DRAFT ENVIRONMENTAL ASSESSMENT

Prepared in Accordance with Requirements of Chapter 343, Hawaii Revised Statutes

CONSTRUCTION OF PIER 29 CONTAINER YARD HONOLULU HARBOR

TMK: (1) 1-5-038: 1(por.), 2, 8, 28, 29, 30, 31, 35, 36, 43, 44, 51, 57, 59, 60, 62, 63, 64, 65, 66, 67

Honolulu, O‘ahu, Hawai‘i

March 10, 2009

Department of Transportation,
Harbors Division
79 South Nimitz Highway
Honolulu, Hawai‘i 96813

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Job No. H.C. 10354

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March 10, 2009

Accepting Agency:

Department of Transportation,
Harbors Division
79 South Nimitz Highway
Honolulu, Hawai‘i 96813

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TABLE OF CONTENTS

ACRONYMNS AND ABBREVIATIONS iv

SECTION 1 PROJECT SUMMARY 1

SECTION 2 DESCRIPTION OF PROJECT 2

2.1 Background 2
2.2 Project Purpose and Need 2
2.3 Project Location 2
2.4 Existing Conditions and Current Operations 5
2.4.1 Existing Conditions 5
2.4.2 Current Operations 5
2.5 Piers 29 Improvement Alternatives 7
2.5.1 No Action 7
2.5.2 Delayed Action 7
2.5.3 Preferred Alternative 7
2.6 Project Schedule 10
2.7 Estimated Costs 10

SECTION 3 DESCRIPTION OF AFFECTED ENVIRONMENT, POTENTIAL ENVIRONMENTAL IMPACTS, AND PROPOSED MITIGATION 12

3.1 Physical Environment 12
3.1.1 Climate 12
3.1.2 Topography 12
3.1.3 Soils and Geology 12
3.1.4 Hydrology 18
3.1.5 Floods and Tsunami 19
3.1.6 Flora and Fauna 22
3.1.7 Marine Biology 23
3.1.8 Threatened and Endangered Species 24
3.1.9 Alien Species 24
3.1.10 Water Quality 28
3.1.11 Air Quality 29
3.1.12 Noise 30
3.2 Socio-Economic Environment 31
3.2.1 Land Use 31
3.2.2 Historical, Archaeological and Cultural Resources 31
3.2.3 Scenic and Visual Resources 32
3.2.4 Recreational Facilities 32
3.2.5 Population 32
3.2.6 Ceded Lands 32
3.3 Infrastructure Systems and Services 33
3.3.1 Traffic and Transportation Systems 33
3.3.2 Potable Water System 35
3.3.3 Drainage System 36
3.3.4 Wastewater System 38
3.3.5 Electrical and Communications Systems 38
3.3.6 Solid Waste Disposal System 38
3.3.7 Fire, Police and Medical Services 39

SECTION 4 RELATIONSHIP TO STATE AND COUNTY LAND USE PLANS AND POLICIES .. 40

4.1 The Hawai‘i State Plan 40
4.2 Honolulu Waterfront Master Plan 42
4.3 State Land Use Law 42
4.4 State Functional Plans 43
4.5 Oahu Commercial Harbors 2020 Master Plan 43
4.6 Coastal Zone Management Program (Special Management Areas) 44
4.7 General Plan & Development Plan 45
4.7.1 General Plan 45
4.7.2 Primary Urban Center 46
4.8 County Land Use Ordinance and Zoning 46

SECTION 5 NECESSARY PERMITS AND APPROVALS 48

5.1 City and County of Honolulu 48
5.2 State of Hawai‘i 48
5.3 Utility Companies 48

SECTION 6 ORGANIZATIONS AND AGENCIES TO BE CONSULTED DURING THE EA PREPARATION PERIOD 49

6.1 City and County of Honolulu 49
6.2 State Of Hawai‘i 49
6.3 Federal Agencies 49
6.4 Government Officials 49
6.5 Utility Companies 49
6.6 Private Organizations / Individuals 49

SECTION 7 FINDINGS AND DETERMINATION 50

7.1 Analysis 50
7.2 Findings and Reasons Supporting Anticipated Determination 53

REFERENCES 54

APPENDICES 56

APPENDIX 1 LETTER REPORT, PIER 29 SOIL CHARACTERIZATION, Element Environmental, April 2006
APPENDIX 2 SITE CHARACTERIZATION REPORT, PIER 29, Kimura International, December 2004
APPENDIX 3 SEDIMENT AND WATER TESTING, PIER 29, Marine Research Consultants, 2006
APPENDIX 4 ENVIRONMENTAL CONSIDERATION, Element Environmental, 2008.
APPENDIX 5 TECHNICAL MEMORANDUM, GEOTECHNICAL RECOMMENDATIONS, Geolabs Hawai‘i, 2008.
APPENDIX 6 TRAFFIC ASSESSMENT, Julian Ng, 2008

LIST OF FIGURES

1 PROJECT LOCATION 3

2 TAX MAP KEY 4

3 PIER 29 LAYOUT PLAN 8

4 PIER 29 UTILITY PLAN PLAN 11

5 SOIL MAP 13

6 FLOOD MAP 20

7 EXISTING DRAINAGE MAP 37

8 ZONING MAP 47

ACRONYMNS AND ABBREVIATIONS

BMP	Best Management Plan
BTEX	benzene, toluene, ethyl benzene, and xylene
CZM	Coastal Zone Management
DEA	Draft Environmental Assessment
DOH	Department of Health
DOT-HAR	Harbors Division, Department of Transportation
EA	Environmental Assessment
FEA	Final Environmental Assessment
HAR	Hawai‘i Administrative Rules
HDOT	Department of Transportation
HECO	Hawaiian Electric Company
HRS	Hawai‘i Revised Statutes
HVOC	halogenated volatile organic compounds
IDPP	Iwilei District Participating Parties, LLC
IMO	International Maritime Organization
LOS	Level of Service
msl	mean sea level
NOAA	National Oceanic and Atmospheric Agency
NPDES	National Pollutant Discharge Elimination System
OEQC	Office of Environmental Quality Control, Department of Health
PAH	polychlorinated aromatic hydrocarbons
PCB	polychlorinated biphenyls (PCB’s)
RO/RO	Roll-on Roll-off
SLH	Session Laws of Hawai‘i
SMA	Special Management Area
SPH	Separate Phase Hydrocarbons
TMK	Tax Map Key
TRPH	total recoverable petroleum hydrocarbons
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
WWPS	Wastewater Pump Station
WWTP	Wastewater Treatment Plant

SECTION 1
PROJECT SUMMARY

Proposed Action:	Construction of the Pier 29 Container Yard facilities, Honolulu Harbor, O‘ahu. The project will be developed in multiple phases – Phase 1 = 12.21 acres (9.00 acres of concrete pavement, 1.12 acres of asphalt concrete pavement, and 2.09 acres of gravel fill). A possible future phase may include paving the gravel filled area (2.09 acres) graded in Phase 1.
Applicant and Proposing Agency:	Department of Transportation, Harbors Division Brennon Morioka, P.E., Ph.D., Director
Agent for the Applicant:	R.M. Towill Corporation 2024 North King Street, Suite 200 Honolulu, Hawai‘i 96819-3494 Contact: Mr. Chester Koga Phone: 842-1133 email: chesterk@rmtowill.com
Project Cost:	$28,500,000 (does not include paving of the 2.09 acres)
Project Location:	Pier 29, Honolulu Harbor
Recorded Fee Owner:	State of Hawai‘i
Tax Map Key:	(1) 1-5-038: 1(por.), 2, 8, 28, 29, 30, 31, 35, 36, 43, 44, 51, 57, 59, 60, 62, 63, 64, 65, 66, 67
Area:	531,867.6 s.f. (12.21 ac.)
State Land Use:	Urban District
Land Use Map: **Development Plan**	Public Facility
Public Facilities Map: **County Zoning:**	I-3, Waterfront Industrial
Special Management Area:	Not located within the SMA
Flood Insurance Rate Map:	Flood Zone X– areas designated within the 500-year floodplain
Existing Use:	Waterfront Industrial Uses
Permits Required:	National Pollutant Discharge Elimination System, Notice of Intent, Appendices C and F, Noise Permit

SECTION 2
DESCRIPTION OF PROJECT

2.1 BACKGROUND

The Island of O‘ahu is distinguished by three of the State's eleven (11) commercial harbors - Barbers Point, Kewalo Basin[1] and Honolulu Harbor. Kalaeloa Barbers Point Harbor, on the west-side of the island, is in the vicinity of the developing city of Kapolei, while Kewalo Basin and Honolulu Harbor are located on the south shore of O‘ahu in the only well-sheltered area available for commercial purposes. Honolulu Harbor is the largest and most important of O‘ahu's and the State's commercial harbors because of the volume of ship traffic and cargo it accommodates.

The Department of Transportation (DOT), Harbors Division (HAR), proposes to improve the cargo handling capabilities of Pier 29 in Honolulu Harbor by improving the 12.21-acre site by removing remnants of previous development, re-surfacing (paving) the site, and upgrading and improving site utilities.

2.2 PROJECT PURPOSE AND NEED

This Environmental Assessment (EA) has been prepared in accordance with the Hawai‘i Revised Statutes (HRS), Chapter 343, Section 343-5-1, which states an environmental assessment shall be required for actions which "*[P]ropose the use of state or county lands or the use of state or county funds, other than funds to be used for feasibility or planning studies for possible future programs or projects which the agency has not approved, adopted, or funded, or funds to be used for the acquisition of unimproved real property; provided that the agency shall consider environmental factors and available alternatives in its feasibility or planning studies.*"

The land at Pier 29 is owned by the State of Hawai‘i which necessitates the preparation of this EA for the improvements at Pier 29 described in this document.

This document describes the proposed project, the environmental conditions of the site, the potential for significant adverse impacts, and the application of mitigation measures as appropriate, to reduce the potential for significant environmental impacts.

2.3 PROJECT LOCATION

The location of the project site is off Nimitz Highway in the Honolulu Harbor and is shown in Figure 1, Island of O‘ahu. Figure 2 identifies the project site by Tax Map Key TMK's (1) 1-5-038: 1(por.), 2, 8, 28, 29, 30, 31, 35, 36, 43, 44, 51, 57, 59, 60, 62, 63, 64, 65, 66, 67. All of the land is owned by the State of Hawai‘i.

[1] Effective March 1, 2009, the Hawaii Community Development Agency assumed management and operations of Kewalo Basin. Kewalo Basin's inclusion as a program under the Harbors System will cease on June 30, 2009.

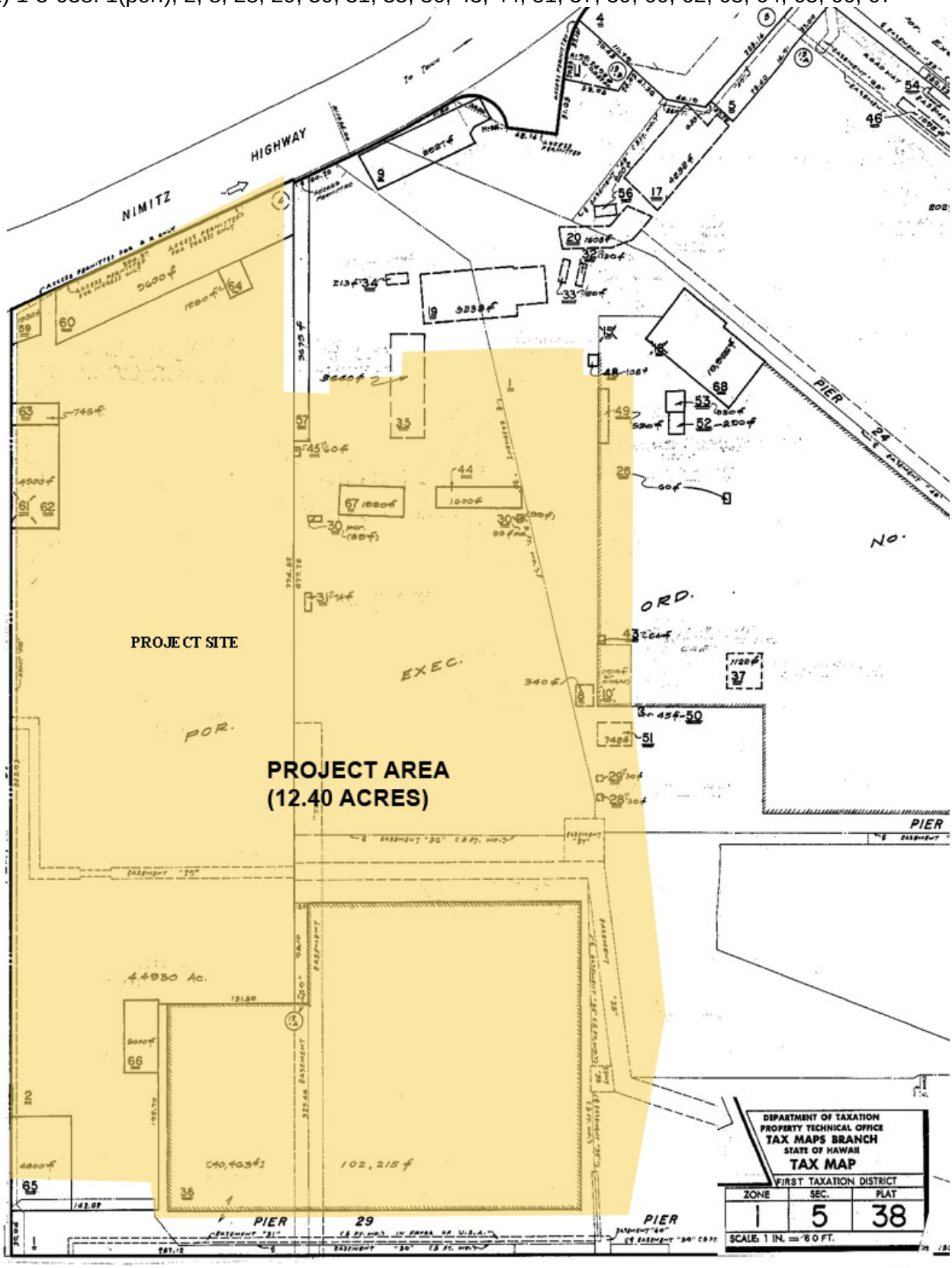
FIGURE 1
PROJECT LOCATION
Pier 29 Improvements, Honolulu Harbor
Department of Transportation

0 2 4 6 Miles 12

R. M. TOWILL CORPORATION

Figure 2. Tax Map Key

(1) 1-5-038: 1(por.), 2, 8, 28, 29, 30, 31, 35, 36, 43, 44, 51, 57, 59, 60, 62, 63, 64, 65, 66, 67



2.4 EXISTING CONDITIONS AND CURRENT OPERATIONS

2.4.1 Existing Conditions

The project site is currently used as a large parking area for vehicles shipped to the island. Bulkhead repairs (Project No. HC10105, see Figure 3 for location) at Pier 29 were completed on January 14, 2005. Additional bulkhead repairs (Project No. HC10160R, see Figure 3 for location) were completed on March 7, 2006. There are two restrooms, one located approximately 300 feet from the pier edge on the eastern side of the site, and the other approximately 80 feet from the pier edge. The project site is relatively flat, however, ponding occurs sporadically during rainfall events because of the uneven pavement. The majority of ponding occurs on the western half of the project site where there is no underground drainage system and the grades are uneven. The rest of the project site is graded to direct runoff towards the two drain inlets within the project site. These drain inlets are connected by 12-inch and 24-inch drain lines and a 4 ft. x 1 ft. box culvert. The main drainline running through the center of the site was recently upgraded by the DOT-HAR. Runoff directed to the drainage system is conveyed eastward and discharges into Honolulu Harbor.

2.4.2 Current Operations

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

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

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

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

trucked directly to consignees on O‘ahu, or emptied and its contents delivered by truck on O‘ahu.

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

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

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

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

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

Cruise Ships – Domestic and foreign cruise ships call at Honolulu Harbor, and passengers disembark for short stays. Interisland cruise ships travel around the Hawaiian Islands and make weekly calls at Honolulu Harbor. Cruise ships currently dock at Piers 2, 10 and 11, which are located adjacent to the Aloha Tower Marketplace (ATM). In 2004, 352,881 passengers were accommodated (DOT-HAR, 2004)

Excursion Vessels - Excursion vessels are smaller in size than the foreign and interisland cruise vessels. These popular tourist cruises last only a few hours and often include meals and entertainment. For the most part, excursion vessels operate out of Kewalo Basin, but a few operate out of Honolulu Harbor as well. Piers that accommodate excursion vessel operations include Kewalo Basin and Honolulu Harbor’s Piers 5, 6, 8, and 40.

Commercial Fishing - Commercial fishing operations, which include fish loading, storage, vessel repair, etc., are mainly accommodated at Kewalo Basin and Honolulu Harbor’s Piers 15 through 18. Additionally, construction activities for the “Domestic Commercial Fishing Village” at Piers 36 – 38 are currently on-going. The fishing village consolidated O‘ahu’s domestic fish auction house and many wholesaling operations while showcasing the fishing industry as a unique visitor attraction.

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

2.5 PIERS 29 IMPROVEMENT ALTERNATIVES

2.5.1 NO ACTION

The “no-action” alternative would result in no effort to repair or replace the existing pavement and upgrading of utilities to meet current and future operational requirements. Under this option, environmental impacts resulting from pier improvement activities would be averted, and improvement costs would be spared. However, the pier would continue to function but not at an optimized basis had Pier 29 been improved to optimize its performance. In addition, revenue would be lost because the facilities could not be utilized to its full potential.

2.5.2 DELAYED ACTION

Under this alternative, the existing Pier 29 would continue to be used for an undefined period. Regular inspections and maintenance to prolong the useful life of the area at Pier 29 would continue to be performed by DOT-HAR. Under this alternative, resource expenditures for pier improvements would be averted in the short-term. However, the proposed improvements would ultimately incur higher development cost due to inflation while generating environmental outcomes similar to other alternatives for immediate action.

