27	8.5	1							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	65	32-143		2-Fluorobiphenyl	51	14-146	
2-Fluorophenol	53	15-138		Nitrobenzene-d5	40	18-162	
p-Terphenyl-d14	71	34-148		Phenol-d6	73	17-141	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3545
Method:	EPA 8270C SIM
Units:	ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**GC/MS MM**	**10/10/12**	**10/13/12 22:10**	**121010L16**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	26	3.3	1		Chrysene	250	26	5.3	1	
2,4-Dichlorophenol	ND	26	3.5	1		Di-n-Butyl Phthalate	13	26	5.4	1	J
2,4-Dimethylphenol	4.5	26	4.2	1	J	Di-n-Octyl Phthalate	ND	26	7.4	1	
2,4-Dinitrophenol	ND	1300	140	1		Dibenz (a,h) Anthracene	67	26	5.0	1	
2-Chlorophenol	ND	26	4.2	1		Diethyl Phthalate	ND	26	5.1	1	
2-Methylphenol	ND	26	4.1	1		Dimethyl Phthalate	ND	26	4.5	1	
2-Nitrophenol	ND	26	3.8	1		Fluoranthene	340	26	4.9	1	
3/4-Methylphenol	23	26	4.1	1	J	Fluorene	7.7	26	4.5	1	J
4,6-Dinitro-2-Methylphenol	ND	1300	180	1		Indeno (1,2,3-c,d) Pyrene	300	26	4.6	1	
4-Chloro-3-Methylphenol	ND	26	3.6	1		Naphthalene	33	26	4.7	1	
4-Nitrophenol	ND	1300	160	1		Pentachlorophenol	ND	1300	140	1	
Acenaphthene	13	26	4.7	1	J	Phenanthrene	130	26	4.9	1	
Acenaphthylene	41	26	4.2	1		Phenol	110	26	4.6	1	
Anthracene	47	26	4.6	1		Pyrene	440	26	6.4	1	
Benzo (a) Anthracene	170	26	5.5	1		1,6,7-Trimethylnaphthalene	ND	26	8.7	1	
Benzo (a) Pyrene	380	26	4.5	1		2,6-Dichlorophenol	ND	26	6.4	1	
Benzo (b) Fluoranthene	300	26	4.6	1		Dibenzothiophene	13	26	8.2	1	J
Benzo (g,h,i) Perylene	330	26	4.7	1		Benzo (e) Pyrene	240	26	3.6	1	
Benzo (k) Fluoranthene	270	26	6.4	1		Perylene	93	26	3.6	1	
Bis(2-Ethylhexyl) Phthalate	270	26	7.9	1		2,6-Dimethylnaphthalene	34	26	3.3	1	
Butyl Benzyl Phthalate	33	26	8.1	1							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	112	32-143		2-Fluorobiphenyl	53	14-146	
2-Fluorophenol	59	15-138		Nitrobenzene-d5	44	18-162	
p-Terphenyl-d14	74	34-148		Phenol-d6	81	17-141	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3545
		Method:	EPA 8270C SIM
		Units:	ug/kg
Project: DOT-Harbor Piers 12-15			Page 5 of 5

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-256-13**	**N/A**	**Solid**	**GC/MS MM**	**10/10/12**	**10/15/12 12:56**	**121010L16**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
2,4,6-Trichlorophenol	ND	10	1.3	1		Chrysene	ND	10	2.0	1	
2,4-Dichlorophenol	ND	10	1.4	1		Di-n-Butyl Phthalate	ND	10	2.1	1	
2,4-Dimethylphenol	ND	10	1.6	1		Di-n-Octyl Phthalate	ND	10	2.9	1	
2,4-Dinitrophenol	ND	500	54	1		Dibenz (a,h) Anthracene	ND	10	2.0	1	
2-Chlorophenol	ND	10	1.6	1		Diethyl Phthalate	2.0	10	2.0	1	J
2-Methylphenol	ND	10	1.6	1		Dimethyl Phthalate	ND	10	1.8	1	
2-Nitrophenol	ND	10	1.5	1		Fluoranthene	ND	10	1.9	1	
3/4-Methylphenol	ND	10	1.6	1		Fluorene	ND	10	1.8	1	
4,6-Dinitro-2-Methylphenol	ND	500	69	1		Indeno (1,2,3-c,d) Pyrene	ND	10	1.8	1	
4-Chloro-3-Methylphenol	ND	10	1.4	1		Naphthalene	ND	10	1.8	1	
4-Nitrophenol	ND	500	64	1		Pentachlorophenol	ND	500	54	1	
Acenaphthene	ND	10	1.8	1		Phenanthrene	ND	10	1.9	1	
Acenaphthylene	ND	10	1.6	1		Phenol	ND	10	1.8	1	
Anthracene	ND	10	1.8	1		Pyrene	ND	10	2.5	1	
Benzo (a) Anthracene	ND	10	2.2	1		1,6,7-Trimethylnaphthalene	ND	10	3.4	1	
Benzo (a) Pyrene	ND	10	1.8	1		2,6-Dichlorophenol	ND	10	2.5	1	
Benzo (b) Fluoranthene	ND	10	1.8	1		Dibenzothiophene	ND	10	3.2	1	
Benzo (g,h,i) Perylene	ND	10	1.8	1		Benzo (e) Pyrene	ND	10	1.4	1	
Benzo (k) Fluoranthene	ND	10	2.5	1		Perylene	ND	10	1.4	1	
Bis(2-Ethylhexyl) Phthalate	ND	10	3.1	1		2,6-Dimethylnaphthalene	ND	10	1.3	1	
Butyl Benzyl Phthalate	ND	10	3.2	1							

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2,4,6-Tribromophenol	66	32-143		2-Fluorobiphenyl	43	14-146	
2-Fluorophenol	23	15-138		Nitrobenzene-d5	18	18-162	
p-Terphenyl-d14	73	34-148		Phenol-d6	41	17-141	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM PCB Congeners
Units: ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**GC/MS HHH**	**10/08/12**	**10/12/12 17:34**	**121010L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	0.20	0.049	10		PCB126	ND	0.20	0.067	10	
PCB008	ND	0.20	0.044	10		PCB128	ND	0.20	0.068	10	
PCB018	ND	0.20	0.062	10		PCB132	ND	0.20	0.072	10	
PCB028	ND	0.20	0.060	10		PCB138/158	ND	0.40	0.13	10	
PCB031	ND	0.20	0.050	10		PCB141	ND	0.20	0.059	10	
PCB033	ND	0.20	0.053	10		PCB149	ND	0.20	0.070	10	
PCB037	ND	0.20	0.061	10		PCB151	ND	0.20	0.061	10	
PCB044	ND	0.20	0.066	10		PCB153	ND	0.20	0.067	10	
PCB049	ND	0.20	0.080	10		PCB156	ND	0.20	0.069	10	
PCB052	ND	0.20	0.072	10		PCB157	ND	0.20	0.064	10	
PCB056	ND	0.20	0.061	10		PCB167	ND	0.20	0.069	10	
PCB060	ND	0.20	0.077	10		PCB168	ND	0.20	0.065	10	
PCB066	ND	0.20	0.064	10		PCB169	ND	0.20	0.064	10	
PCB070	ND	0.20	0.065	10		PCB170	ND	0.20	0.068	10	
PCB074	ND	0.20	0.061	10		PCB174	ND	0.20	0.047	10	
PCB077	ND	0.20	0.060	10		PCB177	ND	0.20	0.063	10	
PCB081	ND	0.20	0.064	10		PCB180	ND	0.20	0.068	10	
PCB087	ND	0.20	0.065	10		PCB183	ND	0.20	0.064	10	
PCB095	ND	0.20	0.053	10		PCB184	ND	0.20	0.049	10	
PCB097	ND	0.20	0.049	10		PCB187	ND	0.20	0.062	10	
PCB099	ND	0.20	0.063	10		PCB189	ND	0.20	0.057	10	
PCB101	ND	0.20	0.066	10		PCB194	ND	0.20	0.068	10	
PCB105	ND	0.20	0.066	10		PCB195	ND	0.20	0.075	10	
PCB110	ND	0.20	0.066	10		PCB200	ND	0.20	0.070	10	
PCB114	ND	0.20	0.060	10		PCB201	ND	0.20	0.059	10	
PCB118	ND	0.20	0.065	10		PCB203	ND	0.20	0.052	10	
PCB119	ND	0.20	0.067	10		PCB206	ND	0.20	0.060	10	
PCB123	ND	0.20	0.065	10		PCB209	ND	0.20	0.074	10	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
p-Terphenyl-d14	107	50-150		2-Fluorobiphenyl	83	50-150	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 · TEL:(714) 895-5494 · FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM PCB Congeners
Units: ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**GC/MS HHH**	**10/08/12**	**10/12/12 18:00**	**121010L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	0.20	0.049	10		PCB126	ND	0.20	0.067	10	
PCB008	ND	0.20	0.044	10		PCB128	ND	0.20	0.068	10	
PCB018	ND	0.20	0.062	10		PCB132	ND	0.20	0.072	10	
PCB028	ND	0.20	0.060	10		PCB138/158	ND	0.40	0.13	10	
PCB031	ND	0.20	0.050	10		PCB141	ND	0.20	0.059	10	
PCB033	ND	0.20	0.053	10		PCB149	ND	0.20	0.070	10	
PCB037	ND	0.20	0.061	10		PCB151	ND	0.20	0.061	10	
PCB044	ND	0.20	0.066	10		PCB153	ND	0.20	0.067	10	
PCB049	ND	0.20	0.080	10		PCB156	ND	0.20	0.069	10	
PCB052	ND	0.20	0.072	10		PCB157	ND	0.20	0.064	10	
PCB056	ND	0.20	0.061	10		PCB167	ND	0.20	0.069	10	
PCB060	ND	0.20	0.077	10		PCB168	ND	0.20	0.065	10	
PCB066	ND	0.20	0.064	10		PCB169	ND	0.20	0.064	10	
PCB070	ND	0.20	0.065	10		PCB170	ND	0.20	0.068	10	
PCB074	ND	0.20	0.061	10		PCB174	ND	0.20	0.047	10	
PCB077	ND	0.20	0.060	10		PCB177	ND	0.20	0.063	10	
PCB081	ND	0.20	0.064	10		PCB180	ND	0.20	0.068	10	
PCB087	ND	0.20	0.065	10		PCB183	ND	0.20	0.064	10	
PCB095	ND	0.20	0.053	10		PCB184	ND	0.20	0.049	10	
PCB097	ND	0.20	0.049	10		PCB187	ND	0.20	0.062	10	
PCB099	ND	0.20	0.063	10		PCB189	ND	0.20	0.057	10	
PCB101	ND	0.20	0.066	10		PCB194	ND	0.20	0.068	10	
PCB105	ND	0.20	0.066	10		PCB195	ND	0.20	0.075	10	
PCB110	ND	0.20	0.066	10		PCB200	ND	0.20	0.070	10	
PCB114	ND	0.20	0.060	10		PCB201	ND	0.20	0.059	10	
PCB118	ND	0.20	0.065	10		PCB203	ND	0.20	0.052	10	
PCB119	ND	0.20	0.067	10		PCB206	ND	0.20	0.060	10	
PCB123	ND	0.20	0.065	10		PCB209	ND	0.20	0.074	10	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
p-Terphenyl-d14	107	50-150		2-Fluorobiphenyl	86	50-150	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM PCB Congeners
Units: ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**GC/MS HHH**	**10/08/12**	**10/12/12 18:26**	**121010L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	0.20	0.049	10		PCB126	ND	0.20	0.067	10	
PCB008	ND	0.20	0.044	10		PCB128	ND	0.20	0.068	10	
PCB018	ND	0.20	0.062	10		PCB132	ND	0.20	0.072	10	
PCB028	ND	0.20	0.060	10		PCB138/158	ND	0.40	0.13	10	
PCB031	ND	0.20	0.050	10		PCB141	ND	0.20	0.059	10	
PCB033	ND	0.20	0.053	10		PCB149	ND	0.20	0.070	10	
PCB037	ND	0.20	0.061	10		PCB151	ND	0.20	0.061	10	
PCB044	ND	0.20	0.066	10		PCB153	ND	0.20	0.067	10	
PCB049	ND	0.20	0.080	10		PCB156	ND	0.20	0.069	10	
PCB052	ND	0.20	0.072	10		PCB157	ND	0.20	0.064	10	
PCB056	ND	0.20	0.061	10		PCB167	ND	0.20	0.069	10	
PCB060	ND	0.20	0.077	10		PCB168	ND	0.20	0.065	10	
PCB066	ND	0.20	0.064	10		PCB169	ND	0.20	0.064	10	
PCB070	ND	0.20	0.065	10		PCB170	ND	0.20	0.068	10	
PCB074	ND	0.20	0.061	10		PCB174	ND	0.20	0.047	10	
PCB077	ND	0.20	0.060	10		PCB177	ND	0.20	0.063	10	
PCB081	ND	0.20	0.064	10		PCB180	ND	0.20	0.068	10	
PCB087	ND	0.20	0.065	10		PCB183	ND	0.20	0.064	10	
PCB095	ND	0.20	0.053	10		PCB184	ND	0.20	0.049	10	
PCB097	ND	0.20	0.049	10		PCB187	ND	0.20	0.062	10	
PCB099	ND	0.20	0.063	10		PCB189	ND	0.20	0.057	10	
PCB101	ND	0.20	0.066	10		PCB194	ND	0.20	0.068	10	
PCB105	ND	0.20	0.066	10		PCB195	ND	0.20	0.075	10	
PCB110	ND	0.20	0.066	10		PCB200	ND	0.20	0.070	10	
PCB114	ND	0.20	0.060	10		PCB201	ND	0.20	0.059	10	
PCB118	ND	0.20	0.065	10		PCB203	ND	0.20	0.052	10	
PCB119	ND	0.20	0.067	10		PCB206	ND	0.20	0.060	10	
PCB123	ND	0.20	0.065	10		PCB209	ND	0.20	0.074	10	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
p-Terphenyl-d14	101	50-150		2-Fluorobiphenyl	85	50-150	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM PCB Congeners
Units: ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**GC/MS HHH**	**10/08/12**	**10/12/12 18:52**	**121010L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	0.20	0.049	10		PCB126	ND	0.20	0.067	10	
PCB008	ND	0.20	0.044	10		PCB128	ND	0.20	0.068	10	
PCB018	ND	0.20	0.062	10		PCB132	ND	0.20	0.072	10	
PCB028	ND	0.20	0.060	10		PCB138/158	ND	0.40	0.13	10	
PCB031	ND	0.20	0.050	10		PCB141	ND	0.20	0.059	10	
PCB033	ND	0.20	0.053	10		PCB149	ND	0.20	0.070	10	
PCB037	ND	0.20	0.061	10		PCB151	ND	0.20	0.061	10	
PCB044	ND	0.20	0.066	10		PCB153	ND	0.20	0.067	10	
PCB049	ND	0.20	0.080	10		PCB156	ND	0.20	0.069	10	
PCB052	ND	0.20	0.072	10		PCB157	ND	0.20	0.064	10	
PCB056	ND	0.20	0.061	10		PCB167	ND	0.20	0.069	10	
PCB060	ND	0.20	0.077	10		PCB168	ND	0.20	0.065	10	
PCB066	ND	0.20	0.064	10		PCB169	ND	0.20	0.064	10	
PCB070	ND	0.20	0.065	10		PCB170	ND	0.20	0.068	10	
PCB074	ND	0.20	0.061	10		PCB174	ND	0.20	0.047	10	
PCB077	ND	0.20	0.060	10		PCB177	ND	0.20	0.063	10	
PCB081	ND	0.20	0.064	10		PCB180	ND	0.20	0.068	10	
PCB087	ND	0.20	0.065	10		PCB183	ND	0.20	0.064	10	
PCB095	ND	0.20	0.053	10		PCB184	ND	0.20	0.049	10	
PCB097	ND	0.20	0.049	10		PCB187	ND	0.20	0.062	10	
PCB099	ND	0.20	0.063	10		PCB189	ND	0.20	0.057	10	
PCB101	ND	0.20	0.066	10		PCB194	ND	0.20	0.068	10	
PCB105	ND	0.20	0.066	10		PCB195	ND	0.20	0.075	10	
PCB110	ND	0.20	0.066	10		PCB200	ND	0.20	0.070	10	
PCB114	ND	0.20	0.060	10		PCB201	ND	0.20	0.059	10	
PCB118	ND	0.20	0.065	10		PCB203	ND	0.20	0.052	10	
PCB119	ND	0.20	0.067	10		PCB206	ND	0.20	0.060	10	
PCB123	ND	0.20	0.065	10		PCB209	ND	0.20	0.074	10	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
p-Terphenyl-d14	114	50-150		2-Fluorobiphenyl	104	50-150	

Return to Contents

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM PCB Congeners
Units: ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-433-44**	**N/A**	**Aqueous**	**GC/MS HHH**	**10/10/12**	**10/12/12 17:07**	**121010L03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	0.20	0.049	10		PCB126	ND	0.20	0.067	10	
PCB008	ND	0.20	0.044	10		PCB128	ND	0.20	0.068	10	
PCB018	ND	0.20	0.062	10		PCB132	ND	0.20	0.072	10	
PCB028	ND	0.20	0.060	10		PCB138/158	ND	0.40	0.13	10	
PCB031	ND	0.20	0.050	10		PCB141	ND	0.20	0.059	10	
PCB033	ND	0.20	0.053	10		PCB149	ND	0.20	0.070	10	
PCB037	ND	0.20	0.061	10		PCB151	ND	0.20	0.061	10	
PCB044	ND	0.20	0.066	10		PCB153	ND	0.20	0.067	10	
PCB049	ND	0.20	0.080	10		PCB156	ND	0.20	0.069	10	
PCB052	ND	0.20	0.072	10		PCB157	ND	0.20	0.064	10	
PCB056	ND	0.20	0.061	10		PCB167	ND	0.20	0.069	10	
PCB060	ND	0.20	0.077	10		PCB168	ND	0.20	0.065	10	
PCB066	ND	0.20	0.064	10		PCB169	ND	0.20	0.064	10	
PCB070	ND	0.20	0.065	10		PCB170	ND	0.20	0.068	10	
PCB074	ND	0.20	0.061	10		PCB174	ND	0.20	0.047	10	
PCB077	ND	0.20	0.060	10		PCB177	ND	0.20	0.063	10	
PCB081	ND	0.20	0.064	10		PCB180	ND	0.20	0.068	10	
PCB087	ND	0.20	0.065	10		PCB183	ND	0.20	0.064	10	
PCB095	ND	0.20	0.053	10		PCB184	ND	0.20	0.049	10	
PCB097	ND	0.20	0.049	10		PCB187	ND	0.20	0.062	10	
PCB099	ND	0.20	0.063	10		PCB189	ND	0.20	0.057	10	
PCB101	ND	0.20	0.066	10		PCB194	ND	0.20	0.068	10	
PCB105	ND	0.20	0.066	10		PCB195	ND	0.20	0.075	10	
PCB110	ND	0.20	0.066	10		PCB200	ND	0.20	0.070	10	
PCB114	ND	0.20	0.060	10		PCB201	ND	0.20	0.059	10	
PCB118	ND	0.20	0.065	10		PCB203	ND	0.20	0.052	10	
PCB119	ND	0.20	0.067	10		PCB206	ND	0.20	0.060	10	
PCB123	ND	0.20	0.065	10		PCB209	ND	0.20	0.074	10	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
p-Terphenyl-d14	86	50-150		2-Fluorobiphenyl	68	50-150	

Return to Contents

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8270C SIM PCB Congeners
Units: ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-B**	**10/05/12 08:21**	**Sediment**	**GC/MS HHH**	**10/10/12**	**10/12/12 13:09**	**121010L15**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	1.7	0.41	1		PCB126	ND	1.7	0.48	1	
PCB008	0.45	1.7	0.29	1	J	PCB128	0.96	1.7	0.36	1	J
PCB018	1.6	1.7	0.55	1	J	PCB132	ND	1.7	0.57	1	
PCB028	0.55	1.7	0.35	1	J	PCB138/158	2.9	3.5	0.70	1	J
PCB031	0.85	1.7	0.40	1	J	PCB141	0.60	1.7	0.39	1	J
PCB033	3.0	1.7	0.38	1		PCB149	1.9	1.7	0.31	1	
PCB037	0.55	1.7	0.45	1	J	PCB151	0.45	1.7	0.36	1	J
PCB044	0.76	1.7	0.46	1	J	PCB153	2.8	1.7	0.36	1	
PCB049	0.81	1.7	0.41	1	J	PCB156	ND	1.7	0.34	1	
PCB052	1.3	1.7	0.34	1	J	PCB157	ND	1.7	0.33	1	
PCB056	0.54	1.7	0.48	1	J	PCB167	ND	1.7	0.35	1	
PCB060	ND	1.7	0.37	1		PCB168	ND	1.7	0.30	1	
PCB066	0.83	1.7	0.32	1	J	PCB169	ND	1.7	0.28	1	
PCB070	0.71	1.7	0.28	1	J	PCB170	1.5	1.7	0.32	1	J
PCB074	0.35	1.7	0.33	1	J	PCB174	0.75	1.7	0.37	1	J
PCB077	ND	1.7	0.34	1		PCB177	ND	1.7	0.43	1	
PCB081	ND	1.7	0.42	1		PCB180	1.7	1.7	0.21	1	
PCB087	0.46	1.7	0.35	1	J	PCB183	ND	1.7	0.39	1	
PCB095	1.2	1.7	0.58	1	J	PCB184	ND	1.7	0.19	1	
PCB097	0.75	1.7	0.47	1	J	PCB187	1.0	1.7	0.36	1	J
PCB099	1.0	1.7	0.30	1	J	PCB189	ND	1.7	0.30	1	
PCB101	1.5	1.7	0.28	1	J	PCB194	0.69	1.7	0.33	1	J
PCB105	0.85	1.7	0.36	1	J	PCB195	ND	1.7	0.18	1	
PCB110	1.4	1.7	0.36	1	J	PCB200	ND	1.7	0.32	1	
PCB114	1.6	1.7	0.35	1	J	PCB201	ND	1.7	0.20	1	
PCB118	1.7	1.7	0.46	1	J	PCB203	0.51	1.7	0.37	1	J
PCB119	ND	1.7	0.30	1		PCB206	ND	1.7	0.29	1	
PCB123	ND	1.7	0.30	1		PCB209	ND	1.7	0.37	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2-Fluorobiphenyl	86	50-125		p-Terphenyl-d14	74	50-125	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 · TEL:(714) 895-5494 · FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8270C SIM PCB Congeners
Units: ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-D	**12-10-0512-2-B**	**10/05/12 08:22**	**Sediment**	**GC/MS HHH**	**10/10/12**	**10/12/12 13:35**	**121010L15**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	1.9	0.45	1		PCB126	ND	1.9	0.53	1	
PCB008	0.46	1.9	0.32	1	J	PCB128	0.77	1.9	0.39	1	J
PCB018	0.99	1.9	0.60	1	J	PCB132	ND	1.9	0.63	1	
PCB028	ND	1.9	0.38	1		PCB138/158	3.3	3.8	0.77	1	J
PCB031	0.69	1.9	0.44	1	J	PCB141	0.52	1.9	0.42	1	J
PCB033	1.8	1.9	0.41	1	J	PCB149	1.8	1.9	0.34	1	J
PCB037	ND	1.9	0.50	1		PCB151	0.55	1.9	0.39	1	J
PCB044	0.51	1.9	0.50	1	J	PCB153	3.1	1.9	0.40	1	
PCB049	0.80	1.9	0.45	1	J	PCB156	0.60	1.9	0.37	1	J
PCB052	1.2	1.9	0.37	1	J	PCB157	ND	1.9	0.36	1	
PCB056	ND	1.9	0.52	1		PCB167	ND	1.9	0.38	1	
PCB060	ND	1.9	0.40	1		PCB168	ND	1.9	0.33	1	
PCB066	0.67	1.9	0.35	1	J	PCB169	ND	1.9	0.31	1	
PCB070	0.49	1.9	0.31	1	J	PCB170	1.6	1.9	0.35	1	J
PCB074	ND	1.9	0.36	1		PCB174	0.74	1.9	0.41	1	J
PCB077	ND	1.9	0.37	1		PCB177	ND	1.9	0.47	1	
PCB081	ND	1.9	0.46	1		PCB180	1.7	1.9	0.23	1	J
PCB087	0.44	1.9	0.38	1	J	PCB183	0.45	1.9	0.42	1	J
PCB095	1.0	1.9	0.63	1	J	PCB184	ND	1.9	0.21	1	
PCB097	0.92	1.9	0.52	1	J	PCB187	1.2	1.9	0.40	1	J
PCB099	1.1	1.9	0.32	1	J	PCB189	ND	1.9	0.33	1	
PCB101	1.5	1.9	0.31	1	J	PCB194	0.69	1.9	0.36	1	J
PCB105	0.88	1.9	0.40	1	J	PCB195	ND	1.9	0.20	1	
PCB110	1.5	1.9	0.39	1	J	PCB200	ND	1.9	0.36	1	
PCB114	1.9	1.9	0.38	1		PCB201	ND	1.9	0.22	1	
PCB118	1.8	1.9	0.50	1	J	PCB203	ND	1.9	0.41	1	
PCB119	ND	1.9	0.33	1		PCB206	ND	1.9	0.32	1	
PCB123	ND	1.9	0.33	1		PCB209	0.83	1.9	0.41	1	J

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2-Fluorobiphenyl	57	50-125		p-Terphenyl-d14	51	50-125	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8270C SIM PCB Congeners
Units: ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-S	**12-10-0512-3-B**	**10/05/12 08:10**	**Sediment**	**GC/MS HHH**	**10/10/12**	**10/12/12 14:01**	**121010L15**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	1.3	0.32	1		PCB126	ND	1.3	0.37	1	
PCB008	0.87	1.3	0.23	1	J	PCB128	1.2	1.3	0.28	1	J
PCB018	2.8	1.3	0.42	1		PCB132	ND	1.3	0.44	1	
PCB028	0.56	1.3	0.27	1	J	PCB138/158	7.7	2.7	0.55	1	
PCB031	1.6	1.3	0.31	1		PCB141	1.4	1.3	0.30	1	
PCB033	3.6	1.3	0.29	1		PCB149	4.8	1.3	0.24	1	
PCB037	ND	1.3	0.35	1		PCB151	1.2	1.3	0.28	1	J
PCB044	1.8	1.3	0.35	1		PCB153	7.5	1.3	0.28	1	
PCB049	2.3	1.3	0.32	1		PCB156	1.3	1.3	0.26	1	J
PCB052	3.3	1.3	0.26	1		PCB157	ND	1.3	0.26	1	
PCB056	0.40	1.3	0.37	1	J	PCB167	ND	1.3	0.27	1	
PCB060	ND	1.3	0.29	1		PCB168	ND	1.3	0.23	1	
PCB066	1.5	1.3	0.25	1		PCB169	ND	1.3	0.22	1	
PCB070	1.5	1.3	0.22	1		PCB170	2.3	1.3	0.25	1	
PCB074	0.67	1.3	0.25	1	J	PCB174	1.8	1.3	0.29	1	
PCB077	ND	1.3	0.26	1		PCB177	0.80	1.3	0.33	1	J
PCB081	ND	1.3	0.33	1		PCB180	4.7	1.3	0.16	1	
PCB087	1.5	1.3	0.27	1		PCB183	1.2	1.3	0.30	1	J
PCB095	3.7	1.3	0.45	1		PCB184	ND	1.3	0.15	1	
PCB097	1.6	1.3	0.37	1		PCB187	2.7	1.3	0.28	1	
PCB099	2.5	1.3	0.23	1		PCB189	ND	1.3	0.23	1	
PCB101	4.8	1.3	0.22	1		PCB194	1.6	1.3	0.26	1	
PCB105	2.0	1.3	0.28	1		PCB195	ND	1.3	0.14	1	
PCB110	4.1	1.3	0.28	1		PCB200	ND	1.3	0.25	1	
PCB114	1.8	1.3	0.27	1		PCB201	ND	1.3	0.15	1	
PCB118	4.2	1.3	0.36	1		PCB203	1.4	1.3	0.29	1	
PCB119	ND	1.3	0.23	1		PCB206	ND	1.3	0.22	1	
PCB123	ND	1.3	0.23	1		PCB209	ND	1.3	0.29	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2-Fluorobiphenyl	82	50-125		p-Terphenyl-d14	82	50-125	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8270C SIM PCB Congeners
Units: ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-D	**12-10-0512-4-B**	**10/05/12 08:11**	**Sediment**	**GC/MS HHH**	**10/10/12**	**10/12/12 15:46**	**121010L15**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	1.3	0.31	1		PCB126	ND	1.3	0.35	1	
PCB008	0.48	1.3	0.22	1	J	PCB128	0.85	1.3	0.26	1	J
PCB018	0.97	1.3	0.40	1	J	PCB132	ND	1.3	0.42	1	
PCB028	2.1	1.3	0.26	1		PCB138/158	4.3	2.6	0.52	1	
PCB031	1.3	1.3	0.30	1	J	PCB141	1.0	1.3	0.28	1	J
PCB033	2.1	1.3	0.28	1		PCB149	2.9	1.3	0.23	1	
PCB037	1.2	1.3	0.34	1	J	PCB151	0.69	1.3	0.27	1	J
PCB044	8.5	1.3	0.34	1		PCB153	4.4	1.3	0.27	1	
PCB049	4.9	1.3	0.30	1		PCB156	0.71	1.3	0.25	1	J
PCB052	8.1	1.3	0.25	1		PCB157	0.39	1.3	0.25	1	J
PCB056	5.2	1.3	0.35	1		PCB167	ND	1.3	0.26	1	
PCB060	3.1	1.3	0.27	1		PCB168	ND	1.3	0.22	1	
PCB066	9.0	1.3	0.23	1		PCB169	ND	1.3	0.21	1	
PCB070	4.7	1.3	0.21	1		PCB170	1.7	1.3	0.24	1	
PCB074	3.9	1.3	0.24	1		PCB174	1.1	1.3	0.27	1	J
PCB077	1.5	1.3	0.25	1		PCB177	0.57	1.3	0.32	1	J
PCB081	ND	1.3	0.31	1		PCB180	2.8	1.3	0.16	1	
PCB087	2.8	1.3	0.26	1		PCB183	0.77	1.3	0.29	1	J
PCB095	5.2	1.3	0.43	1		PCB184	ND	1.3	0.14	1	
PCB097	3.3	1.3	0.35	1		PCB187	1.7	1.3	0.27	1	
PCB099	3.9	1.3	0.22	1		PCB189	ND	1.3	0.22	1	
PCB101	6.3	1.3	0.21	1		PCB194	0.81	1.3	0.25	1	J
PCB105	3.2	1.3	0.27	1		PCB195	ND	1.3	0.14	1	
PCB110	6.3	1.3	0.26	1		PCB200	ND	1.3	0.24	1	
PCB114	0.86	1.3	0.26	1	J	PCB201	ND	1.3	0.15	1	
PCB118	6.4	1.3	0.34	1		PCB203	0.82	1.3	0.28	1	J
PCB119	0.57	1.3	0.22	1	J	PCB206	1.6	1.3	0.21	1	
PCB123	ND	1.3	0.22	1		PCB209	4.6	1.3	0.27	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2-Fluorobiphenyl	55	50-125		p-Terphenyl-d14	63	50-125	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8270C SIM PCB Congeners
Units: ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-341-68**	**N/A**	**Solid**	**GC/MS HHH**	**10/10/12**	**10/12/12 11:50**	**121010L15**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
PCB003	ND	0.50	0.12	1		PCB126	ND	0.50	0.14	1	
PCB008	ND	0.50	0.085	1		PCB128	ND	0.50	0.10	1	
PCB018	ND	0.50	0.16	1		PCB132	ND	0.50	0.17	1	
PCB028	ND	0.50	0.099	1		PCB138/158	ND	1.0	0.20	1	
PCB031	ND	0.50	0.12	1		PCB141	ND	0.50	0.11	1	
PCB033	ND	0.50	0.11	1		PCB149	ND	0.50	0.089	1	
PCB037	ND	0.50	0.13	1		PCB151	ND	0.50	0.10	1	
PCB044	ND	0.50	0.13	1		PCB153	ND	0.50	0.10	1	
PCB049	ND	0.50	0.12	1		PCB156	ND	0.50	0.098	1	
PCB052	ND	0.50	0.097	1		PCB157	ND	0.50	0.096	1	
PCB056	ND	0.50	0.14	1		PCB167	ND	0.50	0.10	1	
PCB060	ND	0.50	0.11	1		PCB168	ND	0.50	0.086	1	
PCB066	ND	0.50	0.091	1		PCB169	ND	0.50	0.082	1	
PCB070	ND	0.50	0.082	1		PCB170	ND	0.50	0.093	1	
PCB074	ND	0.50	0.094	1		PCB174	ND	0.50	0.11	1	
PCB077	ND	0.50	0.097	1		PCB177	ND	0.50	0.12	1	
PCB081	ND	0.50	0.12	1		PCB180	ND	0.50	0.061	1	
PCB087	ND	0.50	0.10	1		PCB183	ND	0.50	0.11	1	
PCB095	ND	0.50	0.17	1		PCB184	ND	0.50	0.056	1	
PCB097	ND	0.50	0.14	1		PCB187	ND	0.50	0.10	1	
PCB099	ND	0.50	0.085	1		PCB189	ND	0.50	0.086	1	
PCB101	ND	0.50	0.081	1		PCB194	ND	0.50	0.096	1	
PCB105	ND	0.50	0.10	1		PCB195	ND	0.50	0.053	1	
PCB110	ND	0.50	0.10	1		PCB200	ND	0.50	0.093	1	
PCB114	ND	0.50	0.10	1		PCB201	ND	0.50	0.057	1	
PCB118	ND	0.50	0.13	1		PCB203	ND	0.50	0.11	1	
PCB119	ND	0.50	0.087	1		PCB206	ND	0.50	0.083	1	
PCB123	ND	0.50	0.087	1		PCB209	ND	0.50	0.11	1	

Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual
2-Fluorobiphenyl	116	50-125		p-Terphenyl-d14	105	50-125	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3550B (M)
Method:	Organotins by Krone et al.
Units:	ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-B**	**10/05/12 08:21**	**Sediment**	**GC/MS JJJ**	**10/10/12**	**10/16/12 13:46**	**121010L21**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Dibutyltin	ND	10	2.3	1		Tetrabutyltin	ND	10	2.7	1	
Monobutyltin	ND	10	2.3	1		Tributyltin	10	10	2.0	1	J

Surrogates:	REC (%)	Control Limits	Qual
Tripentyltin	98	48-126	

P-15-D	**12-10-0512-2-B**	**10/05/12 08:22**	**Sediment**	**GC/MS JJJ**	**10/10/12**	**10/16/12 14:16**	**121010L21**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Dibutyltin	ND	11	2.5	1		Tetrabutyltin	ND	11	2.9	1	
Monobutyltin	ND	11	2.5	1		Tributyltin	12	11	2.2	1	

Surrogates:	REC (%)	Control Limits	Qual
Tripentyltin	72	48-126	

P-12-S	**12-10-0512-3-B**	**10/05/12 08:10**	**Sediment**	**GC/MS JJJ**	**10/10/12**	**10/16/12 14:45**	**121010L21**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Dibutyltin	8.3	8.1	1.8	1		Tetrabutyltin	ND	8.1	2.1	1	
Monobutyltin	ND	8.1	1.8	1		Tributyltin	11	8.1	1.5	1	

Surrogates:	REC (%)	Control Limits	Qual
Tripentyltin	102	48-126	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3550B (M)
Method: Organotins by Krone et al.
Units: ug/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-D	**12-10-0512-4-B**	**10/05/12 08:11**	**Sediment**	**GC/MS JJJ**	**10/10/12**	**10/16/12 15:15**	**121010L21**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Dibutyltin	5.9	7.7	1.7	1	J	Tetrabutyltin	ND	7.7	2.0	1	
Monobutyltin	ND	7.7	1.7	1		Tributyltin	9.3	7.7	1.5	1	

Surrogates:	REC (%)	Control Limits	Qual
Tripentyltin	79	48-126	

Method Blank	**099-07-016-974**	**N/A**	**Solid**	**GC/MS JJJ**	**10/10/12**	**10/11/12 12:49**	**121010L21**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Dibutyltin	ND	3.0	0.65	1		Tetrabutyltin	ND	3.0	0.77	1	
Monobutyltin	ND	3.0	0.65	1		Tributyltin	ND	3.0	0.58	1	

Surrogates:	REC (%)	Control Limits	Qual
Tripentyltin	69	48-126	

Return to Contents

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 7471A Total
		Method:	EPA 7471A

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-B**	**10/05/12 08:21**	**Sediment**	**Mercury**	**10/08/12**	**10/09/12 14:58**	**121008L07E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	0.483	0.0696	0.0204	1		mg/kg

P-15-D	**12-10-0512-2-B**	**10/05/12 08:22**	**Sediment**	**Mercury**	**10/08/12**	**10/09/12 15:00**	**121008L07E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	0.629	0.0762	0.0224	1		mg/kg

P-12-S	**12-10-0512-3-B**	**10/05/12 08:10**	**Sediment**	**Mercury**	**10/08/12**	**10/09/12 15:02**	**121008L07E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	0.446	0.0539	0.0158	1		mg/kg

P-12-D	**12-10-0512-4-B**	**10/05/12 08:11**	**Sediment**	**Mercury**	**10/08/12**	**10/09/12 15:05**	**121008L07E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	0.609	0.0514	0.0151	1		mg/kg

Method Blank	**099-12-452-334**	**N/A**	**Solid**	**Mercury**	**10/08/12**	**10/09/12 14:51**	**121008L07E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	ND	0.0200	0.00588	1		mg/kg

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 1311
Method:	EPA 1640
Units:	ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**ICP/MS 05**	**10/08/12**	**10/15/12 19:13**	**121010L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Antimony	0.412	0.500	0.154	10	J	Lead	0.783	0.300	0.135	10	B
Arsenic	14.0	0.300	0.122	10		Molybdenum	0.780	0.500	0.243	10	
Barium	123	0.500	0.252	10	B	Nickel	12.7	0.500	0.0607	10	B
Beryllium	ND	5.00	0.635	10		Selenium	0.194	0.500	0.121	10	J
Cadmium	ND	0.300	0.0567	10		Silver	0.0982	0.500	0.0822	10	J
Chromium	ND	2.00	1.64	10		Thallium	0.0999	0.300	0.0870	10	J
Cobalt	11.3	0.500	0.0486	10		Vanadium	2.19	0.500	0.332	10	
Copper	0.160	0.300	0.0898	10	B,J	Zinc	81.0	5.00	0.736	10	B

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**ICP/MS 05**	**10/08/12**	**10/15/12 19:21**	**121010L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Antimony	0.329	0.500	0.154	10	J	Lead	0.599	0.300	0.135	10	B
Arsenic	16.1	0.300	0.122	10		Molybdenum	1.76	0.500	0.243	10	
Barium	181	0.500	0.252	10	B	Nickel	10.1	0.500	0.0607	10	B
Beryllium	ND	5.00	0.635	10		Selenium	0.133	0.500	0.121	10	J
Cadmium	ND	0.300	0.0567	10		Silver	ND	0.500	0.0822	10	
Chromium	1.93	2.00	1.64	10	B,J	Thallium	ND	0.300	0.0870	10	
Cobalt	6.23	0.500	0.0486	10		Vanadium	1.27	0.500	0.332	10	
Copper	0.377	0.300	0.0898	10	B	Zinc	90.0	5.00	0.736	10	B

P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**ICP/MS 05**	**10/08/12**	**10/15/12 19:28**	**121010L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Antimony	0.489	0.500	0.154	10	J	Lead	1.26	0.300	0.135	10	B
Arsenic	14.7	0.300	0.122	10		Molybdenum	0.656	0.500	0.243	10	
Barium	175	0.500	0.252	10	B	Nickel	10.4	0.500	0.0607	10	B
Beryllium	ND	5.00	0.635	10		Selenium	0.121	0.500	0.121	10	J
Cadmium	ND	0.300	0.0567	10		Silver	ND	0.500	0.0822	10	
Chromium	1.66	2.00	1.64	10	B,J	Thallium	ND	0.300	0.0870	10	
Cobalt	10.3	0.500	0.0486	10		Vanadium	3.32	0.500	0.332	10	
Copper	0.606	0.300	0.0898	10	B	Zinc	154	5.00	0.736	10	B

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 1311
Method:	EPA 1640
Units:	ug/L

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**ICP/MS 05**	**10/08/12**	**10/19/12 15:26**	**121010L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Antimony	0.711	0.500	0.154	10		Lead	0.377	0.300	0.135	10	B
Arsenic	17.7	0.300	0.122	10		Molybdenum	1.27	0.500	0.243	10	
Barium	173	0.500	0.252	10	B	Nickel	10.9	0.500	0.0607	10	B
Beryllium	0.859	5.00	0.635	10	J	Selenium	0.197	0.500	0.121	10	J
Cadmium	ND	0.300	0.0567	10		Silver	ND	0.500	0.0822	10	
Chromium	ND	2.00	1.64	10		Thallium	ND	0.300	0.0870	10	
Cobalt	6.65	0.500	0.0486	10		Vanadium	1.10	0.500	0.332	10	
Copper	0.239	0.300	0.0898	10	B,J	Zinc	44.8	5.00	0.736	10	B

Method Blank	**099-13-067-278**	**N/A**	**Aqueous**	**ICP/MS 05**	**10/08/12**	**10/15/12 18:21**	**121010L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Antimony	ND	0.500	0.154	10		Lead	0.303	0.300	0.135	10	
Arsenic	ND	0.300	0.122	10		Molybdenum	ND	0.500	0.243	10	
Barium	151	0.500	0.252	10		Nickel	3.86	0.500	0.0607	10	
Beryllium	ND	5.00	0.635	10		Selenium	ND	0.500	0.121	10	
Cadmium	ND	0.300	0.0567	10		Silver	ND	0.500	0.0822	10	
Chromium	3.43	2.00	1.64	10		Thallium	ND	0.300	0.0870	10	
Cobalt	ND	0.500	0.0486	10		Vanadium	ND	0.500	0.332	10	
Copper	0.275	0.300	0.0898	10	J	Zinc	47.6	5.00	0.736	10	

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	N/A
		Method:	EPA 1631E

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**Hg/AF 1**	**10/08/12**	**10/11/12 00:00**	**121011L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	ND	0.00500	0.00146	10		ug/L

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**Hg/AF 1**	**10/08/12**	**10/11/12 00:00**	**121011L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	0.00268	0.00500	0.00146	10	J	ug/L

P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**Hg/AF 1**	**10/08/12**	**10/11/12 00:00**	**121011L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	0.00198	0.00500	0.00146	10	J	ug/L

P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**Hg/AF 1**	**10/08/12**	**10/11/12 00:00**	**121011L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	0.00368	0.00500	0.00146	10	J	ug/L

Method Blank	**099-15-224-10**	**N/A**	**Aqueous**	**Hg/AF 1**	**10/08/12**	**10/11/12 00:00**	**121011L01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
Mercury	ND	0.00500	0.00146	10		ug/L

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3050B
Method:	EPA 6020
Units:	mg/kg

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
P-15-S	**12-10-0512-1-A**	**10/05/12 08:21**	**Sediment**	**ICP/MS 03**	**10/09/12**	**10/09/12 18:02**	**121009L03E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Arsenic	18.4	0.347	0.303	1	B	Nickel	106	0.347	0.176	1	
Cadmium	1.13	0.347	0.199	1		Selenium	0.824	0.347	0.254	1	
Chromium	114	0.347	0.216	1		Silver	0.498	0.347	0.109	1	
Copper	150	0.347	0.146	1		Zinc	306	3.47	2.76	1	
Lead	95.5	0.347	0.229	1							

P-15-D	**12-10-0512-2-A**	**10/05/12 08:22**	**Sediment**	**ICP/MS 03**	**10/09/12**	**10/09/12 18:07**	**121009L03E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Arsenic	21.9	0.380	0.332	1	B	Nickel	116	0.380	0.192	1	
Cadmium	1.50	0.380	0.218	1		Selenium	0.695	0.380	0.278	1	
Chromium	132	0.380	0.236	1		Silver	0.677	0.380	0.119	1	
Copper	176	0.380	0.159	1		Zinc	370	3.80	3.02	1	
Lead	117	0.380	0.251	1							

P-12-S	**12-10-0512-3-A**	**10/05/12 08:10**	**Sediment**	**ICP/MS 03**	**10/09/12**	**10/09/12 18:10**	**121009L03E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Arsenic	23.3	0.269	0.235	1	B	Nickel	71.4	0.269	0.136	1	
Cadmium	0.760	0.269	0.154	1		Selenium	0.466	0.269	0.196	1	
Chromium	85.4	0.269	0.167	1		Silver	0.432	0.269	0.0841	1	
Copper	128	0.269	0.113	1		Zinc	277	2.69	2.14	1	
Lead	103	0.269	0.177	1							

P-12-D	**12-10-0512-4-A**	**10/05/12 08:11**	**Sediment**	**ICP/MS 03**	**10/09/12**	**10/09/12 18:13**	**121009L03E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
-Results are reported on a dry weight basis.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Arsenic	22.3	0.256	0.224	1	B	Nickel	70.5	0.256	0.130	1	
Cadmium	0.946	0.256	0.147	1		Selenium	0.437	0.256	0.187	1	
Chromium	108	0.256	0.159	1		Silver	0.475	0.256	0.0803	1	
Copper	143	0.256	0.107	1		Zinc	351	2.56	2.04	1	
Lead	500	0.256	0.169	1							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3050B
		Method:	EPA 6020
		Units:	mg/kg
Project: DOT-Harbor Piers 12-15			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-254-55**	**N/A**	**Solid**	**ICP/MS 03**	**10/09/12**	**10/09/12 17:24**	**121009L03E**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Parameter	Result	RL	MDL	DF	Qual
Arsenic	0.127	0.100	0.0873	1		Nickel	ND	0.100	0.0506	1	
Cadmium	ND	0.100	0.0572	1		Selenium	ND	0.100	0.0731	1	
Chromium	ND	0.100	0.0621	1		Silver	ND	0.100	0.0313	1	
Copper	ND	0.100	0.0419	1		Zinc	ND	1.00	0.795	1	
Lead	ND	0.100	0.0659	1							

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date Collected	Matrix
P-15-S	**12-10-0512-1**	**10/05/12**	**Sediment**

Comment(s): (9) -Results are reported on a dry weight basis
(24) -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag

Parameter	Result	RL	MDL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Volatile (24)	3.6	0.10	0.10	1		%	10/12/12	10/12/12	EPA 160.4M
Sulfide, Dissolved (24)	ND	0.10	0.084	1		mg/kg	10/06/12	10/06/12	EPA 376.2M
Sulfide, Total (9) (24)	9.0	0.35	0.29	1		mg/kg	10/12/12	10/12/12	EPA 376.2M
Carbon, Total Organic (9) (24)	7.3	0.17	0.042	1		%	N/A	10/08/12	EPA 9060A
Solids, Total (24)	28.8	0.100	0.100	1		%	10/12/12	10/12/12	SM 2540 B
Ammonia (as N) (9) (24)	12	0.69	0.38	1		mg/kg	10/15/12	10/15/12	SM 4500-NH3 B/C (M)

P-15-D	**12-10-0512-2**	**10/05/12**	**Sediment**

Comment(s): (9) -Results are reported on a dry weight basis
(24) -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag

Parameter	Result	RL	MDL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Volatile (24)	4.9	0.10	0.10	1		%	10/12/12	10/12/12	EPA 160.4M
Sulfide, Dissolved (24)	ND	0.10	0.084	1		mg/kg	10/06/12	10/06/12	EPA 376.2M
Sulfide, Total (9) (24)	35	1.9	1.6	5		mg/kg	10/12/12	10/12/12	EPA 376.2M
Carbon, Total Organic (9) (24)	9.5	0.19	0.046	1		%	N/A	10/08/12	EPA 9060A
Solids, Total (24)	26.3	0.100	0.100	1		%	10/12/12	10/12/12	SM 2540 B
Ammonia (as N) (9) (24)	13	0.76	0.42	1		mg/kg	10/15/12	10/15/12	SM 4500-NH3 B/C (M)

P-12-S	**12-10-0512-3**	**10/05/12**	**Sediment**

Comment(s): (9) -Results are reported on a dry weight basis
(24) -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag

Parameter	Result	RL	MDL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Volatile (24)	4.1	0.10	0.10	1		%	10/12/12	10/12/12	EPA 160.4M
Sulfide, Dissolved (24)	ND	0.10	0.084	1		mg/kg	10/06/12	10/06/12	EPA 376.2M
Sulfide, Total (9) (24)	3.0	0.27	0.23	1		mg/kg	10/12/12	10/12/12	EPA 376.2M
Carbon, Total Organic (9) (24)	4.8	0.13	0.033	1		%	N/A	10/08/12	EPA 9060A
Solids, Total (24)	37.2	0.100	0.100	1		%	10/12/12	10/12/12	SM 2540 B
Ammonia (as N) (9) (24)	6.0	0.54	0.30	1		mg/kg	10/15/12	10/15/12	SM 4500-NH3 B/C (M)

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7440 Lincoln Way, Garden Grove, CA 92841-1427 ▪ TEL:(714) 895-5494 ▪ FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

Analytical Report

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512

Project: DOT-Harbor Piers 12-15

Client Sample Number	Lab Sample Number	Date Collected	Matrix
P-12-D	**12-10-0512-4**	**10/05/12**	**Sediment**

Comment(s): (9) -Results are reported on a dry weight basis
(24) -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag

Parameter	Result	RL	MDL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Volatile (24)	4.2	0.10	0.10	1		%	10/12/12	10/12/12	EPA 160.4M
Sulfide, Dissolved (24)	ND	0.10	0.084	1		mg/kg	10/06/12	10/06/12	EPA 376.2M
Sulfide, Total (9) (24)	3.8	0.26	0.22	1		mg/kg	10/12/12	10/12/12	EPA 376.2M
Carbon, Total Organic (9) (24)	4.1	0.13	0.031	1		%	N/A	10/08/12	EPA 9060A
Solids, Total (24)	39.0	0.100	0.100	1		%	10/12/12	10/12/12	SM 2540 B
Ammonia (as N) (9) (24)	3.6	0.51	0.28	1		mg/kg	10/15/12	10/15/12	SM 4500-NH3 B/C (M)

Method Blank	**N/A**	**Solid**	

Parameter	Result	RL	MDL	DF	Qual	Units	Date Prepared	Date Analyzed	Method
Solids, Volatile (24)	ND	0.10	0.10	1		%	10/12/12	10/12/12	EPA 160.4M
Sulfide, Dissolved (24)	ND	0.020	0.017	0.2		mg/kg	10/06/12	10/06/12	EPA 376.2M
Sulfide, Total (24)	ND	0.10	0.084	1		mg/kg	10/12/12	10/12/12	EPA 376.2M
Carbon, Total Organic (24)	ND	0.050	0.012	1		%	N/A	10/08/12	EPA 9060A
Solids, Total (24)	ND	0.100	0.100	1		%	10/12/12	10/12/12	SM 2540 B
Ammonia (as N) (24)	ND	0.20	0.11	1		mg/kg	10/15/12	10/15/12	SM 4500-NH3 B/C (M)

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RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

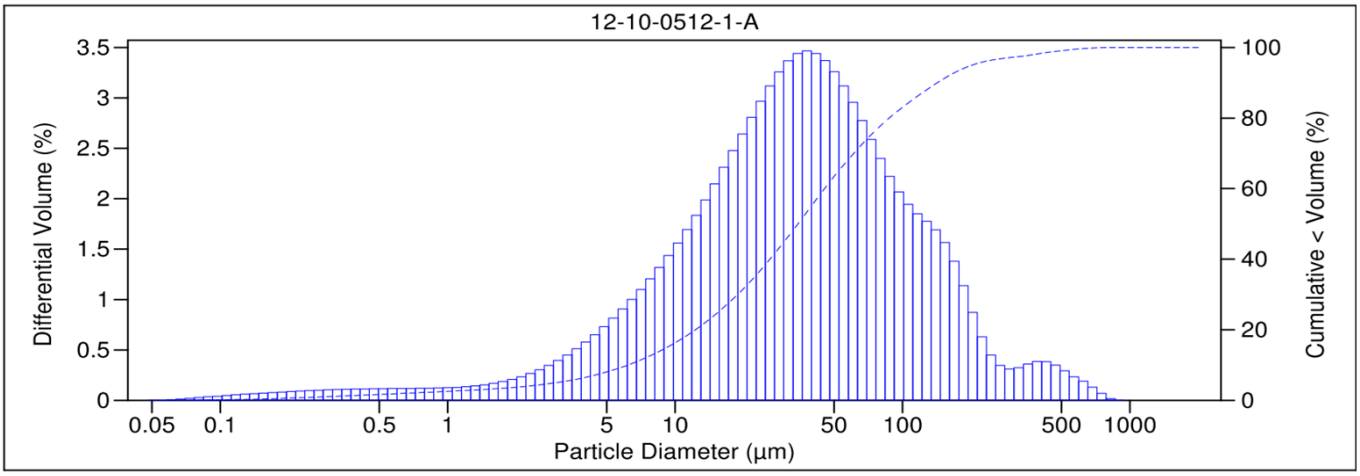
PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

Marine Research Consultants, Inc.		Date Sampled:	10/5/2012
		Date Received:	10/8/2012
		Work Order No:	12-10-0512
		Date Analyzed:	10/11/2012
		Method:	ASTM D4464M
Project:	DOT-Harbor Piers 12-15		Page 1 of 4

Sample ID	Depth ft	Description	Mean Grain Size mm
P-15-S		Silt	0.062

Particle Size Distribution, wt by percent								Total Silt & Clay
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	
0.00	0.00	0.90	2.64	8.90	16.80	64.41	6.34	70.75



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Calscience Environmental Laboratories, Inc.

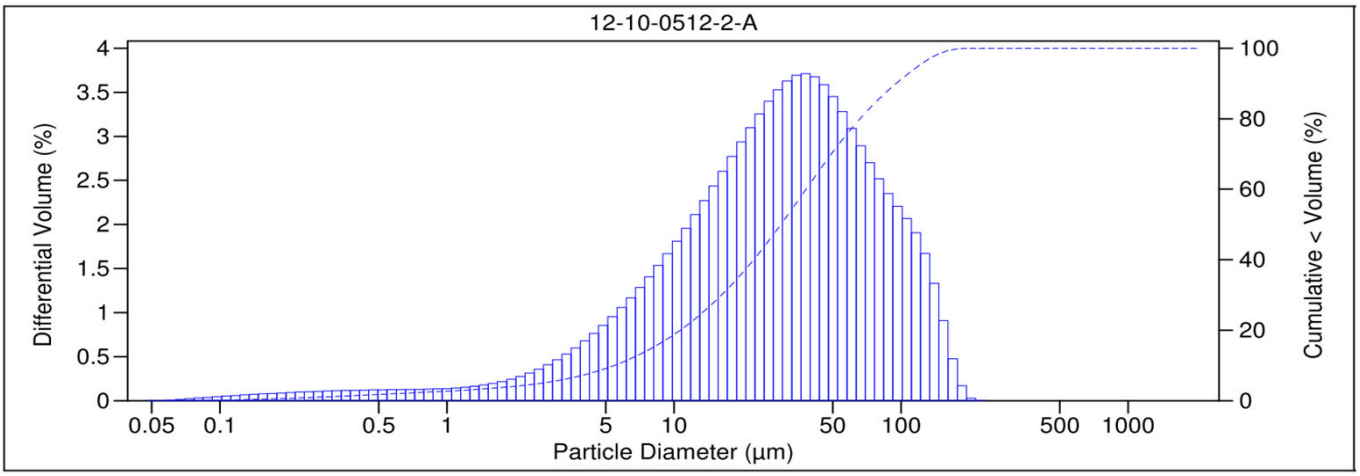
PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

Marine Research Consultants, Inc.		Date Sampled:	10/5/2012
		Date Received:	10/8/2012
		Work Order No:	12-10-0512
		Date Analyzed:	10/11/2012
		Method:	ASTM D4464M
Project:	DOT-Harbor Piers 12-15		Page 2 of 4

Sample ID	Depth ft	Description	Mean Grain Size mm
P-15-D		Silt	0.041

Particle Size Distribution, wt by percent								Total Silt & Clay
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	
0.00	0.00	0.00	0.00	4.15	17.60	71.09	7.16	78.25



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Calscience Environmental Laboratories, Inc.

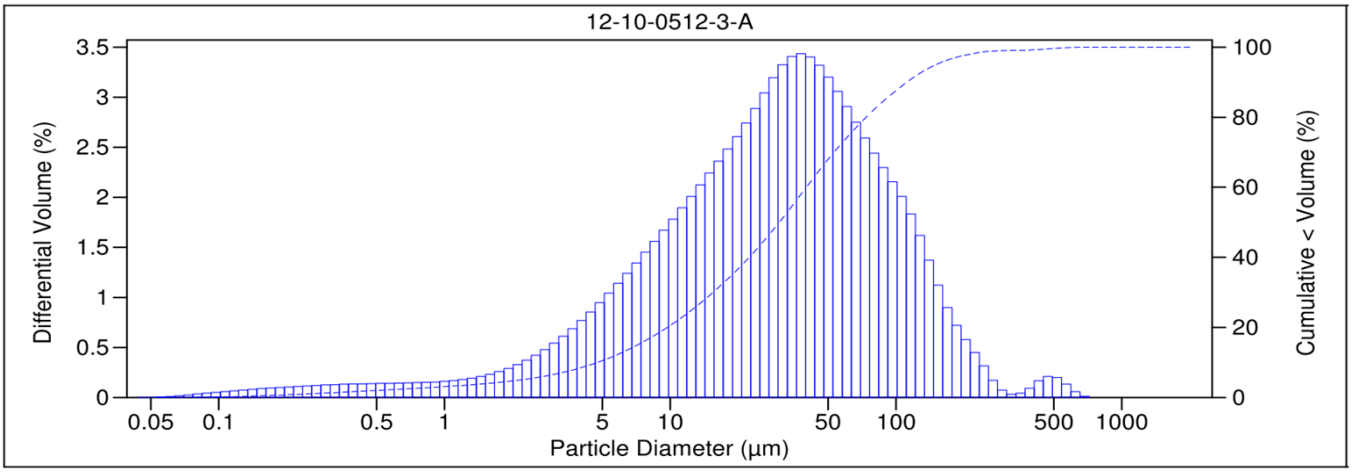
PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

Marine Research Consultants, Inc.		Date Sampled:	10/5/2012
		Date Received:	10/8/2012
		Work Order No:	12-10-0512
		Date Analyzed:	10/11/2012
		Method:	ASTM D4464M
Project:	DOT-Harbor Piers 12-15		Page 3 of 4

Sample ID	Depth ft	Description	Mean Grain Size mm
P-12-S		Silt	0.049

Particle Size Distribution, wt by percent								Total Silt & Clay
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	
0.00	0.00	0.38	0.92	6.55	16.99	66.87	8.29	75.16



Calscience Environmental Laboratories, Inc.

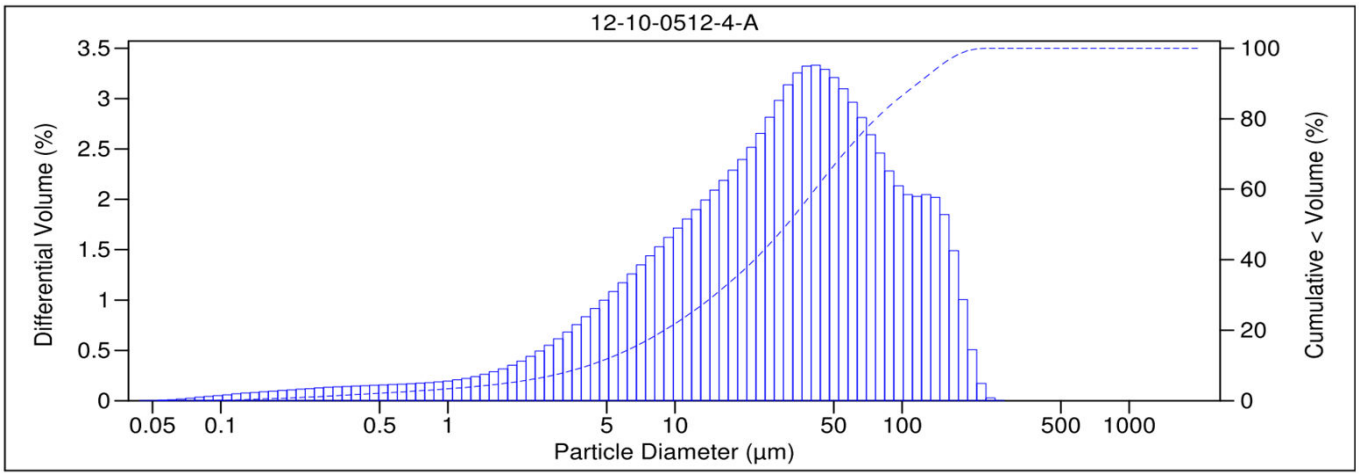
PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

Marine Research Consultants, Inc.		Date Sampled:	10/5/2012
		Date Received:	10/8/2012
		Work Order No:	12-10-0512
		Date Analyzed:	10/11/2012
		Method:	ASTM D4464M
Project:	DOT-Harbor Piers 12-15		Page 4 of 4

Sample ID	Depth ft	Description	Mean Grain Size mm
P-12-D		Silt	0.046

Particle Size Distribution, wt by percent								Total Silt & Clay
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	
0.00	0.00	0.00	0.01	8.57	17.40	64.59	9.44	74.02



Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

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Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 1311
		Method:	EPA 1640

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**ICP/MS 05**	**10/08/12**	**10/15/12**	**121010S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Antimony	ND	5.000	5.433	109	5.574	111	50-150	3	0-20	
Arsenic	13.99	5.000	16.63	53	17.21	64	50-150	3	0-20	
Barium	123.3	5.000	131.0	4X	132.1	4X	50-150	4X	0-20	Q
Beryllium	ND	50.00	56.68	113	57.57	115	50-150	2	0-20	
Cadmium	ND	5.000	3.969	79	3.920	78	50-150	1	0-20	
Chromium	ND	50.00	43.35	87	37.95	76	50-150	13	0-20	
Cobalt	11.28	5.000	23.40	242	18.43	143	50-150	24	0-20	3,4
Copper	ND	5.000	4.293	86	3.866	77	50-150	10	0-20	
Lead	0.7831	5.000	4.533	75	4.253	69	50-150	6	0-20	
Molybdenum	0.7798	5.000	2.894	42	3.211	49	50-150	10	0-20	3
Nickel	12.66	5.000	18.58	119	16.64	80	50-150	11	0-20	
Selenium	ND	5.000	5.286	106	5.349	107	50-150	1	0-20	
Silver	ND	2.500	2.299	92	2.055	82	50-150	11	0-20	
Thallium	ND	5.000	5.207	104	5.086	102	50-150	2	0-20	
Vanadium	2.191	5.000	5.760	71	5.590	68	50-150	3	0-20	
Zinc	80.98	50.00	145.8	130	148.8	136	50-150	2	0-20	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 3050B
Method:	EPA 6020

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**ICP/MS 03**	**10/09/12**	**10/09/12**	**121009S03**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Arsenic	5.298	25.00	33.57	113	33.44	113	80-120	0	0-20	
Cadmium	0.3249	25.00	26.81	106	27.10	107	80-120	1	0-20	
Chromium	32.80	25.00	59.40	106	59.02	105	80-120	1	0-20	
Copper	43.12	25.00	69.88	107	72.31	117	80-120	3	0-20	
Lead	27.52	25.00	49.43	88	52.61	100	80-120	6	0-20	
Nickel	30.49	25.00	57.14	107	58.55	112	80-120	2	0-20	
Selenium	0.2372	25.00	24.20	96	23.52	93	80-120	3	0-20	
Silver	0.1434	12.50	13.55	107	13.18	104	80-120	3	0-20	
Zinc	88.08	25.00	120.1	128	116.8	115	80-120	3	0-20	3

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - PDS / PDSD

Marine Research Consultants, Inc.		Date Received	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3050B
		Method:	EPA 6020

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
P-15-S	**Sediment**	**ICP/MS 03**	**10/09/12**	**10/09/12**	**121009S03**

Parameter	SAMPLE_CONC	SPIKE_ADDED	PDS_CONC	PDS %REC	%REC CL	Qualifiers
Arsenic	5.298	25.00	32.68	110	75-125	
Cadmium	0.3249	25.00	25.39	100	75-125	
Chromium	32.80	25.00	57.16	97	75-125	
Copper	43.12	25.00	71.46	113	75-125	
Lead	27.52	25.00	52.50	100	75-125	
Nickel	30.49	25.00	57.44	108	75-125	
Selenium	0.2372	25.00	23.15	92	75-125	
Silver	0.1434	12.50	11.43	90	75-125	
Zinc	88.08	25.00	116.1	112	75-125	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	N/A
		Method:	EPA 9060A

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**TOC 5**	**N/A**	**10/08/12**	**C1008TOCS1**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	2.1	3.0	4.6	82	4.6	84	75-125	1	0-25	

RPD - Relative Percent Difference , CL - Control Limit

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Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	N/A
Method:	EPA 413.2M

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-12-D	**Sediment**	**IR 2**	**10/17/12**	**10/17/12**	**121017S03**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Oil and Grease	ND	20.00	23.41	117	22.60	113	55-135	4	0-30	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	Extraction
		Method:	EPA 418.1M

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-12-D	**Sediment**	**IR 2**	**10/17/12**	**10/17/12**	**121017S04**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TRPH	ND	100.0	114.2	114	107.1	107	55-135	6	0-30	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	EPA 7471A Total
Method:	EPA 7471A

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**Mercury**	**10/08/12**	**10/09/12**	**121008S07**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	0.1392	0.8350	0.8457	85	0.8319	83	76-136	2	0-16	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received:	10/06/12
Work Order No:	12-10-0512
Preparation:	N/A
Method:	EPA 1631E

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**Hg/AF 1**	**10/08/12**	**10/11/12**	**121011S01**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	ND	0.2000	0.1995	100	0.1929	96	71-125	3	0-24	

RPD - Relative Percent Difference , CL - Control Limit

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Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3550B (M)
Method: Organotins by Krone et al.

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**GC/MS JJJ**	**10/10/12**	**10/11/12**	**121010S21C**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Tetrabutyltin	ND	100.0	89.42	89	97.93	98	79-175	9	0-31	
Tributyltin	ND	100.0	81.10	81	91.95	92	69-135	13	0-29	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

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Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 1311
		Method:	EPA 8270C SIM

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**GC/MS MM**	**10/09/12**	**10/16/12**	**121009S10**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
2,4,6-Trichlorophenol	ND	200.0	217.2	109	222.3	111	80-120	2	0-20	
2,4-Dichlorophenol	ND	200.0	246.5	123	251.8	126	40-160	2	0-20	
2-Methylphenol	ND	200.0	232.3	116	245.8	123	40-160	6	0-20	
2-Nitrophenol	ND	200.0	245.0	122	254.5	127	40-160	4	0-20	
4-Chloro-3-Methylphenol	ND	200.0	249.3	125	264.3	132	40-160	6	0-20	
Acenaphthene	ND	200.0	210.2	105	217.4	109	49-121	3	0-20	
Benzo (a) Pyrene	ND	200.0	271.5	136	281.9	141	40-160	4	0-20	
Chrysene	ND	200.0	228.0	114	241.0	121	40-160	6	0-20	
Di-n-Butyl Phthalate	ND	200.0	208.6	104	213.4	107	40-160	2	0-20	
Dimethyl Phthalate	ND	200.0	246.4	123	253.5	127	40-160	3	0-20	
Fluoranthene	ND	200.0	227.4	114	232.2	116	40-160	2	0-20	
Fluorene	ND	200.0	228.6	114	238.0	119	40-160	4	0-20	
Naphthalene	ND	200.0	190.0	95	199.4	100	40-160	5	0-20	
Phenanthrene	ND	200.0	218.7	109	224.2	112	40-160	2	0-20	
Phenol	ND	200.0	178.6	89	192.0	96	40-160	7	0-20	
Pyrene	ND	200.0	226.3	113	234.1	117	18-168	3	0-22	

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RPD - Relative Percent Difference , CL - Control Limit

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Quality Control - Spike/Spike Duplicate

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Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8081A

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**GC 51**	**10/09/12**	**10/11/12**	**121009S04**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Aldrin	ND	5.000	3.501	70	3.694	74	50-135	5	0-25	
Alpha-BHC	ND	5.000	4.720	94	4.391	88	50-135	7	0-25	
Beta-BHC	ND	5.000	4.518	90	4.644	93	50-135	3	0-25	
Delta-BHC	ND	5.000	4.062	81	4.005	80	50-135	1	0-25	
Gamma-BHC	ND	5.000	4.268	85	4.144	83	50-135	3	0-25	
Dieldrin	1.083	5.000	5.866	96	5.852	95	50-135	0	0-25	
4,4'-DDD	ND	5.000	7.732	155	7.697	154	50-135	0	0-25	3
4,4'-DDE	ND	5.000	5.542	111	5.538	111	50-135	0	0-25	
4,4'-DDT	ND	5.000	5.542	111	5.423	108	50-135	2	0-25	
Endosulfan I	ND	5.000	5.105	102	5.073	101	50-135	1	0-25	
Endosulfan II	ND	5.000	4.387	88	4.286	86	50-135	2	0-25	
Endosulfan Sulfate	ND	5.000	7.487	150	7.275	145	50-135	3	0-25	3
Endrin	ND	5.000	4.422	88	4.268	85	50-135	4	0-25	
Endrin Aldehyde	ND	5.000	3.712	74	3.846	77	50-135	4	0-25	
Endrin Ketone	ND	5.000	6.747	135	6.262	125	50-135	7	0-25	
Heptachlor	ND	5.000	4.239	85	4.126	83	50-135	3	0-25	
Heptachlor Epoxide	ND	5.000	5.109	102	4.871	97	50-135	5	0-25	
Methoxychlor	ND	5.000	6.578	132	6.946	139	50-135	5	0-25	3
Alpha Chlordane	3.016	5.000	12.35	187	12.39	188	50-135	0	0-25	3
Gamma Chlordane	2.566	5.000	7.414	97	7.358	96	50-135	1	0-25	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

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Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3545
		Method:	EPA 8270C SIM

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-12-D	**Sediment**	**GC/MS MM**	**10/10/12**	**10/13/12**	**121010S16**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
2,4,6-Trichlorophenol	ND	1000	603.7	60	615.8	62	40-160	2	0-20	
2,4-Dichlorophenol	ND	1000	709.8	71	766.6	77	40-160	8	0-20	
2-Methylphenol	ND	1000	761.4	76	818.8	82	40-160	7	0-20	
2-Nitrophenol	ND	1000	476.9	48	681.8	68	40-160	35	0-20	4
4-Chloro-3-Methylphenol	ND	1000	668.7	67	697.0	70	40-160	4	0-20	
Acenaphthene	ND	1000	667.6	67	740.1	74	40-106	10	0-20	
Benzo (a) Pyrene	147.3	1000	910.9	76	1013	87	17-163	11	0-20	
Chrysene	97.43	1000	805.6	71	870.2	77	17-168	8	0-20	
Di-n-Butyl Phthalate	ND	1000	589.9	59	621.2	62	40-160	5	0-20	
Dimethyl Phthalate	ND	1000	809.1	81	865.2	87	40-160	7	0-20	
Fluoranthene	131.3	1000	776.7	65	832.9	70	26-137	7	0-20	
Fluorene	ND	1000	701.5	70	759.6	76	59-121	8	0-20	
Naphthalene	12.93	1000	623.2	61	742.6	73	21-133	17	0-20	
Phenanthrene	49.70	1000	722.8	67	778.6	73	54-120	7	0-20	
Phenol	42.03	1000	897.7	86	871.0	83	40-160	3	0-20	
Pyrene	170.1	1000	821.6	65	917.9	75	6-156	11	0-46	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8270C SIM PCB Congeners

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-12-D	**Sediment**	**GC/MS HHH**	**10/10/12**	**10/12/12**	**121010S15**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
PCB008	ND	25.00	27.34	109	27.33	109	50-125	0	0-30	
PCB018	ND	25.00	24.60	98	25.06	100	50-125	2	0-30	
PCB028	0.8367	25.00	24.73	96	25.16	97	50-125	2	0-30	
PCB044	3.312	25.00	24.78	86	25.29	88	50-125	2	0-30	
PCB052	3.167	25.00	24.16	84	24.91	87	50-125	3	0-30	
PCB066	3.518	25.00	24.76	85	25.72	89	50-125	4	0-30	
PCB077	0.5733	25.00	24.98	98	25.98	102	50-125	4	0-30	
PCB101	2.470	25.00	26.26	95	26.90	98	50-125	2	0-30	
PCB105	1.267	25.00	25.35	96	26.43	101	50-125	4	0-30	
PCB118	2.507	25.00	29.78	109	30.90	114	50-125	4	0-30	
PCB126	ND	25.00	23.53	94	24.61	98	50-125	4	0-30	
PCB128	ND	25.00	24.70	99	26.26	105	50-125	6	0-30	
PCB153	1.703	25.00	25.74	96	26.70	100	50-125	4	0-30	
PCB170	0.6512	25.00	27.13	106	27.84	109	50-125	3	0-30	
PCB180	1.074	25.00	27.41	105	29.29	113	50-125	7	0-30	
PCB187	0.6801	25.00	25.13	98	26.32	103	50-125	5	0-30	
PCB195	ND	25.00	28.73	115	28.56	114	50-125	1	0-30	
PCB206	0.6126	25.00	31.03	122	30.61	120	50-125	1	0-30	
PCB209	1.779	25.00	28.31	106	28.47	107	50-125	1	0-30	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: 10/06/12
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM PCB Congeners

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-12-D	**Sediment**	**GC/MS HHH**	**10/08/12**	**10/15/12**	**121010S03**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
PCB008	ND	10.00	7.381	74	7.190	72	50-150	3	0-25	
PCB018	ND	10.00	7.258	73	7.129	71	50-150	2	0-25	
PCB028	ND	10.00	7.470	75	7.383	74	50-150	1	0-25	
PCB044	ND	10.00	7.996	80	7.835	78	50-150	2	0-25	
PCB052	ND	10.00	7.352	74	7.268	73	50-150	1	0-25	
PCB066	ND	10.00	7.944	79	7.829	78	50-150	1	0-25	
PCB077	ND	10.00	8.172	82	8.129	81	50-150	1	0-25	
PCB101	ND	10.00	8.173	82	8.103	81	50-150	1	0-25	
PCB105	ND	10.00	7.945	79	7.839	78	50-150	1	0-25	
PCB118	ND	10.00	9.145	91	9.072	91	50-150	1	0-25	
PCB126	ND	10.00	7.586	76	7.474	75	50-150	1	0-25	
PCB128	ND	10.00	7.828	78	7.797	78	50-150	0	0-25	
PCB153	ND	10.00	7.631	76	7.492	75	50-150	2	0-25	
PCB170	ND	10.00	7.401	74	7.236	72	50-150	2	0-25	
PCB180	ND	10.00	8.304	83	8.165	82	50-150	2	0-25	
PCB187	ND	10.00	7.955	80	7.765	78	50-150	2	0-25	
PCB195	ND	10.00	8.123	81	7.813	78	50-150	4	0-25	
PCB206	ND	10.00	8.636	86	8.251	83	50-150	5	0-25	
PCB209	ND	10.00	7.686	77	7.357	74	50-150	4	0-25	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.		Date Received:	10/06/12
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 1311
		Method:	EPA 8081A

Project DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
P-15-S	**Sediment**	**GC 44**	**10/08/12**	**10/15/12**	**121010S04**

Parameter	SAMPLE CONC	SPIKE ADDED	MS CONC	MS %REC	MSD CONC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Aldrin	ND	2.500	1.994	80	1.938	78	50-150	3	0-25	
Alpha Chlordane	ND	2.500	2.327	93	2.264	91	50-150	3	0-25	
Alpha-BHC	ND	2.500	2.584	103	2.457	98	50-150	5	0-25	
Beta-BHC	ND	2.500	2.366	95	2.252	90	50-150	5	0-25	
4,4'-DDD	ND	2.500	2.396	96	2.280	91	50-150	5	0-25	
4,4'-DDE	ND	2.500	2.481	99	2.391	96	50-150	4	0-25	
4,4'-DDT	ND	2.500	2.548	102	2.479	99	50-150	3	0-25	
Delta-BHC	ND	2.500	2.534	101	2.388	96	50-150	6	0-25	
Dieldrin	ND	2.500	2.493	100	2.399	96	50-150	4	0-25	
Endosulfan I	ND	2.500	2.532	101	2.418	97	50-150	5	0-25	
Endosulfan II	ND	2.500	2.520	101	2.425	97	50-150	4	0-25	
Endosulfan Sulfate	ND	2.500	2.407	96	2.335	93	50-150	3	0-25	
Endrin	ND	2.500	2.279	91	2.223	89	50-150	3	0-25	
Endrin Aldehyde	ND	2.500	2.601	104	2.500	100	50-150	4	0-25	
Gamma Chlordane	ND	2.500	2.274	91	2.222	89	50-150	2	0-25	
Gamma-BHC	ND	2.500	2.535	101	2.426	97	50-150	4	0-25	
Heptachlor	ND	2.500	2.164	87	2.071	83	50-150	4	0-25	
Heptachlor Epoxide	ND	2.500	2.392	96	2.293	92	50-150	4	0-25	
Methoxychlor	ND	2.500	2.464	99	2.375	95	50-150	4	0-25	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: N/A
Work Order No: 12-10-0512

Project: DOT-Harbor Piers 12-15

Matrix: Aqueous or Solid

Parameter	Method	QC Sample ID	Date Analyzed	Sample Conc	DUP Conc	RPD	RPD CL	Qualifiers
Sulfide, Total	EPA 376.2M	P-12-D	10/12/12	1.5	1.6	6	0-25	
Sulfide, Dissolved	EPA 376.2M	P-12-D	10/06/12	ND	ND	NA	0-25	
Solids, Total	SM 2540 B	P-12-D	10/12/12	39.0	40.0	3	0-10	
Solids, Volatile	EPA 160.4M	P-12-D	10/12/12	4.2	4.5	7	0-25	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: N/A
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 1640

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-067-278	**Aqueous**	**ICP/MS 05**	**10/08/12**	**10/15/12**	**121010L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Antimony	0.5000	0.5539	111	0.5938	119	70-130	60-140	7	0-20	
Arsenic	0.5000	0.5230	105	0.5323	106	70-130	60-140	2	0-20	
Barium	0.5000	0.6029	121	0.5854	117	70-130	60-140	3	0-20	
Beryllium	5.000	5.236	105	5.406	108	70-130	60-140	3	0-20	
Cadmium	0.5000	0.3643	73	0.3632	73	70-130	60-140	0	0-20	
Chromium	5.000	5.144	103	4.917	98	70-130	60-140	5	0-20	
Cobalt	0.5000	0.4576	92	0.4558	91	70-130	60-140	0	0-20	
Copper	0.5000	0.4459	89	0.4554	91	70-130	60-140	2	0-20	
Lead	0.5000	0.5569	111	0.5605	112	70-130	60-140	1	0-20	
Molybdenum	0.5000	0.4789	96	0.4870	97	70-130	60-140	2	0-20	
Nickel	0.5000	0.4439	89	0.4789	96	70-130	60-140	8	0-20	
Selenium	0.5000	0.5610	112	0.5584	112	70-130	60-140	0	0-20	
Silver	0.2500	0.2453	98	0.2083	83	70-130	60-140	16	0-20	
Thallium	0.5000	0.4815	96	0.4770	95	70-130	60-140	1	0-20	
Vanadium	0.5000	0.5234	105	0.5142	103	70-130	60-140	2	0-20	
Zinc	5.000	3.749	75	3.837	77	70-130	60-140	2	0-20	

Total number of LCS compounds : 16
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3050B
		Method:	EPA 6020

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-254-55	**Solid**	**ICP/MS 03**	**10/09/12**	**10/09/12**	**121009L03E**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Arsenic	25.00	25.58	102	26.29	105	80-120	3	0-20	
Cadmium	25.00	25.06	100	24.94	100	80-120	0	0-20	
Chromium	25.00	24.12	96	24.07	96	80-120	0	0-20	
Copper	25.00	27.58	110	28.67	115	80-120	4	0-20	
Lead	25.00	24.47	98	24.91	100	80-120	2	0-20	
Nickel	25.00	26.30	105	26.73	107	80-120	2	0-20	
Selenium	25.00	20.34	81	20.51	82	80-120	1	0-20	
Silver	12.50	11.40	91	11.78	94	80-120	3	0-20	
Zinc	25.00	25.31	101	25.55	102	80-120	1	0-20	

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	N/A
		Method:	EPA 9060A

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-06-013-789	**Solid**	**TOC 5**	**N/A**	**10/08/12**	**C1008TOCL1**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	0.60	0.50	83	0.51	84	80-120	2	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	N/A
		Method:	SM 4500-NH3 B/C (M)

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-816-49	**Solid**	**BUR05**	**10/15/12**	**10/15/12**	**C1015NH3L1**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Ammonia (as N)	5.0	4.8	95	4.6	92	80-120	3	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	N/A
		Method:	EPA 413.2M

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	Lab File ID	LCS Batch Number
099-07-019-127	**Solid**	**IR 2**	**10/17/12**	**NONE**	**121017L03**

Parameter	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
Oil and Grease	20.00	19.87	99	70-130	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - Laboratory Control Sample

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	Extraction
		Method:	EPA 418.1M

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	Lab File ID	LCS Batch Number
099-07-015-1,883	**Solid**	**IR 2**	**10/17/12**	**NONE**	**121017L04**

Parameter	Conc Added	Conc Recovered	LCS %Rec	%Rec CL	Qualifiers
TRPH	100.0	95.80	96	70-130	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 7471A Total
		Method:	EPA 7471A

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-452-334	**Solid**	**Mercury**	**10/08/12**	**10/09/12**	**121008L07E**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	0.8350	0.8107	97	0.8003	96	82-124	1	0-16	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	N/A
		Method:	EPA 1631E

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-224-10	**Aqueous**	**Hg/AF 1**	**10/08/12**	**10/11/12**	**121011L01**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Mercury	0.2000	0.2063	103	0.2111	106	71-125	2	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3550B (M)
		Method:	Organotins by Krone et al.