2.5.3 PREFERRED ALTERNATIVE

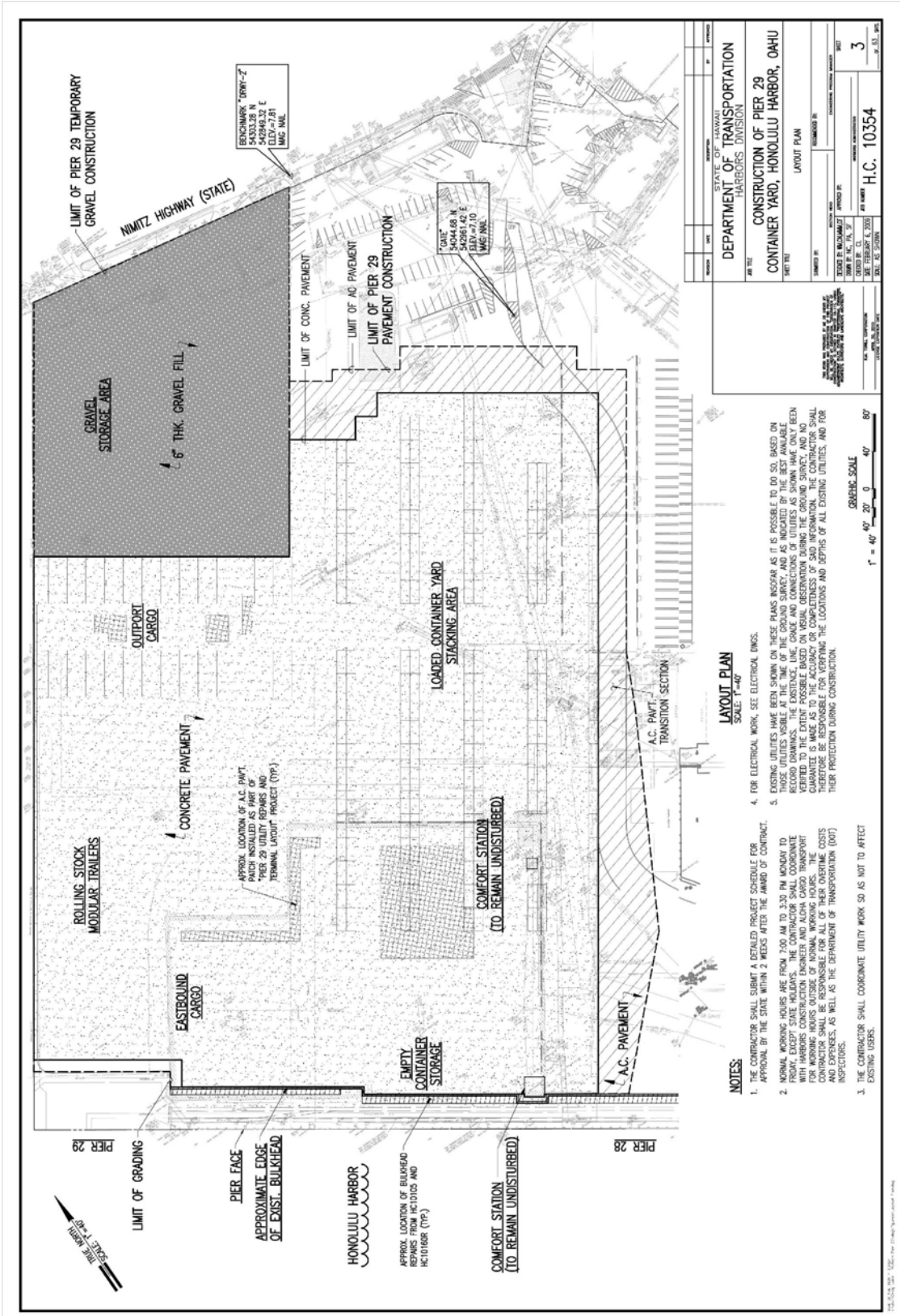
A. **Preferred Plan**

The preferred alternative to the improvements at Pier 29 is to increase its functionality as a cargo support facility by adjusting the existing ground surface elevations to provide positive drainage, upgrading the existing pavement structure to accommodate increased and heavy duty vehicular loads, replacing existing utility lines with new utility lines that will satisfy the design standards of the City and County of Honolulu, and providing security lighting (see Figure 3, Layout Plan). The Department of Transportation – Harbors Division (DOT-HAR), at the request of Aloha Cargo Transport (ACT), is proposing to improve the Pier 29 facilities to accommodate the following future uses:

1) Loaded Container Yard Stacking Area. The Loaded Container Yard Stacking Area may accommodate 165 container stalls measuring 25-feet long by 10-feet wide. The containers will be stacked 4-high. The area will be able accommodate two-way traffic via 48-foot aisles. The existing comfort stations located with the area will remain undisturbed.

2) Empty Container Storage Area. In addition to its use as a storage space for empty containers, the Empty Container Storage Area is the primary point for loading and offloading containers from ships docked at the existing bulkhead. The existing comfort station and pier area (bulkhead to pier face) located within the area will remain undisturbed.

Figure 3 Layout Plan



3) Eastbound Cargo Area. The Eastbound Cargo Area will be used as a container storage area. The limits of the proposed improvements to the Eastbound Cargo Area will be setback approximately 75 ft. from the existing bulkhead in order to accommodate a future bulkhead improvement project.

4) Rolling Stock Modular Trailers Area. The Rolling Stock Modular Trailers Area will be used as a chassis storage yard. Similar to the Eastbound Cargo Area, the Rolling Stock Modular Trailer Area will be setback approximately 75 ft. from the existing bulkhead in order to accommodate a future bulkhead improvement project.

5) Outport Cargo Area. The Outport Cargo Area may accommodate 25 container stalls measuring 50-feet long by 20-feet wide. The area will be able to accommodate two-way traffic via a 50-foot aisle.

6) Gravel Storage Area. The Gravel Storage Area will consist of a layer of geotextile fabric and a 6-inch layer of gravel. The space will be used as a storage area for miscellaneous lightweight items.

The proposed action will also consist of the removal and re-routing of underground utilities located within the project site. As part of the work, the existing sewer force main and domestic water system will be relocated outside of the improved concrete pavement area. The existing electrical utilities located within the project limits will be removed and replaced. As part of a previous project, a 3-foot by 1-foot box drain was installed within the project limits. The recently installed box drain will be incorporated into the proposed project; however the remaining portions of the drainage system located onsite will be demolished and removed.

The proposed action will also include the installation of a fire protection system. The system will satisfy the requirements of the City and County of Honolulu's Board of Water Supply and the Honolulu Fire Department by providing adequate fire hydrant coverage through the installation of 17 fire hydrants spaced at approximately 300-foot intervals (See Figure 4, Utility Plan).

The proposed project will also include the design of an onsite drainage system. In the existing condition, the project area consists of sumps that create large ponds in the northern area of the site. Also, other areas sheet flow to neighboring DOT-HAR properties and to the ocean. The proposed drainage and grading will mitigate the ponding through the installation of trench drains and box culverts.

In addition, in order to accommodate the proposed pavement and utility improvements, the existing pier shed footing will be removed.

B. **Development Phases**

12.21-Acre Site (begin July 2010) (see Figure 3)

1. Demolition Phase

   - Demolition and removal of existing pavement
   - Demolition and removal of existing utilities (water line, domestic water, sewer, and electrical lines)
   - Remove the existing pier shed footing (foundation)
   - Remove the existing AC pavement patches

2. Installation of the following utilities

   - 3,590 LF of 12" water lines (Fire protection); Installation of 17 fire hydrants; and 685 LF of 6-inch pipe connections from the 12-inch waterlines serving the hydrants
   - 685 LF of 4" Sewer Force Main
   - 695 LF of 6" Domestic Line (water for the comfort station) (ductile iron pipe)
   - 15 – 85' high electrical lighting posts and associated handholes and conduit
   - 300 LF of 6" gravity sewer line for the comfort station

3. Installation of 520 LF of 18" wide trench drains, 550 LF of 30" wide trench drains, 30 LF of 3' by 1' box drains, 65 LF of 4' by 1' box drains, 135 LF of 5' by 1' box drains, and drainage structures in order to accommodate the City and County of Honolulu's requirements for a 10-year, 1-hour storm event.

4. Grading, paving and striping over the completed area.

2.09-Acre Site (see Figure 3 shaded area) (project start to be determined)

1. Paving and striping of the existing gravel area installed in the initial phase of the project.

2.6 PROJECT SCHEDULE

The project is expected to proceed in accordance with the following schedule:

- Design Fall 2009

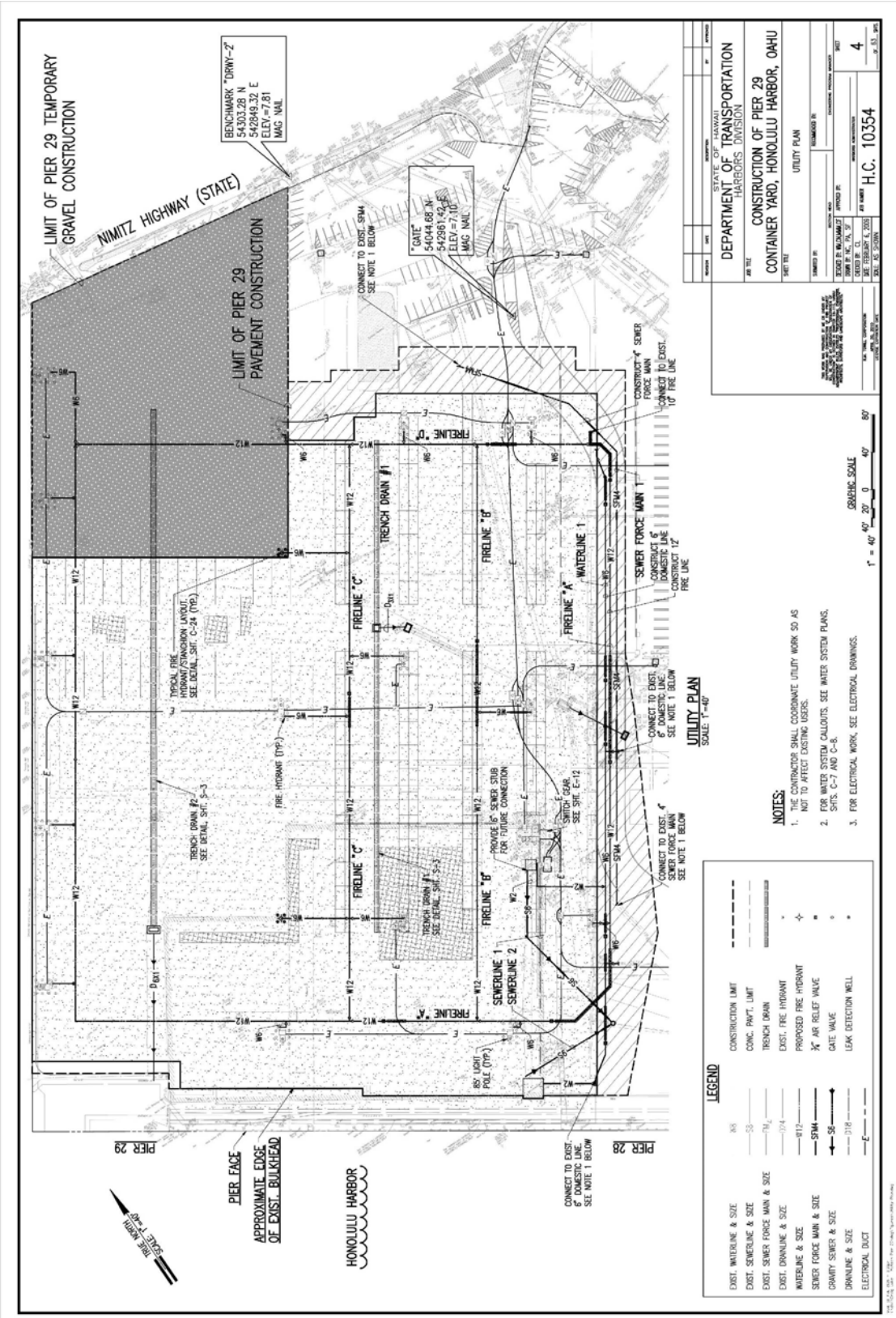
- Construction – July 2010 (9 acres of concrete pavement, 1.12 acres of asphalt concrete pavement, and 2.09 acres of gravel fill)

- Construction – Paving of 2.09 acres – to be determined

2.7 ESTIMATED COSTS

The estimated construction cost for the proposed project is approximately $28,500,000 for the first phase, and does not include a possible future phase of paving the 2.09 acres gravel filled area . The project will be funded by the State Department of Transportation.

Figure 4 Utility Plan



SECTION 3
DESCRIPTION OF AFFECTED ENVIRONMENT, POTENTIAL ENVIRONMENTAL IMPACTS, AND PROPOSED MITIGATION

3.1 PHYSICAL ENVIRONMENT

3.1.1 CLIMATE

The climate in the project area is characterized by abundant sunshine, relatively constant temperatures, persistent trade winds, and moderate humidity. Temperatures range from 73 degrees Fahrenheit (F) in the winter to 81+ degrees F in the summer. Annual rainfall averages approximately 23 inches with the greatest amount occurring between the months of November and April. Trade winds from the northeast prevail throughout most of the year. Relative humidity ranges from 56 to 72 percent.

Potential Impacts and Proposed Mitigation

The proposed project is not expected to impact the climate of the area. No mitigation is required or proposed.

3.1.2 TOPOGRAPHY

The project site is virtually flat with ground elevations ranging from 5 to 8 feet above mean sea level (MSL). The project site was previously modified for construction of the existing facilities. Earthwork will be required to accommodate the proposed cargo yard. Geotechnical studies (Geolabs Hawai‘i, 2008) conducted on site indicate that the existing pavement varies between 2 and 8 inches thick.

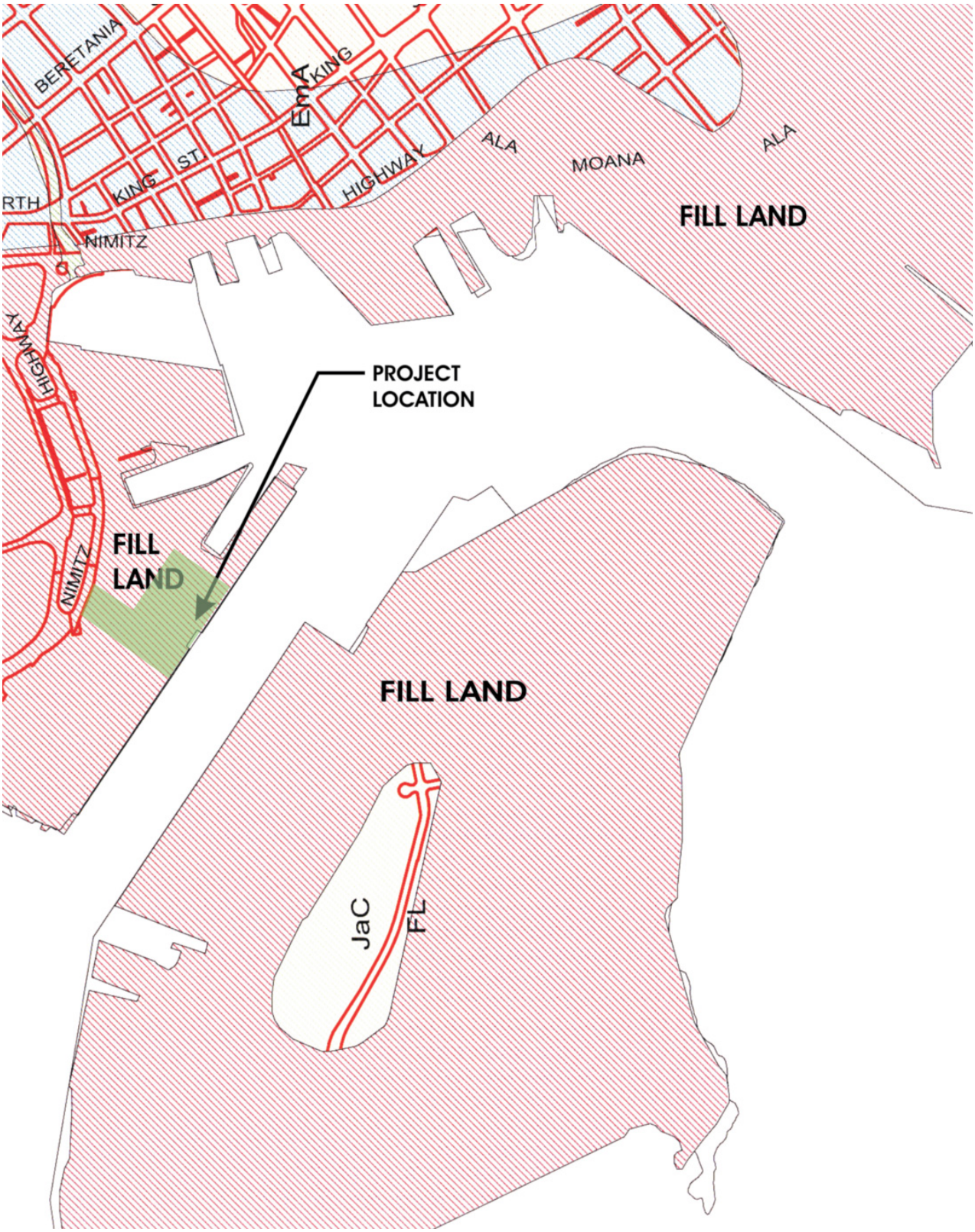
Potential Impacts and Proposed Mitigation

The proposed project is not expected to have a significant impact on the topography of the area. The new pavement will be at or near existing heights. (See additional discussion on subsurface conditions below.) No mitigation is required or proposed.

3.1.3 SOILS AND GEOLOGY

The project site is classified as “Fill land, mixed (FL)” by the U.S. Department of Agriculture, Soil Conservation Service (USDA, 1972). See Figure 5. This land type consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. The site is underlain by a layer of soft lagoonal deposits made of sand, silt, and clay from between 10 to 15 feet below the fill material. These deposits cover a coral layer occurring below the soft sandy silt.

Figure 5. Soils Map



The regional geology within the vicinity of Honolulu consists of a volcanic basalt island core that is overlain and flanked by ancient beaches, coral reefs, estuaries, and lagoons. The mixing and the inter-fingering of coral reef, beach sand, and lagoon deposits with recent Honolulu Volcanic Series tuff, lava flows and occasional alluvial deposits carried down from the mountains make the local geologic conditions highly complex. In addition, granular fill occur below the pavement from two to five feet. Below the fill material lagoonal deposits consisting of soft to very soft sandy silt occur between 10 to 15 feet. Coralline material occur below the sandy silt. Groundwater was encountered at depths of 5.4 to 6.6 feet below the existing pavement or ground surface. It was also observed that the groundwater was tidally influenced (CH2M Hill, 2004).

Pier 29 and the area surrounding has been the center of discussion for several years because of the contamination of the soils due to petroleum products release. Several studies (see Appendix 1, 2 and 4) have been conducted to determine the extent of the contamination as well as potential mitigation measures. A working group, called the Iwilei District Participating Parties (IDPP), LLC, was organized to recommend and conduct remediation measures. Due to the petroleum contamination, a lined stockpile area will be designated on-site in order to store, profile, and properly dispose of the contaminated soil. Similarly, the same stockpile area will be setup to handle contaminated groundwater. Specialized piping and subsurface utility boxes will be used to mitigate the contamination from excavated soil and groundwater.

Improvements to the cargo yard will require excavation and disposal of soil and sediment that has been impacted by petroleum and other contamination. The site will require approximately 31,000 cubic yards of uncontaminated soil removal and approximately 3,000 cubic yards of contaminated soil removal. During site investigations it was observed that free product (petroleum products) occurred above the ground water at approximately -4 feet below the existing pavement. Site and soil characterization investigations were conducted at the project site to determine if the soil and sediment have been impacted by petroleum and other contamination (***see Appendix 2 for complete text***). The findings are summarized in the following table – Table 1 and 2 Soil Analytical Results (Kimura, 2004). The data collected from the sampling was used to complete a waste profile for acceptance approval from the PVT Landfill located in Nanakuli, O‘ahu, Hawai‘i. The site contractor will be required to verify this acceptance by PVT. Based on the site investigation and sample analysis, the soil material to be excavated from the project site does not contain any chemicals of potential concern at concentrations that would preclude disposal of this excavated material at the PVT landfill.

The results of the sediment and water testing showed that several groups of compounds, including benzene, toluene, ethyl benzene, and xylene **(**BTEX), and halogenated volatile organic compounds (HVOC’s) were detected in the samples taken, with the exception of polychlorinated biphenyls (PCB’s) which was not detected (see Table 2). Likewise, ignitability of all sediment samples “passed”, and all water samples were greater than 200° F (Kimura, 2004).