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-07-016-974	**Solid**	**GC/MS JJJ**	**10/10/12**	**10/11/12**	**121010L21**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Tetrabutyltin	100.0	80.81	81	88.14	88	79-151	9	0-20	
Tributyltin	100.0	75.88	76	78.08	78	51-129	3	0-20	

RPD - Relative Percent Difference , CL - Control Limit

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Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: N/A
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-430-172	**Aqueous**	**GC/MS MM**	**10/09/12**	**10/16/12**	**121009L10**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
2,4,6-Trichlorophenol	200.0	159.4	80	158.0	79	80-120	73-127	1	0-20	ME
2,4-Dichlorophenol	200.0	159.4	80	159.2	80	40-160	20-180	0	0-20	
2-Methylphenol	200.0	173.0	86	173.2	87	40-160	20-180	0	0-20	
2-Nitrophenol	200.0	154.0	77	157.4	79	40-160	20-180	2	0-20	
4-Chloro-3-Methylphenol	200.0	162.6	81	165.0	83	40-160	20-180	1	0-20	
Acenaphthene	200.0	176.8	88	172.2	86	55-121	44-132	3	0-15	
Benzo (a) Pyrene	200.0	175.0	87	176.1	88	17-163	0-187	1	0-20	
Chrysene	200.0	150.8	75	150.0	75	17-168	0-193	1	0-20	
Di-n-Butyl Phthalate	200.0	138.4	69	138.6	69	40-160	20-180	0	0-20	
Dimethyl Phthalate	200.0	184.1	92	182.2	91	40-160	20-180	1	0-20	
Fluoranthene	200.0	154.0	77	149.9	75	26-137	8-156	3	0-20	
Fluorene	200.0	186.3	93	181.3	91	59-121	49-131	3	0-20	
Naphthalene	200.0	150.1	75	150.8	75	21-133	2-152	0	0-20	
Phenanthrene	200.0	142.2	71	143.7	72	54-120	43-131	1	0-20	
Phenol	200.0	163.0	81	163.3	82	40-160	20-180	0	0-20	
Pyrene	200.0	148.2	74	146.2	73	45-129	31-143	1	0-15	

Total number of LCS compounds : 16
Total number of ME compounds : 1
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: N/A
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8081A

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-858-161	**Solid**	**GC 51**	**10/09/12**	**10/11/12**	**121009L04**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Aldrin	5.000	4.570	91	4.594	92	50-135	36-149	1	0-25	
Alpha-BHC	5.000	4.552	91	4.586	92	50-135	36-149	1	0-25	
Beta-BHC	5.000	4.531	91	4.539	91	50-135	36-149	0	0-25	
Delta-BHC	5.000	4.272	85	4.292	86	50-135	36-149	0	0-25	
Gamma-BHC	5.000	4.542	91	4.596	92	50-135	36-149	1	0-25	
Dieldrin	5.000	4.567	91	4.592	92	50-135	36-149	1	0-25	
4,4'-DDD	5.000	4.475	90	4.464	89	50-135	36-149	0	0-25	
4,4'-DDE	5.000	4.359	87	4.331	87	50-135	36-149	1	0-25	
4,4'-DDT	5.000	4.378	88	4.384	88	50-135	36-149	0	0-25	
Endosulfan I	5.000	4.997	100	5.072	101	50-135	36-149	1	0-25	
Endosulfan II	5.000	4.339	87	4.354	87	50-135	36-149	0	0-25	
Endosulfan Sulfate	5.000	4.355	87	4.374	87	50-135	36-149	0	0-25	
Endrin	5.000	4.138	83	4.178	84	50-135	36-149	1	0-25	
Endrin Aldehyde	5.000	4.660	93	4.687	94	50-135	36-149	1	0-25	
Endrin Ketone	5.000	4.858	97	4.867	97	50-135	36-149	0	0-25	
Heptachlor	5.000	4.652	93	4.682	94	50-135	36-149	1	0-25	
Heptachlor Epoxide	5.000	4.302	86	4.325	86	50-135	36-149	1	0-25	
Methoxychlor	5.000	4.305	86	4.313	86	50-135	36-149	0	0-25	
Alpha Chlordane	5.000	4.403	88	4.410	88	50-135	36-149	0	0-25	
Gamma Chlordane	5.000	4.481	90	4.500	90	50-135	36-149	0	0-25	

Total number of LCS compounds : 20
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

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RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 3545
		Method:	EPA 8270C SIM

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-256-13	**Solid**	**GC/MS MM**	**10/10/12**	**10/13/12**	**121010L16**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
2,4,6-Trichlorophenol	1000	466.8	47	471.0	47	40-160	20-180	1	0-20	
2,4-Dichlorophenol	1000	543.6	54	546.4	55	40-160	20-180	0	0-20	
2-Methylphenol	1000	419.3	42	429.8	43	40-160	20-180	2	0-20	
2-Nitrophenol	1000	419.3	42	427.4	43	40-160	20-180	2	0-20	
4-Chloro-3-Methylphenol	1000	486.1	49	482.8	48	40-160	20-180	1	0-20	
Acenaphthene	1000	663.0	66	683.5	68	48-108	38-118	3	0-11	
Benzo (a) Pyrene	1000	768.0	77	829.7	83	17-163	0-187	8	0-20	
Chrysene	1000	701.9	70	752.4	75	17-168	0-193	7	0-20	
Di-n-Butyl Phthalate	1000	645.7	65	692.8	69	40-160	20-180	7	0-20	
Dimethyl Phthalate	1000	729.2	73	704.4	70	40-160	20-180	3	0-20	
Fluoranthene	1000	717.1	72	768.4	77	26-137	8-156	7	0-20	
Fluorene	1000	709.1	71	727.0	73	59-121	49-131	2	0-20	
Naphthalene	1000	613.5	61	631.6	63	21-133	2-152	3	0-20	
Phenanthrene	1000	653.3	65	701.6	70	54-120	43-131	7	0-20	
Phenol	1000	464.0	46	484.9	48	40-160	20-180	4	0-20	
Pyrene	1000	689.5	69	740.4	74	28-106	15-119	7	0-16	

Total number of LCS compounds : 16
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

Return to Contents

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: N/A
Work Order No: 12-10-0512
Preparation: EPA 3545
Method: EPA 8270C SIM PCB Congeners

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-341-68	**Solid**	**GC/MS HHH**	**10/10/12**	**10/12/12**	**121010L15**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
PCB008	25.00	14.98	60	14.46	58	50-125	38-138	4	0-30	
PCB018	25.00	15.68	63	15.18	61	50-125	38-138	3	0-30	
PCB028	25.00	16.15	65	15.66	63	50-125	38-138	3	0-30	
PCB044	25.00	16.47	66	16.14	65	50-125	38-138	2	0-30	
PCB052	25.00	15.39	62	14.98	60	50-125	38-138	3	0-30	
PCB066	25.00	16.53	66	16.14	65	50-125	38-138	2	0-30	
PCB077	25.00	16.91	68	16.65	67	50-125	38-138	1	0-30	
PCB101	25.00	16.47	66	16.15	65	50-125	38-138	2	0-30	
PCB105	25.00	16.18	65	15.70	63	50-125	38-138	3	0-30	
PCB118	25.00	18.24	73	18.11	72	50-125	38-138	1	0-30	
PCB126	25.00	15.16	61	14.86	59	50-125	38-138	2	0-30	
PCB128	25.00	15.64	63	15.40	62	50-125	38-138	2	0-30	
PCB153	25.00	14.75	59	14.41	58	50-125	38-138	2	0-30	
PCB170	25.00	13.76	55	13.17	53	50-125	38-138	4	0-30	
PCB180	25.00	15.71	63	15.41	62	50-125	38-138	2	0-30	
PCB187	25.00	15.14	61	15.00	60	50-125	38-138	1	0-30	
PCB195	25.00	14.94	60	14.40	58	50-125	38-138	4	0-30	
PCB206	25.00	14.75	59	14.19	57	50-125	38-138	4	0-30	
PCB209	25.00	13.68	55	12.84	51	50-125	38-138	6	0-30	

Total number of LCS compounds : 19
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

Return to Contents

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu, HI 96822-1173

Date Received: N/A
Work Order No: 12-10-0512
Preparation: EPA 1311
Method: EPA 8270C SIM PCB Congeners

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-433-44	**Aqueous**	**GC/MS HHH**	**10/10/12**	**10/15/12**	**121010L03**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
PCB008	10.00	8.655	87	8.695	87	50-150	33-167	0	0-25	
PCB018	10.00	8.538	85	8.564	86	50-150	33-167	0	0-25	
PCB028	10.00	8.965	90	8.947	89	50-150	33-167	0	0-25	
PCB044	10.00	9.452	95	9.539	95	50-150	33-167	1	0-25	
PCB052	10.00	8.778	88	8.743	87	50-150	33-167	0	0-25	
PCB066	10.00	9.562	96	9.555	96	50-150	33-167	0	0-25	
PCB077	10.00	9.930	99	9.854	99	50-150	33-167	1	0-25	
PCB101	10.00	9.929	99	9.815	98	50-150	33-167	1	0-25	
PCB105	10.00	9.687	97	9.722	97	50-150	33-167	0	0-25	
PCB118	10.00	11.12	111	11.21	112	50-150	33-167	1	0-25	
PCB126	10.00	9.224	92	9.179	92	50-150	33-167	0	0-25	
PCB128	10.00	9.610	96	9.625	96	50-150	33-167	0	0-25	
PCB153	10.00	9.224	92	9.298	93	50-150	33-167	1	0-25	
PCB170	10.00	9.069	91	9.049	90	50-150	33-167	0	0-25	
PCB180	10.00	10.16	102	10.07	101	50-150	33-167	1	0-25	
PCB187	10.00	9.631	96	9.611	96	50-150	33-167	0	0-25	
PCB195	10.00	9.898	99	9.906	99	50-150	33-167	0	0-25	
PCB206	10.00	10.47	105	10.41	104	50-150	33-167	1	0-25	
PCB209	10.00	9.310	93	9.478	95	50-150	33-167	2	0-25	

Total number of LCS compounds : 19
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

Return to Contents

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

ACCREDITED IN ACCORDANCE WITH nelac

Marine Research Consultants, Inc.		Date Received:	N/A
1039 Waakaua Pl.		Work Order No:	12-10-0512
Honolulu, HI 96822-1173		Preparation:	EPA 1311
		Method:	EPA 8081A

Project: DOT-Harbor Piers 12-15

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-435-67	**Aqueous**	**GC 44**	**10/10/12**	**10/15/12**	**121010L04**

Parameter	SPIKE ADDED	LCS CONC	LCS %REC	LCSD CONC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Aldrin	2.500	1.677	67	2.055	82	50-150	33-167	20	0-25	
Alpha Chlordane	2.500	1.977	79	2.380	95	50-150	33-167	19	0-25	
Alpha-BHC	2.500	2.249	90	2.637	105	50-150	33-167	16	0-25	
Beta-BHC	2.500	2.017	81	2.358	94	50-150	33-167	16	0-25	
4,4'-DDD	2.500	2.043	82	2.407	96	50-150	33-167	16	0-25	
4,4'-DDE	2.500	2.091	84	2.490	100	50-150	33-167	17	0-25	
4,4'-DDT	2.500	2.175	87	2.624	105	50-150	33-167	19	0-25	
Delta-BHC	2.500	2.152	86	2.532	101	50-150	33-167	16	0-25	
Dieldrin	2.500	2.112	84	2.498	100	50-150	33-167	17	0-25	
Endosulfan I	2.500	2.142	86	2.533	101	50-150	33-167	17	0-25	
Endosulfan II	2.500	2.143	86	2.529	101	50-150	33-167	17	0-25	
Endosulfan Sulfate	2.500	2.054	82	2.456	98	50-150	33-167	18	0-25	
Endrin	2.500	1.982	79	2.392	96	50-150	33-167	19	0-25	
Endrin Aldehyde	2.500	2.221	89	2.551	102	50-150	33-167	14	0-25	
Gamma Chlordane	2.500	1.936	77	2.349	94	50-150	33-167	19	0-25	
Gamma-BHC	2.500	2.218	89	2.598	104	50-150	33-167	16	0-25	
Heptachlor	2.500	1.823	73	2.250	90	50-150	33-167	21	0-25	
Heptachlor Epoxide	2.500	2.035	81	2.413	97	50-150	33-167	17	0-25	
Methoxychlor	2.500	2.093	84	2.521	101	50-150	33-167	19	0-25	

Total number of LCS compounds : 19
Total number of ME compounds : 0
Total number of ME compounds allowed : 1
LCS ME CL validation result : Pass

Return to Contents

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 12-10-0512

Qualifier	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported without further clarification.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
ME	LCS/LCSD Recovery Percentage is within Marginal Exceedance (ME) Control Limit range.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
MPN - Most Probable Number

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12-10-0512

CHAIN OF CUSTODY

MARINE RESEARCH CONSULTANTS, INC.
1039 WAAKAUA PL. HONOLULU, HI 96822

SUBMITTED TO:

CALSCIENCES
7440 Lincoln Way
Garden Grove CA 92841
(714) 895-5494

PROJECT: DOT-Harbors Piers 12-15

SAMPLE NO.	SAMPLE ID	DATE	TIME	SAMPLE TYPE	# OF CONTAINERS	REQUESTED ANALYSES	PRESERVE
1	P-15-S	5-Oct-12	0821	sediment	1	see attached list of constituents	ice
2	P-15-D	"	0822	"	1	"	"
3	P-12-S	"	0810	"	1	"	"
4	P-12-D	"	0811	"	1	"	"

SAMPLED BY:	RELINQUISHED BY:	RECEIVED BY:
S. Dollar 10/5/12	S. Dollar 10/5/12	Yau Liao 10/06/12
PRINT DATE	PRINT DATE	PRINT DATE
0810	1430	1030
SIGNATURE TIME	SIGNATURE TIME	SIGNATURE TIME

COMMENTS:

Calscience Environmental Laboratories, Inc.

7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1427
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: Maxxam Analytical

CHAIN OF CUSTODY RECORD

DATE: 10/08/12
PAGE: 1 OF 1

LABORATORY CLIENT: Calscience Environmental Laboratories, Inc.	CLIENT PROJECT NAME / NUMBER: 12-10-0512
ADDRESS: 7440 Lincoln Way	P.O. NO.: 12-10-0512
CITY: Garden Grove, CA 92841-1427	PROJECT CONTACT: Danielle Gonsman
TEL: (714) 895-5494 / E-MAIL: dgonsman@calscience.com	TEMP BLANK:
	SAMPLER(S) - PRINT:
	LAB USE ONLY

TURNAROUND TIME: ___ SAME DAY ___ 24 HR ___ 48 HR ___ 72 HR ___ 5 DAYS X STANDARD

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSIS

9-Oct-12 11 40
Ivana Vukovic
B2F6092
RDV ENV-979

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	#Cont	Dioxins/Furans by EPA 8290
	P-15-S	10/05/12	0821	SED	1	x
	P-15-D	10/05/12	0822	SED	1	x
	P-12-S	10/05/12	0810	SED	1	x
	P-12-D	10/05/12	0811	SED	1	x

Relinquished by (Signature)	Received by / Affiliation (Signature)	Date	Time
(CALSCIENCE)	Fedex # 799145162616 75 5914 18	10/8/12	1530
	ZUKEY SAMARCO 2012/10/09 11:40		

3.5°C, 5°C

Table 4. Chemical and Physical Parameters, Analytical Methods, and Target Detection Limits

Parameter	Method	Procedure	Sediment Target Detection Limit (dry weight)	Tissue Target Detection Limit (wet weight)
Physical / Conventional Tests				
Grain Size	Plumb (1981)	Sieve/Pipette	1.0%	n/a
~~Specific Gravity~~	SM 2710F	Gravimetric	0.001 g/cc	n/a
~~Atterberg Limits~~	ASTM D4318	Wet Preparation	1%	n/a
TOC	USEPA 9060A	Combustion IR	0.01%	n/a
Percent Solids	SM 2540B	Gravimetric	0.1%	n/a
Percent Volatile Solids	SM 2540E	Gravimetric	0.1%	n/a
Ammonia	SM 4500-NH3F	ICP-MS	0.01 mg/L	n/a
Total Sulfides	Plumb (1981)	Titrametric	0.05 mg/L	n/a
Dissolved Sulfides	Plumb (1981)	Titrametric	0.01 mg/L	n/a
Oil and Grease	SM 5520E	Gravimetric	2%	n/a
TRPH	SM 5520E	IR Spectroscopy	0.1%	n/a
Lipids	Gravimetric	Gravimetric	n/a	0.01%
Metals				
Arsenic (As)	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Cadmium (Cd)	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Chromium (Cr)	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Copper (Cu)	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Lead (Pb)	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Mercury (Hg)	USEPA 245.7m	CVAFS	0.01 mg/kg	0.01 mg/kg
Nickel (Ni)	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Selenium	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Silver	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Zinc (Zn)	USEPA 6020m	ICP-MS	0.025 mg/kg	0.025 mg/kg
Pesticides				
4-4′ DDD	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
4-4′-DDE	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
4-4′-DDT	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Aldrin	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
α-BHC	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
β-BHC	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Chlordane	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
δ-BHC	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Dieldrin	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Endosulfan I	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Endosulfan II	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Endosulfan Sulfate	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Endrin	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Endrin Aldehyde	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Heptachlor	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Endrin Ketone	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Heptachlor Epoxide	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
γ-BHC	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Methoxychlor	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Toxaphene	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
PCBs				
Aroclor 1016	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
Aroclor 1221	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
Aroclor 1232	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
Aroclor 1242	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
Aroclor 1248	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
Aroclor 1254	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
Aroclor 1260	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
PCB Congeners	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Dioxin/furan*				
2,3,7,8-TCDD	USEPA 8290	GC/MS	1.0 ng/kg	1.0 ng/kg
1,2,3,7,8-PeCDD	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,6,7,8-HxCDD	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,7,8,9-HxCDD	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg

Table 4. Chemical and Physical Parameters, Analytical Methods, and Target Detection Limits

Parameter	Method	Procedure	Sediment Target Detection Limit (dry weight)	Tissue Target Detection Limit (wet weight)
1,2,3,4,6,7,8,9-HpCDD	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,4,6,7,8,9-OCDD	USEPA 8290	GC/MS	5.0 ng/kg	5.0 ng/kg
2,3,7,8-TCDF	USEPA 8290	GC/MS	1.0 ng/kg	1.0 ng/kg
1,2,3,7,8-PeCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
2,3,4,7,8-PeCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,6,7,8-HxCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,7,8,9-HxCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,4,7,8-HxCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
2,3,4,6,7,8- HxCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,4,7,8-HxCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,4,6,7,8-HpCDF	USEPA 8290	GC/MS	2.5 ng/kg	2.5 ng/kg
1,2,3,4,7,8,9-HpCDF	USEPA 8290	GC/MS	5.0 ng/kg	5.0 ng/kg
1,2,3,4,6,7,8,9-OCDF	USEPA 8290	GC/MS	5.0 ng/kg	5.0 ng/kg
Semivolatile Organics				
2,4-dimethylphenol	USEPA 8270Cm	GC/MS SIM	100 µg/kg	n/a
2,4,6-trichlorophenol	USEPA 8270Cm	GC/MS SIM	50 µg/kg	n/a
2-chlorophenol	USEPA 8270Cm	GC/MS SIM	50 µg/kg	n/a
2,4-dichlorophenol	USEPA 8270Cm	GC/MS SIM	50 µg/kg	n/a
2-nitrophenol	USEPA 8270Cm	GC/MS SIM	100 µg/kg	n/a
4-nitrophenol	USEPA 8270Cm	GC/MS SIM	100 µg/kg	n/a
4-methylphenol	USEPA 8270Cm	GC/MS SIM	100 µg/kg	n/a
4,6-dinitro-2-methylphenol	USEPA 8270Cm	GC/MS SIM	100 µg/kg	n/a
2,4-dinitrophenol	USEPA 8270Cm	GC/MS SIM	100 µg/kg	n/a
Pentachlorophenol	USEPA 8270Cm	GC/MS SIM	50 µg/kg	n/a
Naphthalene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Acenaphthylene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Acenaphthene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Fluorene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Phenanthrene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Anthracene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Fluoranthene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Pyrene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Chrysene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Benzo(a)anthracene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Benzo(b)fluoranthene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Benzo(a)pyrene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Indeno(1,2,3-cd)pyrene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Dibenzo(a,h)anthracene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Benzo(g,h,i)perylene	USEPA 8270Cm	GC/MS SIM	1 µg/kg	1 µg/kg
Bis (2-ethylhexyl) phthalate	USEPA 8270Cm	GC/MS SIM	100 µg/kg	100 µg/kg
Butyl benzyl phthalate	USEPA 8270Cm	GC/MS SIM	25 µg/kg	25 µg/kg
Di-n-butylbenzyl phthalate	USEPA 8270Cm	GC/MS SIM	100 µg/kg	100 µg/kg
Diethyl phthalate	USEPA 8270Cm	GC/MS SIM	50 µg/kg	50 µg/kg
Dimethyl phthalate	USEPA 8270Cm	GC/MS SIM	75 µg/kg	75 µg/kg
Di-n-octyl phthalate	USEPA 8270Cm	GC/MS SIM	10 µg/kg	10 µg/kg
Organotins				
Monobutyltin	Krone et al. (1989)	GC/MS	1 µg/kg	1 µg/kg
Dibutyltin	Krone et al. (1989)	GC/MS	1 µg/kg	1 µg/kg
Tributyltin	Krone et al. (1989)	GC/MS	1 µg/kg	1 µg/kg
Tetrabutyltin	Krone et al. (1989)	GC/MS	1 µg/kg	1 µg/kg

* Detection limit may vary significantly based on sample; therefore, reporting limits are presented in this table.
n/a not applicable

Table 5. Chemical Analytes, Analytical Methods, and Target Detection Limits for Toxicity Characteristic Leaching Procedure

Analyte	Method	Procedure	Leachate Target Detection Limit (wet weight)
TCLP Metals			
Antimony (Sb)	USEPA 200.8(m)	ICP-MS	0.1 µg/L
Arsenic (As)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Barium (Ba)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Beryllium (Be)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Cadmium (Cd)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Chromium (Cr)	USEPA 200.8(m)	ICP-MS	0.1 µg/L
Cobalt (Co)	USEPA 200.8(m)	ICP-MS	0.1 µg/L
Copper (Cu)	USEPA 200.8(m)	ICP-MS	0.4 µg/L
Lead (Pb)	USEPA 200.8(m)	ICP-MS	0.05 µg/L
Molybdenum (Mo)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Nickel (Ni)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Selenium (Se)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Silver (Ag)	USEPA 200.8(m)	ICP-MS	0.5 µg/L
Thallium (Tl)	USEPA 200.8(m)	ICP-MS	0.1 µg/L
Vanadium (V)	USEPA 200.8(m)	ICP-MS	0.2 µg/L
Zinc (Zn)	USEPA 200.8(m)	ICP-MS	0.1 µg/L
Mercury (Hg)	USEPA 245.7m	CVAFS	0.01 µg/L
TCLP Semivolatile Organics			
2,4,6-trichlorophenol	USEPA625(m)	GC/MS SIM	0.05 µg/L
2,4-dichlorophenol	USEPA625(m)	GC/MS SIM	0.05 µg/L
Pentachlorophenol	USEPA625(m)	GC/MS SIM	0.05 µg/L
TCLP Pesticides			
Aldrin	USEPA625(m)	GC/MS SIM	0.001 µg/L
γ-BHC	USEPA625(m)	GC/MS SIM	0.001 µg/L
Chlordane (Total)	USEPA625(m)	GC/MS SIM	0.001 µg/L
Dieldrin	USEPA625(m)	GC/MS SIM	0.001 µg/L
Endrin	USEPA625(m)	GC/MS SIM	0.001 µg/L
Heptachlor	USEPA625(m)	GC/MS SIM	0.001 µg/L
Heptachlor Epoxide	USEPA625(m)	GC/MS SIM	0.001 µg/L
Methoxychlor	USEPA625(m)	GC/MS SIM	0.001 µg/L
Toxaphene	USEPA625(m)	GC/MS SIM	0.010 µg/L
Total Detectable DDTs	USEPA625(m)	GC/MS SIM	0.001 µg/L
TCLP PCBs			
Total Detectable PCBs	USEPA625(m)	GC/MS SIM	0.001 µg/L

2.3 Bioassay Testing

To establish suitability for ocean disposal, bioassay testing will be conducted in accordance with the OTM (USEPA and USACE, 1991), ITM (USEPA and USACE, 1998), RIM (USEPA Region IX and USACE Hawaii District, 1997), ASTM (2006, 2008a-d), *Methods for Assessing Toxicity of Sediment-Associated Contaminants with Estuarine and Marine Amphipods* (USEPA, 1994), and *Guidance Manual: Bedded Sediment Bioaccumulation Tests* (USEPA, 1999). The project plan is for analysis of six project samples from the vicinity of Bravo Wharves, Dry Docks 1-3, and Alpha Wharves (Areas A1, A2, A3, B3, DD1, and DD2) representing approximately 313,573 cy of material and a reference sample. In addition, appropriate laboratory control samples will be run with each of the selected test species. Bioassay testing for this project consists of three SPP tests, two SP tests, and two BP tests. The bioassays proposed for this project are summarized in Table 6. Bioassay testing for this project will be conducted according to the phased approaches described in Section 1.5. During Phase I of analysis of Areas A1, A2, A3, and B3, the *A. abdita* SP test will begin within seven days from the time of compositing such that there is sufficient time for initiation of additional phases of testing (i.e., within six week holding time requirements). For Areas DD1 and DD2, the *A. abdita* SP test will be conducted in Phase II based on the results of chemical and physical analyses of the individual stations within the dredge footprint.

Danielle Gonsman

From: Bob Stearns
Sent: Friday, October 05, 2012 8:47 PM
To: Danielle Gonsman
Subject: Fwd: Sediments coming tomorrow

See below.

Bob Stearns
Vice President, Client Services
(714) 904-5235 (cell)

Sent by iPhone

Begin forwarded message:

> **From:** Steve Dollar <sdollar@mrc-hawaii.com>
> **Date:** October 5, 2012, 8:14:09 PM PDT
> **To:** Bob Stearns <bstearns@calscience.com>
> **Subject: Re: Sediments coming tomorrow**
>
> Thanks Bob. I would say we only would need congeners.
>
> steve
>
> On 10/5/2012 5:11 PM, Bob Stearns wrote:
>
> > Regarding the PCBs, the industry trend is toward Congeners. Congeners are the individual PCB isomers whereas Aroclors are groups of individual PCBs Aroclors that were sold, and are thus a chromatographic pattern and not an individual peak. There are about 7 or 8 Aroclors usually reported (like 1248 or 1260). Like I say, we mostly report Congeners but on occasion we are asked to report both. Congener testing is more expensive.
> >
> > Bob Stearns
> > Vice President, Client Services
> > (714) 904-5235 (cell)
> >
> > Sent by iPhone
> >
> > On Oct 5, 2012, at 7:04 PM, "Steve Dollar" <sdollar@mrc-hawaii.com> wrote:
> >
> > > Hi Bob;
> > >
> > > sorry about the delay getting back to you. Yes, might as well run grain size. I dont know enough about the "PCB Aroclors and Congeners" to be able to answer you question intelligently. Can you explain a little about why you question running both. I obviously dont want to spend money on something that is not of any value. I do think the TCLP does however provide information

useful to the client on potential toxicity of the sediment.

Also, I was duped by the planners into thinking there is a real rush on this. turns out other people are way behind me, so dont worry too much about the turnaround time. I am going on vacation anyway next week and wont be back till the 23rd to send it in.

thanks

steve

On 10/5/2012 3:01 PM, Bob Stearns wrote:

> Okay thanks. Can you answer my other questions?
>
> Bob Stearns
> Vice President, Client Services
> (714) 904-5235 (cell)
>
> Sent by iPhone
>
> On Oct 5, 2012, at 5:52 PM, "Steve Dollar" <sdollar@mrc-hawaii.com> wrote:
>
>> Bob;
>>
>> Samples sent will be to you tomorrow
>>
>> Thanks
>>
>> Steve
>>
>> On Oct 5, 2012 1:02 PM, "Bob Stearns" <bstearns@calscience.com> wrote:
>>
>> Steve- did the sampling go okay? Did you send them for delivery here tomorrow?
>>
>> A couple of questions. First, you said not to run the Atterberg limits or Specific Gravity. Do you want Grain Size? We can run that here at our lab.
>>
>> Second, there are both PCB Aroclors and Congeners as part of the list you

0512

ORIGIN ID: HNLA (808) 988-5009
MARINE RESEARCH CONSULTANTS

1039 WAAKAUA PL

HONOLULU, HI 968221173
UNITED STATES US

SHIP DATE: 05OCT12
ACTWGT: 31.1 LB
CAD: /POS1321
DIMS: 18x15x12 IN

BILL SENDER

TO **BOB STEARNS**
CALSCIENCE ENVIRONMENTAL
7440 LINCOLN WAY

GARDEN GROVE CA 92841
(714) 895-5494
INV:
PO:
REF:
DEPT:

FedEx Express

J12201207160125

TRK# 0200 **8018 1282 0810**

SATURDAY ### A1
PRIORITY OVERNIGHT

WO APVA

92841
CA-US **SNA**

RT 137 1 B
FZ
0810
10.06

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 12-10-0512

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: Marine Research

DATE: 10/06/12

TEMPERATURE: Thermometer ID: SC4 (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature 2.3 °C - 0.3 °C (CF) = 2.0 °C ☐ Blank ☑ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____).

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature: ☐ Air ☐ Filter Initial: YL

CUSTODY SEALS INTACT:

☐ Cooler ☐_____ ☐ No (Not Intact) ☑ Not Present ☐ N/A Initial: YL

☐ Sample ☐_____ ☐ No (Not Intact) ☑ Not Present Initial: TS

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
pH / Res. Chlorine / Diss. Sulfide / Diss. Oxygen received within 24 hours	☐	☐	☑
Proper preservation noted on COC or sample container	☐	☐	☑
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☑1C6J

Water: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☐1AGB ☐1AGB**na$_2$** ☐1AGB**s**

☐500AGB ☐500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☐500PB

☐250PB ☐250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** TS

Container: C: Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** [illegible]

Preservative: h: HCL **n:** HNO_3 **na$_2$:** $Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:** [illegible]

Calscience Environmental Laboratories, Inc.

Subcontractor Analysis Report

Work Order # 12-10-0512

One or more samples in this Work Order have tests that were subcontracted. The subcontract report(s) follows.

For subcontracted tests, please reference the laboratory information noted below.

1 Maxxam Analytics, Inc. - Ontario,Canada NELAP 02106CA

Dioxins / Furans

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Success Through Science®

Your P.O. #: 12-10-0512

Your Project #: 12-10-0512
Your C.O.C. #: na

Attention: Danielle Gonsman

Calscience Environmental Laboratories Inc
7440 Lincoln Way
Garden Grove, CA
USA 92841-1427

Report Date: 2012/11/05

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B2F6092
Received: 2012/10/09, 11:40

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (8290) (1)	1	2012/10/27	2012/10/31	BRL SOP-00406	EPA 8290 mod.
Dioxins/Furans in Soil (8290) (1)	3	2012/10/27	2012/11/01	BRL SOP-00406	EPA 8290 mod.
2378TCDF Confirmation in Soil	1	N/A	2012/11/02	BRL SOP-00406	EPA 8290 mod.
2378TCDF Confirmation in Soil	2	N/A	2012/11/03	BRL SOP-00406	EPA 8290 mod.
Moisture	4	N/A	2012/10/11	CAM SOP-00445	R.Carter,1993

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

U = Undetected at the limit of quantitation.
J = Estimated concentration between the EDL & RDL.
B = Blank Contamination.
Q = One or more quality control criteria failed.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Ivana Vukovic, Env Project Manager
Email: IVukovic@maxxam.ca
Phone# (905) 817-5700

==========
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

RESULTS OF ANALYSES OF SOIL

Maxxam ID		PD0432	PD0433	PD0434	PD0435		
Sampling Date		2012/10/05 08:21	2012/10/05 08:22	2012/10/05 08:10	2012/10/05 08:11		
COC Number		na	na	na	na		
	Units	**P-15-S**	**P-15-D**	**P-12-S**	**P-12-D**	**RDL**	**QC Batch**
Moisture	%	68	65	60	62	1.0	2998909

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0432						
Sampling Date		2012/10/05 08:21						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	P-15-S	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.53 J	0.16	2.8	1.00	0.530	N/A	3021991
1,2,3,7,8-Penta CDD	pg/g	3.33 J	0.16	6.9	1.00	3.33	N/A	3021991
1,2,3,4,7,8-Hexa CDD	pg/g	7.3	0.17	6.9	0.100	0.730	N/A	3021991
1,2,3,6,7,8-Hexa CDD	pg/g	25.3	0.15	6.9	0.100	2.53	N/A	3021991
1,2,3,7,8,9-Hexa CDD	pg/g	19.7	0.16	6.9	0.100	1.97	N/A	3021991
1,2,3,4,6,7,8-Hepta CDD	pg/g	564 B	0.16	6.9	0.0100	5.64	N/A	3021991
Octa CDD	pg/g	4790 B (1)	0.15	14	0.000300	1.44	N/A	3021991
Total Tetra CDD	pg/g	10.7	0.16	2.8	N/A	N/A	N/A	3021991
Total Penta CDD	pg/g	41.3	0.16	6.9	N/A	N/A	N/A	3021991
Total Hexa CDD	pg/g	263	0.16	6.9	N/A	N/A	N/A	3021991
Total Hepta CDD	pg/g	1180 B	0.16	6.9	N/A	N/A	N/A	3021991
2,3,7,8-Tetra CDF **	pg/g	3.4 U (2)	3.4	2.8	0.100	0.340	N/A	3021991
1,2,3,7,8-Penta CDF	pg/g	2.01 J	0.16	6.9	0.0300	0.0603	N/A	3021991
2,3,4,7,8-Penta CDF	pg/g	2.91 J	0.16	6.9	0.300	0.873	N/A	3021991
1,2,3,4,7,8-Hexa CDF	pg/g	10.8	0.14	6.9	0.100	1.08	N/A	3021991
1,2,3,6,7,8-Hexa CDF	pg/g	7.6	0.14	6.9	0.100	0.760	N/A	3021991
2,3,4,6,7,8-Hexa CDF	pg/g	5.08 J	0.16	6.9	0.100	0.508	N/A	3021991
1,2,3,7,8,9-Hexa CDF	pg/g	0.49 J	0.17	6.9	0.100	0.0490	N/A	3021991
1,2,3,4,6,7,8-Hepta CDF	pg/g	148	0.14	6.9	0.0100	1.48	N/A	3021991
1,2,3,4,7,8,9-Hepta CDF	pg/g	9.1	0.18	6.9	0.0100	0.0910	N/A	3021991
Octa CDF	pg/g	397 E	0.15	14	0.000300	0.119	N/A	3021991
Total Tetra CDF	pg/g	28.0	0.16	2.8	N/A	N/A	N/A	3021991
Total Penta CDF	pg/g	79.2	0.16	6.9	N/A	N/A	N/A	3021991
Total Hexa CDF	pg/g	189	0.15	6.9	N/A	N/A	N/A	3021991
Total Hepta CDF	pg/g	419	0.16	6.9	N/A	N/A	N/A	3021991

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
(1) EMCL - PCDD/DF analysis - Exceeds Maximum Calibration Limit
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0432						
Sampling Date		2012/10/05 08:21						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	**P-15-S**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.8	0.23	1.4	0.100	0.180	N/A	3023746
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	21.4	N/A	N/A
Surrogate Recovery (%)								
C13-1234678 HeptaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	3021991
C13-1234678 HeptaCDF	%	82	N/A	N/A	N/A	N/A	N/A	3021991
C13-123478 HexaCDF	%	78	N/A	N/A	N/A	N/A	N/A	3021991
C13-123678 HexaCDD	%	78	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDD	%	81	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDF	%	76	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDD	%	92	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDF	%	82	N/A	N/A	N/A	N/A	N/A	3021991
C13-OCDD	%	88	N/A	N/A	N/A	N/A	N/A	3021991
Confirmation C13-2378 TetraCDF	%	82	N/A	N/A	N/A	N/A	N/A	3023746

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0433						
Sampling Date		2012/10/05 08:22						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	P-15-D	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.49 J	0.21	3.7	1.00	0.490	N/A	3021991
1,2,3,7,8-Penta CDD	pg/g	3.44 J	0.22	9.2	1.00	3.44	N/A	3021991
1,2,3,4,7,8-Hexa CDD	pg/g	7.87 J	0.21	9.2	0.100	0.787	N/A	3021991
1,2,3,6,7,8-Hexa CDD	pg/g	26.2	0.19	9.2	0.100	2.62	N/A	3021991
1,2,3,7,8,9-Hexa CDD	pg/g	22.7	0.20	9.2	0.100	2.27	N/A	3021991
1,2,3,4,6,7,8-Hepta CDD	pg/g	605 B	0.22	9.2	0.0100	6.05	N/A	3021991
Octa CDD	pg/g	4940 EB (1)	0.21	18	0.000300	1.48	N/A	3021991
Total Tetra CDD	pg/g	11.2	0.21	3.7	N/A	N/A	N/A	3021991
Total Penta CDD	pg/g	44.8	0.22	9.2	N/A	N/A	N/A	3021991
Total Hexa CDD	pg/g	290	0.20	9.2	N/A	N/A	N/A	3021991
Total Hepta CDD	pg/g	1250 B	0.22	9.2	N/A	N/A	N/A	3021991
2,3,7,8-Tetra CDF **	pg/g	3.35 J	0.21	3.7	0.100	0.335	N/A	3021991
1,2,3,7,8-Penta CDF	pg/g	2.04 J	0.20	9.2	0.0300	0.0612	N/A	3021991
2,3,4,7,8-Penta CDF	pg/g	2.96 J	0.20	9.2	0.300	0.888	N/A	3021991
1,2,3,4,7,8-Hexa CDF	pg/g	11.0	0.18	9.2	0.100	1.10	N/A	3021991
1,2,3,6,7,8-Hexa CDF	pg/g	7.79 J	0.18	9.2	0.100	0.779	N/A	3021991
2,3,4,6,7,8-Hexa CDF	pg/g	5.39 J	0.19	9.2	0.100	0.539	N/A	3021991
1,2,3,7,8,9-Hexa CDF	pg/g	0.51 J	0.22	9.2	0.100	0.0510	N/A	3021991
1,2,3,4,6,7,8-Hepta CDF	pg/g	156	0.20	9.2	0.0100	1.56	N/A	3021991
1,2,3,4,7,8,9-Hepta CDF	pg/g	10.1	0.25	9.2	0.0100	0.101	N/A	3021991
Octa CDF	pg/g	403	0.20	18	0.000300	0.121	N/A	3021991
Total Tetra CDF	pg/g	30.4	0.21	3.7	N/A	N/A	N/A	3021991
Total Penta CDF	pg/g	79.4	0.20	9.2	N/A	N/A	N/A	3021991
Total Hexa CDF	pg/g	203	0.19	9.2	N/A	N/A	N/A	3021991
Total Hepta CDF	pg/g	445	0.22	9.2	N/A	N/A	N/A	3021991
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	22.7	N/A	N/A

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
(1) EMCL - PCDD/DF analysis - Exceeds Maximum Calibration Limit

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0433						
Sampling Date		2012/10/05 08:22						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	**P-15-D**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Surrogate Recovery (%)								
C13-1234678 HeptaCDD *	%	85	N/A	N/A	N/A	N/A	N/A	3021991
C13-1234678 HeptaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	3021991
C13-123478 HexaCDF	%	79	N/A	N/A	N/A	N/A	N/A	3021991
C13-123678 HexaCDD	%	79	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDD	%	84	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDF	%	76	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDD	%	88	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDF	%	79	N/A	N/A	N/A	N/A	N/A	3021991
C13-OCDD	%	88	N/A	N/A	N/A	N/A	N/A	3021991

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0434						
Sampling Date		2012/10/05 08:10						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	P-12-S	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.40 J	0.12	2.2	1.00	0.400	N/A	3021991
1,2,3,7,8-Penta CDD	pg/g	2.97 J	0.13	5.6	1.00	2.97	N/A	3021991
1,2,3,4,7,8-Hexa CDD	pg/g	6.7	0.13	5.6	0.100	0.670	N/A	3021991
1,2,3,6,7,8-Hexa CDD	pg/g	25.7	0.12	5.6	0.100	2.57	N/A	3021991
1,2,3,7,8,9-Hexa CDD	pg/g	20.1	0.12	5.6	0.100	2.01	N/A	3021991
1,2,3,4,6,7,8-Hepta CDD	pg/g	560 B	0.13	5.6	0.0100	5.60	N/A	3021991
Octa CDD	pg/g	4840 EB (1)	0.12	11	0.000300	1.45	N/A	3021991
Total Tetra CDD	pg/g	14.4	0.12	2.2	N/A	N/A	N/A	3021991
Total Penta CDD	pg/g	51.9	0.13	5.6	N/A	N/A	N/A	3021991
Total Hexa CDD	pg/g	316	0.12	5.6	N/A	N/A	N/A	3021991
Total Hepta CDD	pg/g	1250 B	0.13	5.6	N/A	N/A	N/A	3021991
2,3,7,8-Tetra CDF **	pg/g	4.9	0.12	2.2	0.100	0.490	N/A	3021991
1,2,3,7,8-Penta CDF	pg/g	3.03 J	0.11	5.6	0.0300	0.0909	N/A	3021991
2,3,4,7,8-Penta CDF	pg/g	3.9 U (2)	3.9	5.6	0.300	1.17	N/A	3021991
1,2,3,4,7,8-Hexa CDF	pg/g	17.1	0.11	5.6	0.100	1.71	N/A	3021991
1,2,3,6,7,8-Hexa CDF	pg/g	10.0	0.10	5.6	0.100	1.00	N/A	3021991
2,3,4,6,7,8-Hexa CDF	pg/g	6.1	0.12	5.6	0.100	0.610	N/A	3021991
1,2,3,7,8,9-Hexa CDF	pg/g	0.50 J	0.13	5.6	0.100	0.0500	N/A	3021991
1,2,3,4,6,7,8-Hepta CDF	pg/g	156	0.11	5.6	0.0100	1.56	N/A	3021991
1,2,3,4,7,8,9-Hepta CDF	pg/g	10.4	0.14	5.6	0.0100	0.104	N/A	3021991
Octa CDF	pg/g	375	0.11	11	0.000300	0.113	N/A	3021991
Total Tetra CDF	pg/g	44.0	0.12	2.2	N/A	N/A	N/A	3021991
Total Penta CDF	pg/g	97.8	0.11	5.6	N/A	N/A	N/A	3021991
Total Hexa CDF	pg/g	221	0.11	5.6	N/A	N/A	N/A	3021991
Total Hepta CDF	pg/g	433	0.12	5.6	N/A	N/A	N/A	3021991

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
(1) EMCL - PCDD/DF analysis - Exceeds Maximum Calibration Limit
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0434						
Sampling Date		2012/10/05 08:10						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	**P-12-S**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.7 B	0.16	1.1	0.100	0.270	N/A	3025127
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	22.3	N/A	N/A
Surrogate Recovery (%)								
C13-1234678 HeptaCDD *	%	90	N/A	N/A	N/A	N/A	N/A	3021991
C13-1234678 HeptaCDF	%	85	N/A	N/A	N/A	N/A	N/A	3021991
C13-123478 HexaCDF	%	82	N/A	N/A	N/A	N/A	N/A	3021991
C13-123678 HexaCDD	%	82	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDD	%	84	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDF	%	80	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDD	%	94	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDF	%	86	N/A	N/A	N/A	N/A	N/A	3021991
C13-OCDD	%	94	N/A	N/A	N/A	N/A	N/A	3021991
Confirmation C13-2378 TetraCDF	%	97	N/A	N/A	N/A	N/A	N/A	3025127

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0435						
Sampling Date		2012/10/05 08:11						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	P-12-D	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.45 J	0.24	4.3	1.00	0.450	N/A	3021991
1,2,3,7,8-Penta CDD	pg/g	3.06 J	0.23	11	1.00	3.06	N/A	3021991
1,2,3,4,7,8-Hexa CDD	pg/g	7.52 J	0.25	11	0.100	0.752	N/A	3021991
1,2,3,6,7,8-Hexa CDD	pg/g	27	0.23	11	0.100	2.70	N/A	3021991
1,2,3,7,8,9-Hexa CDD	pg/g	23	0.24	11	0.100	2.30	N/A	3021991
1,2,3,4,6,7,8-Hepta CDD	pg/g	607 B	0.25	11	0.0100	6.07	N/A	3021991
Octa CDD	pg/g	5260 EB (1)	0.25	22	0.000300	1.58	N/A	3021991
Total Tetra CDD	pg/g	14.7	0.24	4.3	N/A	N/A	N/A	3021991
Total Penta CDD	pg/g	55	0.23	11	N/A	N/A	N/A	3021991
Total Hexa CDD	pg/g	329	0.24	11	N/A	N/A	N/A	3021991
Total Hepta CDD	pg/g	1330 B	0.25	11	N/A	N/A	N/A	3021991
2,3,7,8-Tetra CDF **	pg/g	4.9	0.25	4.3	0.100	0.490	N/A	3021991
1,2,3,7,8-Penta CDF	pg/g	3.01 J	0.23	11	0.0300	0.0903	N/A	3021991
2,3,4,7,8-Penta CDF	pg/g	4.3 U (2)	4.3	11	0.300	1.29	N/A	3021991
1,2,3,4,7,8-Hexa CDF	pg/g	17	0.24	11	0.100	1.70	N/A	3021991
1,2,3,6,7,8-Hexa CDF	pg/g	10.3 J	0.24	11	0.100	1.03	N/A	3021991
2,3,4,6,7,8-Hexa CDF	pg/g	6.49 J	0.27	11	0.100	0.649	N/A	3021991
1,2,3,7,8,9-Hexa CDF	pg/g	0.58 J	0.30	11	0.100	0.0580	N/A	3021991
1,2,3,4,6,7,8-Hepta CDF	pg/g	160	0.22	11	0.0100	1.60	N/A	3021991
1,2,3,4,7,8,9-Hepta CDF	pg/g	12	0.29	11	0.0100	0.120	N/A	3021991
Octa CDF	pg/g	421	0.25	22	0.000300	0.126	N/A	3021991
Total Tetra CDF	pg/g	46.2	0.25	4.3	N/A	N/A	N/A	3021991
Total Penta CDF	pg/g	105	0.23	11	N/A	N/A	N/A	3021991
Total Hexa CDF	pg/g	217	0.26	11	N/A	N/A	N/A	3021991
Total Hepta CDF	pg/g	450	0.25	11	N/A	N/A	N/A	3021991

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
(1) EMCL - PCDD/DF analysis - Exceeds Maximum Calibration Limit
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		PD0435						
Sampling Date		2012/10/05 08:11						
COC Number		na			TOXIC EQUIVALENCY		# of	
	Units	**P-12-D**	**EDL**	**RDL**	**TEF (2005 WHO)**	**TEQ(DL)**	**Isomers**	**QC Batch**
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.8 B	0.28	2.2	0.100	0.280	N/A	3025127
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	23.9	N/A	N/A
Surrogate Recovery (%)								
C13-1234678 HeptaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	3021991
C13-1234678 HeptaCDF	%	79	N/A	N/A	N/A	N/A	N/A	3021991
C13-123478 HexaCDF	%	76	N/A	N/A	N/A	N/A	N/A	3021991
C13-123678 HexaCDD	%	76	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDD	%	84	N/A	N/A	N/A	N/A	N/A	3021991
C13-12378 PentaCDF	%	78	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDD	%	92	N/A	N/A	N/A	N/A	N/A	3021991
C13-2378 TetraCDF	%	81	N/A	N/A	N/A	N/A	N/A	3021991
C13-OCDD	%	85	N/A	N/A	N/A	N/A	N/A	3021991
Confirmation C13-2378 TetraCDF	%	90	N/A	N/A	N/A	N/A	N/A	3025127

N/A = Not Applicable
RDL = Reportable Detection Limit
EDL = Estimated Detection Limit
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan
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The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

Test Summary

Maxxam ID PD0432 **Collected** 2012/10/05
Sample ID P-15-S **Shipped**
Matrix Soil **Received** 2012/10/09

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (8290)	HRMS/MS	3021991	2012/10/27	2012/10/31	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	3023746	N/A	2012/11/02	Vica Cioranic
Moisture	BAL	2998909	N/A	2012/10/11	Min Yang

Maxxam ID PD0433 **Collected** 2012/10/05
Sample ID P-15-D **Shipped**
Matrix Soil **Received** 2012/10/09

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (8290)	HRMS/MS	3021991	2012/10/27	2012/11/01	Kay Shaw
Moisture	BAL	2998909	N/A	2012/10/11	Min Yang

Maxxam ID PD0434 **Collected** 2012/10/05
Sample ID P-12-S **Shipped**
Matrix Soil **Received** 2012/10/09

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (8290)	HRMS/MS	3021991	2012/10/27	2012/11/01	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	3025127	N/A	2012/11/03	Vica Cioranic
Moisture	BAL	2998909	N/A	2012/10/11	Min Yang

Maxxam ID PD0435 **Collected** 2012/10/05
Sample ID P-12-D **Shipped**
Matrix Soil **Received** 2012/10/09

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (8290)	HRMS/MS	3021991	2012/10/27	2012/11/01	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	3025127	N/A	2012/11/03	Vica Cioranic
Moisture	BAL	2998909	N/A	2012/10/11	Min Yang

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Maxxam Job #: B2F6092
Report Date: 2012/11/05

Calscience Environmental Laboratories Inc
Client Project #: 12-10-0512

Your P.O. #: 12-10-0512

Package 1	2.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

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Success Through Science®

Calscience Environmental Laboratories Inc
Attention: Danielle Gonsman
Client Project #: 12-10-0512
P.O. #: 12-10-0512
Site Location:

Quality Assurance Report

Maxxam Job Number: GB2F6092

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
2998909 THT	RPD - Sample/Sample Dup	Moisture	2012/10/11	0.5		%	20
3021991 KKS	Matrix Spike	C13-1234678 HeptaCDD	2012/11/01		84	%	40 - 135
	Matrix Spike DUP	C13-1234678 HeptaCDD	2012/11/01		85	%	40 - 135
	Matrix Spike	C13-1234678 HeptaCDF	2012/11/01		81	%	40 - 135
	Matrix Spike DUP	C13-1234678 HeptaCDF	2012/11/01		80	%	40 - 135
	Matrix Spike	C13-123478 HexaCDF	2012/11/01		79	%	40 - 135
	Matrix Spike DUP	C13-123478 HexaCDF	2012/11/01		79	%	40 - 135
	Matrix Spike	C13-123678 HexaCDD	2012/11/01		78	%	40 - 135
	Matrix Spike DUP	C13-123678 HexaCDD	2012/11/01		79	%	40 - 135
	Matrix Spike	C13-12378 PentaCDD	2012/11/01		84	%	40 - 135
	Matrix Spike DUP	C13-12378 PentaCDD	2012/11/01		80	%	40 - 135
	Matrix Spike	C13-12378 PentaCDF	2012/11/01		80	%	40 - 135
	Matrix Spike DUP	C13-12378 PentaCDF	2012/11/01		76	%	40 - 135
	Matrix Spike	C13-2378 TetraCDD	2012/11/01		92	%	40 - 135
	Matrix Spike DUP	C13-2378 TetraCDD	2012/11/01		90	%	40 - 135
	Matrix Spike	C13-2378 TetraCDF	2012/11/01		82	%	40 - 135
	Matrix Spike DUP	C13-2378 TetraCDF	2012/11/01		80	%	40 - 135
	Matrix Spike	C13-OCDD	2012/11/01		90	%	40 - 135
	Matrix Spike DUP	C13-OCDD	2012/11/01		92	%	40 - 135
	Matrix Spike	2,3,7,8-Tetra CDD	2012/11/01		88	%	80 - 140
	Matrix Spike DUP	2,3,7,8-Tetra CDD	2012/11/01		88	%	80 - 140
	MS/MSD RPD	2,3,7,8-Tetra CDD	2012/11/01	0		%	25
	Matrix Spike	1,2,3,7,8-Penta CDD	2012/11/01		97	%	80 - 140
	Matrix Spike DUP	1,2,3,7,8-Penta CDD	2012/11/01		96	%	80 - 140
	MS/MSD RPD	1,2,3,7,8-Penta CDD	2012/11/01	1.0		%	25
	Matrix Spike	1,2,3,4,7,8-Hexa CDD	2012/11/01		98	%	80 - 140
	Matrix Spike DUP	1,2,3,4,7,8-Hexa CDD	2012/11/01		97	%	80 - 140
	MS/MSD RPD	1,2,3,4,7,8-Hexa CDD	2012/11/01	1.0		%	25
	Matrix Spike	1,2,3,6,7,8-Hexa CDD	2012/11/01		101	%	80 - 140
	Matrix Spike DUP	1,2,3,6,7,8-Hexa CDD	2012/11/01		99	%	80 - 140
	MS/MSD RPD	1,2,3,6,7,8-Hexa CDD	2012/11/01	2.0		%	25
	Matrix Spike	1,2,3,7,8,9-Hexa CDD	2012/11/01		102	%	80 - 140
	Matrix Spike DUP	1,2,3,7,8,9-Hexa CDD	2012/11/01		97	%	80 - 140
	MS/MSD RPD	1,2,3,7,8,9-Hexa CDD	2012/11/01	5.0		%	25
	Matrix Spike	1,2,3,4,6,7,8-Hepta CDD	2012/11/01		90	%	80 - 140
	Matrix Spike DUP	1,2,3,4,6,7,8-Hepta CDD	2012/11/01		88	%	80 - 140
	MS/MSD RPD	1,2,3,4,6,7,8-Hepta CDD	2012/11/01	2.2		%	25
	Matrix Spike	Octa CDD	2012/11/01		71 Q (1)	%	80 - 140
	Matrix Spike DUP	Octa CDD	2012/11/01		32 Q (1)	%	80 - 140
	MS/MSD RPD	Octa CDD	2012/11/01	NC (1)		%	25
	Matrix Spike	2,3,7,8-Tetra CDF	2012/11/01		94	%	80 - 140
	Matrix Spike DUP	2,3,7,8-Tetra CDF	2012/11/01		93	%	80 - 140
	MS/MSD RPD	2,3,7,8-Tetra CDF	2012/11/01	1.1		%	25
	Matrix Spike	1,2,3,7,8-Penta CDF	2012/11/01		97	%	80 - 140
	Matrix Spike DUP	1,2,3,7,8-Penta CDF	2012/11/01		98	%	80 - 140
	MS/MSD RPD	1,2,3,7,8-Penta CDF	2012/11/01	1.0		%	25
	Matrix Spike	2,3,4,7,8-Penta CDF	2012/11/01		108	%	80 - 140
	Matrix Spike DUP	2,3,4,7,8-Penta CDF	2012/11/01		107	%	80 - 140
	MS/MSD RPD	2,3,4,7,8-Penta CDF	2012/11/01	0.9		%	25
	Matrix Spike	1,2,3,4,7,8-Hexa CDF	2012/11/01		97	%	80 - 140
	Matrix Spike DUP	1,2,3,4,7,8-Hexa CDF	2012/11/01		96	%	80 - 140
	MS/MSD RPD	1,2,3,4,7,8-Hexa CDF	2012/11/01	1.0		%	25
	Matrix Spike	1,2,3,6,7,8-Hexa CDF	2012/11/01		95	%	80 - 140

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Calscience Environmental Laboratories Inc
Attention: Danielle Gonsman
Client Project #: 12-10-0512
P.O. #: 12-10-0512
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB2F6092

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
3021991 KKS	Matrix Spike DUP	1,2,3,6,7,8-Hexa CDF	2012/11/01		95	%	80 - 140
	MS/MSD RPD	1,2,3,6,7,8-Hexa CDF	2012/11/01	0		%	25
	Matrix Spike	2,3,4,6,7,8-Hexa CDF	2012/11/01		94	%	80 - 140
	Matrix Spike DUP	2,3,4,6,7,8-Hexa CDF	2012/11/01		92	%	80 - 140
	MS/MSD RPD	2,3,4,6,7,8-Hexa CDF	2012/11/01	2.2		%	25
	Matrix Spike	1,2,3,7,8,9-Hexa CDF	2012/11/01		101	%	80 - 140
	Matrix Spike DUP	1,2,3,7,8,9-Hexa CDF	2012/11/01		99	%	80 - 140
	MS/MSD RPD	1,2,3,7,8,9-Hexa CDF	2012/11/01	2.0		%	25
	Matrix Spike	1,2,3,4,6,7,8-Hepta CDF	2012/11/01		90	%	80 - 140
	Matrix Spike DUP	1,2,3,4,6,7,8-Hepta CDF	2012/11/01		87	%	80 - 140
	MS/MSD RPD	1,2,3,4,6,7,8-Hepta CDF	2012/11/01	3.4		%	25
	Matrix Spike	1,2,3,4,7,8,9-Hepta CDF	2012/11/01		96	%	80 - 140
	Matrix Spike DUP	1,2,3,4,7,8,9-Hepta CDF	2012/11/01		96	%	80 - 140
	MS/MSD RPD	1,2,3,4,7,8,9-Hepta CDF	2012/11/01	0		%	25
	Matrix Spike	Octa CDF	2012/11/01		93	%	80 - 140
	Matrix Spike DUP	Octa CDF	2012/11/01		90	%	80 - 140
	MS/MSD RPD	Octa CDF	2012/11/01	3.3		%	25
	Spiked Blank	C13-1234678 HeptaCDD	2012/11/01		77	%	40 - 135
		C13-1234678 HeptaCDF	2012/11/01		78	%	40 - 135
		C13-123478 HexaCDF	2012/11/01		72	%	40 - 135
		C13-123678 HexaCDD	2012/11/01		72	%	40 - 135
		C13-12378 PentaCDD	2012/11/01		83	%	40 - 135
		C13-12378 PentaCDF	2012/11/01		77	%	40 - 135
		C13-2378 TetraCDD	2012/11/01		85	%	40 - 135
		C13-2378 TetraCDF	2012/11/01		73	%	40 - 135
		C13-OCDD	2012/11/01		76	%	40 - 135
		2,3,7,8-Tetra CDD	2012/11/01		87	%	80 - 140
		1,2,3,7,8-Penta CDD	2012/11/01		97	%	80 - 140
		1,2,3,4,7,8-Hexa CDD	2012/11/01		97	%	80 - 140
		1,2,3,6,7,8-Hexa CDD	2012/11/01		101	%	80 - 140
		1,2,3,7,8,9-Hexa CDD	2012/11/01		101	%	80 - 140
		1,2,3,4,6,7,8-Hepta CDD	2012/11/01		88	%	80 - 140
		Octa CDD	2012/11/01		96	%	80 - 140
		2,3,7,8-Tetra CDF	2012/11/01		93	%	80 - 140
		1,2,3,7,8-Penta CDF	2012/11/01		97	%	80 - 140
		2,3,4,7,8-Penta CDF	2012/11/01		113	%	80 - 140
		1,2,3,4,7,8-Hexa CDF	2012/11/01		98	%	80 - 140
		1,2,3,6,7,8-Hexa CDF	2012/11/01		96	%	80 - 140
		2,3,4,6,7,8-Hexa CDF	2012/11/01		94	%	80 - 140
		1,2,3,7,8,9-Hexa CDF	2012/11/01		102	%	80 - 140
		1,2,3,4,6,7,8-Hepta CDF	2012/11/01		92	%	80 - 140
		1,2,3,4,7,8,9-Hepta CDF	2012/11/01		96	%	80 - 140
		Octa CDF	2012/11/01		105	%	80 - 140
	Method Blank	C13-1234678 HeptaCDD	2012/11/01		65	%	40 - 135
		C13-1234678 HeptaCDF	2012/11/01		65	%	40 - 135
		C13-123478 HexaCDF	2012/11/01		62	%	40 - 135
		C13-123678 HexaCDD	2012/11/01		63	%	40 - 135
		C13-12378 PentaCDD	2012/11/01		66	%	40 - 135
		C13-12378 PentaCDF	2012/11/01		58	%	40 - 135
		C13-2378 TetraCDD	2012/11/01		66	%	40 - 135
		C13-2378 TetraCDF	2012/11/01		57	%	40 - 135
		C13-OCDD	2012/11/01		65	%	40 - 135
		2,3,7,8-Tetra CDD	2012/11/01	0.10 U, EDL=0.10		pg/g	
		1,2,3,7,8-Penta CDD	2012/11/01	0.11 U, EDL=0.11		pg/g	
		1,2,3,4,7,8-Hexa CDD	2012/11/01	0.12 U, EDL=0.12		pg/g	

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Calscience Environmental Laboratories Inc
Attention: Danielle Gonsman
Client Project #: 12-10-0512
P.O. #: 12-10-0512
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB2F6092

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
3021991 KKS	Method Blank	1,2,3,6,7,8-Hexa CDD	2012/11/01	0.13 J, EDL=0.11		pg/g	
		1,2,3,7,8,9-Hexa CDD	2012/11/01	0.12 U, EDL=0.12		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2012/11/01	2.55 JB, EDL=0.11		pg/g	
		Octa CDD	2012/11/01	20 B, EDL=0.12 (2)		pg/g	
		Total Tetra CDD	2012/11/01	0.10 U, EDL=0.10		pg/g	
		Total Penta CDD	2012/11/01	0.11 U, EDL=0.11		pg/g	
		Total Hexa CDD	2012/11/01	0.34 J, EDL=0.12		pg/g	
		Total Hepta CDD	2012/11/01	4.13 JB, EDL=0.11		pg/g	
		2,3,7,8-Tetra CDF	2012/11/01	0.20 J, EDL=0.11		pg/g	
		1,2,3,7,8-Penta CDF	2012/11/01	0.11 U, EDL=0.11		pg/g	
		2,3,4,7,8-Penta CDF	2012/11/01	0.11 U, EDL=0.11		pg/g	
		1,2,3,4,7,8-Hexa CDF	2012/11/01	0.118 J, EDL=0.099		pg/g	
		1,2,3,6,7,8-Hexa CDF	2012/11/01	0.099 U, EDL=0.099		pg/g	
		2,3,4,6,7,8-Hexa CDF	2012/11/01	0.11 U, EDL=0.11		pg/g	
		1,2,3,7,8,9-Hexa CDF	2012/11/01	0.12 U, EDL=0.12		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2012/11/01	0.71 U, EDL=0.71 (3)		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2012/11/01	0.11 U, EDL=0.11		pg/g	
		Octa CDF	2012/11/01	1.91 J, EDL=0.10		pg/g	
		Total Tetra CDF	2012/11/01	0.34 J, EDL=0.11		pg/g	
		Total Penta CDF	2012/11/01	0.11 U, EDL=0.11		pg/g	
		Total Hexa CDF	2012/11/01	0.62 J, EDL=0.11		pg/g	
		Total Hepta CDF	2012/11/01	0.93 J, EDL=0.10		pg/g	
	RPD - Sample/Sample Dup	Total Tetra CDD	2012/11/02	NC		%	25
		Total Penta CDD	2012/11/02	NC		%	25
		Total Hexa CDD	2012/11/02	21.1		%	25
		Total Hepta CDD	2012/11/02	20.1		%	25
		Total Tetra CDF	2012/11/02	NC		%	25
		Total Penta CDF	2012/11/02	23.3		%	25
		Total Hexa CDF	2012/11/02	17.9		%	25
		Total Hepta CDF	2012/11/02	11.9		%	25
3023746 VCI	Method Blank	Confirmation C13-2378 TetraCDF	2012/11/01		82	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2012/11/01	0.10 U, EDL=0.10		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2012/11/02	5.7		%	100
3025127 VCI	Method Blank	Confirmation C13-2378 TetraCDF	2012/11/02		87	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2012/11/02	3.5 B, EDL=0.18 (4)		pg/g	

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) The recovery in the matrix spike was below 80-140% due to sample heterogeneity and due to the high concentration of this analyte in the parent sample, the relative difference between the spiked and unspiked concentrations is not sufficiently significant to permit a reliable recovery calculation.
(2) OCDD exceeds RDL but concentration found is less than 1/10 of what was found in the associated samples
(3) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.
(4) EMPC / Ratio - Isotopic ratio adjusted to meet theoretical

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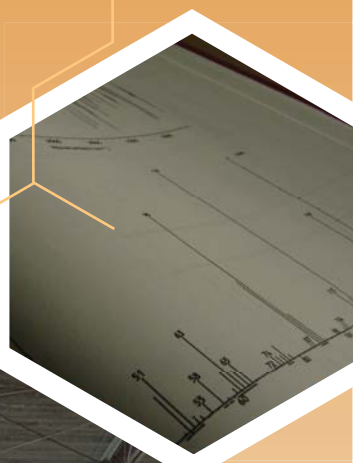
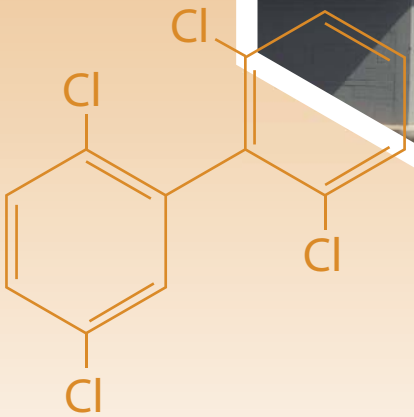
APPENDIX B.
HAZARDOUS MATERIALS SURVEY

HAZARDOUS MATERIALS SURVEY REPORT

Pier 15
Honolulu Harbor
Partial Demolition
Oahu, Hawaii





HAZARDOUS MATERIALS SURVEY REPORT
PIER 15, HONOLULU HARBOR
PARTIAL DEMOLITION

July 30, 2012

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APPENDIX IV: LABORATORY REPORT AND CHAIN-OF-CUSTODY: LEAD

Prepared For:

SATO & ASSOCIATES, INC.
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Honolulu, Hawaii 96826

Prepared By:

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Honolulu, Hawaii 96814

1.0 CERTIFICATIONS AND LIMITATIONS

Kimura International, Inc. (KI) has completed this Hazardous Materials Survey Report for Pier 15 at Honolulu Harbor as a part of the Piers 12 and 15 renovation project. KI's findings are based on research, site observations, government regulations and laboratory analytical data of the samples which were collected at the time and location of the survey. Even with such extensive investigative efforts, we cannot dismiss the possibility of additional hazardous materials being present that were inaccessible during the time of the survey.

We make no guarantee or warranty, either expressed or implied, except that our services are consistent with good commercial or customary practices designed to conform to acceptable industry standards.

This report is exclusively for the use and benefit of Sato & Associates, Inc. and is not for the use or benefit of, nor may it be relied upon by, any other person or entity. The contents of this report may not be quoted in whole or in part or distributed to any person or entity without, in each case, the written consent of *Kimura International, Inc.*

Prepared By: _____

Fletcher Kimura
State of Hawaii Asbestos Inspector
Certification No. HIASB-3073
EPA Certified Lead Risk Assessor
Certification No. PB-0429

Date: July 30, 2012

2.0 EXECUTIVE SUMMARY

Kimura International, Inc. (KI) has completed a Hazardous Materials Survey Report for Pier 15 at Honolulu Harbor. The purpose of this survey was to determine if asbestos containing material or lead-based/containing paint is present in portion of the shed that will be demolished as a part of planned renovations.

On May 9 and June 29, 2012, KI personnel collected a total of 24 samples of suspect asbestos containing building materials from portions of the Pier 15 shed that will be affected by the renovations. The United States Environmental Protection Agency (EPA), under the National Emission Standards for Hazardous Air Pollutants (NESHAP), requires that all asbestos containing building materials be identified prior to any renovation or demolition work. Under these standards, the proper sampling of suspect asbestos containing building material is described by the Asbestos Hazard Emergency Response Act (AHERA). All samples were collected according to these procedures. The National Emission Standards for Hazardous Air Pollutants (NESHAP, 40 CFR 61) definition of an asbestos containing material is any material containing more than 1% asbestos. **According to the laboratory results, nine of the 24 samples were identified as asbestos containing material. These samples were of the following materials:**

- **Silver mastic on roof (3 samples)**
- **Black mastic on roof (3 samples)**
- **Gray/Off-white window caulking (3 samples)**

During the May 9, 2012 site visit, KI personnel collected 4 paint samples from various painted exterior surfaces for lead analysis. The survey was conducted according to United States Environmental Protection Agency (EPA) and United States Department of Housing and Urban Development (HUD) guidelines and recommendations. The EPA and HUD define lead-based paint as any material containing greater than or equal to 0.5% lead (Pb) by weight or 5,000 milligrams/kilogram (mg/kg) or parts per million (ppm). As part of EPA's ongoing efforts to protect children from lead poisoning, the agency has also set a standard to identify dangerous levels of lead in paint, dust and soil. To prevent exposure, EPA and HUD require hazard controls if lead-based paint is 1) deteriorated; 2) located on any friction or impact surfaces; and/or 3) present on any surfaces accessible for mouthing or chewing by children (under the age of 6). Based on these guidelines and the sampling laboratory report, **none of the 4 samples collected were identified as lead-based paint (LBP).**

The United States Occupational Safety and Health Administration (OSHA) and State of Hawaii Occupational Safety and Health (HIOSH) define paint or other coatings containing any amount of lead as lead-containing paint. When lead-containing paint is encountered during renovation or demolition, OSHA and HIOSH requirements apply, and any work should be performed in compliance with 29 CFR 1926.62 and HIOSH 12-148.1. The paint samples for which accredited laboratory analysis (flame atomic absorption spectrometry) identifies the presence of lead at or above the analytical limit of detection is considered lead-containing paint. If the lead is not

detected at or above the analytical limit of detection, the paint sample may be considered non-lead containing paint. Based on these guidelines and the sampling analytical laboratory report, **all four samples were found to contain lead. These samples were of the off-white exterior paint at roof level, the green trim paint, the gray exterior paint on the ground level, and the yellow trim paint on the ground level.**

RECOMMENDATIONS

KI recommends the following remedial actions for the asbestos containing materials:

The silver and black mastic found on the roof, and the off-white window caulking, in their location and condition at the time of the survey, were found to be non-friable and in good condition. As a result, KI does not believe that these materials pose a significant health threat at this time. However, these materials must be removed by a qualified asbestos abatement contractor prior to the partial demolition of the Pier 15 shed. In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable EPA, OSHA, and HIOSH regulations pertaining to the handling of asbestos containing material. Environmental specifications should be drawn up prior to the abatement work onsite. These specifications will address proper work techniques in dealing with asbestos containing materials and will also address handling and disposal of asbestos contaminated items.

KI recommends the following remedial actions for the lead-containing paint:

The lead-containing paints (LCP) in their ***present location and condition at the time of the survey***, does not pose a significant health threat. However, as the demolition activities will disturb surfaces covered with lead-containing paint, the owner must notify workers and contractors of the presence of lead in the paints.

Prior to demolition, environmental specifications should be produced. These specifications will address proper work techniques in dealing with affected areas and will also address handling and disposal of lead contaminated items. In addition, the services of a qualified consultant should also be obtained to monitor and inspect the removal activities to ensure compliance with applicable EPA, OSHA, and HIOSH regulations pertaining to the handling of lead.

The OSHA and HIOSH lead standard requirements may need to be applied when paint containing lead is encountered during renovation or demolition activities. Specifically, such activities may need to be performed in compliance with 29 CFR 1926.62 and HIOSH 12-148.1.

Some of the components of 29 CRF 1926.62 and HIOSH 12-148.1 are:

- Exposure assessment via personal air monitoring
- Lead awareness training
- Medical surveillance

- Hazard communication
- Respiratory protection
- Personal protective clothing and equipment

Generally, representative core samples of the material with lead-containing paint must be collected prior to disposal and analyzed via the Toxicity Characteristic Leaching Procedure (TCLP) to determine if the building components meet the definition of a Resource Conservation and Recovery Act (RCRA) regulated hazardous waste per 40 CFR §261. If the laboratory analytical result is less than 5 mg/L for lead, the building components may be disposed of as general construction debris. If the laboratory analytical result exceeds 5 mg/L for lead: 1) the entire painted component must be disposed of as a RCRA-regulated hazardous waste; or 2) the LCP must be removed prior to disposal activities and only the removed paint chips must be disposed of as a RCRA-regulated hazardous waste.

3.0 INTRODUCTION

Kimura International, Inc. (KI) is pleased to submit this report documenting the Hazardous Materials Survey for the Pier 15 Shed located at Honolulu Harbor.

3.1 Background

Kimura International, Inc. was contacted by Sato and Associates, Inc. to conduct a hazardous materials survey on the Pier 15 shed prior to its partial demolition. The shed is a concrete and CMU stucture that is presently used for storage and vehicle parking. Only the southwest corner of the shed is scheduled for demolition. The following suspect asbestos containing materials were sampled:

- Roof field and associated mastics
- Exterior paint and coating on concrete
- Exterior paint and coating on CMU
- Interior paint and coating on concrete
- Interior paint and coating on CMU
- Window caulk

Suspect lead-containing materials included all paints.

Specific sampling locations are shown in Figure 1 in Appendix I.

3.2 Scope of Work

Specifically, KI performed the following scope of work:

- Performed a site visit on May 9, 2012, where the following took place:
    - Collected a total of 18 bulk samples from suspect asbestos containing building materials in accordance with Environmental Protection Agency (EPA) guidelines and analyzed each sample by polarized light microscopy to determine asbestos type and content.
    - Collected 4 paint samples from interior and exterior surfaces in accordance with EPA/Housing and Urban Development (HUD) guidelines and analyzed by flame atomic absorption spectrometry for lead content.
- Performed a second site visit on June 29, 2012, where the following took place:
    - Collected a total of 6 bulk samples from suspect asbestos containing building materials in accordance with Environmental Protection Agency (EPA) guidelines

and analyzed each sample by polarized light microscopy to determine asbestos type and content.

- Provided this report detailing our methodologies, findings, areas that were sampled and appropriate recommendations based upon those findings.

4.0 METHODOLOGY

4.1 Asbestos

KI collected a total of 24 samples of suspect building material for asbestos analysis. All samples were collected in accordance with EPA guidelines and recommendations.

Each suspect asbestos containing material was first wet with moist wipes or water. A small piece was then carefully cut out or scraped and placed in a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. The location, color and condition of each suspect asbestos-containing material were noted in a field notebook on site.

All samples were properly logged and recorded following strict chain of custody procedures and submitted to *EMC Labs, Inc.* in Phoenix, AZ and *Inalab, Inc*., in Honolulu Hawaii, for analysis by polarized light microscopy in accordance with EPA Method 600/M4-82-020. *EMC* and *Inalab* are accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP) and the State of Hawaii Department of Health.

4.2 Lead-Based and Lead-Containing Paint

A total of 4 paint samples were collected from various interior and exterior painted surfaces. All work was performed in accordance with EPA and HUD guidelines.

Paint chips were cut out or scraped off, down to the underlying substrate, and carefully placed in a labeled re-sealable plastic bag for delivery to the laboratory. The sampling equipment was cleaned between each sample collection to avoid cross-contamination. The location, condition and condition of each paint chip sample were recorded in a field notebook on site at the time of sampling.

All samples were properly logged and recorded following strict chain of custody procedures and submitted to *EMC Labs, Inc.* in Phoenix, AZ for analysis by flame atomic absorption spectrometry in accordance with EPA SW-846 Method 7420. *EMC* is accredited for lead sample analysis through successful participation in the National Lead Laboratory Accreditation Program (NLLAP).

5.0 RESULTS

5.1 Asbestos

Based on the polarizing light microscopy (PLM) laboratory analysis (EPA Method 600/M4-82-020), **nine of of the samples collected showed >1% asbestos content.** The analytical results from all the samples are summarized in Table 1. The detailed laboratory report is included as Appendix III.

TABLE 1
ASBESTOS BULK SAMPLE RESULTS
PIER 15 SHED
MAY 9, AND JUNE 29, 2012

Sample Number	Sample Location*	Description	Condition	Asbestos Content & Type
509-A01	Roof	Layer 1: Roof Field, Black Layer 2: Roof Field, Black Layer 3: Roof Field, Black Layer 4: Roof Field, Black Layer 5: Roof Field, Black Layer 6: Roof Field, Black	Layer 1: Good Layer 2: Good Layer 3: Good Layer 4: Good Layer 5: Good Layer 6: Good	Layer 1: NO ACM Layer 2: NO ACM Layer 3: NO ACM Layer 4: NO ACM Layer 5: NO ACM Layer 6: NO ACM
509-A02	Roof	Layer 1: Roof Field, Black Layer 2: Roof Field, Black Layer 3: Roof Field, Black Layer 4: Roof Field, Black Layer 5: Roof Field, Black Layer 6: Roof Field, Black	Layer 1: Good Layer 2: Good Layer 3: Good Layer 4: Good Layer 5: Good Layer 6: Good	Layer 1: NO ACM Layer 2: NO ACM Layer 3: NO ACM Layer 4: NO ACM Layer 5: NO ACM Layer 6: NO ACM
509-A03	Roof	Layer 1: Roof Field, Black Layer 2: Roof Field, Black Layer 3: Roof Field, Black Layer 4: Roof Field, Black	Layer 1: Good Layer 2: Good Layer 3: Good Layer 4: Good	Layer 1: NO ACM Layer 2: NO ACM Layer 3: NO ACM Layer 4: NO ACM
509-A04	***Roof***	***Mastic, Silver/Gray/Black***	***Good***	***10% Chrysotile***
509-A05	***Roof***	***Mastic, Silver/Gray/Black***	***Good***	***10% Chrysotile***
509-A06	***Roof***	***Mastic, Silver/Gray/Black***	***Good***	***10% Chrysotile***
509-A07	***Roof***	***Mastic, Black***	***Good***	***5% Chrysotile***
509-A08	***Roof***	***Mastic, Black***	***Good***	***5% Chrysotile***
509-A09	***Roof***	***Mastic, Black***	***Good***	***5% Chrysotile***
509-A10	Roof	Exterior Concrete Paint, and Coating, Off-white/Gray	Good	NO ACM
509-A11	Roof	Exterior Concrete Paint and Coating, Off-white/Gray	Good	NO ACM

TABLE 1

ASBESTOS BULK SAMPLE RESULTS
PIER 15 SHED
MAY 9 AND JUNE 29, 2012

509-A12	Roof	Exterior Concrete Paint and Coating, Off-white/Gray	Good	NO ACM
509-A13	Ground Level	Interior CMU Paint and Coating, Off-white/Lt. Gray	Good	NO ACM
509-A14	Ground Level	Interior CMU Paint and Coating, Off-white/Lt. Gray	Good	NO ACM
509-A15	Ground Level	Exterior CMU Paint and Coating, Off-white/Lt. Gray	Good	NO ACM
509-A16	***Ground Level***	***Window Caulk, Gray/Off-White***	***Good***	***10% Chrysotile***
509-A17	***Ground Level***	***Window Caulk, Gray/Off-White***	***Good***	***10% Chrysotile***
509-A18	***Ground Level***	***Window Caulk, Gray/Off-White***	***Good***	***10% Chrysotile***
629-A01	Ground Level	Exterior CMU Paint and coating, Gray	Good	NO ACM
629-A02	Ground Level	Exterior CMU Paint and coating, Gray	Good	NO ACM
629-A03	Ground Level	Interior CMU Paint and Coating, Green and Gray	Good	NO ACM
629-A04	Ground Level	Interior Concrete Paint and Coating, Green and Gray	Good	NO ACM
629-A05	Ground Level	Interior Concrete Paint and Coating, Green and Gray	Good	NO ACM
629-A06	Ground Level	Interior Concrete Paint and Coating, Green and Gray	Good	NO ACM

*See Figures 1 in Appendix I for sample locations

5.2 Lead-Based and Lead-Containing Paint

The United States Environmental Protection Agency (EPA) and the United States Housing for Urban Development (HUD) define lead-based paint as paint or other coatings containing lead in concentrations equal to or in excess of 0.5% weight or 5,000 mg/kg (ppm). Paint containing lead in *any* concentration is categorized by OSHA and HIOSH as lead-containing paint.

Based on these guidelines and the laboratory analysis by EPA SW-846 Method 7420, none of the samples were identified as lead-based paint. However, all four of the samples showed detectable levels of lead and are therfore considered lead-containing paint. The analytical reports from all of the samples are presented in Table 2. The detailed laboratory reports are included as Appendix IV.

TABLE 2
LEAD PAINT MEASUREMENT RESULTS
PIER 15 SHED
MAY 9, 2012

Sample Number	Sample Location	Description	Reporting Limit (%)	Lead Content (%)
131-FL01	**Roof**	**Off-White Exterior Paint**	**0.010**	**0.027**
131-FL02	**Windows**	**Green Trim Paint**	**0.014**	**0.021**
131-FL03	**Ground Level**	**Gray Paint**	**0.010**	**0.010**
131-FL04	**Ground Level**	**Yellow Trim Paint**	**0.010**	**0.017**

BRL = Below Reportable Limits
Bold italic text denotes lead-based paint
Bold text denote lead-containing paint

6.0 DISCUSSION AND RECOMMENDATIONS

6.1 Asbestos

The National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 61, defines asbestos containing materials as any material containing greater than 1% asbestos. NESHAP also categorizes ACM as either being a "friable" material, a Category I non-friable material or a Category II non-friable material.

Friable asbestos containing materials (FACM) are defined by NESHAP as being material that can be reduced to powder by hand pressure and contain more than 1% asbestos. **None of the asbestos containing materials identified in this survey would be considered FACM.**

Category I non-friable materials are defined as packing, gaskets, resilient floor covering and asphalt roofing products that contain more than 1% asbestos. **All 9 of the asbestos containing samples would fall into this category.**

Category II non-friable materials include any material, excluding Category I non-friable material, in particular, cementitious material such as stucco and Transite. **None of the asbestos containing materials identified in this survey would be considered Category II non-friable materials.**

The friability of the asbestos containing material is relevant because asbestos must be inhaled before it is a significant health concern. The more friable the material, the more likely it is to become airborne, opening the possibility of inhalation by building occupants. The following materials, with their respective locations, have been found to be asbestos containing:

The roof field mastics and window caulking, in their present location and condition at the time of the survey, are non-friable and do not pose a significant health risk. However, prior to re-roofing, the mastic must be removed and disposed by a qualified asbestos abatement contractor. In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable EPA, OSHA, and HIOSH regulations pertaining to the handling of asbestos containing material. Environmental specifications should be drawn up prior to the abatement work onsite. These specifications will address proper work techniques in dealing with asbestos containing materials and will also address handling and disposal of asbestos contaminated items.

6.2 Lead

The lead-containing paints (LCP) in their ***present location and condition at the time of the survey***, does not pose a significant health threat. However, as the demolition activities will disturb surfaces covered with lead-containing paint, the owner must notify workers and contractors of the presence of lead in the paints.

Prior to demolition, environmental specifications should be produced. These specifications will address proper work techniques in dealing with affected areas and will also address handling and disposal of lead contaminated items. In addition, the services of a qualified consultant should also be obtained to monitor and inspect the removal activities to ensure compliance with applicable EPA, OSHA, and HIOSH regulations pertaining to the handling of lead.

The OSHA and HIOSH lead standard requirements may need to be applied when paint containing lead is encountered during renovation or demolition activities. Specifically, such activities may need to be performed in compliance with 29 CFR 1926.62 and HIOSH 12-148.1.

Some of the components of 29 CRF 1926.62 and HIOSH 12-148.1 are:

- Exposure assessment via personal air monitoring
- Lead awareness training
- Medical surveillance
- Hazard communication
- Respiratory protection
- Personal protective clothing and equipment

Generally, representative core samples of the material with lead-containing paint must be collected prior to disposal and analyzed via the Toxicity Characteristic Leaching Procedure (TCLP) to determine if the building components meet the definition of a Resource Conservation and Recovery Act (RCRA) regulated hazardous waste per 40 CFR §261. If the laboratory analytical result is less than 5 mg/L for lead, the building components may be disposed of as general construction debris. If the laboratory analytical result exceeds 5 mg/L for lead: 1) the entire painted component must be disposed of as a RCRA-regulated hazardous waste; or 2) the LCP must be removed prior to disposal activities and only the removed paint chips must be disposed of as a RCRA-regulated hazardous waste.

7.0 REFERENCES

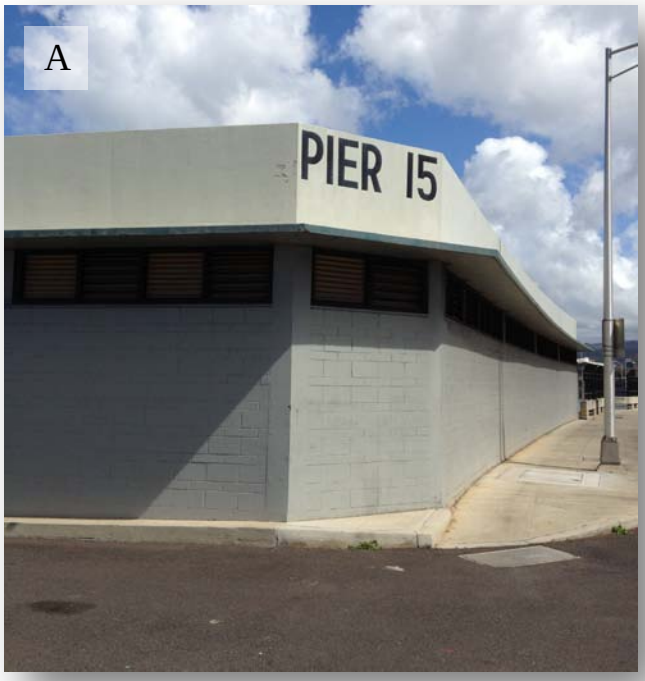
- Code of Federal Regulations. Occupational Safety and Health Standards. Title 29, Part 1910 (1910.1000 TO END). Washington DC. US Government Printing Office, 1918
- Code of Federal Regulations. Occupational Safety and Health Standards. Title 29, Part 1926.62. Washington DC. US Government Printing Office, 1986.
- Code of Federal Regulations. Asbestos Hazards Emergency Response Act (AHERA), Asbestos Regulations. Title 40, Part 763. Washington DC. US Government Printing Office, 1986.
- Code of Federal Regulations. National Emission Standard for Hazardous Air Pollutants (NESHAP), Asbestos Regulations. Title 40, Part 61, Subpart M. Washington DC. US Government Printing Office, July 1991.

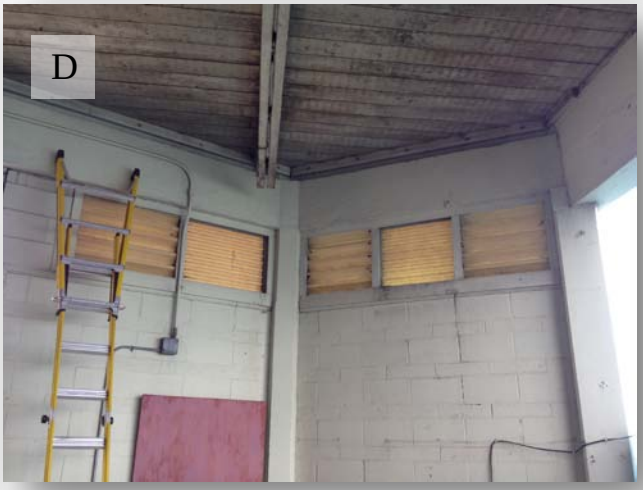
Appendix I

SAMPLE LOCATIONS DIAGRAM

Appendix II

PHOTOGRAPHIC DOCUMENTATION





Asbestos and Lead containing materials:

A. The Pier 15 shed featured gray interior and exterior paint, green trim on the roof and yellow trim on ground level. All paints contained detectable levels of lead. ***B.*** The roof is asphaltic over wood planks. ***C.*** Both the black mastic along the top of the low wall around the roof, as well as the silver mastic on the low wall contain non-friable asbestos. ***D.*** The interior of the building was open to the outside and served as a garage and storage area. The window caulk around the window frame contains asbestos. ***E.*** A close up of the asbestos containing window caulk.

Appendix III

LABORATORY ANALYSIS AND CHAIN-OF-CUSTODY ASBESTOS

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0112720

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	KIMURA INTERNATIONAL, INC	Job# / P.O. #:	111001
Address:	1600 KAPIOLANI BLVD, STE 1610 HONOLULU HI 96814	Date Received:	05/11/2012
		Date Analyzed:	05/21/2012
Collected:	05/09/2012	Date Reported:	05/22/2012
Project Name:	PIERS 12 & 15 IMPROVEMENTS	EPA Method:	EPA 600/M4-82-020
Address:		Submitted By:	BRANDIS UEYAMA
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	Non-Asbestos Constituents	
0112720-001 509-A01	ROOF	LAYER 1 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 2 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 3 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 4 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		Please see EMC Labs Sample Number 0112720-019 for Additional Layers				
0112720-002 509-A02	ROOF	LAYER 1 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 2 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 3 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 4 Roof Field, Black	No		Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		Please see EMC Labs Sample Number 0112720-020 for Additional Layers				

EMC LABS, INC.

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Address:	1600 KAPIOLANI BLVD, STE 1610 HONOLULU HI 96814	Date Received:	05/11/2012
		Date Analyzed:	05/21/2012
Collected:	05/09/2012	Date Reported:	05/22/2012
Project Name:	PIERS 12 & 15 IMPROVEMENTS	EPA Method:	EPA 600/M4-82-020
Address:		Submitted By:	BRANDIS UEYAMA
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type		Non-Asbestos Constituents	
0112720-003 509-A03	ROOF	LAYER 1 Roof Field, Black	No			Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 2 Roof Field, Black	No			Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 3 Roof Field, Black	No			Fibrous Glass Gypsum Quartz Binder/Filler	30% 70%
		LAYER 4 Roof Field, Black	No			Fibrous Glass Gypsum Carbonates Quartz Binder/Filler	30% 70%
0112720-004 509-A04	ROOF	Mastic, Silver/ Gray/ Black	Yes	Chrysotile	10%	Fibrous Glass Gypsum Carbonates Quartz Binder/Filler	10% 80%
0112720-005 509-A05	ROOF	Mastic, Silver/ Gray/ Black	Yes	Chrysotile	10%	Fibrous Glass Gypsum Carbonates Quartz Binder/Filler	10% 80%
0112720-006 509-A06	ROOF	Mastic, Silver/ Gray/ Black	Yes	Chrysotile	10%	Fibrous Glass Gypsum Carbonates Quartz Binder/Filler	10% 80%

EMC LABS, INC.

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Client:	KIMURA INTERNATIONAL, INC	Job# / P.O. #:	111001
Address:	1600 KAPIOLANI BLVD, STE 1610 HONOLULU HI 96814	Date Received:	05/11/2012
		Date Analyzed:	05/21/2012
Collected:	05/09/2012	Date Reported:	05/22/2012
Project Name:	PIERS 12 & 15 IMPROVEMENTS	EPA Method:	EPA 600/M4-82-020
Address:		Submitted By:	BRANDIS UEYAMA
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type		Non-Asbestos Constituents	
0112720-007 509-A07	ROOF	Mastic, Black/ Gray	Yes	Chrysotile	5%	Fibrous Glass	10%
						Carbonates Gypsum Quartz Binder/Filler	85%
0112720-008 509-A08	ROOF	Mastic, Black/ Gray	Yes	Chrysotile	5%	Fibrous Glass	10%
						Carbonates Gypsum Quartz Binder/Filler	85%
0112720-009 509-A09	ROOF	Mastic, Black/ Gray	Yes	Chrysotile	5%	Fibrous Glass	10%
						Carbonates Gypsum Quartz Binder/Filler	85%
0112720-010 509-A10	ROOF	Exterior Concrete Paint, Off White/ Gray	No			Carbonates Quartz Binder/Filler	100%
0112720-011 509-A11	ROOF	Exterior Concrete Paint, Off White/ Gray	No			Carbonates Quartz Binder/Filler	100%
0112720-012 509-A12	ROOF	Exterior Concrete Paint, Off White/ Gray	No			Cellulose Fiber	<1%
						Carbonates Quartz Binder/Filler	99%
0112720-013 509-A13	GROUND LEVEL	Exterior CMU Paint, Off White/ Lt. Gray	No			Gypsum Quartz Binder/Filler	100%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0112720

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	KIMURA INTERNATIONAL, INC	Job# / P.O. #:	111001
Address:	1600 KAPIOLANI BLVD, STE 1610 HONOLULU HI 96814	Date Received:	05/11/2012
		Date Analyzed:	05/21/2012
Collected:	05/09/2012	Date Reported:	05/22/2012
Project Name:	PIERS 12 & 15 IMPROVEMENTS	EPA Method:	EPA 600/M4-82-020
Address:		Submitted By:	BRANDIS UEYAMA
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type		Non-Asbestos Constituents	
0112720-014 509-A14	GROUND LEVEL	Exterior CMU Paint, Off White/ Lt. Gray	No			Gypsum Quartz Binder/Filler	100%
0112720-015 509-A15	GROUND LEVEL	Exterior CMU Paint, Off White/ Lt. Gray	No			Gypsum Quartz Binder/Filler	100%
0112720-016 509-A16	GROUND LEVEL	Window Caulk, Gray/ Off White	Yes	Chrysotile	10%	Carbonates Gypsum Quartz Binder/Filler	90%
0112720-017 509-A17	GROUND LEVEL	Window Caulk, Gray/ Off White	Yes	Chrysotile	10%	Carbonates Gypsum Quartz Binder/Filler	90%
0112720-018 509-A18	GROUND LEVEL	Window Caulk, Gray/ Off White	Yes	Chrysotile	10%	Carbonates Gypsum Quartz Binder/Filler	90%
0112720-019 509-A01	ROOF - ADDITIONAL LAYERS	LAYER 1 Roof Field, Black	No			Fibrous Glass	30%
						Gypsum Quartz Binder/Filler	70%
		LAYER 2 Roof Field, Black	No			Fibrous Glass	30%
						Gypsum Carbonates Quartz Binder/Filler	70%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0112720

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	KIMURA INTERNATIONAL, INC	Job# / P.O. #:	111001
Address:	1600 KAPIOLANI BLVD, STE 1610	Date Received:	05/11/2012
	HONOLULU HI 96814	Date Analyzed:	05/21/2012
Collected:	05/09/2012	Date Reported:	05/22/2012
Project Name:	PIERS 12 & 15 IMPROVEMENTS	EPA Method:	EPA 600/M4-82-020
Address:		Submitted By:	BRANDIS UEYAMA
		Collected By:	Customer

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	Non-Asbestos Constituents	
0112720-020 509-A02	ROOF - ADDITIONAL LAYERS	LAYER 1 Roof Field, Black	No		Fibrous Glass	30%
					Gypsum Carbonates Quartz Binder/Filler	70%
		LAYER 2 Roof Field, Black	No		Fibrous Glass	30%
					Gypsum Carbonates Quartz Binder/Filler	70%

Analyst - Kurt Kettler

Signatory - Lab Director - Kurt Kettler

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernable layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicated or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. These reports are for the exclusive use of the addressed client and that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of thirty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method for asbestos. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by any entity to claim product endorsement by NVLAP or any agency of the U.S. Government. Polarized Light Microscopy may not be consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.

Page ___ of ___

CHAIN OF CUSTODY

EMC Labs, Inc.
9830 S. 51ST St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 112720
TAT: 5 days
Rec'd: MAY 11 P.M.
EMC USE ONLY

COMPANY NAME: KIMURA INTERNATIONAL INC.
1600 Kapiolani Blvd, #1600
Honolulu, HI 96814
CONTACT: Brandis Ueyama SCAN COC
Phone/Fax: (808) 944-8848 / (808) 941-8999
Email: bueyama@kimurainternational.com

BILL TO: (If Different Location)

Now Accepting: VISA – MASTERCARD

Price Quoted: $_____ / Sample $____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. TURNAROUND TIME: [4hr rush} [8hr rush} [1-Day] [2-Day] [3-Day] [5-Day] [6-10 Day]

****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to delay if credit terms are not met

2. TYPE OF ANALYSIS: [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]

3. DISPOSAL INSTRUCTIONS: [Dispose of samples at EMC] / [Return samples to me at my expense]

(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. Project Name: Piers 12 & 15 Improvements

P.O. Number: _____ **Project Number:** 11001

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
1	509-A-01	5/9	Bulk	Y N			
				Y N			
				Y N			
				Y N			
18	509-A18			Y N			
19	" -01		Add'l Layers	Y N			
20	" -02			Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			

SPECIAL INSTRUCTIONS: _____

Sample Collector: (Print) _____ (Signature) _____

Relinquished by: _____ Date/Time: _____ Received by: Diana Federico Date/Time: 5/11/12

Relinquished by: Diana Federico Date/Time: 5/11/12 Received by: [signature] Date/Time: 5/11/12

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

Rev. 09/01/08

112720

Kimura International, Inc. **Bulk Sample Sheet**

Sample Date: 05/09/12	Turnaround Time Required: Standard	Analysis: PLM
Job No: 111001	Job Name: Piers 12 and 15 Improvements	

	Sample ID	Location	Substrate	Color	Description	HA#
1	509-A01	Roof	Bulk	Black	Roof field	N/A
2	509-A02	Roof	Bulk	Black	Roof field	N/A
3	509-A03	Roof	Bulk	Black	Roof field	N/A
4	509-A04	Roof	Bulk	Silver	Mastic	N/A
5	509-A05	Roof	Bulk	Silver	Mastic	N/A
6	509-A06	Roof	Bulk	Silver	Mastic	N/A
7	509-A07	Roof	Bulk	Black	Mastic	N/A
8	509-A08	Roof	Bulk	Black	Mastic	N/A
9	509-A09	Roof	Bulk	Black	Mastic	N/A
10	509-A10	Roof	Bulk	Off white	Exterior concrete paint	N/A
11	509-A11	Roof	Bulk	Off white	Exterior concrete paint	N/A
12	509-A12	Roof	Bulk	Off white	Exterior concrete paint	N/A
13	509-A13	Ground Level	Bulk	Off white	Exterior CMU paint	N/A
14	509-A14	Ground Level	Bulk	Off white	Exterior CMU paint	N/A
15	509-A15	Ground Level	Bulk	Off white	Exterior CMU paint	N/A
16	509-A16	Ground Level	Bulk	Gray	Window caulk	N/A
17	509-A17	Ground Level	Bulk	Gray	Window caulk	N/A
18	509-A18	Ground Level	Bulk	Gray	Window caulk	N/A

Additional Attached Field Notes Sheet (yes / no)

Sampled By: Fletcher Kimura and Brandis Ueyama — Date/Time: 05/09/12, 9:00-10:00

Relinquished By: [signature] — Date/Time: 5/9/12, 14:00

Received By: Diana Federico — Date/Time: 5/11/12

1600 Kapiolani Boulevard, Suite 1610, Honolulu, HI 96814
Phone: (808) 944-8848 Fax: (808) 941-8999
bueyama@kimurainternational.com

INALAB, Inc.
LABORATORY DIVISION
ANALYTICAL REPORT

NVLAP LAB CODE 200655-0

Friday, July 06, 2012

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VOICE: (808) 735-0422 / FAX: (808) 735-0047
WWW.INALAB.COM

AIHA LAP, LLC ACCREDITED LABORATORY ENVIRONMENTAL MICROBIOLOGY ISO/IEC 17025:2005 LAB # 101812

AIHA LAP, LLC ACCREDITED LABORATORY ENVIRONMENTAL LEAD ISO/IEC 17025:2005 LAB # 101812

AIHA LAP, LLC ACCREDITED LABORATORY INDUSTRIAL HYGIENE ISO/IEC 17025:2005 LAB # 101812

Mr. Fletcher Kimura
Kimura International
1600 Kapiolani Blvd Ste 1610

Honolulu HI 96814

Phone Number: (808) 944-8848
Facsimile: (808) 941-8999
Email:

INALAB Job No: 20122010
Your Project: Pier 15, 6/29/12

Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present? / Type	%v/v	Other Fibrous	% v/v	Matrix	% v/v	Date Received	Date Analyzed
20120629010	**629-A01 ext. CMU, paint**	NONE DETECTED		Cellulose (undulose extinction)	< **2**	Calcite + binder + quartz + paint + aggregate	> **98**	6/29/2012	7/2/2012
Layer	Whole Sample Basis								
Comments	Grey paint with tan spackle material and tan aggregate. Visual estimation: < 1 %.								
20120629011	**629-A02 ext. CMU, paint**	NONE DETECTED		Cellulose (undulose extinction)	< **2**	Calcite + binder + quartz + paint	> **98**	6/29/2012	7/2/2012
Layer	Whole Sample Basis								
Comments	Grey paint with tan spackle material. Visual estimation: < 1 %.								

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Email:

INALAB Job No: 20122010
Your Project: Pier 15, 6/29/12

Bulk Asbestos Determination

Sample No.	Your Sample Description	Asbestos Present? / Type	%v/v	Other Fibrous	% v/v	Matrix	% v/v	Date Received	Date Analyzed
20120629012	**629-A03 int. CMU, paint**	NONE DETECTED		Cellulose (undulose extinction)	< **2**	Calcite + binder + quartz + paint + aggregate	> **98**	6/29/2012	7/2/2012
Layer	Whole Sample Basis								
Comments	Green paint with white spackle material and tan aggregate. Visual estimation: < 1 %.								
20120629013	**629-A04 int. concrete, paint**	NONE DETECTED		Cellulose (undulose extinction)	< **2**	Calcite + binder + quartz + paint + other	> **98**	6/29/2012	7/2/2012
Layer	Whole Sample Basis								
Comments	Green paint with white spackle material and dark grey cement-like material. Visual estimation: < 1 %.								
20120629014	**629-A05 int. concrete, paint**	NONE DETECTED		Cellulose (undulose extinction)	< **2**	Calcite + binder + quartz + paint + other	> **98**	6/29/2012	7/2/2012
Layer	Whole Sample Basis								
Comments	Green paint with white spackle material and dark grey cement-like material. Visual estimation: < 1 %.								
20120629015	**629-A06 int. concrete, paint**	NONE DETECTED		Cellulose (undulose extinction)	< **2**	Calcite + binder + quartz + paint + other	> **98**	6/29/2012	7/2/2012
Layer	Whole Sample Basis								
Comments	Green paint with multi-colored spackle materials and dark grey cement-like material. Visual estimation: < 1 %.								

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Phone Number: (808) 944-8848
Facsimile: (808) 941-8999
Email:

INALAB Job No: 20122010
Your Project: Pier 15, 6/29/12

General Comments
The bulk samples analyses subject of this analytical report were conducted in general accordance with the procedures outlined in the United States Environmental Protection Agency's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" (EPA-600/M4-82-020, Dec. 1982) and/ or "Method for Determination of Asbestos in bulk Building Materials" (EPA-600/R-93-116, July 1993). The analysis of each bulk sample relates only to the material examined, and may or may not represent the overall composition of its original source. Floor tile and other resinously bound materials, when analyzed by the EPA methods referenced above may yield false negative results because of limitations in separating closely bound fibers and in detecting fibers of small length and diameter. Alternative methods of identification, including Transmission Electron Microscopy (TEM) may or may not be applicable and suffer from serious analytical limitations of their own including a lack of standardized or accredited methodology. We utilize calibrated visual area estimation on a routine basis and do not conduct point counting unless specifically requested to do so. Estimated error for the visual determinations presented are 50% relative (1 to 5%); 25% relative (6 to 25%) and 20% (>26% v/v). Whole sample percentage results are estimated on the basis of the relative "volume" of each readily discernable layer. We will not separate layers which in our opinion are not readily discernable. This report is not to be duplicated except in full without the expressed written permission of INALAB. This report does not represent a product endorsement by the AIHA, NIST or any affiliated organizations. Unless otherwise indicated, the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
None Detected = asbestos was not observed in the sample.
Tr = TRACE, i.e., asbestos WAS detected above our detection limits of 0.1% but BELOW quantifiable limits of 1.0%. Point counting must be used for concentration ranges below 1%.
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
 # = Analytical methods marked with an "#" are not within our AIHA Scope of Accreditation.

DID INALAB FORENSIC DIVISION COLLECT THESE SAMPLES? No

Ms. Jennifer Hsu
Laboratory Manager

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INALAB, Inc.

Experts in Environmental, Forensic and Occupational Laboratory Services

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NVLAP LAB CODE 200655-0

DATE: 6/29/12

CLIENT / COMPANY: Kimura International

TELEPHONE NUMBER: 944-8848

PROJECT: Pier 15

Delivered By (print name): Brandis Ueyama

Requested Turn-Around-Time	
___	Best Choice* ( )
X	Best Buy (4 Working Days)
___	Premium (2 Working Days)
___	Priority (1 Working Day)
___	Rush (< 1 Working Day)
___	Immediate (4 Work Hours)

Date required: _____

INALAB JOB #: 20122010

INALAB CLIENT I.D.#: 2917

INALAB Sample NUMBER(s) For INALAB Use Only	Your Sample No./ I.D.	Client's Sampling Location	Client's Sample DESCRIPTION	Date / Time Collected	SAMPLE MATRIX **	ANALYSIS REQUEST	AIR VOLUME
20120629010	629-A01	ext. CMU	paint	6/29/12 @ 946		asbestos (PLM)	
20120629011	629-A02	ext. CMU	↓	↓		↓	
20120629012	629-A03	int. CMU					
20120629013	629-A04	int. concrete					
20120629014	629-A05	int. concrete					
20120629015	629-A06	int. concrete	↓	↓		↓	

Relinquished By & Agree to Administrative Terms (Sign) ***	Date / Time	Received By: (Signature)	Date / Time
x [signature]	6/29/12 @ 1130	x [signature]	6/29/12 11:30
x		x	

Send Report To (E-MAIL Address OR FAX Number): fkimura@kimurainternational.com

SPECIAL NOTATION:

* Custom TAT is subject to management confirmation. For sample(s) received after 9:00 A.M., TAT begins following day.

Inalab Collection?: ☐ YES ☑ NO

** If matrix is "soil", please specify if it is a FOREIGN SOIL SAMPLE (outside Hawaii) in the Special Notation section.

*** Please refer to our "Request for Services" form for a complete list of our administrative terms. See *http://www.inalab.com/resourcesforms.html*

**** Please call for sample pickup on Oahu or Interisland Cargo for Same Day Service (*mention* INALAB, INC.)! Thank you for your continued support!

Received Via: PICK-UP_____ DROP BOX _____ FEDEX_____ USPS_____ UPS _____ Office D/O_____

Request copy of "COC"? _____YES ✓ NO

Appendix IV

LABORATORY ANALYSIS AND CHAIN-OF-CUSTODY LEAD

EMC LABS, INC.

9830 South 51st Street, Suite B-109 / PHOENIX, ARIZONA 85044 / 480-940-5294 or 800-362-3373 / FAX 480-893-1726
emclab@emclabs.com

LEAD (Pb) IN PAINT CHIP SAMPLES

EMC SOP METHOD #L01/1 EPA SW-846 METHOD 7420

EMC LAB #:	L45458	**DATE RECEIVED:**	05/11/12
CLIENT:	Kimura International Inc.	**REPORT DATE:**	05/15/12
		DATE OF ANALYSIS:	05/15/12
CLIENT ADDRESS:	1600 Kapiolani Blvd, #1600 Honolulu, HI 96814	**P.O. NO.:**	
PROJECT NAME:	Piers 12 & 15 Improvement	**PROJECT NO.:**	

EMC # L45458-	SAMPLE DATE /12	CLIENT SAMPLE #	DESCRIPTION	REPORTING LIMIT (%Pb by weight)	%Pb BY WEIGHT
1	05/09	131-FL01	Roof / Concrete / Off-White / Exterior Paint	0.010	0.027
2	05/09	131-FL02	Windows / Concrete / Green / Trim Paint	0.014	0.021
3	05/09	131-FL03	Ground Level / Concrete / Gray / Exterior Paint	0.010	0.010
4	05/09	131-FL04	Ground Level / Concrete / Yellow / Trim Paint	0.010	0.017

^ = Dilution Factor Changed * = Excessive Substrate May Bias Sample Results **BRL** = Below Reportable Limits # = Very Small Amount Of Sample Submitted, May Affect Result

This report applies to the standards or procedures identified and to the samples tested only. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. Unless otherwise noted, all quality control analyses for the samples noted above were within acceptable limits.

Where it is noted that a sample with excessive substrate was submitted for laboratory analysis, such analysis may be biased. The lead content of such sample may, in actuality, be greater than reported. EMC makes no warranty, express or implied, as to the accuracy of the analysis of samples noted to have been submitted with excessive substrate. Resampling is recommended in such situations to verify original laboratory results.

These reports are for the exclusive use of the addressed client and are rendered upon the condition that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. Samples not destroyed in testing are retained a maximum of sixty (60) days.

ANALYST: Jason Thompson

QA COORDINATOR: Kurt Kettler

Rev. 11/30/08

Page ___ of ___

CHAIN OF CUSTODY

EMC Labs, Inc.
9830 S. 51ST St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: R45458
TAT: 1-2day
Rec'd: 5/11/12
EMC USE ONLY

COMPANY NAME: KIMURA INTERNATIONAL INC.
1600 Kapiolani Blvd, #1600
Honolulu, HI 96814
CONTACT: Brandis Ueyama SCAN COC
Phone/Fax: (808) 944-8848 / (808) 941-8999
Email: bueyama@kimurainternational.com

BILL TO: (If Different Location)

Now Accepting: VISA – MASTERCARD

Price Quoted: $_____ / Sample $____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. **TURNAROUND TIME:** [4hr rush] [8hr rush] [1-Day] [2-Day] [3-Day] [5-Day] [6-10 Day]

****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to delay if credit terms are not met

2. **TYPE OF ANALYSIS:** [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]
3. **DISPOSAL INSTRUCTIONS:** [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. **Project Name:** Piers 12 & 15 Improvement

P.O. Number: _____ **Project Number:** _____

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
1	131-FL01	5/9	Lead	Y N			
				Y N			
				Y N			
4	13-FL-04			Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			

SPECIAL INSTRUCTIONS: _____

Sample Collector: (Print) _____ (Signature) _____

Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time 5/12/12

Relinquished by: _____ Date/Time 5/11/12 Received by: _____ Date/Time: 5/12/12

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

Rev. 09/01/08

Kimura International, Inc.

Bulk Sample Sheet

Sample Date: 05/09/12	Turnaround Time Required: Standard	Analysis: Pb by FLAA
Job No: 111001	Job Name: Piers 12 and 15 Improvements	

	Sample ID	Location	Substrate	Color	Description	HA#
1	131-FL01	Roof	concrete	Off white	Exterior paint	N/A
2	131-FL02	Windows	concrete	Green	Trim paint	N/A
3	131-FL03	Ground Level	concrete	Gray	Exterior paint	N/A
4	131-FL04	Ground Level	concrete	Yellow	Trim paint	N/A
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Additional Attached Field Notes Sheet (yes / no)

Sampled By: Fletcher Kimura and Brandis Ueyama

Date/Time: 05/09/12, 9:00-10:00

Relinquished By:

Date/Time: 5/9/12, 14:00

Received By:

Date/Time:

1600 Kapiolani Boulevard, Suite 1610, Honolulu, HI 96814
Phone: (808) 944-8848 Fax: (808) 941-8999

APPENDIX C.
MARINE BIOLOGICAL ASSESSMENT

Phase 2 marine resources assessment for Honolulu Harbor piers 12 and 15, Honolulu, O‘ahu

December 4, 2012
Revised January 7, 2013

Phase 2 marine resources assessment for Honolulu Harbor, piers 12 and 15, Honolulu, O'ahu[1]

December 4, 2012 *AECOS* No. 1300C
Rev. January 7, 2013

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[1] This report was prepared for Sato and Associates for use in project permitting and will become part of the public record.

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Introduction

The Department of Transportation, Harbors Division is proposing new berthing and mooring structures and upgraded utilities at piers 12 and 15 in the main Honolulu Harbor basin (the "Project"). These improvements are needed to accommodate two spill response boats and one spill response barge owned by Marine Spill Response Corporation (MSRC) and Clean Islands Council (CIC). The MSRC and CIC vessels are currently berthed at Pier 35, but are being displaced by a series of relocations associated with the state proposed Kāpalama Container Terminal.

Sato and Associates retained *AECOS*, Inc. to conduct marine biological surveys of the two piers to support preparation of an Environmental Assessment (EA). *AECOS* biologists conducted a marine biological survey on February 13, 2012. The report from the February 2012 survey describes the environment and identifies coral reef resources (including essential fish habitat or EFH) listed

and petitioned species, and critical habitats associated with the project locations (*AECOS*, 2012a).

The February 2012 survey generally followed U.S. Fish and Wildlife Service (USFWS) marine biological survey protocols (USFWS and NOAA, 2011) and included components of both "Phase 1" and "Phase 2" methodologies. As described in the USFWS/NOAA planning aid report, a "Phase 1" survey is a preliminary site investigation and should encompass two components: (1) identification of site habitats, sub-habitats, unique features, invasive species, diseases, listed species, relative species abundances, and growth forms of corals; and, (2) compile georeferenced photographs and data in a Geographic Information System (GIS) format. A "Phase 2" survey is designed to quantify coral resources that will be directly and indirectly impacted by project alternatives and includes methods to: (1) quantify coral colony size-frequency (size, diversity, new recruits, large colonies, health); (2) quantify diversity, size, density, and biomass of fishes; (3) identify and quantify (percent cover) algae and seagrass; (4) identify and quantify non-coral macro-invertebrate (target cnidarians, echinoderms, mollusks, and crustaceans); and (5) quantify percent cover of the benthic species and substrate types.

The February 13, 2012 survey included item (1) from the "Phase 1" protocol and items (2), (3), (4), and (5) from the "Phase 2" survey protocol (*AECOS*, 2012a). Data obtained from this survey were used by the Department of Transportation, Harbors Division to explore feasible design alternatives and initiate discussions with federal permitting and resources agencies (USACE, NOAA, USEPA, and USFWS). Afterwards, Sato and Associates finalized project designs and contracted *AECOS* to conduct a follow-up survey to determine impacts from the construction footprint by completing item (1) from the "Phase 2" survey protocol (that is, quantify coral colony size frequency and coral coverage in the Project footprints).

Data collected from the February 2012 survey were used to design and develop a quantitative sampling methodology for the subsequent October 2012 survey (*AECOS,* 2012b). Results from this latest survey (called the "Phase 2" survey) are presented herein and will be used to further project planning efforts, prepare permit applications, and develop appropriate avoidance, minimization, and compensatory mitigation strategies.

Site Description

Honolulu Harbor, located on the south side of O'ahu (Fig. 1), is the primary commercial harbor for ship traffic in and out of the Hawaiian Islands. Over a century ago, development of the harbor began within a natural channel created

by Nu'uanu Stream through the shallow coral reef. Dredging over the years gradually increased the size and depth of the harbor basin (Main Harbor Basin) and entrance channel (Main or Fort Armstrong Channel).

Dredged fill was used to create fast land, particularly on the seaward reef at Sand Island (formerly a much smaller Ānuenue Island). The Kāpalama Basin, also once a natural break in the reef, was eventually joined to the Main Harbor Basin by dredging a channel (Kāpalama Channel) between the two basins. In 1960, the western entrance channel (Kalihi Channel) was opened to Kāpalama Basin, substantially improving circulation within the latter basin and Honolulu Harbor as a whole. Sand Island borders Honolulu Harbor on the south and extensive commercial and industrial areas occur on all sides of the harbor. Honolulu Harbor is classified as a Class A embayment by the State of Hawai'i, Department of Health (HDOH, 2009).

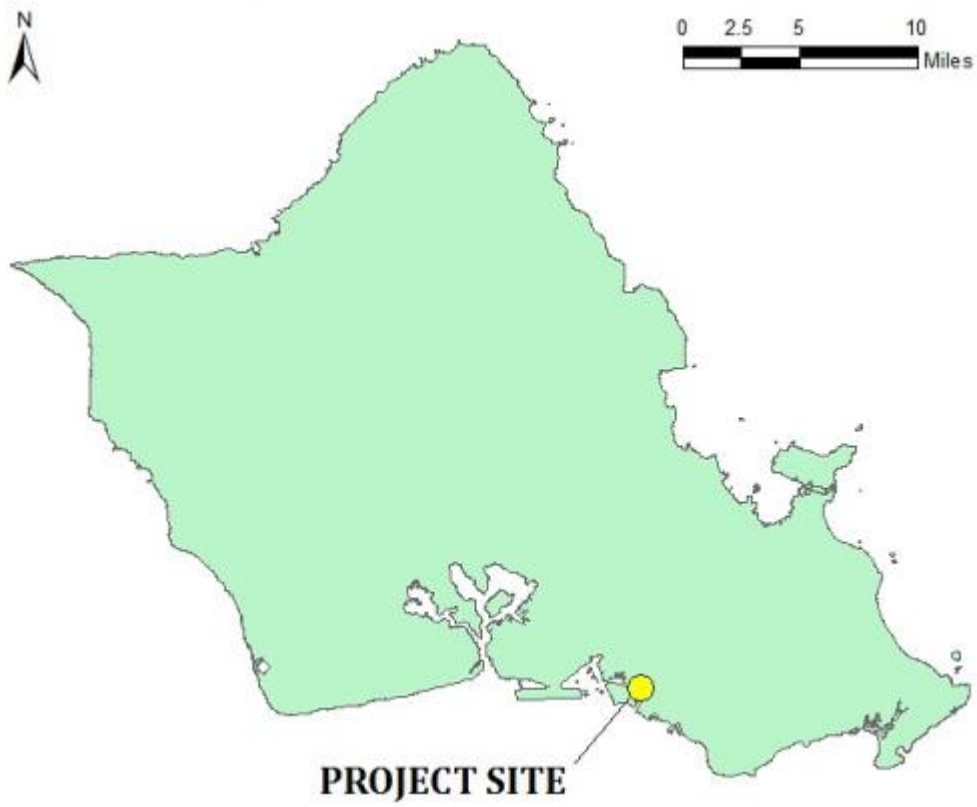

Figure 1. Project location on the Island of O'ahu.

Pier 12 was constructed in 1907 (WOA, 1968) at the site of the first wharf placed in the Harbor in 1825 (Rush, 1957). The area around Pier 12 appears not to have been dredged when Kewalo Basin Annex (piers 12 through 18) was created in 1945 (HDOT, 2012; Brill, 1999). Cultural and historical surveys of the area show the historic shoreline at Pier 12 and Pier 15 (Fig. 2; Hammatt and Shideler, 2010). The existing shore near Pier 12 matches well with the original coastline, supporting the assertion that this area has not been filled or dredged like most of the harbor. The sloping limestone shelf at Pier 12, which remains well-populated with coral colonies today, appears to be the original natural submerged shelf. Pier 15 is located near the mouth of Nu'uanu Stream. The historical shoreline here likely varied over time, influenced by deposition of sediment from the stream until the shore was straightened and hardened.

Figure. 2. Historic shoreline near Pier 12 and 15, Honolulu Harbor (Hammatt and Shideler, 2010)

A biological reconnaissance survey of piers 12 and 15 was conducted in 1982 (*AECOS*, 1982). This survey found substratum types in the vicinity of the piers to include mud bottom, concrete pilings, boulders (particularly around the remaining portion of Pier 12), and miscellaneous concrete and metal debris. On concrete boulders and pilings, biologists found a fouling community of sponges, tunicates, hydrozoans, mollusks, and barnacles. Corals were observed in the area around Pier 15 and the sloping bottom off Pier 12 supported a healthy growth of corals. Coral cover off Pier 12 was estimated to be 25%, with the densest coral growth on the west slope. Most coral colonies were 30 to 40 cm in diameter. Dominant species off both piers were *Porites lobata*, *P. compressa*, and *Montipora capitata*.

Project Description

The Pier 12 and Pier 15 proposed improvements do not include dredging activities. Project design, as it pertains to the marine biological surveys, is as follows:

<u>Pier 12</u> (Fig. 3):

- 20 piles to support one loading platform and two mooring dolphins
    - Piles are 51 cm diameter (0.20 m^2 each)
- One loading platform 4.6 m x 12.2 m (56.1 m^2)
    - Supported by 8 piles
- Two mooring dolphins, 3.0 m x 3.0 m (9.3 m^2) each.
    - Each mooring dolphin is supported by 6 piles.
- One vehicular bridge with approximately 1.8 m x 4.6 m (8.36 m^2) over water.
    - No piles
- 40 m x 10 m (400 m^2) OSRV Clean Islands vessel moored on-site

<u>Pier 15</u> (Fig. 4):

- 67 piles to support 2 loading platforms and 5 mooring dolphins
    - Piles are 51 cm diameter (0.20 m^2 each)
- Two loading platforms 29.0 m x 7.6 m (220.4 m2) and 30.5 m x 7.6 m (231.8 m^2)
    - Each platform is supported by 16 piles each
- Five mooring dolphins, 3.7 m x 3.7 m (13.7 m^2) each.
    - Each mooring dolphin is supported by 7 piles.
- One barge and one ship (one 84 m by 18 m or 1512 m^2 and one 63 m by 13 m or 819 m^2) moored on-site.
- 10 piles (61 cm diameter), in waters less than 9 ft to be removed at mudline.

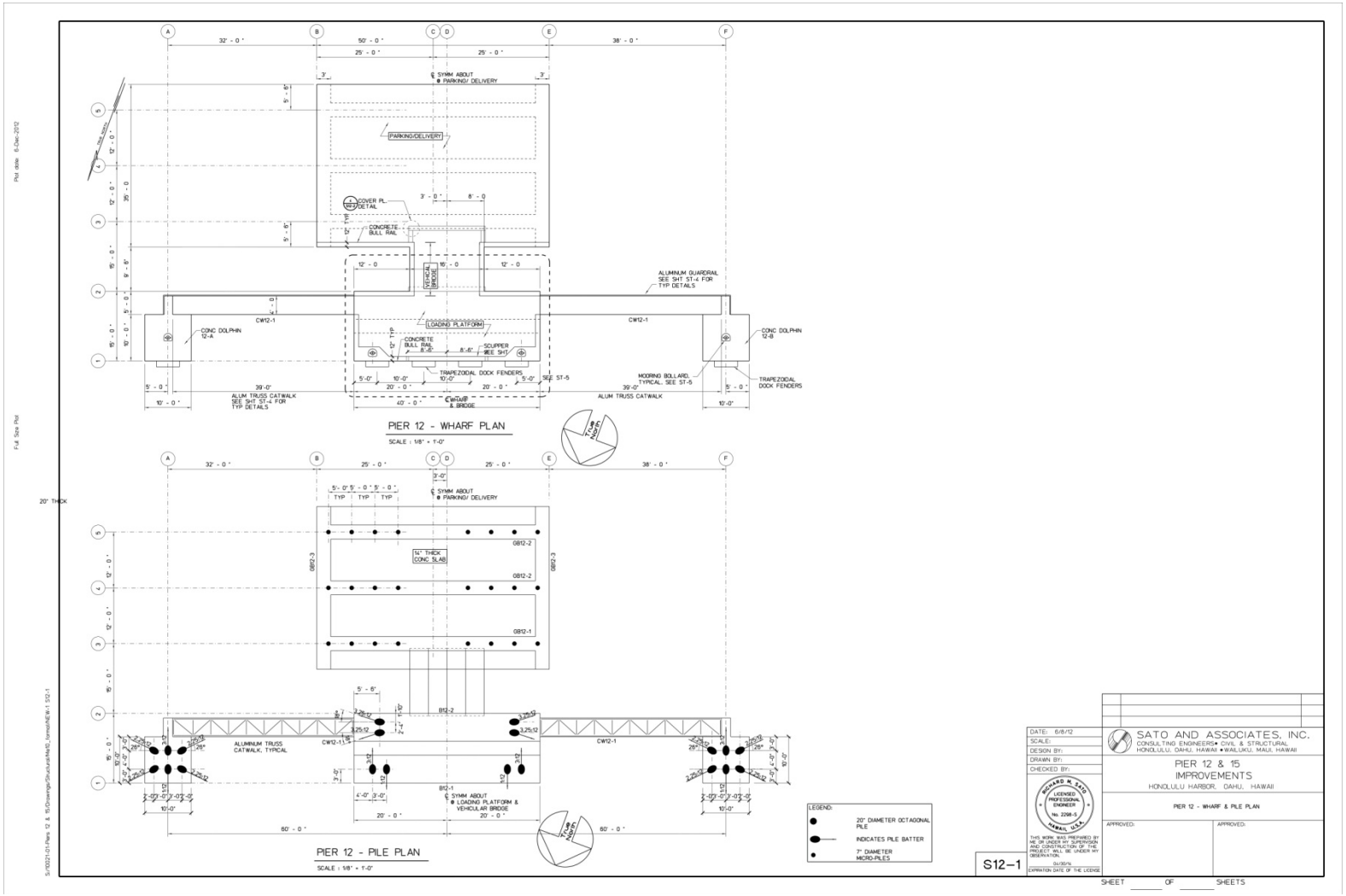

Figure 3. Pier 12 conceptual plan.

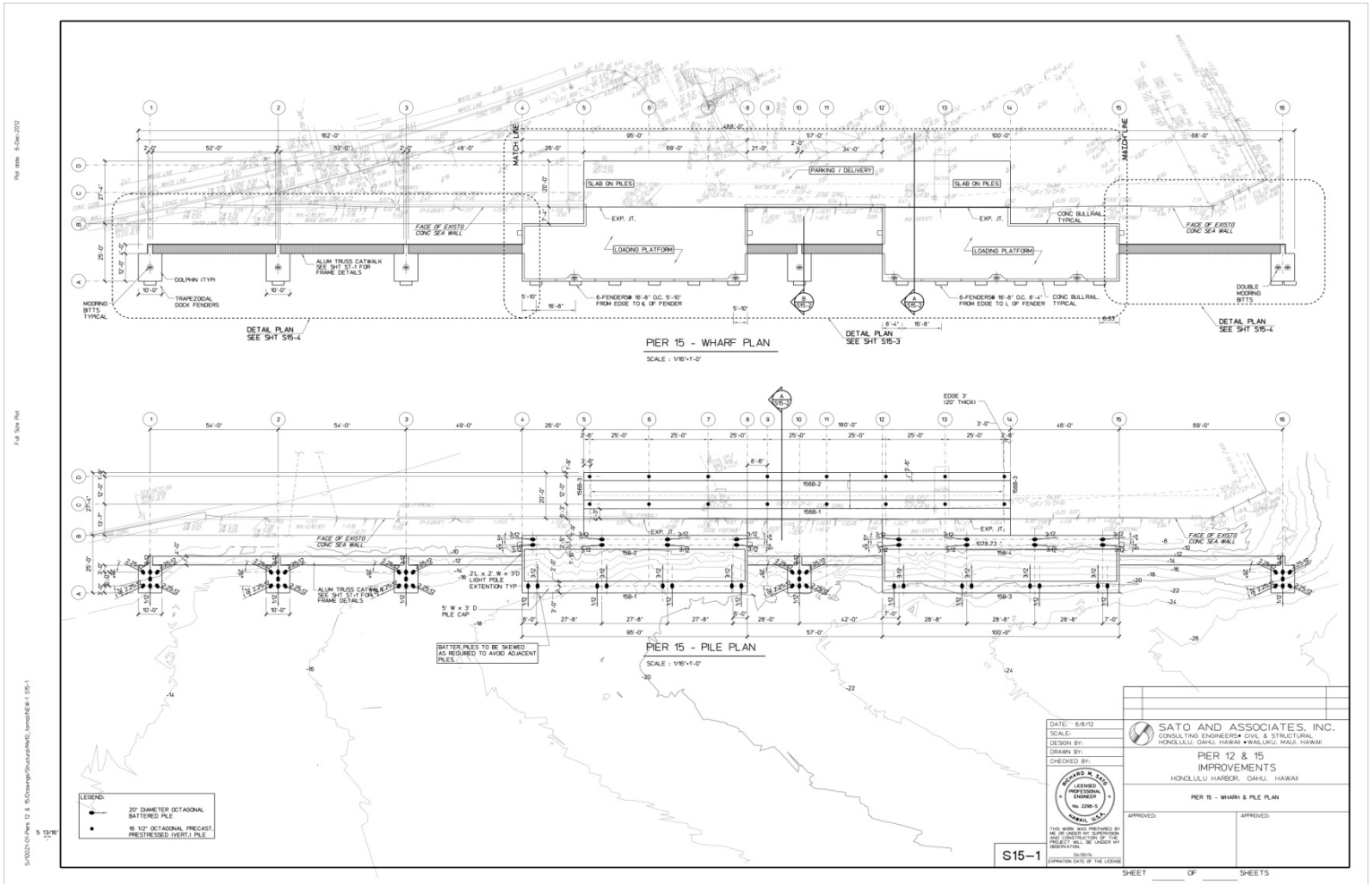

Figure 4. Pier 15 conceptual plan.

Methods

Phase 2 Marine Biological Survey

AECOS marine biologists conducted a quantitative survey of the marine community associated with Pier 12 and Pier 15 October 22-24, 2012. The purpose of the "Phase 2" survey was to quantify coral colony size-frequency distribution in areas that will be directly impacted by the footprint of the piles. The "Phase 2" survey also quantified coral colony size-frequency distribution directly under each loading platform, vehicular bridge, mooring dolphin, and moored vessel that would create shading of the bottom.

Pier 12 — According to the latest project plans for Pier 12, 20 piles are to be placed in water depths ranging from 4 to 18 ft. Four of the piles will be at approximately 4- to 6-ft depths, 5 of the piles will be between 10- to 12-ft depths, and 11 of the piles will be between 14- to 18-ft depths. Twenty piles are to be placed at Pier 12. The footprint of each pile has an area of 0.20 m2 (2.2 ft2), for a total direct impact area of 4 m2 (43 ft2). An additional undetermined area surrounding the footprint of the piles will be directly impacted during construction, though the extent of this area is not known at this time. This additional area was not included in our calculation of the direct impacts, as presented in this report, although could be calculated from the data presented herein once construction methodology is determined. Total shaded area from the loading platform (56.1 m2; 603.9 ft2), mooring dolphins (18.6 m2; 200 ft2), vehicular bridge (8.4 m2; 90 ft2) and docked vessels (400 m2; 4,306 ft2) is estimated to be 483.1 m2 (5,200 ft2).

AECOS biologists conducted a survey consisting of 18 transects in the project vicinity: 6 along each of the depth contours described above (Fig. 5). The stratified random approach was conducted by swimming to the start location of each transect using a randomly determined number of kicks (15 kicks between each point). Each coral head observed within a 5-m^2 belt transect (5 m in length by 1 m in width) survey area was identified, its growth form (branching, finger, mounding, plating, encrusting, or multiple forms) noted, widest diameter recorded, and probable ease of removal from the bottom determined. Coral heads over 15 cm (6 in) in diameter with partial morbidity (areas of dead tissue) were noted as percent of colony with live tissue.

According to the latest project plans, most of the loading platform, vehicular bridge, and mooring dolphins are to be placed over water depths ranging from 4

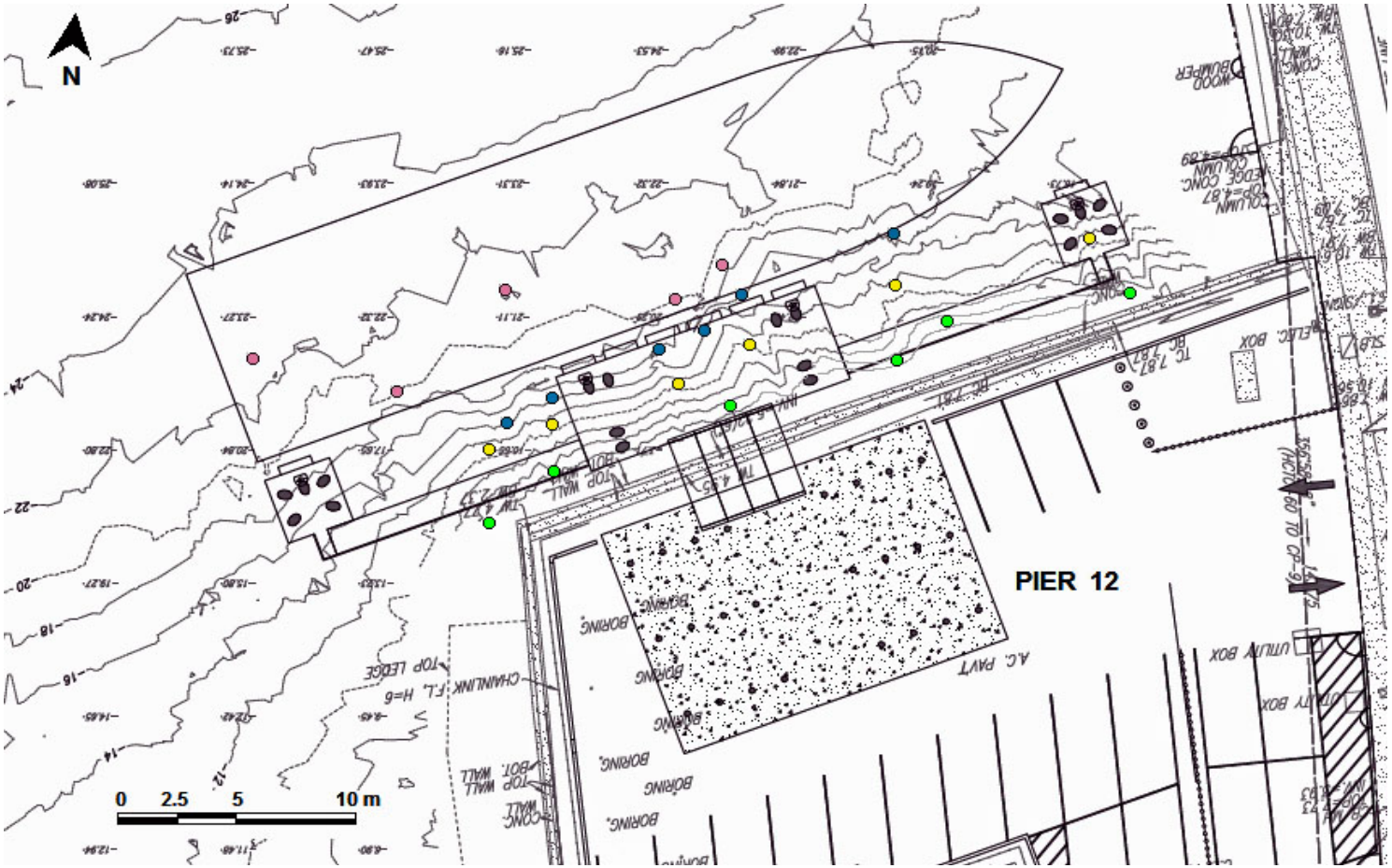

Figure 5. Survey locations at Pier 12. Green points are between the 4- to 6-ft depth contours, yellow points are along the 10- to 12-ft contours, blue points are along the 14- to 18-ft contours, and pink points are under the moored vessel area.

to 18 ft, in the general vicinity of the area surveyed. The 18 transects, described above, were also used to determine coral cover under these structures. Additionally, *AECOS* biologists surveyed the area under the vessel to be docked at Pier 12 (18- to 24-ft depths). Five transects, set parallel to the shoreline (10 m in length by 1 m in width), were located by swimming to a start point using a randomly determined number of kicks (stratified random method). Within each 10-m^2 belt transect, biologists recorded information for each coral colony as described above. Biologists also conducted a video survey of the project vicinity to identify and document all rare, protected, and invasive species encountered during the survey.

Pier 15 — According to the latest project plans, 16 of the 67 piles are to be placed in the 4- to 6-ft depth contour, 7 in the 9- to 12-ft depth contour, and 44 in deeper water (12 to 22 ft). The vessel and barge will also be docked over these deeper bottom areas (12 to 22 ft depth). *AECOS* biologists conducted a survey consisting of 12 transects in the project vicinity: 6 along the 4- to 6-ft depth contours, 6 along the 10- to 12-ft contours, and 10 between 12 and 24 ft deep (Fig. 6). The stratified random approach was conducted by swimming to the start location of each transect using a pre-determined number of kicks (15 kicks between each start location). Within each belt transect (5-m^2, 5 m length by 1 m width, at the 4- to 6-ft depth contours and 10-m^2, 10 m length by 1 m width between 12 and 24 ft deep), biologists recorded information for each coral colony, as described above.

Live coral cover within the footprint of piles was calculated as follows. The widest diameter of each coral was used to determine the area of each coral using the formula $\prod r^2$ where r = 0.5 x diameter. The area of each coral head was then multiplied by the percent live tissue for each coral. The sum of the measured area of individual corals (=total live coral) was divided by the total area surveyed to obtain percent live coral cover.

Relative abundances of marine plants, fishes, and macro-invertebrates were assessed in the field during the February 2012 survey and the data were updated with observations made during the October 2012 survey. Identifications were verified using various published texts. Biologists identified and documented all rare, protected, and invasive species encountered during the February and October 2012 surveys. A listing of macroalgal (*limu*) species and marine fauna observed in the two surveys is presented as Appendix A.

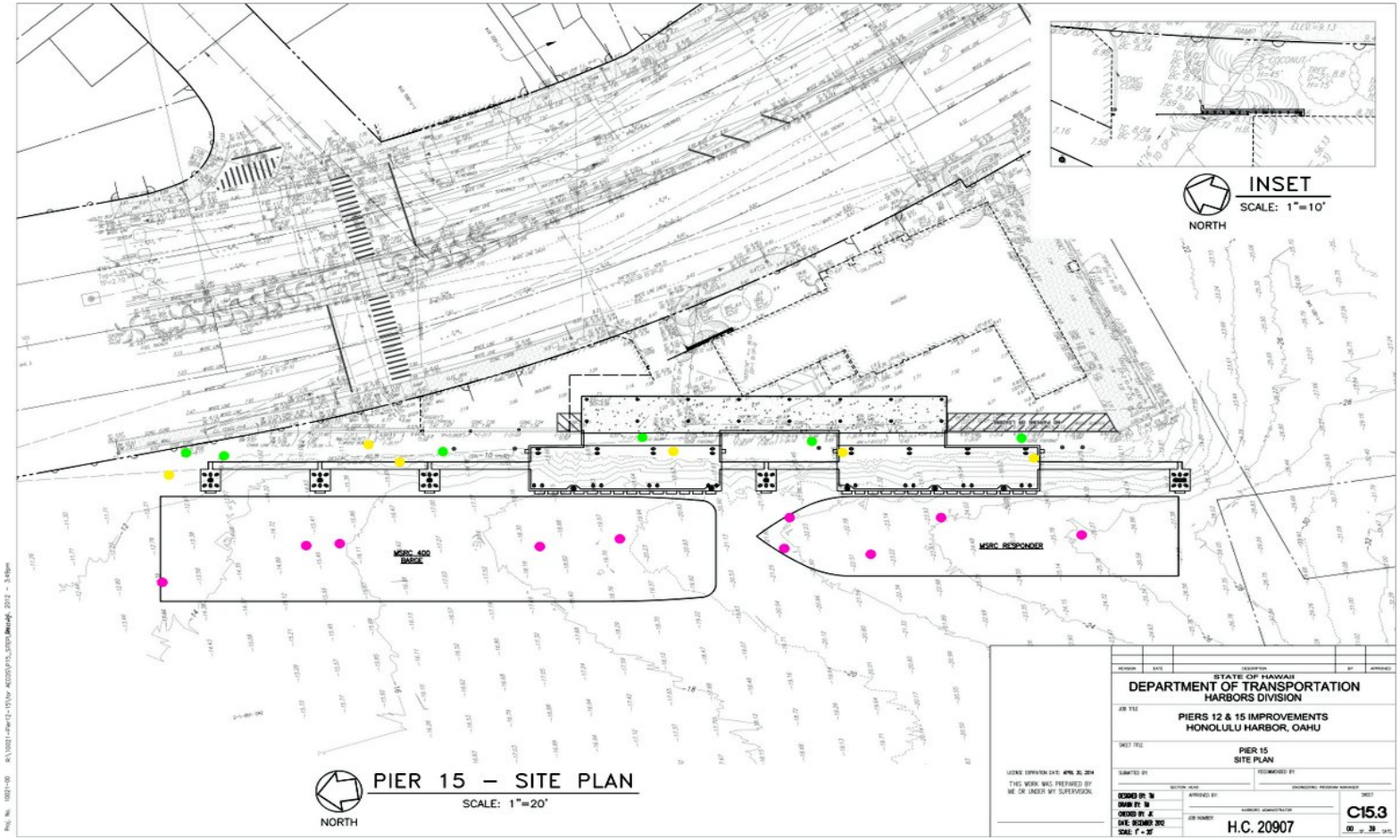

Figure 6. Survey locations at Pier 15. Green points are along the 4- to 6-ft contours, yellow points are along the 10- to 12-ft contours, and pink points are in the 12- to 24-ft depth, under proposed vessel and barge mooring areas.

Power Analysis

Power analysis is commonly used to calculate the minimum sample size required to detect an effect of a given size, based on existing (*a priori*) data. It is used herein to estimate the minimum number of transects that would be required to determine if percent coral coverage increases approximately (100%) or decreases (50%) in the project area following construction, based on data collected during the preconstruction phase of the Project. Significance parameters for this analysis are set at $\alpha = 0.05$ and power $(\beta\text{-}1) = 0.80$. The percent coverage for collected coral data were first tested for normality using the Shapiro-Wilk statistic. None of these data were normally distributed ($P < 0.0001$) and commonly applied transformations (e.g., logarithmic, square root, and reciprocal) did not significantly improve normality. Thus, Student's non-central t-test for independent samples was used to estimate power levels for the coral and non-coral invertebrate data, using XLSTAT software Version 4011.4.02. Student's non-central t-test does not require that data be normally distributed.

Applying the "Phase 2" data to power analysis, in some cases resulted in unrealistically large number of transects to estimate statistically significant changes in percent coverage before and after project completion. The bootstrap method (Azzalini, 2000) was, therefore, employed to resample the "Phase 2" data, with replacement, repeatedly (1,000 times). Bootstrapping is an accepted method applied to small sample sizes to estimate population characteristics as defined by the central limit theorem which states (Investopedia.com):

> *…that given a sufficiently large sample size from a population with a finite level of variance, the mean of all samples from the same population will be approximately equal to the mean of the population. Furthermore, all of the samples will follow an approximate normal distribution pattern, with all variances being approximately equal to the variance of the population divided by each sample's size.*

The only assumption for applying the bootstrap method is that the original data must be representative of the population (i.e., not outliers).

Results

Pier 12

General Observations — Based on February 2012 surveys, almost all of the substratum on the sloping bottom of the remnant reef off Pier 12 is either living coral or limestone. Invertebrates (including tunicates, pearl oyster, sponges, sea urchins, hydroids, and bryozoans) are not common in the area, and make up less than 5% of benthic cover in the area. Several of the invertebrates are known or suspected non-native species introduced from outside of Hawai'i (Coles et al., 1999), including sponges (*Mycale* sp. and *Stylinos* sp.) and bryozoans (*Amathia distans*, *Bugula dentata*, and *Zoobotryon verticillatum*; *AECOS*, 2012a).

Coral Size Class Distribution — The total area surveyed for the pile locations (4- to 18-ft depths) at Pier 12 was 90 m^2 (969 ft^2). A total of 471 coral colonies of at least 8 different taxa was observed across the three depth survey areas (Table 1). The most common corals observed are *Montipora patula* (31.6% of total), *Montipora capitata*, and *Leptastrea* spp. (each 26% of total). Also occurring are *Porites lobata* (8.1% of total), *P. compressa* (2.8% of total), *Pocillopora damicornis* (2.3% of total), *Cyphastrea ocellina* (1.5% of total), and *Pavona varians* (1.1% of total). Of the 471 coral colonies observed along the three depth contours off Pier 12, 38% are in the 1 to 5 cm size class; most of these smallest colonies are *Leptastrea* spp. Corals in the 21 to 40 cm and 41 to 80 cm size classes are common (17% and 16%, respectively), with *M. capitata* and *M. patula* colonies making up the majority of these size classes. A total of 41 large colonies (81to 160 cm; 7% of total and >161 cm; 2% of total) was observed. Coral size class distribution specific to each of the three depth contour survey areas and vessel survey areas is presented in the sections below.

4 to 6 ft Depth Range — The coral community in the 4- to 6-ft depth contours off Pier 12 consists of large, encrusting and plate coral colonies, with individual colonies merging with or overlapping adjacent colonies (Fig. 7). Over half of the coral colonies measured at Pier 12 were found at this depth range. A total of 253 coral colonies of at least 8 different taxa were identified and measured within the 30 m^2 survey area: *Cyphastrea ocellina* (7), *Leptastrea* spp. (48), *M. capitata* (57), *M. patula* (102), *Porites compressa* (8), *P. lobata* (20), *Poc. damicornis* (10), and *Pavona varians* (1).

Table 2 presents the size class distribution for coral species observed along the 4- to 6-ft depth range off Pier 12. *Montipora patula* is the most frequently

Table 1. Number of coral colonies in each size class for coral species observed throughout three depth survey areas off Pier 12 (90 m² survey area).

	Size class (cm)								Percent
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**81 to 160**	**>161**	**Total**	**of total**
C. ocellina	7	0	0	0	0	0	0	7	**1.5**
Leptastrea spp.	120	5	0	0	0	0	0	125	**26.5**
M. capitata	10	15	6	22	42	21	7	123	**26.1**
*M. patula**	20	32	23	43	21	5	1	149	**31.6**
P. compressa	3	1	0	6	2	1	0	13	**2.8**
P. lobata	8	4	7	6	7	6	0	38	**8.1**
Poc. damicornis	6	2	3	0	0	0	0	11	**2.3**
Pav. varians	4	1	0	0	0	0	0	5	**1.1**
Total count	179	60	39	77	72	33	8	471	
Percent of total	**38**	**13**	**8**	**17**	**16**	**7**	**2**		

* species presently proposed to be listed as threatened under the Endangered Species Act

Table 2. Number of coral colonies in each size class for coral species observed along the 4 to 6 ft depth contour off Pier 12 (30 m² survey area).

	Size class (cm)								Percent
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**81 to160**	**>161**	**Total**	**of total**
C. ocellina	7	0	0	0	0	0	0	7	**2.8**
Leptastrea spp.	45	3	0	0	0	0	0	48	**18.9**
M. capitata	5	10	2	12	18	8	2	57	**22.5**
*M. patula**	15	25	15	23	18	5	1	102	**40.3**
P. compressa	3	0	0	4	1	0	0	8	**3.2**
P. lobata	4	2	6	2	5	1	0	20	**7.9**
Poc. damicornis	5	2	3	0	0	0	0	10	**3.9**
Pav. varians	1	0	0	0	0	0	0	1	**0.4**
Total count	75	42	26	41	42	14	3	253	
Percent of total	**30**	**17**	**10**	**16**	**17**	**6**	**2**		

* species presently proposed to be listed as threatened under the Endangered Species Act

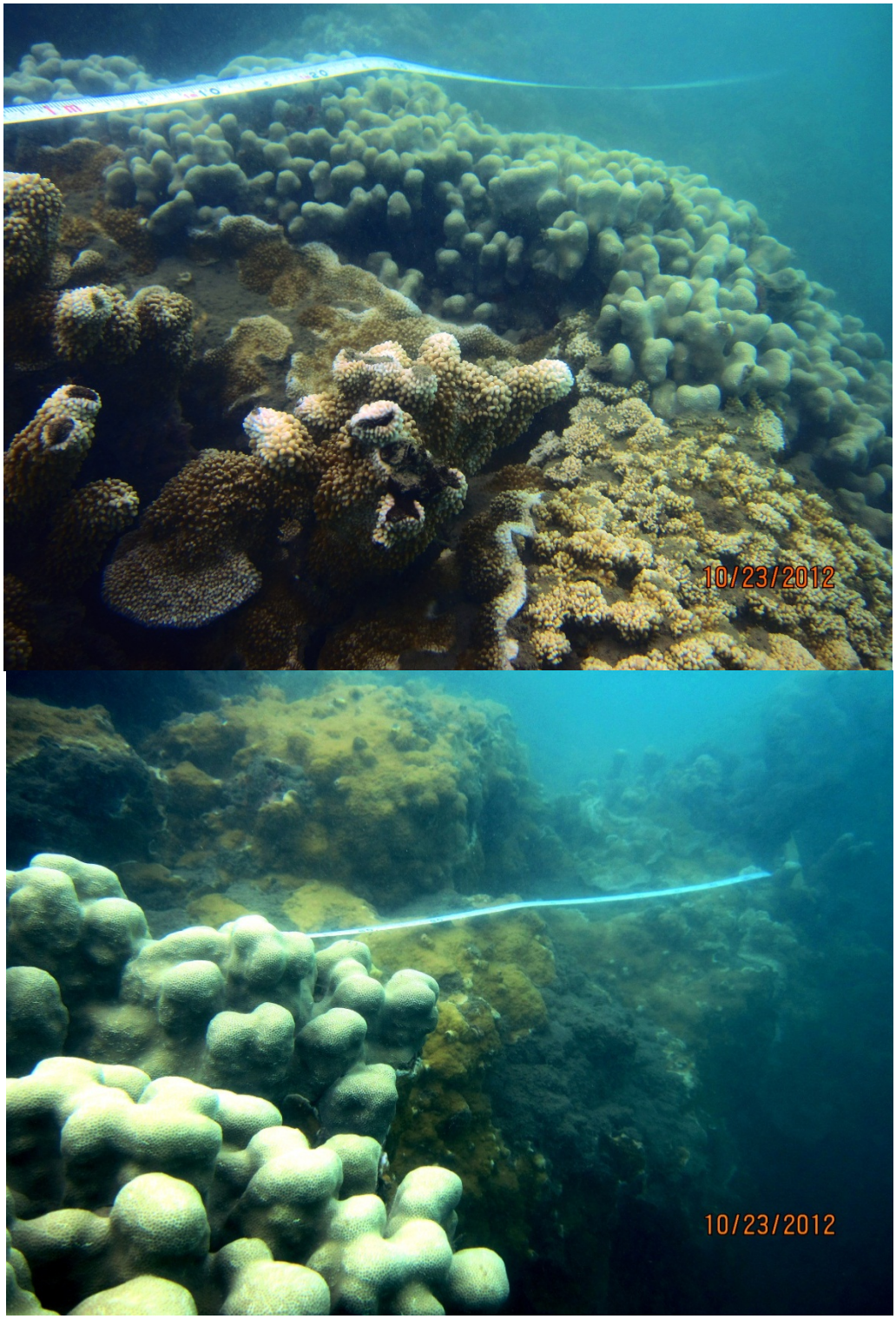

Figure 7. Representative coral cover along 4- to 6-ft depth range off Pier 12.

encountered coral species in the area (40.3% of total). There is a fairly even distribution of *M. patula* colonies across the 1 to 80 cm class sizes, most being in the 6 to 10 cm and 21 to 40 class sizes. Large colonies of *M. patula* were observed: 5 colonies in the 81 to 160 cm class size and 1 colony >161 cm. *M. capitata* is also common in the survey area (22.5% of total). Colonies of *M. capitata* colonies are found in each class size, with most in the 21 to 40 cm and 41 to 80 cm class sizes, and several larger colonies are present: 8 colonies in the 81 to 160 cm class size, and 2 colonies >161 cm. Small colonies (1 to 5 cm) of *Leptastrea* spp. are also common (18.9% of total). A total of 20 (7.9% of total) *P. lobata* colonies was observed, most in the 11 to 20 cm and 41 to 80 cm class sizes. Colonies of *Poc. damicornis* are uncommon (3.9% of total) and most are in the 1 to 5 cm class size. Eight colonies (3.2% of total) of *P. compressa* were observed, most in the 21 to 40 cm and 1 to 5 cm class sizes. Also occurring are small colonies (1 to 5 cm) of *C. ocellina* and *Pavona varians* (combined, being 3.2% of total).

<u>10- to 12-ft Depth Range</u> — A total of 146 coral colonies of at least 6 different taxa were identified and measured within the 30 m^2 survey area: *Leptastrea* spp. (30), *M. capitata* (51), *M. patula* (42), *P. compressa* (5), *P. lobata* (17), and *Poc. damicornis* (1). Table 3 presents the size class distribution for coral species observed along the 10- to 12-ft depth contours off Pier 12. The composition and distribution observed was similar to that determined at the same depth in the February survey (*AECOS*, 2012a). *M. capitata* is the most frequently encountered coral species in the vicinity (34.9% of total). Colonies of *M. capitata* are represented in each of the class sizes, with most in the large class sizes: 20 colonies in the 41 to 80 cm class size, 11 colonies in the 81 to 160 cm class size, and 5 colonies >161 cm. *M. patula* is also common at these depths (28.8% of total). Most colonies of *M. patula* are in the 21 to 40 cm class size. Small colonies (1 to 5 cm and 6 to 10 cm) of *Leptastrea* spp. are also common (20.5% of total). A total of 17 (12% of total) *P. lobata* colonies was observed, most in the 81 to 160 cm class size, and several in the 1 to 5 cm and 6 to 10 cm class sizes. Five colonies (3.4% of total) of *P. compressa* were observed, fairly evenly distributed across all size classes. One small (1 to 5 cm) colony of *Poc. damicornis* was encountered. Representative coral cover along 10- to 12-ft depth contours is presented in Fig. 8.

<u>14- to 18-ft Depth Range</u> — A total of 72 coral colonies of at least 5 different taxa were identified and measured within the 30 m^2 survey area: *Leptastrea* spp. (47), *M. capitata* (15), *M. patula* (5), *P. lobata* (1), and *Pav. varians* (4). Table 4 presents the size class distribution for coral species observed along the 14- to 18-ft depths off Pier 12. *Leptastrea* spp. is the most frequently encountered coral in the area (65.3% of total). All colonies of *Leptastrea* spp. are

Table 3. Number of coral colonies in each size class for coral species observed along the 10- to 12-ft depth contour off Pier 12 (30 m² survey area).

	Size class (cm)								Percent
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**81 to 160**	**>161**	**Total**	**of total**
Leptastrea sp.	28	2	0	0	0	0	0	30	**20.5**
M. capitata	2	4	2	7	20	11	5	51	**34.9**
*M. patula**	5	7	7	20	3	0	0	42	**28.8**
P. compressa	0	1	0	2	1	1	0	5	**3.4**
P. lobata	4	2	0	4	2	5	0	17	**11.6**
Poc. damicornis	1	0	0	0	0	0	0	1	**0.7**
Total count	40	16	9	33	26	22	5	146	
Percent of total	**27**	**11**	**6**	**23**	**18**	**12**	**3**		

* species presently proposed to be listed as threatened under the Endangered Species Act

Table 4. Number of coral colonies in each size class for coral species observed in the 14- to 18-ft depth range off Pier 12 (30 m² survey area).

	Size class (cm)								Percent
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**81 to 160**	**>161**	**Total**	**of total**
Leptastrea spp.	47	0	0	0	0	0	0	47	**65.3**
M. capitata	3	1	2	3	4	2	0	15	**20.8**
*M. patula**	1	0	2	2	0	0	0	5	**6.9**
P. lobata	0	0	1	0	0	0	0	1	**1.4**
Pav. varians	3	1	0	0	0	0	0	4	**5.5**
Total count	54	2	5	5	4	2	0	72	
Percent of total	**75**	**3**	**7**	**7**	**6**	**3**	**0**		

* species presently proposed to be listed as threatened under the Endangered Species Act

in the 1 to 5 cm class size. A total of 15 colonies of *M. capitata* was observed at this depth contour survey area (20.8% of total). There is a fairly even distribution of *M. capitata* colonies across all class sizes, with most being in the 41 to 80 cm class size. Two large (81 to 160 cm) colonies of *M. capitata* were observed. Five colonies (6.9% of total) of *M. patula* were encountered: one colony in the 1 to 5 cm class size, and two colonies in each of the 11 to 20 cm and 21 to 40 cm class sizes. One colony in the 11 to 20 cm class size of *P. lobata*

Figure 8. Representative coral cover at 10- to 12-ft depths off Pier 12.

was encountered. Colonies of *Pav. varians* (5.5% of total) are represented by three in the 1 to 5 cm class size and one in the 6 to 10 cm class size. No corals in the 161+ cm class size were observed in the survey area. Photographs of representative coral cover along the 14- to 18-ft depth contours is presented in Fig. 9.

Vessel area — The total survey area for the area under the vessel to be docked at Pier 12 (18 to 24 ft depth) was 50 m^2 (538 ft^2). Corals in this area will be shaded by the vessel. A total of 15 coral colonies of at least three different taxa was identified and measured: *Leptastrea* spp. (13), *M. capitata* (1), and *C. ocellina* (1). Table 5 presents the size class distribution for coral species observed in the area under the vessel to be docked at Pier 12. *Leptastrea* spp. is the most frequently encountered coral in the vicinity (87% of total). All colonies of *Leptastrea* spp. are in the 1 to 5 cm class size. One small (1 to 5 cm) colony each of *M. capitata* and *C. ocellina* was observed. Figure 10 displays the benthic community composition of the area under the vessel off Pier 12.

Table 5. Number of coral colonies in each size class observed in the area under the vessel to be docked at Pier 12 (18- to 24-ft depth range; 50 m^2 survey area).

	Size class (cm)								***Percent***
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**81 to 160**	**>161**	**Total**	***of total***
Leptastrea spp.	13	0	0	0	0	0	0	13	*87*
M. capitata	1	0	0	0	0	0	0	1	*7*
C. ocellina	1	0	0	0	0	0	0	1	*7*
Total count	15	0	0	0	0	0	0	15	
Percent of total	*100*	*0*	*0*	*0*	*0*	*0*	*0*		

Coral Cover Estimates — Table 6 presents estimates of percent live coral cover in the three depth contour survey areas, as calculated by the size-class measurements and survey areas presented in Tables 2 through 4. Live coral cover is 87% in depths ranging from 4 to 6 ft, 86% in depths ranging from 10 to 12 ft, and 11% in depths ranging from 14 to 18 ft. Based on these values, and the respective footprint of the piles in each depth range, the areas of live coral that will be directly impacted by the piles is estimated at 0.70 m^2 (7.55 ft^2) in 4- to 6-ft depths, 0.86 m^2 (9.3 ft^2) in 10- to 12-ft depths, and 0.24 m^2 (2.6 ft^2) in 14- to 18-ft depths. Table 6 also provides estimates of *M. patula* (a species presently proposed to be listed as threatened under the Endangered Species Act) coral

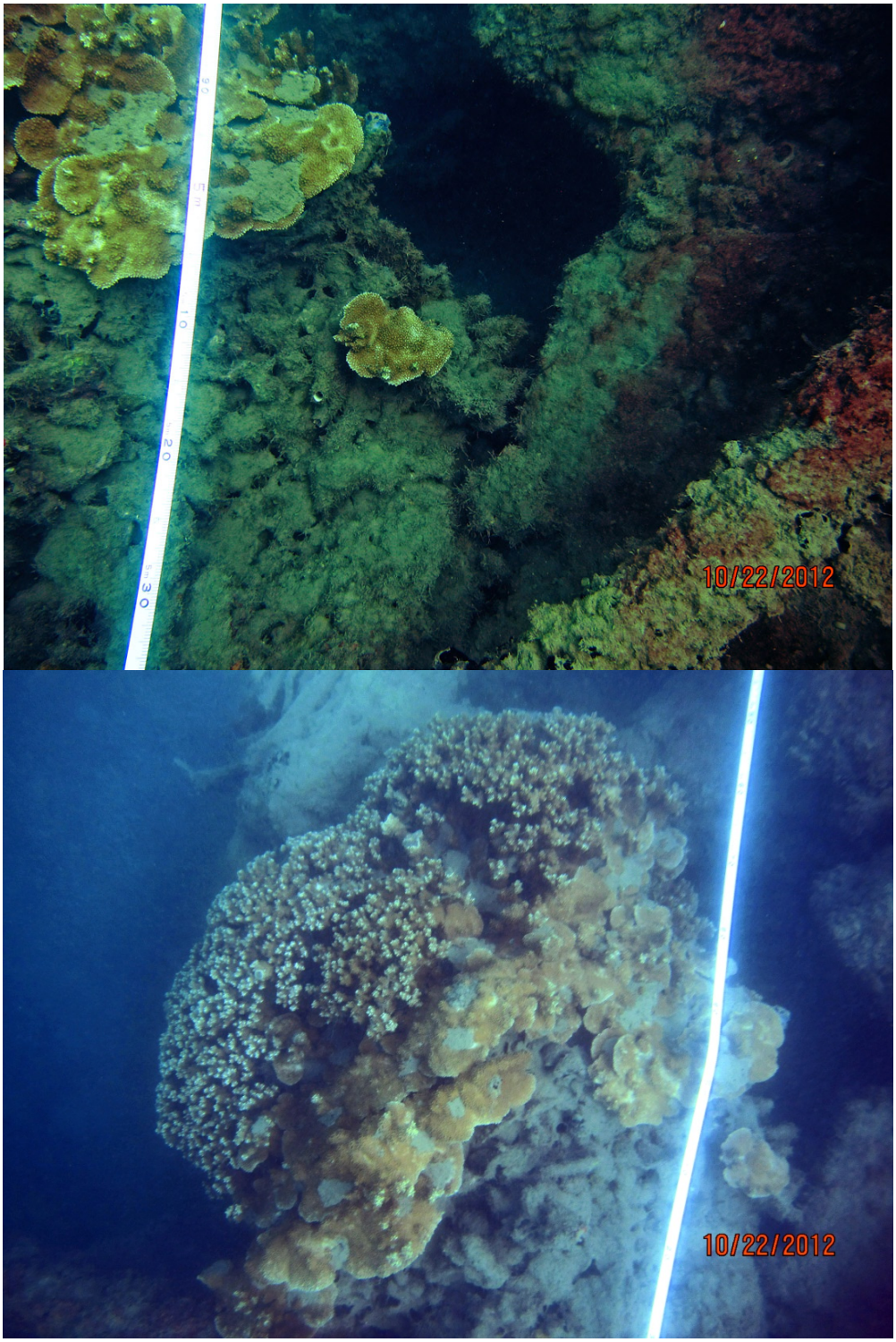

Figure 9. Representative coral cover, 14- to 18-ft depths off Pier 12.