In addition, analyses of water samples showed no concentrations of heavy metals,

Table 1
Soil Anlaytical Results, Kimura Investigation
Pier 29 Honolulu Harbor

Contaminant	DOH Tier 1 SALs	Sample Identification									
		SB-1a	SB-1b	SB-2a	SB-2b	SB-3a	SB-3b	SB-4a	SB-4b	SB-5a	SB-5b
Fuel Scan											
TPH-Gasoline	2,000	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TPH-Diesel	5,000	< 20	< 20	< 20	61	< 20	< 20	75	< 20	< 20	< 20
TPH-Oil	5,000	< 40	< 40	< 40	< 40	720	< 40	< 40	< 40	< 40	< 40
BTEX											
Benzene	1.7	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	34	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	23	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PAHs											
Naphthalene	41	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	11	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PCBs											
PCBs	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals											
Lead	400	ND	10	11	5	400	16	21	15	94	16
Cadmium	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	*210	ND	20	ND	54	ND	ND	ND	20	ND	ND
Arsenic	*22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	*390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium	*5,400	61.5	39.9	29.4	48	394	44.5	76.4	39.5	34.1	50.5
Selenium	*390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	*23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

All results are listed in mg/kg.
* EPA Region 9 Preliminary Remediation Goals for residential soil for 2000

Table 1 (Continued)
Soil Anlaytical Results, Kimura Investigation
Pier 29 Honolulu Harbor

CONTAMINANT	DOH TIER 1 SALS	SAMPLE IDENTIFICATION									
		SB-6a	SB-6b	SB-7a	SB-7b	SB-8a	SB-8b	SB-9a	SB-9b	SB-10a	SB-10b
Fuel Scan											
TPH-Gasoline	2,000	< 20	250	< 20	240	< 20	< 20	< 20	< 20	< 20	< 20
TPH-Diesel	5,000	< 20	530	< 20	480	66	640	66	< 20	< 20	< 20
TPH-Oil	5,000	< 40	< 40	1,400	< 40	< 40	< 40	< 40	< 40	< 40	< 40
BTEX											
Benzene	1.7	< 0.05	0.86	< 0.05	0.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	34	< 0.05	13	< 0.05	2.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	23	< 0.05	< 0.05	< 0.05	4.8	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PAHs											
Naphthalene	41	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	11	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PCBs											
PCBs	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals											
Lead	400	14	34	740	28	120	60	49	110	510	ND
Cadmium	38	ND	ND	8	ND	ND	ND	ND	ND	2	ND
*Chromium	210	ND	20	ND	ND	ND	ND	ND	ND	25	ND
*Arsenic	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Silver	390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Barium	5,400	79.1	48.9	526	50.4	57.6	71.7	139	142	116	53.7
*Selenium	390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Mercury	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

All results are listed in mg/kg.
* EPA Region 9 Preliminary Remediation Goals for residential soil for 2000
ND = not detected above the method detection limit

Table 2
Groundwater Anlaytical Results, Kimura Investigation
Pier 29 Honolulu Harbor

CONTAMINANT	DOH TIER 1 SALS	SAMPLE IDENTIFICATION			
		MW-1	MW-2	MW-3	MW-4
Fuel Scan					
TPH-Gasoline	NS	<0.60	300	220	NA
TPH-Diesel	NS	<0.60	69	570	NA
TPH-Oil	NS	<1.0	33	110	NA
BTEX					
Benzene	1.7	<0.0005	0.15	0.15	NA
Toluene	2.1	<0.0005	1.2	1.2	NA
Ethylbenzene	0.14	<0.0005	0.48	0.62	NA
Xylenes	10	<0.0005	2.4	2.0	NA
PAHs					
Naphthalene	0.77	<0.0002	<0.0002	<0.0002	NA
Acenaphthene	0.32	<0.0002	<0.0002	<0.0002	NA
Fluoranthene	0.013	<0.0002	<0.0002	<0.0002	NA
Benzo(a)pyrene	0.0002	<0.0002	<0.0002	<0.0002	NA
PCBs					
PCBs	0.002	ND	ND	0.039(1)	ND
Metals					
Lead	0.0056	0.00066	0.00196	0.000805	NA
Cadmium	0.009	ND	ND	ND	NA
*Chromium	0.050	0.00759	0.0209	0.047	NA
*Arsenic	0.036	0.00522	0.00589	0.013	NA
*Silver	NS	ND	0.00005	0.00004	NA
*Barium	NS	0.0514	0.0201	0.0591	NA
*Selenium	0.071	0.00373	0.00576	0.0146	NA
*Mercury	NS	0.000071	0.000243	0.000082	NA

All results are listed in mg/L.
* DOH's Water Quality Standards for Chronic Toxicity for Saltwater
ND = not detected above the method detection limit
NS = no standard
NA = not analyzed
(1) = concentration for PCB-1260

polychlorinated aromatic hydrocarbons (PAH's), total recoverable petroleum hydrocarbons (TRPH), gasoline, and diesel above detection limits. With respect to metals, none of the sediment or water samples revealed detectable levels of cadmium, silver or thallium. In addition, none of the water samples contained mercury or nickel.

Potential Impacts and Proposed Mitigation

The likely presence of some free product or Separate Phase Hydrocarbons (SPH) pose special handling requirements during construction to minimize exposure to construction workers and to contain the contaminated soils and groundwater. Potential remediation activities will be coordinated between the DOT-HAR and IDPP. Specific actions to be taken will be established through an agreement between DOT-HAR and IDPP based on an 'incremental costs of remediation" based on the agreement developed. The following activities have been identified: 1) general excavation below the existing pavement; 2) demolition phase where existing pavement is removed and excavated; 3) trenching for utilities (water line, fire line, sewer, and drains); and 4) excavation for installation of supports for area and security lighting.

Mitigation for the work described above is detailed in the Appendix 1. In summary, the following is proposed:

- During construction, measures are to be taken to ensure that runoff is contained on-site and prevented from entering existing storm drains and Honolulu Harbor.
- Excavated material will be contained (lined) in a separate area for analysis; remediation, if necessary; and final disposal. Excavated material will also be covered in order that rainwater will not cause the excavated material from entering the harbor.
- Dewatering activities, if required, shall minimally include provisions for oil-water separation and sediment control before discharge into storm drains or sanitary sewer. Dewatering without discharge into the storm drain or sewer system may include the use of back-trenches where discharges from one open trench is pumped into another trench where the water is allow to seep back into the ground. Mechanical filtering of groundwater may also be considered, such as portable filtering tanks or the use of chemicals to remove contamination.
- Air samples shall be taken when ground-disturbing activities take place. Personal protective equipment (PPE) shall be issued to construction workers to minimize inhalation of gases. Details shall be outlined in a Site Safety and Health Plan prior to construction.

3.1.4 HYDROLOGY

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

The caprock layer is formed at the interface between upper sedimentary layers and the underlying basalt of the plain. The caprock forms a zone of low permeability which extends along the coastline, and in the project area, is believed to be between 800 to 900 feet thick. This impervious zone prevents the seaward movement of potable water from the basaltic aquifers. The project site, however, is now located over a non-potable water source as the freshwater resources in the area have been depleted.

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

Surface waters in the immediate vicinity of the project area consist of two streams: the Nu'uanu Stream which discharges into Honolulu Harbor at Piers 15 and 16, and Kapalama Stream which discharges into Honolulu Harbor (Kapalama Basin) at Piers 38-39. Water quality of these streams is strongly influenced by surface runoff from surrounding industrial, commercial, and residential areas.

Potential Impacts and Proposed Mitigation

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

The proposed project is not expected to have a significant impact on groundwater. Implementation of appropriate Best Management Practices (BMPs) will minimize the impacts of construction. Drainage patterns will not change substantially as the majority of the proposed improvements will be modifications to existing facilities.

3.1.5 FLOODS AND TSUNAMI

The Flood Insurance Rate Maps indicate that the project site is within flood Zone X (see Figure 6). Flood Zone X represents a flood hazard area determined to be outside the 0.2 % "annual chance flood boundary" or the 500-year flood which is less than the 100-year flood which has a 1% chance of occurrence. The project site is not in a tsunami evacuation zone (Tsunami Evacuation O'ahu Map 19: Airport to Waikiki, Verizon 2001).

Potential Impacts and Proposed Mitigation

The project site is located outside of the 500-year flood plain and the limited scope of the project is not anticipated to exacerbate any existing flooding conditions. The Pier 29 project site is not in a tsunami evacuation zone therefore no mitigation is proposed.

Figure 6. Flood Insurance Rate Map

Recent discussions regarding the effects of global warming has suggested that with a projected one (1) meter rise in global sea levels by the end of this century much of Honolulu will be inundated. Dr. "Chip" Fletcher of the University of Hawai'i has noted: "In Hawaii, sea-level rise resulting from global warming is a particular concern. Riding on the rising water are high waves, hurricanes, and tsunami that will be able to penetrate further inland with every fraction of rising tide. In addition, the coastal groundwater table is likely to crop out above ground level and lead to widespread flooding. The physical effects of sea-level rise fall into five (5) categories. These are:

1. Marine inundation of low-lying developed areas including coastal roads,
2. Erosion of beaches and bluffs,
3. Salt intrusion into aquifers and surface ecosystems,

4. Higher water tables, and
5. Increased flooding and storm damage due to heavy rainfall." (Fletcher, April 2008).

Using sensitive topographic data collected by National Oceanic and Atmospheric Administration (NOAA) and the Army Corps of Engineers, Dr. Fletcher note that "it is possible to map the contour line marking 1 m above present day high tide. This "blue line" identifies the portion of our communities that fall below sea level when seas reach the 1 m mark later in the century. This dramatic map has roughly 30 cm accuracy. Those lands that are closer to the ocean are highly vulnerable to inundation by seawater during high waves, storms, tsunami, and extreme water levels. Hotel basements will flood, ground floors will be splashed by wave run-up, and seawater will come out from the storm drains on most of the streets in Waikiki and along Ala Moana Boulevard."

"Don't think that waves will be rolling down the streets and reaching the blue line. More likely, lands lying below sea level in the future will be dry at low tide during arid summers. But they will have high water tables, standing pools of rainwater, and backed up storm drains when it rains and tides are high. Beaches will be mostly gone and we'll have built large seawalls lining most of our shores. Despite the wet conditions, most of the buildings will probably still be inhabited and residents will have to time their movement between the tides, just as they do today in Mapunapuna" (Fletcher, 2008).

Dr. Fletcher illustrates areas of potential inundation given a 1-meter sea rise. "The blue line marks the contour of high tide when sea level is 1 m above present. Lands makai of the line are highly vulnerable to coastal hazards. These are targets for redevelopment to increase resiliency to natural hazards" (Fletcher, 2008).

3.1.6 FLORA AND FAUNA

The project is located in a highly altered urban environment. No rare or endangered flora and fauna are known to inhabit the project site. Existing flora at the site consists of introduced weedy species along the property boundary. Flora present on-site include common introduced species such as haole koa (Leucaena leucocephala) and several weedy species of grasses.

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

Potential Impacts and Proposed Mitigation

No adverse impacts on flora and fauna are anticipated. No rare or endangered flora and fauna are known to inhabit the project site, therefore no mitigation is being proposed.

3.1.7 MARINE BIOLOGY

The biological analysis of the marine environment in the vicinity of the project area is based on surveys conducted in September of 1998 by S. L. Coles and R.E. De Felice of the Bishop Museum's Department of Natural Sciences. These surveys were incorporated into the *Aquatic Habitat and Water Quality Impact Assessment Report* which was prepared by AECOS, Inc. in conjunction with an EIS prepared for the Honolulu Harbor 2020 Plan. The information presented in this report is based on these surveys and the assessment report.

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

An in-water survey was not conducted at Piers 24-29 as part of the marine survey, however the marine biota in this area was characterized as being generally similar to that described for Pier 15, consisting of fouling biota on vertical piles and a generally sparse community of assorted fishes (Coles, et.al. 1999). At Pier 15, a total of 47 taxa were found consisting of 4 macroalga, 35 invertebrates and 8 fish species. Sponges, represented by 14 different species, are most abundant at this site. No coral occurred at the site, and decreasing numbers of invertebrate coverage on the pier pilings going toward the Nu‘uanu Stream mouth suggest the limiting effect of stream outflow on the marine community (Coles, et.al., 1999)." Pier locations this far into the harbor show a lesser diversity of organisms compared with piling-associated biota closer to the harbor entrance (Guinther, et. al., 1999).

Potential Impacts and Proposed Mitigation

The waters within Honolulu Harbor contain complex benthic communities which may experience some project-related impacts. It is unlikely that the proposed project would result in any significant, long-term impacts on the resident marine biota.

Significant impacts to the marine biota are not anticipated. However, the minor impacts expected to occur as a result of construction activities can be mitigated by employing measures to contain and reduce the suspension of silt and sedimentation resulting from run-off from the project site. Mitigation described above will prevent pollutants from entering the Harbor.

3.1.8 THREATENED AND ENDANGERED SPECIES

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

Potential Impacts and Proposed Mitigation

No adverse impacts on threatened or endangered species are anticipated. No rare or endangered flora and fauna are known to inhabit the project site. In the event that threatened or endangered species are encountered, construction activity will be stopped until appropriate mitigation can be established.

3.1.9 ALIEN SPECIES

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

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

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

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

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

The potential diversity of marine biota which can be transported in ballast water is vast. The maximum size range of organisms capable of being taken into a ship depends upon the method of ballasting and the size of the intake screens. Virtually all organisms less than 1cm in size that are adjacent to the vessel – either swimming naturally, stirred up from bottom sediments, or rubbed off harbor pilings – could be ballasted into the vessel. Such organisms include viruses, bacteria, protozoa, fungi, algae, plants, zooplankton, and fish.

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

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

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

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

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

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

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

At the present time, the Coast Guard is responsible for enforcing laws which regulate ballast water discharge. Concerted efforts are being undertaken by both international organizations and individual governments to establish regulatory mechanisms to monitor ballast water discharge. The main purpose of these efforts is to establish universal regulations which are enforceable in both international and national waters.

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

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

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

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

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

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

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

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

Potential Impacts and Proposed Mitigation

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

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

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

As discussed in Section 2.4, Hawai‘i is primarily an import state receiving almost all of its goods through Honolulu Harbor. Cargo ships entering the harbor are usually carrying a full cargo load with only minimal amounts of ballast water (as opposed to an empty ship which would need to fill its ballast tanks to capacity to stabilize the vessel). Consequently, cargo ships in Honolulu Harbor do not discharge but rather take in ballast water prior to port departure. This practice further reduces the risk of alien species introduction via ballast water discharge.

The Aquatic Resources Division of the Department of Land and Natural Resources is the designated agency for preventing the introduction of alien aquatic organisms and for carrying our the destruction of these organisms through Act 134 Sessions Law 2000 which amends Chapter 187, Hawai‘i Revised Statutes. In addition, the U.S. Coast Guard has developed Mandatory Ballast Water Management (MBWM) program which required “all vessels equipped with ballast water tanks that took on

ballast water less than 200 miles from any shoreline, entering U.S., waters from beyond the 200-mile Exclusive Economic Zone, to employ at least one of the following ballast water management practices:

1. Perform complete ballast water exchange in an area no less than 200 nautical miles from any shore prior to discharging ballast water in U.S., waters;

2. Retain ballast water onboard the vessel; or

3. Prior to the vessel entering U.S. waters, use an alternative environmentally sound method of ballast water management that has been approved by the Coast Guard (Title 33, CFR Part 151.2035)."

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

3.1.10 WATER QUALITY

Nearshore coastal waters from Ala Moana Beach to the east entrance channel of Honolulu Harbor are designated as "Class A" by the Department of Health, State of Hawai'i (DOH) while Honolulu Harbor is designated a "Class A" embayment. Waters designated "Class A" are to be protected for recreational uses, aesthetic enjoyment, and propagation of marine life.

Potential Impacts and Proposed Mitigation

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

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

- Silt Curtains – To limit and contain the suspension of fine sediments from activities associated with excavation and to contain and prevent the spread of sediment stirred up from dredging activities
- Drainage Berms – To prevent off-site stormwater from entering the site and erosion.
- Storm Drain Inlet Protection – Filtering measures placed around inlets and drains to trap sediment, preventing it from entering inlets and receiving waters.

- Sediment Traps – To retain site runoff and allow suspended sediments to settle out. Oil-water separators installed to prevent contaminants from entering the Harbor during dewatering activities, as necessary.
- Soil Stabilization – Practices designed to prevent the loss of disturbed or exposed soil areas through the use of vegetation and/or geotextiles.
- Soil Containment – Establish containment area for the storage of excavated soils and dewatered sediment.
- No excessive watering to cause sheet flow from the site.
- Text surface water runoff, if required by DOH.

Specific BMPs for the proposed actions will be determined during the design and construction phases and incorporated into the BMPP to be submitted to DOH as part of the NPDES permitting process.

3.1.11 AIR QUALITY

Automobile emissions from traffic along Nimitz Highway are the major source of air pollution in the area. Despite the urban character of the surrounding area, the present ambient air quality in the project area is generally considered good due to the prevailing northeasterly trade winds and the absence of "heavy" industries. However, during Kona (southerly and southwesterly) wind conditions, a buildup of particles could occur in the general project area. The potential for petroleum-based gases being released during earth disturbing activities is acknowledged. Generally, the prevailing northeast tradewinds will cause the gases to dissipate over the harbor. However, during periods when there are west and south winds, gases will be dispersed over the project area and potentially towards other harbor uses.

Potential Impacts and Proposed Mitigation

The proposed project is not expected to have a significant impact on air quality. Construction activities may result in short-term air quality impacts from fugitive dust and equipment emissions. The site contractor will be required to minimize the release of dust and equipment emissions through good house-keeping and by the use of properly maintained equipment. Construction related impacts to air quality will be temporary and will cease when construction is completed.

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

State air pollution control regulations require that there be no visible fugitive dust emissions at the project boundary. Therefore, an effective dust control plan will be implemented by the project contractor to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using dust screens, keeping adjacent paved roads clean, and by covering open-bodied trucks. Exhaust emissions will be mitigated by ensuring that project contractors properly maintain their internal combustion engines and comply

with DOH Rules Title 11, Chapter 59 and 60, regarding Air Pollution Control.

Long-term air quality impacts will result from the continued use of Pier 29. Air quality impacts from related dock activities at the proposed improved pier will not be measurably lesser or greater than those incurred from the continued use of the existing pier. The new Pier 29 improvements will not, in and of itself, result in increased long-term air quality impacts. Due to the predicted minimal impact of the project, it appears that mitigation of any long-term impacts is unwarranted.

3.1.12 NOISE

Unavoidable but temporary noise impacts may occur during the construction of the proposed harbor improvement projects. Construction related noise will be generated by both on-site equipment (i.e., pumps, generators, compressors, jack hammers, rock drills, demolition equipment, and power tools) and vehicles (i.e. trucks, front loaders, backhoes, tractors, graders, pavers, and concrete mixers-trucks, etc.).

Construction-related noise impacts are not anticipated beyond the project site because it is in excess of 2,000 feet from current noise sensitive (residential) receptors. The noise sensitive properties anticipated to experience the highest noise levels during construction activities are the residential condominiums across from Piers 12 – 18 (Harbor Village, Marin Tower, and Harbor Court).

The Harbor Court, Marin Tower, and Harbor Village Condominium units are expected to experience construction-related noise levels ranging from 60 to 75+ decibels (dB). Construction activities will typically be at least 1,000 feet from the condominiums, and construction noise levels will be barely audible or inaudible.

Potential Impacts and Proposed Mitigation

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

- The use of properly muffled construction equipment should be required.
- If possible, heavy equipment and portable diesel engines and generators should be located at least 400 – 500 feet from residences.
- The adherence to DOH regulations controlling construction noise limits and construction curfew times. Under DOH permit procedures, construction activities are permitted weekdays between the hours of 7:00 AM – 6:00 PM, and on Saturdays between 9:00 AM – 6:00 PM.

Exterior noise levels as high as 75 dB are generally considered acceptable for commercial, industrial, and other non-noise sensitive land uses. The proposed project will take place within an industrial area, therefore the potential for adverse noise impacts within the proposed project areas is considered to be small.