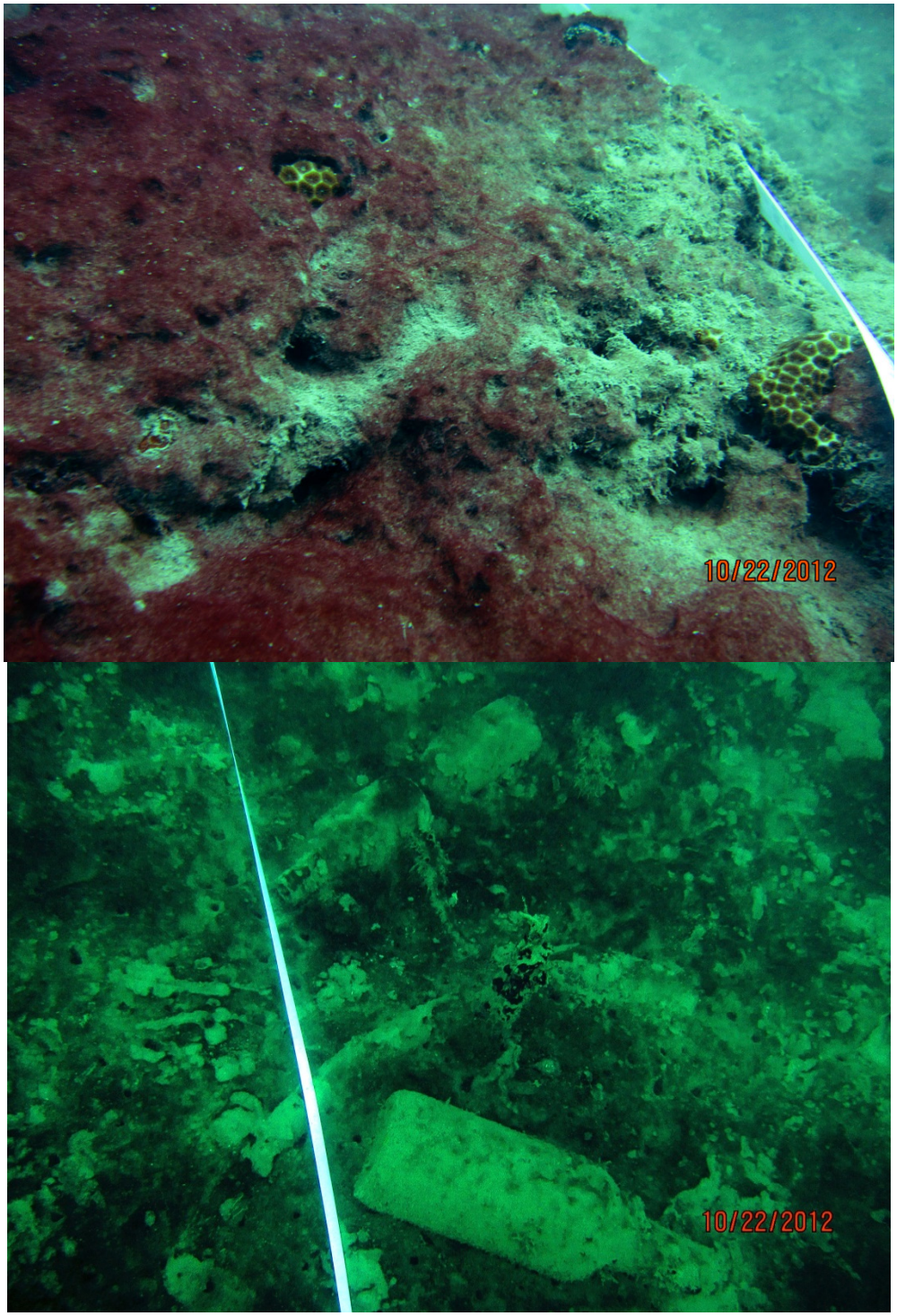

Figure 10. Representative benthic cover of area
under vessel to be docked at Pier 12 (18- to 24-ft depth range).

Table 6. Coral coverage in footprint of piles off Pier 12.

Depth contour	Number of piles	Total pile footprint (m^2)	Percent live coral in survey area	Total coral coverage in pile footprint (m^2)	*M. patula** coral coverage in pile footprint (m^2)
4 to 6 ft	4	0.80	87	0.70†	0.25
10 to 12 ft	5	1.00	86	0.86†	0.08
14 to 18 ft	11	2.20	11	0.24†	0.04

† These values are underestimates, as the calculation does not account for direct impacts to adjacent corals and remaining colony outside of footprint
*species presently proposed to be listed as threatened under the Endangered Species Act

coverage in the pile footprints: 0.25 m^2 (2.70 ft^2) in 4- to 6-ft depths, 0.08 m^2 (0.86 ft^2) in 10- to 12-ft depths, and 0.04 m^2 (0.43 ft^2) in 14- to 18-ft depths. These values are underestimates, as the calculation assumes there would be no direct impacts to nearby corals—that is, corals not crushed under the cross-sectional area of a pile would survive. This additional direct impact can perhaps be estimated once construction methods are finalized.

Table 7 presents estimates of percent live coral cover under the vessel, loading platform, mooring dolphins, and vehicular bridge off Pier 12, as calculated by the size-class measurements and survey areas presented in Tables 2 through 5. Live coral cover is 0.04% in the vessel survey area. An estimated 0.18 m^2 (1.9 ft^2) of live coral will be shaded by the footprint of the vessel. Live coral cover is estimated at 61% under the loading platform, 48% under the mooring dolphins, and 87% under the vehicular bridge. Based on these values, and the respective shaded area provided by each structure in each depth contour, the areas of live coral that would be shaded under the structures is estimated at 34.4 m^2 (370.3 ft^2) for the loading platform, 9.01 m^2 (97.0 ft^2) for the mooring dolphins, and 7.28 m^2 (78.4 ft^2) for the vehicular bridge. The area of live *M. patula* that would be shaded under the loading platform is estimated at 7.7m^2 (82.9 ft^2), 0.92 m^2 (9.9 ft^2) for the mooring dolphins, and 2.6 m^2 (29 ft^2) for the vehicular bridge. No colonies of *M. patula* were observed in the area under the proposed vessel.

Table 7. Coral coverage under the vessel, loading platform, mooring dolphins and vehicular bridge off Pier 12.

Location	Total shaded area (m^2)	Percent live coral in survey area‡	Total coral coverage under structures (m^2)	*M. patula** coral coverage under structures (m^2)
Area under vessel	400	0.04	0.18	0
Loading platform	56.1	61	34.4	7.7
Mooring dolphins	18.6	48	9.01	0.9
Vehicular bridge	8.4	87	7.3	2.6

‡derived from %cover calculations from depth contour survey areas
* species presently proposed to be listed as threatened under the Endangered Species Act

Coral Morphology and Ease of Transplantation — Table 8 presents the general coral growth forms and ease of transplantation by species across all depth contours off Pier 12. Growth forms include: encrusting, plating, branching, mounding, or multiple (many coral heads, particularly at Pier 12 exhibited both encrusting and plate or pillar growth forms). Most of the corals off Pier 12 have encrusting growth forms (343 colonies; 73% of the total). A total of 54 colonies with plating form, 34 colonies with mixed (encrusting and plate/pillar) form, and 33 with mounding form were observed off Pier 12. Branching corals are uncommon, with only 7 colonies encountered in the survey areas. Most colonies (370; 79% of total) would be regarded as unsuitable for transplantation due to their encrusting morphologies. Many of the corals with mixed morphologies are large *Montipora* colonies. Of these colonies of mixed morphologies, it appears that portions (plates) of the large colonies could be easily removed and transplanted.

Rare, Protected, or Invasive Species — No federally-listed (USFWS, 2012) threatened or endangered species (e.g., sea turtles, monk seal, cetaceans) were encountered during this survey or the "Phase 1" survey (AECOS, 2012a). One species of coral proposed for ESA listing was observed at Pier 12: M. patula (NOAA-NMFS, 2012a). A total of 149 colonies of M. patula coral were observed in the survey area off Pier 12. Several pearl oyster, a state-protected species (HAR §13-83-01, DLNR, 2009), were encountered in the February and October 2012 surveys.

Table 8. Coral morphology and ease of removal off Pier 12

	Morphology (count/ % of total)														Ease of Removal (count/% of total)			
Species	**Encrusting**		**Plating**		**Branching**		**Mounding**		**Multiple†**		**Difficult**		**Easy**	
C. ocellina	7	100%	--		--		--		--		7	100%	--	
Leptastrea spp.	125	100%	--		--		--				125	100%	--	
M. capitata	62	50%	39	32%	--		2	2%	20	16%	70	57%	53	43%
*M. patula**	124	83%	13	9%	--		--		12	8%	134	90%	15	10%
P. compressa	3	23%	--		--		10	77%	--		6	46%	7	54%
P. lobata	17	45%	2	5%	--		17	45	2	5%	19	50%	19	50%
Poc. damicornis	--		--		7	64%	4	36%	--		4	36%	7	64%
Pav. varians	5	100%									5	100%		
Total count	343		54		7		33		34		370		101	
Percent of total	73		11		1		7		7		79		21	

† colonies that exhibit both encrusting and plating or pillar morphologies.
* species presently proposed to be listed as threatened under the Endangered Species Act

Pier 15

General Observations — Based on the February 2012 surveys, the bottom composition off Pier 15 is dominated by non-living substrata, primarily silt (43%), limestone pavement (23%), and debris (26%). Corals, tunicates, and sponges are found growing attached to the debris and silt-coated limestone (*AECOS*, 2012a). Water visibility was low at all survey locations due to turbid conditions, particularly in deeper waters (12 to 24 ft) and in waters near the mouth of Nu'uanu Stream. Debris—metal scraps, bottles, bicycles, shopping carts, concrete blocks, etc.—litters the seafloor at the 4- to 6-ft depths and 10- to 12-ft depths (Fig. 11).

Coral Size Class Distribution — The total area surveyed for the pile locations (4 to 24 ft) at Pier 15 was 160 m^2 (1,722 ft^2). This area includes corals likely at indirect risk as well as heads directly at risk from placement of piles. A total of 154 coral colonies of 4 different taxa was observed across the three depth contour survey areas (Table 9). The most common corals are *P. lobata* (70.1% of total) and, *M. capitata* (14.9% of total). Also occurring are *M. patula* (7.8% of

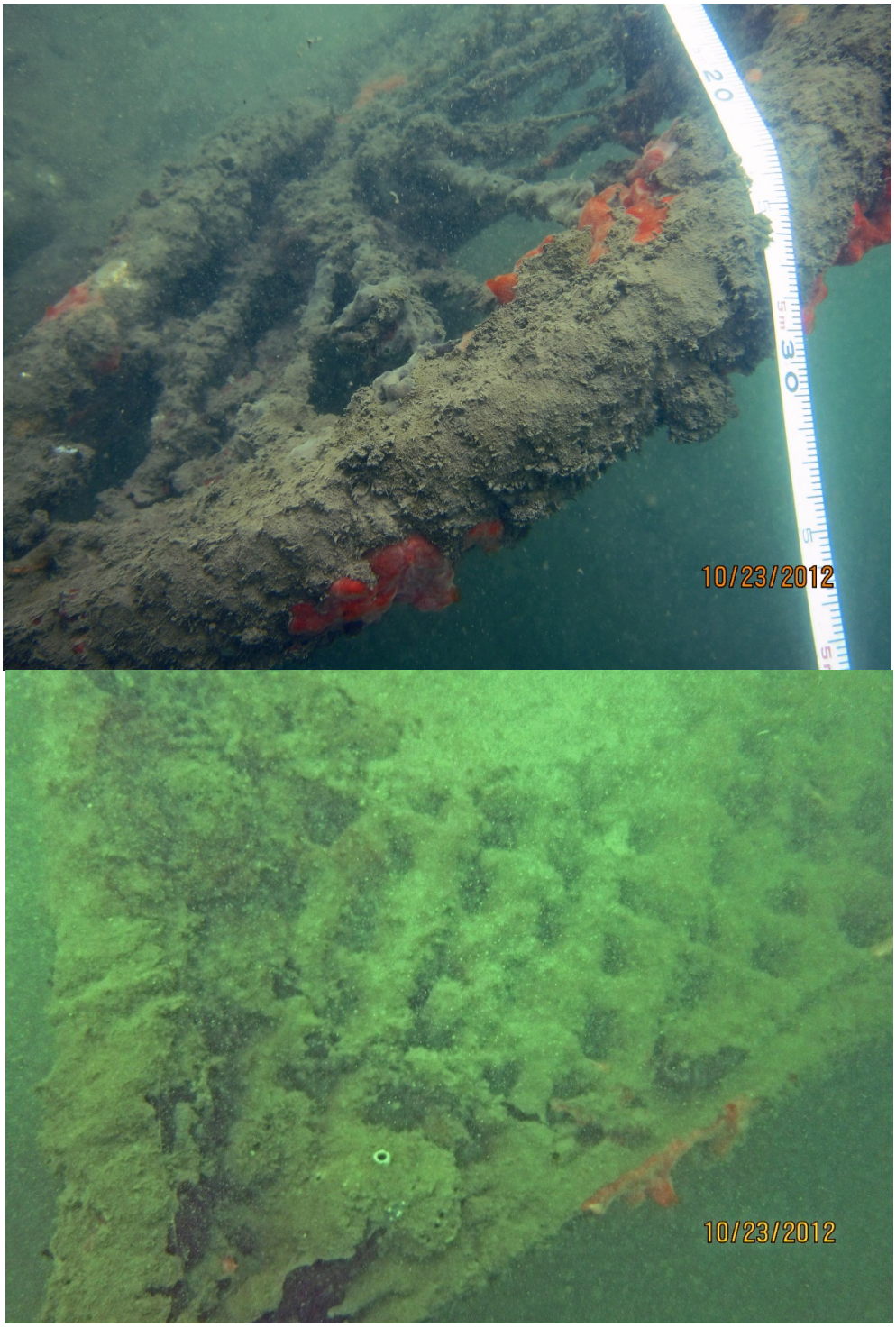

Figure 11. (Top) debris scattered on the seafloor off Pier 15: bicycle at 4- to 6-ft depth range; and (bottom) shopping cart at the 10- to 12-ft depths.

total) and *Leptastrea* spp. (7.1% of total). Of the 154 coral colonies observed throughout the three depth contours off Pier 15, 79% are in the 1 to 5 cm size class; most of these are *P .lobata*. Frequency of corals decreases as size class increases and no large colonies (>81 cm) were observed. Coral size class distribution for the 4- to 6-ft, 10- to 12-ft, and 14- to 24-ft depth survey areas is presented in the sections following.

Table 9. Number of coral colonies in each size class observed throughout three depth contour survey areas off Pier 15 (60 m^2 survey area).

	Size class (cm)							Percent
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**>81 cm**	**Total**	**of total**
Leptastrea spp.	11	0	0	0	0	0	11	7.1
M. capitata	5	6	7	4	1	0	23	14.9
*M. patula**	1	3	3	1	1	0	9	7.8
P. lobata	67	31	8	2	0	0	108	70.1
Total count	85	41	19	7	2	0	154	
Percent of total	**79**	**38**	**18**	**6**	**2**	**0**		

* species presently proposed to be listed as threatened under the Endangered Species Act

4- to 6-ft Depths — The majority of corals encountered in the survey at Pier 15 were in the 4- to 6-ft depths. A total of 103 coral colonies of at least 4 different taxa were identified and measured in the 30 m^2 survey area: *Leptastrea* spp. (6), *M. capitata* (15), *M. patula* (12), and *P. lobata* (70). Table 10 presents the size class distribution for coral species observed in the 4- to 6-ft depth contours. *P. lobata* is the most frequently encountered coral species (68% of total). Most colonies of *P. lobata* are in the 1 to 5 cm and 6 to 10 size classes. A total of 15 colonies of *M. capitata* were observed, most in the 11 to 20 cm size class. One larger colony (41 to 80 cm) was encountered. Twelve colonies of *M. patula* were measured; 2 colonies in the 1 to 5 cm, 4 colonies each in the 6 to 10 cm and 11 to 20 cm size classes, and 1 colony in each the 21 to 40 and 41 to 80 cm size classes. Six colonies of *Leptastrea* spp. were measured: all in the smallest class size. No colonies >81 cm were encountered. Representative benthic coral cover within the 4- to 6-ft depth range off Pier 15 is shown in Fig. 12.

10- to 12-ft Depths — A total of 51 coral colonies of at least three different taxa were identified and measured in the 30 m^2 survey area: *Leptastrea* spp. (5), *M. capitata* (8), and *P. lobata* (38). Table 11 presents the size class distribution

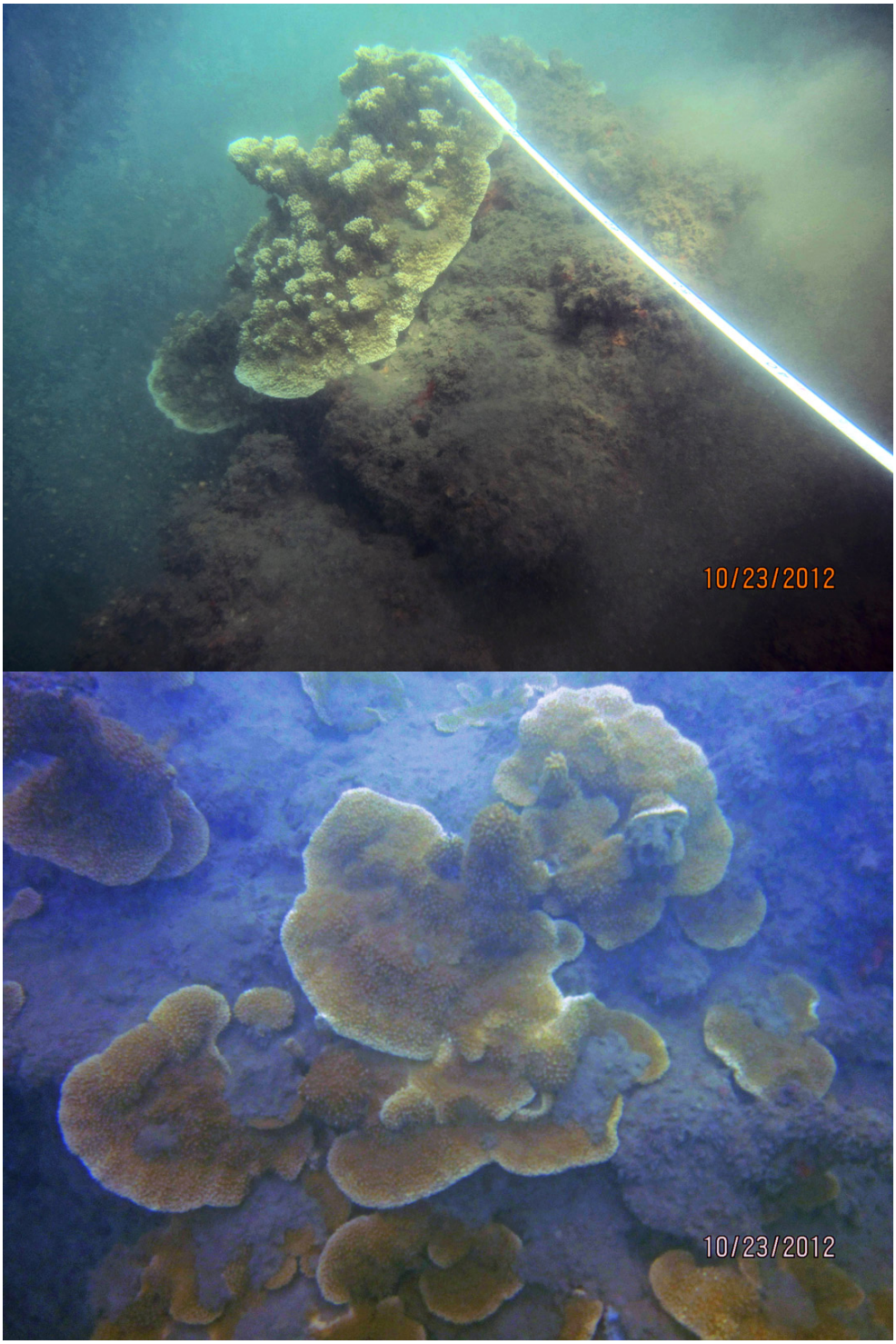

Figure 12. Representative benthic coral cover at 4- to 6-ft depths off Pier 15.

Table 10. Number of coral colonies in each size class observed along 4 to 6 ft depth contour survey area off Pier 15 (30 m² survey area).

	Size class (cm)								Percent
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**81 to 160**	**>161**	**Total**	**of total**
Leptastrea spp.	6	0	0	0	0	0	0	6	**5.8**
M. capitata	2	4	6	2	1	0	0	15	**14.6**
*M. patula**	2	4	4	1	1	0	0	12	**11.7**
P. lobata	39	23	6	2	0	0	0	70	**67.9**
Total count	49	31	16	5	2	0	0	103	
Percent of total	**48**	**30**	**15**	**5**	**2**	**0**	**0**		

* species presently proposed to be listed as threatened under the Endangered Species Act

for coral species observed between the 10- and 12-ft depth contours off Pier 15. Similar to the 4- to 6-ft depths, *P. lobata* is the most frequently encountered coral species (74.5% of total). Most colonies of *P. lobata* are in the 1 to 5 cm size classes. A total of 8 colonies of *M. capitata* were observed, 3 in the 1 to 5 cm size class, 2 in each the 6 to 10 cm and 21 to 40 cm size class, and 1 in the 11 to 20 cm size class. Five colonies of *Leptastrea* spp. were measured, all in the smallest class size (1 to 5 cm). No colonies >81 cm were encountered. Representative benthic coral cover within the 10- to 12-ft depth range off Pier 15 is shown in Fig. 13.

Table 11. Number of coral colonies in each size class observed along 10- to 12- ft depth contour off Pier 15 (30 m² survey area).

	Size class (cm)								Percent
Taxa	**1 to 5**	**6 to 10**	**11 to 20**	**21 to 40**	**41 to 80**	**81 to 160**	**>161**	**Total**	**of total**
Leptastrea spp.	5	0	0	0	0	0	0	4	**9.8**
M. capitata	3	2	1	2	0	0	0	8	**15.7**
P. lobata	28	8	2	0	0	0	0	38	**74.5**
Total count	36	10	3	2	0	0	0	51	
Percent of total	**71**	**20**	**6**	**4**	**0**	**0**	**0**		

Figure 13. Representative bottom, 10- to 12-ft depths off of Pier 15.

14- to 24-ft Depths — No corals were observed in the two 50 m^2 survey areas, in waters 14 to 24 ft deep off Pier 15. This area is silt bottom, with few scattered debris. Visibility is extremely poor (<1 ft; Fig. 14).

Coral Cover Estimates — Table 12 presents estimates of percent live coral cover in the footprint of the piles along three depth contour survey areas off Pier 15. Live coral cover is 5.1% in depths ranging from 4 to 6 ft and 0.98% in depths ranging from 10 to 12 ft. No corals were observed in surveyed 12 to 24 ft depths. Based on these values, and the respective total footprint area of each pile in each depth contour, the areas of live coral that would be directly impacted by the piles is estimated at 0.07 m^2 (0.8 ft^2) along the 4- to 6-ft depth contour and 0.03 m^2 (0.3 ft^2) along the 10- to 12-ft depth contour. Table 12 also

provides estimates of *M. patula* coral coverage in the pile footprints: 0.02 m^2 (0.22 ft^2) in 4- to 6-ft depths, 0 m^2 (0 ft^2) in 10- to 12-ft and 14- to 18-ft depths.

Table 12. Area coverage of coral colonies in footprint of piles off Pier 15.

Depth contour	Number of piles	Total pile footprint (m^2)	Percent live coral in survey area	Total coral coverage in pile footprint (m^2)	*M. patula** coral coverage in pile footprint (m^2)
4 to 6 ft	7	1.40	5.1	0.07	0.02
10 to 12 ft	16	3.20	0.98	0.03	0
12 to 24 ft	44	8.80	0	0	0

*species presently proposed to be listed as threatened under the Endangered Species Act

Table 13 presents estimates of percent live coral cover under the vessels, loading platforms, and mooring dolphins off Pier 15. No corals occur in the area under the vessels. Live coral cover is 0.03% under the loading platforms and 0.05% under the mooring dolphins. Based on these values, and the respective sizes of each structure in each depth contour, the areas of live coral that would be shaded under the structures is estimated at 13.7m^2 (147.5 ft^2) for the loading platforms combined and 3.5 m^2 (37.7 ft^2) for the mooring dolphins. The area of live *M. patula* that would be shaded under the loading platforms is estimated at 3.1m^2 (33.4.5 ft^2). No colonies of *M. patula* were observed in the areas under the mooring dolphins.

Table 13. Live coral cover under the vessels, loading platforms, and mooring dolphins off Pier 15

Location	Total shaded area (m^2)	Percent live coral in survey area‡	Total coral coverage under structures (m^2)	*M. patula** coral coverage under structures (m^2)
Area under vessels	2331	0	0	0
Loading platforms	452.2	0.03	13.7	3.1
Mooring dolphins	68.5	0.05	3.5	0

‡derived from %cover calculations from depth contour survey areas
* species presently proposed to be listed as threatened under the Endangered Species Act

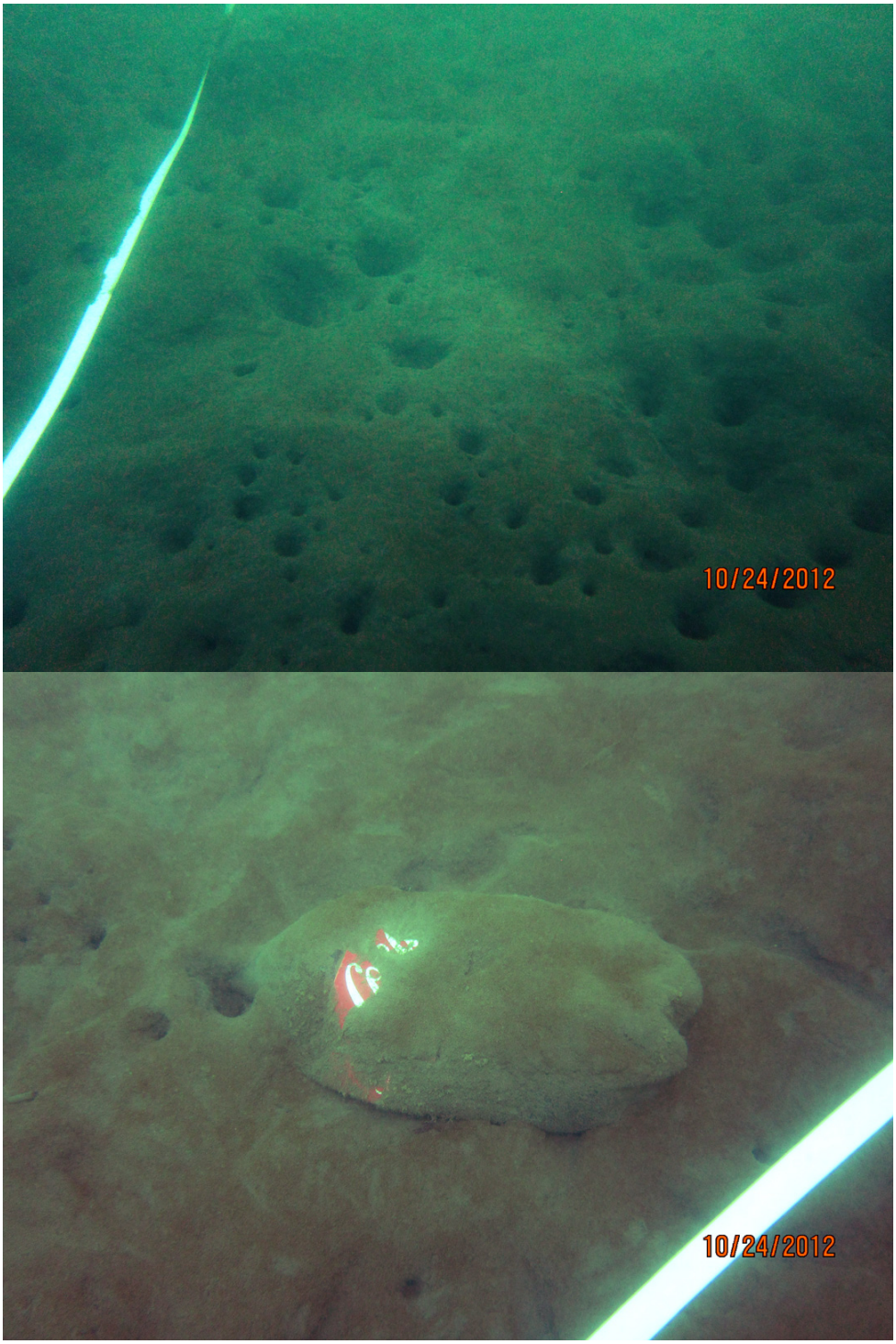

Figure 14. The bottom under the proposed vessel and barge mooring locations off Pier 15 is silt (top) and scattered debris (bottom).

Coral Morphology and Ease of Transplantation — Table 14 presents the general coral growth forms and ease of transplantation by species across all depth contours off Pier 15. Growth forms include: encrusting, plating, branching, mounding, or mixed (exhibiting both encrusting and plate or pillar growth forms). Most of the corals off Pier 15 have encrusting growth (132 colonies; 86% of the total). A total of 12 colonies with mounding form, 4 colonies with mixed (encrusting and plate/pillar) form, and 3 with plating form were observed off Pier 15. No branching corals were encountered in the survey areas. Over half (53%) of the colonies encountered were considered suitable for transplantation. Despite the high number of encrusting colonies (which can make transplantation difficult), many of these encrusting colonies were attached to loose rubble or debris that can be moved away from pile locations.

Table 14. Coral morphology and ease of removal off Pier 12

	Morphology (count/ % of total)								**Ease of Removal (count/% of total)**			
Species	**Encrusting**		**Plating**		**Branching**	**Mounding**		**Multiple†**		**Difficult**		**Easy**
Leptastrea spp.	11	100%	--		--	--			11	100%	--	
M. capitata	18	78%	1	4%	--	--	1	4%	19	83%	4	17%
*M. patula**	7	58%	2	17%	--	--	3	25%	10	83%	2	17%
P. lobata	96	89%	--		--	12	11%	--	32	30%	76	70%
Total count	132		3		0	12		4	72		82	
Percent of total	86		2		0	8		3	47		53	

† colonies exhibit encrusting, plating, and pillar morphologies
* species presently proposed to be listed as threatened under the Endangered Species Act

Rare, Protected, or Invasive Species — No federally-listed (USFWS, 2012) threatened or endangered species were encountered during the survey off Pier 15. One species of coral proposed for ESA listing was observed at Pier 15 (*M. patula*; NOAA-NMFS, 2012a). A total of 12 colonies of *M. patula* coral colonies was observed in the survey area of Pier 15. No pearl oysters or other state-protected species (HAR §13-83-01, DLNR, 2009) were observed.

Pile removal — The 10 existing piles to be removed off Pier 15 were not quantitatively surveyed in the 2012 surveys. Based on a qualitative assessment, these piles host a composition of biota similar to that found in the surrounding 4-6 ft depth contour survey area (see above; corals, tunicates, and sponges). Because the orientation and substrate of the piles are different from the surrounding sea floor, data from the quantitative surveys cannot be directly applied to the piles. A quantitative assessment, including coral size class

distribution, should be conducted prior to construction to quantify the impacts of the removal of the piles.

Post Hoc Sampling Sizes

A goal of the "Phase 2" survey was to estimate the number of transects required for postconstruction surveys to determine a statistically significant decrease of 50% or increase of 100% (magnitudes of effect) in coral coverage at piers 12 and 15. The calculated number of transects required to establish a statistical test of power (1 - β) = 0.80 and statistical significance (α) = 0.05 for the desired effect sizes using the October survey data and bootstrapped data derived from the October survey data are shown in Table 15. Power analysis, using preconstruction coral coverage uncorrected data, results in an unrealistically high number of transects necessary to estimate a 50% decrease, or 100% increase in coral coverage following Project construction. Bootstrapping the preconstruction data, as described in Methods above, significantly reduces the estimated standard deviation for these data and, hence, the number of transects required to detect a 50% decrease, or 100% increase in postconstruction percent coral coverage.

Table 15. Comparison of number of transects required to estimate a 50% decrease or 100% increase in coral coverage at piers 12 and 15 for survey and bootstrapped data (1-β = 0.80 and α =0.05).

	Pier 12		**Pier 15**	
Transect	Survey Data	Bootstrap Data	Survey Data	Bootstrap Data
4- to 6-ft depths				
50% Decrease	20	4	68	10
100% Increase	20	3	68	11
10- to 12-ft depths				
50% Decrease	45	7	5	2
100% Increase	45	7	5	2
14- to18-ft depths				
50% Decrease	47	8	--	--
100% Increase	47	8	--	--
Vessel Mooring Area				
50% Decrease	69	14	--	--
100% Increase	14	17	--	--

Direct Impacts

Pile Impacts

Direct impacts to marine biological resources off piers 12 and 15 in Honolulu Harbor would result from driving support piles (for the loading platform and mooring dolphins) into the harbor bottom. Predicted direct impacts at each pier are presented in Table 16 and described below. These values are underestimates, as the calculation assumes there would be no direct impacts to nearby corals—that is, corals not buried or crushed under the cross-sectional area of a pile would survive. This additional direct impact can be estimated once construction methods are finalized. Coral cover for surveyed depth contours and direct and indirect impact areas for Project areas off Pier 12 and 15 is provided as Appendix B.

Table 16. Predicted direct impacts to corals off Pier 12 and 15.

Location	Total number of piles	Total pile footprint (m^2)	Area coverage of coral colonies in direct impact area (m^2 of coral)	Area coverage of *M. patula** coral colonies in direct impact area (m^2 of coral)
Pier 12	20	4.00	1.80†	0.37
Pier 15	67	13.4	0.10†	0.02

† These values are underestimates, as the calculation does not account for direct impacts to adjacent corals and remaining colony outside of footprint
*species presently proposed to be listed as threatened under the Endangered Species Act

<u>Pier 12</u> — Twenty piles are to be placed at Pier 12. The footprint of each vertical has an area of 0.20 m^2 (2.2 ft^2), for a total direct impact area of 4.0 m^2 (43 ft^2). Total area coverage of coral colonies in the direct impact area of Pier 12 is 1.8 m^2, and 0.37 m^2 coral coverage of *M. patula* (Table 16). Within the 4- to 6-ft depth contours, where 4 piles (0.80 m^2 pile footprint) are proposed to be placed, coral cover is estimated at 87% of the bottom and live coral cover that would be buried under the pile footprint is 0.70 m^2. At the 10- to 12-ft depths, where five plies (0.86 m^2) are proposed to be placed, coral cover is estimated to be 86% and live coral that would be destroyed is estimated at 0.86 m^2. The remaining 11 piles (2.2 m^2) are proposed for depths between 14 and 18 ft, where coral cover is estimated at 11%. Live coral that would be destroyed by these piles is estimated at 0.24 m^2. However, due to the overlapping, plate and

encrusting growth forms of the colonies in the 4- to 6-ft and 10- to 12-ft depth ranges, collateral damage will be higher and direct impacts can be anticipated to extend beyond the actual footprint of a piling as nearby corals will be dislodged or broken.

Pier 15 — A total of 67 piles are to be placed at Pier 15. The ends of the piles have an area of 0.2 m^2 (2.2 ft^2), for a total direct impact area of 13.4 m^2 (144 ft^2). Total area coverage of coral colonies in the direct impact area of Pier 15 is 0.10 m^2 (1.1 ft^2), and 0.02 m^2 (0.22 ft^2) coral coverage of *M. patula* (Table 16). In 4- to 6-ft depths, where 7 piles (1.40 m^2 pile footprint) are proposed to be placed, coral cover is estimated at 5.08% and live coral that would be destroyed is estimated to be 0.07 m^2 (0.75 ft^2). At 10- to 12-ft depths, where 16 piles (3.2 m^2) are proposed to be placed, coral cover is estimated at 0.98%, and area of live coral that would be destroyed is estimated to be 0.03 m^2 (0.32 ft^2). . At 12- to 24- ft depths, where 44 piles (8.8 m^2) are proposed to be placed, no corals were observed.

Pile-driving noise

Direct impacts to sea turtles, monk seals, and humpback whales may result from pile-driving sounds. Sound pressures from marine pile-driving depend upon the size of the pile and the size of the hammer used. Other factors can cause large variations in measured sound pressures at different locations, including: water depth, tidal conditions or currents if sound attenuation systems are used, and geotechnical conditions that affect the difficulty of driving in a pile. Based on data from various projects, driving 0.61-m diameter concrete piles in waters of approximately 5 m deep have a peak average sound pressure of 185 dB (Oestman et al., 2009).

Sounds generated from Project activities may be substantial enough to cause an acoustic disturbance to protected species in nearshore waters. The following in-water acoustic impact thresholds are currently used by the National Marine Fisheries Service (NMFS) to assess potential impacts to marine mammals (NOAA, 2005; D. Hubner, Pers. Comm., 2011): Onset of Injury (also known as the Permanent Threshold Shift) is 180 dB for cetaceans (whales, porpoises) and 190 dB for pinnipeds (seals). The Onset of Behavioral Disturbance (also known as the Temporary Threshold Shift/Areal Avoidance) is 160 dB for an impulsive sound and 120 dB for a continuous, non-impulsive sound.

Turbidity

At both Pier 12 and Pier 15, direct impacts to the marine environment would occur during installation of the pilings, loading dock and shore-side infrastructure construction. Project construction may temporarily increase the amount of suspended sediment (i.e., turbidity) in the water column at each site. This increased sediment-load can negatively impact corals in several ways: inhibit coral recruitment, reduce light required by zooxanthellae, reduce the ability of coral polyps to feed, increase respiration rates, reduce growth rates, and increase mucus production for sloughing away sediment (Rogers, 1983; Hodgson, 1990; Te, 1992; ISRS, 2004; Piniak, 2004).

Indirect Impacts

Indirect impacts to marine biological resources off piers 12 and 15 in Honolulu Harbor would result from shading from project structures (loading platforms, vehicular bridge, mooring dolphins, and moored vessels) and a local increase in boat traffic. Predicted indirect impacts from shading at each pier are presented in Table 17.

Table 17. Predicted indirect impacts to corals off Pier 12 and 15.

Location	Total shaded area (m^2)	Area coverage of coral colonies in shaded area (m^2)
Pier 12 structures	83.1	50.7
Vessel	400	0.18
Total	483.1	50.9
Pier 15 structures	520.7	17.2
Vessels	2331	0
Total	2851.7	17.2

Shading from Structures

An indirect impact to benthic organisms dependent upon light level would come from shading by the loading docks, mooring dolphins, and semi-permanently moored vessels. Shading impacts to corals under the structures are likely to be variable and occur after project completion. The amount of available light is an important factor affecting survival, growth, and depth distribution of corals (Osinga et al., 2008). Reduced light availability to coral zooxanthellae (symbiotic

microalgae) can result in increased coral mortality. There are potential positive effects from the shading produced from the permanent loading docks. Shading may cause a slight decrease in the water temperature, which may reduce thermal stress in corals. Thermal stress can lead to the disruption of normal photosynthetic processes in the corals' zooxanthellae (i.e., bleaching) and coral disease (Jones et al., 2004; Bally and Garrabou, 2007; Bruno et al., 2007; Rodriguez and Croquer, 2008; TNC, 2012). The impact from shading of the bottom is a more subtle impact on light dependent corals and algae than driving piles, but will influence a larger area than that directly impacted by the latter.

Pier 12 — Total shaded area at Pier 12 is 483.1 m^2 (5,200 ft^2; Table 17, above). The loading platform at Pier 12 is proposed to be located in depths of 4- to 18- ft and would shade an area of 56.1 m^2 (603.9 ft^2). . Live coral under the shaded area is estimated to be 61%, for a total impact of 34.4 m^2 (370.3 ft^2) of coral permanently shaded. The two mooring dolphins are proposed to be located in depths of 10- to 18- ft, where coral cover is estimated to be 48%. Under the area of the mooring dolphins (18.6 m^2; 200.2 ft^2), an estimated 9.01 m^2 (97 ft^2) of coral would be permanently shaded. The vehicular bridge at Pier 12 is proposed to be located along the 4- to 6-ft depth contours and cover an area of 8.4 m^2 (90.4 ft^2). Live coral coverage in this area is 87%, for an area of 7.3 m^2 (78.6 ft^2) of coral permanently shaded from the vehicular bridge. The proposed location for the docked vessel is over depths of 18 to 24 ft, where coral cover is estimated at 0.04%. Under the vessel (400 m^2; 4,306 ft^2).), an estimated 0.18 m^2 (1.9 ft^2) of coral would be shaded.

Pier 15 — Total shaded area at Pier 15 is 2,851.7 m^2 (30,695 ft^2). The two loading platforms at Pier 15 are proposed to extend across water depths of 4- to 18+ ft, and will shade an area of 452.2 m^2 (2715 ft^2). Coral cover under these structures is estimated to be 0.03%, for a total direct impact of 13.7 m^2 (147.5 ft^2) of coral permanently shaded. Five mooring dolphins are proposed for Pier 15, covering a total area of 68.5 m^2 (737 ft^2). Coral cover under the mooring dolphins is estimated at 0.05%, for an area of 3.5 m^2 (38 ft^2) of coral permanently shaded. No corals were observed in the areas under the two proposed vessels off Pier 15.

Boat Traffic

Indirect impacts would be caused by increased boat traffic in this part of Honolulu Harbor. Indirect impacts from boat traffic include resuspension of fine bottom sediment and increased damage to coral heads from boat-strikes (i.e., propeller scarring).

Other Impacts

Other indirect impacts that may result from the Project include increased pollutant and water run-off and potential invasive species circulation from hull-fouling. Polluted surface runoff (fine sediments, soap, oil, fuel, and other chemicals), chemical contamination from treated wood surfaces, and fuel and oil leakage may impact coral reef resources at Pier 12 and Pier 15, and these may increase with the Project. The proposed new loading docks and vehicular bridges would increase both the amount of impervious surfaces and land-based vehicle and machinery activities at the piers. This could result in an increase in storm water run-off and pollutants entering the water. The introduction of new aquatic invasive species is an unlikely impact because the vessels to be docked at Pier 12 and 15 are currently stationed at Honolulu Harbor and do not leave state waters.

Few fishes occur in Honolulu Harbor (*AECOS*, 2012a). The fishes that we observed are common to the Hawaiian Islands. Fishing is prohibited in the Harbor (§HAR 188-34, DLNR, 2007). Frequent dredging, low benthic rugosity, silt bottom, high turbidity, and frequent boat traffic make Honolulu Harbor a generally poor environment for fishes. Even with the robust coral growth around Pier 12, fish abundance was low (*AECOS*, 1982, 2012a). Impacts to fishes from the project will be minimal, in part because the addition of piles can enhance some fish habitats.

Rare, Protected, or Invasive Species

No Endangered Species Act (ESA) listed (endangered or threatened; USFWS, 2012) species were encountered during the February or October 2012 marine surveys. One coral species proposed for ESA listing (NOAA-NMFS, 2012a) was observed at Pier 12 and at Pier 15. One marine protected species was observed in the project vicinity: black-lipped pearl oyster (*Pinctada margaritifera*). Some listed species are known to occur in the general vicinity, as described further below.

<u>Black-lipped pearl oyster</u> — The pearl oyster (*P. margaritifera*) is protected throughout the State of Hawai'i, and it is prohibited to "catch, take, kill, possess, remove, sell or offer for sale" (HAR §13-83-01, DLNR, 2009). Black-lipped pearl oysters were observed in low numbers at Pier 12.

<u>Coral</u> — Coral species are protected under Hawai'i state law. State law prohibits the breaking or damaging, with any implement, any stony coral from

the waters of Hawai'i, including any reef or mushroom coral (HAR §13-95-70, DLNR, 2002). It is also unlawful to take, break or damage, with any implement, any rock or coral to which marine life of any type is visibly attached (HAR §13-95-71, DLNR, 2002).

In 2009, the National Oceanic and Atmospheric Administration (NOAA) received a petition to list 83 species of reef-building corals under the ESA. On February 10, 2010, NOAA found substantial information from the petition indicating that listing as threatened or endangered under the ESA may be warranted for 82 of the 83 petitioned species (NOAA-NMFS, 2010a). Following the initial finding, NOAA completed a status review report (Brainard et al., 2011) and a draft management report of the candidate species in April 2012 (PIRO-NOAA, 2012). A public review process of the two reports began on April 13, 2012, and ended July 31, 2012. All information gathered from the review process was summarized in a Supplemental Information Report (NOAA-NMFS, 2012b). Based on the Status Review, Supplemental Information and Final Management reports, NOAA Fisheries proposed listing for 66 coral on November 30, 2012(NOAA-NMFS, 2012a). Before making a final decision on this proposal, the public has 90 days to provide additional comments, which will be considered before NOAA issues its final decision. Of the proposed species, one was observed in the Project areas of Pier 12 and Pier 15. Direct and indirect impacts to these species will occur from the project, as discussed above.

<u>Sea Turtle</u> — The threatened green sea turtle or *honu* (*Chelonia mydas*) is known to occur in the waters of Honolulu Harbor. The endangered hawksbill turtle or *honue'a* (*Eretmochelys imbricata*) may also appear on rare occasions in the vicinity (NOAA-NMFS, 2010b). Impacts to sea turtles from the project will be minimal or none.

<u>Monk Seal</u> — The endangered Hawaiian monk seal (*Monachus schauinslandi*) is rarely seen in Honolulu Harbor. The majority of monk seal sighting information collected in the main Hawaiian Islands is reported by the general public and is highly biased by location and reporting effort. Systematic monk seal count data come from aerial surveys conducted by the Pacific Islands Fisheries Science Center (PIFSC). Aerial surveys of all the main Hawaiian Islands were conducted in 2000-2001 and in 2008 (Baker and Johanos, 2004; PIFSC, unpublished data). One complete survey of O'ahu was conducted for each of these years. The 2000 survey was conducted from an airplane and the 2001 and 2008 surveys were both conducted by helicopter. No Hawaiian monk seals were sighted within Honolulu Harbor during these three surveys (PIFSC, 2009).

Currently, only the remote Northwestern Hawaiian Islands are considered critical habitat for monk seals (50 CFR 226.201, NOAA-NMFS, 2011). Recently,

the waters surrounding the Main Hawaiian Islands (MHI) have been proposed as monk seal critical habitat, excluding portions of the MHI coastal environments considered hardened shorelines or developed areas (e.g., boat harbors, cliffs, active lava, and large bays with extensive runoff) that do not have the features that would support Hawaiian monk seal use. Honolulu Harbor is an area that would not meet the definition of critical habitat for monk seal. Thus, this area, defined as the following locations and delineated by the identified boundaries: Pearl Harbor to Kapua Channel delineated by all terrestrial coastlines between Keahi point (21°18′57.95″N/157°58′42.82″W) east to eastern edge of the Kapua channel is not proposed designated as critical habitat area (21°15′28.77″ N/157°49′07.51″ W; 50 CFR 226, June 2, 2011; NOAA-NMFS, 2011).

Reports by the general public, which are non-systematic and not representative of overall seal use of main Hawaiian Islands shorelines, have been collected in the main Hawaiian Islands since the early 1980s. A total of three Hawaiian monk seal sightings have been reported for Honolulu Harbor. These sightings occurred in 2002, 2004, and 2009. One of these sightings was reported as a dead seal floating in the harbor, but the carcass was never recovered (PIFSC, 2009).

Humpback Whale — The humpback whale or *koholā* (*Megaptera novaeangliae*) was listed as endangered in 1970 under the ESA. In 1993 it was estimated that there were 6,000 whales in the North Pacific Ocean, and that 4,000 of those regularly came to Hawai'i annually from November through May with the peak between January and March (HIHWNMS, 2008). The population is estimated to be growing at between 4 and 7 percent per year. Today, as many as 10,000 humpback whales may visit Hawai'i each year. The waters of Honolulu Harbor are not within the Hawaiian Islands Humpback Whale National Marine Sanctuary. However, sightings of whales in the harbor have been made. In January 2012, two whales, a mother and calf, were seen at Piers 30, 52, and 53 of Honolulu Harbor (Yamada, 2012).

Mitigation

Mitigation for impacts to marine resources caused by the project includes avoiding impacts, minimizing impacts, and compensating for unavoidable impacts. The first step is to avoid impacts through project design decisions. The second step, after avoidance measures have been incorporated, is to minimize impacts. If unavoidable impacts still exist after avoidance and minimization, then replacement of lost ecosystem functions and values is appropriate. This last step is called compensatory mitigation (Bentivoglio, 2003).

The Clean Water Act states that compensatory mitigation is required to offset environmental losses resulting from unavoidable impacts to waters of the U.S. authorized by Corps permits, and that the mitigation must be commensurate with the amount and type of impact (40 CFR 230, Final Rule; see USACE & EPA, 2008). The Final Rule stipulates that the compensatory mitigation required should be sufficient to replace lost aquatic resource functions. Where appropriate functional assessment methods are available these methods should be used to determine how much compensatory mitigation is required. Lacking an appropriate assessment method, "a minimum one-to-one acreage or linear feet compensation ratio must be used" (33 CFR 332.3 (f)(1); USACE, 2005).

The Final Rule on compensatory mitigation describes three mechanisms for carrying out compensatory mitigation: permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee mitigation. The rule establishes a primary preference for mitigation banks and a secondary preference for in-lieu fee programs. The District Engineer, however, can override these preferences based on specific circumstances, including any applicable state and local mitigation requirements. Wetland mitigation banks are presently not available in Hawai'i. The Honolulu District guidance document (USACE, 2005) recommends the following:

> Alternatives to the mitigation bank or in-lieu fee arrangement are project-specific mitigation proposals that include on-site mitigation, off-site mitigation, or some combination of both. Consistent with RGL 02-2 [USACE, 2002], the mitigation site should be adjacent to or contiguous with the impact site when practicable in order to preserve locally important functions such as local flood control or a specific, unique wildlife habitat. Off-site mitigation should occur when on-site mitigation is not practicable, or when an off-site mitigation project would provide a greater environmental benefit within the watershed than on-site.

Avoidance and Minimization

Coral Relocation — A suggested avoidance and minimization strategy for the project is to transplant corals from proposed pile placement locations to nearby receiving locations in or near the harbor. At both piers, many of the coral colonies (*Leptastrea* spp., *Cyhpastrea ocellina, P. lobata*, and *Montipora* spp.) have encrusting and plate growth forms; a factor that could make coral transplantation labor intensive and may also limit survivorship due to stresses and breakage incurred by removal, transport, and reattachment. At Pier 12, *M. patula* and *M. capitata* colonies occur in encrusting, plate, and pillar morphologies (Fig. 15).

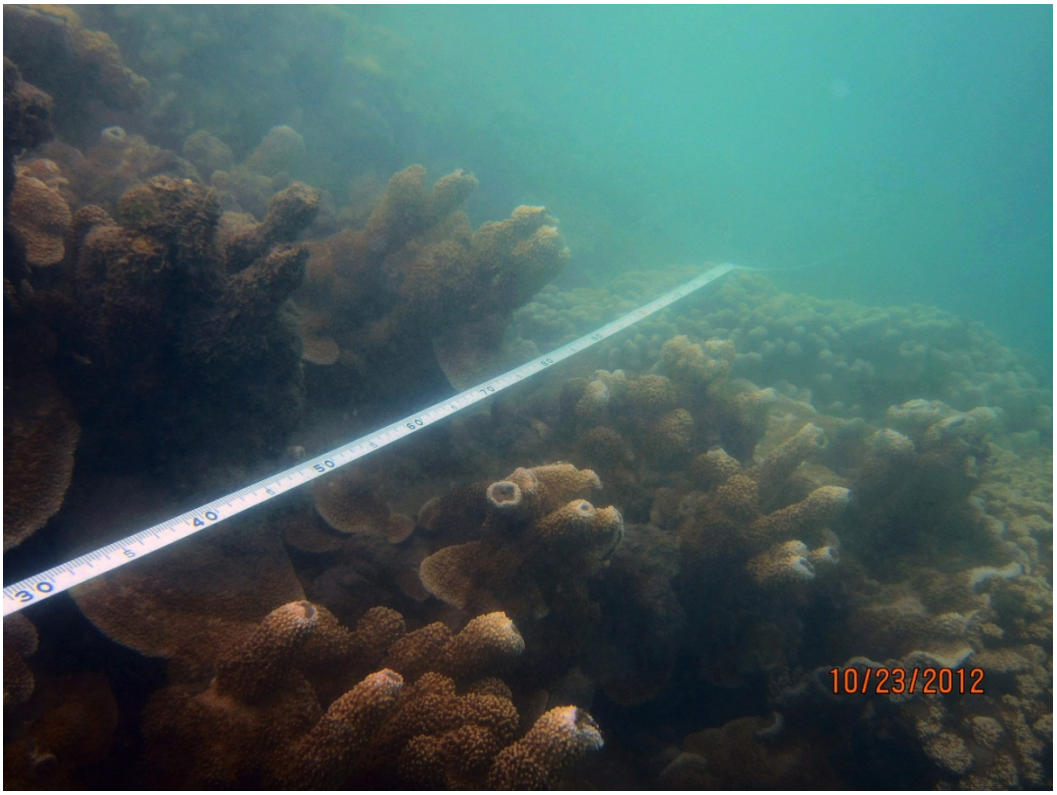

Figure 15. Colonies of *Montipora* spp. off Pier 12 occur in encrusting plate and pillar morphologies; a factor that could make transplantation labor intensive, and possibly limit survivorship.

Partial removal (individual plates or pillars) and relocation of these colonies may be feasible. Additionally, several large (>80 cm) mound-forming *Porites*

spp. colonies occur in shallow waters (4 to 8 ft) near the southwestern end of Pier 12. The mounding morphology of these large colonies makes them viable candidates for transplantation. Off Pier 15, the most common corals observed, *P. lobata,* are small and encrusting. Many of the colonies occur on loose rubble or substrate that could be rather easily relocated.

Techniques for the transplantation of corals have been developed and vetted around the world (Edwards, 2010). Coral transplantation methodology should follow procedures outlined in the Kawaihae Small Boat Harbor Coral Transplant Plan (*AECOS*, 2012c) and Kaunakakai Ferry System Improvements Coral Transplantation Plan (*AECOS*, 2012d). Our survey did consider coral transplantation receiving sites and additional surveys will be required to evaluate potential receiving sites if corals are to be moved for transplantation. A coral transplantation plan and monitoring program should be prepared prior to project construction.

Best Management Practices

Some potentially adverse indirect impacts may occur as a result of the pier improvement work. Best management practices (BMPs), including environmental protection specifications and endangered species protection, as described below, may be applicable.

<u>Environmental Protection Specifications</u> – A detailed environmental protection specification document should be developed for the construction contractor. Site-specific BMPs are generally a requirement of nation-wide permit (NWP) verifications, either directly or by state water quality certification conditions, which are incorporated by reference. To the extent applicable, the following BMPs should be considered to minimize the degradation of water quality and avoid adverse impacts to fishes, corals, and other aquatic resources (modified from USACE, 2012):

- Turbidity and sediment from project-related work must be minimized and contained to the immediate vicinity of the authorized activity through the appropriate use of effective sediment containment devices.
- To the extent practicable, work in the marine environment must be scheduled to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods. Coordination with federal resource agencies (U.S. Fish and Wildlife Service and/or NOAA) can assist in identifying these time periods.
- Dredging and filling in the marine environment must be designed to avoid or minimize adverse impacts to or the loss of special aquatic sites (e.g., coral reefs).

- All project-related materials (fill, landscaping, etc.) and equipment (dredges, barges, backhoes, etc.) to be placed in the marine environment should be inspected and cleaned of pollutants, organic matter, and invasive species prior to use in any aquatic environment.
- Project-related materials (fill, revetment rock, pipe etc.) are not to be stockpiled in the marine environment or in close proximity such that materials could be carried into the water by wind, rain, or high surf.
- All construction debris and material removed from the marine environment should be disposed of at an approved upland or alternative disposal site.
- No contamination (by trash, debris, sediment, non-native species introductions, attractions of non-native pests, etc.) of adjacent waters of the United States, including special aquatic sites, shall result from project-related activities. Special attention must be paid to fouling on barges, vessels, and equipment to minimize transport and potential introduction and spread of aquatic non-native species. If dredged or excavated material or structural members are removed from the water or placed in the water, measures should be taken to prevent the spread or introduction of aquatic non-native species. A litter-control plan and/or a Hazard Analysis and Critical Control Point Plan may be needed to prevent attraction and introduction of non-native species.
- Fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during project activities should be developed. Absorbent pads and containment booms should be stored where and as appropriate to facilitate the clean-up of accidental petroleum releases.
- To minimize turbidity in the marine environment, any under-layer fills used in the project should be protected from erosion with suitable material (such as precast concrete armor or mat units) as soon after placement as practicable.
- Silt fences, silt curtains, or other diversion or containment structures may need to be installed to contain sediment and turbidity at the work site.

<u>Endangered Species Protection</u> — During preconsultation with NOAA, the use of air-bubble curtains was recommended as a measure to avoid adverse noise impacts to whales, dolphins and sea turtles. Air bubble curtains infuse an area surrounding piles with air bubbles, creating a bubble screen that inhibits the propagation of underwater sound from pile driving. Results on the effectiveness of air-bubble curtains in reducing sound pressure waves are varied, but the data generally indicate that an air-bubble curtain used on a steel or concrete pile with a maximum cross-section dimension of 24 in or less (pile

size comparable to those proposed for this project) can provide about 5 dB of noise reduction (Oestman et al., 2009).

The following endangered species BMPs may be applicable during the proposed work (USACE, 2012):

- A survey of the project area shall be performed just prior to commencement or resumption of construction activity to ensure that no protected species are in the project area. If protected species are detected, construction activities shall be postponed until the animal(s) voluntarily leave the area.
- If any listed species enters the area during construction activities, all activities shall cease until the animals(s) voluntarily depart the area.
- All on-site project personnel shall be apprised of the status of any listed species potentially present in the project area and the protections afforded to those species under federal law.
- The project foreman shall designate an appropriate number of competent observers to survey the area adjacent to the proposed action for protected species. The project foreman shall also have in his/her possession at the jobsite a handout with photographs of protected species that may enter the construction site to assist with identification of the protected species. U.S. Fish and Wildlife Service–Pacific Islands Fish and Wildlife Office (PIFWO) will provide the informational handout.
- To ensure that no protected species are in the project area (typically considered within 50 yards of the work activity), surveys of the project area shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour, All work shall be postponed or halted when protected species are present, and shall only begin/resume after the animals have voluntarily departed the area. In the case of sessile species, a conservation plan shall be developed and approved between the Regulatory Branch, U.S. Army Corps of Engineers and PIFWO and/or National Marine Fisheries Service Pacific Islands Regional Office (PIRO).
- If an onsite protected species does not depart the area on its own for three days or more, contact PIFWO (808- 792-9400) for technical assistance and guidance.
- Any interaction with or incidental take of protected species must be reported immediately to the Regulatory Branch, U.S. Army Corps of Engineers (808-438-9258). Additionally, pursuant to the ESA, any take of ESA-listed species (other than marine mammals) must be reported to the U.S. Fish and Wildlife Office of Law Enforcement in Honolulu (808-861-8525). Any incidental take of marine mammals must be reported immediately to the National Oceanic and Atmospheric Administration's (NOAA) 24-hour hotline (1-888-256-9840). Information reported must

include the name and phone number of a point of contact, location of the incident, and nature of the take and/or injury.

- These and other requirements may be designated by the Honolulu District as appropriate for specific projects, including all conservation measures and/or best management practices (BMPs) required by any ESA consultation for the project.

Compensatory Mitigation

Based upon the results of the Phase 1 and 2 surveys, and considering the suggested strategies above, the project should be designed to avoid and minimize impacts to coral reef resources. If all of the impacts cannot be avoided and minimized, some form of compensatory mitigation and monitoring could be required as part of the federal permit (US Army Corps Rivers and Harbors Section 10 or Clean Water Act Section 404).

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Appendix A

Checklist of taxa observed in Project vicinity in waters north Honolulu Harbor at Pier 12 and 15, February and October 2012.

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name & *Hawaiian name*	Status	Abundance by location Pier 12	 Pier 15
	ALGAE			
CHLOROPHYTA	GREEN ALGAE			
Dictyosphaeria versluysii		**Ind.**	U	--
Ventricaria ventricosa		**Ind.**	U	--
RHODOPHYTA	RED ALGAE			
Hydrolithon onkodes		**Ind.**	U	--
Hydrolithon reinboldii		**Ind.**	U	--
Mesophyllum mesomorphum		**Ind.**	U	--
Peyssonnelia rubra		**Ind.**	U	--
CYANOBACTERIA	BLUE GREEN ALGAE			
Lyngbya majuscule		**Ind.**	U	--
Symploca hydnoides		**Ind.**	U	--
	INVERTEBRATES			
PORIFERA, DEMOSPONGIAE, MYCALIDAE	SPONGES			
Mycale sp.		**Nat.**	C	O
Stylinos sp		**Nat.**	O	U
MYXILLIDAE				
Iotrochota protea	staining sponge	**Ind.**	U	U
CNIDARIA, HYDROZOA, ANTHOATHECATA	HYDROIDS			
Pennaria disticha	Christmas tree hydroid	**Ind.**	O	O
CNIDARIA, ANTHOZOA, SCELRACTINIA	CORALS			
POCILLOPORIDAE				
Pocillopora damicornis	lace coral	**Ind.**	O	--
Pocillopora meandrina	cauliflower coral	**Ind.**	R	

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name & *Hawaiian name*	Status	Abundance by location Pier 12	 Pier 15
PORITIDAE				
Porites lobata	lobe coral	**Ind.**	C	O
Porites compressa	finger coral	**Ind.**	C	--
ACROPORIDAE				
Montipora capitata	rice coral	**Ind.**	A	O
Montipora patula	sandpaper rice coral	**Ind.**	A	O
FAVIIDAE				
Leptastrea bewickensis	bewick coral	**Ind.**	U	R
Leptastrea purpurea	crust coral	**Ind.**	C	O
Cyphastrea ocellina	ocellated coral	**Ind.**	U	--
ANNELIDA, POLYCHAETA, SABELLIDAE	WORMS			
Sabellastarte spectabilis	feather duster worm	**Ind.**	O	--
SERPULIDAE				
Spirobranchus giganteus	Christmas-tree worm, k*io*	**Ind.**	U	--
TEREBELLIDAE				
Loimia medusa	Medusa spaghetti worm	**Ind.**	U	--
ECTOPROCTA, GYMNOLAEMATA, CHEILOSTOMATA, RETEPORIDAE	BRYOZOANS			
Reteporellina denticulata	lace bryozoan	**Ind.**	U	--
SCHIZOPORELLIDAE				
Schizoporella errata	erratic bryozoan	**Ind.**	U	--
BRYOZOA, VESICULARIIDAE				
Amathia distans	white bushy bryozoan	**Nat.**	O	--
Zoobotryon verticillatum		**Nat.**	U	
BUGULIDAE				
Bugula dentata	blue fan bryozoan	**Nat.**	O	--
MOLLUSCA,BIVALVIA, PTERIIDAE	MOLLUSCS			
Pinctada margaritifera	black-lipped pearl oyster	**Ind.**	U	--
ISOGNOMONIDAE				
Isognomon perna	brown purse shell, *nahawele*	**Ind.**	R	--

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name & *Hawaiian name*	Status	Abundance by location Pier 12	Pier 15
ECHINODERMATA, ECHNOIDEA, ECHINOMETRIDAE	SEA URCHINS			
Echinometra mathaei	rock boring urchin, *'ina kea*	**Ind.**	A	A
Echinometra oblonga	oblong boring urchin, *'ina*	**Ind.**	C	U
ECHINODERMATA, HOLOTHUROIDEA HOLOTHURIDAE	SEA CUCUMBERS			
Actinopyga mauritiana	white-spotted sea cucumber, *loli*	**Ind.**	--	U
Holothuria atra	black sea cucumber, *loli okuhi kuhi*	**Ind.**	--	U
Holothuria cinerascens	ashy sea cucumber	**Ind.**	A	C
VERTEGRATA, ACTINOPTERYGII ACANTHURIDAE	BONY FISHES			
Acanthurus triostegus	convict tang, *manini*	**Ind.**	U	A
POMACENTRIDAE				
Dascyllus albisella	Hawaiian Dascyllus, *ālo'ilo'i*	**End.**	U	--
Plectroglyphidodon imparipennis	bright-eye damselfish	**Ind.**	U	--
LABRIDAE				
Thalassoma duperrey	saddle wrasse, *hinalea lauwili*	**End.**	U	U
Stethojulius balteata	belted wrasse, *'omaka*	**End.**	U	U
LUTJANIDAE				
Lutjanus fulvus	black tail snapper, *to'au*	**Ind.**	U	--
CHAETODONIDAE				
Chaetodon lunula	raccoon butterflyfish, *kikakapu*	**Ind.**	R	--
Chaetodon ornatissimus	ornate butterflyfish, *kīkākapu*	**Ind.**	U	--

PHYLUM, CLASS, ORDER, FAMILY *Genus species*	Common name & *Hawaiian name*	Status	Abundance by location Pier 12	 Pier 15
TETRAODONTIDAE				
Canthigaster jactator	Hawaiian whitespotted toby	**End.**	R	--
CHORDATA, ASCIDACEA				
ENTEROGONA, ASCIDIIDAE				
Ascidea sydneiensis	yellow sea squirt	**Nat.**	U	U
Phallusia nigra	black sea squirt	**Nat.**	U	--

KEY TO SYMBOLS USED:

Abundance categories:

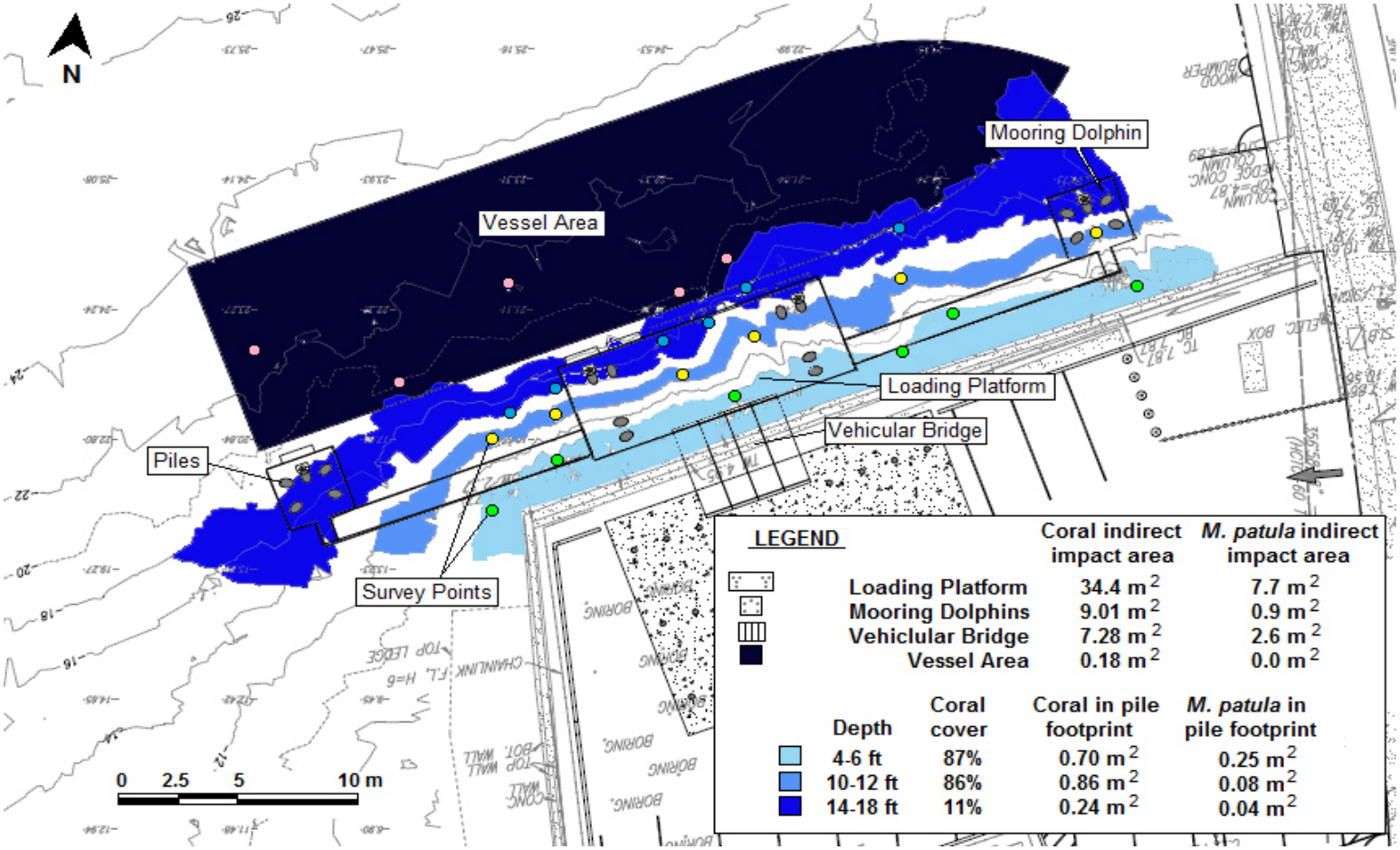
R – Rare–only one or two individuals observed.
U – Uncommon–several to a dozen individuals observed.
O – Occasional–seen irregularly in small numbers
C – Common–observed everywhere, although generally not in large numbers.
A – Abundant–observed in large numbers and widely distributed.

Status categories:

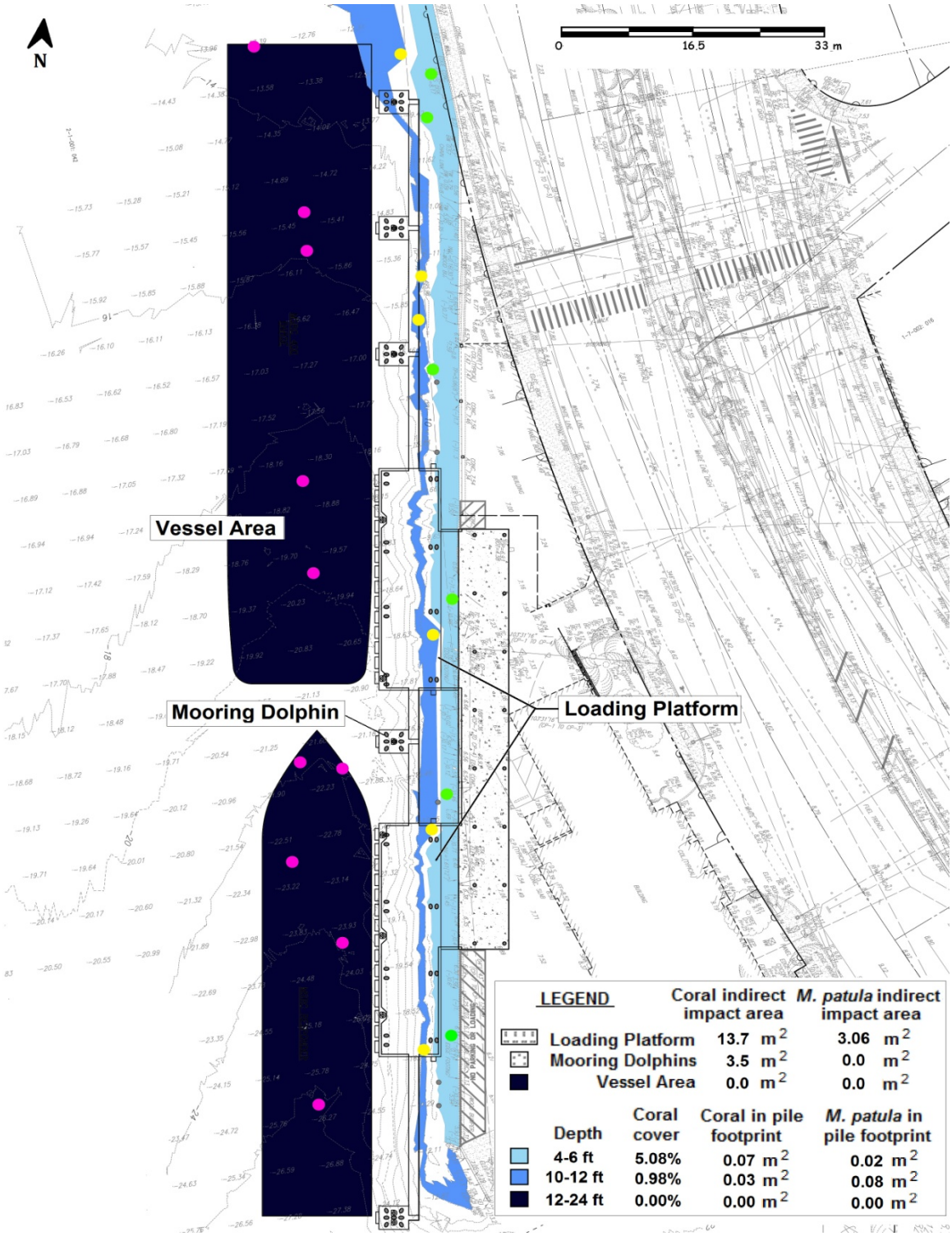
End. – Endemic–species found only in Hawai'i
Ind. – Indigenous–species found in Hawai'i and elsewhere
Nat. – Naturalized–species were introduced to Hawai'i intentionally, or accidentally.

Appendix B

Coral coverage for survey areas of depth contours and project design for piers 12 and 15.



Coral cover at surveyed depth contours and project locations for Pier 12



Coral cover at surveyed depth contours and project locations for Pier 15

APPENDIX D.
ARCHAEOLOGY

Archaeological Literature Review and Field Inspection for the Pier 12 and Pier 15 Improvement Project, Honolulu Harbor, Honolulu Ahupua‘a, Honolulu District, Island of O‘ahu TMK: [1] 2-1-001:043, 044, 045, 055, 056

Prepared for

Department of Transportation, Harbors Division

December 2012

Management Summary

Reference	Archaeological Literature Review and Field Inspection (LRFI) for the Pier 12 and Pier 15 Improvement Project, Honolulu Harbor, Honolulu Ahupuaʻa, Honolulu District, Island of Oʻahu, Tax Map Key (TMK): [1] 2-1-001:043, 044, 045, 055, 056
Date	December 2012
Project Number (s)	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: HONOLULU 34
Project Location	The project area consists of Pier 12 and Pier 15 in Honolulu Harbor. Pier 12 is seaward of the junction of Bethel Street and Nimitz Highway. Pier 15 is seaward of the Kekaulike-Maunakea Block at Nimitz Highway.
Land Jurisdiction	Department of Transportation – Harbors Division State of Hawaiʻi
Agencies	This study was prepared to facilitate decision-making in advance of any proposed redevelopment work and to be a basis for consultation with the State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) and/or other entities in preparation of an archaeological inventory survey as we believe will be required.
Project Description	Plans are to convert Piers 12 and 15 to accommodate spill response boats by the construction of new foundation slabs on their own piers (there are no plans for the alteration of the old foundations).
Project Acreage	Approximately 1.58 acres (ac) (0.64 hectare [ha]); approximately 20 percent of this acreage is within the harbor itself, and not on dry land.
Historic Preservation Regulatory Context	This investigation does not fulfill the requirements of an archaeological inventory survey (per Hawaiʻi Administrative Rules (HAR) Chapter 13-276). Rather, it serves as a document to facilitate the proposed project's planning, and it supports historic preservation review compliance by identifying any archaeological concerns within the study area. This document develops data on the likely general nature, density and distribution of archaeological resources as can be gleaned from available sources.
Results Summary	A field inspection was carried out on August 1, 2012 by CSH archaeologist Constance R. O'Hare, B.A., under the general supervision of Dr. Hallett H. Hammatt and per archaeological permit number 12-04 issued by the SHPD/DLNR, per HAR Chapter 13-282. The archaeologist walked all open, accessible areas of the property and took photographs of the structures and parking lots.
Management Recommendation	Given the previous history, we would anticipate the regulatory State Historic Preservation Division (SHPD) would require an archaeological monitoring program for improvements to Piers 12 and 15.

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David W. Shideler, M.A., and Hallett H. Hammatt, Ph.D.)

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Section 1 Introduction

1.1 Project Background

At the request of Kimura International, Inc., (1600 Kapiʻolani Blvd., Suite 1610, Honolulu, HI 96814), Cultural Surveys Hawaiʻi, Inc. (CSH) completed a Literature Review and Field Inspection (LRFI) for the Pier 12 and Pier 15 Improvement Project at the central portion of Honolulu Harbor, Honolulu Ahupuaʻa (traditional land division), Honolulu District, Island of Oʻahu, Tax Map Key (TMK): [1] 2-1-001:043, 044, 045, 055, 056. The project area is comprised of Pier 12 and Pier 15 at Honolulu Harbor, bound by the harbor on the west and *makai* (seaward) side and by Nimitz Highway on the east and *mauka* (inland) side. Pier 15 is bound by the junction of Nimitz and River Street on the north, near the mouth of Nuʻuanu Stream, and the junction of Nimitz and Maunakea Street to the south. Pier 12 is bound by the junction of Nimitz and Nuʻuanu Avenue to the north and the junction of Nimitz and Bethel Street to the south. The project area is shown on a 1998 U.S. Geological Survey map (Figure 1), a 2008 aerial photograph (Figure 2), and a state tax map plat [1] 2-1-001 (Figure 3). The five TMK parcels total 1.58 acres (ac) (0.64 hectares [ha]); but 20 percent of this acreage is within the harbor itself, and not on dry land.

Both piers are within the Chinatown Special District (*Makai* Precinct) and the Chinatown Historic District on the National Register of Historic Places (NRHP) (State Inventory of Historic Properties (SIHP) # 50-80-14-9986). Pier 12 is outside but adjacent to the Hawaiʻi Capitol Special District and the Capitol Historic District (SIHP # 50-80-14-1321), which begins on the west side of Aloha Tower Market Place. Renovations to Pier 12 and 15 were evaluated to have an adverse impact on the Chinatown Special District, but not on the Capitol Special District.

The ordinance for the Chinatown Special District states that buildings constructed from the 1880s to the 1940s are significant historic structures. Although the two structures on Pier 15, the Fireboat Station, built in 1951, and the Pier 15 shed, built ca. 1955, do not fall within this age range parameter, if the NRHP nomination was updated to include all buildings presently older than 50 years, it is likely that these buildings would be considered historically significant (Mason Architects, Inc. 2011:6). Both piers are included in the list of architecturally significant structures for the Chinatown Special District.

The main use of Pier 12 is currently vehicle parking, while the main use for Pier 15 is for the Harbor Fireboat. Planned improvements to Pier 12 include new berthing and mooring structures with fendering systems to create 200 feet (ft) (60.96 meters [m]) of berthing space for a Clean Islands Council (CIC) spill response boat. A structural slab will be placed over the existing bulkhead, but it will be supported by separate piles and will not be connected to the existing bulkhead of Pier 12. Planned improvements to Pier 15 include adding 500 ft (152.4 m) of berthing space for a new Marine Spill Response Corporation (MSRC) spill response boat and spill response barge. Again the structural slab will be on its own piles and will not bear on the existing pier. Some underwater piles associated with a former apron will be removed around Pier 15. The fire station on the Pier 15 will remain, with some modification to the shed roof (Mason Architects, Inc. 2011:13-14). Proposed modifications to the two piers are shown on Figure 4.

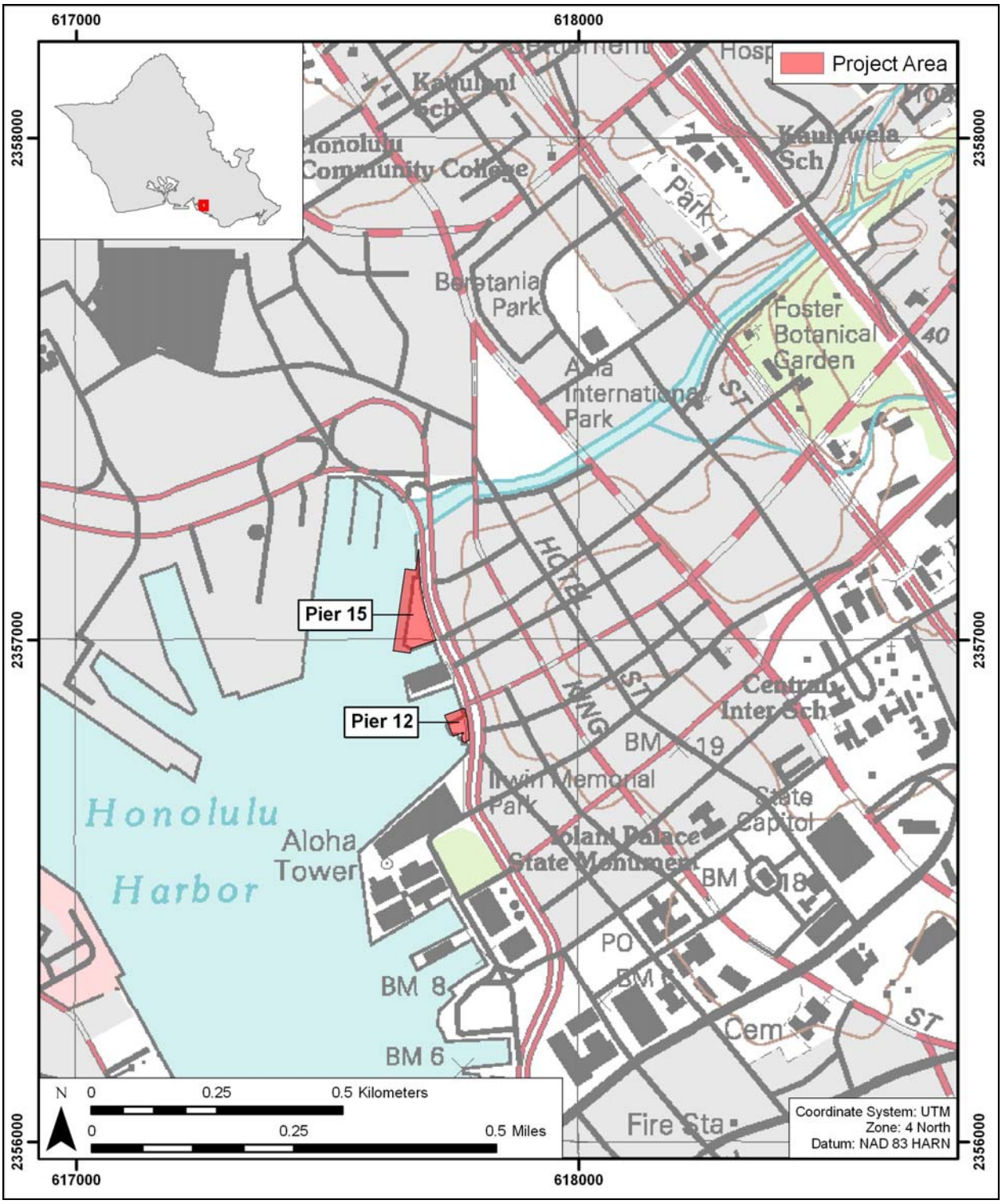


Figure 1. 1998 U.S. Geological Survey 7.5 minute topographic map of O‘ahu, Honolulu Quadrangle, showing project area at Honolulu Harbor, Pier 12 and Pier 15

Figure 2. 2009 Aerial photograph of O‘ahu, showing Pier 12 and Pier 15 (Google Earth 2009)

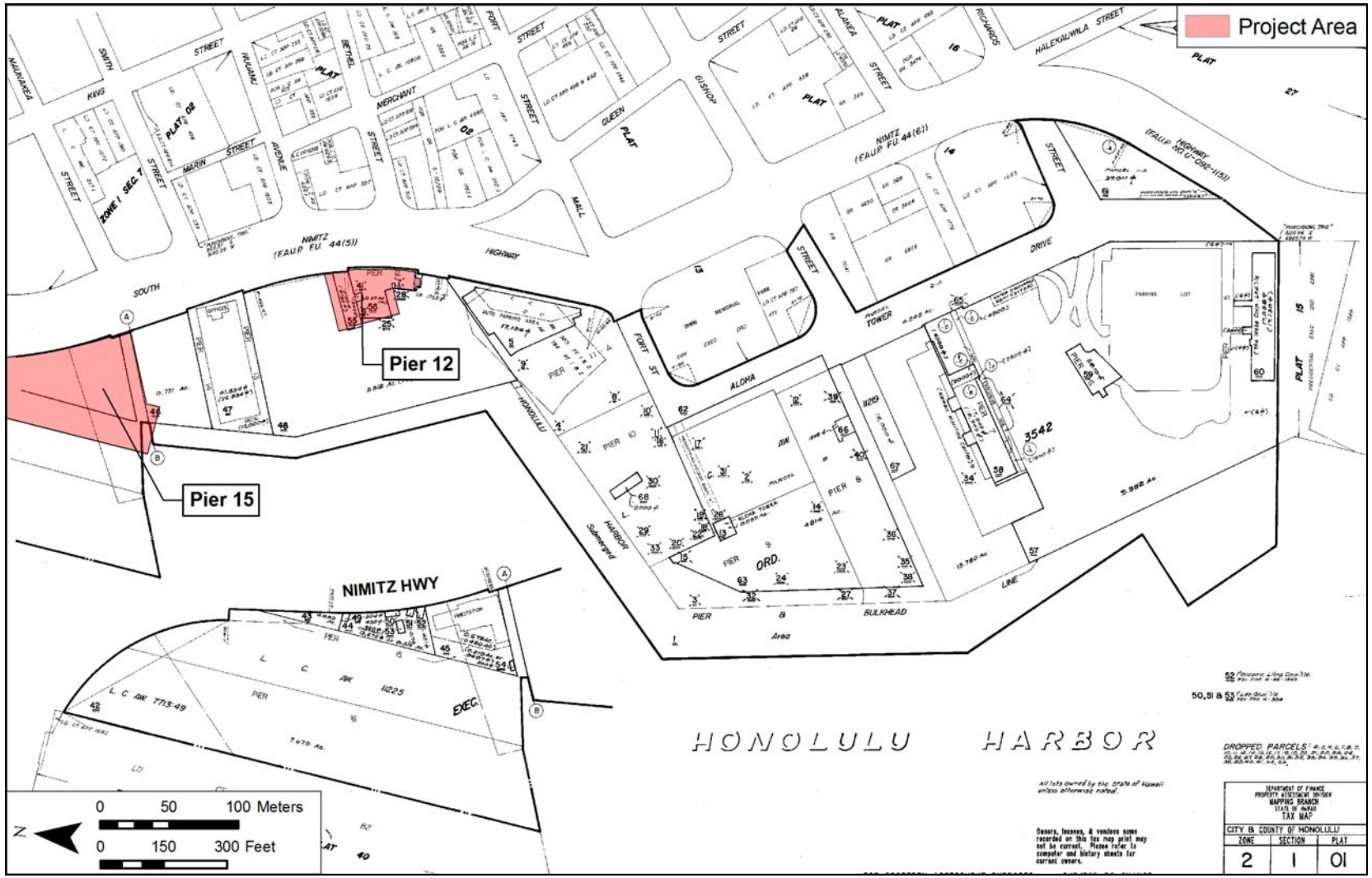


Figure 3. Tax Map Key 2-1-001, showing project area in parcels 043, 044, 045 (Pier 15), and parcels 055 and 056 (Pier 12) (Hawai‘i TMK Service 2012)

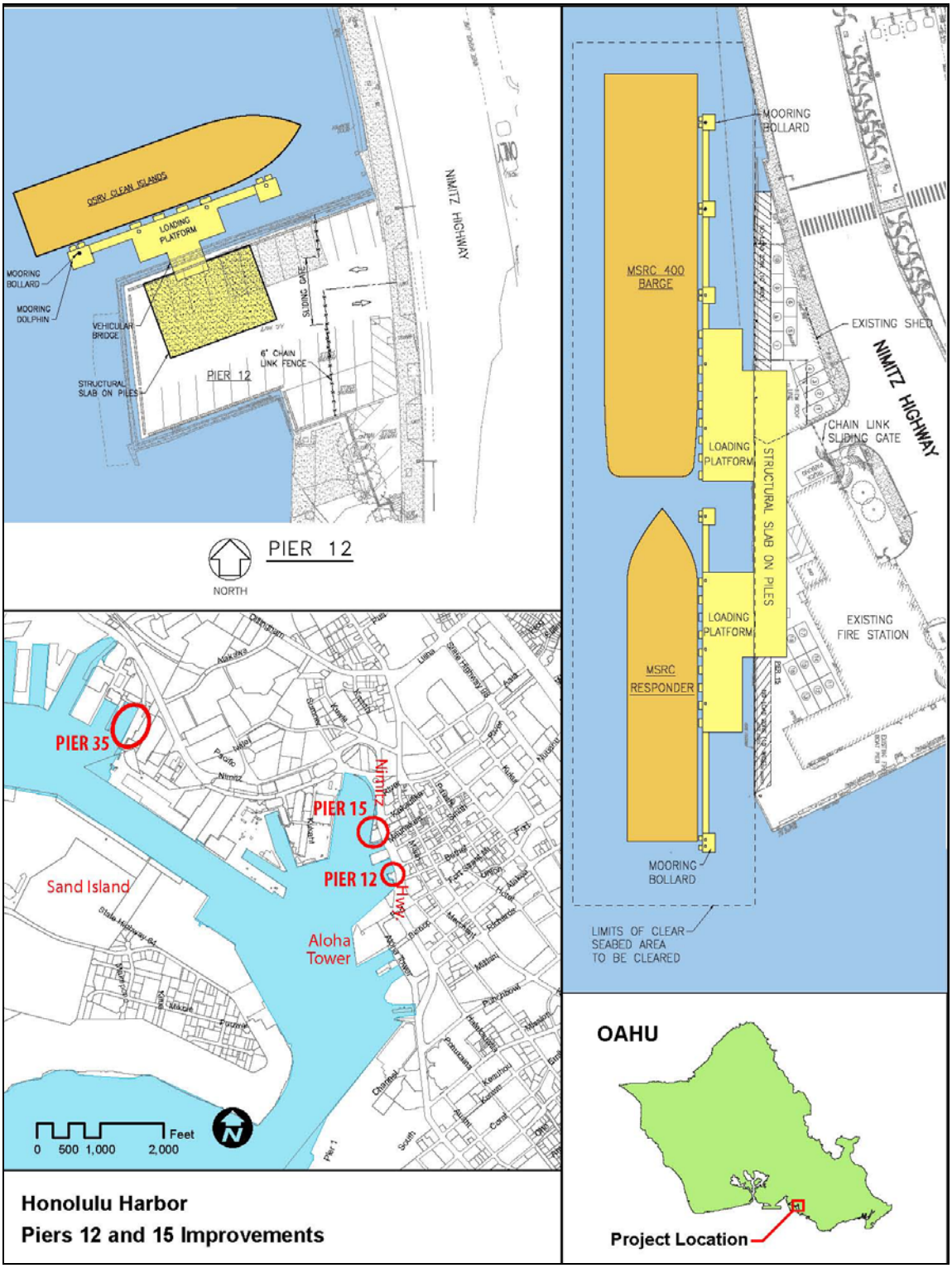


Figure 4. Location and Proposed Improvements to Piers 12 and 15, Honolulu Harbor (figure provided by Kimura International, Inc.)

This investigation does not fulfill the requirements of an archaeological inventory survey (per Hawai‘i Administrative Rules (HAR) Chapter 13-276). Rather, it serves as a document to facilitate the proposed project’s planning, and it supports historic preservation review compliance by identifying any archaeological concerns within the study area. This document develops data on the general nature, density and distribution of archaeological resources as can be gleaned from available sources.

1.2 Scope of Work

The scope of work for report includes:

1. Historical research to include a study of archival sources, historic maps, Land Commission Awards (LCA), and previous archaeological reports to construct a history of land use and to determine if archaeological sites have been recorded on or near these properties.
2. Limited field inspection of the project area to identify any surface archaeological features and to investigate and assess the potential for impact to such sites. This assessment will identify any sensitive areas that may require further investigation or mitigation before the project proceeds.
3. Preparation of a report to include the results of the historical research and the limited fieldwork with an assessment of archaeological potential based on that research, with recommendations for further archaeological work, if appropriate. It will also provide mitigation recommendations if there are archaeological sensitive areas that need to be taken into consideration.

This scope of work includes full coordination with the State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) and county relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

1.3 Environmental Setting

1.3.1 Natural Environment

The Honolulu leeward coastal plain is stratified with late-Pleistocene coral reef substrate overlaid with calcareous marine beach sand, terrigenous sediments, and/or stream-fed alluvial deposits (Armstrong 1983:36). Terrigenous sediments are formed and deposited on land, or are materials derived from land mixed with purely marine material. The modern Hawaiian shoreline configuration, including that of Honolulu Harbor, is primarily the result of three factors: the rising sea level following the end of the Pleistocene (Stearns 1978; McDonald et al. 1983); the 1.5-2.0 m- (4.9-6.6 ft) -high-stand of the sea during the mid to late Holocene; and prehistoric and historic human landscape modification. Rainfall in the project vicinity averages 20-30 inches (in) (51-76 centimeters [cm]) per year (Armstrong 1983:62).

Lands within the survey area are relatively level with an elevation of three feet above mean sea level (AMSL). According to U.S. Department of Agriculture (USDA) soil survey data (Foote et al. 1972) (Figure 5), sediments within the survey area consist predominantly of Fill (FL) with

Figure 5. Soil map of the project area over 2009 aerial photograph (Google Earth 2009; soil boundaries from Foote et al. 1972)

smaller pockets of Jaucas Sand (JaC) (Foote et al. 1972) possibly in the *mauka* area of Pier 12. The following is a synopsis of each soil series:

> Fill is described as a land type occurring mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. (Foote et al. 1972)
>
> Jaucas series consists of excessively drained, calcareous soils that occur as narrow strips on coastal plains, adjacent to the ocean…developed in wind and water deposited sand from coral and seashells…used for pasture, sugarcane, truck crops, alfalfa, recreational areas, wildlife habitat, and urban development. (Foote et al. 1972)

1.3.2 Built Environment

The project area consists of Pier 12 and Pier 15 on the shore of central Honolulu Harbor. The following is a summary of the history of construction and modification of the two piers. For a more detailed discussion, including reference citations, see Report Sections 3.5 and 3.6.

At the Pier 12 location, a landing was built in 1823. It was originally only 20 to 25 ft- (6.09 to 7.62 m)-wide, in a truncated pyramid shape with the widest side adjacent to Queen Street on the shore (thus not entirely on fill land). In the 1830s and 1840s it became a true wharf, with a slip on the east and west sides for boats. By 1880, the wharf was approximately 80 ft- (24.4 m)-wide and 160 ft- (48.8 m)-long. It was extended ten ft (3 m) in 1881 and to an approximate length of 220 ft (67 m) in 1888. The pier was used for most of the nineteenth century by the mercantile business Brewer and Co., and was called Brewer's Wharf into the twentieth century. In the early twentieth century it was used by the Interisland Steam Navigation Company, who transported goods and people between the islands.

In 1907, Pier 12 was reshaped as a long rectangle approximately 300 ft- (91.4 m)-long. In 1963, the wharf was shortened to 125-ft- (38.1 m)-long. This truncation has led to the exposure of some of the original cut coral blocks and brick understructure, dating back a pre-1880 structure. A shed was present on the structure as early as 1886, which became a shed that covered the entire pier by 1893. A new shed with a gable roof was probably built when the pier was lengthened in 1907, and the shed appears on historic maps as late as 1943. It was probably torn down in the 1950s. By 1950, the pier appears to have been used mainly for parking vehicles.

Pier 15, a triangular shaped pier 900 ft- (274.3 m)-long, was built around 1900, according to historic maps and photographs, completely on fill land built out from the shore. The pier was at first controlled by the Interisland Steam Navigation Company, then the Matson Navigation Company by 1927, who operated ships that sailed from the mainland to the Hawaiian Islands. In the later 1910s, it was used for moorage of the sampan fleet, small fishing vessels used in the tuna industry, but these boats were moved in 1918-1919 to the newly dredged Kewalo Basin to the east. By 1925, the pier had multiple gable-roof frame buildings joined side-by-side. At this time, the pier was designated a place to unload lumber from ships. During WWII, it was also used to unload army freight. By 1950, it was used for auto parking.

In the early 1950s, Queen Street was widened to make way for the construction of the new multi-lane Nimitz Highway, and a portion of the *mauka* section of the pier was demolished and turned into part of the highway. It was at this time that the gable structure was removed. The southern portion of the pier was then designated for a new Fire Station, which was built on the pier in 1951. The ship *Abner T. Longley* acted as a fire boat for the Honolulu Fire Department from 1951 to 1990. It was replaced in 1990 with the fireboat *Moku Ahi*. In 1955, a shed was built north of the fire station; this shed contained rooms for a fish auction and for fish storage. In 1978, a timber apron that once extended from the gable-roofed complex was demolished. There are still pilings underwater in front of the wharf that once supported this apron. Several of the rooms in the shed were also demolished or remodeled at this time. The main use of the pier today is for support of the fire station.

1.4 Methods

The information generated during the background research and brief field inspections are used here to facilitate assessment of the potential for the project to negatively impact any cultural resources or historic properties. Detailed construction designs, including the extent of subsurface excavations may be considered along with archaeological data in order to prepare a more detailed impact analysis for the project.

1.4.1 Background Research

Background research for this report includes: a review of previous archaeological studies on file at the SHPD; a review of documents at Hamilton Library of the University of Hawai‘i at Mānoa, the Hawai‘i State Archives, the Hawai‘i Public Library, and the Archives of the Bernice Pauahi Bishop Museum (BPBM); a study of historic photographs at the Hawai‘i State Archives and the Archives of the BPBM and several online sources; and, a study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona ‘Āina (2012) database (<www.waihona.com>).This research provided the environmental, cultural, historic, and archaeological background for the study area to formulate a predictive model regarding the expected types and locations of cultural resources in the project area.

1.4.2 Field Inspection

Fieldwork for the project consisted of a pedestrian survey of pier areas with public access. The fieldwork was conducted on August 1, 2012 by CSH archaeologist Constance R. O’Hare, B.A., under the general supervision of Dr. Hallett H. Hammatt. The fieldwork for the archaeological field inspection was carried out under archaeological permit number 12-04 issued by the DLNR/SHPD. The archaeologist walked all open, accessible areas of the property and took photographs of the structures and parking lots. Approximately ten percent of TMK parcels for Pier 15 include part of the harbor itself (water area adjacent to the *makai* side of the pier), and approximately 30 percent of the Pier 12 TMK parcels consist of the water area adjacent to the north side of Pier 12. Some areas of Pier 15 were fenced off and the buildings of Pier 15 were not open to the public. The only accessible area of Pier 15 was the area directly adjacent to Nimitz Highway, although the *makai* edge could be viewed from Pier 12 and parts of Nimitz

Highway. The exterior of Pier 12 was fenced, which limited access to the water side of the pier and to the small southern extension, but the interior of the parking lot on Pier 12 was accessible from Nimitz Highway. In total, approximately ten percent of Pier 15 was physically surveyed and 25 percent could be viewed from other points, and approximately 75 percent of Pier 12 was physically surveyed and 100 percent could be viewed from the street or from other piers.

Section 2 Traditional Background

2.1 Place Names

In Hawai‘i, most place names, including towns, streets, rural areas, mountains, valleys, surfing areas, and stones, are in Hawaiian. This is far different from the mainland United States where names from an indigenous group may be in use, but in many cases the history, stories, and meanings of the names are lost. By utilizing the Hawaiian names for these natural landscapes, the meanings and stories associated with these areas perpetuate a living and thriving Hawaiian culture that is passed on to younger generations. Therefore it is important that these areas are referred to with the traditional names given to them by Hawaiians, either many years ago or in the more recent historical record. The following place names are associated with Honolulu, both in past and present, and continue to be culturally significant to the native Hawaiian population. All place names are cited from Pukui et al. (1974) unless otherwise specified.

2.1.1 Honolulu

Pukui et al. (1974:49–50) literally translates Honolulu as “protected bay,” which refers to Honolulu Harbor. Old names for the harbor were Kou and Māmala.

According to Westervelt, Honolulu is a name made by the union of the two words “Hono” and “lulu.” Westervelt continues:

> Some say it means “Sheltered Hollow.” The old Hawaiians say that “Hono” means "abundance" and “lulu” means “calm,” or “peace,” or “abundance of peace.” The navigator who gave the definition “Fair Haven” was out of the way, inasmuch as the name does not belong to a harbor, but to a district having “abundant calm,” or “a pleasant slope of restful land.” “Honolulu” was probably a name given to a very rich district of farm land near what is now known as the junction of Liliha and School Streets, because its chief was Honolulu, one of the high chiefs of the time of Kakuhihewa, according to the legends. (Westervelt 1915:14)

2.1.2 Kou (Honolulu)

Kou is the “old name, until 1800, for Honolulu Harbor and vicinity, including the area from Nu‘uanu Avenue to Alakea Street and from Hotel Street to the sea, noted for *kōnane* (ancient game resembling checkers) and for *ulu maika* (bowling), and said to be named for the executive officer of Chief Kākuhihewa of O‘ahu” (Pukui et al. 1974:117–118). Named for the *kou* tree (*Cordia subcordata*), a beautiful wood, soft, but lasting, was valuable to the early Hawaiians and was used for cups, dishes, and calabashes (Pukui and Elbert 1986:167).

2.1.3 Māmala

Honolulu Harbor to Pearl Harbor, named for a shark woman who lived at the entrance of Honolulu Harbor and often played *kōnane*. She left her shark husband, ‘Ouha, for Honoka‘upu. ‘Ouha then became the shark god of Waikīkī and of Koko Head (Pukui et al. 1974:144). Ke kai o

Māmala is the surf in the outer entrance of Honolulu Harbor, named for the chiefess Māmala who loved to play *kōnane*, drink *ʻawa* (kava) and ride the surf (Pukui et al. 1974:106).

In the song *Nā ka Pueo*, the *Pueo-kahi* was a ship named for a place near Hāna, Maui, which had been named for a *pueo kupua* (owl demigod). Honolulu harbor was called Māmala; note the play on words with *mālama* (to care for), to protect:

Nā ka Pueo-kahi ke aloha,	Love from the *Pueo-kahi*,
Nēnē ʻau kai o Maui.	The Maui goose that sails the sea.
Kōwelo kō hae Hawaiʻi	Your Hawaiian flag waves
Ma ka ʻilikai aʻo Māmala.	Over the sea at Māmala.
Mālama ʻia iho ke aloha	Keep your love
I kuleana naʻu e hiki aku ai.	And I have the right to come.
Haʻina ʻia mai ka puana:	Tell the refrain:
Nā ka Pueo-kahi ke aloha.	Love from the *Pueo-kahi*.

(Elbert and Mahoe 1970:81–82)

2.1.4 Nihoa

Nihoa was the Waterfront area in downtown Honolulu formerly owned by Kaʻahumanu and named by her in honor of her visit to Nihoa Island (ʻĪʻī 1959:166). This area had a sandy beach where natives could land and pull up their canoes on shore. In the early nineteenth century, Western ships were also beached here for mooring and repair. In the time of Kamehameha I, "the shore at Nihoa …was a shipyard where foreign style vessels were being made by Hawaiians under the tutelage of whites" (ʻĪʻī 1959:64).

2.1.5 Pākākā and the Honolulu Fort

Pākāka was the name of a coastal point, a canoe landing, the name of a wharf built off the point in 1827, and the name of a *heiau* (religious structure) built on the point. The name literally means "to skim, as stones over the water (Pukui et al. 1974:175). In 1816, the Honolulu Fort (*pāpū*) called Kekuanohu, was also built in this area. The fort was demolished in 1857 and the stones from the wall were used to create a seawall (Pukui et al. 1974:30), which was then filled to create a new land, called the Esplanade or ʻĀinahau, *hau* tree land (Pukui et al. 1974:7). Pākāka was not one of the *heiau* destroyed when the *kapu* (tabu) system was abolished by order of Kamehameha II in 1819, but became part of the chiefly compound. Liholiho, Kamehameha II, built a palace complex in this area in 1821, possibly on the old Pākākā Heiau platform. The wharf at Pākākā may also have been part of the original *heiau* complex. P. Christiaan Klieger (1997:15-16) has suggested that the Pākākā Palace complex may have lasted until around 1826, when a new royal compound was built for Kamehameha III within the town of Honolulu, near the modern junction of Alakea and Beretania streets.

2.2 ʻŌlelo Noʻeau (Traditional Sayings)

There are many *ʻōlelo noʻeau* for Māmala, which refers to the entrance to Honolulu Harbor, called Kuloloia:

He kai hele kohana ko Māmala.

A sea for going naked is at Māmala.
The entrance to Honolulu Harbor was known as Māmala. In time of war the people took off their clothes and traveled along the reef to avoid meeting the enemy on land.
(Pukui 1983:74)

Ka nuku o Māmala.
The mouth of Māmala.
The entrance to Honolulu Harbor, named for a shark goddess who once lived in the vicinity.
(Pukui 1983:163)

Ke kai ʻau umauma o Māmala.
The sea of Māmala, where one swims at the surface.
Māmala is the entrance to Honolulu Harbor.
(Pukui 1983:185)

Na ʻale kuehu o Māmala.
The billows of Māmala with wind-blown sprays.
Māmala is the entrance to Honolulu Harbor.
(Pukui: 1983:241)

Ka iʻa maunu lima o Kuloloia.
The hand-baited fish of Kuloloia.
Small eels (*pūhi ʻōilo*) that were caught by placing bait on the open palm of one hand with the fingers held wide apart. When the eels came up to take the bait, the fingers were clenched into a tight fist, grabbing the eels tightly by the heads.
(Pukui 1983:149)

The weather (*au*) of Honolulu was called Kūkalahale, according to the chants of the winds in the story "The Wind Gourd of Laʻamaomao" (Nakuina 1992:50). This name was incorporated into an early Hawaiian song, *He Aloha nō ʻO Honolulu* (Goodbye to Honolulu), written by the Hawaiian composer Lot Kauwe, after a trip on the interisland steamer, *Maunaloa*.

He aloha nō ʻo Honolulu	Goodbye Honolulu
I ka ua Kūkalahale	In the Kūkalahale rain
Ka nuku aʻo Māmala	Mamala, the entrance of Honolulu Harbor
ʻAu aʻe nei mahope	Lies behind
Kau mai ana mamua	Ahead
Ka malu ʻulu aʻo Lele	The shady groves of Lele
Kukui ʻaʻā mau	Lighthouse is always burning
Pio ʻole i ke Kauaʻula	And not extinguished by the Kauaʻula rain

(Kauwe 2011)

In the chant for the wind gourd of Laʻamaomao, the name for the wind of Māmala is ʻAoʻaoa (Nakuina 1990:50), which Pukui and Elbert (1986:27 identify as a sea breeze. Other winds names are *Mooaea*, a north wind of Honolulu, *Muuluu* (possibly *mūʻululū*, meaning "chilled"

(Bernice Pauahi Bishop Musuem, Henriques Collection, HEN Vol. 1:1342), and *Kūkalahale* (Pukui and Elbert 1986:560).

There are also several *ʻōlelo noʻeau* of Kou (Honolulu), that also refer to the coastal area:

> ***Hāhā pōʻele ka pāpaʻi o Kou.***
> **The crabs of Kou are groped for in the dark**.
> Applied to one who goes groping in the dark. The chiefs held kōnane and other games at the shore of Kou (now central Honolulu), and people came from everywhere to watch. Very often they remained until it was too dark to see and had to grope for their companions.
> (Pukui 1983:50–51)
>
> ***Hui aku na maka i Kou.***
> **The faces will meet in Kou.**
> We will all meet there. Kou (now central Honolulu) was the place where the chiefs played games, and people came from everywhere to watch.
> (Pukui 1983:120)
>
> ***Ke awa laʻi lulu o Kou.***
> **The peaceful harbor of Kou.**
> Honolulu Harbor.
> (Pukui 1983:182)
>
> ***Ola ke awa o Kou i ka ua Waʻahila.***
> **Life comes to the harbor of Kou because of the Waʻahila rain.**
> It is the rain of Nuʻuanu that gives water to Kou (now central Honolulu).
> (Pukui 1983:272)

2.3 *Moʻolelo* (Stories) Associated with Place Names

2.3.1 Hiʻiaka's travel to Kou

Kou was known as a place where chiefs gathered to play and where the people gathered to watch them. Pukui (1983:1128) relates the poetical saying *"Hui aka nā maka i Kou"* ("the faces will meet at Kou") in reference to just such gatherings. It is briefly mentioned in the legend of Hiʻiaka, beloved sister of the Hawaiian volcano goddess, Pele. Hiʻiaka and her companions have been traveling around Oʻahu on the land trails, but decide to travel from Puʻuloa (on Pearl Harbor in ʻEwa) to Waikīkī by canoe. At Puʻuloa, Hiʻiaka met a party who were planning on traveling to the house of the chiefess Peleʻula in Waikīkī. Hiʻiaka recited a chant, telling the people although they were going by land and she was going by sea they would meet again in Kou:

Kou is the coral flat	*ʻO Kou ka papa*
Kaʻākaukukui is the pool	*ʻO Kaʻākaukukui ka loko*
Some ʻalamihi [a black crab], indeed	*ʻO ka ʻalamihi aʻe nō*
Wait all day until night	*ʻO ka lā a pō iho*

Friends shall meet in Kou. *Hui aku i Kou nā maka*.
(Hoʻoulumāhiehie 2006a:277; Hoʻoulumāhiehie 2006b:297)

2.3.2 The Legend of ʻAiʻai and Puniaiki in Kou

The *ahupuaʻa* of Kou was subdivided into several smaller land divisions, known as *ʻili.* The area between Maunakea Street and Nuʻuanu stream and *makai* (towards the sea) of King Street was known as Kapuʻukolo. The area between Maunakea and Nuʻuanu Stream *mauka* (towards the mountains) of King Street to Beretania Street was called Kīkīhale. In Pukui et al.'s (1974:110) *Place Names of Hawaiʻi,* no meanings are given for these names, but they do state that Kīkīhale was named for the daughter of the chief, Kou, for whom the district was named. Many of these names are mentioned in the legend of ʻAiʻai (Thrum 1998:230-254).

Kūʻula, the god presiding over the fish of the sea had a son named ʻAiʻai. He was the first to teach the Hawaiians how to make various fishing lines and nets, the first to set up a *koʻa kūʻula*, a rock shrine on which the fishermen would place their first catch as an offering to Kūʻula, and the first to set up *koʻa ia*, fishing stations where certain fish were known to gather. Leaving his birthplace in Maui, ʻAiʻai traveled around the islands, establishing *koʻa kūʻula* and *koʻa ia*.

He landed first at Keana Point, then traveled around the island of Oʻahu, stopping in Kakaʻako (an ʻ*ili* now covered by One Waterfront Plaza) to visit his friend, Apua. Here he met the famed Oʻahu chief, Kou, a skilled fisherman who caught the large *aku* (*Katsuwonus pelamis*; bonito) in the bay of Māmala (ancient name for a part of Honolulu Harbor). ʻAiʻai soon met a young woman named Puiwa, married her, and had a son named Puniaiki. One day the family went to a dam on the Nuʻuanu Stream to catch ʻ*oʻopu* (gobies) and ʻ*ōpae* (shrimp). Puiwa left her newborn son on the bank of the river to catch the ʻ*oʻopu* and ʻ*ōpae*, when the baby started to cry. ʻAiʻai told his wife to tend to the child but she answered him back saucily, so ʻAiʻai called on his ancestors and a storm came up, flooding the dam and sweeping the child into the stream. Leaving his wife, he went downstream to the ʻ*ili* of Kaumakapili (in the area of Beretania and Maunakea streets; labeled as "Smith's church" on the 1847 map). Here he saw Kīkīhale gather a large *oʻopu* from the stream. Her guardian advised her to put it in a calabash with water and keep it as a pet. ʻAiʻai realized that the *oʻopu* was his transformed child, swept downstream to Kīkīhale (to the person and also to the ʻ*ili* named Kīkīhale). The next day the chiefesses' guardian saw that the *ʻoʻopu* had turned back into a child, and Kīkīhale instructed her to raise the child until it was an adult, so that she could take the young man for a husband. This came to pass, but the chiefess was not satisfied with her husband since he did not bring fish home as the other men in the islands. Puniaiki was annoyed with her complaints, and took the pearl fishhook, Kahuai, given to him by his father ʻAiʻai, and went out with the men of Kou to fish for the *aku*. When Puniaiki held the pearl fishhook in his hand:

> . . . the akus, unprecedented in number, fairly leaped into the canoes. They became so filled with the fish, without labor, that they sank in the water as they reached **Kapuukolo**, and the men jumped overboard to float them to the beach. (Thrum 1998:247-248)

This suggests that not only was Kapuʻukolo an ʻ*ili* name, but also a canoe landing, a place to come ashore after *aku* fishing.

Section 3 Historical Background

3.1 Pre-Contact to Early-1800s

The area that, today, comprises the portion of downtown Honolulu that surrounds Honolulu Harbor extending to the mouth of Nuʻuanu Stream was known to the Hawaiians as "Kou", a center of population and activity, similar to Waikīkī, its preeminent neighbor to the southeast. Kou stretched from "Nuʻuanu to Alakea streets and from Hotel Street to the sea" (McAllister 1933:80) and possessed shoreward fishponds and irrigated fields fed by streams descending from Nuʻuanu and Pauoa valleys. Kou was known as a place where chiefs gathered to play and where the people gathered to watch them. Pukui (1983:1128) relates the poetical saying *"Hui aka nā maka i Kou"* ("the faces will meet at Kou") in reference to just such gatherings. In the accounts of the Pele and Hiʻiaka saga (Emerson 1915:168), Hiʻiaka from Hawaiʻi Island and Lohiʻau chief of Kauaʻi, joined with Peleʻula, chiefess of Oʻahu, for pleasure at Kou. This vignette probably was based on a long tradition of Kou as a royal center where the *aliʻi* (chiefs) would meet and entertain.

Kou was somewhat slow to catch on as a major destination for foreigners visiting the archipelago. The only stop of Cook's ships on Oʻahu was at Waimea Bay (1779), not viable as a significant port owing to the famous winter swell that breaks there. A discouraging factor for early trade at Oʻahu was political instability. The ruling chief Peleiōhōlani died around 1780, and his heir, Kumuhana was almost immediately deposed in a *coup d'etat*. A period of political unrest followed including the successful invasion by Kahekili of Maui in 1783, the bloody crushing of the Oʻahu rebellion in 1786, the invasion by the Kauaʻi ruler, Kaʻeokūlani in 1791, the passing of the rule following Kahekili's death in 1794 to Kalanikūpule, and finally, his defeat by Kamehameha I in 1795 (Beechert 1991:12-14).

These events all contributed to political and economic instability, and in turn, delayed the development of Honolulu as a major port. In addition, such events as the *Daedalus* killings in 1792, the mysterious death of Captain Kendrick in 1794, the seizure of the *Jackal* and *Prince Lee Boo* ships with the killing of Captains Brown and Gordon in 1795, and the wreck of the *Arthur* under Captain Henry Barber in 1796 did not enhance Oʻahu's reputation as a good port of call. The earliest accounts of the south shore of Oʻahu relate the fear of attack and the difficulty of getting water and food, particularly yams (Portlock 1789:75), and in one instance, the efforts of natives to seize a whaleboat (Dixon 1789:161). Another factor for the delay in the development of Kou as a major port was the relatively late discovery of Honolulu harbor, attributed to Captain William Brown in early 1793.

Honolulu's prominence had to await the peace established by Kamehameha I and his encouragement of trade there. Kamehameha defeated Kalanikūpule at the battle of Nuʻuanu in 1795, and in 1809, moved his court, government, and residence from Waikīkī to Honolulu. Kamehameha I was known to have taken a special interest in farming and would work in the fields alongside the commoners to demonstrate the importance of agriculture. Crops such as yams were developed under Kamehameha and were often sold to the captains of foreign ships in need of provisions at Honolulu Harbor (ʻĪʻī 1959:69).

Increasing commerce and association with newly arrived foreigners altered the traditional patterns of Hawaiian life on Oʻahu, and by the first decade of the nineteenth century:

> Honolulu was becoming a place of some importance commercially. It is situated in a rich and productive island and its protected harbor, the only accessible one in the entire group, caused foreign ships to go there in preference to other places. To the Hawaiians themselves, Honolulu and its snug harbor had been of very little importance compared with the nearby reef-protected beach and town of Waikiki. But the foreigners rendezvous at Honolulu caused the natives to congregate in that place. (Kuykendall 1938:27)

Francisco de Paula Marin, a Spaniard who arrived in the Hawaiian Islands in 1793 or 1794 and had become a confidante of Kamehameha, recorded in his journal, "In the end of 1809 and beginning of 1810 I was employed building a stone house for the King" (Gast and Conrad 1973:200). This was the first stone structure in Honolulu, a town that, according to Marin, was:

> …[by 1810] a village of several hundred native dwellings centered around the grass houses of Kamehameha on Pākākā Point near the foot of what is now Fort Street. Of the 60 white residents on Oʻahu, nearly all lived in the village, and many were in the service of the king. (Gast and Conrad 1973:29)

It is unclear whether Kamehameha himself ever resided in the completed house, as in 1810 he returned to Hawaiʻi island where he lived the remainder of his life, traveling intermittently back to Oʻahu. Building in Honolulu, however, continued apace with Marin and other foreign residents building their own stone houses and buildings during the ensuing decade.

For the 1959 publication of the book, *Fragments of Hawaiian History*, Dorothy Barrerè and Paul Rockwood drew a map of Honolulu (ʻĪʻī 1959:65) as it would have appeared in 1810, based on the descriptions by the early Hawaiian scholar John Papa ʻĪʻī, who lived in the royal compound at Pākākā Point. This map (Figure 6) shows a *heiau* (ceremonial structure) at Pākākā Point, around the modern location of Pier 11 off Aloha Tower Marketplace. North of this was the location of the compound of Kamehameha and his wives, with a second religious structure, Hale o Lono to the east. To the west was the beach area called Nihoa, where native canoes could land. *Mauka* of the beach was a *maika* (rolling stone) playing field where athletic competitions could be held, and to the west additional houses for high chiefs. Adjacent to Nuʻuanu Stream were the complexes of taro fields and native houses. The map also shows a large ship moored next to the point, but at this time there were no permanent wharfs.

3.2 1815 to 1850: Honolulu in Transition

The development of Honolulu during the nineteenth century was inevitably a rapid substitution of the traditional patterns that had once shaped the land by new responses to the pressures of a burgeoning western presence. Into the 1820s, Honolulu remained more notable for its native culture than for any western urbanization imposed on that culture. A visitor to Honolulu in 1819 (de Freycinet 1978:42) writes:

Figure 6. Sketch of 1810 Honolulu by Paul Rockwood (1959:65), from descriptions in ʻĪʻī (1959:63-66), note that the compound of Kamehameha I is south of the Pier 12 area; the only wharf at this time was a wooden gangplank at Pākākā Point, where ships could be tied offshore (project area shaded in red)

> The port of Onorourou, generally frequented today by all the European vessels that come to the islands, is without doubt the most favorable location with respect to shelter, commerce, and resources for the supply of ships. The town of Onorourou is located on a large, flat plain. It is on the shores of a bay of the same name. The houses, similar to the most part to those of Owhyhi [Hawai‘i] and of Mowi [Maui], are however interspersed with a certain number of houses built of stone that belong for the most part to Europeans or to Anglo-Americans.

Pākākā Heiau, was once located at the foot of Fort Street, east of the current Project Area. Kamehameha I lived in a complex around Pākākā Heiau from 1809 to 1812. The site's use as a ceremonial structure ended in 1819 with the abolition of the *kapu* system, but the area of the *heiau* platform was part of a royal village up to 1826, when Ka‘ahumanu, wife of Kamehameha, moved from this complex to a site nearer Kawaiaha‘o Church to be near the houses of the new American missionaries (Kamakau 1992:265) and when Kamehameha III moved to a new palace in Honolulu town (Klieger 1997:15-16).

In 1816, the Honolulu Fort had been built to the east of the complex. According to John Papa ‘Ī‘ī (1959:64-66), at this time the chiefs were living along the beach of the harbor of Kou. In the same area, located at the end of Fort Street, a large fort was constructed. A Russian adventurer named Dr. Georg Anton Scheffer, an agent of the Russian-American Company, landed at Honolulu Harbor sometime in 1816. He instructed the men from Russian ships to build a trading blockhouse with a wooden palisade at Honolulu Harbor, where they raised the Russian flag. They also desecrated a *heiau*, possible Hale o Lono (Barratt 1988:202), by entering it without permission, and they laid out plans to build a fort at the site. When Kamehameha I, on the island of Hawai‘i, heard of this, he dispatched the *ali‘i* Kalanimōkū with several warriors to investigate the matter and drive the Russians away if the report was true. The Hawaiians outnumbered the foreigners, and the Russians withdrew. After this successful foray, Kamehameha decided that the harbor needed some protection, and he ordered a stone fort built at the same place as the wooden palisade, west of Pākākā Heiau (Dukas 2004:101-102).

The following is from Judd's (1975) *Palaces and Forts of the Hawaiian Kingdom*, regarding Honolulu Fort:

> After a small contingent of Russians awoke one morning and found themselves surrounded by a large number of armed and hostile warriors, they left Honolulu and the island of O‘ahu in a hurry. Once he had evicted the Russians, Kalanimoku began to build a fort to protect the harbor on the same location as the partially constructed [Russian] blockhouse. This fort was variously known to the Hawaiians as Kekuanohu (the Thorny Back, because of the bristling guns on the walls) or Kepapu (the Gun Wall). The location of Honolulu Fort was just *makai* of the present location of Fort St. Mall and Queen St. Fort St. at the time the fort was constructed was only a trail to the Pākāka canoe landing at the water's edge; in time it grew to a road known as Alanui Papu (street to the Gun Enclosure), and in more modern times received its present name. Queen St. was a path along the shore at the time of the fort's construction. (Judd 1975:42)

Honolulu Fort served as a military post, as well as a government center, prison and asylum. The first capital punishment was administered in the fort was on October 20, 1840, when chief

Kamanawa was hanged for poisoning his wife Kamokuʻiki. The gallows were set up on the parapet just east of the main gate and the execution was attended by some 10,000 viewers (Judd 1975:50). The original fort was 340 by 300 ft (103.6 by 91.4 m) in size with walls 12 ft (3.7 m) high made of large coral blocks on each side of a wall section 20 ft- (6.1 m)-wide, and a coral rubble fill between the blocks (Alexander 1908:13). The fort was dismantled in 1857, and between this time and 1870, the coral blocks of the walls were used to build a 2,000 ft (609.6 m) retaining wall out from the existing shoreline; the rubble from the core fill of the wall was used to fill the interior of this new land extension, which was called the Esplanade, or ʻĀinahau (Judd 1975:59). Today, this area is the Aloha Tower Marketplace.

The presence of the Protestant missionary church and habitation area (Kawaiahaʻo Church and the Mission Houses) in the area now known as Kakaʻako, and the establishment of the royal court in Honolulu appear to have been major factors pulling the development of Honolulu towards the east, away from Nuʻuanu Stream into an area that had been relatively rarely used in pre-Contact times. In 1820, the American Board of Commissioners for the "Foreign Missions Sandwich Islands" arrived in Hawaiʻi and quickly made Honolulu its headquarters. As a member of that mission, Reverend Hiram Bingham, writing in 1847, describes Honolulu as viewed from "Punchbowl Hill" in 1820 (Bingham 1947:92-93):

> From the highest part of the rim we had a beautiful view of the village and valley of Honolulu, the harbor and the ocean, and of the principal mountains of the island…Below us, on the south and west, spread the plain of Honolulu, having its fishponds and salt making pools along the seashore, the village and fort between us and the harbor, and the valley stretching a few miles north into the interior, which presented its scattered habitations and numerous beds of *kalo* (*Arum esculentum*) in its various stages of growth, with its large green leaves, beautifully embossed on the silvery water, in which it flourishes…Through this valley, several streams descending from the mountains in the interior, wind their way, some six or seven miles, watering and overflowing by means of numerous artificial canals, the bottoms of kalo patches, and then, by one mouth, fall into the peaceful harbor.

Another visitor to Honolulu in the 1820s, Jacobus Boelen (1988:62), hints at the possible pre-contact character of the Honolulu lands:

> It would be difficult to say much about Honoruru. On its southern side is the harbor or the basin of that name... The landlocked side in the northwest consists mostly of tarro fields. More to the north there are some sugar plantations and a sugar mill, worked by a team of mules. From the north toward the east, where the beach forms the bight of Whytetee [Waikīkī] the soil around the village is less fertile, or at least not as greatly cultivated.

The 1830s marked a profound shift in the character of the Honolulu area as perceived by its inhabitants. Western and urban ideals propelled Honolulu's growth. Such ideals found expression in practices such as the formal naming of streets that commenced in September 1836. It was then that the *Sandwich Island Gazette* began soliciting suggestions for street names from its readers. Among those accepted were King Street, Beretania Street, and Garden Lane.

By the 1840s, western commercial and missionary interests had supplanted the native Hawaiian traditions that had previously shaped the environment. In 1846, Honolulu was made the capitol of the Hawaiian Kingdom and was becoming the commercial and political hub of the islands. D. Gilman (1903:97), who arrived in Honolulu in 1841, described the limits of the town of Honolulu during the early 1840s:

> The boundaries of the old town may be said to have been, on the *makai* side, the waters of the harbor; on the *mauka* side, Beretania Street; on the Waikīkī side [i.e., the area just beyond Punchbowl Street], the barren and dusty plain, and on the ʻewa [west] side, the Nuʻuanu stream.

An 1847 survey map by Thomas Metcalf (Figure 7) illustrates the expansion of the Honolulu area, with streets and development *mauka* of Beretania Street. The map also indicates several notable structures along the waterfront, the Custom House, the lot of the Hudson Bay Trading Co. (H.B. Co.), and the Honolulu Fort.

3.3 Mid-Nineteenth Century and the Māhele

The Organic Acts of 1845 and 1846 initiated the process of the Māhele—the division of Hawaiian lands—that introduced private property into Hawaiian society. In 1848, the Crown and the *aliʻi* received their land titles as *konohiki* (land manager) awards. Kuleana (Native land rights) Awards to commoners for individual parcels within the *ahupuaʻa* were subsequently granted in 1850, and thereafter. The Crown Lands were considered the private lands of the monarch, and many lands were sold or mortgaged during the reigns of Kamehameha III and IV to settle debts to foreigners. To end this practice, the Crown Lands were made inalienable in 1865, and their dispensation was regulated by a Board of Commissioners of Crown Lands, which effectively put them under the administrative control of foreign-born residents (Kameʻeleihiwa 1992:310).

In 1850, the Privy Council passed resolutions that would affirm the rights of the commoners or native tenants. To apply for fee simple title to their lands, native tenants were required to file their claim with the Land Commission within the specified time period of February 1846 and February 14, 1848. The Kuleana Act of 1850 confirmed and protected the rights of native tenants. Under this act, the claimant was required to have two witnesses who could testify they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land for a minimum of two years, and knew that no one had challenged the claim. The land also had to be surveyed (Chinen 1958:31).

These awards were presented to tenants, native Hawaiians, naturalized foreigners, non-Hawaiians born in the islands, or long-term resident foreigners who could prove occupancy on the parcels before 1845. LCA documents indicate that these parcels were awards to a variety of native Hawaiians and foreign settlers who had moved into Honolulu as the city developed.

On March 8, 1848, Kamehameha III divided his property in the islands of Hawaiʻi reserved for him through the Māhele into two parts; the smaller portion he retained for himself and his heirs, while the larger portion was given "…to his Chiefs and People," the latter became known as 'Government Lands' (Chinen 1958:26). Fifty-two *ʻili* in Honolulu, Kalihi, and Waikīkī were set aside from the Government Lands as "Fort Lands" for the support of the garrison of the Fort

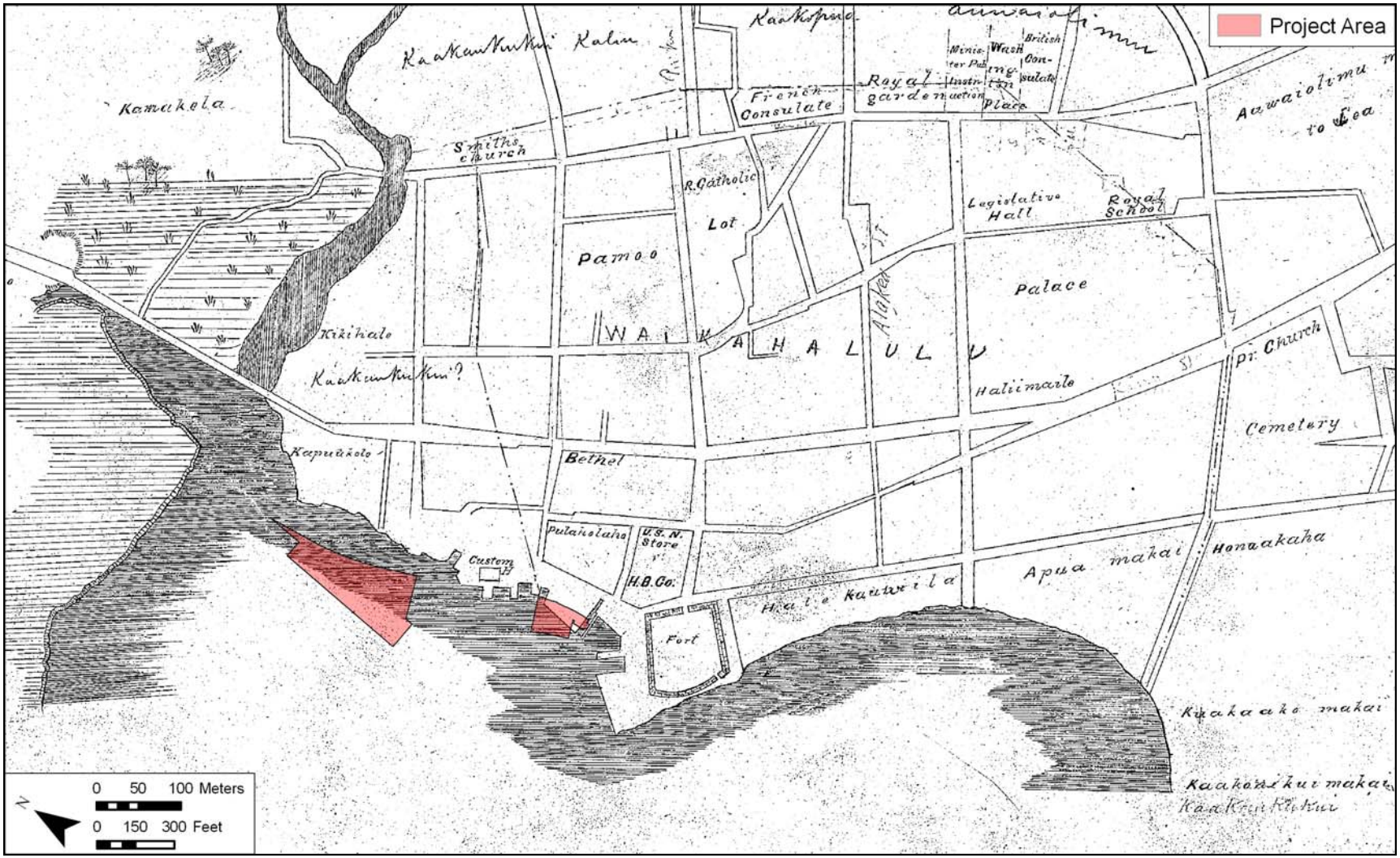


Figure 7. 1847 map of Honolulu (Metcalf 1847); Pier 12 is a broad, short landing and the Pier 15 area is offshore, as it was later built on filled land (Registered Map No. 242, Hawai‘i Land Survey Division)

at Honolulu. A distinct series of LCAs were issued for the *kuleana* (Native land rights) in these lands, marked F.L. (Fort Land) to distinguish them from other awards. The Fort Land *kuleana* were granted free of charge to the awardees.

Most of the LCAs in Honolulu were houselots and store lots *mauka* of Queen Street. However, one *makai* parcel along the waterfront was granted to an American businessman. Pier 12 (Figure 8) overlaps with LCA 626 to Stephen Reynolds, who was awarded three parcels, two on the *mauka* side and one on the *makai* side of Queen Street, ʻĀpana (lot) 2. The *makai* parcel corresponds to Reynolds' wharf, the Pier 12 area. The entire LCA claim is presented in Appendix A. This LCA will be discussed in further detail in Report Section 3.6.

A large section of the waterfront between Nuʻuanu Stream and Maunakea Street was awarded to the *aliʻi* Kekualoa as a Konohiki Award for the *ʻili* of Kaliʻu as LCA 11225 (Figure 8). The *mauka* section of Kaliʻu was in the Nuʻuanu/Vineyard area of Honolulu; the *makai* section extended out from Queen Street "down to the sea & then following high water mark to the boundary of Akaukukui [ʻĀkaukukui; reef area, later part of Sand Island] & then running seaward to the reef of the Sumner family" [now an area in Iwilei] (LCA 11225; for full claim see Appendix A). Thus the *makai* award was generally for the western part of the harbor front and the harbor. It included a slaughterhouse built on a landfill area, once part of the Nuʻuanu streambed. Kekualoa probably had the fishing rights to this area, although the award does not explicitly state this right.

3.4 Late 1800s to 1900

In 1846, Honolulu was made the capitol of the Hawaiian Kingdom and was well on its way to becoming the commercial and political hub of the islands. By 1850 Honolulu was, as described by Charles Wilkes, "very conspicuous from the sea and has more the appearance of a civilized land, with its churches and spires, than any other island in Polynesia" (Wilkes 1856:373).

During this period there was an obvious increase in density of land use and urbanization. The waterfront of Honolulu changed significantly during this period. Experiencing the peak of the whaling industry, around 1850, the harbor area became crowded with trading and whaling vessels, and required additional wharfs to accompany them.

Along King Street were numerous storehouses, such as that owned by Isaac Montgomery, boarding houses, such as that owned by Francisco Marin, where visitors could stay and sea captains could take their meals, and grog shops, such as that owned by John Meek, which the common sailors frequented. A few of these establishments are shown on the 1843 map (Figure 9), which indicates that the town proper ended at on the west side at Maunakea Street. On this map, the waterfront is still dominated by the Honolulu Fort, and several small wharfs between the Esplanade and Maunakea Street. The Pier 12 area would be south of the foot of Nuʻuanu Street, adjacent to the Ladd & Co. wharf on the north side of the foot of the street.

Honolulu was in a period of rapid change. Reverend Sereno Bishop offers a unique perspective of the changes in the layout of Honolulu and the structures that lined the streets:

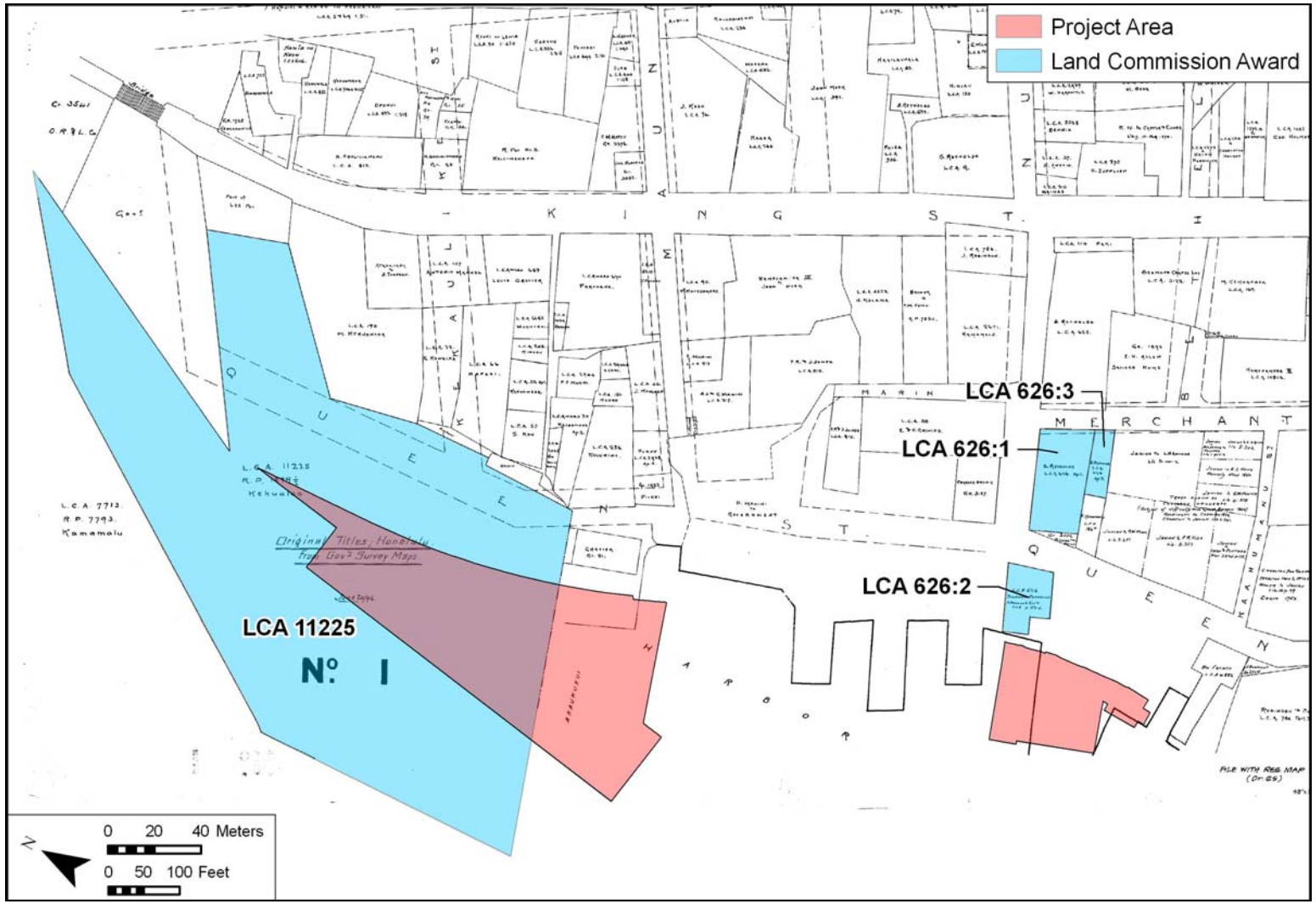


Figure 8. 1886 map of Honolulu Land Titles (source: Lyons 1886), showing Pier 12 near LCA 262:2 to Stephen Reynolds and Pier 15 within LCA 11225 to Kekualoa

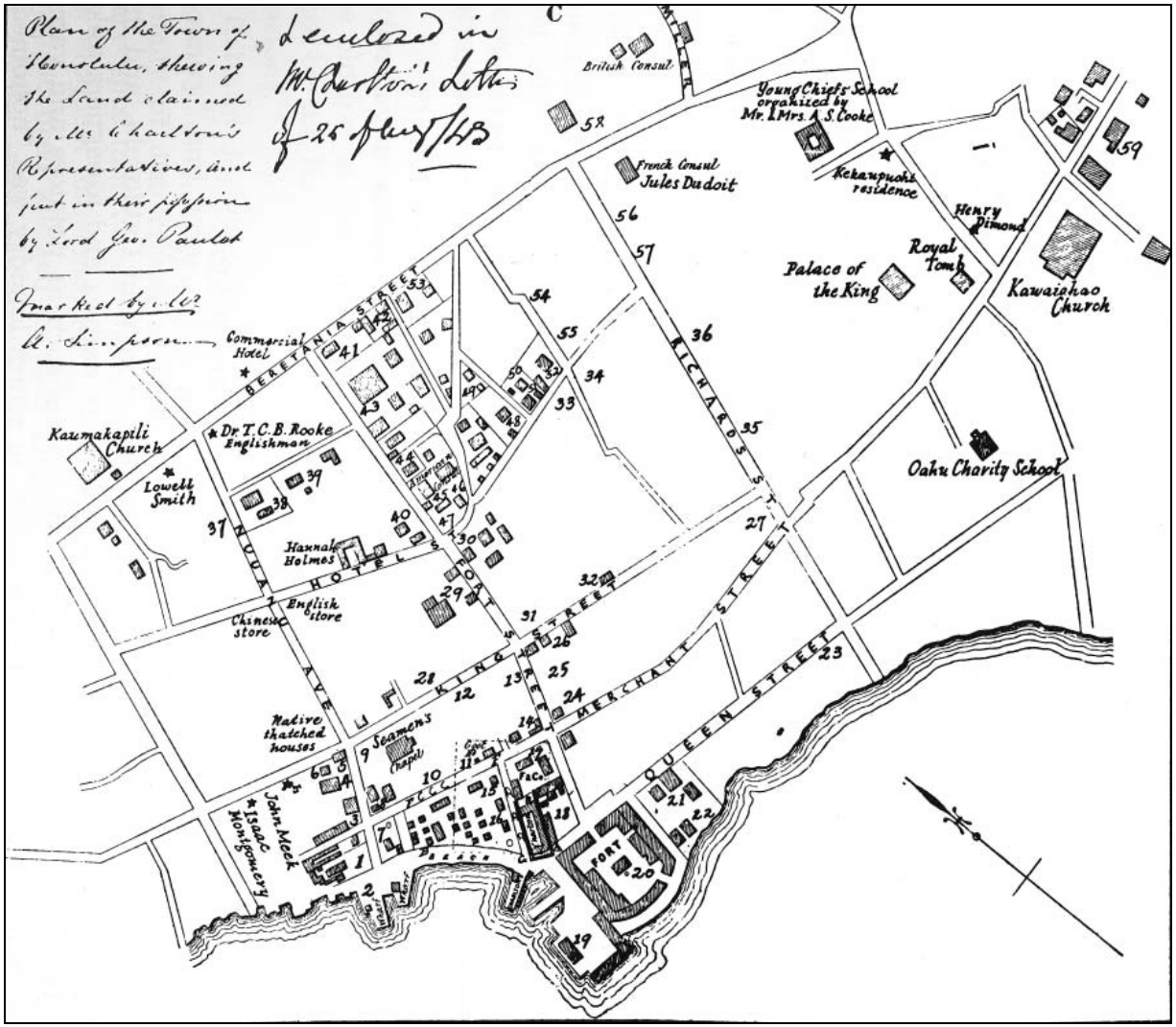


Figure 9. 1843 map (not to scale) showing prominent establishments in the town; the Pier 12 area is the small wharf at the south foot of Nu‘uanu Avenue adjacent to the Ladd & Co. wharf (No. 2 on the map) (source: Simpson 1843)

> When I returned to Honolulu in 1853, after an absence of thirteen years, I was struck by the many changes.... [In 1840] The major portion of the residents of Honolulu still lived in thatched houses. In fact the town was almost entirely composed of this kind of dwellings... When I went away there were only Punchbowl Road, Beretania Street, King Street and Merchant Street. This was the condition of the city in 1840. (Bishop 1916:58)

In the whaling era, when seamen came ashore for "rest and relaxation", the downtown area from Nu'uanu Street west to Nu'uanu Stream was a district of "dilapidated native huts and tenements, tiny bar-rooms, coffee-shops, and run-down 'boarding houses,' all turning to the harbor for their opportunities and income" (Daws 2006:239).

3.4.1 Cholera Epidemic of 1895

In 1895, a cholera epidemic struck the islands and spread due to the unsanitary conditions of the harbors and Nu'uanu Stream. Near the King Street bridges were many laundries. This area was called *'a'ala* (meaning fragrant), by the Hawaiians, an ironic statement on the odors of the area. The cholera:

> . . . came in the form of active cases among Chinese steerage passengers on the *Belgic*, which arrived August 9. The harbor waters-stagnant, alkaline, and heavily contaminated with sewage and refuse became infected and crabs feeding uponthis infected material were believed to have been the means through which it spread, first to a native woman, and then to guests at a luau in her house. One of these secondary cases washed his clothing at the Aala laundries and infected the Nuuanu stream, and various rice and taro patches became contaminated in a similar manner. (Arnold 1956:317)

A total of 88 cases, 76 to Hawaiians, were reported between the start of the epidemic in August to its end in October. A total of 64 people died, all in the Honolulu area (Arnold 1956:317; Schmitt 1970:363). In the late nineteenth century, spurred by the deaths of the recent cholera epidemic, the government began to plan and institute public improvements to the roads, bridges, sewer systems, and streams in the western Honolulu area. Thomas Thrum, editor of the *Hawaiian Almanac and Annual*, reported on these improvements in his annual retrospect of the preceding year.

In the Retrospect for 1895, Thrum noted:

> The new spirit of public improvements . . . has been pushed with vigor. The relaying of larger water mains through a number of streets and completion of the new pumping plant, auxiliary to the reservoir system, was effected in time to do valuable service during the cholera period by shutting off the reservoir supply with its possible contamination, and flushing the mains with artesian water. . . .the enlargement of the inner harbor by dredging, with contemplated increased wharfage facilities along the extension of Queen street toward the King street bridge has already been entered upon. The dredging serves the further beneficial purpose of filling in the low land partly occupied, till recently, by the old wash houses, on the northern side of Nuuanu stream which is to be assigned to park

> [‘A‘ala Park] purposes for the benefit of the residents in that part of the city and the improvement of its sanitary condition. (Thrum 1895:144)

In the Retrospect for 1897, the *Hawaiian Annual* gave an update on the project:

> The dredging of Honolulu harbor and rock cutting to deepen the site at the Waikiki end of the Pacific - Mail Wharf' selected for the special needs of the big steamers of the Orient line, has been pushed, and considerable progress made in filling in the Aala and other tracts adjacent to the Nuuanu stream. There remains much yet to be done to complete the extensive channelization contemplated by this river and harbor improvement. (Thrum 1898:158)

3.4.2 The 1900 Chinatown Fire

In 1852, there were only about 71 Chinese living around Honolulu, most of whom had come to the islands as merchants and continued to carry out this trade. In 1852, sugar planters began to import large numbers of Chinese “coolies” to work on their sugar plantations. Once their contracts were filled, some of the workers moved to Honolulu to open their own businesses in the area that soon came to be known as Chinatown. The unsanitary and over-populated area alarmed the white business class who noted that “Most Chinese businesses were housed in decaying buildings on the depressed lower blocks of Nu‘uanu and Maunakea Street, and in Chinatown the womanless coolies congregated to gamble, smoke opium or simply pass the time” (Daws 2006:300). By the 1870s, a sizeable population of Chinese immigrants had settled in Honolulu, especially concentrated in the blocks between Nu‘uanu and Maunakea Streets. An 1878 census recorded 1,299 Chinese in Honolulu; the total city population numbered 14,114.

In 1899, the first case of bubonic plague was identified in Hawai‘i, in a Chinese bookkeeper named You Chong. After an examination by Dr. G.H. Herbert, who noted a high temperature and swelling in the groin, the patient died the next night. After an autopsy, the diagnosis of bubonic plague was determined.

Since the disease had broken out in the immigrant’s area of Honolulu, all Chinese and Japanese were barred from leaving Honolulu for other ports. Two other cases were reported on the same day, and the Board of Health laid down a strict quarantine for Chinatown, that area of Honolulu bound by Nu‘uanu Street, Kukui Street, River Street, and Queen Street. Within this area about 7,000 people, primarily Chinese and Japanese immigrants, lived and worked (Iwamoto 1969:122-124). A third ethnic group who inhabited the area were about 1,000 Hawaiians, who lived in areas their families had occupied for generations (Mohr 2005:63). An 18 year old Hawaiian, named Noah Kinapu,

> . . . was found dead in a shack on Queen Street where it turns into River Street. . . . The first floor of the shack was the living quarters of eight Hawaiians . . . Upstairs the Board found a completely arranged opium joint in full blast.

From December 12, 1899 to March 31, 1900, 71 cases were reported, with 61 deaths; 41 of whom lived within the established Chinatown quarantine area. The Board of Health concluded that they could not contain the plague and decided the best remedy was to set “sanitary fires” to infected wooden buildings. A total of 41 controlled fires were set between December 31, 1899 and August 13, 1900:

> Therefore, on December 30, after careful deliberation, the Board of Health chose fire as the 'surest, most thorough, and most expeditious' method. Fire would destroy the plague germs, kill rats, cleanse the soil and open it up to the purifying influence of sun and air, and would prevent any occupancy of the premises until a safe period of time had elapsed. (Iwamoto 1969:124)

Infected patients were moved to a quarantine camp at Kaka'ako. Some people, not necessarily patients, whose houses were burned were housed at the barracks of the Kaka'ako Rifle Range. Their belongings were stored in the cellars of Kaumakapili Church.

On January 20, 1900, a fire was set between Kaumakapili Church and Nu'uanu Avenue, which quickly got out of control. Rising winds swept burning embers to the roof of the church; the fire then jumped to several other blocks and then to the wharfs:

> By 1:30 p.m. the fire began making its way from Beretania Street along Achi Lane toward Kukui Street. People feared that the *mauka* section of the city would be destroyed. Chinatown refugees rushed back to save belongings, but were driven back by fire and smoke; they formed a seething mob near the bridge and Kukui Street. . . . The Chinese consul and vice consul also circulated among the people and tried to pacify them, since at this time the Chinese believed that the Board of Heath had purposely burned their homes. (Iwamoto 1969:130-131)

No one was killed in the fire, but Chinatown was destroyed. Many people were homeless and bereft of all belongings, which were lost when Kaumakapili Church burned to the ground. No additional patients were identified with the disease in April 1900, and the Hawaiian Islands were declared free of plague (Iwamoto 1969:125, 129).

3.4.3 1900 to the Present

The history of the project area from 1900 to the present is a portion of the history of Honolulu Harbor, which will be presented in the following section.

3.5 Honolulu Harbor, 1798 to the Present

Honolulu Harbor was discovered by westerners in November of 1798 by Captain Brown of the British ship *Butterworth*. Only a few native fishermen lived in scattered houses around the shoreline. The harbor was 200 ft- (60.96 m)-wide, three-fourths of a mile (mi)-long (1.2 kilometers [km]), and about three to 30 ft (0.9 to 9.1 m) deep (Hawaii. DOT 2008). Ships could not simply sail into the harbor, but had to be towed due to the narrow passage. In 1815, Otto von Kotzebue visited the harbor; his ship was towed in by eight double-hulled canoes (Alexander 1908:13); later teams of oxen, men, or whale boats were used for this purpose. In 1809, Kamehameha I had made it his capitol and had several coral and wood buildings used as stores and storage sheds. By 1825, the population had grown in 6,000 (Hawaii. DOT 2008).

The first dredging of the harbor took place around 1840. The dredged material was used to fill the coastal tidelands. Surveys of the depth of the harbor and the bar that prevented large vessels from sailing easily into the bay were made throughout the 1800s.

In comparing the harbor of 1843 versus 1893, Thrum noted:

> Steam tugs have long since displaced the long line of yoked cattle that did service in towing ships into the harbor. No distinguished visitors are now received at the boat landing in a manele, or the low hand drawn buggy, which early residents can recall, but they can have their choice of private carriages . . . or by the convenience of street cars traversing the length of its principal thoroughfares. (Thrum 1893a:60).

A major problem for the harbor in the early to mid-nineteenth century was the siltation from Nu‘uanu Stream, which had increased as the shores were cleared, farmed, and used for laundries. In addition, foreign ships often used the harbor as a convenient dumping ground for their ballast and trash. To prevent the siltation problem, a breakwater was built in 1848 out from Emme's Wharf (foot of Maunakea Street) perpendicular to the mouth of the stream, enclosing the western section of the harbor, and new ordinances and laws were passed to address the dumping problems (Hawaii DOT 2008).

Trade increased in the 1850s, the peak period for the whaling industry, and steamships entered in harbor as early as 1846. The government decided that the Honolulu Fort had to be demolished to make way for new and larger wharfs to handle the new trade (Thrum 1896:97). Following the demolition of the fort in 1857 (Judd 1975:50), its walls became a 2,000-ft (610 m) retaining wall used to extend the land out onto the shallow reef in the harbor; the remaining fort materials were used as fill to create a what came to be known as the Esplanade (Judd 1975:50). Between 1857 and 1870, 22 ac (8.9 ha) of reef land between Fort Street and Alakea Street was filled in with material dredged from the harbor to create the Esplanade (Bush 1957:14).

The first harbor seawall was constructed in 1874. (Hawaii DOT 2008). A complaint about the construction was noted in an 1895 issue of *The Independent*:

> We are told that crabs in the harbor are most unhealthy, and we now see a seawall being built which seems specially intended as a home, and breeding place, for the dirty black crab against which we are warned. Instead of building a cemented seawall with a foundation on coral a wall is being erected of a lot of rocks piled on the sand. The crabs are simply having a jubilee among Mr. Rowell's latest masterwork. (*The Independent*, September 21, 1895, p. 2)

In 1877, the harbor was described as:

> Its harbor is small but perfectly safe, and will easily accommodate one hundred vessels. Its wharves, of which it possesses a frontage of over three thousand feet, are built, mostly, of solid stone. Every vessel that can cross the bar can lay alongside of these wharves, where facilities for loading and discharging cargoes are equal to those of any port of America or Europe. (Baker 1877:32)

In 1890 the government purchased a hydraulic dredger to break up and deepen the water over the bar to thirty feet. Work began in 1892, and sand and coral from the dredger was deposited in a 28-acre (11.3 ha) coral-walled enclosure at the east end of the harbor (Thrum 1892:78-79). In 1893, the harbor was deepened to allow new steam vessels to dock (Thrum 1893b:133).

> Major alteration of Honolulu from its natural configuration began in 1890 with the dredging of the main channel to 60 m- (200 ft)-width by 9 m- (30 ft)-deep for about 303 m (1,000 ft) through the sand bar at the entrance. . . Dredging required

> two years to complete. . . Many dredging and filling operations soon followed, and the 1890s and 1900s saw the construction of many new piers and channels in the harbor, the dredged material going to create new dry land areas. . . Further dredging was conducted at the base of Alakea Street in 1906. (Coles et al. 1999:10)

Dredging of the harbor continued into the twentieth century. Following annexation of the Hawaiian Islands in 1898 and the establishment of the Honolulu Engineer District in 1905, federally-funded dredging of the harbor was initiated and completed in December 1908. It was at this time that reclamation projects would create Sand Island; as a history of the Honolulu Engineer District notes:

> As anticipated, enlarging the small island just seaward of the lighthouse calmed the entire harbor; indeed reclamation of this land, today known as Sand Island, has eliminated the need for a breakwater in Honolulu Harbor…A separate project to reclaim Quarantine Island, a low, swampy area on a reef in the harbor, was adopted in February 1906 and was carried out by contract until funds were exhausted in March 1908. Continued reclamation over the next four decades would result in the absorption of Quarantine Island into an enlarged Sand Island. (Van Hoften 1970:3)

In 1900, the eastern wharf section of the harbor was complete, and by 1905 the harbor was 800 ft- (243.8 m)-wide and 35 ft- (10.7 m)-deep. In 1912, the first piers with concrete pilings and concrete decks were constructed. Aloha Tower was completed in 1926, gradually changing the former Esplanade warehouse area into the modern Aloha Tower Marketplace, completed in 1994. The harbor was widened again in 1935, a second entrance to the harbor was dredged through Keʻehi Lagoon to the west in 1962, and the harbor was dredged an additional five ft (1.5 m) in depth in 1980-81 (Hawaii. DOT 2008).

3.6 History of Piers 12 and 15

3.6.1 Honolulu Harbor's First Wharf

There are several sources that state that the "**first**" wharf in Honolulu Harbor was constructed in 1825 when a derelict vessel was sunk at the "foot of Nuʻuanu Street." This has led some people to state that Pier 12, southeast of the foot of Nuʻuanu Street was the "first" wharf, but there is some confusion on the location of this early wharf and its construction.

The identification of the "first wharf" with Pier 12 seems to originally come from an article in Thrum's *Hawaiian Almanac and Annual for 1891*, which states:

> The first wharf constructed at this port was at a point a little to the northward of the foot of Nuuanu street, but of the particular year that witnessed this dawn of Honoluluʻs commercial progress we are not advised; but without doubt it followed closely upon the establishment of the house of Ladd & Co. about 1825. (Thrum 1890:143)

Thrum returned to the topic in 1893, where he reprinted an article in the newspaper *The Friend* on memories of Hawaiʻi in the 1840s. The author stated that besides the wharf of

Robinson & Co. at Pākākā Point: "The only other wharf in our harbor at that time was one constructed by Ladd & Co., at, or near, the foot of Nuuanu street, in place of the sunken hulk of an old schooner that served such a purpose in earlier days" (Thrum 1893a:59).

A 1907 article by W. D. Alexander (1908) called "Early Improvements in Honolulu Harbor," provides a little more detail on this wharf.

> The first wharf constructed at Honolulu is said to have been a little north of the foot of Nuuanu street, and to have been at first an old hulk, sunk at the spot about 1825. In 1837, with the consent of the King [Kamehameha III] and Kinau [daughter of Kamehameha I], the hulk was removed, and a wharf built under the superintendence of Capt. John Meek, and at the joint expense of Ladd and Co., and E. Grimes and Co.

At no time does Thomas Thrum or W.D. Alexander refer to this wharf as Pier 12. Although Pier 12 is near the foot of Nuʻuanu Street, it is south of the foot, not north, and Pier 12 was not built by Ladd & Co. To identify the first wharf, it is necessary to explain the early history of the wharfs in the old section of Honolulu Harbor.

Today there are five separate pier structures (Figure 10) along the old waterfront area of Honolulu, from the western side of Aloha Tower Marketplace on the east to Nuʻuanu Stream on the west. From the east, there are Piers 10 and 11 on the western side of Aloha Tower Marketplace, Pier 12 near the southeastern side of the foot of Nuʻuanu Street, a combined Pier 13/14 at the foot of Smith Street and northwest of Nuʻuanu Street, and Pier 15, fronting Maunakea to Kekaulike Street. However, up to the early twentieth century, there were as many as seven wharfs in this area

In 1886 (Figure 11), there was, from east to west (and south to north): the James Robinson & Co. shipyard and wharf near Pākākā Point (Pier 10-11 area); the Charlton/French wharf at the foot of the Kaʻahumanu Street; the Reynolds/Brewer wharf at the southeast side of the foot of Nuʻuanu Street (Pier 12 area); two Pacific Navigation Co. wharfs , at the northwestern foot of Nuʻuanu Street (Pier 13-14 area), Sorenson's Wharf, at the foot of Smith Street, and Emme's Shipyard and Wharf, at the foot of Maunakea Street, where the breakwater across Nuʻuanu Stream was later built. Between the 1820's and the present, the wharfs in this area have been altered, moved, demolished and improved. The alignment and widths of streets of downtown Honolulu have also been altered. In order to understand the evolution of the old waterfront, it is necessary to discuss the origins of the five wharf areas, and discuss the controversy surrounding the designation of the "first wharf."

3.6.2 King's/Robinson's Wharf (Pier 10-11 Area)

One problem in establishing the earliest wharf is the exact definition of wharf, which is defined by Webster's Dictionary rather ambiguously as "a structure built along or at an angle from the shore so that ships may receive and discharge cargo and passengers." Using this definition, the first "wharf" in Honolulu Harbor was actually around Pākākā Point, now in the Pier 10-11 area.

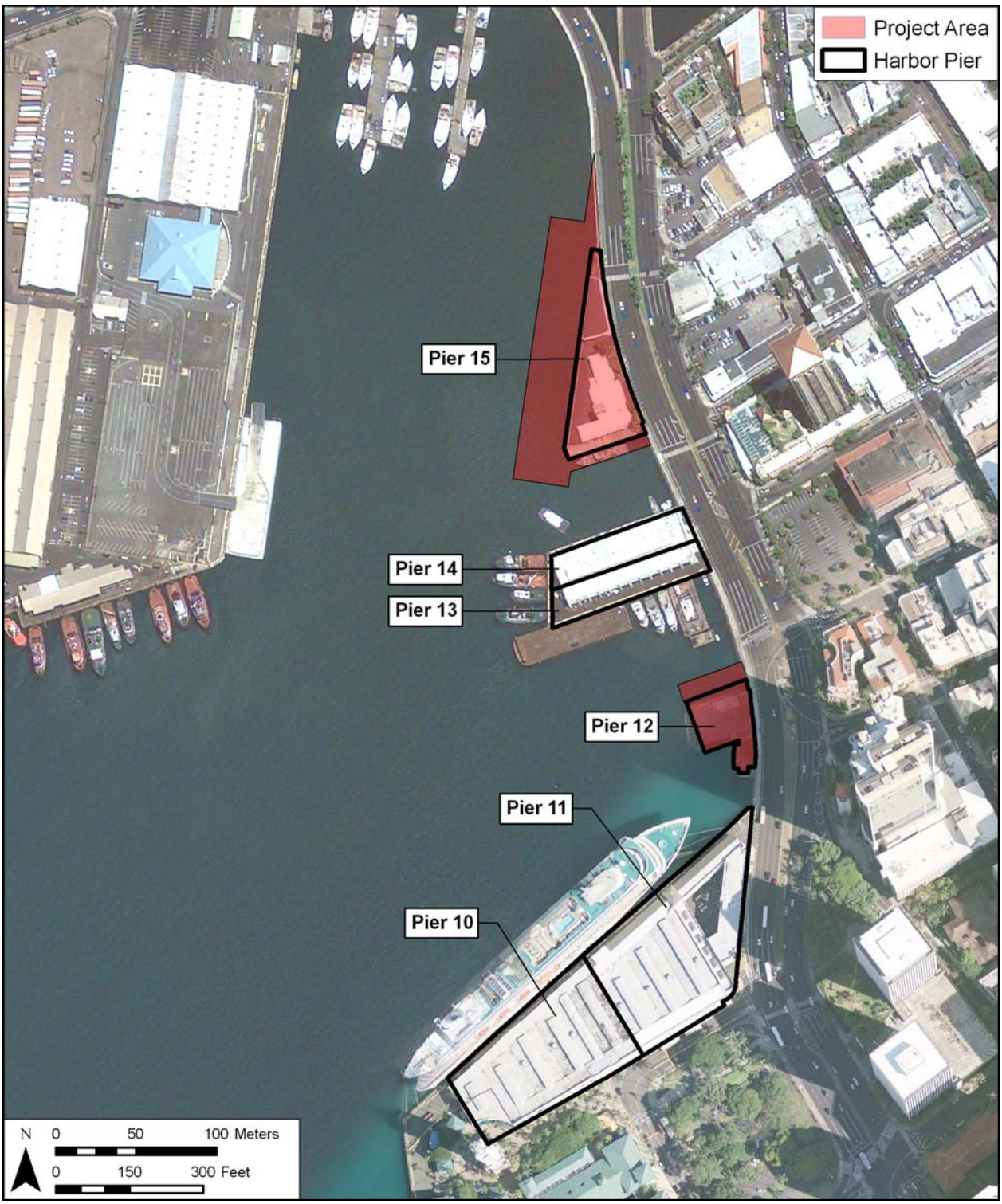


Figure 10. 2009 Aerial photograph (Google Earth 2009) showing the old Honolulu Waterfront, Pier 10 to Pier 15

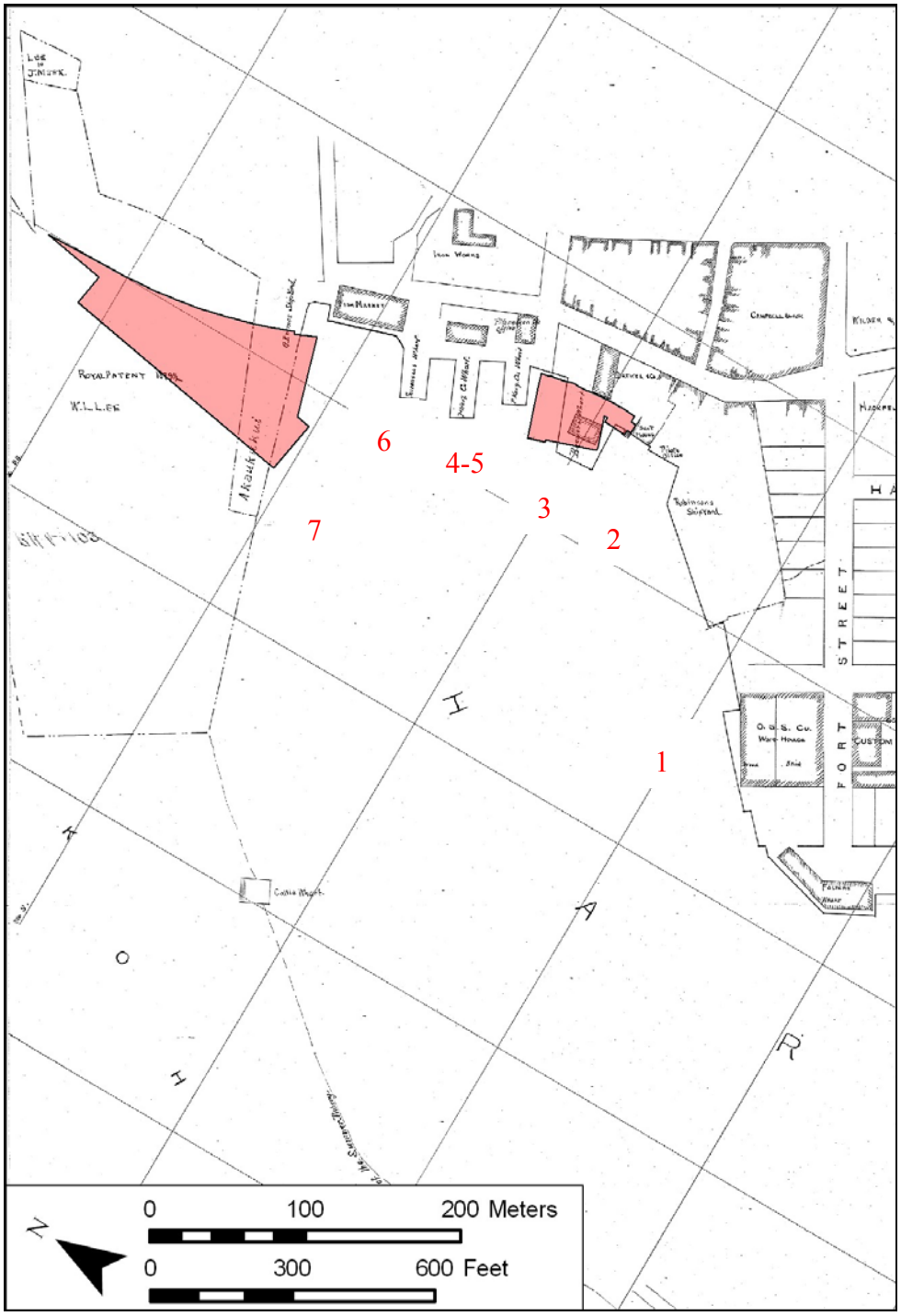


Figure 11. 1886 U. S. Interior Department map from the Esplanade east to west are (1) Robinson's Shipyard, (3) Brewer's Wharf, (4-5) two Pacific Navigation Co. Wharfs, (6) Sorenson's Wharf, and (7) Emmes' Shipyard/Wharf (later area of breakwater and Pier 15) (Registered Map No. 1119, Hawai'i Land Survey Division); note that the (2) Charlton/French Wharf has been demolished by this time

The first place in Honolulu Harbor that was used to load and unload freight and passengers from Western-built ships was the "King's Wharf." Kamehameha moved to Pākākā Point in 1809 and lived there until 1812 in a large compound west of the area on which the Honolulu Fort was later built. C. S. Campbell, who visited Honolulu in 1809-1810, noted that the sloop *Leila Byrd*, a foreign vessel purchased by Kamehameha I:

> . . . had been repaired by Kamehameha's carpenters and laid up at Honaroora, alongside a wharf built for the purpose. The remainder of his fleet, ten or twelve more, were hauled up at the same place. (Campbell 1817:108)

'Ī'ī (1959:66) described this simple landing site as:

> . . . to the right of the houses and pond was a wharf of rocks where a three-masted foreign-built vessel could be seen. This was the *Lelia Bird*, or the *Lelepali*, which had been bought by Kamehameha I, who named it the *Keoua*. The ship was tied to the shore by ropes, and a gangplank of boards reached from ship to shore.