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

3.2 SOCIO-ECONOMIC ENVIRONMENT

3.2.1 LAND USE

The present general mix of land uses in the area consists of: industrial and commercial business facilities, roadway and offices. The nearest public park is A‘ala Park, located 3,500 feet to the northeast.

Potential Impacts and Proposed Mitigation

Construction activities will have short-term impacts on surrounding land uses. To mitigate short-term construction related impacts, the Contractor will be required to follow applicable State and City erosion, dust, and noise control regulations and implement appropriate BMPs. The proposed project is not expected to have significant long-term adverse impacts on current or future land uses in the area.

3.2.2 HISTORICAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

There are no known archaeological or cultural sites on or adjacent to the project site based on a review of the State’s Register of Historic Sites. Based on field observations, the project site is composed entirely of fill land. The project site has been in continual use as a pier facility since its construction in 1938.

Because of the site’s active use as a cargo shipping facility, public access is restricted. Because of the restricted access, there are few to no opportunities to use the property for cultural practices involving the gathering of plant, animal or mineral resources, or for conducting ceremonial or religious activities. The project site is currently being used as pier facility by the DOT-HAR. The terrestrial area of the site is sparsely populated by introduced plants and grasses (see Section 3.1.6, above).

Potential Impacts and Proposed Mitigation

No significant negative impacts to historic, archaeological or cultural resources or practices are anticipated to result from the proposed project activities. In the unlikely event that archaeological remains are uncovered during the course of the project, work in the immediate area will cease and the Historic Preservation Division of the Department of Land and Natural Resources will be contacted for further evaluation.

3.2.3 SCENIC AND VISUAL RESOURCES

The surrounding structures and flat topography limit views from the project site. The 1987 Coastal View Study does not identify any significant views that would be affected from the proposed project.

Potential Impacts and Proposed Mitigation

There will be no significant visual impacts associated with the proposed Pier 29 improvement. The proposed project is not anticipated to adversely impact any scenic and visual resources.

3.2.4 RECREATIONAL FACILITIES

There are no recreational facilities in the vicinity of the proposed project. The nearest coastal recreational area is the Sand Island State Recreational Area, located on the southern coast of Sand Island, approximately 3,500 feet to the south.

Potential Impacts and Proposed Mitigation

There are no anticipated adverse impacts to recreational facilities, therefore no mitigation measures are being proposed.

3.2.5 POPULATION

The study area is located within the Primary Urban Center on the Island of Oʻahu. According to the State of Hawaiʻi, Department of Business, Economic Development and Tourism, the 2007 residential and de facto populations of the City and County of Honolulu were 928,219 and 948,147, respectively. Resident population on Oʻahu is projected to increase to 1,130,300 by 2035 (DBEDT 2035 Series, January 2008).

Potential Impacts and Proposed Mitigation

The proposed project is not expected to have an adverse impact on population growth. The proposed Pier 29 improvements provide one of the basic support areas needed for commercial harbor operations.

3.2.6 CEDED LANDS

When Hawaiʻi became a State in 1959, the disposition of former Crown and Government lands (ceded lands) were established in Section 5 of the Admission Act. Section 5(f) of the Admission Act provides that these lands and the income and proceeds derived from them are to be held in trust by the State of Hawaiʻi. Submerged lands in the State of Hawaiʻi are a part of the ceded lands trust. Therefore, any submerged parcels within the project area is identified as ceded lands, although administered by the State DOT-HAR. The lands to be used for the PIER 29 improvements are all on “fast” land and are not classified as ceded according to the Harbors Division.

It should be noted that consultation with the Office of Hawaiian Affairs on the O‘ahu Commercial Harbors 2020 Master Plan determined that the Pier 29 project site is included in the ceded lands inventory (Act 178, SLH 2006). However, it should also be noted that an accurate and complete ceded lands inventory does not yet exist and the DOT-HAR has determined that the land at Pier 29 is not ceded as stated above.

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

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

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

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

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

In the long-term, the improved harbor structure is expected to have positive economic impacts as well. The proposed project will increase the functionality of Pier 29.

Potential Impacts and Proposed Mitigation

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

3.3 INFRASTRUCTURE SYSTEMS AND SERVICES

3.3.1 TRAFFIC AND TRANSPORTATION SYSTEMS

Pier 29 is accessed via the eastbound leg of Nimitz Highway through a security gate located approximately 150 feet from the intersection. Pier 29 is also accessed from the

south bound leg of Pacific Street. No construction activity will take place on Nimitz Highway or Pacific Street. A traffic assessment was prepared for this project in the findings presented in the Appendix (Julian Ng, 2008). Existing conditions at Nimitz Highway and Pacific Street are summarized in the table below.

Existing Conditions, Nimitz Highway and Pacific Street

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	v/c	AD	LOS	v/c	AD	LOS	v/c	AD	LOS
Westbound Nimitz Hwy				0.61	12.9	B	0.56	15.2	B
Eastbound Nimitz Hwy	0.90	23.4	C	0.72	13.4	B	0.56	12.8	B
Considered as one intersection					14.7	B		14.9	B
Notes: v/c – volume/capacity ratio, AD- average delay (seconds) LOS- Level of Service Source: Julian Ng, 2008									

In August 2008 a Traffic Impact Analysis Report (TIAR) was prepared by PB Americas for the Lowe's Iwilei Project. The TIAR reported the need to construct a deceleration lane along Nimitz Highway (westbound) and synchronizing the signals on Pacific Street at the two Nimitz Highway intersections. The study concluded that at project opening in 2009 the traffic level of services (see LOS discussion below) will be E during the AM peak period, B during the PM peak and B on the weekends. No additional changes or improvements have been proposed for the Lowe's development .

The transportation level of service (LOS) system uses the letters A through F, with A being best and F being worst. LOS A is the best, described as conditions where traffic flows at or above the posted speed limit and all motorists have complete mobility between lanes. LOS A occurs late at night in urban areas, frequently in rural areas, and generally in car advertisements. B is slightly more congested, with some impingement of maneuverability; two motorists might be forced to drive side by side, limiting lane changes. LOS B does not reduce speed from LOS A. LOS C has more congestion than B, where ability to pass or change lanes is not always assured. LOS C is the target for urban highways in many places. At LOS C most experienced drivers are comfortable, roads remain safely below but efficiently close to capacity, and posted speed is maintained. LOS D is perhaps the level of service of a busy shopping corridor in the middle of a weekday, or a functional urban highway during commuting hours: speeds are somewhat reduced, motorists are hemmed in by other cars and trucks. In busier urban areas this level of service is sometimes the goal for peak hours, as attaining LOS C would require a prohibitive cost in bypass roads and lane additions. LOS E is a marginal service state. Flow becomes irregular and speed varies rapidly, but rarely reaches the posted limit. On highways this is consistent with a road over its designed capacity. LOS F is the lowest measurement of efficiency for a road's performance. Flow is forced; every vehicle moves in lockstep with the vehicle in front of it, with frequent drops in speed to nearly zero mph.

LOS does not describe an instant state, but rather an average or typical service. For example, a highway might operate at LOS D for the AM peak hour, but have traffic consistent with LOS C some days, LOS E or F others, and come to a halt once every few

weeks. However, LOS F describes a road for which the travel time cannot be predicted. (*Highway Capacity Manual and AASHTO -Geometric Design of Highways and Streets (2004*).

Project impacts resulting from the project is summarized in the table below.

Project Impact, Nimitz Highway and Pacific Street

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	v/c	AD	LOS	v/c	AD	LOS	v/c	AD	LOS
Westbound Nimitz Hwy									
Existing				0.56	15.2	B	0.61	12.9	B
Plus Project				0.58	17.3	B	0.61	13.0	B
Plus Project (right turn only)				0.56	15.1	B	0.62	12.7	B
Eastbound Nimitz Hwy									
Existing	0.90	23.4	C	0.56	12.8	B	0.72	13.4	B
Plus Project	0.91	24.6	C	0.58	13.6	B	0.72	13.5	B
Plus Project (right turn only)	0.90	24.6	C	0.57	13.3	B	0.72	13.5	B
Considered as one intersection									
Existing					14.7	B		14.9	B
Plus Project					17.4	B		14.0	B
Plus Project (right turn only)					15.9	B		14.1	B
Notes: v/c – volume/capacity ratio, AD- average delay (seconds) LOS- Level of service Source: Julian Ng, 2008									

Potential Impacts and Proposed Mitigation

The proposed projects will have an adverse impact on traffic during construction, however, the volume of traffic will not be unlike operating conditions prior to this upgrade of the pier facilities. No improvements are proposed for Nimitz Highway and Pacific Street. During the improvement to Pier 29 additional truck traffic is anticipated in the form of concrete trucks and trucks hauling away construction debris. The overall volume of construction traffic will, however, be below normal operational levels of Pier 29.

To mitigate traffic impacts the following measures will be required of the construction contractor:

- No movement of construction equipment on Nimitz Highway during peak morning (between 6 and 8 a.m.) and afternoon travel periods (between 3 and 5 p.m.).
- No movement of construction equipment on Nimitz Highway on Friday and Saturday evenings (between 5 and 7 p.m.).

3.3.2 POTABLE WATER SYSTEM

The proposed project will not have an impact on the potable water system. Daily water demands are not expected to increase beyond current usage. Continued availability of potable water is anticipated. Pier 29 is serviced by three main water lines: a 6" water line along Pier 26, a 4" water line along Pier 27, and another 6" line which runs along Piers 28

and 29. These three lines connect to a single 6" main which eventually connects to the 16" water main underneath Nimitz Highway. The project area is serviced by one 4" compound meter and two smaller 3/4" meters.

Potential Impacts and Proposed Mitigation

The proposed pier improvements will not impact existing potable water system. The water system plans will be submitted to the DOT-HAR and Board of Water Supply for review and comment.

3.3.3 DRAINAGE SYSTEM

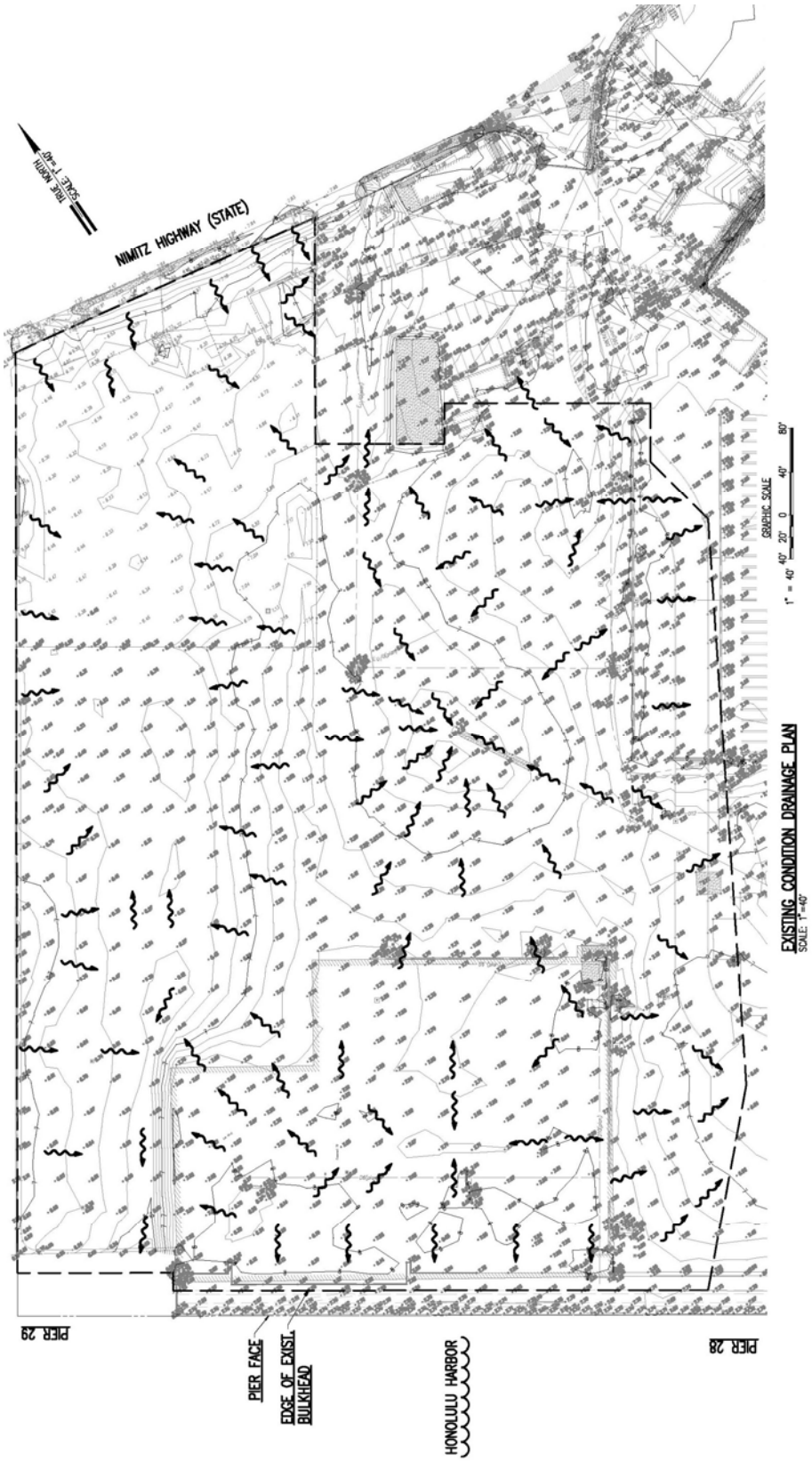
Runoff from Pier 29 currently sheet-flows across the property into Honolulu Harbor, or flows into an existing drainage system which also discharge into Honolulu Harbor (see Figure 7). In order to facilitate site drainage, a new drainage system is proposed via trench drains (see Figure 4). The drainage system as proposed includes sediment traps and oil-water separators before discharge into Honolulu Harbor. Regular inspection and periodic maintenance will be required of Harbor personnel to ensure proper operations.

Potential Impacts and Proposed Mitigation

Implementation of appropriate BMPs during construction will minimize the impacts of construction storm water and dewatering activities. The contractor shall include the following control measures in the BMPs:

- A silt screen shall be installed across the face of the piers to contain silt from the construction activities. The silt screen shall consist of a filter fabric combined with a layer of polyester netting for support. The screen shall remain in place for the duration of project activities.
- Sediment retention berms lined with silt screen shall be placed along the harbor-side of the active construction areas, and staging and stockpile areas. In particular, sediment retention berms shall be in place during demolition and excavation activities associated with improvements to the cargo handling areas. Wash water and water used for dust control shall also be monitored to ensure that they do not enter the harbor. These berms shall function to prevent sediment captured of storm runoff from entering Honolulu Harbor. They shall be shaped to retain runoff and trap sediment before it leaves the construction site, and shall be sized to accommodate the volume of runoff generated by a one-inch storm. When construction is complete, the berms and all of their components shall be removed. Dredged material, once dried, will be removed from the site and disposed at the landfill.

Figure 7 Existing Drainage Map – Pier 29



- All discharge pollution controls shall be regularly monitored and maintained by the project contractor. In the event of rainfall of .5-inch or greater within a 24-hour period, discharge pollution control measures should be checked within 24 hours of the event. During prolonged rainfall, control measures should be checked daily and excavated soil covered. If a severe storm event such as a 100-year storm occurs, then construction activities shall stop, equipment and materials will be stored, relocated, or otherwise secured against storm impacts, and any discharge control features removed. The contractor shall be responsible for recovering any materials or equipment washed away by the severe storm.
- After construction completion, maintenance of the drainage system shall be the responsibility of the DOT-HAR or the pier's lessee (user).

3.3.4 WASTEWATER SYSTEM

Wastewater from the service area is conveyed from the Hart Street WWPS to the Sand Island WWTP through a force main that is installed under the Kapalama Basin in Honolulu Harbor west of Pier 30.

Potential Impacts and Proposed Mitigation

The proposed pier improvements will not impact existing wastewater collection system.

3.3.5 ELECTRICAL AND COMMUNICATIONS SYSTEMS

The electrical power and communications utilities which serve the Harbor are privately owned by Hawaiian Electric Company and Hawaiian Telcom. Electrical power and communications are supplied to the project site by overhead service lines along Nimitz Highway. Pad-mounted transformers step down HECO's 11.5 KV power to 480/277V power.

Potential Impacts and Proposed Mitigation

The proposed pier improvements will impact existing services provided by HECO or Hawaiian Telcom in that additional demand will be placed on existing systems.

3.3.6 SOLID WASTE DISPOSAL SYSTEM

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

Potential Impacts and Proposed Mitigation

The proposed project is not expected to have a significant impact on the solid waste disposal system. The proposed improvements should not have a significant effect on the amount of solid waste generated at the facility. The Contractor will be responsible for disposal of construction debris which will be the primary item for disposal.

3.3.7 FIRE, POLICE AND MEDICAL SERVICES

Police protection services are provided by the Department of Transportation Harbor Patrol. Fire protection service is provided through the Honolulu Fire Department's Downtown and Kapalama Stations. In addition, fire protection is provided by the Fire Boat stationed at Pier 15.

Major medical services in the Primary Urban Center include the Queen's Medical Center on Punchbowl Street, Straub Clinic and Hospital at the intersection of King Street and Ward Avenue, and the Kaiser Permanente Medical Center in Moanalua.

Potential Impacts and Proposed Mitigation

The proposed project is not expected to have a significant impact on fire, police and medical services.

SECTION 4
RELATIONSHIP TO STATE AND COUNTY LAND USE PLANS AND POLICIES

4.1 THE HAWAIʻI STATE PLAN

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

The proposed action is consistent with the objectives and policies of the Hawaiʻi State Plan. Specifically, the proposed action will increase and diversify the State's economic base through upgrading the Pier 29 facility for the shipping industry. Described below are sections of the State Plan's overall theme, goals, objectives, and policies that relate to the proposed action.

Part I - Goals, Objectives, and Policies

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

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

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

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

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

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

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

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

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

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

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

(2) Effective protection of Hawai‘i's unique and fragile environmental resources.

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

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

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

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

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

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

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

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

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

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

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

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

SEC. 226-103 Economic priority guidelines.

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

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

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

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

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

4.2 HONOLULU WATERFRONT MASTER PLAN

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

The proposed project supports the overall objectives of the HWMP by:

- Improving to provide a more efficient shipping facility that will provide for the current and future needs of Hawai‘i’s residents.
- Maximizes public benefits associated with the improvement of Pier 29, located within the waterfront planning area.

4.3 STATE LAND USE LAW

The State Land Use Commission classifies all lands in the State of Hawai‘i into one of four land use designations: Urban, Rural, Agricultural or Conservation. The project site is located in the Urban (land use) District. Land uses in the State Urban District are regulated by the City and County of Honolulu through its zoning regulations as contained in the Land Use Ordinance.

4.4 STATE FUNCTIONAL PLANS

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

State Transportation Functional Plan

Objective 1A: Expansion of the transportation system.

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

The proposed Pier 29 improvements will improve the shore-side facilities to accommodate new container handling facility. Sections of the State Transportation Plan with particular significance to the proposed projects are following sections which address specific areas. Section 226 (New Facilities), section 227 (Alterations of existing Facilities), and section 303 (New Construction and Alterations in Public Accommodations and Commercial Facilities).

4.5 OAHU COMMERCIAL HARBORS 2020 MASTER PLAN

The State of Hawai‘i, DOT-HAR is responsible for administering the state-owned or controlled harbor facilities used by commercial cargo, passenger, and fishing operations.