In the diary of the early resident George Marin, he notes that on July 24, 1819, the natives were bringing stone to Pākākā to build a wharf (cited in Greer 1998:57-58). It was described by the missionary C. S. Stewart (1970:94) in 1823 as a "low, stone quay on a point under the fort" The wharf is shown on an 1810 sketch (see Figure 6) and the location of Honolulu Fort is shown on two 1840's maps (see Figure 7 and Figure 9). An 1821 painting includes a drawing of Honolulu Fort as a stone enclosure flying the Hawaiian flag, with a simple wharf on the west side (Figure 12). This painting of Honolulu Harbor is also interesting as it shows a boat hulk pulled on to the shore. Thrum (1896:90) noted that: "Old sunken hulks were used at other locations for wharf purposes, and unseaworthy vessels moored in the harbor did duty for storage or transshipment warehouse purposes for many years." To the west of this hulk is a simple wooden pier on two piles.

The King's Wharf was present and noted by the first missionaries to land in the Islands in 1820 (Levi Chamberlain 1824 Journal, Mission House Museum, cited in Beechert 1991:30). Lord Byron, of the British ship HMS *Blonde*, who brought back the body of Kamehameha II after his ill-fated trip to England in 1825, noted that next to Honolulu Fort was a "small pier for facilitating the unloading of vessels; and such as are of small burden may lies almost close to the shore" (Calcott 1826:121). Charles Malden, a cartographer on the *Blonde*, described it as "a small pier for facilitating the unloading of vessels" (cited in Beechert 1991 30). This wharf may have incorporated a part of a platform of the old Pākākā Heiau complex (Klieger 1997:15-16).

In 1827, the *ali'i* Kalanimōkū, premier councilor to Kamehameha I and his successors, l deeded the reef land at Pākākā and one-half of the King's Wharf to John Robinson, who set up a shipyard in this area (Greer 1998:59). He improved and enlarged the wharf, where ships for unloading or repair could lie alongside the edge of the point (Beechert 1991:54). Before the Esplanade was constructed in 1857-1870, the shipyard wharf was adjacent and parallel to the shore. A new government wharf was built perpendicular to the shore to the north of the shipyard, before 1843, as shown on the 1843 (see Figure 9) and 1847 maps (see Figure 7). When the Esplanade was built in 1857-1870, this perpendicular pier was demolished and the area of Pier 10 was developed for the new larger steamships, as shown on an 1875 map (Figure 13).

Figure 12. 1821 painting by C. E. Bensell (portion) of the port of Honolulu of the: Honolulu Fort with the Hawaiian flag is in the center; to the left is the rudimentary "King's Wharf:" note that behind the King's Wharf there is a ship hulk near the shore and a wooden pier in front of a grass house

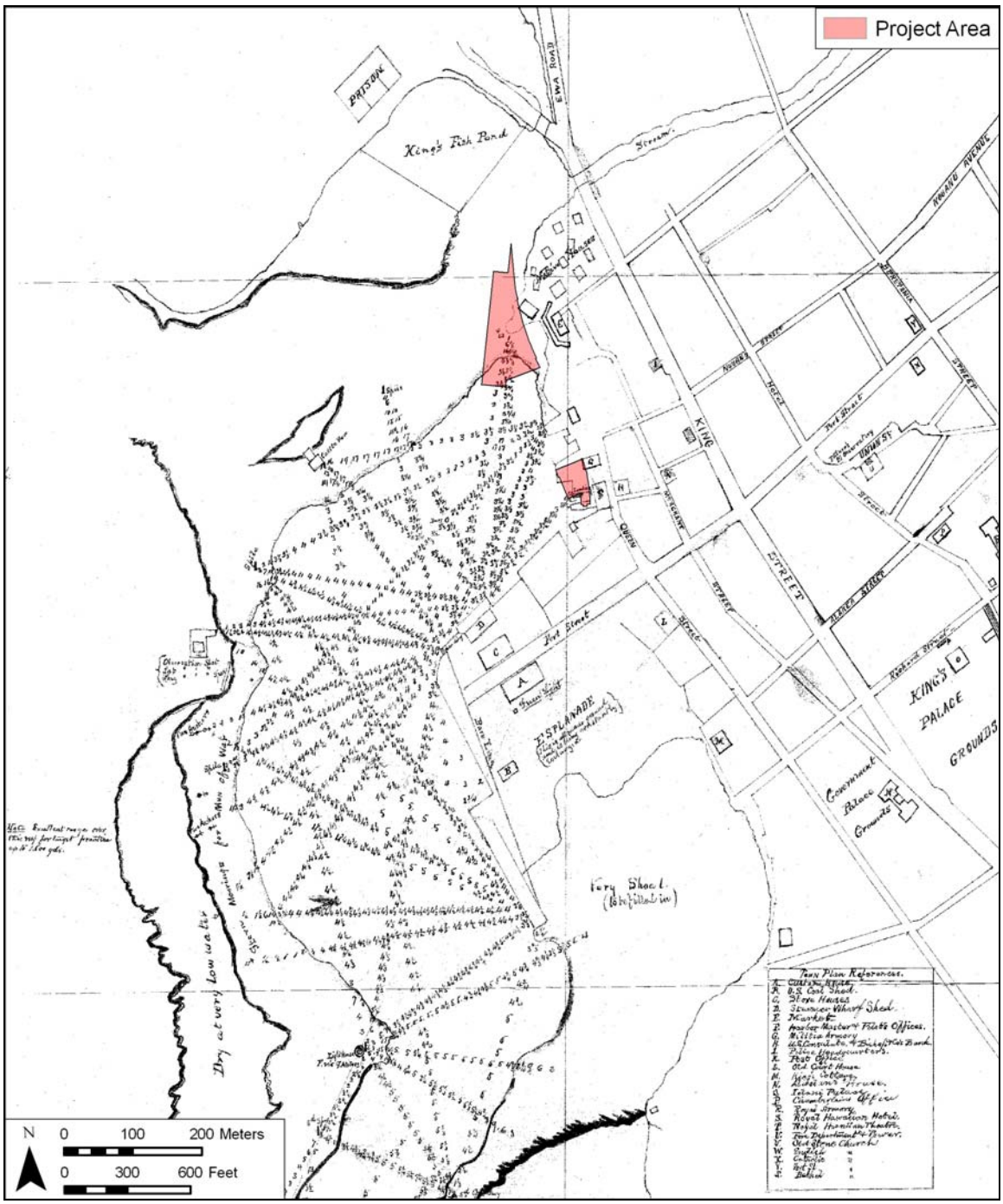


Figure 13. 1875 map of Honolulu Harbor by the U.S. Flagship *Pensacola,* drawn after the construction of the Esplanade; In the Pier 12 area, there are two labeled structures (rectangles) *makai* of Queen Street, No. F, the Harbor Master and Pilot's Office in front of the old Charlton/French Wharf, and No. G. the Militia Armory (same as the Market House), in front of Brewer's Wharf. No D is the "Steamer Wharf Shed" in the Pier 10 area (U.S. Flagship Registered Map No. 430, Hawai'i Land Survey Division)

3.6.3 Charlton/French Wharf

The former beach area named Nihoa, stretching from Nuʻuanu to Fort streets, was one area in Honolulu that had not been taken over and developed by foreign-born residents by 1830. It was the one area that natives could still pull up their canoes on the beach. In the area *mauka* of the beach, a village called Pulaholalo housed many of Queen Kaʻahumanu's former supporters and retainers.

In 1826, according to the British Consult Richard Charlton, Kalanimōkū, who controlled most of the waterfront area, granted Charlton a 299-year lease on waterfront land near the foot of Fort Street. He also had the right to "improve, sell, or otherwise dispose of the place at will" (Greer 1998:51). In 1827, he was also given permission to build a wharf, but he could not obstruct the old Robinson pier at Pākākā Point. This may be why this wharf was built somewhat diagonal to the shore. The wharf was completed by 1838 (Hawaiʻi Bureau of Land Conveyances 1838:I.3-4, cited in Hurst and Allen 1992:17).

By 1940 Richard Charlton had claimed not only this waterfront land but large areas *mauka* of the shore, including Nihoa and Pulaholalo. Although the Hawaiian Government disputed the claim and felt that the lease was "suspect," the British Government backed the claim, and Charlton demolished the village of Pulaholalo, evicted 156 Hawaiians living in the area, and began to build warehouses and storerooms in the area (Greer 1998:44).

Charlton transferred the property to Robert C. Janion in 1845 and in 1846, another businessman, William French, owned a part of the land. This man may have had an earlier interest in the wharf, as it was called the Charlton-French wharf as early as the 1830s (Greer 1998:54-55). This diagonal wharf is shown clearly on the 1843 map and 1875 maps (see Figure 9 and Figure 13) of Honolulu Harbor, but it seems to have been shortened or demolished by 1893, (Figure 14). There is no trace of this wharf on a 1920 Monsarrat map (Figure 15).

3.6.4 Reynolds'/ Brewer's Wharf (Pier 12 area)

In 1822, Stephen Reynolds settled in Hawaiʻi and worked as a trader, a shop-owner, a doctor, a ship pilot, a sugar plantation owner, and a consul for Bremen (in Germany). A resident of the islands in the 1840s noted:

> On the *mauka* corner of Nuuanu and Merchant streets stood the store of one of the most noted characters of the town, Mr. Stephen Reynolds. . . . A visitor to his store went up the half dozen well-worn planks to the somewhat rickety veranda and entering found a most miscellaneous assortment of dry goods and notions in what would be to him an indescribable confusion, yet the kindly gentlemen . . . found no difficulty in meeting their wishes, and enjoyed a large share of their confidence. (Gilman 1903:78-79)

Around 1823, a small landing was built aligned with the foot of Nuʻuanu Street (now the southeast side) *makai* of Queen Street (Greer 1998:42). Around 1822, a man named James Reeves constructed a house on a lot on the southeast corner of Nuʻuanu and Merchant Street, extending to Queen Street, and built the Oʻahu Hotel. By 1826, the hotel was owned by George Marin (son of Don Francisco de Paula Marin) who later took in a partner Amos Knight. Marin built a fence separating the *mauka* and *makai* sides. Around 1826, Marin, "jumped out of his

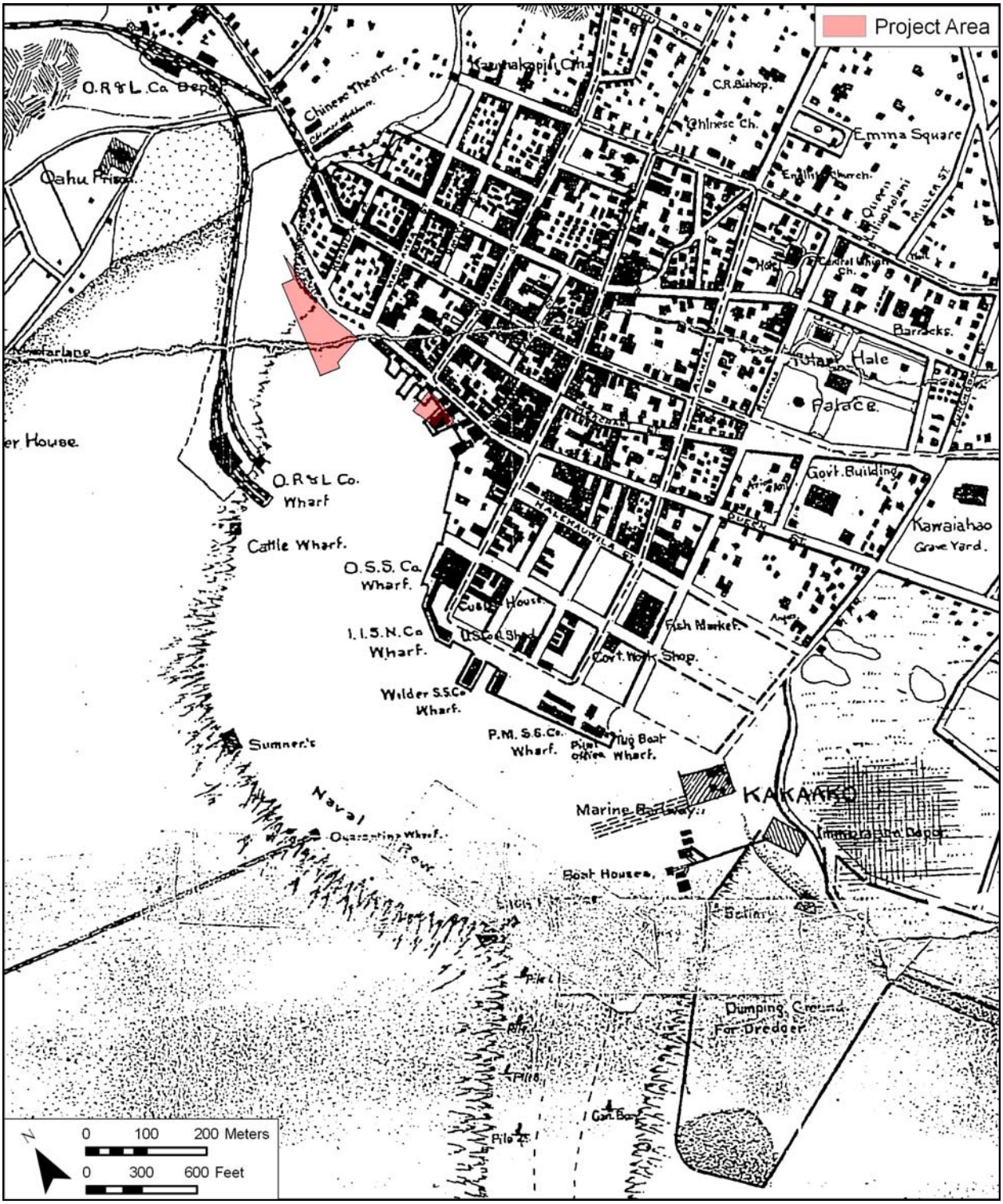


Figure 14. 1893 map of Honolulu, by W. A. Wall, showing numerous piers in the old waterfront area (Registered Map No. 1690, Hawai‘i Land Survey Division)

Figure 15. 1920 map of Honolulu by M. D. Monsarrat, indicating new wide streets in Honolulu and numbered piers in Honolulu Harbor; note that Pier 12 has been lengthened and Pier 15 on new filled land has been completed (Copy on file at Library of Congress)

Fence," and built a wharf at the landing site (Greer 1998:42). The O'ahu Hotel lot had "main buildings, a woodshed, a kitchen, a hog pen, a canoe house, a cook house, a bowling alley with a lookout on top, a sleeping house, and a grog shop," called the South Sea Taps (Greer 1994:50).

The original wharf was 20 to 25 ft (6.1 to 7.6 m) in breadth; it was widened in 1829 to 1830. In 1832, Stephen Reynolds, executor of the Marin estate, bought half of the property from George Marin's estate, and in 1838 he bought the other half from Amos Knight's estate (Greer 1994:50-51). After this, the pier became known as the "Reynolds' Wharf."

Due to his services to the monarchy, mainly as a doctor and ship pilot, Reynolds was awarded several properties during the Māhele in 1845, including two lots on the *mauka* side of Queen Street (the O'ahu Hotel lot), and one lot on the *makai* side, Reynolds' wharf as LCA 626 (presented in full in Appendix A). In the Māhele testimony, John Meek, one of the pilots for Honolulu Harbor, testified that he had known of the lands since it had been owned by George Knight and Manini [Marin], and they had built the wharf. He states that the wharf "had been repaired several times, and afterwards rebuilt by Mr. Reynolds." Another witness said that "Mr. Reynolds, I think, partly filled up the part in front" of his wharf lot." An 1848 map (Figure 16) of this area shows the Reynolds' Wharf southeast and adjacent to two Ladd & Co. wharf lots along Queen Street. In 1856, Reynolds left the Hawaiian Islands and he sold his property, including the wharf, to the Hawaiian government.

Charles Brewer established C. Brewer and Co. in 1843. He had been a ship's officer on several trading vessels that stopped in the Hawaiian Islands and began a partnership with a local merchant, Henry A. Pierce. They sold the goods on ships that touched on the islands, bought or bartered sandalwood from the Hawaiian chiefs, and provided supplies to the whale-ships that began to stop in the island in the 1820s. Several other partnerships were made over the years, but in 1847, the company was taken over by Charles Brewer II (Stone 1991:23-47). From 1859 to 1899, the company leased the Market House, a large two-story stone structure originally built in 1851 by the Hawaiian Government (Scott 1968:105, 150). They also took over the old Reynolds' Wharf, just *makai* of the structure. E. T. Perkins described the Market House at the waterfront in 1851 as:

> Everything from needles to coasting vessels was being sold at auction and Honolulu's market house, so appropriate ornament for any town, situated near the principal wharf, was thronged with the you and old . . . laughing, jostling, joking and haggling over the piece of fish, poultry and esculents of every description (Perkins, cited in Scott 1968:67).

From ca. 1859, the wharf is usually labeled on historic maps as "Brewer's Wharf," instead of the Reynolds' Wharf. The two story Market House can be seen in the center of an 1854 lithograph (Figure 17) of Honolulu Harbor as a two story structure with the staircase to the front entrance facing the harbor. No large wharf can be seen in the picture, but several small boats are drawn up next to the shore in front of the building. There is a large wharf in front of the Custom House, a three-story building built in the 1840s (at the left side of the picture). This structure was *mauka* of one of the Ladd & Co. wharf lots. A mid-1870s photograph (Figure 18) of the harbor shows the Market House at the right and the Custom House at the left, both with broad wharfs along the waterfront. An 1895 photograph (Figure 19) shows the still standing Market House

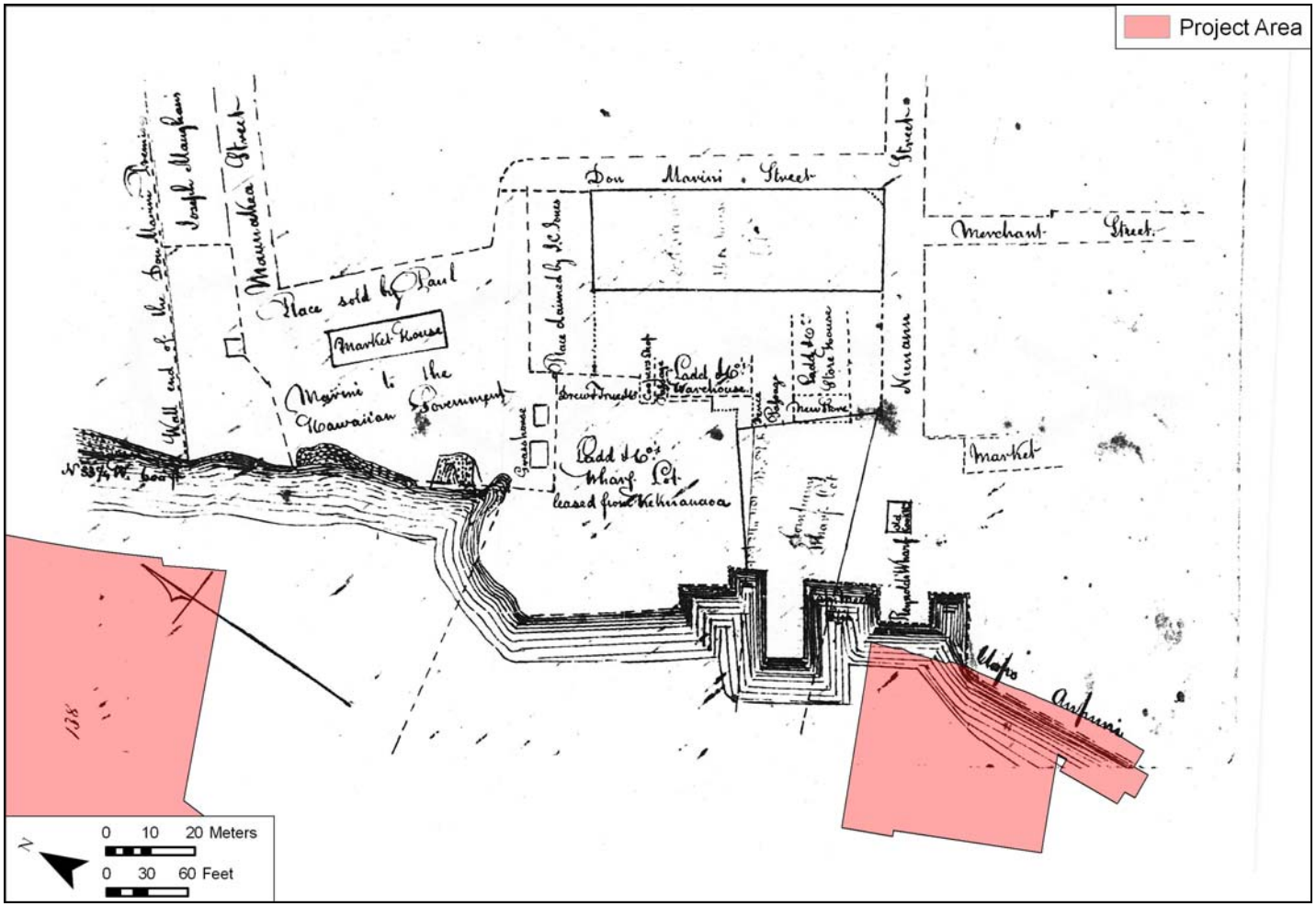


Figure 16. 1848 Survey map for LCA 38 (Hawai‘i State Archives) from south to north (right to left); Reynolds’ Wharf at the foot of Nu‘uanu Street, E. & H. Grimes & Ladd & Co. Wharf lot at the northwest foot of Nu‘uanu Street, Ladd & Co. Wharf lot *mauka* of Marin Street (south of Smith Street), and the Manini land around the Old 1843 Market House and Maunakea Street

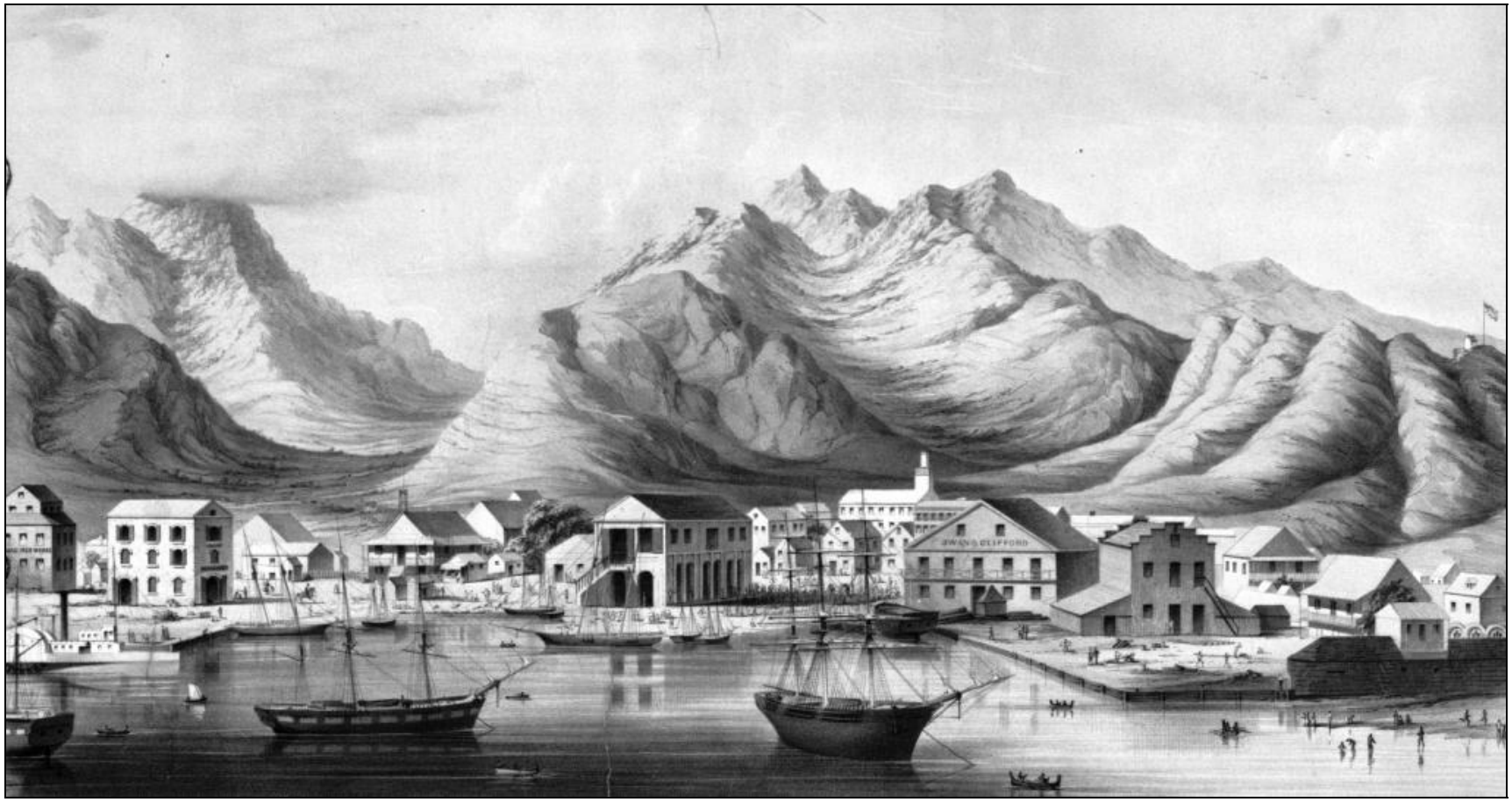


Figure 17. 1854 lithograph by Paul Emmert of Honolulu Harbor; from right to left is the Honolulu Fort, then Robinson & Co. shipyards and wharf, the French/Charlton Wharf (in front of the Swan & Clifford Co. building), Brewer's Wharf (in front of the two story Market House), and the Ladd & Co. wharf (in front of the three-story Custom House); note that the artist has exaggerated the size of the buildings and the space between the buildings and the harbor

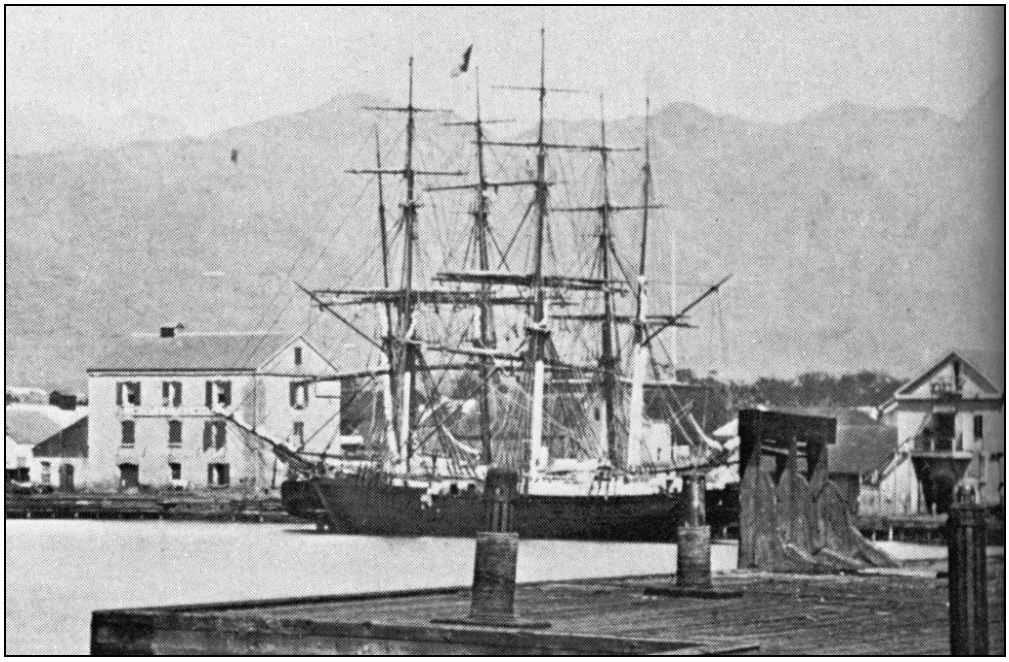


Figure 18. Mid-1870s photograph (Anonymous 1870) :taken from Robinson & Co. wharf towards Brewer's Wharf (in front of two story Market House at extreme right) and Ladd & Co. Wharf (in front of three-story Custom House); contrast this photograph with Figure 15 for true dimensions of buildings and spaces

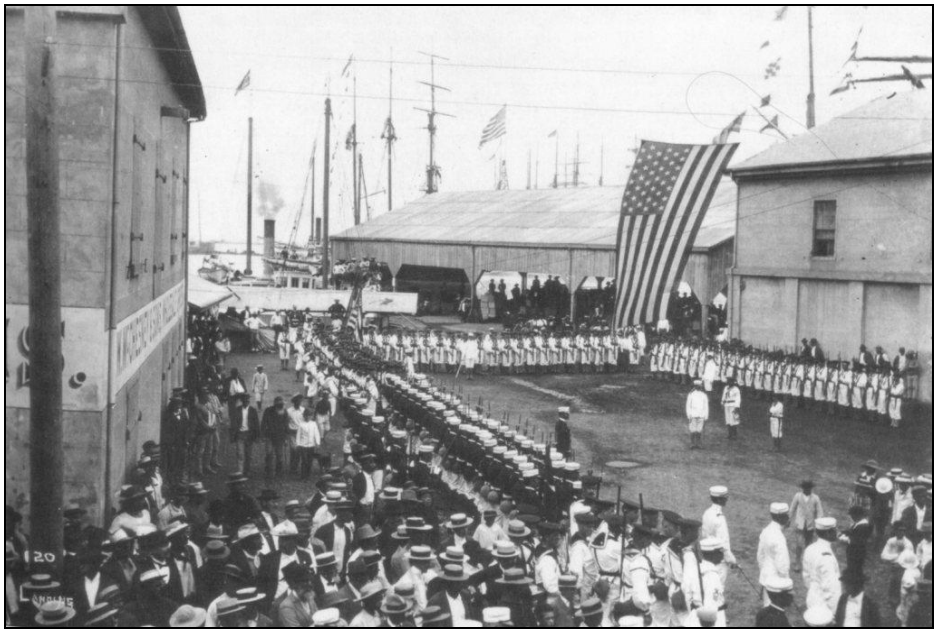


Figure 19. 1895 photograph of Pier 12 in front on the Market House (extreme right); troops from the ships *Philadelphia* and *Mohican*, present to attend the U.S. annexation of Hawai'i ceremonies are lined up adjacent to the pier (Hawai'i State Archives)

with troops of the U. S. Ships *Pensacola* and *Mohican* lined up in front of a long wharf covered with a shed (Pier 12).

A map traced in 1891 (original probably predates 1888) Figure 20 shows the original truncated pyramid shape of Pier 12 in 1888. This map shows that by 1880, the wharf was approximately 80 ft- (24.4 m)-wide and 160 ft- (48.8 m)-long. It was extended ten ft (3 m) in 1881 and to an approximate length of 220 ft (67 m) in 1888. In 1887 (Figure 21), there were plans to reconfigure Piers 12, 13, and 14, making them an equal length and shape. However, for Pier 12, the pier was not lengthened to match the other piers until 1907, when the wharf was modified into a long rectangle 300 ft- (91.4 m)-long (Figure 22).

The wharf was altered again in 1963; it was shortened to 125 ft- (38.1 m)-long, as can be seen in a 1978 aerial photograph (Figure 23). This shortening exposed large stacked coral rocks and old bricks on the *makai* side, probably part of the pre-1888 structure. Cheever and Cheever (2003:69) believe that the stacked coral stones seen at the *makai* end of Pier 12 are some of the coral stones originally used to build the Honolulu Fort, and used to create the Esplanade between 1857 and 1870. However, no other sources could be found that the Honolulu Fort stones were used for any other purpose than for the seawall around the Esplanade, which is east of the Pier 12 area. So it is possible that these coral blocks were cut and used to construct the original Reynolds'/Brewer's Wharf. The use of these large coral blocks as construction material in Honolulu seems to date to the first half of the nineteenth century (Cheever and Cheever 2003:35). It is also possible that the blocks are part of the 1874 harbor seawall that was built of "stacked stones," to the delight of the black crabs (see Section 3.5).

A shed was present on the structure as early as 1886, which became a shed that covered the entire pier by 1893. A new shed with a gable roof was probably built when the pier was lengthened in 1907, and the shed appears on historic maps as late as 1943. It was probably torn down in the 1950s. By 1950, the pier appears to have been used mainly for parking vehicles.

Brewer's Wharf had an important part to play in the history of Hawai'i. In 1893, marines from the ship the *U.S.S. Boston* landed at Brewer's Wharf. A committee of businessmen, mainly Americans, had decided to overthrow the Hawaiian monarchy. They sent a letter to the American minister requesting that he order troops to land from the *Boston* to protect the citizens of Honolulu from rioters. A member of the new Hawaiian Republic government, established after the successful overthrow of Queen Liliu'okalani, claimed that the troops "were landed to protect American citizens and property in the event of the impending and inevitable conflict between the Queen and the citizens. . ." (cited in Kuykendall 1967:594).

The Lieutenant Commander of the ship reported to his superior officer:

> Lieut. Commander Swinburne to Capt. Wiltse.
> Camp Boston.
> Honolula [*sic*], Hawaiian Islands, February 24, 1893
>
> SIR: I have the honor to submit the following report of the landing and subsequent operations of the battalion of the U.S.S. *Boston* in the city of Honolulu:

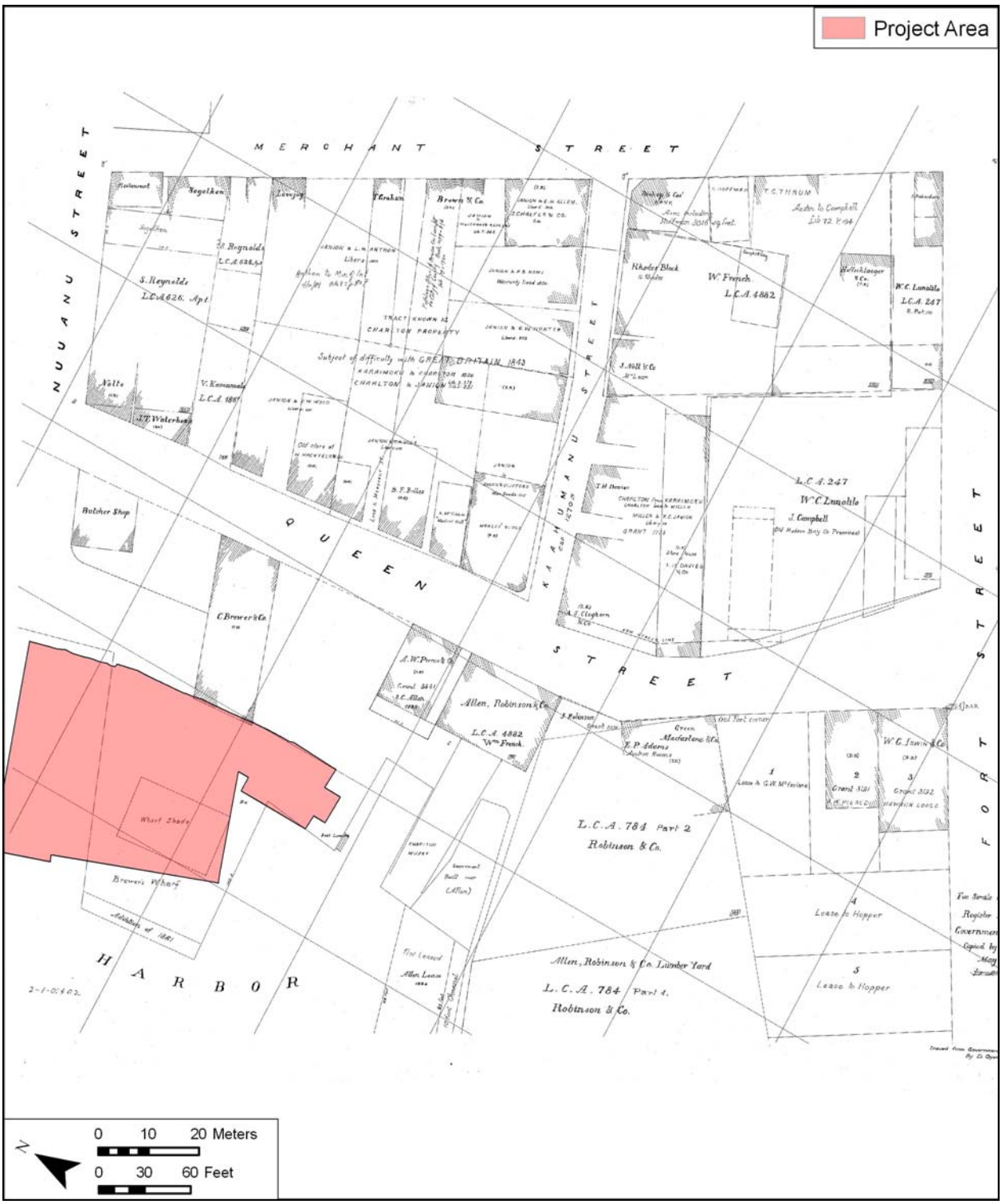


Figure 20. 1891 Facsimile map (note: original map probably pre-dates 1888) traced by C. J. Willis; map shows Brewer's Wharf pre 1881, and ten-ft addition in 1881 (Registered Map No. 843, Hawai'i Land Survey Division)

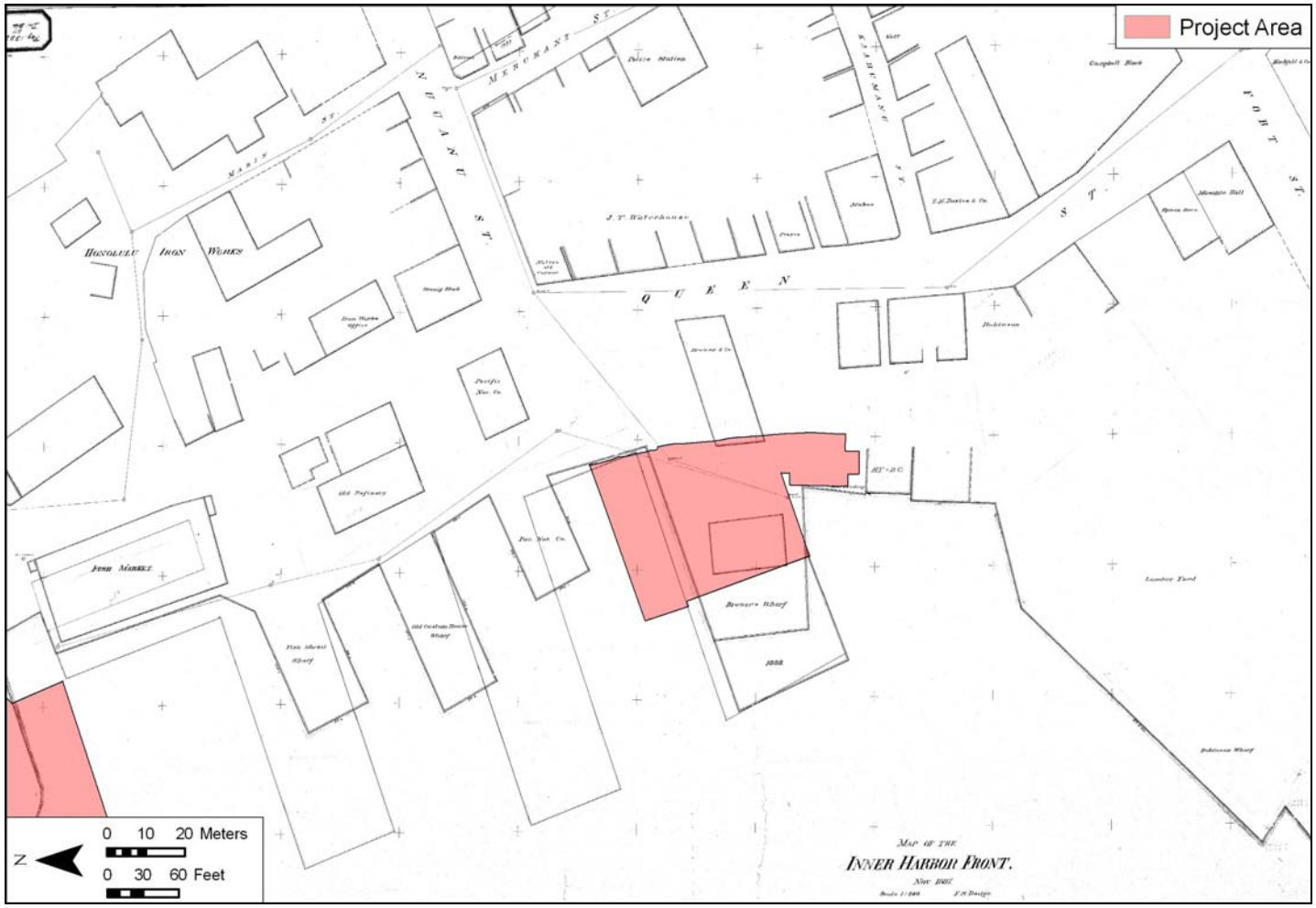


Figure 21. 1887 map of the Inner Harbor of Honolulu by F. S. Dodge, showing length of Brewer's Wharf in 1888; note the light lines representing the planned redesign of Brewer's Wharf's (Pier 12), the consolidation of the two Pacific Navigation Co. wharfs into one longer wharf (Pier 13), and the extension of the Sorenson/Fish Market Wharf (Pier 14) (Registered Map No. 1392, Hawai'i Land Survey Division)

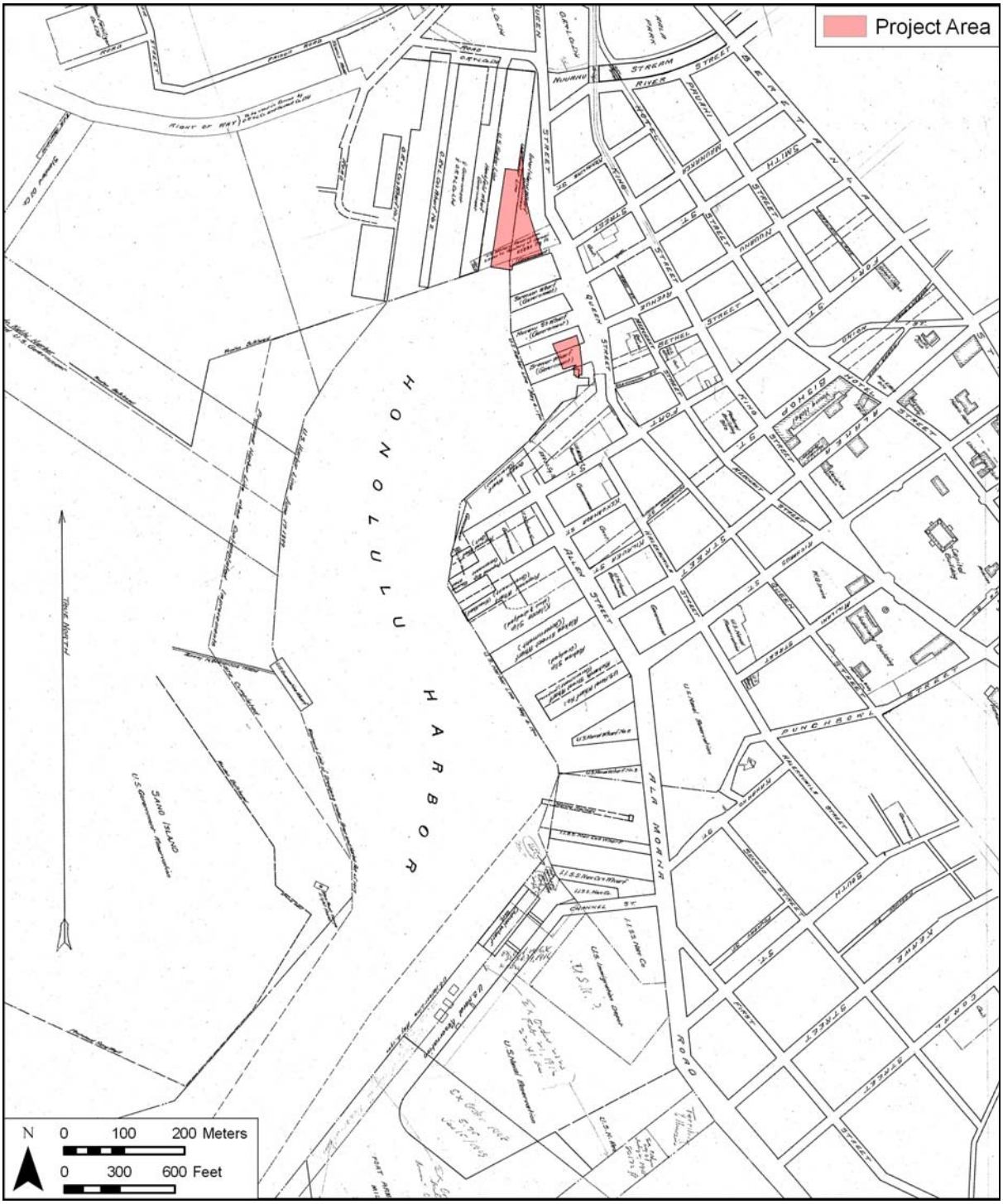


Figure 22. 1907 map by H. E. Newton; wharfs labeled (from south to north): Government Wharf (Pier 10), Brewer's Wharf – Government (Pier 12), Nu'uanu St. Wharf- Government (Pier 13), Sorenson's Wharf – Government (Pier 14), and Inter-Island Wharf (Pier 15) (Registered Map No. 2611, Hawai'i Land Survey Division)

Figure 23. 1978 U.S. Geological Survey Orthophoto of O‘ahu, Honolulu Quadrangle; note that Pier 12 has been shortened to its present length

> In obedience to your order, a copy of which is attached, marked A. the battalion of the *Boston* landed at Brewers Wharf, in the city of Honolulu, at 5 p.m. January 16. . . .
>
> During the day of the 18th the royal standard [Hawaiian flag] was hauled down over the palace [ʻIolani Palace], and the household troops disbanded, by order of the Provisional Government . . . (U. S. Congress 1893:492)

In 1898, U. S. Marines again landed at the same wharf, and raised the American flag in front of Pier 12 on the day the U.S. officially annexed Hawaiʻi as a territory of the United States (see Figure 19). A naval officer reported:

> U.S. Flagship *Philadelphia*,
> Honolulu, Hawaiian Islands, August 14, 1898
>
> SIR: I have the honor to submit the following report on the participation of the forces under my command in the ceremonies attending the change of sovereignty of the Hawaiian Islands, which took place at noon on Friday, the 12th [1898] instant:
>
> The force under arms from the Philadelphia and Mohican attending the ceremonies consisted of four companies of infantry and two sections of artillery. . . . The Hawaiian National Guard met our force at the landing [Pier 12] and escorted them to the front of the executive building [ʻIolani Palace], where they took position in column on the driveway leading to the front of the building, the head of the column being close to the official stand. . .Colors were sounded, and, a 21-gun salute was fired by the shore battery and by the *Philadelphia* and *Mohican*, after which the Hawaiian flag was slowly hauled down, all the spectators standing uncovered. (Report reprinted in Pryor 2004:155)

Notably, Pier 12 was used in the twentieth century by interisland steamers and other small craft, including government ships. In 1937, the U. S. Coast Guard Cutter *Itasca*, was ordered to Honolulu to provide support for the aviator Amelia Earhart and her navigator Fred Noonan on the first circumnavigation flight around the world along the equator. On June 18, the *Itasca* was ordered from her mooring at Pier 12 of Honolulu Harbor and sent to Howland Island, to help guide Earhart on one of the last legs of her journey, from New Guinea to Howland Island. Their mission was to provide radio communication to help guide her to the tiny airport on the uninhabited island. On July 2, *Itasca* received a message from Earhart that she was flying over Howland, but there was no sign of her and they lost communication with the plane. The two were never seen or heard from again, and the disappearance of Amelia Earhart has become an enduring mystery (Long and Long 1999:200-205).

3.6.5 Ladd & Co. Wharf (Piers 13 and 14 area)

The noted historian, Richard A. Greer wrote an article for the *Hawaiian Journal of History* in 1998, called "Along the Old Honolulu Waterfront." In this article, he gives the history of land ownership along the old waterfront from Pākākā Point to Maunakea Street. This includes the complicated ownership history of the area from Nuʻuanu Street west to Smith Street, which was owned and developed by the Ladd & Co. in two leased lots. Unfortunately, although Greer does

give dates for the transfer of these two lots, called "wharf lots," he does not always discuss or locate specific piers. As previously noted, there were three piers in this area in 1886. By 1920, there were two piers (Piers 13 and 14) and currently there is a combined Pier 13/14 at the foot of Smith Street. Thus, there is still some confusion about the location of the "first wharf" built on a hulk "around" 1925 by Ladd & Co. north of the foot of Nu'uanu Street, as recorded by Thomas Thrum in his 1890 article on Honolulu Harbor.

In 1819, Captain William Babcock, the American agent of the firm Marshall & Wildes, put up a two-story wooden house in Honolulu, somewhere *makai* of Marin Street. In 1821, John Coffin Jones, Jr. arrived as the U. S. Consul and occupied the Babcock house, which was called the "wooden house" or the "Consul House." In 1825, the company moved the hulk of the ship *Eliza Ann* in front of this wooden house, and in 1826 they began to build a proper wharf. C. S. Stewart landed at this wharf in 1829; he described the wharf as a stone quay opposite the American consulate (Greer 1998:33). This wharf was northwest of the foot of Nu'uanu Street, but Greer does not locate it exactly. In 1833, the new firm of Brinsmade, Ladd & Hopper took over the wharf lot, *makai* of the wooden house to the shore, which presumably included the wharf (Greer 1998:35)

A long-time resident remembered this pier in his reminiscences of Honolulu in the 1840s:

> What is now known as Queen street was then only a pathway along the water's edge, the water coming up most of the way between what are now Nuuanu and Kaahumanu streets. Along the *mauka* side of the street was a collection of straw houses with lanais. There was not a frame building at this time in this distance between the two streets. On the Ewa side of Nuuanu street stood the building occupied by B. L. & Co. [Brinsmade, Ladd & Co.], in which was also the consul's office, where I was to be domesticated as the youngest clerk of the establishment, and which was my business home of some years. *Makai* of the store was a small wharf built by B. L. & Co. standing out into deep water so that a vessel could load alongside or discharge its cargo. (Gilman 1903:75-76)

According to Greer (1998:38), the firm of Brinsmade, Ladd & Co. built a wharf, a sunken hulk placed on the beach by royal consent, in 1833. In 1835, Brinsmade, Ladd & Co. became simply Ladd & Co. (Greer 1998:38). In 1837, the hulk was removed and a proper wharf was built by Ladd & Co. and Eliab Grimes "sixty feet ewa of Reynold's wharf" (Greer 1998:38). The wharf became known as the "Market Wharf." Thus, this is the wharf closest to the foot of Nu'uanu Street on the north side.

Thus, Greer seems to mention two separate wharfs built by the company "Ladd & Co." or companies associated with them. One wharf was built by Marshals & Wildes, then taken over by Brinsmade, Ladd & Co in 1833, which became Ladd & Co. in 1835. It began as a hulk placed on the shore (no mention of sinking the hulk) in 1825, which was replaced by a proper wharf in 1826. The second wharf began as a sunken hulk placed off-shore by Brinsmade, Ladd & Co. in 1833, which was replaced by a proper wharf in 1837.

Thrum (1890:143) describes the first wharf of Honolulu as one built by Ladd & Co. soon after its founding in 1825. Later, he added that the pier replaced a sunken hulk. However, Ladd & Co. was not founded until 1835; if the date is a mistake, then Thrum is referring to the wharf adjacent

to the north side of Nuʻuanu built in 1833 (soon after the founding of Ladd & Co. in 1835), and replaced by a dock in 1837. Alexander states that the first wharf was a hulk sunk on the shore in 1825, and replaced by a new wharf in 1837. Thus, he seems to combine the dates on the two different wharfs, accurately stating that the Marshall & Wildes Co. wharf began as a hulk in 1825, and the Ladd & Co. stone wharf was built in 1837. Whatever, the confusion, it seems as if the first wharf noted by both Thrum and Alexander was north of Nuʻuanu Street, in the area of the old Pier 13 location.

The 1875 map of Honolulu (see Figure 13) shows two piers north of Nuʻuanu Street, a small one adjacent to the foot of the street, and a larger wharf *makai* of a large structure called at one time, the "Custom House," which was built in the early 1840s. The Ladd & Co. wharf *makai* of the Custom House is probably the one on an 1854 Emmert sketch of Honolulu (see Figure 17).

As noted, by 1893, there were three piers between Nuʻuanu and Smith Streets, and only two by 1920, Pier 13 at the foot of Nuʻuanu on the north side and Pier 14, aligned with the foot of Smith Street (see Figure 14 and Figure 15). Piers 13 and 14 were redesigned into one structure around 1931 (Van Hoften 1970:20), and moved and aligned to the south side of the foot of Smith Street. This change is not shown on the 1933 U. S. War Department map (Figure 24), but the military often did not update changes that occurred during the 1930s and 1940s, especially in areas that were of strategic and defensive concern, such as the harbors of Hawaiʻi. The 1950 Sanborn Fire Insurance map (Figure 25) and the 1953 U.S. Army Mapping Service map (Figure 26) accurately show the combined Pier 13/14 location, also seen on a 1978 aerial photograph (see Figure 23) at the foot of Smith Street. A 1919 and a 1933 photograph of the Pier 12 to 14 area shows the shape and location of the Piers before and after the construction of the Aloha Tower in 1927 (Figure 27 and Figure 28).

The loss of the pier on the northwest side of Nuʻuanu Street, when Piers 12 and 13 were combined and placed near the foot of Smith Street, probably led to the statements in some reports that Pier 12 was near the "first wharf." If the "first wharf" was just north of the foot of Nuʻuanu Street, there is currently no wharf in this area. Pier 12, once the Marin Wharf, then Reynold's Wharf, and then Brewer's Wharf has always been located southeast of the foot of Nuʻuanu Street.

3.6.6 Maunakea Street Wharf (Pier 15 area)

A Spaniard, Don Francisco de Paula Marin, came to Hawaiʻi in 1793 or 1794. He became a favorite of Kamehameha I, who granted him extensive lands on Oʻahu, including a large section of the waterfront area between Nuʻuanu Stream and Nuʻuanu Street. During this time, some type of simple landing may have been built in this area. His heirs sold some of this area to the Hawaiian government in 1843, and they began to build storehouses and a wharf in the following years (Greer 1998:30). The wharf in this area was later called Emme's Wharf. In 1848, a breakwater was built from the end of this wharf across the harbor to divert silt and trash from Nuʻuanu Stream (Hawaii DOT 2008). Plans were drawn up to build a new wharf in 1900, and a long 900-ft (274.3 m) triangular-shaped wharf on fill land out from the natural shoreline was built soon after in 1900-1901 (Hawaii DOT 2008).

From historic maps, it is evident that by 1907, this wharf was owned by the U. S. Military, although they leased it back to the Hawaiian Government. In the early twentieth century, the

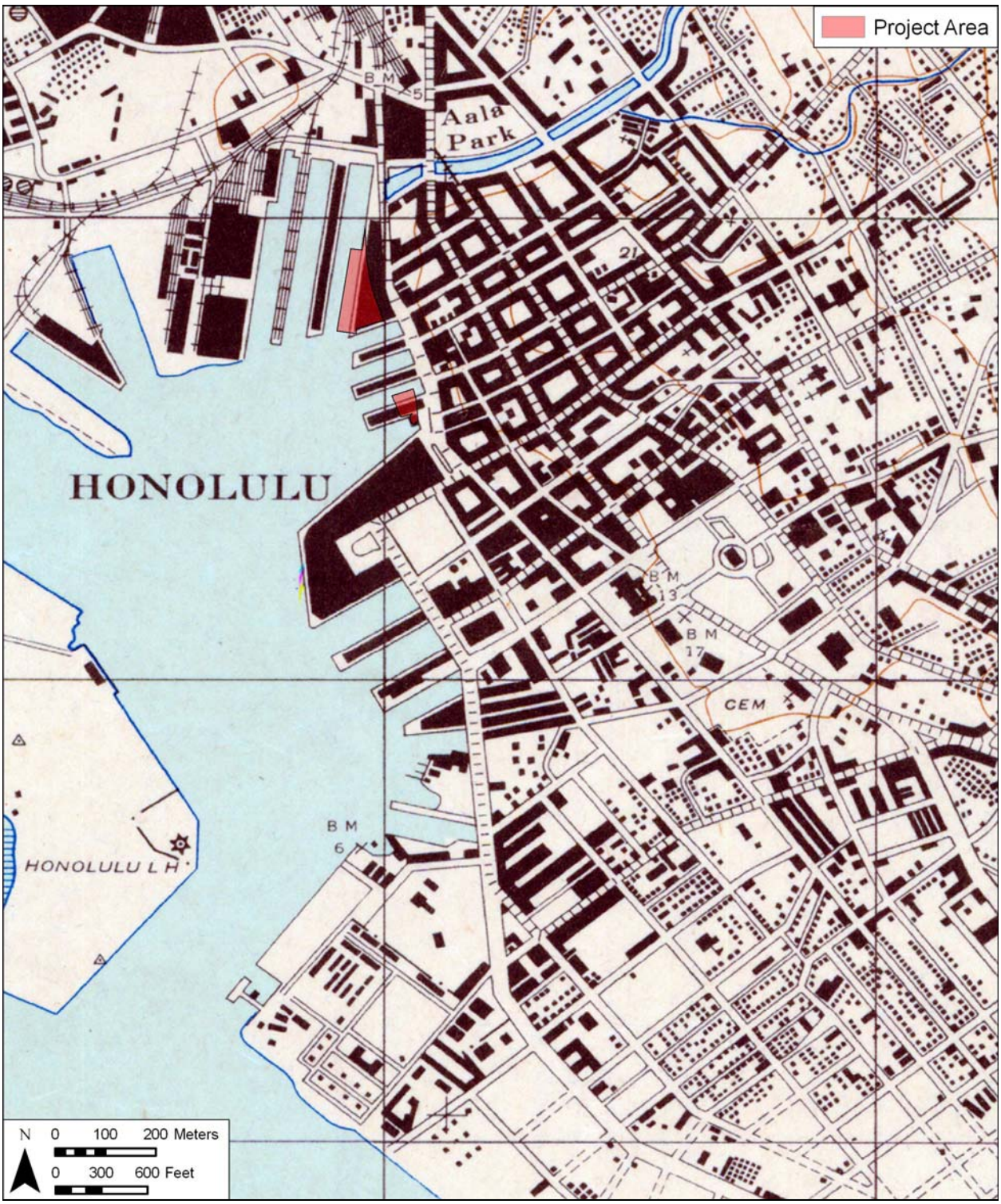


Figure 24. 1933 U.S. War Department map of O‘ahu, Honolulu Quadrangle, after the construction of Aloha Tower, east of Pier 12 and 15

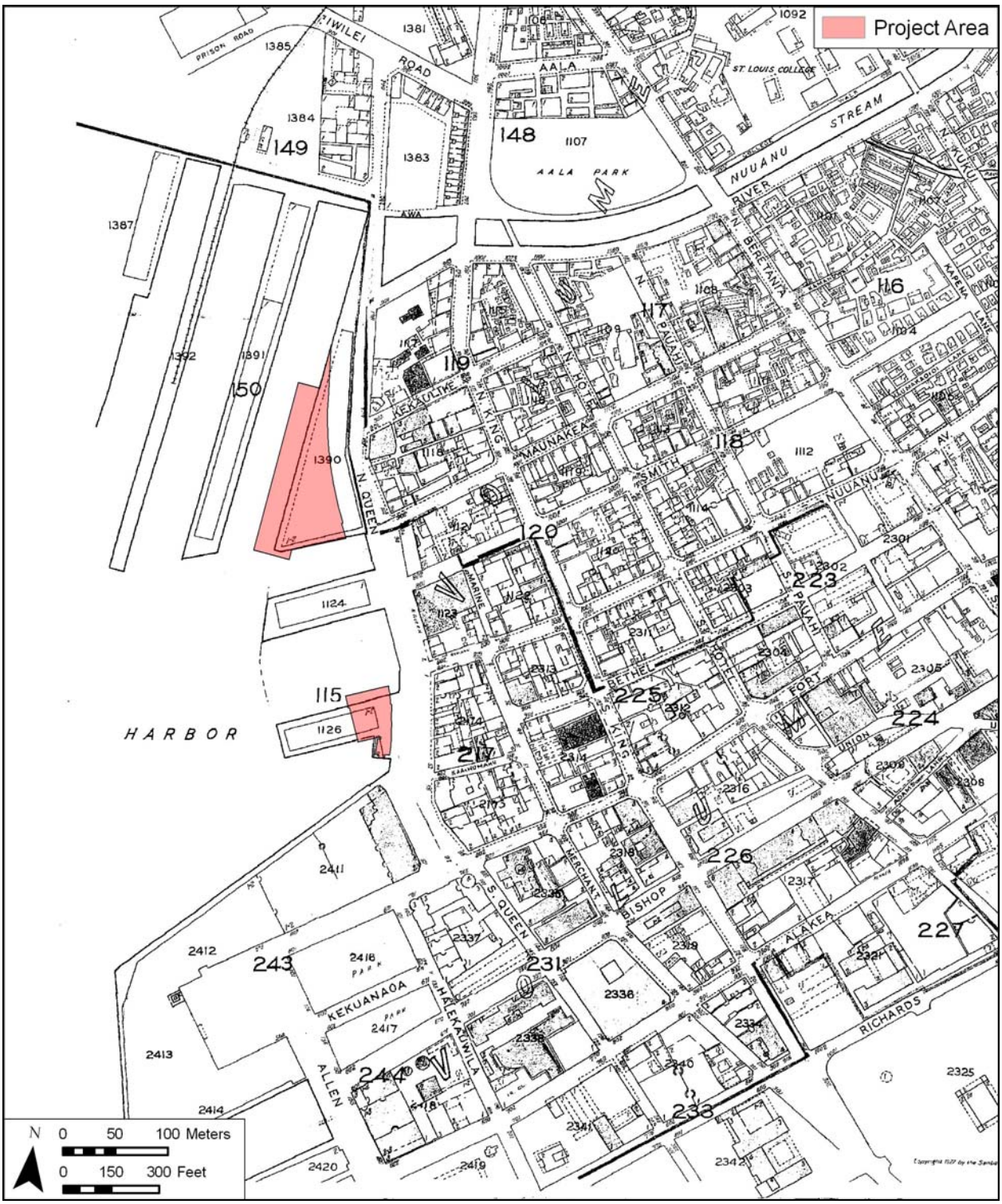


Figure 25. 1950 Sanborn Fire Insurance Co. map (Sheet 0c), with Pier 12, combined Pier 13/14 and Pier 15

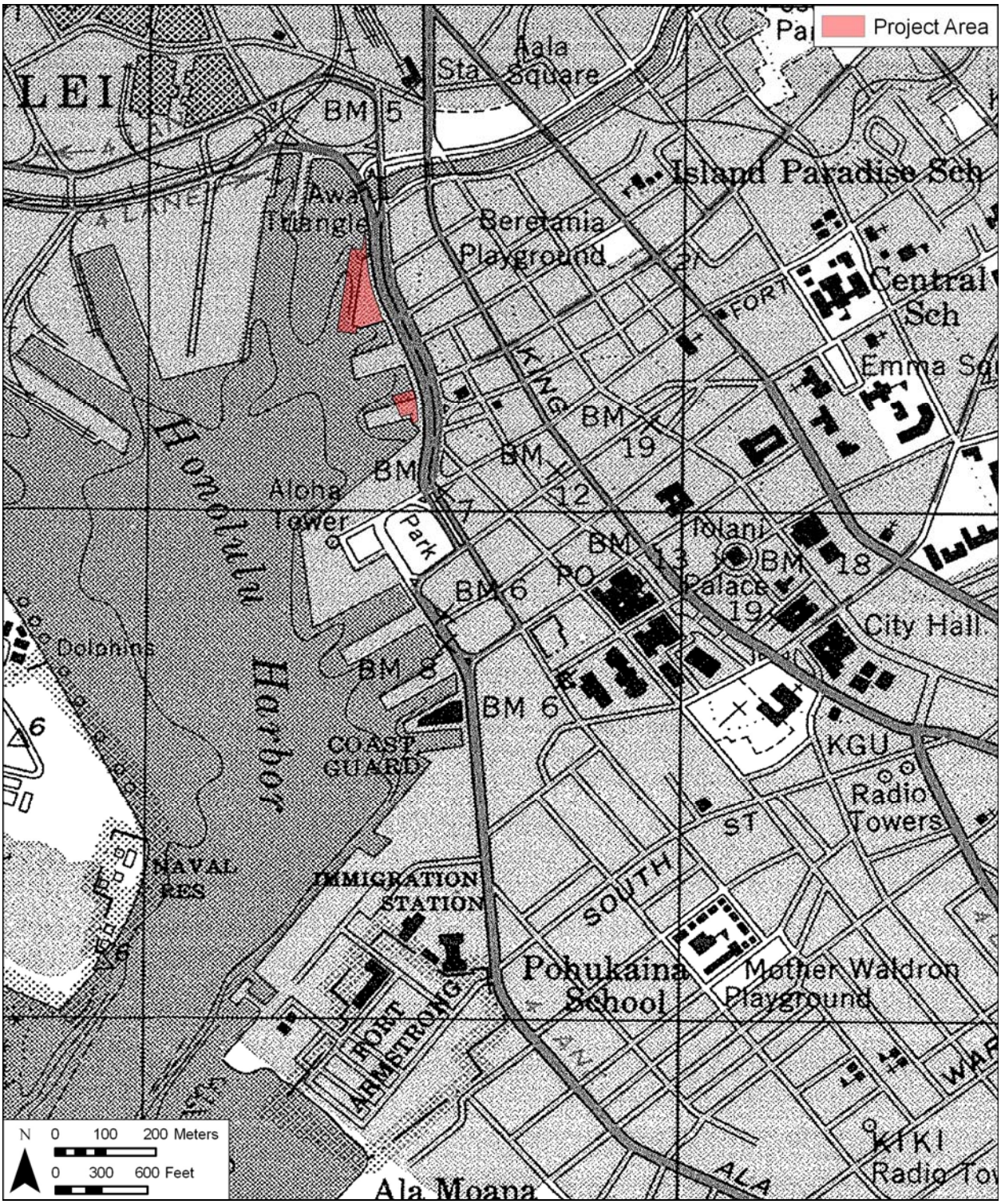


Figure 26. 1953 U.S. Army Mapping Service map of O‘ahu, Honolulu Quadrangle

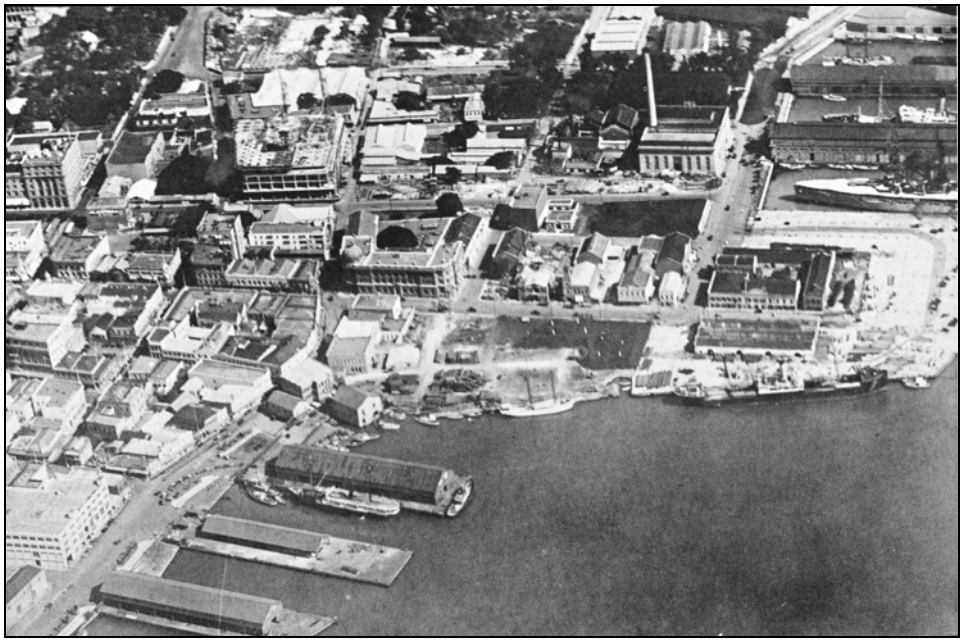


Figure 27. 1919 photograph of Piers 12, 13, and 14 before construction of Aloha Tower (Anonymous 1919)

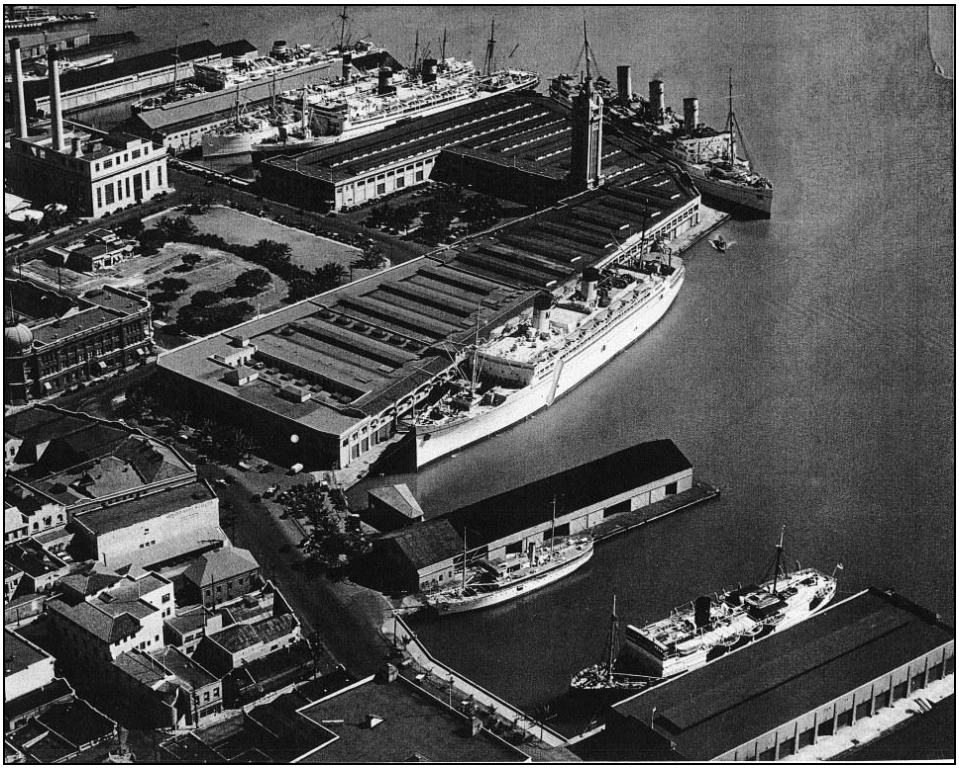


Figure 28. 1933 photograph of Piers 12 and combined Pier 13/14 after construction of Aloha Tower in 1927 (Hawai‘i State Archives)

sampan fleet of tuna fishermen moored their colorful vessels alongside Piers 15 and 16, but the fleet was moved to the newly dredged Kewalo Basin in 1918-1919, and Pier 15 was then designated as a pier to unload the lumber ships. Ships of the Interisland Navigation Co. and the Matson Navigation Co. moored at this pier (Schnack 1915:102).

By 1925, the pier had multiple gable-roof frame buildings joined side by side. At this time, the pier was designated a place to unload lumber from ships. During WWII, it was also used to unload army freight. The wharf was rebuilt in 1956 and storage facilities were added (Hawaii. DOT 2008). By 1950, it was used for auto parking. In the early 1950s, Queen Street was widened to make way for the construction of the new multi-lane Nimitz Highway, and a portion of the *mauka* section of the pier was demolished and turned into part of the highway. It was at this time that the gable structure was removed.

The fireboat *Abner T. Lonley* of the Honolulu Fire Department was moored at the pier in 1951, and then replaced by the fireboat *Moku Ahi* in 1990 (Pendelton 2000). The shape and size of the pier in 1927 is shown on a Sanborn Fire Insurance map (Figure 29), along with photographs of the pier in 1924 and 1973 (Figure 30 and Figure 31). In 1955, a shed was built north of the fire station; this shed contained rooms for a fish auction and for fish storage. In 1978, a timber apron that once extended from the gable-roofed complex was demolished. There are still pilings underwater in front of the wharf that once supported this apron. Several of the rooms in the shed were also demolished or remodeled at this time. The main use of the pier today is for support of the fire station.

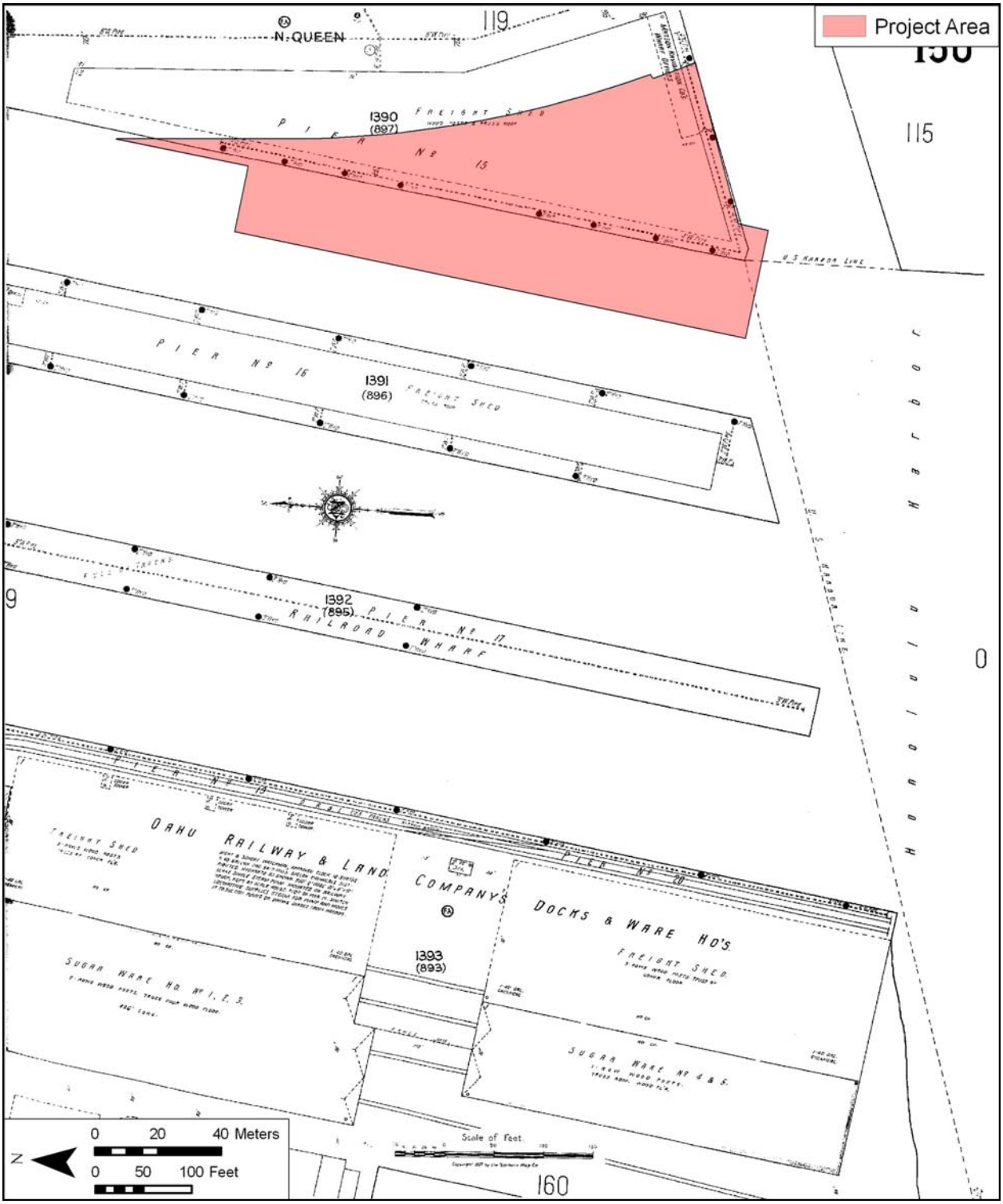


Figure 29. 1927 Sanborn Fire Insurance Co. map (Sheet 150) of Honolulu, showing Pier 15; note the amount of larger size of the property before the construction of Nimitz Highway in 1950

Figure 30. Ca. 1924 photograph of Pier 15 (University of Hawaiʻi-Mānoa Digital Collection 2012)

Figure 31. 1973 photograph of Honolulu Harbor; from front to back is Aloha Tower, a shortened Pier 12, a combined Pier 13/14, and Pier 15 (Hawaii DOT 2012)

Section 4 Previous Archaeological Research

Due to the considerable amount of development in Downtown Honolulu numerous archaeological studies have been done in the vicinity of the project areas. The previous archaeology researched for this monitoring report will be limited to the area bounded by River Street, King Street, Bishop Street, and Honolulu Harbor. The study areas are located on Figure 32, identified sites are located on Figure 33, and the findings of the studies are summarized in Table 1, and described in more detail below.

In downtown Honolulu, historic properties have been placed on the NRHP as part of the Chinatown Historic District (SIHP # 50-80-14-9986), the Merchant Street District (SIHP #50-80-14-9905), or the Capitol District (SIHP # 50-80-14-1307 and 1321). Specific significant historic buildings in the general Business District (between the Chinatown District to the west and the Capitol District to the east) have also been given NRHP site designations. The current project area is within the Chinatown Historic District, west and *makai* of the Merchant Street District, and adjacent and north of the Capitol Historic District (see Figure 33).