DOT-HAR is responsible for the control, management, use and regulation of commercial harbors and their improvements. The State of Hawai‘i receives the bulk of its goods through its commercial harbors, and DOT-HAR manages the harbor traffic, berthing, landside usage, and facility development of these harbors.

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

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

Presently, berthing and landside accommodations within Honolulu Harbor are reaching capacity therefore vessel traffic, lack of berths, and insufficient operational space is a daily problem.

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

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

Major objectives of the 2020 PLAN include:

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

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

The proposed improvement of Pier 29 is an essential part of the 2020 PLAN and will provide needed berthing facilities to accommodate shipping activities within Honolulu Harbor.

4.6 COASTAL ZONE MANAGEMENT PROGRAM (SPECIAL MANAGEMENT AREAS)

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

Chapter 205A outlines controls and policies for development within an area along the shoreline referred to as the Special Management Area (SMA) which is under the jurisdiction of the City and County of Honolulu. SMA policies are administered by the Department of Planning and Permitting the County level. The proposed Pier 29 improvement does not fall within the SMA boundary limits established by the City and County of Honolulu which is located along the northern shoreline of Sand Island.

Environmental concerns are also addressed through the CZM consistency review process. The entire Island of O‘ahu is within the coastal zone area affected by the Federal CZM Act.

4.7 GENERAL PLAN & DEVELOPMENT PLAN

4.7.1 GENERAL PLAN

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

Transportation and Utilities

Objective A: To create a transportation system which will enable people and goods to move safely, efficiently, and at a reasonable cost; serve all people, including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.

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

Economic Activity:

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

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

Physical Development and Urban Design:

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

Objective B: To develop Honolulu, Aiea, and Pearl City as the island's primary urban center.

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

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

4.7.2 PRIMARY URBAN CENTER DEVELOPMENT PLAN

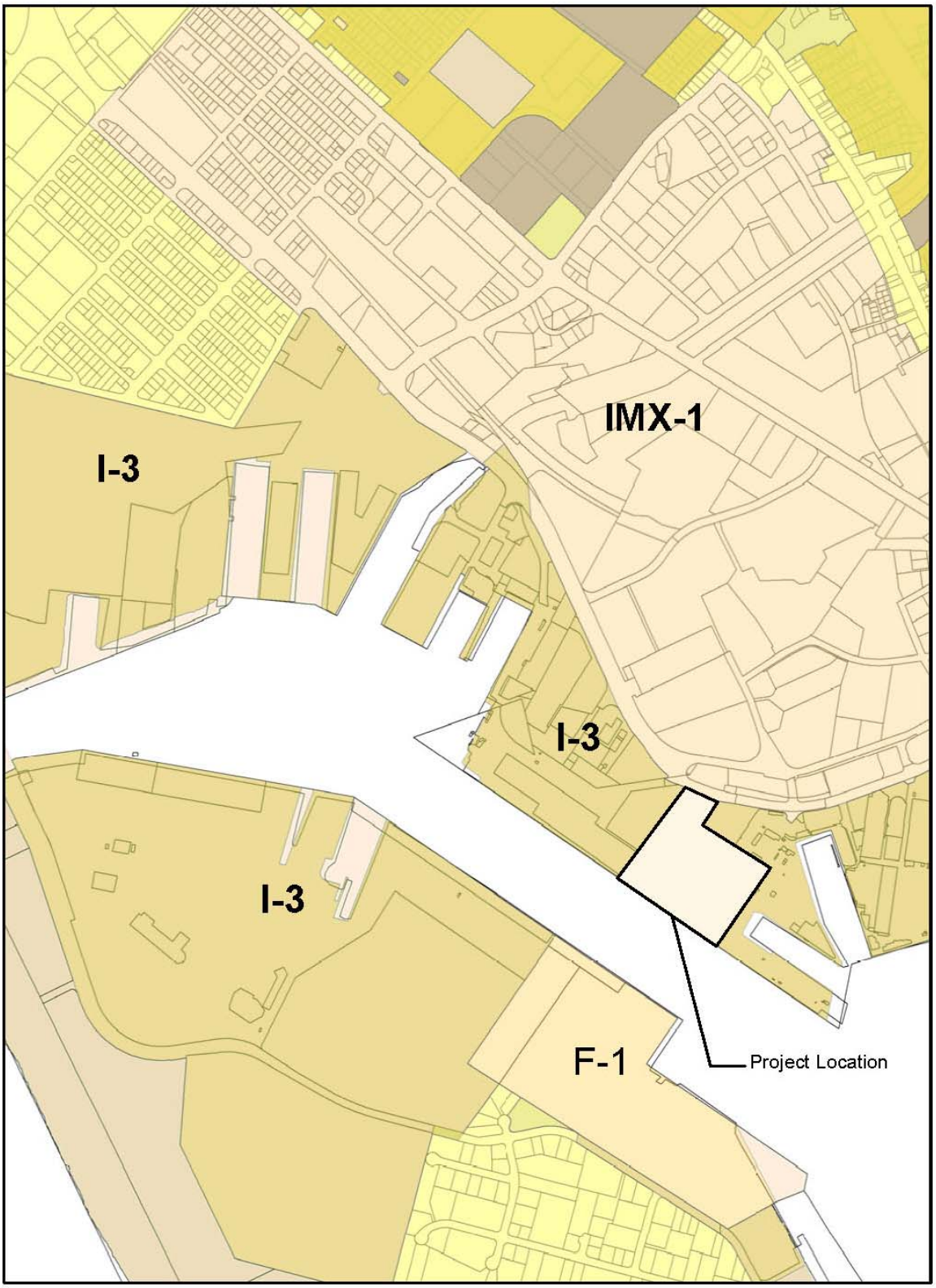
The project site is located in the Primary Urban Center of the City and County of Honolulu. The Development Plan Land Use Designation is industrial which is consistent with the proposed use of the project site.

4.8 COUNTY LAND USE ORDINANCE AND ZONING

The proposed project area is located within the I-3 Waterfront Industrial designation (See Figure 8). All improvements within these districts are subject to review by City and County Department of Planning and Permitting.

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

Figure 8. Zoning Map



SECTION 5
NECESSARY PERMITS AND APPROVALS

5.1 CITY AND COUNTY OF HONOLULU

- Board of Water Supply – Plan Review and Approval
- Department of Planning and Permitting – Plan Review and Approval

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

- Grading, Grubbing, and Stockpiling Permit
- Compliance with City and County Zoning

5.2 STATE OF HAWAI'I

The following permits, approvals and/or reviews are required by the State of Hawai'i:

- Noise Permit, Community Noise Control - Department of Health
- Plan Review, Commission on Persons with Disabilities
- National Pollutant Discharge Elimination System Permits for Construction Stormwater Discharge and Hydo-Testing – Department of Health
- Site Evaluation, Hazard Evaluation and Emergency Response, listed "site of interest"

5.3 UTILITY COMPANIES

Construction documents will be reviewed by the following utility companies:

- Hawaiian Electric Company
- Hawaiian Telcom Incorporated
- Oceanic Cable
- Security Clearances will be required of construction workers in accordance with the Maritime Security (MARSEC) program
- Transportation Worker Identification Credential (TWIC) registration

SECTION 6
ORGANIZATIONS AND AGENCIES TO BE CONSULTED DURING THE EA PREPARATION PERIOD

6.1 CITY AND COUNTY OF HONOLULU

Board of Water Supply
Department of Planning and Permitting
Fire Department
Police Department
Department of Design and Construction
Department of Facility Maintenance

6.2 STATE OF HAWAIʻI

Department of Business, Economic Development and Tourism
Department of Health
Department of Land and Natural Resources
Department of Transportation, Highways Division
Department of Agriculture
Office of Hawaiian Affairs
Aloha Tower Development Corporation

6.3 FEDERAL AGENCIES

Department of the Army, Corps of Engineers
U.S. Coast Guard

6.4 GOVERNMENT OFFICIALS

Councilman Romy Cachola

6.5 UTILITY COMPANIES

Hawaiian Telcom Incorporated
Hawaiian Electric Company, Inc.
Oceanic Cable

6.6 PRIVATE ORGANIZATIONS / INDIVIDUALS

Kalihi-Palama Neighborhood Board
Kalihi-Palama Community Council
Sand Island Business Association
Sause Brothers
Hawaiian Tug and Barge
Hawaiʻi Harbor Users Group
Iwilei District Participating Parties, LLC (IDPP)
Aloha Cargo Transport (ACT)
American Marine

SECTION 7
FINDINGS AND DETERMINATION

7.1 ANALYSIS

Chapter 200 (Environmental Impact Statement Rules) of Title 11, Administrative Rules of the State Department of Health establishes criteria for determining whether an action may have a significant impact on the environment. The Rules establish "significance criteria" for making the determination. The relationship of the proposed project to the thirteen criteria is provided below.

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

The existing project site was modified when the existing piers were developed. The subject property does not contain any known natural or cultural resources. The proposed activity involves the improvement of the site pavement and utility upgrades. Should archaeological or cultural features be discovered during the demolition or grading phase of work, the Historic Preservation Division of the Department of Land and Natural Resources will be notified and work in the vicinity of the discovered features will be halted until the site has been evaluated for significance.

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

The proposed project involves improvements to an existing cargo facility. The existing use of the project area will be modified to optimize cargo handling operations at the site. The improvements proposed will continue to support harbor related uses and therefore other non-harbor related uses will be curtailed.

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 Pier 29 cargo facility is consistent with the City and County of Honolulu's General Plan relating to transportation and utilities and the Honolulu Harbor 2020 plan.

4. Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.

The proposed Pier 29 improvements project will generally benefit the community and State indirectly. By providing the upgrades, the Pier will provide a more efficient resource to the maritime industry which provides the gateway for almost all of the consumer goods imported into the State of Hawai'i.

5. Substantially affects public health.

There is no public health concerns related to the proposed construction of the Pier 29 improvements. No long term impacts to soil or water quality are anticipated. Short-term impacts to noise and air quality (dust and odors) as a result of construction are not anticipated to be significant and will be limited to the construction phase.

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

The development of the projects will not have secondary impacts on the neighboring communities as well as other parts of O‘ahu.

7. Involves a substantial degradation of environmental quality.

The proposed projects does not involve a substantial impact to environmental quality. It is anticipated that fuel, material, and human resources will be expended during the construction phases of the project. Mitigation measures will be employed as practicable to minimize potential effects from construction activities, such as dust control and noise during construction. The proposed project does not constitute substantial degradation of environmental quality.

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

The proposed project does not involve a commitment for a larger action at this time. The proposed project does not create significant adverse effects upon the environment.

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

The project site has been previously disturbed and developed. There are no known rare, threatened or endangered species or habitat for such rare, endangered or threatened species at the project site.

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

The proposed project will not detrimentally affect air or water quality or ambient noise levels beyond the construction period. Mitigation measures and Best Management Practices proposed during the construction period will mitigate temporary air, water and noise pollution.

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

The project site is not located near or adjacent to an environmentally sensitive area such as a flood plain, tsunami zone, erosion-prone area, geologically hazardous lands, etc. As noted earlier, the Federal Emergency Management Agency's FIRM Insurance designation for the project site is Zone X – areas determined to be outside the 500-year floodplain.

12. Substantially affects scenic vistas and view planes identified in county or state plans or studies.

The Pier 29 improvement will not impact existing views and vistas. The improvements proposed will be at or near existing grades and therefore will not directly impact views or vistas directly. However, the use of the site as a cargo container yard will mean that view towards the ocean will be blocked.

13. Requires substantial energy consumption.

Construction of the project will require the consumption of energy in the form of petroleum products to operate construction machinery. Operations of the completed pier improvements will also require the consumption of energy (fuel) for its daily cargo handling operations and power required for lighting the site. However, if the pier improvements are not made the pier will continue to be used for cargo operations, albeit in a less efficient manner which may result in an increase consumption of energy.

7.2 FINDINGS AND REASONS SUPPORTING ANTICIPATED DETERMINATION

In accordance with the provisions set forth in Chapter 343, HRS, and the significance criteria in Section 11-200-12 of HAR, Title 11, Chapter 200, it is anticipated that the project will have no significant adverse impacts to air quality, water quality, noise levels, social welfare, historic sites, or wildlife habitat. Anticipated short-term impacts will be temporary and will not significantly adversely impact the environmental quality of the area. Further, mitigation measures described in this document will further minimize short-term impacts.

Long-term and secondary impacts anticipated are beneficial. Beneficial impacts are related to increased operational efficiencies gained from the upgrade of the project area at Pier 29. Long-term impacts are related to the additional operational efficiencies that will be available in Honolulu Harbor. Overall, the benefits of the project are believed to outweigh the adverse impacts. Therefore, it is anticipated that an Environmental Impact Statement (EIS) will not be required, and that a Finding of No Significant Impact (FONSI) will be issued for this project.

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APPENDICES

APPENDIX 1	LETTER REPORT, PIER 29 SOIL CHARACTERIZATION, Element Environmental, APRIL 2006
APPENDIX 2	SITE CHARACTERIZATION REPORT, PIER 29, Kimura International, DECEMBER 2004
APPENDIX 3	SEDIMENT AND WATER TESTING, PIER 29, Marine Research Consultants, 2006
APPENDIX 4	ENVIRONMENTAL CONSIDERATION, Element Environmental, 2008.
APPENDIX 5	TECHNICAL MEMORANDUM, GEOTECHNICAL RECOMMENDATIONS, Geolabs Hawaiʻi, 2008.
APPENDIX 6	TRAFFIC ASSESSMENT, Julian Ng, 2008

APPENDIX 1

LETTER REPORT,

PIER 29,

SOIL CHARACTERIZATION,

Element Environmental,

APRIL 2006

Letter Report
Pier 29 Soil Characterization

Pier 29, Honolulu Harbor
Honolulu, Oahu, Hawaii

Prepared for:

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April 2006

Introduction

This letter report summarizes the results of on-land soil sampling and analysis performed at the Pier 29 project site in Honolulu Harbor, Oahu, Hawaii (Figure 1). Improvements to the pier will require excavation and disposal of soil and sediment that has been potentially impacted by petroleum and other contamination. The purpose of the sampling and analysis is to determine if the soil and sediment has been impacted, and if so, the concentrations of the constituents of concern. The data collected from the sampling was used to complete a waste profile for acceptance approval from the PVT Landfill located in Nanakuli, Oahu, Hawaii.

The sampling and permitting work presented in this letter report were prepared for R.M. Towill Corporation by Element Environmental, LLC (EE) in accordance with our fee proposal dated January 24, 2006.

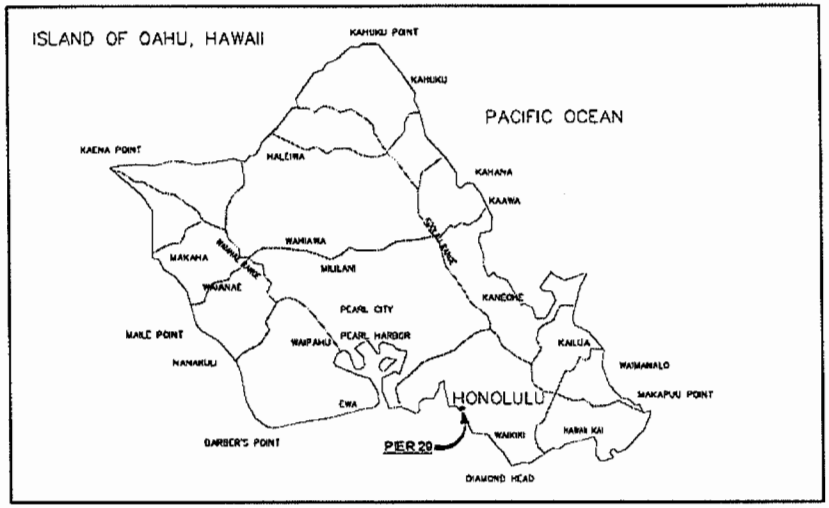
Data summary tables are presented in Appendix A while laboratory analytical data sheets and the chain-of-custody form are included in Appendix B.

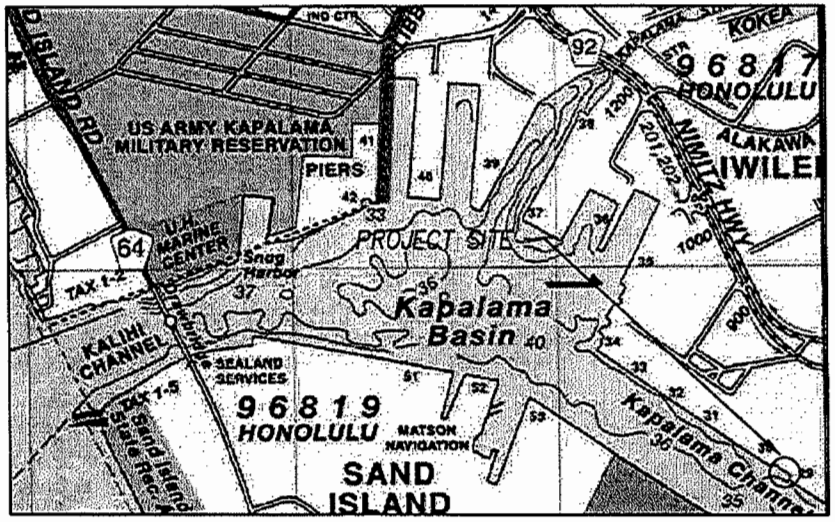
Project Background

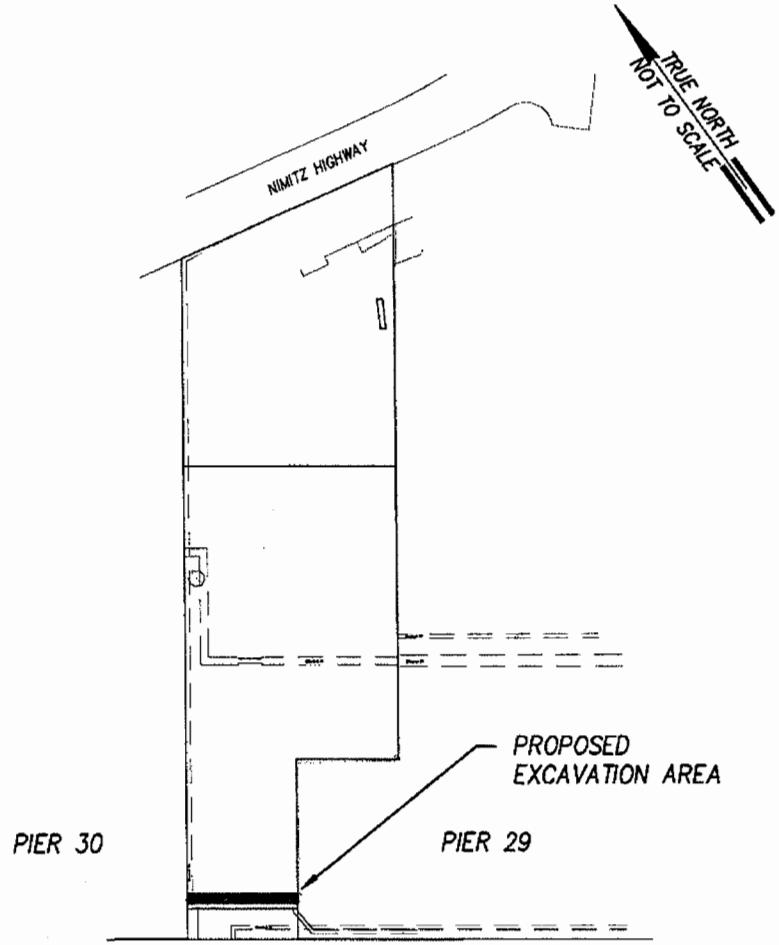
The State of Hawaii, Department of Transportation, Harbors Division (HDOT Harbors) is planning to make improvements to Pier 29. The Pier 29 extension project involves extending the bulkhead piers 145 feet from Pier 29 to Pier 30 to create a continuous docking frontage. Soils and sediments throughout Honolulu Harbor are known to contain varying levels of petroleum related constituents. Previous sampling conducted at Pier 29 indicates petroleum and other contamination exists in both the subsurface soil and groundwater. Construction of the extension will require structural excavations of both sediment and soil.

The Site Characterization Report prepared by Kimura International has indicated that soil and groundwater near the proposed area of work on the land side of Pier 29 is impacted with petroleum contamination and lead. Construction improvements will require excavation of approximately 325 cubic yards of soil within 19 feet of the existing edge of the pier (Figure 2). The excavation is required for the installation of the pier girder and sheeting pile cap for the new bulkhead. The excavation depths are estimated to be approximately 5 feet below ground surface (bgs). The area where these soils will be removed during pier construction was sampled during this investigation to allow the chemical characterization of this material required for disposal at an on-island landfill (Figures 2 and 3).

Soil samples collected from borings SB-1, SB-8, SB-9, and SB-10 during the Initial Site Characterization (Kimura, 2004) indicated low levels of TPH diesel and lead in the subsurface soil up to a depth of 5 to 6 feet bgs (Table 1). Borings SB-1 and SB-10 were converted into monitoring wells, MW-1 and MW-4 respectively. Petroleum contamination was not detected in the groundwater in well MW-1 (Table 2). Groundwater in well MW-4 was not sampled due to the presence of free product on the surface. Groundwater was encountered in both wells at a depth of 7 feet bgs.







REFERENCES: RMTC TOPO, PHEARS MAPBOOK

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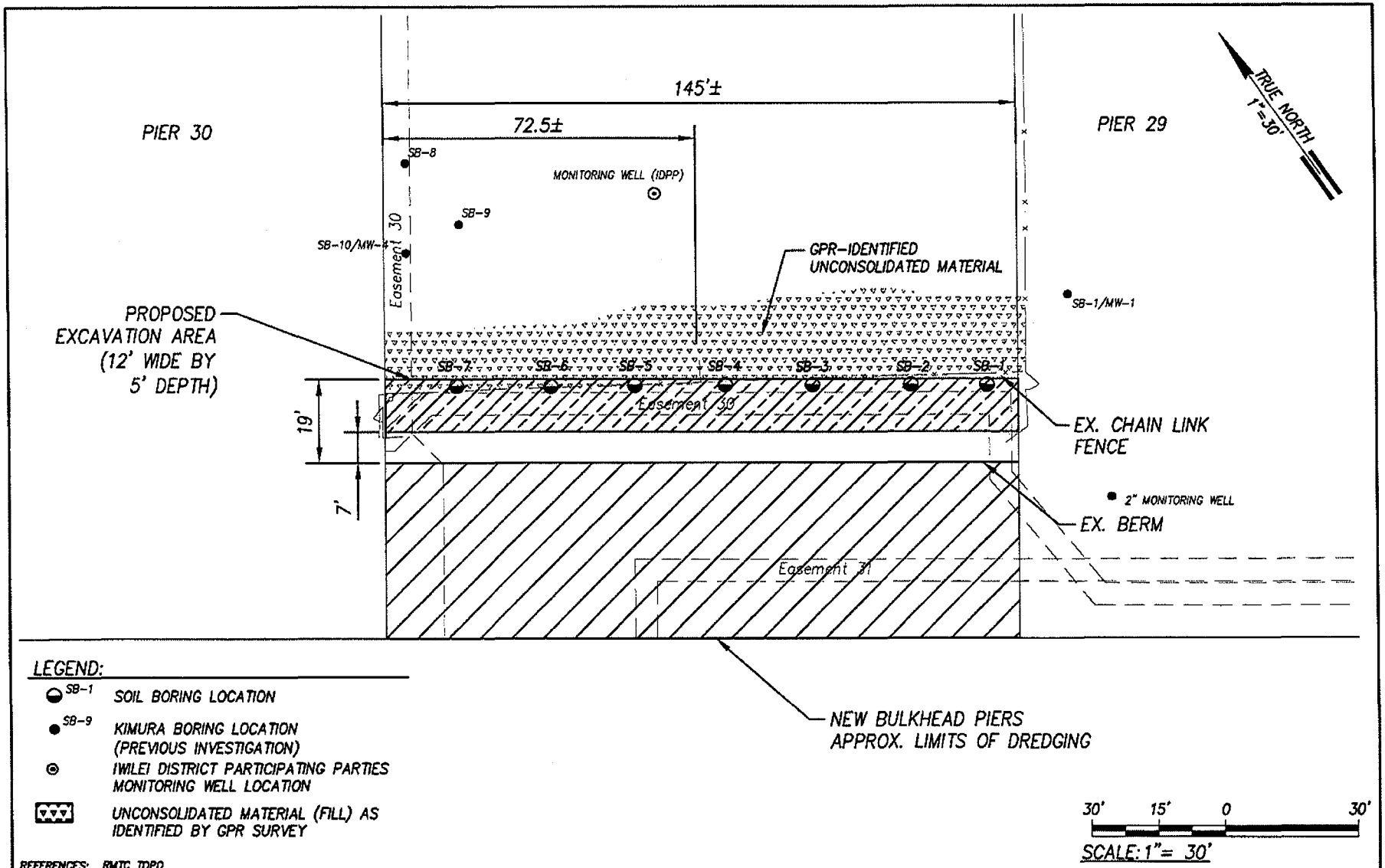
PIER 29 SOIL SAMPLING REPORT

SITE LOCATION

FIGURE 1



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PIER 29 SOIL SAMPLING REPORT

SAMPLE LOCATIONS

FIGURE
2

Table 1
Soil Anlaytical Results, Kimura Investigation
Pier 29 Honolulu Harbor

Contaminant	DOH Tier 1 SALs	Sample Identification									
		SB-1a	SB-1b	SB-2a	SB-2b	SB-3a	SB-3b	SB-4a	SB-4b	SB-5a	SB-5b
Fuel Scan											
TPH-Gasoline	2,000	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TPH-Diesel	5,000	< 20	< 20	< 20	61	< 20	< 20	75	< 20	< 20	< 20
TPH-Oil	5,000	< 40	< 40	< 40	< 40	720	< 40	< 40	< 40	< 40	< 40
BTEX											
Benzene	1.7	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	34	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	23	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PAHs											
Naphthalene	41	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	11	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PCBs											
PCBs	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals											
Lead	400	ND	10	11	5	400	16	21	15	94	16
Cadmium	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	*210	ND	20	ND	54	ND	ND	ND	20	ND	ND
Arsenic	*22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	*390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium	*5,400	61.5	39.9	29.4	48	394	44.5	76.4	39.5	34.1	50.5
Selenium	*390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	*23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

All results are listed in mg/kg.
* EPA Region 9 Preliminary Remediation Goals for residential soil for 2000

Table 1 (Continued)
Soil Anlaytical Results, Kimura Investigation
Pier 29 Honolulu Harbor

Contaminant	DOH Tier 1 SALs	Sample Identification									
		SB-6a	SB-6b	SB-7a	SB-7b	SB-8a	SB-8b	SB-9a	SB-9b	SB-10a	SB-10b
Fuel Scan											
TPH-Gasoline	2,000	< 20	250	< 20	240	< 20	< 20	< 20	< 20	< 20	< 20
TPH-Diesel	5,000	< 20	530	< 20	480	66	640	66	< 20	< 20	< 20
TPH-Oil	5,000	< 40	< 40	1,400	< 40	< 40	< 40	< 40	< 40	< 40	< 40
BTEX											
Benzene	1.7	< 0.05	0.86	< 0.05	0.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	34	< 0.05	13	< 0.05	2.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	23	< 0.05	< 0.05	< 0.05	4.8	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PAHs											
Naphthalene	41	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	11	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PCBs											
PCBs	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals											
Lead	400	14	34	740	28	120	60	49	110	510	ND
Cadmium	38	ND	ND	8	ND	ND	ND	ND	ND	2	ND
*Chromium	210	ND	20	ND	ND	ND	ND	ND	ND	25	ND
*Arsenic	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Silver	390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Barium	5,400	79.1	48.9	526	50.4	57.6	71.7	139	142	116	53.7
*Selenium	390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Mercury	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

All results are listed in mg/kg.
* EPA Region 9 Preliminary Remediation Goals for residential soil for 2000
ND = not detected above the method detection limit

Table 2

Groundwater Anlaytical Results, Kimura Investigation

Pier 29 Honolulu Harbor

CONTAMINANT	DOH TIER 1 SALS	SAMPLE IDENTIFICATION			
		MW-1	MW-2	MW-3	MW-4
Fuel Scan					
TPH-Gasoline	NS	<0.60	300	220	NA
TPH-Diesel	NS	<0.60	69	570	NA
TPH-Oil	NS	<1.0	33	110	NA
BTEX					
Benzene	1.7	<0.0005	0.15	0.15	NA
Toluene	2.1	<0.0005	1.2	1.2	NA
Ethylbenzene	0.14	<0.0005	0.48	0.62	NA
Xylenes	10	<0.0005	2.4	2.0	NA
PAHs					
Naphthalene	0.77	<0.0002	<0.0002	<0.0002	NA
Acenaphthene	0.32	<0.0002	<0.0002	<0.0002	NA
Fluoranthene	0.013	<0.0002	<0.0002	<0.0002	NA
Benzo(a)pyrene	0.0002	<0.0002	<0.0002	<0.0002	NA
PCBs					
PCBs	0.002	ND	ND	0.039(1)	ND
Metals					
Lead	0.0056	0.00066	0.00196	0.000805	NA
Cadmium	0.009	ND	ND	ND	NA
*Chromium	0.050	0.00759	0.0209	0.047	NA
*Arsenic	0.036	0.00522	0.00589	0.013	NA
*Silver	NS	ND	0.00005	0.00004	NA
*Barium	NS	0.0514	0.0201	0.0591	NA
*Selenium	0.071	0.00373	0.00576	0.0146	NA
*Mercury	NS	0.000071	0.000243	0.000082	NA

All results are listed in mg/L.

* DOH's Water Quality Standards for Chronic Toxicity for Saltwater

ND = not detected above the method detection limit

NS = no standard

NA = not analyzed

(1) = concentration for PCB-1260

Geophysical Toning

The project site was toned for underground utilities between 8:00 a.m. to 9:30 a.m. on March 3, 2006. Michael Bell from Hawaii Geophysical Services LLC performed the geophysical survey of the area. He first toned the site with a RD4000 Radiodetection device which is effective at identifying the presence of buried conductive material. This device works by sending out a low end FM radio signal which induces a corresponding signal from conductive material buried in the subsurface. No buried subsurface material was discovered within the project area using this piece of equipment.

Mr. Bell then scanned the site using a portable ground penetrating radar device. This sub-surface imaging system did not detect the presence of a buried pipe on the project site. However, the GPR was effective at distinguishing the location of the contact between dense compacted materials present approximately 25 to 30 feet inland from the shore and looser, less consolidated materials present in the area bordering the current pier shoreline. The contact between these consolidated/unconsolidated materials was identified using the GPR and marked on the asphalt with spray paint (Figure 3). The unconsolidated material likely corresponds to a greater thickness of fill material in the vicinity of the current pier edge.

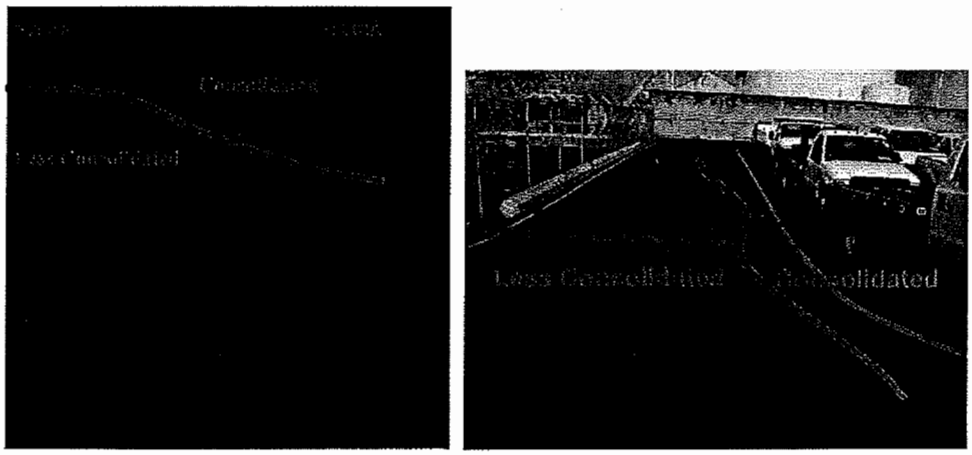

Figure 3: GPR Delineated Contact between Less Consolidated and Consolidated Subsurface Material at Pier 29 Project Site

A visual inspection of an exposed portion of the shoreline located along the seawall revealed that the subsurface consists of approximately a 1 to 1.5 feet thick layer of asphalt and asphalt related base course which was underlain by a grey marine clay. The locations of two recent geotechnical boreholes drilled at the site the previous week by Geolabs were measured. In addition, the well identified as the IDPP Monitoring Well in Figure 1 was located as well as a smaller, 2-inch monitoring well that was located to the east of the current project area.

Soil Sampling at Project Site

A total of seven boreholes were drilled at the Pier 29 site on March 6, 2006 from 8:00 a.m. to 12:15 p.m. The general location of the soil boreholes drilled during this project is depicted in Figure 2. Subsurface soil samples were collected using a direct-push Strataprobe operated by Valley Well Drilling, LLC. The boreholes were drilled at the following distances from the eastern corner post of the fenceline that parallels the future pier extension: 9, 26, 48, 67, 88, 107 and 128 feet. Continuous soil cores were collected from the ground surface to 4 foot depth and from 4 foot to 8 foot depth. The samples were retrieved in 2-inch diameter acetate liners from which the desired sample was extracted. Recovery rates ranged from between 35 to 85% from these sampling intervals. The subsurface materials recovered from each borehole were similar and consisted of the following general lithologies:

1 to 1.5 feet: Asphalt and underlying basaltic base course: FILL
1.5 to 4.0 feet: Dry to moist, dusky red (2.5YR 3/2) clay intermixed with coral and basaltic clasts: FILL
4.0 to 5.5 feet: Moist to wet, strong brown (7.5YR 5/6) clayey silt
5.5 to 7.6 feet: Wet, dark bluish gray gley (4/1) clay
7.6 to 8.0 feet: Wet, dark bluish gray gley (4/1) clay with abundant coral cobbles

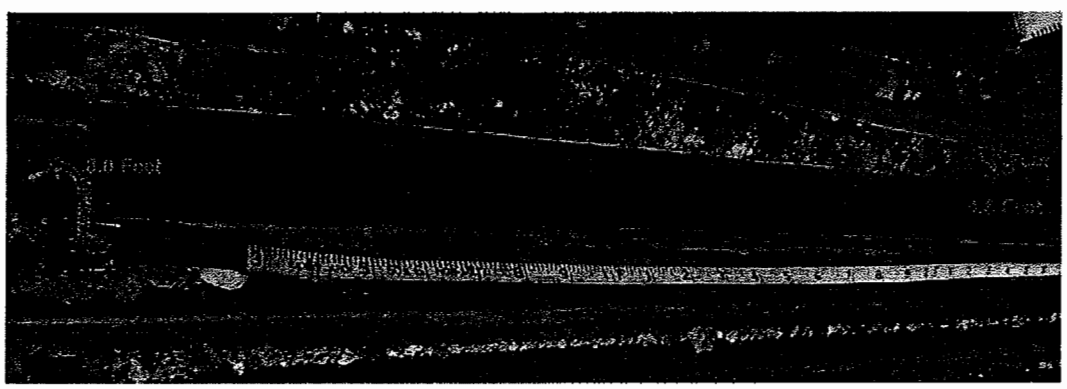

Figure 4: Subsurface Lithologies Encountered at Pier 29 Project Site

The section of soil core corresponding to the depth interval of between 2 to 5.5 feet below ground surface was placed into a mixing bowl and homogenized in the field. No odor was detected in any of the soil samples recovered from the site. A total of five encores and three four-ounce jars of soil were submitted per sample to Oceanic Analytical Laboratory for analysis. The sample collection times and the analyses to be performed are summarized in Table 3. The laboratory received the soil samples within two hours following collection of the last sample in the field. In order to meet the landfill acceptance requirements, the composite soil samples were analyzed for the following constituents:

- Toxicity Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) 8 metals (EPA method 1311 / 6010);

- Ignitability (ASTM D4982);
- Moisture content;
- Total metals (RCRA 8) (EPA method 6010B);
- TPH as gasoline (EPA method 8015B);
- TPH as diesel (EPA method 8015M);
- TPH as oil (EPA method 8015M);
- Benzene, toluene, ethylbenzene, xylenes (BTEX) (EPA method 8020);
- Polynuclear aromatic hydrocarbons (PAHs) (EPA method 8270C);
- Polychlorinated biphenyls (PCBs) (EPA method 8082); and
- Halogenated volatile organic compounds (HVOCs) (EPA method 8260B).

Sample ID	Date	Time	Total Metals	TCLP Metals	Ignitability	Moisture Content	TPH as Gas	TPH as Diesel	TPH as Oil	BTEX	PAH	PCB	Halogenated VOCs
Pier 29-1	3/6/2006	8:35	X	X	X	X	X	X	X	X	X	X	X
Pier 29-2	3/6/2006	9:05	X	X	X	X	X	X	X	X	X	X	X
Pier 29-3	3/6/2006	10:35	X	X	X	X	X	X	X	X	X	X	X
Pier 29-4	3/6/2006	10:50	X	X	X	X	X	X	X	X	X	X	X
Pier 29-5	3/6/2006	11:10	X	X	X	X	X	X	X	X	X	X	X
Pier 29-6	3/6/2006	11:25	X	X	X	X	X	X	X	X	X	X	X
Pier 29-7	3/6/2006	11:45	X	X	X	X	X	X	X	X	X	X	X

Table 3: Pier 29 Soil Sample Times and Analyses

Sample Results

The analytical data obtained on the seven composite samples submitted to the analytical laboratory are presented in a series of tables in Appendix A. The chain of custody form for the soil sample data is provided in Appendix B. The major findings from the review of the sample data include:

- Halogenated VOCs were not detected in any of the seven composite samples collected.
- Gasoline (TPH-gas) was not detected in any of the seven composite samples collected.
- All seven composite samples were determined to be non-flammable using the ASTM D4982-95B method.
- Diesel range organic (TPH-diesel) concentrations ranged from non-detect to 281 mg/kg in the seven composite samples collected.

- Residual range organic (TPH-oil) concentrations ranged from 37 to 1,140 mg/kg in the seven composite samples collected.
- BTEX compounds were not detected in any of the seven composite samples collected.
- Aroclor 1260 (PCB) was detected in six of seven composite samples at an average concentration of 0.115 mg/kg.
- The PAH compound benzo(a)pyrene was detected in three of the seven composite samples collected at an average concentration of 0.071 mg/kg.
- The PAH compound fluoranthene was detected in five of the seven composite samples collected at an average concentration of 0.141 mg/kg.
- The RCRA metals selenium and silver were not detected in any of the seven composite samples collected.
- The RCRA metals arsenic, barium, cadmium, chromium, lead and mercury were detected in all seven composite samples at the following average concentrations: 9.5 (As), 99.2 (Ba), 8.3 (Cd), 90.2 (Cr), 288.4 (Pb) and 1.2 mg/kg (Hg).
- No metals were detected in the TCLP metal analyses with the exception of a single detection of chromium in sample Pier 29-2 at a concentration of 0.138 mg/L. This measured TCLP concentration is well below the TCLP regulatory criteria (for designation as hazardous waste) for chromium of 5 mg/L.