Archaeological sites in Honolulu are dominated by nineteenth and twentieth century historic cultural deposits, but deposits dating to the pre-Contact period and early post-Contact period (post 1778) have also been found beneath fill layers under demolished older structures, such as those found for the construction of Harbor Court (SIHP # 50-80-14-2456), and the Marin Tower (SIHP # 50-80-14-4494).

4.1.1 Kennedy 1984

Kennedy (1984) conducted subsurface test excavations at the corner of Hotel and Bethel Streets. Archival research and informant interviews were conducted as well, to illuminate the history of the site. Project stratigraphy was simple; approximately 6 in (15 cm) of asphaltic concrete and coral, underlain by 8 to 12 ft (2.4 to 3.7 m) of fill mixed with construction debris, resting on sterile coral reef material. Based on informant testimony and the results of the excavations, it became clear that there the basement of the site had been demolished in the 1960s and the site filled (down to the coral reef) with imported materials.

4.1.2 Wong-Smith and Rosendahl 1990

Smith and Rosendahl (1990) conducted a historic assessment and an archaeological field inspection of the proposed Aloha Tower Complex site, south of Ala Moana Boulevard/Nimitz Highway, from Pier 5 to Pier 14. They reported that there had been no previous archaeological work within their study area (1990:1). They concluded that the entire project area had been submerged (the one small area that had been shoreline land in 1810 was subsequently removed during channel dredging). The only historically significant structures in their study area were Piers 8-12 and Aloha Tower with its associated grounds (1990:25).

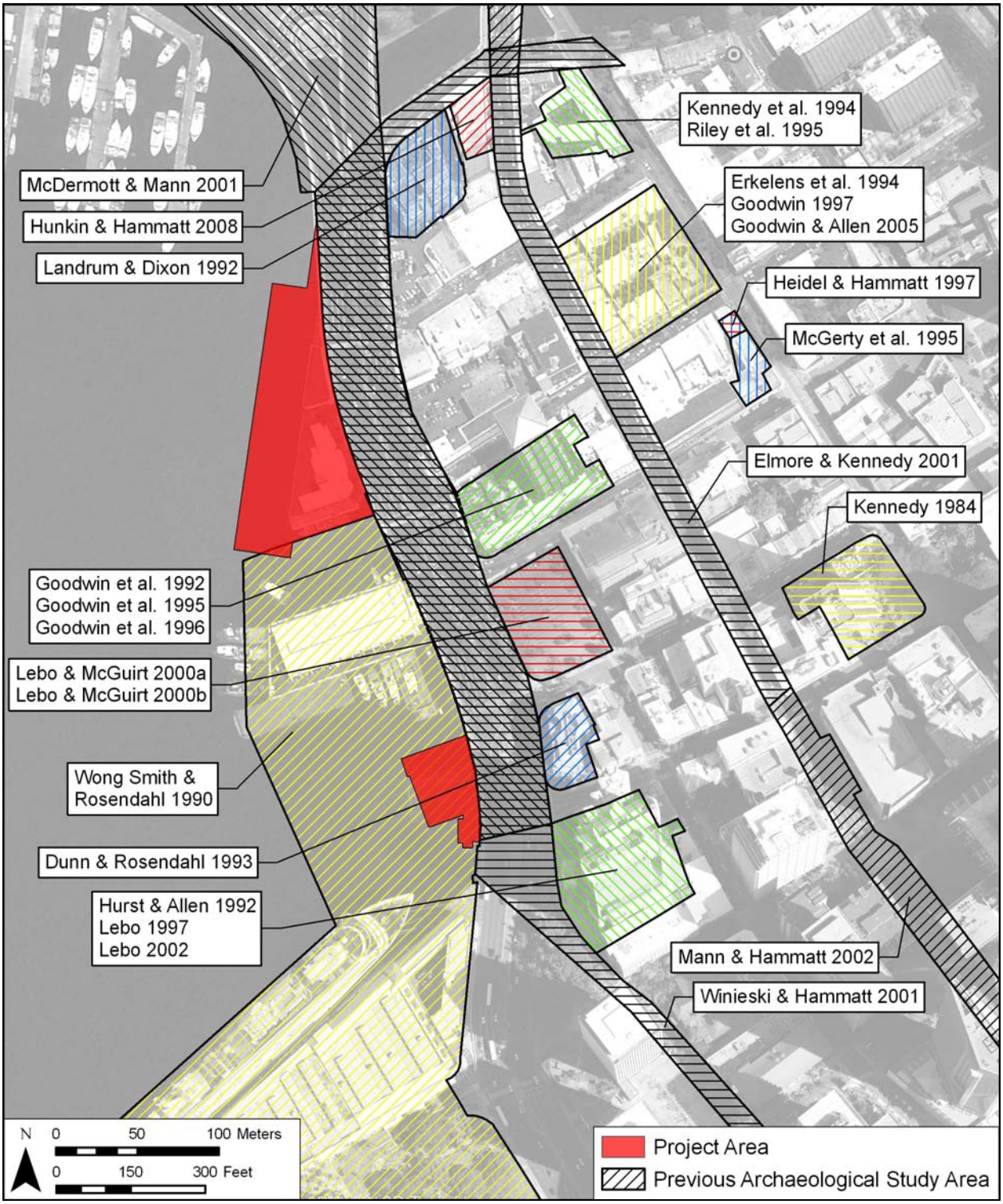


Figure 32. Previous Archaeological Study Areas in the Chinatown and Business Districts of Honolulu *makai* of King Street (base figure: Aerial photograph Google Earth 2009)

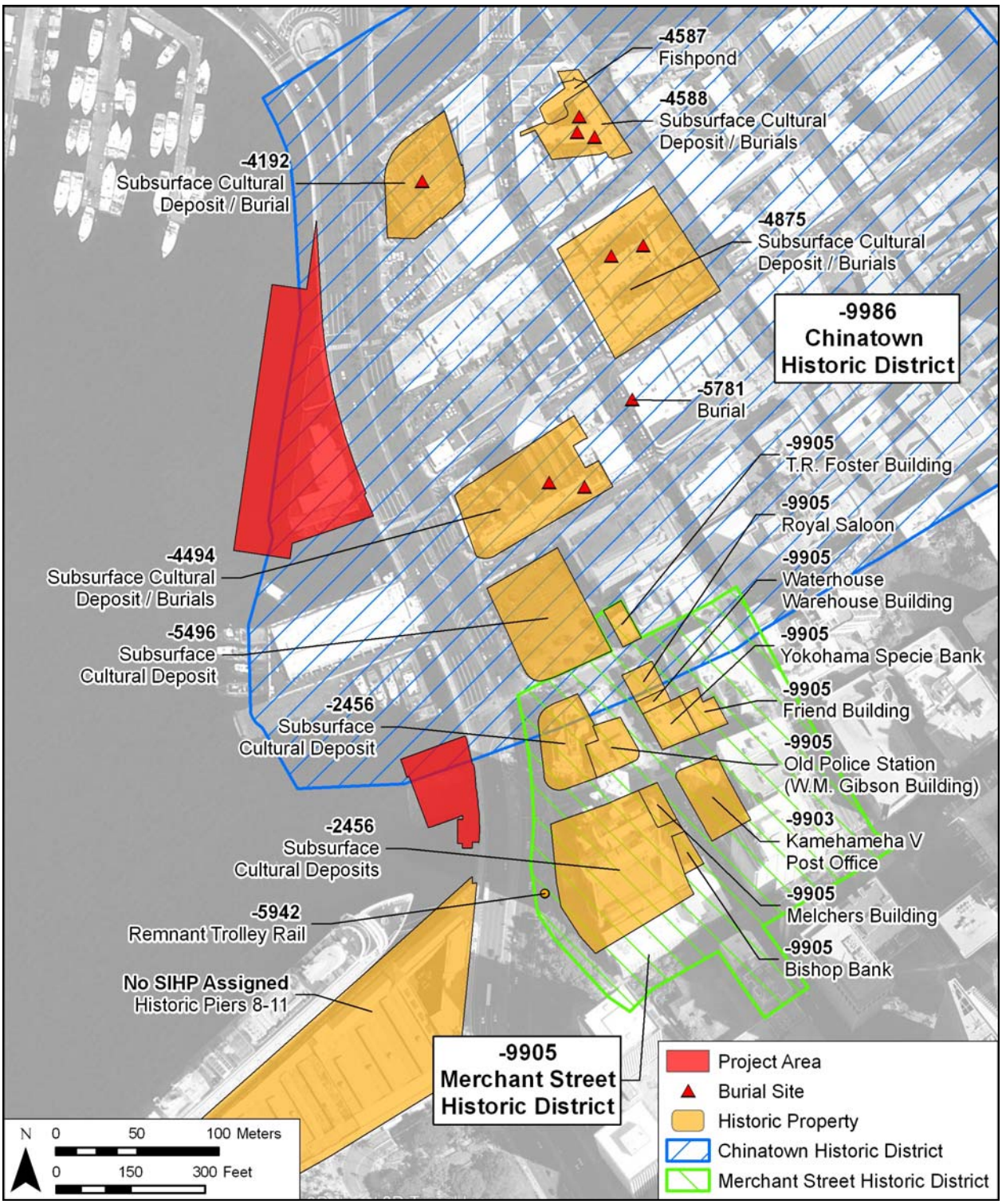


Figure 33. Previously identified archaeological and historic sites in the Chinatown and Business Districts of Honolulu, *makai* of King Street (base figure: Aerial photograph Google Earth 2009)

Table 1. Previous Archaeological Research in Downtown Honolulu

Reference	Location	Project Type	Results
Kennedy 1984	Parking lot on corner of Hotel and Bethel streets	Data recovery	Excavations revealed that imported fill had been placed all the way to the coral bedrock
Wong-Smith and Rosendahl 1990	Aloha Tower Complex, Aloha Tower Drive	Historical assessment	Determines that the entire project area sits on historic period landfill
Hurst and Allen 1992	Ka‘ahumanu Parking Lot/Harbor Court on Bethel, Fort, Merchant and Queen Street	Monitoring and inventory survey	18 contact era features, numerous historic and traditional artifacts, and building material
Landrum and Dixon 1992	River Nimitz Redevolpment Project, River Street and Nimitz Highway	Data recovery	Documented four post-Contact trash pits, a brick and motor building foundation, and a single pre-Contact human burial. All documented archaeological features were designated part of SIHP # 50-80-14-4192.
Goodwin et al. 1992	Marin Tower property, Smith and Maunakea Street	Data recovery	Disinterment of 13 burials features and the remains of several displaced and isolated human skeletal elements
Dunn & Rosendahl 1993	Nu‘uanu Court; Area bounded by Bethel and Fort Street, Nu‘uanu Avenue and Nimitz Highway	Inventory survey	One historic property was documented: SIHP # 50-80-14-2456, a cultural layer roughly 10,000 square feet containing both pre- and post-Contact features.
Erkelens et al. 1994	Kekaulike Revitilization Project, Diamond Head Block	Burial report	Report on burials from SIHP # -4875; the remains were too fragmentary to date
Kennedy et al. 1994	Kekaulike Revitilization Project, ‘Ewa Block	Inventory survey	Two historic properties: SIHP #50-80-14-4587, subsurface remnants of a small fishpond. and SIHP #50-80-14-4588, subsurface cultural layer with both pre- and post-Contact components. Of note are two post-contact and one pre-Contact burials.

Reference	Location	Project Type	Results
Goodwin et al. 1995	Marin Tower property, Smith and Maunakea Street	Burial report	Separate report (Volume II) for burial descriptions of 28 burials at (SIHP # 50-80-14-4494)
McGerty et al. 1995	Hotel Street between Maunakea and Smith Street	Archaeological assessment	Historic background and a brief field chick on a block in Kīkīhale ‘Ili
Riley et al. 1995	Kekaulike Revitilization Project, ‘Ewa Block	Inventory survey	Further research at SIHP #s -4587 and -4588.
Goodwin et al. 1996	Marin Tower property, Smith and Maunakea Street	Inventory survey, data recovery and monitoring	The entire Marin Tower property (Volume I) was designated SIHP # 50-80-14-4494, which consists of 28 post-Contact burial features and the remains of several displaced human skeletal remains, pre-Contact fire pits and early post-Contact structural foundations associated with the residence of the Marin family from about 1810 to 1850.
Goodwin 1997	Kekaulike Revitilization Project, Diamond Head Block	Inventory survey	One historic property identified: SIHP # 50-80-14-4875, a subsurface cultural layer with evidence of both pre- and post-Contact occupation.
Heidel and Hammatt 1997	Corner of Hotel and Maunakea Street	Data recovery	No cultural deposits found in four backhoe trenches
Lebo 1997	Harbor Court, area bound by Bethel, Fort, Merchant and Queen Street	Data recovery	53 historic and traditional features
Lebo and McGuirt 2000a	800 Nu‘uanu Project	Inventory survey	Six trenches were excavated and a pre-Contact to twentieth century cultural layer was identified and designated SIHP # 50-80-14-5496
Lebo and McGuirt 2000b	800 Nu‘uanu Project	Data recovery	Ten additional trenches excavated to explore SIHP # 50-80-14-5496, a subsurface cultural layer
Elmore and Kennedy 2001	King Street between Maunakea and Smith Street	Monitoring	One traditional Hawaiian burial (SIHP # -5781) on King St. between Maunakea and Smith

Reference	Location	Project Type	Results
McDermott and Mann 2001	Nimitz Highway between Queen and Awa Street	Inventory survey	One historic property, SIHP # 50-80-14-5966, Kawa Fishpond, west of River Street was recorded
Winieski and Hammatt 2001	Area along Nimitz Highway, Queen Street and Ala Moana Boulevard	Monitoring	Historic rubbish and the remains of a light gauge rail system (SIHP # 50-80-14-5942) at the intersection of Queen Street and Nimitz Highway, associated with the historic Honolulu Rapid Transit System
Lebo 2002	Harbor Court Project, Bethel Street	Data recovery	Radiocarbon analysis of the SIHP -2456, a pre-Contact deposit, indicated that occupation at the site began between A.D. 1000 and A.D. 1200.
Mann and Hammatt 2002	King Street between Dillingham and South Street	Monitoring	On burial (SIHP # -6371) was found near the junction of King and Punchbowl streets
Goodwin and Allen 2005	Kekaulike Revitalization Project, Diamond Head Block	Data recovery	A multi-component site (SIHP # 50-80-14-4875) dating to the thirteenth century was found; four burial were also present
Hunkin and Hammatt 2008	Armstrong Bldg., corner of River and King Street	Monitoring	No cultural deposits were found during renovations to the outside courtyard

SIHP # (50-80-14)	Nature of Site	Status/ Comments	Source
# -1321*	Honolulu Capitol District	Includes: ‘Iolani Palace Grounds (Hawaii State Capitol Bldg. and Grounds, ‘Iolani Palace and grounds, ‘Iolani Barracks, Coronation Stand, Pohukaina Royal Tomb), Kana‘ina Bldg (Old Territorial Archives), Hawai‘i State Library, Hawaiian Elec. Co. Office, King Kalākaua (Federal) Bldg, Ali‘iōlani Hale, Kamehameha Statue, Kekūanao‘a (Territorial) Bldg, Kapuaīwa Bldg, Kawaiaha‘o Church, Lunalilo Tomb, Hale ‘Auhau (Tax Office). NRHP 12/1/1978	SHPD Web Site
# -2456	Pre-Contact and Historic Cultural Deposit	Historic artifacts dating from Contact (1778) to the present were analyzed. A total of 113 features were associated with the pre-contact deposit. Radiocarbon analysis suggested occupation of the area as early as A.D. 1000-1200	Hurst and Allen 1992; Dunn and Rosendahl 1993; Lebo 1997; Lebo 2002
# -4192	Pre-Historic, Traditional Hawaiian burial, and post-Contact Deposits	Four post-Contact trash pits, numerous artifacts in the trash pits appeared to be deposited in the early nineteenth through twentieth century, a brick and motor building foundation, and a single pre-contact human burial	Landrum and Dixon 1992
# -4494	Early historic to modern cultural deposit, and 28 early historic burials	Historic deposit and structural remains dating from the contact period (ca. 1778) to the present; twenty-eight historic burials in this area were given the same site number	Goodwin et al. 1995; Goodwin et al. 1996
# -4587	Fishpond	Fishpond with multi-component site dating to as early as the thirteenth century	Kennedy et al. 1994; Riley et al. 1995
# -4588	Burials (four)	Four burials, too fragmentary to determine ethnicity or age	Erkelens et al. 1994

SIHP # (50-80-14)	Nature of Site	Status/ Comments	Source
# -4875	Pre-and post contact subsurface cultural layer and burials	A subsurface cultural layer with evidence of both pre- and post-contact occupation. Initial occupation in the thirteenth century; four burials found.	Erkelens et al. 1994; Goodwin 1997; Goodwin & Allen 2005
# -5942	No traditional Hawaiian cultural materials or features and no pre-Contact or historic burials	Historic rubbish and the remains of a light-gauge rail associated with the historic Honolulu Rapid Transit Trolley system	Winieski and Hammatt 2001
# -5496	Pre-and post contact subsurface cultural layer	The cultural layer dated from three cultural zones, 1810-1860s, a transition from traditional Hawaiian to post-contact habitation, 1860s-1890, use of the area for stores and warehouses, traditional habitation and shore use, 1830s-1860s, and 1890s to the present, urbanization of the area.	Lebo and McGuirt 2000a, 2000b
# -5781	Traditional Hawaiian Burial	One traditional Hawaiian burial on King Street between Maunakea and Smith Street	Elmore & Kennedy 2001
# -9903	Kamehameha V Post Office	1871. NRHP 5/5/1972	SHPD Web Site
# -9905	Merchant Street Historic District	Includes: Nippu Jiji, Irwin Block, T. R. Foster Bldg. - O'Tooles' Pub, Wing Wo Tai & Co. Bldg., Royal Saloon – Murphy's Bar, Gibson Bldg – Old Police Station, J. T. Waterhouse Bldg., The Friend Bldg., Yokohama Specie Bank, Kamehameha V Post Office, Melchers Bldg., Bishop Estate Bldg., Judd Bldg., Stangenwald Bldg., Honolulu Star Bulletin Bldg. Bishop & Co. Bank NRHP 6/28/1973	SHPD Web Site

SIHP # (50-80-14)	Nature of Site	Status/ Comments	Source
# -9986	Chinatown Historic District	Includes: Armstrong Bldg., Kekaulike Bldg., L. Ah. Leong Bldg., Oahu Marketplace, Chinatown Fish Market, Lee & Young Bldg., Yee Hop Plaza, Liberty Bank, Schnack Bldg., Kawahara-Sato Bldg., DOT Harbors Division, Central Pacific Bank; King's Court NRHP 1/17/1973	SHPD web site
--	Pākākā Heiau	Destroyed in early nineteenth century for the construction of the Honolulu Fort	Pukui et al. 1974

*SIHP # -1321 not included on Figure 33 as it is Southeast of the project area.

4.1.3 Hurst and Allen 1992

The Public Archaeology Section of the BPBM Applied Research Group performed preliminary historical research for the redevelopment of two sites (a parking lot and a parking structure) at the corner of Bethel and Queen Streets. In 1991 Public Archaeology Section members monitored the demolition of the parking structure; seventeen subsurface features were exposed during the removal of construction materials and concrete foundation piers, and three test units were excavated. While the test units revealed Contact and pre-Contact era layers, the building piers had not impacted historical features, and had not extended into the Contact and pre-Contact layers. Artifacts recovered included a mix of traditional Hawaiian stone, bone, and shell artifacts, as well as Western glass, ceramic, and metal artifacts. The excavators found that fragile and sensitive cultural remains were exceptionally well-preserved. The final archaeological monitoring and inventory survey report (Hurst and Allen 1992) described the eighteen previously undocumented Contact-era features (fired-brick foundation remnants, coral block features, an arched brick drainage system, domed brick cesspool, basalt block wall, concrete culvert and foundations, metal fuel tank, metal water main, a boulder concentration, and a packed-earth floor). Collected artifacts were described and analyzed as well.

4.1.4 Landrum and Dixon 1992

In 1989, the Applied Research Group at the BPBM conducted emergency data recovery in response to the inadvertent discovery of subsurface archaeological features during River-Nimitz Redevelopment work on the corner of River Street and Nimitz Highway. Documented archaeological features consisted of four post-Contact trash pits, a brick and motor building foundation, and a single pre-contact human burial. The numerous artifacts discovered in the trash pits appeared to be deposited in the early nineteenth century through the early twentieth century. The pre-Contact burial was found within inundated marsh sediments, which preserved some soft-tissue remains, as well as burial goods consisting of braided cordage and matted *pandanus*. All of the documented archaeological features were designated SIHP # 50-80-14-4192.

4.1.5 Dunn and Rosendahl 1993

Dunn and Rosendahl (1993) conducted an archaeological inventory survey (AIS) at Nu‘uanu Court of an area bounded by Bethel and Merchant Streets, Nu‘uanu Avenue, and Nimitz Highway (the former Kaahumanu parking lot described in Hurst 1990). Six backhoe trenches revealed the presence of a single large (roughly 10,000 square feet (ft^2) or 929 square meters [m^2]) cultural deposit underlying the project area, SIHP # 50-80-14-2456, consisting of pre-Contact and early post-Contact layers, overlain by a layer of late historic fill. Nineteen features were identified; eleven pre-Contact and early-Historical postholes, a pit originating in the pre-Contact layer, a historic ash lens, foundation wall, pipe trench, and two historic floors. Based on radiocarbon dating, the site was initially occupied as early as AD 1250.

4.1.6 Erkelens et al. 1994

In 1994, a separate report on the Kekaulike Diamond Head Project (Erkelens et al. 1994), four burials of SIHP # 50-80-14-4587 were discovered and discussed. Three of the individuals, a male aged 24-30, a female aged 15-18, and a female aged 3-4, were found on site. The remains of a

human fetus were also inadvertently removed from the site and later identified during faunal analysis in the laboratory. The highly fragmentary and incomplete remains were all found in a secondary context and limited information could be gathered from them.

4.1.7 Kennedy et al. 1994

In 1994, Archaeological Consultants of Hawaii, Inc., completed AIS for the Kekaulike Revitilization Project ʻEwa Block, an area bounded by Hotel Street, River Street, King Street, and Kekaulike Street (Kennedy et al. 1994). Subsurface testing identified two historic properties: SIHP #50-80-14-4587 and SIHP # 50-80-14-4588. SIHP # -4587 consists of the subsurface remnants, an earthern berm fishpond wall, and pond sediment of a small fishpond. SIHP # -4588 consists of a subsurface cultural layer with both pre- and post-Contact components. Post-Contact elements associated with SIHP # -4588 consistsed of crushed coral building foundations, trash pits, a burn layer, and two human burials. Pre-Contact elements associated with SIHP # -4588 consistsed of post holes, fire pits, and a human burial.

4.1.8 Goodwin et al. 1995

In 1992, International Archaeological Research Institute, Inc., completed data recovery for the Marin Tower property on the *makai* corner of Smith and King streets (Goodwin et al. 1995). The personal diary of Don Pablo Francisco Marin (interred in a tomb on his property on Nov. 7, 1837) and other accounts indicate that Marin and a number of his wives and children were most likely buried on this property in a family cemetery. Fifteen burial features and several isolated, displaced human skeletal remains were found during the data recovery effort on the Marin Tower lands. Many iron coffin nails, both for adult and child coffins, were recovered. A large variety of associated grave goods were also recovered, including small glass beads (0.08 in- (0.20 cm)-in diameter), large glass beads, a copper ring, bone discs, and buttons, an iron and wood smoking pipe, a glass bead necklace, copper alloy buttons, shell buttons, ceramics, an iron-blade kitchen knife, and a copper cross necklace. A Memorandum of Agreement was drawn up with the present Marin family relatives and the skeletal remains were disinterred then re-interred elsewhere on the property on March 3, 1994. The entire Marin Tower property was designated SIHP # 50-80-14-4494.

4.1.9 McGerty, Mills and Spear 1995

An archaeological assessment was conducted on two parcels of land in the Chinatown area on Hotel Street between Maunakea and Smith Streets (McGerty et al. 1995). This work including background research and a brief field check. Documentary research indicated that the project area was near the *maika* field of Kalanikahua in the *ʻili* of Kīkīhale in the pre-Contact period. In the post-Contact period it was part of Chinatown and was within the burn area of the 1900 fire. Several stone structures were built on the properties in the early 1900s.

4.1.10 Riley et al. 1995

In 1995, Archaeological Consultants of Hawaii, Inc., returned to the Kekaulike Revitilization Project site to conduct data recovery excavations at SIHP # 50-80-14-4587 and SIHP # 50-80-14-4588 (Riley et al. 1995). Sixty-four 1 m^2 test units were excavated, yielding abundant pre- and post-contact artifacts, faunal remains, and midden. Data recovery excavations documented

the temporal transition of the project site from a traditional Hawaiian village located along the coast into a thriving urban commercial district that eventually developed into the Chinatown district of modern day Honolulu (Riley et al. 1995).

4.1.11 Goodwin et al. 1996

In 1992, International Archaeological Research Institute, Inc. (Goodwin et al. 1996) conducted monitoring, an AIS, and data recovery at the Marin Tower property. Documented archaeological features consisted of pre-Contact fire pits and early post-contact structural foundations associated with the residence of the Marin family from about 1810 to 1850. Also documented were artifacts associated with the use of the *makai* portion of the property as part of the Honolulu Ironworks from 1850 to 1900, as well as the use of the *mauka* portion for shops and families of Chinese merchants during the same period; Additionally, artifacts and structures related to the commercial development of the property as part of Downtown Honolulu from 1900-1950 were also documented.

4.1.12 Goodwin 1997

In 1997, the International Archaeological Research Institute, Inc. completed an AIS of the Kekaulike Diamond Head Project, an area bounded by King Street, Maunakea Street, Hotel Street, and Kekaulike Street. Subsurface testing identified one historic property: SIHP # 50-80-14-4875. SIHP # -4875 consisted of a subsurface cultural layer with evidence of both pre- and post-Contact occupation. One hundred-five discrete features were identified as being associated with SIHP # -4875. Identified features consisted of coral and brick building foundation, post holes, pre-Contact fire pits, post-Contact privies, and trash pits.

4.1.13 Heidel and Hammatt 1997

In 1997, archaeological testing was conducted by CSH (Heidel and Hammatt 1997) at a 1700 ft^2 parcel at the corner of Hotel and Maunakea Streets. A total of four test trenches were excavated by backhoe. This testing resulted in negative findings; the trenches revealed only the presence of an historic basement filled with modern debris and sediment.

4.1.14 Lebo 1997

Lebo (1997) performed an archaeological data recovery effort at the Kaahumanu parking structure site (the area bounded by Fort, Merchant, Bethel, and Queen Streets) previously studied by Hurst (1991) and Hurst and Allen (1992). Fifty-three pre-Contact and Historic-era features were recorded, providing information on Hawaiian occupation from the late eigtheenth to mid-nineteenth centuries, and on commercial development in Honolulu in the nineteenth and twentieth centuries.

4.1.15 Lebo and McGuirt 2000a

A subsurface inventory survey (Lebo and McGuirt 2000a) was conducted by the BPBM in December 1996 (Lebo et al. 2000) at 800 Nu‘uanu Avenue. Six trenches were excavated in the parking lot of a Bank of Hawai‘i building at the corner of Marin and Smith Streets. An analysis of the trench stratigraphy and recovered cultural remains allowed the researchers to identify five

cultural periods within a cultural deposit designated SIHP # 50-80-14-5496: (1) pre-Contact (pre-1810), when the area was inhabited only by Native Hawaiians; (2) 1810 to 1850, when early foreign residents such as the Spaniard Don Francisco de Paula de Marin and the Englishman Isaac Davis began to build dwellings and storehouses in the area; (3) 1850-1890s, when large industrial structures, such as the Honolulu Flour Mill and the Honolulu Iron Works, were built on the property; (4) 1890s-1925, when many smaller wooden structures for businesses took over the area; and (5) 1925 to present, when most buildings were demolished and the study area was used as a parking lot. A few traditional Hawaiian artifacts and numerous historic artifacts were recovered during the excavations.

4.1.16 Lebo and McGuirt 2000b

Data recovery (Lebo and McGuirt 2000b) was conducted by the BPBM in the 800 Nu‘uanu Block (TMK 1-1-7-002:002) in October 1997. Ten backhoe trenches were excavated within the parking lot on the Diamond Head portion of the block bounded by Nu‘uanu Avenue and Nimitz, Marin, and Smith Streets. A total of 76 features were identified, including building foundations, post molds, coral block floors and walls, fire pits, trash deposits, and cast-iron sewer pipes. All features within the project area were designated as part SIHP # 50-80-14-5496, previously identified by Lebo et al. (2000). The earliest cultural remains were believed to date to earlier than A.D. 1810. Numerous historic artifacts were recovered dating to the early post-Contact period when the area was used for storehouses, to the later historic periods when the lot was used for industrial structures, for small businesses, and then as a parking lot.

4.1.17 Elmore and Kennedy 2001

Archaeological monitoring was conducted during miscellaneous sidewalk improvements in Chinatown on King Street between Maunakea Street and Smith Street (Elmore and Kennedy 2001). One in situ human burial (SIHP # 50-80-14-5781) was identified between Maunakea Street and Smith Street. The burial was believed to be a pre-Contact traditional Hawaiian, based on its flexed position and lack of historic artifacts. A small amount of artifacts were recovered from the back dirt (ceramic fragments, glass, a shark tooth, possible drilled shell fragment, possible shark tooth tool, and one fishhook), however none could be positively associated with the burial.

4.1.18 McDermott and Mann 2001

McDermott and Mann (2001) conducted an AIS along Nimitz Highway from Queen Street to Awa Street for the Nimitz Highway water system improvements. Although several historic buildings and properties were identified outside of their project area, only one historic property (SIHP # 50-80-14-5966, Kawa Fishpond) was located within their project area. Nimitz Highway had been constructed in the 1950s over the western portion of Queen Street, and no remnants of the former Queen Street were identified in their survey. The concrete bridge over Nu‘uanu Stream, although marked with a 1932 date, is a relatively modern reconstruction of the earlier bridge (McDermott and Mann 2001:64).

4.1.19 Winieski and Hammatt 2001

Winieski and Hammatt (2001) conducted archaeological monitoring of the Nimitz Highway Reconstructed Sewer Project. The route of the sewer construction began on River Street, at the intersection of River and Hotel Streets, ran to Nimitz Highway, and extended to Bethel Street, where it merged into the ‘Ewa end of Queen Street. The route then extended along Queen Street to South Street, along South Street to Ala Moana Boulevard, and terminated at the Ala Moana Wastewater Pump Station. The sewer line was installed employing the micro-tunneling technique, which limited the extent of open cut trenching, requiring instead the excavation of 24 jacking and receiving pits (measuring up to 8 m^2) in order to accommodate tunneling machinery. No traditional Hawaiian cultural materials or features and no pre-Contact or historical burials were observed during archaeological monitoring. Very few historical period cultural materials (a historic period bottle at South and Auahi Streets, a historic brick and mortar alignment at Queen and Punchbowl Streets, a historic brick-lined manhole, and scattered historic rubbish at Maunakea Street and Nimitz Highway) were observed in their project area. Only one historic property was encountered: a remnant of a light-gauge rail associated with the historic Honolulu Rapid Transit trolley system (SIHP # 50-80-14-5942) at the intersection of Queen Street and Nimitz Highway (Winieski and Hammatt 2001:19).

4.1.20 Lebo 2002

In 2002, Paul H. Rosendahl Inc. (PHRI) completed data recovery at SIHP # 50-80-14-2456, located at the Harbor Court Tower site (formerly called the Ka‘ahumanu Parking Garage). The data recovery excavations conducted by PHRI completed the work that was initially begun by the Applied Research Group (Lebo 1997). Radiocarbon analysis of the SIHP # -2456 pre-Contact deposits indicated that occupation at the site began between A.D. 1000 and A.D. 1200 (Lebo 2002: 14-1). A total of 113 features were identified within pre-Contact deposits, including 86 post molds, 25 in-filled pits, and two firepits. Traditional Hawaiian artifacts collected from the pre-Contact deposits consisted of primarily basalt tools and flakes, and were recovered from non-feature contexts. Observed midden consisted primarily of fish, bird, sea turtle, and marine mollusks. Dog and pig were also documented, but to a lesser extent.

4.1.21 Mann and Hammatt 2002

Archaeological monitoring was conducted for the King Street Rehabilitation project on sections of King Street between Dillingham Blvd. and South Street (Mann and Hammatt 2002). One human burial (SIHP # 50-80-14-6371) was recovered near the intersection of South King Street and Punchbowl Street, *makai* of Honolulu Hale. The skeletal remains were incomplete and poorly preserved, due to previous disturbance by construction activities. In addition to the human burial, a pit feature containing a substantial quantity of non-human skeletal remains was documented at the corner of South King Street and Richards Street. According to Mann and Hammatt (2002), along King Street, between South and Bethel Street, the asphalt (Stratum Ia) extended 20 cm (7.9 in) below the surface. Below the asphalt layer was 15-25 cm (5.9-9.8 in) of basalt gravel fill (Stratum Ib). Stratum II, 40-70 cm (15.7-27.6 in) below the surface, was a dry clay loam. Portions of Stratum II had a cultural layer that included historic trash and artifacts. Between 70 and 130 cm (27.6 and 51.2 in) below the surface was the black volcanic ash layer

from the Tantalus/Sugarloaf eruption which predated any human occupation. A coral substrate underlay the ash layer.

4.1.22 Goodwin and Allen 2005

Archaeological data recovery field work was conducted from August 2 to September 30 and on October 7, 1994 on the Kekaulike Diamond Head block (southeast corner of Kekaulike and Hotel) in the Chinatown Special District (Goodwin and Allen 2005). Archaeological workers at the multi-component site (SIHP # 50-80-14-4875) recovered artifacts and dated charcoal layers that indicate the area was in use as early as the thirteenth century, with heavy occupation occurring from early to mid-nineteenth century. Four compounds and a blacksmith's shop, dating partly to the early nineteenth century, were excavated. A total of 8,552 artifacts were collected, associated with a variety of ethnic origins (traditional Hawaiian, Euro-American, and Asian). Artifacts collected included porcelains, earthenware, stoneware, lithics, fishhooks, pendants, a poi pounder, metal, coins, beads, bottles, glass shards, bone, shell, and charcoal. Multiple features, such as postmolds, living floors, firepits for heating and cooking, refuse pits, and fence lines, were all recorded in association with each of the four house compounds. Large amounts of bone midden were also recovered, which included faunal remains that were present before Contact, such as pig, dog, turtle, chicken, shark, fish and Pacific rat. Animals later introduced after Contact, including cow, horse, goat and sheep, domestic cat, and the Norway/Roof Rat, were also present. Four burials had been discussed in a previous interim report (Erkelens et al. 1994). Three of the individuals, a male aged 24-30, a female aged 15-18, and a female aged 3-4, were found on site. The remains of a human fetus were also inadvertently removed from the site and later identified during faunal analysis in the laboratory. The highly fragmentary and incomplete remains were all found in a secondary context and limited information could be gathered from them.

4.1.23 Hunkin and Hammatt 2008

CSH monitored the renovation of the courtyard in the back of the Armstrong Building in the Chinatown Historic District (SIHP # 50-80-14-9986). This structure was built in 1905, a brick-masonry building faced with a bluestone rock exterior; it replaced an older structure built in the 1890s and destroyed by the 1900 Chinatown Fire (Hunkin and Hammatt 2008:30). Only shallow trenching was conducted to remove and renovate the concrete pavement of the courtyard, and no cultural deposits or materials were reported by the archaeological monitors.

Section 5 Field Inspection Results

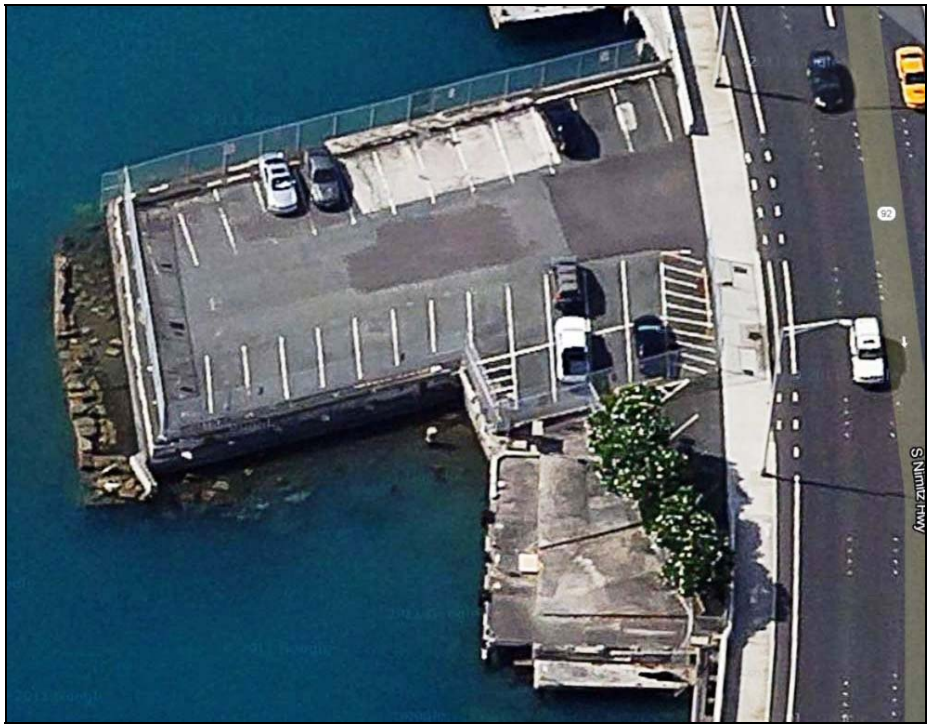
Fieldwork for the project consisted of a pedestrian survey of pier areas with public access. The fieldwork was conducted on August 1, 2012 by CSH archaeologist Constance R. O'Hare, B.A., under the general supervision of Dr. Hallett H. Hammatt. The archaeologist walked all open, accessible areas of the property and took photographs of the structures and parking lots.

Pier 12 (Figure 34 and Figure 35) is an asphalt pad fenced on three sides and is currently used as a parking lot. The entire central section is accessible from Nimitz Highway. The small concrete southern extension is fenced on all sides. Stacked coral blocks, brick pavement, and old concrete curbs can be seen on the *makai* (west) side, on the other side of the fence. The coral blocks are generally rectangular and stacked two courses high on the perimeter. On the *mauka* side of the blocks, the pavement consists of gravel, and in one area, old bricks. This old pier extends all the way across the *makai* edge of the pier, and around the southwest corner Figure 36 to Figure 41).

A landing was built in this area as early as 1823, and was called Reynolds' wharf as early as the 1830s-1840s, then Brewer's Wharf by the 1850s. In 1880 it was 160 ft-(48.8 m)-long, by 1881, it was 170 ft- (51.8 m)-long, and by 1888 it was 200 ft- (61.0 m)-long. In 1907, the pier was reshaped and extended to 300 ft (91.4 m). In 1963, the wharf was shortened to 125 ft- (38.1 m)-long, thus exposing the pre-1888 (or earlier) pier made of coral blocks. It is also possible that this coral block wall is part of the 1874 seawall built along the harbor (Hawaii DOT 2008). The main use of the pier today is for parking cars.

The majority of Pier 15 (Figure 42 and Figure 43) is fenced off from the public or is covered by buildings for the Honolulu Waterfront Fire Station. Only a limited number of photographs could be taken in this area.

Pier 15 was built around 1900 completely on fill land built out from the shore. In the early 1950s, Queen Street was widened to make way for the construction of the new multi-lane Nimitz Highway, and a portion of the *mauka* section of the pier was demolished and turned into part of the highway. In 1978, a timber apron that once extended from the pier was demolished. There are still pilings underwater in front of the wharf that once supported this apron. The main use of the pier today is for support of the Honolulu Waterfront fire station, and the moored Fireboat, *Moku Ahi*.



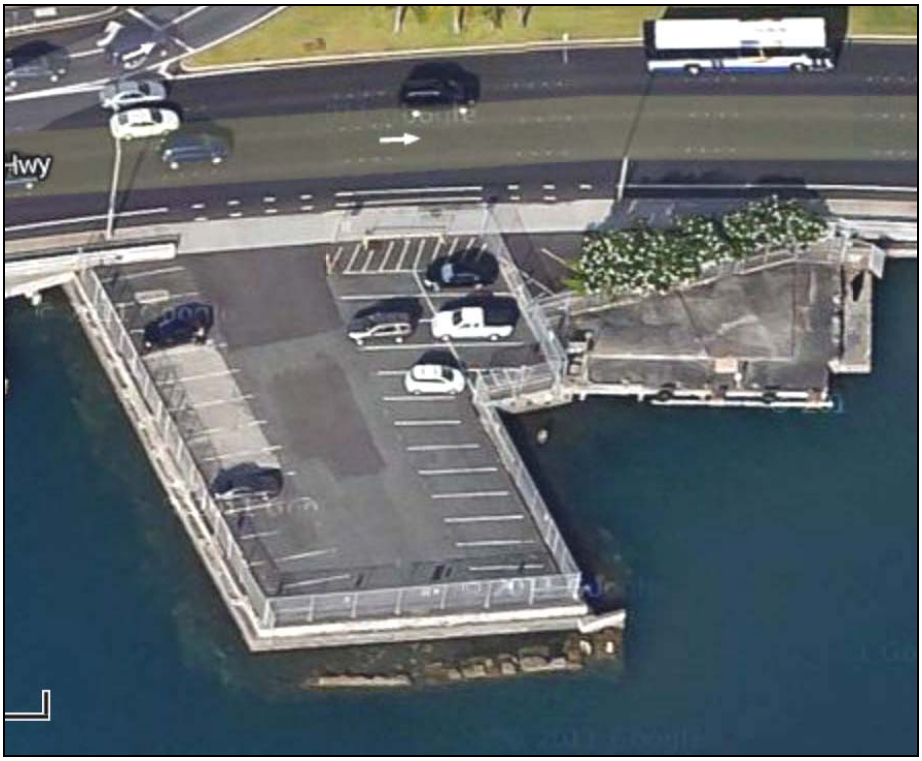


Figure 34. Pier 12, Aerial Oblique photographs (Google Earth 2009); top, view to north; bottom, view *mauka* to the east; note the remains of the old pier on the west, *makai* side

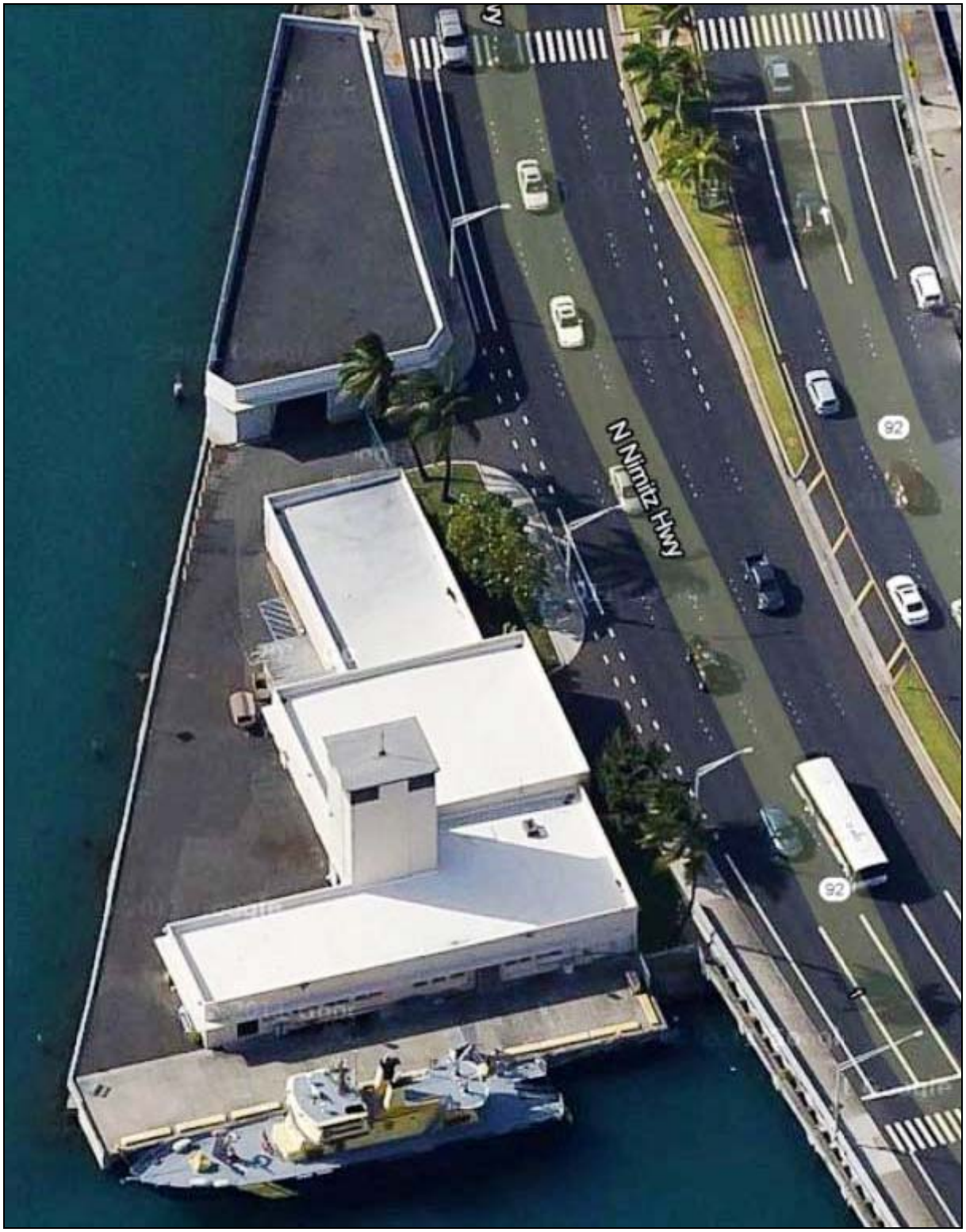


Figure 35. Pier 15, aerial oblique view (Google Earth 2009), view to the north

Figure 36. Pier 12 (right central section of photograph), view northeast from Pier 11 (CSH photograph)

Figure 37. Pier 12 (fenced area in central section of photograph), view north from Nimitz Highway (CSH photograph)

Figure 38. Pier 12, southwest corner, view south; note coral blocks and concrete (CSH photograph)

Figure 39. Pier 12, west, *makai* edge, south section, view west; note coral blocks and brick (CSH photograph)

Figure 40. Pier 12, *makai* side, view west, central section; note stacked coral blocks (CSH photograph)

Figure 41. Pier 12, *makai* side, view west, north section; note coral blocks over coral rubble (CSH photograph)

Figure 42. Pier 15, view to north from Nimitz Highway, with fireboat (CSH photograph)

Figure 43. Pier 15, view south to Aloha Tower, along waterfront (CSH photograph)

Section 6 Summary and Recommendations

6.1 Summary and Predictive Model

Background research indicates that Downtown Honolulu was intensively used by pre-Contact and early post-Contact Hawaiians for agriculture, aquaculture, and habitation. Previous archaeological investigations have identified numerous pre-Contact subsurface cultural deposits in the vicinity of this portion of the study area, providing further evidence of the extensive traditional Hawaiian activity in this area.

Historic accounts by Don Francisco Marin, an early historic settler, indicate that by 1810 a village of several hundred native dwellings surrounded the grass houses of Kamehameha on Pākākā Point near the foot of what is now Fort Street (Gast and Conrad 1973). Marin's account reflects the integration of traditional Hawaiians and Westerners during this period. Around half of the LCAs identified within this portion of the archaeological study area were awarded to foreigners, which emphasizes the cosmopolitan nature of this area.

By the 1840s, Western commercial and missionary interests had supplanted the Native Hawaiian traditions that had previously shaped the environment. During the second half of the nineteenth century, the waterfront of Honolulu changed significantly. At the peak of the whaling industry, around 1850, the Honolulu Harbor area became crowded with trading and whaling vessels, and required additional wharfs to accompany them. Between 1857 and 1870, 22 ac (8.9 ha) of reef land between Fort and Alakea Streets were filled with material dredged from the harbor to create the Esplanade, now part of the Aloha Tower Marketplace Complex.

The urban development of the Downtown waterfront and surrounding areas in the nineteenth and twentieth centuries involved extensive filling associated with the development of harbor infrastructure, industrial subdivisions, and commercial districts. These land reclamations and subsequent urban development would have destroyed and/or buried any surface archaeological historic properties that may have been present within this area. However it is likely that archaeological resources in the form of subsurface cultural deposits are present beneath historic and modern fill layers. These subsurface deposits could contain pre-Contact and post-Contact archaeological historic properties. Pre-Contact subsurface deposits could include fishpond and taro cultivation sediments; alignments and/or walls associated with fishponds and taro cultivation; and buried living surfaces containing midden, artifacts, and hearth features. Post-Contact subsurface deposits could include trash pits, privies, building foundations, and Honolulu Rapid Transit & Land Ltd. streetcar infrastructure.

6.2 Recommendations

Only a small portion of Pier 12 overlaps the original shoreline of Honolulu Harbor. Pier 15 was built on fill land created offshore around 1900. Thus the likelihood for pre-Contact cultural deposits and burials for the two Pier areas seem low. However, the Pier 12 area was used extensively as an early location for the mooring of vessels involved in whaling and trade. A landing was built in the Pier 12 area as early as 1823, and a stone quay by the 1830s and 1840s. Pier 12 has been extensively modified in the nineteenth and twentieth century, but it is possible

that remnants of the original pre-1880 wharf are still beneath and surrounding the present dock. In 1888, the pier was 220 ft- (67.1 m)-long or shorter; this was lengthened to 300 feet (91.4 m) in 1907 and shortened to 125 feet (38.1 m) in 1963. This shortening exposed large stacked cut coral blocks and old bricks off the *makai* side of the pier, probably part of the pre-1880 structure. Therefore, the possibility for early historic deposits, artifacts, and construction material in this area is high. Although the history of Pier 15 is not as long as Pier 12, there may also be early twentieth century artifacts and construction material below Pier 15.

Planned improvements to Pier 12 include new berthing and mooring structures with fendering systems to create 200 ft (61.0 m) of berthing space for a CIC spill response boat on the north side of the current pier. A structural slab will be placed over the existing bulkhead, but it will be supported by separate piles and will not be connected to the existing bulkhead of Pier 12. The exposed portion of the possible pre-1888 wharf (cut coral blocks and bricks) is on the west side of the pier, and thus should not be disturbed during the construction of the slab on the north side of the pier.

Planned improvements to Pier 15 include adding 500 ft (152.4 m) of berthing space for a new Marine Spill Response Corporation (MSRC) spill response boat and spill response barge. Again the structural slab will be on its own piles and will not bear on the existing pier. Some underwater piles associated with a former apron will be removed around Pier 15. The fire station on the Pier 15 will remain, with some modification to the roof (Mason Architects, Inc. 2011:13-14).

Both piers are within the Chinatown Special District (*Makai* Precinct) and the Chinatown Historic District on the NRHP (SIHP # 50-80-14-9986). Pier 12 is outside but adjacent to the Hawai‘i Capitol Special District and the Capitol Historic District (SIHP # 50-80-14-1321), which begins on the west side of Aloha Tower Market Place. Renovations to Pier 12 and 15 were evaluated to have an adverse on the Chinatown Special District,

Thus, there are no planned negative impacts to the current pier structures for the new berthing spaces on Piers 12 and 15. However, CSH recommends that a monitoring program, including the production of a monitoring plan submitted to the SHPD, should be instituted for both Pier 12 and Pier 15. Pier 12 and Pier 15 are historic structures (greater than 50-years-old) within the Chinatown Special District, and they have important remains related to early maritime history, which are illustrative of the development of Honolulu Harbor from its development as a small fishing village and canoe landing to its current status as a great Pacific port. In addition, Pier 12 may have deposits, artifacts, and structural remains dating to important dates in Hawaiian history, to the early use of the area for Hawaiian chiefly habitation and military use, and for early post-Contact maritime wharfs.

The determination of appropriate mitigation for this project (if any) belongs to the regulatory SHPD but CSH would anticipate a requirement for an archaeological monitoring program (beginning with an archaeological monitoring plan for the review and approval of the SHPD) with a requirement that a qualified archaeological monitor should be present during any construction at the Piers that could possibly result in damage to the current structures, including and especially the pre-1888 pier structural remains of Pier 12.

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Appendix A Land Commission Awards

[No. 626, Stephen Reynolds]

F.R. 91v2
[DIAGRAM] [See text in No. 619]

F.T. 95-96v2
No. 626, Stephen Reynolds, continued from page 85

George Wood, sworn, [18 December?

I came here [in 18]25. I recollect Mr. Reeves' blacksmith shop then stood on the sea side. I always understood Knight & Manini got the place from Boki as people reported. I knew Knight & Manini built a bowling alley and other houses. I recollect the small wood house on the sea side and [pig pen?] on north side of the cook house. I know the Hotel and premises having been sold by auction in 1832. (Mr. Reynolds added- the undivided half to settle Mr. Manini's estate) by the Executors: I bid them off and gave them up to Mr. Reynolds. The purchase money was something more than 1100$. The sleeping house stood where the market house now stands. I know of no other occupant of the premises till Mr. Punchard took the place. The market house was built in 1845.

(Note: copy of a protest was offered in evidence made before John Ricord. Notary Public, against Kekuanaoa, dated 12 August 1845 and witnessed [?]. Copy by Mr. Ricord on 13th August 1845 for which see page 110.

Resumed page 100

F.T. 100-103v2

Claim 626, Stephen Reynolds, continued from page 89. December 20 [1846]

John Meek, sworn, I have been acquainted with these premises ever since Knight and Manini owned them, and have been led by business nearly every day to frequent the wharf from that time; with the exception of different intervals of absence. I attended to the construction of the wharf of Ladd & Co. which is about 60 ft. apart from that of Mr. Reynolds. His wharf was built by Knight and Manini first; has been repaired several times, and afterwards rebuilt by Mr. Reynolds. The house of Punchard now stands on the boundary line of Mr. Reynolds' land. Nuuanu Street has been open ever since 1809. Punchard's store is where the old fence was. The line from that to the water has never been defined. The only fence that stood was where Punchard's store now stands; between that and the sea was open ground and on Nuuanu Street.

From Punchard's store up to Merchant Street Mr. Reynolds' premises are bounded by Nuuanu Street. On Ewa side I do not know who the land belonged to where the cook house is built, but to the westward of it, it never belonged to anyone but the Government. I remember Mr. Ladd had some posts up for a building where the Pilot's office now stands and Kekuanaoa soon came and pulled it down. This was several years previous to 1840. The hog pen north of the cook house was made of sticks and I think stood there as long as the hotel. It might have been two fathoms long and I think its length was from the sea. I do not think I was there when the old fence was made. I never heard of Mr. Reynolds or any other person claiming that land north of the cook house before the present office was moved there.

The piece called Captain Meek's slip was [?put] up by Ladd and Co. I laid the string piece. Mr. Reynolds never occupied north of the cook house that I know of, and made no objection at the time when the wharf was built as Ladd & Company.

The fence Southeasterly extended to where the market now stands. The house belonging to the Hotel stood outside the fence; it was 18 or 20 ft. long by 13 or 15 wide.

There was a large beam which lay on the beach which constituted the Waititi boundary of Mr. Reynolds' sea line - up to which the canoes came. The tide came within 5 or 6 ft of the native houses then standing near it.

(Cross-examined by Mr. Reynolds). I know the governor pulled the house down by the people who did it, who I heard were sent by the governor. I know Knight and Manini never had any right in the land north of the cookhouse because they never used it or claimed it.

A stick fence bounded the Hotel premises on both sides Nuuanu and Waititi. That *makai* of Punchards was the boundary there. The thoroughfare between that and the wharf was always a public road.

I do not know whether the land on which the cookhouse stood, and the wharf were a part & parcel of the Oahu Hotel premises or not. I know they were used by them.

William Ladd, sworn, I think it was in 1838 I built the company's wharf. At the time we took possession of our place, the water came within about 20 ft of our *makai* fence. The slip was built at various times. I have possessed the store premises since 1833 and have never been disturbed. Mr. Reynolds claims from the corner of Ladd & Co's premises to Nuuanu St. in a line to the water, just to the north of the cookhouse.

Kekuanaoa, sworn, S. Reynolds boundary is in a line with the cookhouse; it runs from Ewa heads of the cookhouse to the Ewa heads of the wharf. I claim for the Government *mauka* of the cookhouse, Meek's slip as given on the chart belongs to the Government. Meek asked my permission to lay down the timber and construct it; and I gave it him. Mr. Ladd built out there and I told him he had no right. He commenced just *mauka* where the pilot's office stands, a foundation of stones. I enquired whose house is this? He said his own. I said take it away, and I ordered away two other long sheds which he after built and removed them. This was just *mauka*

of where the pilot's office stands, and after the wood for wharf was built in 1838; or it might be in 1841 when the market was altered. Mr. Ladd admitted the correctness of my decision, and that was the reason of their not building again. Their line does not extend in that direction straight down to the sea.

There was a temporary hog pen put up as they put up cattle pens. I never considered it any thing besides what might be put up or taken down as the case might be. I never knew Mr. Reynolds claimed anything beyond the cookhouse. The land between Punchard's store and the cookhouse is not within the claim. George Marini jumped out of his fence and built the cookhouse, and the wharf, his fence was where Punchard's store now stands, and all between that and the cookhouse was open, as was all to the sea of the *makai* fence. The long timber was the boundary of the Waititi side, and the *mauka* corner of the cookhouse was the boundary of that part. I filled up on the Waititi side of the timber.

Resumed below.

F.T. 103-107v2
Claim 626, S. Reynolds, continued from above, December 24 [1847]

Mr. Reynolds offered in evidence a deed from William S. Hinckley to P.A. Brinsmade, William Ladd & William Hooper dated, 4 March 1835 to show that their wharf lot and his own unite together.

P.A. Brinsmade, sworn, when I came here in July 1833 there was an enclosure to the north of the cookhouse between that and the land we after obtained, and it was used by Mr. Reynolds at that time for turkeys, pigs, &c. When that was removed he used the ground for some time in piling spars, firewood &c. I know nothing more than that I always considered him the owner of that land and respected his rights there as our neighbour. In 1840 that ground was used by the U.S. Exploring expedition with his consent. Some of his timber lying there the whole time till I left in December 1841.

I remember the old Government stone store house and a [sic] many small native buildings between that and the sea which have been removed. That land was used as a market place from that time till 1841.

Mr. Judd, offered in evidence three documents (see page 110) to shew the views of Ladd & Co. in 1841 of Mr. Brinsmade's boundary. Mr. Brinsmade admitted these documents to be genuine as signed by Ladd & Co. but he did not recognize them, nor had he any recollection of them. These letters were adduced to shew that they then considered the land on which the pilot's office now stands to be government property. See page 111.

William French, sworn, I came here in 1819. The hotel premises were not then commenced. I think they were enclosed and built on in 1825. I boarded there for a long time when Knight and Manini occupied them. I presume the stick fence was put up by them, but the wharf was never

enclosed. The Nuuanu stone wall boundary was built when I was absent at China. I purchased the Sandalwood house from Boki. There was a house belonging to Hoaai on the land *makai* of that house which I purchased from the sister of Kaahumanu (Piia) for 200$. This land now stands as part of the market grounds. Then some native small houses also were there. She refused to interfere in the sale of the sandalwood house, which I bought of Boki for 300$ after the other purchase for 200$ which when I sent to Piia, she returned to me and reversed the bargain, because it was a smaller sum than the other. I know that Hoaai continued there with his dependents a long time.

(Mr. Reynolds here stated that he had withdrawn his claim to Piia's land and that he only put it in, in answer to Mr. Mudd's challenge at the time of the British Commission).

I think I could point out the boundaries on Mr. Janion's side if I were on the spot. The tide came close up [to?] high water mark to the piece I bought of Piia in 1828 and does so to this time. Occasionally Mr. Reynolds, I think, partly filled up the part in front. I think I could point out the sea boudnary. I only know there was a wharf built belonging to the Hotel premises, but I do not know on what grounds [or] under what circumstances. I considered the wharf to be 20 or 25 feet in width, when I made George Manini an offer of 2000 [$?] for the premises including it. I only expected to purchase the hotel premises and the wharf which was built, though I might have applied to government for an extension afterwards further in the sea. The wharf extended in my view about half the width of the hotel premises. It has been built on since that time on both sides; the thoroughfare crossed between that and the fence *mauka*. I took the Ewa line to be from Mr. Reynolds old premises in a straight direction to the sea, which would bring it to near the north side of the cookhouse. It has been the custom of Merchants for any person to 0put spars and lumber on the ground north of the cookhouse for their convenience. I did so myself in 1839 without any communication with Mr. Reynolds about it. Nor did I ever hear till lately that he made any claim there. I considered the part built up to have belonged to the hotel premises as a wharf but not the sides of it.

Piikoi, sworn, Kekuanaoa filled up the ground where the market now stands. The sea came up about half the width of the market. I and Kekuanaoa filled up jointly sough of the lumber lying on Waititi side, which spar [spot] was always considered the boundary on that side of the Oahu Hotel Premises. The wharf was first narrower and this log was put out to widen it. I and Kekuanaoa filled it up to meet it in 1846.

Kekuanaoa, sworn, a row of stones was the first boundary on the Waititi side and afterwards the timber was put in the same place when Mr. Reynolds got the premises. He has no claim on the Waititi side of that timber. I put in stones and dirt, and filled up on the market ground because the sea came into it. The market now stands below high water mark.

William French, sworn, I recollect there was a stick house north of the cookhouse where Mr. Reynolds kept turkeys, pigs, &c. It was merely a temporary thing.

Kealoha, sworn, I lived 17 years in the premises *mauka* of the market under Hoaai, who held his land under Keaumoku from luna[?], Piia, from him Kinau and now Kekuanaoa. I know Hoaai's

boundary on all sides. I do not know that any encroachment was made on Mr. Reynolds' land when Kekuanaoa made the present market. He filled up the place under him. His sea boundary south is the timber; I and others built the wharf hired by G. Manini &c. He has no claim on Waititi side of that timber; it has always been the dividing line. The market now stands on what formerly was the highway and outside of the original hotel premises. I can point out where the native houses formerly stood on the sea side. I know of the water course from the pump to the casks; it was carried through our yard at the request of G. Manini, but he never claimed the land. There was a stick fencd went along the premises in our Yard. Some stones lay at the bottom of the fence on the Waititi side, and also on the *makai* side. These stones are the present boundary. The old stick fence was the former mark.

Resumed page 111

F.T. 110-113v2
Claim 626, S. Reynolds, resumed, see page 96

Protest

Before the undersigned Notary Public in and for the village of Honolulu, Island of Oahu, Hawaii. On this 12th August 1845 personally appeared Stephen Reynolds, an American citizen, domiciledand residing in said village, who declared in substance that Mataio Kekuanaoa, Governor of said Island, either in his own name as an individual, or in his official capacity, had on that day taken possession adversely of a certain lot of ground situate in said village & belonging to the declarant, which lot of ground is near the waterside, and better known as portion of the Oahu Hotel premises, and further, that said Mataio Kekuanaoa is now erecting a native building thereon in opposition to the remonstrates of said declarant.

Wherefore the said Stephen Reynolds intending as soon as the laws will permit, to prove his right in said land before any tribunal created or to be created for that purpose by the Hawaiian legislature, requested the undersigned to note this, his protest against the unlawful invasion of his rights by the said Mataio Kekuanaoa in order that the same may not be obscured by adverse possession.

In witness whereof, I, the said notary in conjunction with the said declarant have hereto set my hand the day and year first above written.
Signed, Stephen Reynolds, John Ricord, Notarial Office, Honolulu
Hawaiian Islands, 13 August 1845

I certify the foregoing to be the correct copy of an original protest noted in this office before me.
Signed, John Ricord, Notary Public

Three documents referred to in page 104, claim 626
Honolulu, August 5, 1841
Sir, We wish to obtain permission of your Majesty to build a wharf north of the one now belonging to us & on land in front of the old stone building or market adjoining our premises,

and we shall feel obliged to Your Majesty if You will inform us by first vessel for this place, on what terms You will lease us the privilege, and land on which we may build a wharf, the same to revert to Your Majesty's Government at expiration of 50 years from date of lease.

We enclose herewith a plan of said land & as it is now useless, and will require much money to build a wharf, we presume the rent will be merely nominal.
Respectfully, Your Obedient Servants
Ladd & Co.
To Kamehameha III, King of the Sandwich Islands

See plan referred to next pages

Cl. 627. S. Reynolds, continued from page 111, Second, paper referred to page 104.

[DIAGRAM]

[Plan is labeled as 627]

Cl. 626, S. Reynolds, Third paper referred to page 104.
Honolulu, August 5, 1841
Sir,
Under this date we have applied to his Majesty for a privilege for a wharf, and have enclosed to him a plan of the land required. At present the land is of no use except as a location for 3 or 4 native huts. The dots in red ink (in the preceding copy doubled in black) indicate the outline of what we wish. We should be disposed to build a good wharf. We have not measured the land, but judge the water frontage about 200 ft.

As we are disposed to pay a fair rent in shape of rent money, or in the reversion of the land & wharf to this government, at the expiration of the lease, we should feel obliged by an early answer. We presume that the subject can be decided upon without our application being known except to the parties concerned.

A (illegible) straw house belongs perhaps to Kikili & was not long since occupied by George, late Captain of Kinau.
We remain, truly yours,
Ladd & Co.
To Reverend William Richards, Lahaina

F.T. 113-115v2
Claim 626, S. Reynolds, continued

Know all men by these presents that I, William S. Hinckley, a citizen of the United States of America, residing at Oahu, for and in consideration of the sum of 1620 dollars to me in hand paid, have granted and sold unto Peter A. Brinsmade, William Ladd & William Hooper, also

citizens of said states, residing at Oahu, all that piece or parcel of land now in occupancy of the said Brinsmade, Ladd & Hooper, and described & bounded as follows: Viz.

Commencing at a point bearing
South ten degrees East distant 24 feet from the Southeasterly corner of the Stone Store recently erected and now occupied by said Brinsmade, Ladd & Hooper, and running in a line with the public street,
North 57 degrees East ninety-one feet from the said point to land of William Hinckley; thence by [?] said land
North 36 degrees West 216 feet to land of Fransisco de Paula Marrin, thence by said land
South 52 degrees West 60 ft. to land in occupancy of the Government of the Sandwich Islands, thence
South 35 degrees, East 28 ft. thence
South 564 degrees West 21 ft. thence
South 38 degrees East 35 ft. 9 inches, thence
South 54 degrees West 13 ft, thence
South 38 degrees East 21 ft. thence
South 48 degrees West 11 ft. 10 inches and then
South 42 degrees East 128 ft. 6 inches by land owned and occupied by said Brinsmade, Ladd, Hooper & William S. Hinckley to the point above first mentioned, with all the privileges and appurtenances thereunto belonging, reserving a cart road through said land for my and their mutual benefit and convenience. Also one undivided half of the wharf and land included between the premises above described and the harbour bounded northerly by land in occupancy of Government of Sandwich Islands, and southerly by lands and wharf in the occupancy of Stephen Reynolds. To have and to hold the said piece or parcel of land with the privileges and appurtenances unto the said Peter A. Brinsmade, William Ladd & William Hooper, their heirs, executors or assigns forever. Subject - and further I, the said William S. Hinckley, do covenant and agree for myself, my heirs, executors, administrators or assigns, do hereby covenant and agree to warrant and defend the premises aforesaid against the lawful claims and demands of all persons whatever unto the said Peter A. Brinsmade, William Ladd and William Hooper, their heirs, executors, assigns or administrators forever, excepting only such claims as may be made by the Government of these Islands on said land. And I do further avouch that I possess full power, good right and lawful authority to dispose of the said premises in manner aforesaid. Witness my hand and seal at Honolulu, Oahu, this 14th March 1835.
Signed William S. Hinckley (seal)
Witness, Charles R. Smith

Indorsement
I have examined and compared the within and above written copy of an instrument with the original of which it purports to be a copy and hereby attest it to be a true & faithful copy.
Signed, P.A. Brinsmade, United States Consul.

Ke ae aku nei maua i keia hoolilo aina.
Signed Kamehameha III, Kekauluohi

F.T. 115-117v2
Relating to Claim 626

Know all men by these presents that I, William French, as surviving partner of the late firm of French & Co., at present residing at Oahu, one of the Sandwich Islands, for and in consideration of the sum of 500 dollars to me in hand at the signed of these presents paid by Stephen Reynolds of United States of America now residing at Oahu, the receipt whereof I do hereby acknowledge, have bargained, sold, and delivered by & with the consent of the Government of the Sandwich Islands and by these presents do bargain, sell and deliver unto said Stephen Reynolds all that piece of ground with the house erected thereon situated in the village of Honolulu, Island of Oahu and bounded:

on the Northeast by a road 30 ft.
On the Southwest by natives houses 30 ft.
on the southeast by native grounds 96 ft. and
on Northwest by Oahu Hotel 96 ft.

The said William French in manner aforesaid and for his heirs, executors, administrators & assigns do by these presents relinquish all claims to the said premises unto Stephen Reynolds, his heirs, executors, administrators and assigns forever.

In witness whereof, I have hereunto affixed my hand and seal at Honolulu, Island of Oahu, this 1st October 1838
William French
Witnesses: John Meek & G. Rhodes

Doc[?] Estate of Amos Knight in account with Stephen Reynolds, Surviving Executor

[two columns in original]
[Debts]
To 1833, To paid doctor's bills, funeral charges, fence & new grass houses, digging well, clothing for George M. Knight & his mother &c &c from July 9, 1830 to November 30 1833548.92

Passage for George M. Knight, son of Amos Knight from Oahu to United States in November 1833 - 70.

2 bills of exchange remitted in November 1833 for 125 each. - 250.

To bill of Exchange dated February 8, 1839 signed by Ladd & Co. at 30 days, sent to S.S. Reynolds to be delivered to the Guardian for George M. Knight - 2150.63
[total] 3019.55

[Assets]

1833, By amount received by Brig Griffin from Canton for tortoise shell shipped October 1830 - 566.45

due from settlement of Knight & Marini's partnership - 503.86

1838, Hotel establishment collected from March to September - 253.73

Sale of half of Hotel places, September 1838 belonging to said estate 1500
By exchange 195.51
[total] 3019.55

Charlestown, August 26, 1839
I, the undersigned Guardian of George Marini Knight, who is the son and sole heir of the late Amos Knight, hereby acknowledge that I have settled the above account with the said Stephen Reynolds, surviving executor of said estate, that I have received from him the several bills of exchange above charged, and also that I have collected the same of these respective draws in cash. And I hereby discharge the said Reynolds from all liability & responsibility of every name, kind, & nature, to the said estate and to my said ward, George M. Knight, its sole heir, unless further assets should hereafter come into his hands.
William Knight, Guardian of George Marini Knight
Witness. J.P. Healy

N.T. 436-441v2
No. 626, Lanai (S. Reynolds), Honolulu, Oahu December 24, 1847

Lanai has brought a land transfer document from William Hinkle transferring that land to him which he is demanding.

Barinamada (Brinsmade:), sworn by the Word of God and stated, "I had come to this archipelago in the year 1833. There was a small lot at that time on the north side of the kitchen. That place had been for Lanai and the hogs' sty was there. When the wall was broken down, Lanai stored the wood and timber of the ship there and we had thought the place was for Lanai and in the year 1840 that place probably had extended into the lots which had been built for Kapena Wipa (Captain Wilkes). This was of course with Lanai's approval.
I believe Lanai had the short timber [page 438] there until I had gone there in the year 1841.

G. P. Judd had brought some documents as a witness for the south side of Ladd's (property) and it is noted below here.

Mr. French, sworn by the Word of God and stated ' "I had arrived on this land in the year 1819 and in the year 1825 or 6 perhaps, the hotel was built and a fence surrounded it and I lived there sometime. The place was for Naiki (Knight) and Manini at that time. They had erected a wooden fence there separating the wharf and the lot, but I do not recall when the stonewall had been built because I was in a foreign country then.

I had a sale with Poki for a part of the sandalwood storage house and *makai* of that house is the house of Hoaai and toward the ocean of that sandalwood house is the place 1 had bought for $200.00 and I had asked for the place toward the mountain of the sandalwood house and Piia told me the place was for Poki. I had a talk with Poki about buying that place for $300 and Poki had agreed. When Piia had heard this, he returned his two hundred dollars and demanded $300 as the price of his place. Therefore, the first selling price was nought but Hoaai has continued to live there with some other people until very recently. If I were to go there, I believe I can perhaps point out the place I had bought from Piia; however, it is not very clear because there have been many searchings and at the time of the high sea swelling, it had been just about impossible to go there. There was not enough space between the beach and the sea. I believe that place was 20 or probably 25 ft. wide from the pier to *makai* and in the year 1830, 1 had offered Manini the pier and the lot for $3000.00 but they refused; then I had wondered about leasing the --same. I think half of the width of the hotel was the width of the pier. It was customary to leave wood here and there and I had been one of them who has left wood there."

Jonah Piikoi, sworn by the Word of God and stated, "I have seen the boundary on the Waikiki side of Lanai's wharf. There is the boundary on the Ewa side of the house lying toward the mountain on the Waikiki side of the market. Kekuanaoa had that place with soil. Half of the market is standing there and seaward to the big timber lying on the way to the wharf. Kekuanaoa and I had filled that place with soil.

Komo had worked on that place to the cape which is sticking out assuming that place was for the government; later it was decreased and that huge and long log lying on the Waikiki side of Lanai's wharf was the boundary on Waikiki in ancient times. It was in the year 1826 that log was laid there and Kekuanaoa and I had filled the space between in the year 1846."

M. Kekuanaoa, sworn by the Word of God and stated, "The boundary on the Waikiki side is Lanai's pier to the large lumber lying to the pier, but formerly a nini (sic) rock had been the boundary leading seaward to the cooking house and to the sea.

I feel that Lanai has no interest where I had filled on the Waikiki side of that property. I had filled where the market now stands and had built a house. Later after this, Piikoi had said that he would work on that place and I had con-sented to what he had said he would do."

Keloha, sworn by the Word of God and stated, "I had lived by the market for 17 years under Hoaai and Hoaai under Keeumoku and under Piia. Upon his death living was under Kinau and under Kekuanaoa at this time. Kekuanaoa had built the market for he is Kinau's heir. I have seen the boundary of Hoaai's place, and I have $en the house built and part of Lanai's place did not extend into the market place, not in the least. We had filled the foundation of the market place believing it would be livable for someone. The boundary of Lanai's wharf on the Waikiki side is the huge timber there. Lanai has no right on the Waikiki side of that huge timber lying to the pier. The boundary of the lot of the market is toward the mountain of the market. The old stone wall is there just toward the mountain of the market, but the market is away from here. There is a street seaward of the boundary of the hotel. The small houses were ours originally where the

market now stands. Lanai had no house there and I can point out where the hotel had stood. 'I have seen a little house where the house now sits toward the mountain of the market, named Kikila.

I have seen the ditch lying from the well to the wharf, yet inside of our place with our permission, water had flowed until it had ceased to flow, but that place was not possessed by Manini. The corrugated edge of an old stone wall in the ground on the Waikiki side had been the boundary for the hotel before and the stone wall that is sitting there had been Naihekukui's boundary."

[Award 626; R.P. 1769; Hotel & Merchant Sts Honolulu Kona; 1 ap.; .24 Ac.; Merchant St. Honolulu Kona; 1 ap.; .05 Ac.; See Award 619 for Foreign Register and Foreign Testimony documents]

No. 11225, Kekualoa, 3d April 1854
F.T. 540v3

This is a claim for the ili of Kalui in Honolulu.

J. Kapena, sworn says, he was born on the adjoining land to Kalui & has a kuleana on that land now.

Knows the boundaries of the *makai* portion of this ili to be as follows: viz.

Mauka by the land called Kalawahine
Waikiki side by the bank of Eawoa [Pauoa] Stream & kuaanu [Nuuanu]
On the Kaumakapili side down to the sea & then following high water mark to the boundary of Akaukukui & then running seaward to the reef to the Sumner family, called Kohololoa
On the *Makai* side by Kohololoa
On the Ewa side by the fish ponds of Kawa and Kuili & the lands of Aala & Kamakela.

There are two or three other pieces of land farther *mauka* belonging to the ili of Kaliu, whose boundaries I cannot define.

Paauki, sworn says, the boundaries of Kaliu kai are as set forth by last witness, except that on the Ewa side this land called Koiniu touches this land as well as those named by Kapena.

The place where the slaughter house now stands was reclaimed from the bed of the river which belongs to Kaliu.

Kuapuu, sworn says, he is a kamaaina of Kaliu, knows the boundaries of Kaliu kai to be the same as set forth by last witness.

Knows that the place on which now stands the slaughter house belongs to Kaliu.

N.T. 340v10
No. 11225, Kekualoa, Claimant

Paki sworn, I know Kekualoa's claim - it is an ili in Honolulu, Oahu - a land division of the king. This has been registered in the grant Book of the Government in the Interior department. I had it registered with the land commissioner's office in Kauwila Building, Honolulu in 1847, probably or may be 1846, I can't remember; however, I have kept that property since 1847 to the present time. It is a large property that land of Paty and Wyllie in the uplands was half of this land. Here were some other lands too, which were conveyed to Lee and another half of Dudoit Buildings in the uplands.
A. PAKI
Sworn in my presence on this 29th of March 1854
W.L. Lee, President of the Land Commissioners

N.T. 340v10
No. 11225, Kekualoa, 30 March 1854

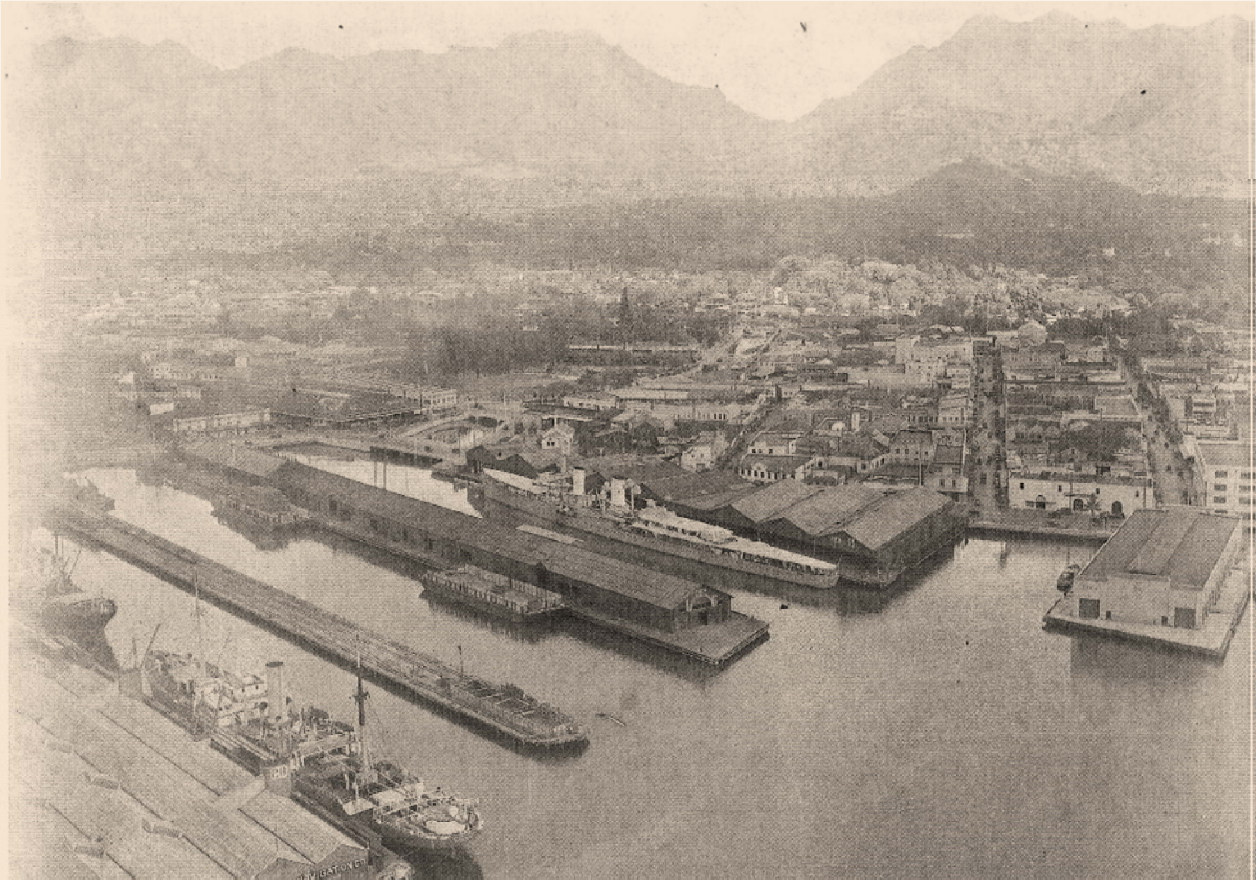
COPY
Kekualoa's land distribution.
Kaliu ili of Honolulu, Kona, Oahu.
TRUE COPY
Interior Department, 27 March 1854
A.G. Thruston, Clerk

[Award 11225; R.P. 1879½; Kaliu Honolulu Kona; 1 ap.; 15.82 Acs]

APPENDIX E.
HISTORIC ARCHITECTURE

Honolulu Harbor Piers 12 and 15 Improvements

Impact Analysis on Piers 12 and 15, Hawaii Capital Special District, and Chinatown Special District



Prepared for the
State of Hawaii Department of Transportation

DRAFT

August 2012

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Honolulu Harbor Piers 12 and 15 Improvements

Impact Analysis on Piers 12 and 15, Hawaii Capital Special District, and Chinatown Special District

Prepared by Mason Architects, Inc.

for

Kimura International, Inc.

on behalf of the

State of Hawaii Department of Transportation

Draft
August 2012

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Executive Summary

Mason Architects, Inc. (MAI) was hired by Kimura International, Inc. (KII) to undertake an evaluation of effects of the Piers 12 and 15 Improvements on: 1) Piers 12 and 15; 2) the Hawaii Capital Special District, and; 3) the Chinatown Special District in Honolulu, Hawaii. This work was contracted in preparation for an Environmental Assessment (EA). The proposed pier improvements will provide new berthing and mooring structures to accommodate two oil-spill-response boats and one spill-response barge.