Conclusions and Recommendations

Based on the field observations and a review of the sampling results, the following is concluded:

- The soil material to be excavated from the future Pier 29 site does not contain any chemicals of potential concern at concentrations that would preclude disposal of this excavated material at the PVT landfill.

References

Kimura International, Inc., 2004. *Site Characterization Report, Pier 29, Honolulu Harbor, 739 North Nimitz Highway, Honolulu, Hawaii, TMK (1) 1-5-038: Parcel 2 (Portion).* Prepared for the State of Hawaii, Department of Transportation, Harbors Division. December 2004.

PVT Land Company Ltd., 2006. Agreement (Bioremediation) Form.

Appendix A: Soil Analytical Data Summary Tables

Petroleum and BTEX Results

Sample ID	Pier 29-1	Pier 29-2	Pier 29-3	Pier 29-4	Pier 29-5	Pier 29-6	Pier 29-7	Reporting Limit	Units
	Result	Result	Result	Result	Result	Result	Result		
PETROLEUM AND BTEX RESULTS									
Diesel Range Organics	198	ND	17	37.8	25.5	31.7	281	105	mg/kg
Residual Range Organics	846	390	37.3	107	98.9	109	1140	317	mg/kg
Flammability	Negative	Negative	Negative	Negative	Negative	Negative	Negative	-	-
Gasoline	ND	ND	ND	ND	ND	ND	ND	1.89	mg/kg
Benzene	ND	ND	ND	ND	ND	ND	ND	0.00189	mg/kg
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	0.00189	mg/kg
m,p-Xylene	ND	ND	ND	ND	ND	ND	ND	0.00377	mg/kg
o-Xylene	ND	ND	ND	ND	ND	ND	ND	0.00189	mg/kg
Toluene	ND	ND	ND	ND	ND	ND	ND	0.00189	mg/kg
Surr: Chlorobenzene	97.8	99.1	99.2	102	111	102	104	67.1-117	
Percent Moisture	24.5	36.8	39.3	27	20.3	29.7	32.7	0.1	wt%

PCB Results

Sample ID	Pier 29-1	Pier 29-2	Pier 29-3	Pier 29-4	Pier 29-5	Pier 29-6	Pier 29-7	Average Result	Reporting Limit	Units
	Result	Result	Result	Result	Result	Result	Result			
PCB RESULTS										
Aroclor 1221	ND	ND	ND	ND	ND	ND	ND	ND	0.0322	mg/kg
Aroclor 1232	ND	ND	ND	ND	ND	ND	ND	ND	0.0643	mg/kg
Aroclor 1242	ND	ND	ND	ND	ND	ND	ND	ND	0.0322	mg/kg
Aroclor 1248	ND	ND	ND	ND	ND	ND	ND	ND	0.0322	mg/kg
Aroclor 1254	ND	ND	ND	ND	ND	ND	ND	ND	0.0322	mg/kg
Aroclor 1260	0.0537	0.0674	ND	0.147	0.184	0.0532	0.285	0.115	0.0322	mg/kg
Surr: Decachlorobiphenyl	62.1	69.8	59.3	69.2	67.2	80.3	79.6		24-154%	
Percent Moisture	24.5	36.8	39.3	27	20.3	29.7	32.7	30	0.1	wt%

PAH Results

Sample ID	Pier 29-1 Result	Pier 29-2 Result	Pier 29-3 Result	Pier 29-4 Result	Pier 29-5 Result	Pier 29-6 Result	Pier 29-7 Result	Average Result	Reporting Limit	Units
PAH Compounds										
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	0.128	mg/kg
Benzo(a)pyrene	0.239	ND	0.0121	0.0187	ND	ND	ND	0.071	0.01	mg/kg
Fluoranthene	0.361	0.321	0.013	0.023	0.169	ND	ND	0.141	0.01	mg/kg
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	0.128	mg/kg
Surr: 2-Fluorobiphenyl	93.2	83.3	78.2	75.9	74	80.8	79.8		30-115%	
Surr: 4-Terphenyl-d14	78.2	77.1	69	76.5	74.6	81.1	801		18-137%	
Surr: Nitrobenzen-d5	79.4	71.8	69.8	82.5	67.4	75.6	70.7		23-120%	
Percent Moisture	24.5	36.8	39.3	27	20.3	29.7	32.7	30	0.1	wt%

Total Metals Results

Sample ID	Pier 29-1 Result	Pier 29-2 Result	Pier 29-3 Result	Pier 29-4 Result	Pier 29-5 Result	Pier 29-6 Result	Pier 29-7 Result	Average Results	Reporting Limit	Units
TOTAL METALS										
Arsenic	9.5	9.1	12.4	9.25	8.62	10.6	6.75	9.5	4.13	mg/kg
Barium	217	72.2	24.9	169	33.1	75.4	103	99.2	8.26	mg/kg
Cadmium	7.44	7.21	9.86	7.7	10.6	8.77	6.36	8.3	1.65	mg/kg
Chromium	65.2	92.9	128	74.4	117	97.1	57	90.2	4.13	mg/kg
Lead	780	88.9	23.7	604	56.5	133	333	288.4	8.26	mg/kg
Mercury	2.55	0.23	0.347	0.798	1.82	0.453	2.02	1.2	0.078	mg/kg
Selenium	ND	ND	ND	ND	ND	ND	ND	4.1	8.26	mg/kg
Silver	ND	ND	ND	ND	ND	ND	ND	2.1	4.12	mg/kg
Percent Moisture	24.5	36.8	39.3	27	20.3	29.7	32.7	30	0.1	wt%

TCLP Metals Results

Sample ID	Pier 29-1 Result	Pier 29-2 Result	Pier 29-3 Result	Pier 29-4 Result	Pier 29-5 Result	Pier 29-6 Result	Pier 29-7 Result	Reportiug Limit	Units
TCLP METALS									
Arsenic	ND	ND	ND	ND	ND	ND	ND	0.5	mg/l
Barium	ND	ND	ND	ND	ND	ND	ND	1	mg/l
Cadmium	ND	ND	ND	ND	ND	ND	ND	0.05	mg/l
Chromium	ND	0.138	ND	ND	ND	ND	ND	0.1	mg/l
Lead	ND	ND	ND	ND	ND	ND	ND	0.2	mg/l
Mercury	ND	ND	ND	ND	ND	ND	ND	0.0025	mg/l
Selenium	ND	ND	ND	ND	ND	ND	ND	0.5	mg/l
Silver	ND	ND	ND	ND	ND	ND	ND	0.2	mg/l

Halogenated Volatile Organics Results

Sample ID	Pier 29-1 Result	Pier 29-2 Result	Pier 29-3 Result	Pier 29-4 Result	Pier 29-5 Result	Pier 29-6 Result	Pier 29-7 Result	Reporting Limit	Units
HALOGENATED VOLATILE ORGANICS									
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,2-Dibromo-3-chloropropane (DBCP)	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,2-Dibromoethane (EDB)	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Bromoform	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Bromomethane	ND	ND	ND	ND	ND	ND	ND	0.0839	mg/Kg
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Chloroethane	ND	ND	ND	ND	ND	ND	ND	0.0419	mg/Kg
Chloroform	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Chloromethane	ND	ND	ND	ND	ND	ND	ND	0.0419	mg/Kg
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	0.0419	mg/Kg
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	0.0419	mg/Kg
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	0.00839	mg/Kg
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	0.0419	mg/Kg
Surr: 1,2-Dichloroethane-d4	91.6	98.1	90.1	99.1	97.7	92.6	90.2	58.3-156	%REC
Surr: 4-Bromofluorobenzene	105	107	96.3	107	112	97.2	106	72.1-156	%REC
Surr: Dibromofluoromethane	89.4	93.6	86.5	91.0	90.7	86.4	84.6	63.2-149	%REC
Surr: Toluene-d8	102	105	99.9	104	103	95.2	101	70.5-145	%REC
Percent Moisture	24.5	36.8	39.3	27	20.3	29.7	32.7	0.1	wt%

Appendix B: Soil Sample Laboratory Analytical Data Sheets and Chain of Custody Form

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Case Narrative

Client:	Element Environmental
Project:	Pier 29 Site
Work Order:	0603039

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition.

All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

A01: The result for this analyte may have a high bias, the Laboratory Control Spike was recovered outside of the method specific control limits.

C01: To reduce matrix interference, the sample extract has undergone sulfuric acid cleanup, SW3665A, which is specific to hydrocarbon interference.

C02: To reduce matrix interference, the sample extract has undergone tetrabutylammonium (TBA) sulfite cleanup, SW3660B, which is specific to sulfur interference.

D09: Results in the diesel organics range are primarily due to overlap from a heavy oil range product.

Q01: The spike recovery/RPD for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.

Q02: The spike recovery/RPD for this QC sample is outside of established control limits due to sample matrix interference.

Q14: Visual examination indicates the RPD and/or matrix spike recovery is outside the control limit due to a nonhomogeneous sample matrix.

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-1
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 8:35
Lab ID:	0603039-01A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
DIESEL/ RESIDUAL RANGE ORGANICS (DRO/RRO)				**SW3550A**	**SW8015M**			
DRO	***198***	176	mg/Kg-dry	20	3/7/06	3/16/2006 3:33:00 PM	13125	D09
RRO	***846***	530	mg/Kg-dry	20				
Surr: O-Terphenyl	95.3	34.7-135	%REC	20				
FLAMMABILITY						**ASTM D4982-95B**		
Flammability	***Neg***	0	Pos/Neg	1	3/15/06	3/15/2006 11:05:00 A	R32219	
ICP METALS, TCLP LEACHED				**SW3015**	**SW1311/6010B**			
Arsenic	ND	0.500	mg/L	1	3/14/06	3/14/2006 6:39:18 PM	13178	
Barium	ND	1.00	mg/L	1				
Cadmium	ND	0.0500	mg/L	1				
Chromium	ND	0.100	mg/L	1				
Lead	ND	0.200	mg/L	1				
Selenium	ND	0.500	mg/L	1				
Silver	ND	0.200	mg/L	1				
ICP METALS-RCRA, TOTAL				**SW3050A**	**SW6010B**			
Arsenic	***9.50***	5.86	mg/Kg-dry	1	3/8/06	3/9/2006 2:02:31 PM	13140	
Barium	***217***	11.7	mg/Kg-dry	1				
Cadmium	***7.44***	2.34	mg/Kg-dry	1				
Chromium	***65.2***	5.86	mg/Kg-dry	1				
Lead	***780***	117	mg/Kg-dry	10		3/10/2006 1:29:10 PM		
Selenium	ND	11.7	mg/Kg-dry	1		3/9/2006 2:02:31 PM		
Silver	ND	5.86	mg/Kg-dry	1				
MERCURY, TCLP LEACHED				**SW7470**	**SW1311/7470**			
Mercury	ND	0.00250	mg/L	1	3/16/06	3/17/2006 12:11:00 PM	13190	
MERCURY, TOTAL				**SW7471**	**SW7471**			
Mercury	***2.55***	0.0909	mg/Kg	5	3/20/06	3/20/2006 4:31:00 PM	13200	
PAH BY EPA 8270 SIM				**SW3550A**	**SW8270C**			
Acenaphthene	ND	0.132	mg/Kg	20	3/8/06	3/9/2006 6:48:08 PM	13134	
Benzo(a)pyrene	***0.239***	0.132	mg/Kg	20				
Fluoranthene	***0.361***	0.132	mg/Kg	20				
Naphthalene	ND	0.132	mg/Kg	20				
Surr: 2-Fluorobiphenyl	93.2	30-115	%REC	20				
Surr: 4-Terphenyl-d14	78.2	18-137	%REC	20				
Surr: Nitrobenzene-d5	79.4	23-120	%REC	20				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-1
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 8:35
Lab ID:	0603039-01A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
PCBS IN SOIL OR SOLID WASTE					**SW3550**	**SW8082**		**C01**
Aroclor 1016	ND	0.0319	mg/Kg	1	3/7/06	3/8/2006 9:31:00 PM	13131	
Aroclor 1221	ND	0.0639	mg/Kg	1				
Aroclor 1232	ND	0.0319	mg/Kg	1				
Aroclor 1242	ND	0.0319	mg/Kg	1				
Aroclor 1248	ND	0.0319	mg/Kg	1				
Aroclor 1254	ND	0.0319	mg/Kg	1				
Aroclor 1260	***0.0537***	0.0319	mg/Kg	1				
Surr: Decachlorobiphenyl	62.1	24-154	%REC	1				
PERCENT MOISTURE						**SW3550**		
Percent Moisture	***24.5***	0.100	wt%	1	3/13/06	3/14/2006 8:15:00 AM	R32221	

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-1
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 8:35
Lab ID:	0603039-01B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
GASOLINE RANGE ORGANICS (GRO)/BTEX				**SW5035**	**SW8015B/8021B**			
Benzene	ND	0.00173	mg/Kg	1	3/7/06	3/7/2006 12:01:00 PM	13136	
Ethylbenzene	ND	0.00173	mg/Kg	1				
GRO	ND	1.73	mg/Kg	1				
m,p-Xylene	ND	0.00346	mg/Kg	1				
o-Xylene	ND	0.00173	mg/Kg	1				
Toluene	ND	0.00173	mg/Kg	1				
Surr: Chlorobenzene	97.8	67.1-117	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-1
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 8:35
Lab ID:	0603039-01C	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
HALOGENATED VOLATILE ORGANICS				**SW5035**	**SW8260B**			
1,1,1-Trichloroethane	ND	0.00839	mg/Kg	1	3/8/06	3/8/2006 1:19:00 PM	13144	
1,1,2,2-Tetrachloroethane	ND	0.00839	mg/Kg	1				
1,1,2-Trichloroethane	ND	0.00839	mg/Kg	1				
1,1-Dichloroethane	ND	0.00839	mg/Kg	1				
1,1-Dichloroethene	ND	0.00839	mg/Kg	1				
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00839	mg/Kg	1				
1,2-Dibromoethane (EDB)	ND	0.00839	mg/Kg	1				
1,2-Dichlorobenzene	ND	0.00839	mg/Kg	1				
1,2-Dichloroethane	ND	0.00839	mg/Kg	1				
1,2-Dichloropropane	ND	0.00839	mg/Kg	1				
1,3-Dichlorobenzene	ND	0.00839	mg/Kg	1				
1,4-Dichlorobenzene	ND	0.00839	mg/Kg	1				
Bromodichloromethane	ND	0.00839	mg/Kg	1				
Bromoform	ND	0.00839	mg/Kg	1				
Bromomethane	ND	0.0839	mg/Kg	1				
Carbon tetrachloride	ND	0.00839	mg/Kg	1				
Chlorobenzene	ND	0.00839	mg/Kg	1				
Chloroethane	ND	0.0419	mg/Kg	1				
Chloroform	ND	0.00839	mg/Kg	1				
Chloromethane	ND	0.0419	mg/Kg	1				
cis-1,2-Dichloroethene	ND	0.00839	mg/Kg	1				
cis-1,3-Dichloropropene	ND	0.00839	mg/Kg	1				
Dibromochloromethane	ND	0.00839	mg/Kg	1				
Dichlorodifluoromethane	ND	0.0419	mg/Kg	1				
Methylene chloride	ND	0.0419	mg/Kg	1				
Tetrachloroethene	ND	0.00839	mg/Kg	1				
trans-1,2-Dichloroethene	ND	0.00839	mg/Kg	1				
trans-1,3-Dichloropropene	ND	0.00839	mg/Kg	1				
Trichloroethene	ND	0.00839	mg/Kg	1				
Trichlorofluoromethane	ND	0.00839	mg/Kg	1				
Vinyl chloride	ND	0.0419	mg/Kg	1				
Surr: 1,2-Dichloroethane-d4	91.6	58.3-156	%REC	1				
Surr: 4-Bromofluorobenzene	105	72.1-156	%REC	1				
Surr: Dibromofluoromethane	89.4	63.2-149	%REC	1				
Surr: Toluene-d8	102	70.5-145	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-2
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 9:05
Lab ID:	0603039-02A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
DIESEL/ RESIDUAL RANGE ORGANICS (DRO/RRO)				**SW3550A**	**SW8015M**			
DRO	ND	105	mg/Kg-dry	10	3/7/06	3/16/2006 4:08:00 PM	13125	
RRO	***390***	317	mg/Kg-dry	10				
Surr: O-Terphenyl	73.0	34.7-135	%REC	10				
FLAMMABILITY						**ASTM D4982-95B**		
Flammability	***Neg***	0	Pos/Neg	1	3/15/06	3/15/2006 11:05:00 A	R32219	
ICP METALS, TCLP LEACHED				**SW3015**	**SW1311/6010B**			
Arsenic	ND	0.500	mg/L	1	3/14/06	3/14/2006 6:52:59 PM	13178	
Barium	ND	1.00	mg/L	1				
Cadmium	ND	0.0500	mg/L	1				
Chromium	***0.138***	0.100	mg/L	1				A01
Lead	ND	0.200	mg/L	1				
Selenium	ND	0.500	mg/L	1				
Silver	ND	0.200	mg/L	1				
ICP METALS-RCRA, TOTAL				**SW3050A**	**SW6010B**			
Arsenic	***9.10***	6.76	mg/Kg-dry	1	3/8/06	3/9/2006 2:18:54 PM	13140	
Barium	***72.2***	13.5	mg/Kg-dry	1				
Cadmium	***7.21***	2.71	mg/Kg-dry	1				
Chromium	***92.9***	6.76	mg/Kg-dry	1				
Lead	***88.9***	13.5	mg/Kg-dry	1				
Selenium	ND	13.5	mg/Kg-dry	1				
Silver	ND	6.76	mg/Kg-dry	1				
MERCURY, TCLP LEACHED				**SW7470**	**SW1311/7470**			
Mercury	ND	0.00250	mg/L	1	3/16/06	3/17/2006 12:18:00 PM	13190	
MERCURY, TOTAL				**SW7471**	**SW7471**			
Mercury	***0.230***	0.0197	mg/Kg	1	3/20/06	3/20/2006 4:52:00 PM	13200	
PAH BY EPA 8270 SIM				**SW3550A**	**SW8270C**			
Acenaphthene	ND	0.132	mg/Kg	20	3/8/06	3/9/2006 10:50:28 PM	13134	
Benzo(a)pyrene	ND	0.132	mg/Kg	20				
Fluoranthene	***0.321***	0.132	mg/Kg	20				
Naphthalene	ND	0.132	mg/Kg	20				
Surr: 2-Fluorobiphenyl	83.3	30-115	%REC	20				
Surr: 4-Terphenyl-d14	77.1	18-137	%REC	20				
Surr: Nitrobenzene-d5	71.8	23-120	%REC	20				

Qualifiers

ND - Not Detected at the Reporting Limit
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B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-2
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 9:05
Lab ID:	0603039-02A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
PCBS IN SOIL OR SOLID WASTE					**SW3550**	**SW8082**		**C01**
Aroclor 1016	ND	0.0319	mg/Kg	1	3/7/06	3/8/2006 9:57:00 PM	13131	
Aroclor 1221	ND	0.0639	mg/Kg	1				
Aroclor 1232	ND	0.0319	mg/Kg	1				
Aroclor 1242	ND	0.0319	mg/Kg	1				
Aroclor 1248	ND	0.0319	mg/Kg	1				
Aroclor 1254	ND	0.0319	mg/Kg	1				
Aroclor 1260	***0.0674***	0.0319	mg/Kg	1				
Surr: Decachlorobiphenyl	69.8	24-154	%REC	1				
PERCENT MOISTURE						**SW3550**		
Percent Moisture	***36.8***	0.100	wt%	1	3/13/06	3/14/2006 8:15:00 AM	R32221	