Piers 12 and 15 are located within the Chinatown Special District, and are outside, but adjacent to, the boundaries of the Hawaii Capital Special District. Both piers are evaluated as having historic significance, as explained in Section 2.0.

The Honolulu Harbor Piers 12 and 15 Improvements do not pose an adverse effect to the Hawaii Capital Special District, but were evaluated by MAI as having an adverse affect on the Chinatown Special District, and on Piers 12 and 15. Specifically, a new loading platform at Pier 12 is evaluated as a visual element that would reduce the integrity of the existing setting of Pier 12 since it would block historic characteristics from view. However, it should be noted that in the historic period, both Piers 12 and 15 had timber extensions ("piers" or "aprons") along their lengths that also hid this underside area from view. The proposed modification to the Pier 15 Shed roof and overall footprint would reduce its integrity of design, although this building has already been altered.

This report is organized as follows. Section 1 introduces the project's scope of work, the methodology used, and the team members involved. Section 2 provides background on the historic resources/Special Districts: Piers 12 and 15, the Hawaii Capital Special District, and the Chinatown Special District. Section 3 of the report explains the proposed Pier 12 and 15 improvements. Section 4 evaluates the effects of these improvements on the districts and historic resources. Section 5 provides recommendations on mitigating adverse effects. References are found in Section 6.

1.0 Introduction

1.1 Scope of Work

MAI was hired by KII to undertake an evaluation of effects of the Piers 12 and 15 Improvements on Piers 12 and 15, the Hawaii Capital Special District, and the Chinatown Special District in Honolulu, Oahu, Hawaii. This work was done in preparation for an upcoming EA on the project. MAI was tasked to evaluate whether the project would pose an adverse affect on the resources.

An "adverse effect" is defined in 36 CFR § 800.5(a)(1) as:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association…Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.
>
> Examples of adverse effects.
> Adverse effects on historic properties include, but are not limited to:
> (i) Physical destruction of or damage to all or part of the property;
> (ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;
> (iii) Removal of the property from its historic location;
> (iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
> (v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
> (vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
> (vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.[1]

1.2 Methodology

For this project, MAI researched and documented the historical background of Pier 15, and relied on previous research and documentation for Pier 12, the Hawaii Capital Special District, and the Chinatown Special District in Honolulu. Previous research undertaken by MAI on the related National Register Historic Districts was also used for this report.

[1] Advisory Council on Historic Preservation. *36 Code of Federal Regulations Part 800 – Historic Properties (incorporating amendments effective August 5, 2004).*

Fieldwork and research was accomplished by MAI from February to May of 2012. Fieldwork included site visits and photographic documentation of Piers 12 and 15. Research on Pier 15 included obtaining historic drawings (at DOT Harbors Plan Room), maps, historic photographs, books, and newspaper articles. Following the fieldwork and research, MAI evaluated the effects of the proposed improvements on each property and completed the report in June of 2012.

1.3 Project Team

The fieldwork, evaluation, and writing for this report were undertaken by Polly Cosson Tice, an Architectural Historian at MAI, with oversight by Glenn Mason, Historic Architect and President of MAI. Ms. Tice meets the Secretary of the Interior's Professional Qualifications Standards for Architectural History. Mr. Mason meets the Secretary of the Interior's Professional Qualifications Standards for Historic Architecture.

2.0 Background on the Historic Resources/Special Districts

Figure 1 shows a map of the project area. The spill response vessels that will be re-located to Piers 12 and 15 are presently berthed at Pier 35.

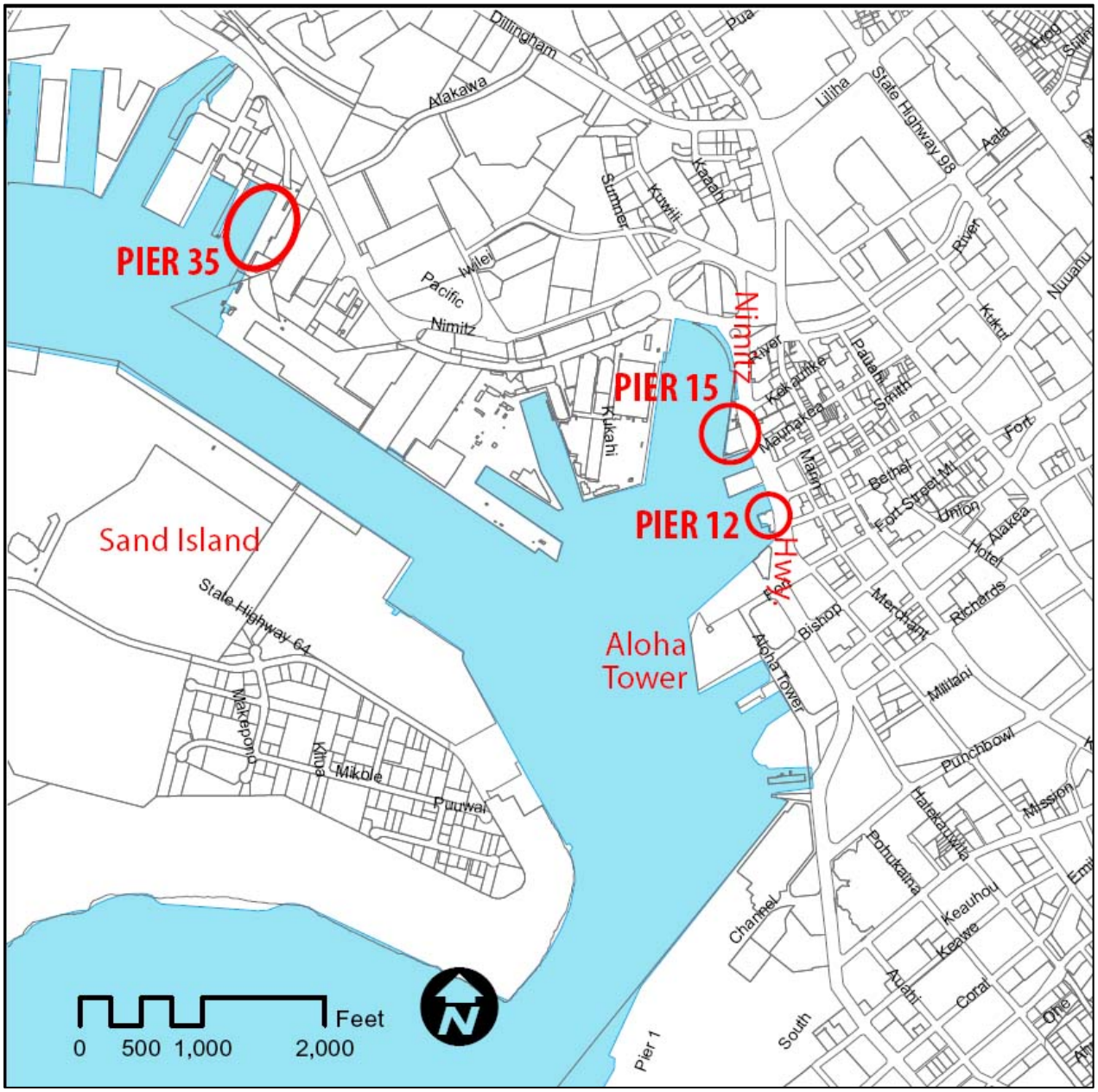

Fig. 1. Map showing Project Area. (*Source: Glenn Kimura.* Early Consultation Letter to SHPD regarding Honolulu Harbor Piers 12 & 15 Improvements, *February 16, 2012.)*

2.1 Hawaii Capital Special District

Piers 12 and 15 are located outside, but adjacent to, the boundaries of the Hawaii Capital Special District, as shown in Figure 2. (The Special District is a city zoning district largely based on the Hawaii Capitol Historic District, which was placed on the National Register of Historic Places [NRHP] in 1978.) The ewa/makai boundary of the District's Waterfront Precinct incorporates the Aloha Tower Market Place property, which is adjacent to Pier 12. Because of the proximity of Pier 12 to this District, it was necessary to evaluate any indirect effects that the proposed improvements may pose.

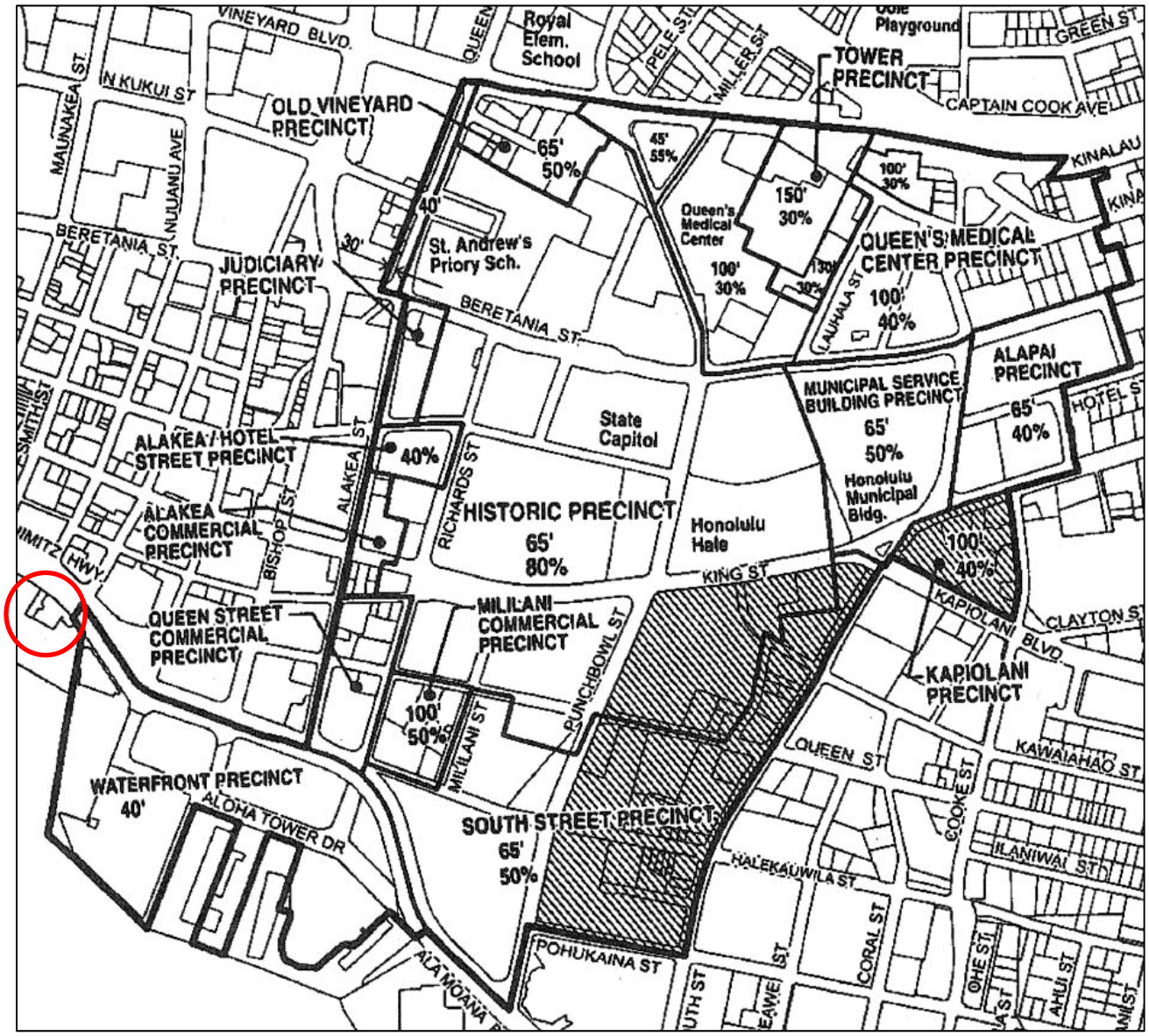

Fig. 2. Map showing Hawaii Capital Special District boundary with Height Limits and Open Space Precincts. The red circle, added by the author, shows the location of Pier 12. (*Source: Department of Planning and Permitting, City and County of Honolulu* Land Use Ordnance *April 2003.)*

2.2 Chinatown Special District

Piers 12 and 15 are located within the boundaries of the Chinatown Historic District as well as the Chinatown Special District,[2] which is shown in Figure 3. The Chinatown Special District is governed by a portion of the Land Use Ordnance, codified in the Revised Ordinances of Honolulu (ROH) as Section 21-9.60. The piers are located within the Special District's Makai Precinct. The importance of the harbor area to Chinatown is explained in the Historic District's NRHP nomination form: "The major reason for its early development and continuous history as a commercial area was due to the close proximity to Honolulu Harbor."[3]

Several objectives of the Chinatown Special District were considered. One of the "Makai precinct objectives" [ROH Sec. 21-9.60-10], relevant to the pier improvement project vicinity, is to "Provide a visible connection between Nimitz Highway and the interior of Chinatown" (ROH Sec. 21-9.60-10 (c)]. The District's "Overall objectives" [ROH Sec. 21-9.60-1] which are particularly relevant to the pier improvement project and its vicinity are listed below:

- Retain the low-rise urban form and character of the historic interior core of Chinatown while allowing for moderate redevelopment at the mauka and makai edges of the district [ROH Sec. 21-9.60-1 (b)];
- Preserve and restore, to the extent possible, buildings and sites of historic, cultural and/or architectural significance, and encourage new development which is compatible with and complements these buildings and sites, primarily through building materials and finishes, architectural detailing… [ROH Sec. 21-9.60-1 (d)];
- Retain makai view corridors as a visual means of maintaining the historic link between Chinatown and the harbor [ROH Sec. 21-9.60-1 (f)].[4]

2.2.1 Structures Listed as Significant

The Chinatown Special District ordinance states that the period of significance for Chinatown is from the 1880s to the 1940s. The two buildings located on Pier 15, the Fire Station and Pier 15 Shed, are included in the Chinatown Special District's list of "Historic and Architecturally Significant Structures" [ROH Exhibit 21-9.10-A] as: "Fireboat Fire Station" and "State of Hawaii (shops)."[5] Research performed for this report indicates that the Fire Station was built circa 1951, and the Pier 15 Shed was built circa 1955, which means they were built outside the Chinatown Special District's period of significance. It is highly likely, however, that if the Chinatown Historic District nomination were to be updated, the period of significance would be extended to include the time period from which these buildings date, and they would remain as contributing elements of the District.

[2] The Chinatown Special District is basically comprised of the Chinatown Historic District (listed on the National Register of Historic Places [NRHP] in 1973) and the Merchant Street Historic District (listed on the NRHP in 1972).
[3] Dorothy Riconda, National Register of Historic Places Inventory – Nomination Form, May 2, 1972, p. 2.
[4] Department of Planning and Permitting, *City and County of Honolulu Land Use Ordnance,* April 2003, p. 9-35.
[5] The Chinatown Special District Historic and Architecturally Significant Structures list lists these two buildings with incorrect addresses and TMKs.

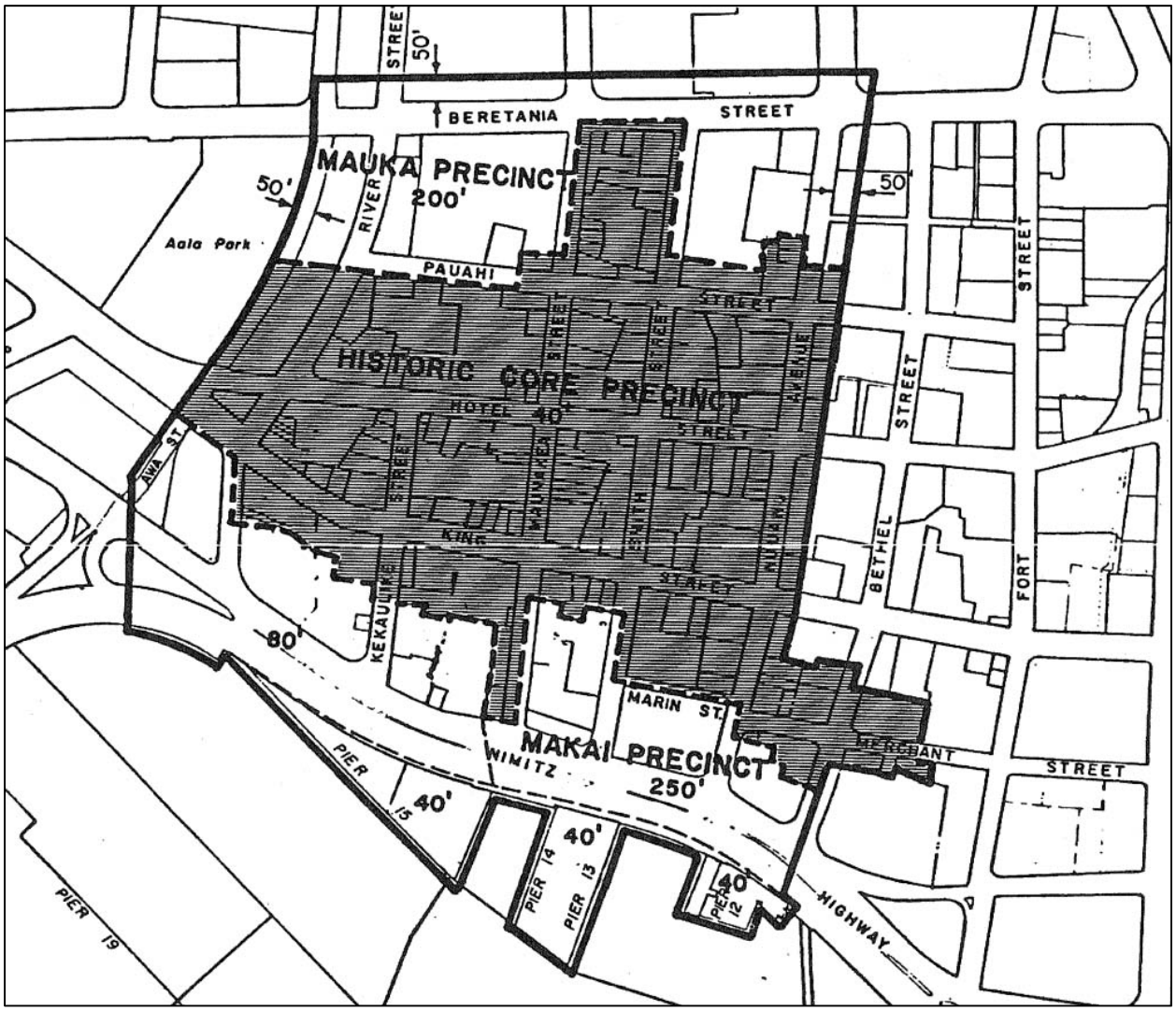

Fig. 3. Map showing Chinatown Special District precinct boundaries and Height Limits. (*Source: Department of Planning and Permitting, City and County of Honolulu* Land Use Ordnance *April 2003.)*

2.3 Piers 12 and 15

As discussed in Sections 2.1 and 2.2, Piers 12 and 15 are located within the boundaries of the Chinatown Special District. The pier structures themselves are not specifically listed in the *Chinatown Special District Historic and Architecturally Significant Structures* list, although the buildings on Pier 15, the Fire Station and the Pier 15 Shed, are both included.

Because the piers are included in the District and the two buildings are listed in the *Historic and Architecturally Significant Structures* list, they are historic resources. See Sections 2.3.1 and 2.3.2 of this report for more information.

2.3.1 Pier 12 Background

To follow is historical background on Pier 12, which is taken directly from a report titled *History of Pier 12*, written by MAI in 2008. In addition to supplying historical information about Pier 12's development, it also provides background on Honolulu Harbor which relates to Pier 15:

> Secondary sources indicate that Honolulu Harbor's retaining wall of coral blocks was constructed between 1857-1859 using coral blocks originally used to build Honolulu Fort (1817-1857) (Cheever, 2003, and Beechert, 1991). In 1854 the legislature voted to demolish Honolulu Fort, which had been built by Kamehameha the Great in 1817 on the shore of Honolulu Harbor from coral cut from a nearby reef. The legislature's intention was to use the blocks of the useless Fort to build a seawall that would create new wharves and new waterfront land behind a seawall (Beechert, 71). Improvements to the Harbor were an ongoing concern in the Kingdom due to the impact of a thriving whaling industry and a sharp increase in traffic and the size of ships (Beechert, 58, 60). In 1844, the newly arrived Robert C. Wyllie (who would become Foreign Minister a year later) began a campaign to improve Honolulu Harbor. At that time the Harbor was only fourteen feet deep at low tide near one of the early wharfs known as the Robinson wharf. The Waikahalulu reef, which was dry at low tide, extended to the southeast of Pier 12 (Beechert, 61). The area to the northwest of Pier 12, where Nuuanu Stream empties into the Harbor, had contained large fishponds. There was little room for the increasingly large ships to maneuver in the shallow Harbor. Wyllie published a series of articles to promote harbor improvements, and he included proposals to demolish the Fort and to fill the area to the southeast to create new waterfront property (Beechert, 60). His proposals were eventually adopted by the legislature, and the Fort's coral blocks were used to construct a harbor-front retaining wall 14 feet high and 7 feet thick and to reclaim 17 to 22 acres of tidal land (Cheever, 69). The seawall construction and filling in of the new waterfront area, known as the Esplanade, was not completed until 1870 (Beechert, 63). By 1897, a wharf known as Brewer's Wharf, approximately 300' long, had been built on the site of Pier 12, as one of three wharves between Maunakea and Kaahumanu Streets (Beechert). Its location at the foot of Nuuanu Street was near the Harbor's first wharf, constructed in 1825 "on a sunken 'hulk' at the foot of Nuuanu Street (Beechert, 58)."
>
> <u>20TH CENTURY:</u>
>
> Aerial photos dated 1925 show that the 300' wharf was furnished with a gable-roof shed that extended the entire 300 foot length of the Pier. On the southeast side of the Pier, a hip-roof building sat on a site adjacent to the shed. A series of aerial photos, taken from 1925 to 1957, show that the shed and the adjacent building on the wharf remained relatively unaltered throughout these years. In 1963, the wharf was shortened to approximately 125'.

SUMMARY:

Over the past hundred years, the ownership of Pier 12 passed from the Territory of Hawaii, Board of Harbor Commissioners, to the State Department of Transportation, Harbors Division…The shortened wharf and site of the former building to the southeast is contained primarily within TMK 2-1-001-056 and totals .37 acres. A small portion of the northwest side of the wharf extends into TMK 2-1-001-055, which includes an area of ocean next to the wharf, and extends .118 acres. The portion of the wharf demolished in 1963 is shown on the tax map as part of TMK 2-1-001-048 and contains 3.518 acres of what is now only water. When the Chinatown Historical District was listed on the National Register in 1973, the makai boundary included Pier 13/14 and TMK 2-1-001-055, but stopped short of TMK 2-1-001-056 that contains most of the existing Pier 12.

2.3.2 Pier 15 Background

In *Honolulu, Crossroads of the Pacific*, Edward Beechert references what *may* be the earliest inception of wharfage at the Pier 15 site: "A further development was the sale of a site for a wharf by the Minister of Finance. This was likely at the foot of Mauna Kea Street. A harbor description in 1844 lists the Charlton-French wharf and the wharf of Land and Company."[6] It is unclear if this sale actually took place at the Pier 15 site, or even if it did, if it subsequently led to infrastructure development.

It is more likely that Pier 15 was built in the early 20th century. It is pictured in a 1908 photograph which shows that its superstructure at that time was comprised of multiple gable-roof frame buildings joined side-by-side.[7] The footprint of the pier was similar to the existing triangular-shape plan that exists today, however, as noted below, it was larger at this time.

Pier 15 provided anchorage to different vessel types through the mid-twentieth century. It served the sampan fishing fleet into the late-teens/early 1920s when the fleet moved to Kewalo Basin. The relocation of the fleet reduced overcrowding in Honolulu Harbor, and Pier 15 was then designated as a 900-foot lumber pier due to its proximity to land transportation.[8] A circa 1935 photograph shows freight vessels docked at the pier, possibly carrying lumber or other necessities.[9] The pier provided anchorage to a foreign vessel, the German Cruiser *KMS Karlsruhe*, in 1934.[10] The pier was used for the handling of army freight circa early 1941.[11]

From 1939 to 1941, the Pier 15 site was embroiled in a very public controversy over a $2.5 million, all-purpose territorial terminal project that never went forward.[12] The project would have built a large terminal to accommodate large combination passenger and freight vessels.

---

[6] Edward Beechert. *Honolulu Crossroads of the Pacific.* University of South Carolina Press, 1991, p. 58.
[7] Black and white photograph found at State of Hawaii Archives, folder: Honolulu Harbor: 1900-1910, PP-40 2.019. "1925" is written on the back, but the folder it is filed in is for the years 1900-1910, and the other photographs in the same panorama series are dated 1908, so it is assumed its correct date is 1908.
[8] Edward Beechert. *Honolulu Crossroads of the Pacific.* University of South Carolina Press, 1991, p. 109.
[9] Black and white photograph found at State of Hawaii Archives, folder: Honolulu Harbor: 1930-1940, PP40-5.030.
[10] Black and white photograph found at the National Archives, Order No. 18-AA-55-62, dated April 23, 1934.
[11] Board of Harbor Commissioners. *Annual Report*, June 30, 1941, p. 4.
[12] Honolulu Star Bulletin. "2,500,000 Asked for Pier 15." March 19, 1941, p. 1.

The multi-gabled superstructure remained on the pier until December 1950, when it was demolished as part of a $2 million project to widen (old) Queen Street. A section of Queen Street, between Fort and River Streets, was expanded into an eight-lane expressway (now Nimitz Highway)[13] part of which was built *makai* of the shoreline, out over the harbor on piles. This project reduced the pier's footprint in size to 65,000 square feet. The southern portion of the site was allocated for a new Fire Station,[14] which was built circa 1951 (Figure 4).

Fig. 4. Fire Station at Pier 15, with fireboat. View from Pier 12. (*Source: MAI, 2012)*

A few years later, circa late-1955, the Pier 15 Shed was built directly north of the Fire Station (Figures 5-8). The original May 1955 drawing set for the project was titled, "Reconstruction of Pier 15 / Construction of Wharf Shed." The floor plan, shown in Figure 5, indicates that the shed was designed with two interior offices, several bathrooms, and a large, open-sided interior space facing the pier apron that included fish auction and fish storage areas. The plan also indicates that the south wall of the shed was solid, with no apertures. Original exterior elevation drawings indicate a wide (11'-6") transite canopy on steel trusses along the makai side of the shed, which provided shade over the fish auction area. The drawings also show a 2'-6" reinforced concrete hood on all other elevations (which is extant today).

[13] Honolulu Star-Bulletin, "Demolition Work on 5 Piers To Start Monday Morning", 12/16/50, p. 4.
[14] Ibid. p. 4.

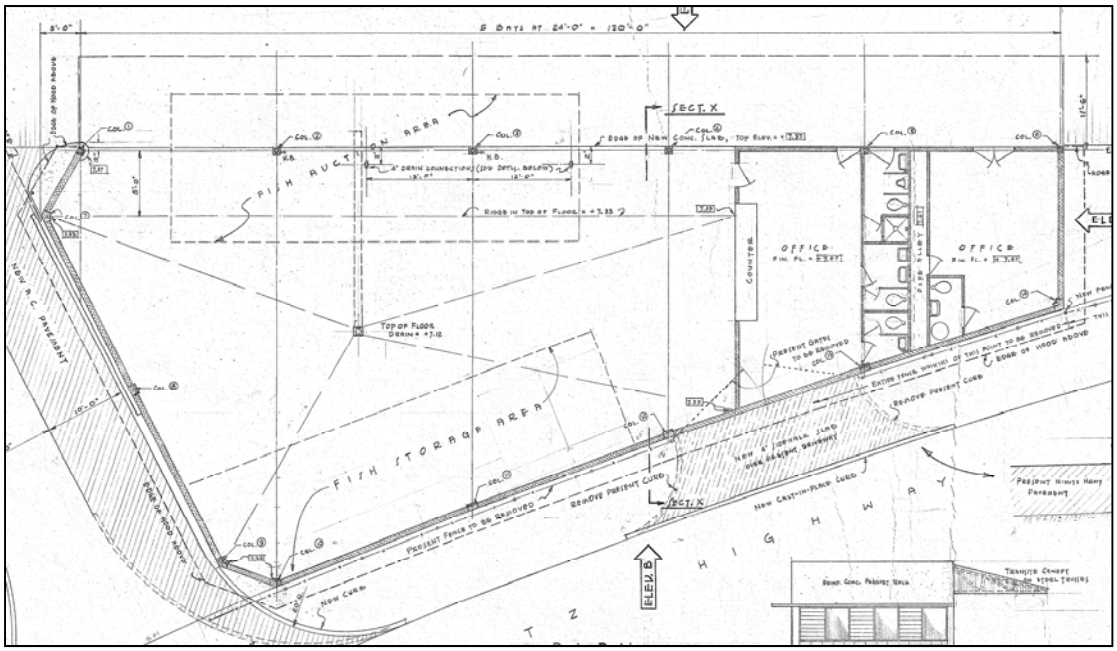

Fig. 5. Floor plan showing original design of the Pier 15 Shed. (*Source: "Reconstruction of Pier 15/Construction of Wharf Shed" dated May 23, 1955. From DOT Harbors Division Plan File room.)*

Several modifications to the Pier 15 Shed have occurred since the 1950s, at unknown dates. Sometime after 1978, the timber apron that fronted the Pier 15 Shed was removed, so that the Shed now immediately fronts the harbor waters. The partially submerged pilings extant today (shown in Figure 13) are likely remnants of this apron. (A few of these piles – those that would be under the proposed loading platforms – are planned to be removed as part of the improvement project.)

Another change that occurred, possibly in connection with the removal of the timber apron, is the modification to the west (makai) wall, and the interior of the shed. The makai-facing office wall was removed (today the entire makai façade consists solely of concrete piers and a metal pipe handrail with chain-link fence infill), and the interior office spaces and bathrooms were removed. Also, sometime after 1978, the wide canopy along the makai-facing wall was removed, and a driveway opening was inserted into the south wall.[15]

Pier 15 is a historic component of the Chinatown Historic District because of its relationship with Honolulu Harbor and Chinatown. The newer Pier 15 Shed is considered historic because it is located on the Pier 15 pier, but in itself is a minor element of the District. Further, the numerous changes that have already occurred have diminished its historic integrity, particularly the portion of the building facing the harbor. With these factors in mind, it would likely not be individually eligible for the NRHP if evaluated on its own.

Pier 15 is located within several different TMKs: 2-1-001:043, -044, -045, -049, -050, -051, -052, -053 and -054.

[15] Black and white photograph dated March 1978 found at State of Hawaii Archives, folder Oahu: Honolulu Harbor, PP-40-6, PPBAC 2-19.021.

Fig. 6. Pier 15 Shed, north end. View from Nimitz Highway. (*Source: MAI, 2012)*

Fig. 7. Interior of Pier 15 Shed showing the interior and the open, makai-facing wall. Originally, there were offices at the rear, so that the last two bays (at left) were nearly completely enclosed. (*Source: MAI, 2012)*

Fig. 8. View of south wall of Pier 15 Shed, showing the driveway that was added sometime after 1978. This corner of the building will be modified as part of the proposed improvement project (*Source: MAI, 2012)*

3.0 Proposed Improvements to Piers 12 and 15

The State of Hawaii Department of Transportation, Harbors Division (DOT-Harbors) is proposing improvements to Piers 12 and 15 as follows:

> The proposed project … will provide new berthing, mooring structures and upgraded utilities at Piers 12 and 15 to accommodate two spill response boats and one spill response barge. The vessels are owned by two companies, the Marine Spill Response Corporation (MSRC) and the Clean Islands Council (CIC), which together comprise the State of Hawaii's marine oil spill response team. The three vessels are presently berthed at Pier 35 but are being displaced by other DOT-Harbors improvements projects. Piers 12 and 15 were selected because of their central location and availability.[16]

An Environmental Assessment is being prepared in accordance with the State of Hawaii Chapter 343 HRS environmental guidelines.

Specific alterations to the piers are discussed below.

3.1 Pier 12

The proposed improvements to Pier 12 are described below, and shown schematically in Figure 9:

> Proposed improvements to Pier 12 will consist of new berthing and mooring structures with appropriate fendering systems to create approximately 200 linear feet of berthing space for a CIC spill response boat. Due to the poor condition of the existing bulkhead, a structural slab on piles will be constructed over the existing bulkhead. This structural slab will not be connected to and will not impose a load on the existing bulkhead. A loading platform and vehicular bridge will also be pile supported.[17]

[16] Glenn Kimura. Early Consultation Letter to SHPD regarding Honolulu Harbor Piers 12 & 15 Improvements, dated February 16, 2012, p. 1.
[17] Ibid, p. 1.

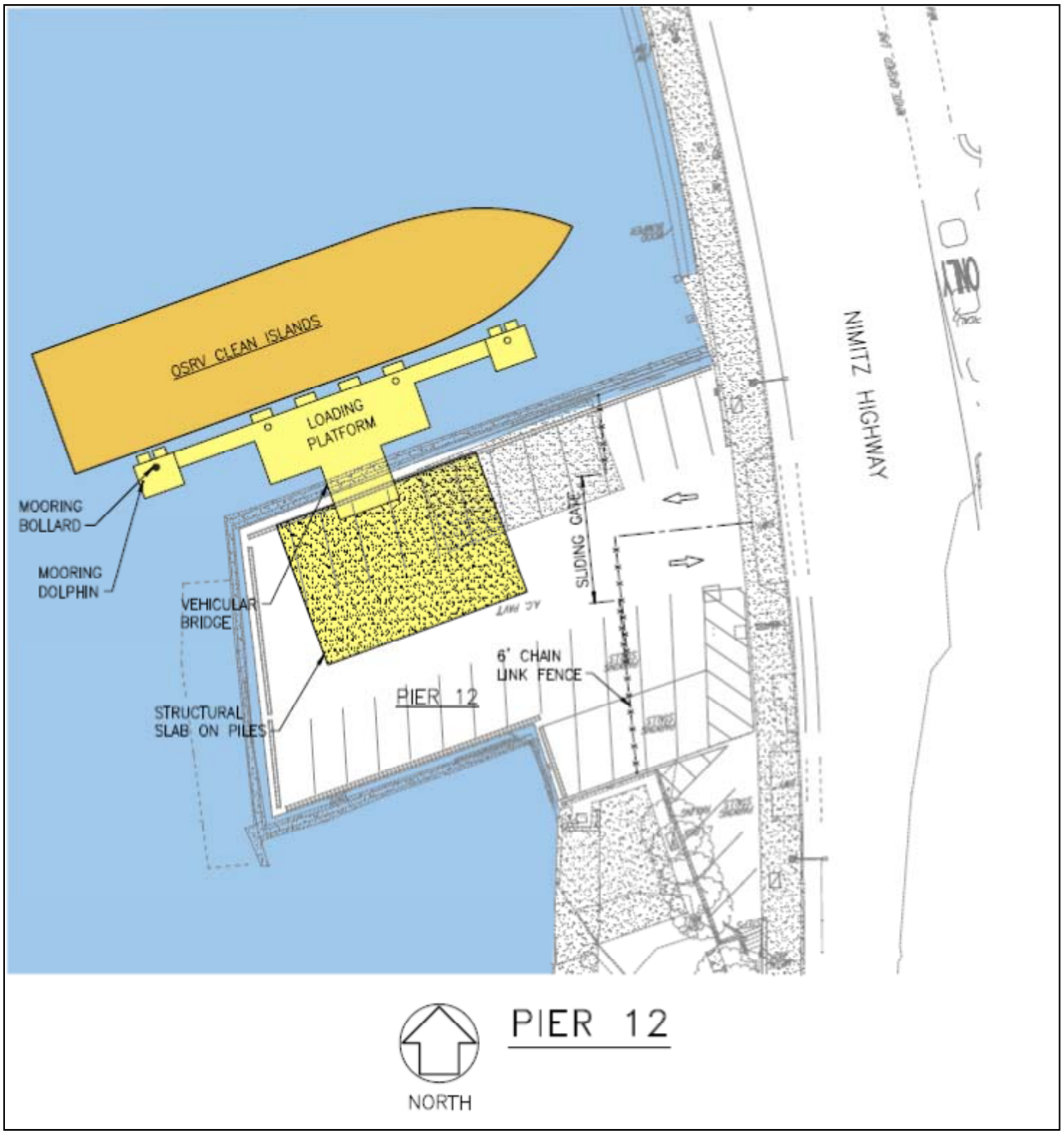

Fig. 9. Pier 12 proposed improvements, showing the proposed Oil Spill Response Vessel (OSRV). (*Source: Glenn Kimura.* Early Consultation Letter to SHPD regarding Honolulu Harbor Piers 12 & 15 Improvements, *dated February 16, 2012.)*

3.2 Pier 15

The proposed improvements to Pier 15 are described below and shown schematically in Figure 10:

> The project will improve the makai face of the wharf, adding 500 linear feet of berthing to accommodate a MSRC spill response boat and barge. The two MSRC vessels will be berthed approximately 35 feet from the existing bulkhead with pile supported mooring dolphins and loading platforms. Similar to Pier 12, the physical condition of the existing bulkhead is poor, and a pile supported structural slab is proposed to accommodate the service vehicles.
>
> The project will also remove numerous old piles located along the sea floor adjacent to the bulkhead, in order to provide adequate draft clearance for vessel berthing. The existing security fence and vehicular gate will be retained.
>
> No work is planned for the existing fire station and fire boat pier, which will continue to be operated out of Pier 15. To allow truck access to the barge loading platform, a portion of the roof of the existing shed building at the north end of the site will be removed.[18]

The proposed work at the Pier 15 Shed will entail removal of the entire southwest corner of the building, demarcated in Figure 10 (right) as 'new roof line'.

The hatched area along the west side of the pier indicates the area is a "no load zone".

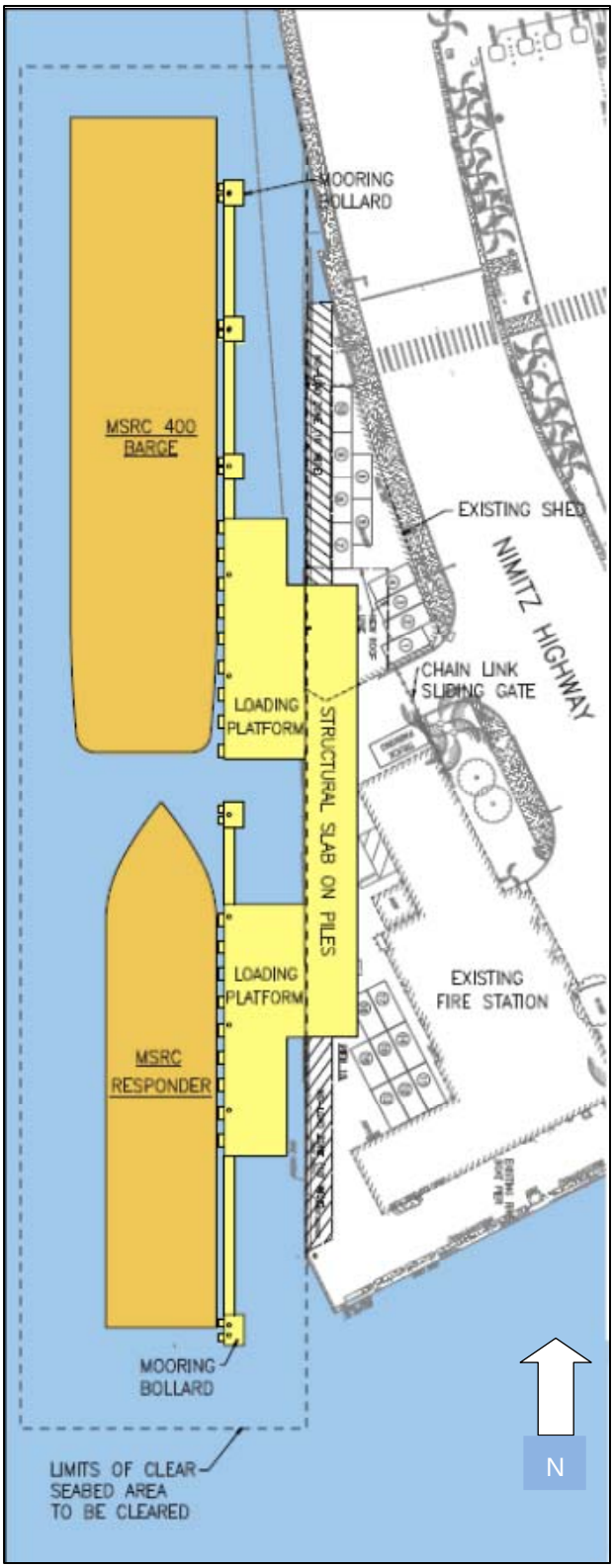

Fig. 10. Pier 15 proposed improvements showing the Marine Spill Response Corporation vessels. (*Source: Glenn Kimura.* Early Consultation Letter to SHPD regarding Honolulu Harbor Piers 12 & 15 Improvements, *dated February 16, 2012.)*

[18] Glenn Kimura. Early Consultation Letter to SHPD regarding Honolulu Harbor Piers 12 & 15 Improvements, dated February 16, 2012, p. 2.

4.0 Evaluation of the Effect of the Project on Historic Resources

The evaluations that follow are for historic resources, such as buildings and structures, which are located above grade. Under water or archaeological resources have not been considered. If appropriate, a qualified archaeological professional would need to make an assessment regarding the probability for potential archaeological discoveries at the pier improvement sites. (See Appendix B, soils map developed by Cultural Surveys Hawaii, Inc. for an unrelated project, which indicates the harbor front in this area is largely comprised of "fill land, mixed," which reduces the likelihood of archaeological discoveries.)

4.1 Hawaii Capital Special District

The proposed modifications to Piers 12 and 15 pose no adverse (direct or indirect) effect to the Hawaii Capital Special District, for the following reasons:

- The historic resources are located outside of the District;
- The direct adverse effects to the Pier 15 Shed (discussed below in Sections 4.2 and 4.3.1) will not affect the District, largely because the changes will take place on the makai side of the structure, and will barely be visible from the Capital District;
- The indirect effect of the Pier 15 modifications was evaluated with respect to its *adjacency to* the Capital District. It was found that the modifications will not impede existing mauka-makai views; nor will they alter the height, open space, or density of development adjacent to the District. The makai-side alterations are not so egregious that they would pose an adverse effect to the District, which is located several piers away.
- The Pier 12 improvements do not affect the District since the proposed loading platform is not visible from within the District.

4.2 Chinatown Special District

The proposed modifications to the Pier 15 Shed were evaluated by MAI as having an adverse effect on the Chinatown Special District for the following reasons:

- The new loading platform at Pier 12 is evaluated as a visual element that would reduce the integrity of the existing setting of the pier, since it would block historic characteristics from view;
- The Chinatown Special District Project Classification Table 21-9.4 determines whether specific projects will be classified as major, minor, or exempt. The structural modification proposed for the Pier 15 Shed is considered by the author of this report as "major exterior repair, alteration" since it entails removing a relatively large portion of the corner of the building. The proposed modification to the Pier 15 Shed roof and overall footprint would reduce its integrity of design.

The adverse effects discussed above are indirect, however, and relatively minor, on the District since:

- In the historic period, both Piers 12 and 15 had timber extensions ("piers" or "aprons") along their lengths that hid the underside from view. The proposed new loading platforms will do the same thing, but to a lesser degree.

- The alterations to the building are located on a secondary view plane visible to the public only from the water, and the Nimitz Highway view corridor will remain largely unchanged;
- The proposed alterations will occur at a corner of the building, which has been affected by associated or nearby alterations (removal of timber apron and steel truss canopy, and the addition of a driveway aperture);
- Pier 15 is a historic component of the Chinatown Historic District because of its relationship with Honolulu Harbor and Chinatown. The (newer) Pier 15 Shed that was built circa 1955 is considered historic because it is located on Pier 15. The Shed is a relatively minor element of the District, built after the District's period of significance (1880s – 1940s). The numerous changes that have already occurred have diminished its historic integrity, particularly the west- and south-facing facades. With these factors in mind, it would likely not be individually eligible for the NRHP if evaluated on its own.

4.3 Piers 12 and 15

4.3.1 Pier 12

The proposed modifications to Pier 12 were evaluated as having an indirect adverse effect on the historic pier due to the introduction of a new loading platform which would reduce the integrity of existing setting of the pier by blocking historic characteristics from view (Figures 11 and 12). However, it should be noted that in the historic period, both Piers 12 and 15 had timber extensions ("piers" or "aprons") along their lengths that also would have blocked these features from view.

Fig. 11. Proposed site for new loading platform at Pier 12. (*Source: MAI, 2012)*

Fig. 12. Historic features of the north-face of Pier 12 include red brick remnants from an unknown period (*Source: MAI, 2012)*

The aspects of the work that were evaluated as resulting in no adverse affect are as follows:

- The proposed "pile supported mooring dolphins and loading platforms" to be added to the north-facing side of the pier will not affect the existing historic coral block remnants from the original 1859 harbor retaining wall/wharf, which are located on the west-facing end of the pier;
- The surface of the existing bulkhead where the pile supported structural slab is proposed does not contain any visible historic features (such as bollards, curbs or paving markings).

Sub-surface work that may need to be monitored for inadvertent discoveries includes:

- The structural slab on piles will require excavation on the Pier 12 surface, approximately 18 to 24 inches deep (with the piles even deeper);
- Piles will be set into the pier surface.

4.3.2 Pier 15

Most of the proposed improvements to Pier 15 were evaluated as having no adverse effects on the pier, however, the modification to the Pier 15 Shed does result in an adverse effect. The effects of the proposed work are discussed below.

Work that was evaluated as having no adverse effect:

- The proposed "pile supported mooring dolphins and loading platforms" do not affect any known historic features (this pier does not contain any historic coral blocks);
- A few of the "old piles located along the sea floor adjacent to the bulkhead" will be removed (those that would be under the proposed loading platforms), but these are not known historic features, and are not evaluated as historic features (Figure 13);
- The surface of the existing bulkhead where the pile supported structural slab is proposed does not contain any visible historic features (such as bollards, curbs or paving markings). (Figure 14).

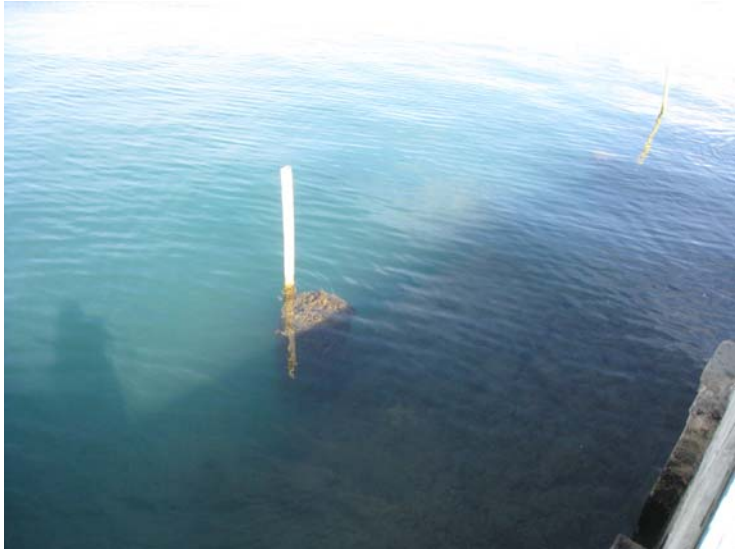

Fig. 13. A few of the "old piles located along the sea floor adjacent to the bulkhead" will be removed. (*Source: MAI, 2012)*

Fig. 14. The surface of the bulkhead where the proposed work will occur does not contain any existing historic features such as bollards or pavement markings. (*Source: MAI, 2012)*

Sub-surface work includes the following (see Appendix B for soils map for Pier 15 and vicinity):

- The structural slab on piles will require excavation on the Pier 15 surface, approximately 18 to 24 inches deep (with the piles even deeper);
- Piles will be set into the pier surface.

Work that poses a direct adverse effect:

- To allow truck access to the barge loading platform, a portion of the Pier 15 Shed will be demolished. (See Figures 15 and 16.) This alteration will alter the design of the building by cutting off one of the building's corners. The building will be distinctly different in appearance after the work occurs. However alterations have already occurred in this area, and the view of the building from Nimitz Highway will be largely unaltered since that façade will remain intact.

Fig. 15. Exterior of Pier 15 Shed. The area shown at left is the portion of the building which will be removed to allow for truck access to the barge loading platform. (*Source: MAI, 2012)*

Fig. 16. Interior of Pier 15 Shed. View facing south. The driveway was an alteration to the original design. The far wall (at right)/corner will be removed as part of the proposed project. (*Source: MAI, 2012)*

5.0 Recommendations

5.1 General Recommendations

Any proposed alterations to historic properties should first be consulted on with SHPD.

Generally, any improvements to historic resources should be made in accordance with the Secretary of the Interior's Standards (SOIS) for the Treatment of Historic Properties.

Prior to any alterations that are not in accordance with the SOIS, an agreement should be reached with SHPD regarding mitigation. This would likely include documentation according to the SOIS for Architectural and Engineering Documentation, commonly known as the Standards for HABS/HAER, or Historic American Buildings Survey/Historic American Engineering Record, program of the National Park Service (NPS).

According to NPS guidelines, the kind and amount of HABS/HAER documentation "should be appropriate to the nature and significance of the buildings, site, structure or object being documented. For example, Documentation Level I [full set of measured drawings, photographs, history and description] would be inappropriate for a building that is a minor element of a historic district, notable only for streetscape context and scale. A full set of measured drawings for such a minor building would be expensive and would add little, if any, information to the HABS/HAER collections. Large format photography (Documentation Level III) would usually be adequate to record the significance of this type of building."[19] Accordingly, with this example in mind, an appropriate level of documentation that may be suggested by SHPD to mitigate the proposed modifications to the Pier 15 Shed would likely be large-format photography.

5.2 Chinatown Special District Recommendations

The Chinatown Special District's Project Classification (Section 21-9.60-13) states that;

> Projects involving demolition of, or the major or minor exterior repair, alteration or addition to structures listed on Exhibit 21-9.10-A [included as Appendix A], set out at the end of this article, may be referred to the state historic preservation officer and other appropriate agencies for review.

Accordingly, since the Pier 15 Shed is included in Exhibit 21-9.10-A, the project shall be reviewed by the SHPD. The two piers (12 and 15) are also historic resources that require review by SHPD.

5.3 Recommendations by SHPD on Pier Improvement Project

In response to a letter which solicited input on the pier improvement project and notified SHPD that an EA was being prepared, Angie Westfall, Architecture Branch Chief, acknowledged Pier 12's historic significance, and made the following recommendations in February, 2012:

> SHPD requests that any planning for use of Pier 12 include the following:

[19] NPS website, Secretary of the Interior's Standards for Architectural and Engineering Documentation, available at http://www.cr.nps.gov/local-law/arch_stnds_6.htm

1. The coral blocks are to be protected and retained and remain visible
2. Public access be provided to view the coral block wall
3. An interpretive marker placed on the site. The design and contents of the marker to be approved by SHPD."[20]

Ms. Westfall did not comment on Pier 15 or the Pier 15 Shed, nor did she comment on any archaeological issues. Appendix B indicates the harbor front in this area is largely comprised of "fill land, mixed," which reduces the likelihood for archaeological discoveries. However, it is recommended that SHPD reviews the project with respect to this.

[20] Angie Westfall. Letter to Glenn Kimura, President of Kimura International, Inc. regarding Section 6E-42 Historic Preservation Review Project: Bulkheads, berthing and mooring structures, TMKs: (1) 2-1-001:045 and 056. February 24, 2012.

6.0 References

Drawings

Original drawings for the Pier 15 Fire Station and Pier 15 Shed were found at the Department of Transportation, Harbors Division, Plan Room.

Collections

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Books, Reports, Letters, and Journals

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Department of Planning and Permitting, City and County of Honolulu. *Land Use Ordnance.* April, 2003.

Kimura, Glenn. Early Consultation Letter regarding Honolulu Harbor Piers 12 & 15 Improvements. February 16, 2012.

Mason Architects, Inc. *History of Pier 12*, prepared for the American Marine Services Group. 2008.

O'Hare, Constance and David Shideler, et al. *Archaeological Monitoring Plan for the Armstrong Building Courtyard Renovation Project, Honolulu Ahupua'a, Kona District, Oahu Island (TMK: (1) 1-7-002:028)*, prepared for Mason Architects, Inc. May, 2008.

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Westfall, Angie. Response letter to Glenn Kimura, President of Kimura International, Inc. regarding Section 6E-42 Historic Preservation Review Project: Bulkheads, berthing and mooring structures, TMKs: (1) 2-1-001:045 and 056. February 24, 2012.

Newspaper Articles

"$2,500,000 Asked for Pier 15." *Honolulu Star Bulletin.* March 19, 1941.

"Budge, Dillingham Argue Harbor Plans Heatedly at Hearing." *Honolulu Advertiser.* March 22, 1941.

"Demolition Work on 5 Piers to Start Monday Morning." *Honolulu Star Bulletin.* December 16, 1950.

"New Pier 15 Wharf Favored by Chamber." *Honolulu Advertiser.* December 12, 1939.

"Pier 15 Plan is Attacked By Citizens." *Honolulu Advertiser*. September 4, 1941.

"Pier 15 in Bitter Senate Row." *Honolulu Star Bulletin*. April 21, 1941.

"Senate Bloc Says Pier 15 Project 'Out'." *Honolulu Advertiser*. September 6, 1941.

Websites

National Park Service. Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines [As Amended and Annotated]: Secretary of the Interior's Standards for Architectural and Engineering Documentation: http://www.cr.nps.gov/local-law/arch_stnds_6.htm, accessed on June 19, 2012.

Appendix A: Chinatown Special District Exhibit 21-9.10-A

(See next page)

EXHIBIT 21-9.10-A

CHINATOWN SPECIAL DISTRICT HISTORIC AND ARCHITECTURALLY SIGNIFICANT STRUCTURES

Tax Map Key	Address[1]	Building Name
1-7-01: 2	55 N. Nimitz Hwy.	Pier 13 & 14
1-7-02: 2	800 Nuuanu Ave.	Fisher Hawaii Building
1-7-02: 4		State of Hawaii (shops)
1-7-02: 4	925 Maunakea St.	Fireboat Fire Station
1-7-02: 8	83 N. King St.	Goodwill Industries
1-7-02: 9,45	75 N. King St.	D. Dam/N. Tam
1-7-02: 11	900 Maunakea St.	M. Kawahara & T. Sato
1-7-02: 13	128 N. Nimitz Hwy.	C. Q. Yee Hop (stone)
1-7-02: 16	905 Kekaulike St.	Nimitz & Kekaulike
1-7-02: 17,18	915 Kekaulike St., 937 Kekaulike St.	King & Kekaulike
1-7-02: 19,21	943 Kekaulike St., 125 N. King St.	Fish Market
1-7-02: 23	101 N. King St.	Bank of Hawaii
1-7-02: 24	950 Maunakea St.	Dentist
1-7-02: 25	922 Maunakea St.	J. H. Schnack
1-7-02: 26	902 Kekaulike St.	Holau Market
1-7-02: 28	175 N. King St.	McCandless
1-7-02: 29	165 N. King St.	Musashiya
1-7-02: 34	145 N. King St.	Oahu Market
1-7-02: 35	2 Marin St.	T. R. Foster/Spaghetti 2 Bldg.
1-7-02: 39	1 N. King St.	One North King
1-7-02: 40	928 Nuuanu Ave.	Nippu Jiji
1-7-02: 45	69 N. King St.	Oka
1-7-03: 1	2 N. King St.	Hocking Hotel
1-7-03: 2	36 N. King St.	United Chinese Society
1-7-03: 4,97	39 N. Hotel St.	Swing Club
1-7-03: 5	29 N. Hotel St.	29 31 Hotel Street
1-7-03: 6	15 N. Hotel St.	Nuuanu Shops
1-7-03: 7	1 N. Hotel St.	Gallery
1-7-03: 8	1044 Nuuanu Ave.	McCandless Property
1-7-03: 9	1038 Nuuanu Ave.	Kim Chow
1-7-03: 10	72 N. King St.	Hawaii National Bank
1-7-03: 11	80 N. King St.	Lum Yip Kee
1-7-03: 12	90 N. King St.	Lee & Young
1-7-03: 15	61 N. Hotel St.	Bath Palace
1-7-03: 15	61 N. Hotel St.	Mendonca (makai)
1-7-03: 16	51 N. Hotel St.	Mendonca (small, corner)
1-7-03: 18,90 92	116 N. King St.	D & B's Lunch
1-7-03: 19	124 N. King St.	Uptown Jewelers
1-7-03: 25	119 N. Hotel St.	Lum Yip Kee 1936
1-7-03: 26	111 N. Hotel St.	Wo Fat
1-7-03: 28	1020 Kekaulike St.	Arita Store
1-7-03: 28	1020 Kekaulike St.	Kekaulike Building
1-7-03: 29,66	170 N. King St.	Lee Building
1-7-03: 30,31 72 74	178 N. King St., 182 N. King St.	N. King & River Streets
1-7-03: 32	165 N. Hotel St.	Wong Building
1-7-03: 33	159 N. Hotel St.	LDCST BenevSoc
1-7-03: 37	102 N. Hotel St.	Siu Building
1-7-03: 42	158 N. Hotel St.	Wong
1-7-03: 45	175 N. Pauahi St.	Komeya Apartments
1-7-03: 48	1138 Maunakea St.	Sumida Building 1926
1-7-03: 49	1130 Maunakea St.	Lum Yip Kee 1920
1-7-03: 50	1110 Maunakea St.	Lee Building
1-7-03: 51	54 N. Hotel St.	Mendonca
1-7-03: 52	1125 Maunakea St.	Ket On Society
1-7-03: 55	65 N. Pauahi St.	Barbershop
1-7-03: 56	2 N. Hotel St.	Encore Saloon Building

1-7-03: 57	24 N. Hotel St.	24 Hotel Street (Mel's)
1-7-03: 58	30 N. Hotel St.	Risque
1-7-03: 59	42 N. Hotel St.	Kuo Min Tang
1-7-03: 59	42 N. Hotel St.	Young Market
1-7-03: 59	50 N. Hotel St.	Mini Garden
1-7-03: 62	1126 Nuuanu Ave.	Love's Bakery
1-7-03: 63	1136 Nuuanu Ave.	McCandless Block
1-7-03: 64	1118 Nuuanu Ave.	Lai Fong
1-7-03: 66,29	158 N. King St.	United Press, Ltd.
1-7-03: 75	136 N. King St.	L. Ah Leong
1-7-03: 76	1034 Maunakea St.	Cindy's Leis
1-7-03: 81	1021 Smith St.	
1-7-03: 83	21 N. Hotel St.	Club Hubba Hubba
1-7-03: 84 89	1023 Maunakea St.	Chung Chong Yuen
1-7-03: 96	1120 Maunakea St.	Colusa Building (part of Maunakea Marketplace)
1-7-03: 98	1128 Smith St.	1128 Smith Street
1-7-04: 1	1150 Nuuanu Ave.	Four Seas Chop Suey
1-7-04: 8	1162 Nuuanu Ave.	Bo San Ton
1-7-04: 9	1158 Nuuanu Ave.	Oweco World Travel
1-7-04: 11	1149 Maunakea St.	Yanin Ltd. Building
1-7-04: 13	1159 Maunakea St.	Tsung Tsin Association
1-7-04: 16	1165 Maunakea St.	Old Jailhouse (stone building)
1-7-04: 18	83 N. Beretania St.	Hai On Tong
1-7-04: 19	73 N. Beretania St.	79 N. Beretania Street
1-7-04: 21,22	53 N. Beretania St.	OK Restaurant (2 sections)
1-7-04: 25	1146 Smith St.	Golden Harvest
1-7-04: 28	1152 Maunakea St.	Minatoya Sukiyaki
1-7-04: 36	171 N. Beretania St.	Fong Building
2-1-02: 12	901 Bethel St.	Kamehameha V Building
2-1-02: 19	63 Merchant St.	Bishop Bank Building
2-1-02: 20	51 Merchant St.	Melcher Building
2-1-02: 24,57	842 Bethel St.	Old Honolulu Police Station (Walter Murray Gibson Building)
2-1-02: 32	924 Bethel St.	The Friend
2-1-02: 33	908 Bethel St.	Honolulu Publishing Co.
2-1-02: 34	16 Merchant St.	
2-1-02: 35	2 Merchant St.	Royal Saloon
2-1-02: 37	923 Nuuanu Ave.	Wing Wo Tai
2-1-02: 42	2 S. King St.	King's Court/First Federal
2-1-03: 16	1121 Nuuanu Ave.	McLean Block
2-1-03: 17	2 S. Hotel St.	Perry Block 1888
2-1-03: 18	1129 Nuuanu Ave.	Pantheon Bar

[1]In the event the listed addresses are not consistent with the tax map keys or building names, the tax map keys and building names shall prevail.
(Added by Ord. 99-12; Am. Ord. 10-19)

Appendix B: Soils Map showing part of project area

(See next page)

(Source: *Archaeological Monitoring Plan for the Armstrong Building Courtyard Renovation Project, Honolulu Ahupua'a, Kona District, Oahu Island (TMK: (1) 1-7-002:028)*, prepared for Mason Architects, Inc by Cultural Surveys Hawaii, Inc. May, 2008.)

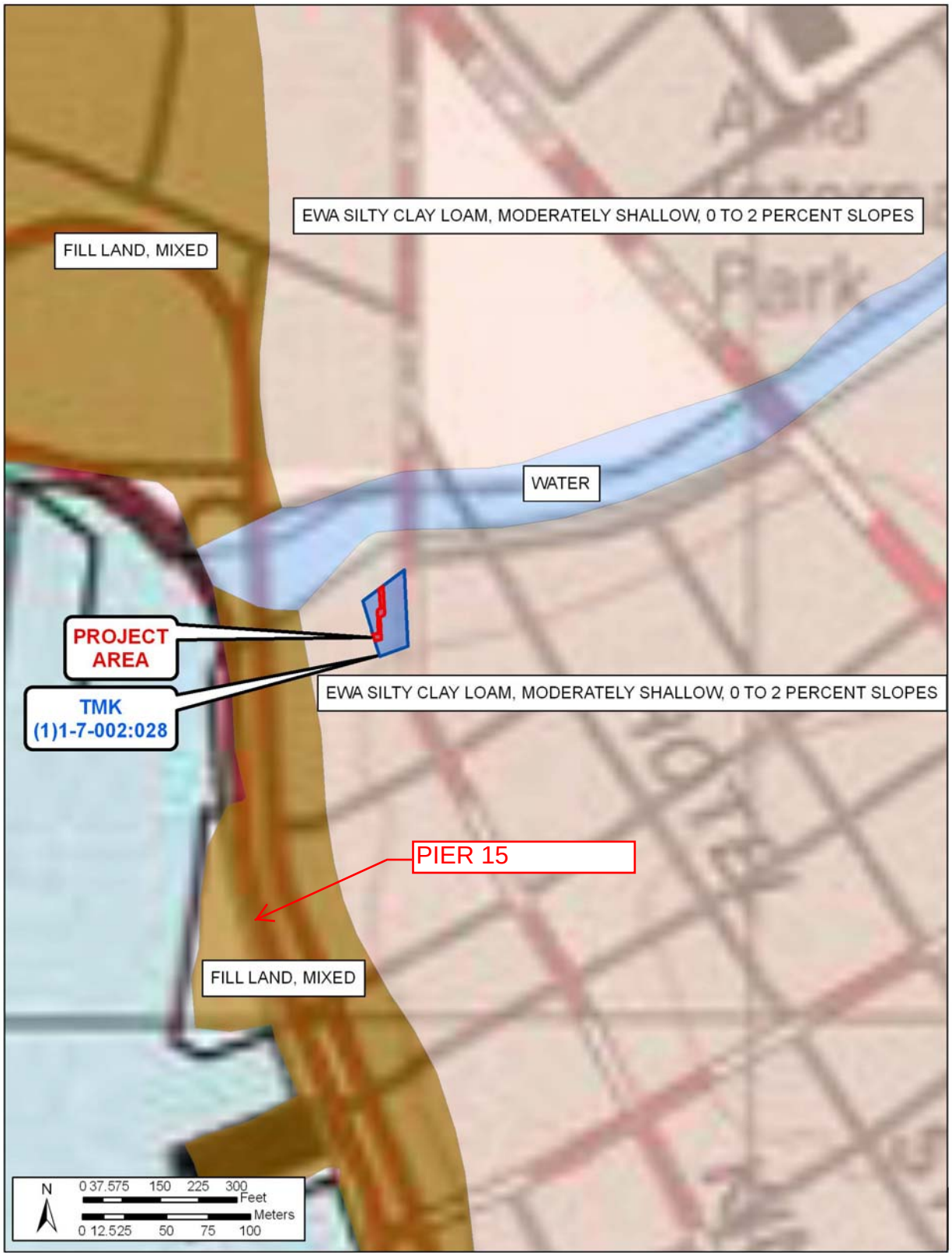


Figure 9. Soils map of the project area

APPENDIX F.
TRAFFIC

Traffic Impact Assessment of Proposed New Uses at Piers 12 and 15 Fronting Nimitz Highway

Honolulu, Hawaii

Summary

The State of Hawaii Department of Transportation, Harbors Division, has proposed to relocate some of the uses presently at Pier 35 to new locations in Honolulu Harbor, specifically at Piers 12 and 15. The Clean Islands Council will be relocated to Pier 12, in an area that was once used as a for-fee parking lot rented on month-to-month permits. The Marine Spill Response Corporation will be relocated to Pier 15, using an open shed that had been previously used for parking and storage. Vehicular access to the Pier 12 site is over an existing driveway that serves the parking lot; vehicular access to the Pier 15 site is through a driveway that is shared with the service area behind the existing waterfront fire station. This traffic assessment found that the impacts of the additional traffic in the area due to these new uses will not be significant.

Traffic movements in or out of each driveway will be limited to right turns from or to the eastbound lanes of Nimitz Highway, since it is a divided facility and there are no median openings in front of the driveways. Traffic to or from the westbound lanes of Nimitz Highway can make U-turns at locations within a half-mile of both driveways, at the signalized intersection of Nimitz Highway and Alakea Street to the east and at a U-turn roadway just west of the Nuuanu Stream bridges.

The traffic impact at each site has been estimated to be less 50 vehicle trips per day, with the peak hourly volume in one direction (in or out) being no more than 15 vehicles per hour. These traffic impacts will be less than 1% of the existing traffic volumes on the eastbound lanes of Nimitz Highway.

Truck movements into the driveways could, however, affect traffic flow on the highway, as the driveways are narrow; turns by larger vehicles will need to be executed slowly and may require the use of two or more lanes. Operators of these vehicles, however, are trained and will have ample opportunity to warn other drivers of their intended movement, as these vehicles would be regular visitors to the site. Vehicles exiting each site would stop before crossing the sidewalk and proceed only when the sidewalk, adjacent bicycle lane, and vehicular traffic lanes are clear; each driveway has adequate sight distance and the upstream traffic signals provide a natural gap in traffic flow to facilitate safe entry into traffic.

Traffic Impact Assessment

In early 2011, the State of Hawaii Department of Transportation (HDOT) had published a draft "Best Practices" guideline for the preparation of traffic impact reports (TIRs). Section 5.2.3 of that proposed guideline discusses "triggers" and states that if "the TIR does not meet the trigger (minimum) for completing the analysis, it is in everyone's best interest to scale the effort appropriately before resources are wasted." Section 5.2.3 further states that actions "that generate relatively low number of trips, and are not expected to significantly increase or alter traffic generation or distribution may be documented with a Traffic Impact Assessment (TIA) memorandum. The memorandum would include a description of the project, the surrounding transportation system including any potential impacts, and also include some analyses regarding trips generated by the project. Figure 5 [of the proposed guideline] shows a sample checklist that covers the Traffic Impact Assessment requirements. Developments consisting of 100 or fewer trips during an hour and/or 500 or fewer daily trips, should prepare a Traffic Impact Assessment memorandum." While that guideline has not yet been adopted, it provides the basis for this traffic assessment. The Highway Planning Branch of the HDOT is currently using an impact of 3% or more traffic volume as a guideline for significant traffic impacts.

The information provided herein is intended to conform to the proposed requirements for a TIA from the draft "Best Practices" document. A copy of the checklist from the HDOT's proposed guideline is shown below:

1. *Development Name*
2. *Development Description (quantity and type of land use, development schedule)*
3. *Development Location (Parcel number(s), address, vicinity map)*
4. *Existing transportation system (functional class, speed, volumes, transit/pedestrian/bike amenities, existing safety and/or operational issues)*
5. *Proposed transportation improvements (site plan, internal/external circulation number and location of access points, modifications to existing motorized/non-motorized system)*
6. *Proposed transportation impacts (trip generation table, trip distribution graphic, description of potential impacts – safety, sight distance, motorized/non-motorized impacts, impacts to critical intersections or facilities.)*

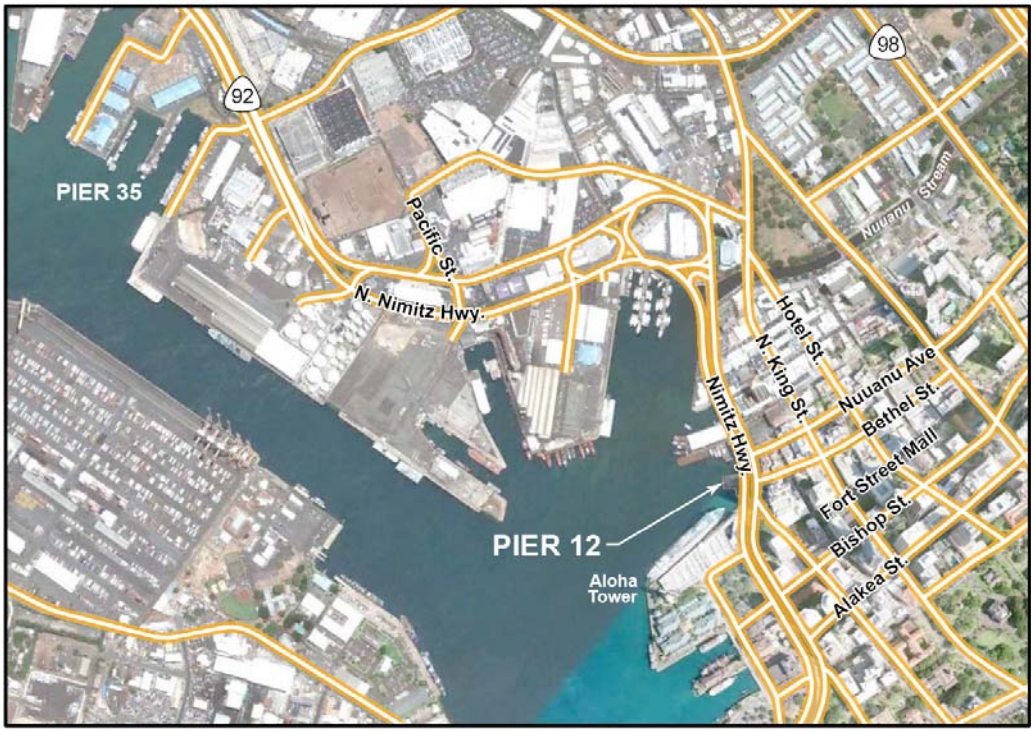
The proposed actions will affect driveway movements to and from Nimitz Highway in the downtown Honolulu area, and are described herein (note: Nimitz Highway is generally an east-west roadway, with the west end at Pearl Harbor and the east end connecting to Ala Moana Boulevard, which continues into Waikiki; however, through the project area, "eastbound" traffic travels in a southerly direction and "westbound" traffic travels in a northerly direction. All discussions of traffic volumes and travel direction use the east-west orientation to minimize confusion.)

Pier 12 (Clean Islands Council)

1. **Development Name:** Honolulu Harbor Pier 12 by Clean Islands Council.

2. **Development Description:** Construction of berthing facilities for Clean Islands Council

3. **Development Location:** TMK 2-1-001:056



basemap from portion of HDOT, 2009 Traffic Station Map Book

4. **Existing Transportation System:** Nimitz Highway is an urban arterial that is part of State Route 92 as it passes through downtown Honolulu. In the vicinity of the project site, it is a divided eight-lane highway (four lanes of traffic in each direction) with auxiliary lanes for left turns at signalized intersections. The site driveway ramp crosses a concrete sidewalk that is approximately 8 feet wide; a bicycle lane, 3-4 feet in width, is striped between the curb and the adjacent traffic lane.

   A 48-hour machine traffic count at the Nuuanu Stream bridge taken in August 2009 showed a total two-way weekday volume of nearly 72,000 vehicles per day; the volume in the eastbound direction (adjacent to the project site) was 35,400 vehicles per day. Traffic volumes on Nimitz Highway peaks during the morning and afternoon commute periods, but remains at a high level

throughout the day; the counts showed flow rates of at least 1,800 vehicles per hour in the eastbound direction between 6:30 AM and 6:30 PM.

Eastbound traffic on Nimitz Highway through the area is controlled by traffic signals at several intersections: at Pacific Street (0.65 mile west), at Nuuanu Avenue (150 feet west), at Fort Street (500 feet east), at Bishop Street (0.2 mile east), and at Alakea Street (0.3 mile east). The posted speed limit is 35 miles per hour and signal coordination has been observed to be fair-to-good during most hours of the day.

A network of local and collector streets connect to Nimitz Highway to provide access to other downtown properties and linkages to the rest of the street and highway network. Downtown streets that intersect Nimitz Highway generally are operated one-way, alternating directions to provide for efficient circulation. Pedestrian crossings of Nimitz Highway are permitted at marked midblock crosswalks and at signalized intersections, which are located where left turns onto or from the highway are permitted.

City bus service is available less than four blocks away on Hotel Street, serving numerous routes. Other bus stops are located nearby on King Street, Bishop Street, and Alakea Street. No City bus routes have stops on Nimitz Highway near the project site.

5. **Proposed Transportation Improvements:** Improvements to the existing driveway will be part of the project, unless the existing driveway is found to adequately serve truck movements between the site and the highway and conform to current standards. Sight distances for drivers of entering and exiting vehicles at the driveway and vehicle turning paths will be checked during design in consultation with, and with the approval of, the State Highways Division.

6. **Proposed Transportation Impacts:** The impact of the proposed access would be minimal. Site-generated traffic has been estimated to be less than 20 vehicles per day, consisting mostly of private vehicles (automobiles and small trucks) used by boat crews in commuting to and from work. Because the vessel that will be berthed at this location is not a cargo vessel, loading or unloading activities will be infrequent, possibly once a month, generating two truck trips (one entering the site, one leaving the site) when that occurs. The largest vehicle expected to access the site will is a flat-deck semi-trailer carrying equipment that would be lifted onto the ship (using the ship's crane).

   Peak hour volumes on a typical day are estimated to be no more than 10 vehicles per hour (total of entering and exiting traffic). The traffic impact, therefore, is an increase of less than 0.1% of the daily traffic, or less than 1% of the hourly volume if the site traffic occurs during daylight hours (if the site traffic occurs at other times, traffic volumes on the highway are much lower;

the relative traffic volume impact may be higher, but the traffic impact of driveway movements would be minimal because traffic volumes are less).

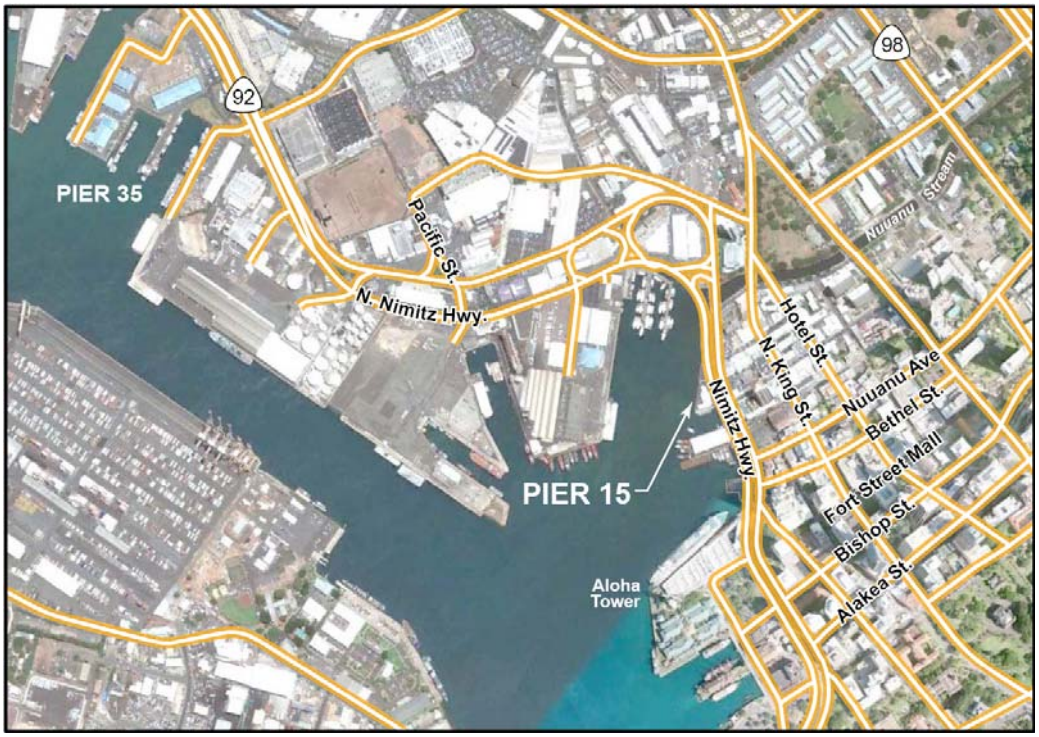
While existing volumes on nearby City streets are less than on Nimitz Highway, the project impacts will be less as site-generated traffic will have various opportunities to enter onto or leave Nimitz Highway. The low volume and type of traffic expected to be generated by the site activity is not expected to result in any changes in demands for public transit service.

Pier 15 (Marine Spill Response Corporation)

1. **Development Name**: Honolulu Harbor Pier 15 by Marine Spill Response Corporation.

2. **Development Description:** Construction of berthing facilities at Pier 15.

3. **Development Location:** TMK 2-1-001:044



basemap from portion of HDOT, 2009 Traffic Station Map Book

4. **Existing Transportation System:** Nimitz Highway is an urban arterial that is part of State Route 92 as it passes through downtown Honolulu. In the vicinity of the project site, it is a divided eight-lane highway (four lanes of traffic in each direction) with auxiliary lanes for left turns at signalized intersections. The site driveway interrupts a concrete sidewalk that is

approximately 10 feet; curb ramps are provided for smooth transitions for persons traveling along the sidewalk. A bicycle lane, 4-5 feet in width, is striped between the curb and the adjacent traffic lane.

A 48-hour machine traffic count at the Nuuanu Stream bridge taken in August 2009 showed a total two-way weekday volume of nearly 72,000 vehicles per day; the volume in the eastbound direction (adjacent to the project site) was 35,400 vehicles per day. Traffic volumes on Nimitz Highway peaks during the morning and afternoon commute periods, but remains at a high level throughout the day; the counts showed flow rates of at least 1,800 vehicles per hour in the eastbound direction between 6:30 AM and 6:30 PM.

Eastbound traffic on Nimitz Highway through the area is controlled by traffic signals at several intersections: at Pacific Street (0.5 mile west), at Nuuanu Avenue (700 feet east), at Fort Street (0.26 mile east), at Bishop Street (0.35 mile east), and at Alakea Street (0.45 mile east). The posted speed limit is 35 miles per hour and signal coordination has been observed to be fair-to-good during most hours of the day.

A network of local and collector streets connect to Nimitz Highway to provide access to other downtown properties and linkages to the rest of the street and highway network. Downtown streets that intersect Nimitz Highway generally are operated one-way, alternating directions to provide for efficient circulation. Pedestrian crossings of Nimitz Highway are permitted at marked midblock crosswalks and at signalized intersections, which are located where left turns onto or from the highway are permitted.

City bus service is available less than four blocks away on Hotel Street, serving numerous routes. Other bus stops are located nearby on King Street. No City bus routes have stops on Nimitz Highway near the project site.

5. **Proposed Transportation Improvements:** A corner of the roof over an existing shed on the site will be altered to improve truck access.

   Improvements to the existing driveway will be part of the project, unless the existing driveway is found to adequately serve truck movements between the site and the highway and conform to current standards. Sight distances for drivers of entering and exiting vehicles at the driveway and vehicle turning paths will be checked during design in consultation with, and with the approval of, the State Highways Division.

6. **Transportation Impacts:** The impact of the proposed access would be minimal. Site-generated traffic has been estimated to be less than 40 vehicles per day, consisting mostly of private vehicles (automobiles and small trucks) used by employees in their commute to and from work.

The user has estimated that large tractor-trailer truck access will occur less than ten times per year. Fuel deliveries may involve multiple trips over a two-day period, once per year.

Peak hour volumes on a typical day are estimated to be no more than 15 vehicles per hour (total of entering and exiting traffic). The traffic impact, therefore, is an increase of less than 0.3% of the daily traffic, or less than 1% of the hourly.

While existing volumes on nearby City streets are less than on Nimitz Highway, the project impacts will be less as site-generated traffic will have various opportunities to enter onto or leave Nimitz Highway. The low volume and type of traffic expected to be generated by the site activity is not expected to result in any changes in demands for public transit service.