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-2
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 9:05
Lab ID:	0603039-02B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
GASOLINE RANGE ORGANICS (GRO)/BTEX				**SW5035**	**SW8015B/8021B**			
Benzene	ND	0.00181	mg/Kg	1	3/7/06	3/7/2006 12:34:00 PM	13136	
Ethylbenzene	ND	0.00181	mg/Kg	1				
GRO	ND	1.81	mg/Kg	1				
m,p-Xylene	ND	0.00362	mg/Kg	1				
o-Xylene	ND	0.00181	mg/Kg	1				
Toluene	ND	0.00181	mg/Kg	1				
Surr: Chlorobenzene	99.1	67.1-117	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-2
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 9:05
Lab ID:	0603039-02C	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
HALOGENATED VOLATILE ORGANICS				**SW5035**	**SW8260B**			
1,1,1-Trichloroethane	ND	0.0103	mg/Kg	1	3/8/06	3/8/2006 1:57:00 PM	13144	
1,1,2,2-Tetrachloroethane	ND	0.0103	mg/Kg	1				
1,1,2-Trichloroethane	ND	0.0103	mg/Kg	1				
1,1-Dichloroethane	ND	0.0103	mg/Kg	1				
1,1-Dichloroethene	ND	0.0103	mg/Kg	1				
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.0103	mg/Kg	1				
1,2-Dibromoethane (EDB)	ND	0.0103	mg/Kg	1				
1,2-Dichlorobenzene	ND	0.0103	mg/Kg	1				
1,2-Dichloroethane	ND	0.0103	mg/Kg	1				
1,2-Dichloropropane	ND	0.0103	mg/Kg	1				
1,3-Dichlorobenzene	ND	0.0103	mg/Kg	1				
1,4-Dichlorobenzene	ND	0.0103	mg/Kg	1				
Bromodichloromethane	ND	0.0103	mg/Kg	1				
Bromoform	ND	0.0103	mg/Kg	1				
Bromomethane	ND	0.103	mg/Kg	1				
Carbon tetrachloride	ND	0.0103	mg/Kg	1				
Chlorobenzene	ND	0.0103	mg/Kg	1				
Chloroethane	ND	0.0513	mg/Kg	1				
Chloroform	ND	0.0103	mg/Kg	1				
Chloromethane	ND	0.0513	mg/Kg	1				
cis-1,2-Dichloroethene	ND	0.0103	mg/Kg	1				
cis-1,3-Dichloropropene	ND	0.0103	mg/Kg	1				
Dibromochloromethane	ND	0.0103	mg/Kg	1				
Dichlorodifluoromethane	ND	0.0513	mg/Kg	1				
Methylene chloride	ND	0.0513	mg/Kg	1				
Tetrachloroethene	ND	0.0103	mg/Kg	1				
trans-1,2-Dichloroethene	ND	0.0103	mg/Kg	1				
trans-1,3-Dichloropropene	ND	0.0103	mg/Kg	1				
Trichloroethene	ND	0.0103	mg/Kg	1				
Trichlorofluoromethane	ND	0.0103	mg/Kg	1				
Vinyl chloride	ND	0.0513	mg/Kg	1				
Surr: 1,2-Dichloroethane-d4	98.1	58.3-156	%REC	1				
Surr: 4-Bromofluorobenzene	107	72.1-156	%REC	1				
Surr: Dibromofluoromethane	93.6	63.2-149	%REC	1				
Surr: Toluene-d8	105	70.5-145	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-3
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:35
Lab ID:	0603039-03A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
DIESEL/ RESIDUAL RANGE ORGANICS (DRO/RRO)				**SW3550A**	**SW8015M**			
DRO	***17.0***	10.9	mg/Kg-dry	1	3/7/06	3/15/2006 2:02:00 PM	13125	D09
RRO	***37.3***	32.7	mg/Kg-dry	1				
Surr: O-Terphenyl	78.3	34.7-135	%REC	1				
FLAMMABILITY						**ASTM D4982-95B**		
Flammability	***Neg***	0	Pos/Neg	1	3/15/06	3/15/2006 11:05:00 A	R32219	
ICP METALS, TCLP LEACHED				**SW3015**	**SW1311/6010B**			
Arsenic	ND	0.500	mg/L	1	3/14/06	3/14/2006 6:59:19 PM	13178	
Barium	ND	1.00	mg/L	1				
Cadmium	ND	0.0500	mg/L	1				
Chromium	ND	0.100	mg/L	1				
Lead	ND	0.200	mg/L	1				
Selenium	ND	0.500	mg/L	1				
Silver	ND	0.200	mg/L	1				
ICP METALS-RCRA, TOTAL				**SW3050A**	**SW6010B**			
Arsenic	***12.4***	7.35	mg/Kg-dry	1	3/8/06	3/9/2006 2:23:35 PM	13140	
Barium	***24.9***	14.7	mg/Kg-dry	1				
Cadmium	***9.86***	2.94	mg/Kg-dry	1				
Chromium	***128***	7.35	mg/Kg-dry	1				
Lead	***23.7***	14.7	mg/Kg-dry	1				
Selenium	ND	14.7	mg/Kg-dry	1				
Silver	ND	7.35	mg/Kg-dry	1				
MERCURY, TCLP LEACHED				**SW7470**	**SW1311/7470**			
Mercury	ND	0.00250	mg/L	1	3/16/06	3/17/2006 12:19:00 PM	13190	
MERCURY, TOTAL				**SW7471**	**SW7471**			
Mercury	***0.347***	0.00916	mg/Kg	1	3/20/06	3/20/2006 4:53:00 PM	13200	
PAH BY EPA 8270 SIM				**SW3550A**	**SW8270C**			
Acenaphthene	ND	0.00651	mg/Kg	1	3/8/06	3/9/2006 7:57:21 PM	13134	
Benzo(a)pyrene	***0.0121***	0.00651	mg/Kg	1				
Fluoranthene	***0.0130***	0.00651	mg/Kg	1				
Naphthalene	ND	0.00651	mg/Kg	1				
Surr: 2-Fluorobiphenyl	78.2	30-115	%REC	1				
Surr: 4-Terphenyl-d14	69.0	18-137	%REC	1				
Surr: Nitrobenzene-d5	69.8	23-120	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-3
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:35
Lab ID:	0603039-03A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
PCBS IN SOIL OR SOLID WASTE					**SW3550**	**SW8082**		**C01**
Aroclor 1016	ND	0.0333	mg/Kg	1	3/7/06	3/8/2006 10:23:00 PM	13131	
Aroclor 1221	ND	0.0667	mg/Kg	1				
Aroclor 1232	ND	0.0333	mg/Kg	1				
Aroclor 1242	ND	0.0333	mg/Kg	1				
Aroclor 1248	ND	0.0333	mg/Kg	1				
Aroclor 1254	ND	0.0333	mg/Kg	1				
Aroclor 1260	ND	0.0333	mg/Kg	1				
Surr: Decachlorobiphenyl	59.3	24-154	%REC	1				
PERCENT MOISTURE						**SW3550**		
Percent Moisture	*39.3*	0.100	wt%	1	3/13/06	3/14/2006 8:15:00 AM	R32221	

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-3
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:35
Lab ID:	0603039-03B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
GASOLINE RANGE ORGANICS (GRO)/BTEX				**SW5035**	**SW8015B/8021B**			
Benzene	ND	0.00186	mg/Kg	1	3/7/06	3/7/2006 1:06:00 PM	13136	
Ethylbenzene	ND	0.00186	mg/Kg	1				
GRO	ND	1.86	mg/Kg	1				
m,p-Xylene	ND	0.00372	mg/Kg	1				
o-Xylene	ND	0.00186	mg/Kg	1				
Toluene	ND	0.00186	mg/Kg	1				
Surr: Chlorobenzene	99.2	67.1-117	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-3
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:35
Lab ID:	0603039-03C	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
HALOGENATED VOLATILE ORGANICS				**SW5035**	**SW8260B**			
1,1,1-Trichloroethane	ND	0.00969	mg/Kg	1	3/8/06	3/8/2006 2:35:00 PM	13144	
1,1,2,2-Tetrachloroethane	ND	0.00969	mg/Kg	1				
1,1,2-Trichloroethane	ND	0.00969	mg/Kg	1				
1,1-Dichloroethane	ND	0.00969	mg/Kg	1				
1,1-Dichloroethene	ND	0.00969	mg/Kg	1				
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00969	mg/Kg	1				
1,2-Dibromoethane (EDB)	ND	0.00969	mg/Kg	1				
1,2-Dichlorobenzene	ND	0.00969	mg/Kg	1				
1,2-Dichloroethane	ND	0.00969	mg/Kg	1				
1,2-Dichloropropane	ND	0.00969	mg/Kg	1				
1,3-Dichlorobenzene	ND	0.00969	mg/Kg	1				
1,4-Dichlorobenzene	ND	0.00969	mg/Kg	1				
Bromodichloromethane	ND	0.00969	mg/Kg	1				
Bromoform	ND	0.00969	mg/Kg	1				
Bromomethane	ND	0.0969	mg/Kg	1				
Carbon tetrachloride	ND	0.00969	mg/Kg	1				
Chlorobenzene	ND	0.00969	mg/Kg	1				
Chloroethane	ND	0.0484	mg/Kg	1				
Chloroform	ND	0.00969	mg/Kg	1				
Chloromethane	ND	0.0484	mg/Kg	1				
cis-1,2-Dichloroethene	ND	0.00969	mg/Kg	1				
cis-1,3-Dichloropropene	ND	0.00969	mg/Kg	1				
Dibromochloromethane	ND	0.00969	mg/Kg	1				
Dichlorodifluoromethane	ND	0.0484	mg/Kg	1				
Methylene chloride	ND	0.0484	mg/Kg	1				
Tetrachloroethene	ND	0.00969	mg/Kg	1				
trans-1,2-Dichloroethene	ND	0.00969	mg/Kg	1				
trans-1,3-Dichloropropene	ND	0.00969	mg/Kg	1				
Trichloroethene	ND	0.00969	mg/Kg	1				
Trichlorofluoromethane	ND	0.00969	mg/Kg	1				
Vinyl chloride	ND	0.0484	mg/Kg	1				
Surr: 1,2-Dichloroethane-d4	90.1	58.3-156	%REC	1				
Surr: 4-Bromofluorobenzene	96.3	72.1-156	%REC	1				
Surr: Dibromofluoromethane	86.5	63.2-149	%REC	1				
Surr: Toluene-d8	99.9	70.5-145	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-4
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:50
Lab ID:	0603039-04A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
DIESEL/ RESIDUAL RANGE ORGANICS (DRO/RRO)				**SW3550A**	**SW8015M**			
DRO	***37.8***	18.0	mg/Kg-dry	2	3/7/06	3/15/2006 2:37:00 PM	13125	D09
RRO	***107***	53.9	mg/Kg-dry	2				
Surr: O-Terphenyl	64.9	34.7-135	%REC	2				
FLAMMABILITY						**ASTM D4982-95B**		
Flammability	***Neg***	0	Pos/Neg	1	3/15/06	3/15/2006 11:05:00 A	R32219	
ICP METALS, TCLP LEACHED				**SW3015**	**SW1311/6010B**			
Arsenic	ND	0.500	mg/L	1	3/14/06	3/14/2006 7:03:53 PM	13178	
Barium	ND	1.00	mg/L	1				
Cadmium	ND	0.0500	mg/L	1				
Chromium	ND	0.100	mg/L	1				
Lead	ND	0.200	mg/L	1				
Selenium	ND	0.500	mg/L	1				
Silver	ND	0.200	mg/L	1				
ICP METALS-RCRA, TOTAL				**SW3050A**	**SW6010B**			
Arsenic	***9.25***	6.59	mg/Kg-dry	1	3/8/06	3/9/2006 2:28:25 PM	13140	
Barium	***169***	13.2	mg/Kg-dry	1				
Cadmium	***7.70***	2.64	mg/Kg-dry	1				
Chromium	***74.4***	6.59	mg/Kg-dry	1				
Lead	***604***	13.2	mg/Kg-dry	1				
Selenium	ND	13.2	mg/Kg-dry	1				
Silver	ND	6.59	mg/Kg-dry	1				
MERCURY, TCLP LEACHED				**SW7470**	**SW1311/7470**			
Mercury	ND	0.00250	mg/L	1	3/16/06	3/17/2006 12:21:00 PM	13190	
MERCURY, TOTAL				**SW7471**	**SW7471**			
Mercury	***0.798***	0.0296	mg/Kg	2	3/20/06	3/20/2006 5:12:00 PM	13200	
PAH BY EPA 8270 SIM				**SW3550A**	**SW8270C**			
Acenaphthene	ND	0.00654	mg/Kg	1	3/8/06	3/9/2006 8:32:04 PM	13134	
Benzo(a)pyrene	***0.0187***	0.00654	mg/Kg	1				
Fluoranthene	***0.0230***	0.00654	mg/Kg	1				
Naphthalene	ND	0.00654	mg/Kg	1				
Surr: 2-Fluorobiphenyl	75.9	30-115	%REC	1				
Surr: 4-Terphenyl-d14	76.5	18-137	%REC	1				
Surr: Nitrobenzene-d5	82.5	23-120	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-4
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:50
Lab ID:	0603039-04A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
PCBS IN SOIL OR SOLID WASTE				**SW3550**	**SW8082**			**C01**
Aroclor 1016	ND	0.0321	mg/Kg	1	3/7/06	3/8/2006 11:39:00 PM	13131	
Aroclor 1221	ND	0.0641	mg/Kg	1				
Aroclor 1232	ND	0.0321	mg/Kg	1				
Aroclor 1242	ND	0.0321	mg/Kg	1				
Aroclor 1248	ND	0.0321	mg/Kg	1				
Aroclor 1254	ND	0.0321	mg/Kg	1				
Aroclor 1260	***0.147***	0.0321	mg/Kg	1				
Surr: Decachlorobiphenyl	69.2	24-154	%REC	1				
PERCENT MOISTURE					**SW3550**			
Percent Moisture	***27.0***	0.100	wt%	1	3/13/06	3/14/2006 8:15:00 AM	R32221	

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-4
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:50
Lab ID:	0603039-04B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
GASOLINE RANGE ORGANICS (GRO)/BTEX				**SW5035**	**SW8015B/8021B**			
Benzene	ND	0.00194	mg/Kg	1	3/7/06	3/7/2006 1:38:00 PM	13136	
Ethylbenzene	ND	0.00194	mg/Kg	1				
GRO	ND	1.94	mg/Kg	1				
m,p-Xylene	ND	0.00388	mg/Kg	1				
o-Xylene	ND	0.00194	mg/Kg	1				
Toluene	ND	0.00194	mg/Kg	1				
Surr: Chlorobenzene	102	67.1-117	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-4
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 10:50
Lab ID:	0603039-04C	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
HALOGENATED VOLATILE ORGANICS				**SW5035**	**SW8260B**			
1,1,1-Trichloroethane	ND	0.00893	mg/Kg	1	3/8/06	3/8/2006 3:12:00 PM	13144	
1,1,2,2-Tetrachloroethane	ND	0.00893	mg/Kg	1				
1,1,2-Trichloroethane	ND	0.00893	mg/Kg	1				
1,1-Dichloroethane	ND	0.00893	mg/Kg	1				
1,1-Dichloroethene	ND	0.00893	mg/Kg	1				
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00893	mg/Kg	1				
1,2-Dibromoethane (EDB)	ND	0.00893	mg/Kg	1				
1,2-Dichlorobenzene	ND	0.00893	mg/Kg	1				
1,2-Dichloroethane	ND	0.00893	mg/Kg	1				
1,2-Dichloropropane	ND	0.00893	mg/Kg	1				
1,3-Dichlorobenzene	ND	0.00893	mg/Kg	1				
1,4-Dichlorobenzene	ND	0.00893	mg/Kg	1				
Bromodichloromethane	ND	0.00893	mg/Kg	1				
Bromoform	ND	0.00893	mg/Kg	1				
Bromomethane	ND	0.0893	mg/Kg	1				
Carbon tetrachloride	ND	0.00893	mg/Kg	1				
Chlorobenzene	ND	0.00893	mg/Kg	1				
Chloroethane	ND	0.0446	mg/Kg	1				
Chloroform	ND	0.00893	mg/Kg	1				
Chloromethane	ND	0.0446	mg/Kg	1				
cis-1,2-Dichloroethene	ND	0.00893	mg/Kg	1				
cis-1,3-Dichloropropene	ND	0.00893	mg/Kg	1				
Dibromochloromethane	ND	0.00893	mg/Kg	1				
Dichlorodifluoromethane	ND	0.0446	mg/Kg	1				
Methylene chloride	ND	0.0446	mg/Kg	1				
Tetrachloroethene	ND	0.00893	mg/Kg	1				
trans-1,2-Dichloroethene	ND	0.00893	mg/Kg	1				
trans-1,3-Dichloropropene	ND	0.00893	mg/Kg	1				
Trichloroethene	ND	0.00893	mg/Kg	1				
Trichlorofluoromethane	ND	0.00893	mg/Kg	1				
Vinyl chloride	ND	0.0446	mg/Kg	1				
Surr: 1,2-Dichloroethane-d4	99.1	58.3-156	%REC	1				
Surr: 4-Bromofluorobenzene	107	72.1-156	%REC	1				
Surr: Dibromofluoromethane	91.0	63.2-149	%REC	1				
Surr: Toluene-d8	104	70.5-145	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-5
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:10
Lab ID:	0603039-05A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
DIESEL/ RESIDUAL RANGE ORGANICS (DRO/RRO)				**SW3550A**	**SW8015M**			
DRO	***25.5***	16.6	mg/Kg-dry	2	3/7/06	3/16/2006 4:43:00 PM	13125	D09
RRO	***98.9***	50.0	mg/Kg-dry	2				
Surr: O-Terphenyl	67.0	34.7-135	%REC	2				
FLAMMABILITY						**ASTM D4982-95B**		
Flammability	***Neg***	0	Pos/Neg	1	3/15/06	3/15/2006 11:05:00 A	R32219	
ICP METALS, TCLP LEACHED				**SW3015**	**SW1311/6010B**			
Arsenic	ND	0.500	mg/L	1	3/14/06	3/14/2006 7:08:26 PM	13178	
Barium	ND	1.00	mg/L	1				
Cadmium	ND	0.0500	mg/L	1				
Chromium	ND	0.100	mg/L	1				
Lead	ND	0.200	mg/L	1				
Selenium	ND	0.500	mg/L	1				
Silver	ND	0.200	mg/L	1				
ICP METALS-RCRA, TOTAL				**SW3050A**	**SW6010B**			
Arsenic	***8.62***	5.75	mg/Kg-dry	1	3/8/06	3/9/2006 2:33:06 PM	13140	
Barium	***33.1***	11.5	mg/Kg-dry	1				
Cadmium	***10.6***	2.30	mg/Kg-dry	1				
Chromium	***117***	5.75	mg/Kg-dry	1				
Lead	***56.5***	11.5	mg/Kg-dry	1				
Selenium	ND	11.5	mg/Kg-dry	1				
Silver	ND	5.75	mg/Kg-dry	1				
MERCURY, TCLP LEACHED				**SW7470**	**SW1311/7470**			
Mercury	ND	0.00250	mg/L	1	3/16/06	3/17/2006 12:26:00 PM	13190	
MERCURY, TOTAL				**SW7471**	**SW7471**			
Mercury	***1.82***	0.0759	mg/Kg	5	3/20/06	3/20/2006 5:13:00 PM	13200	
PAH BY EPA 8270 SIM				**SW3550A**	**SW8270C**			
Acenaphthene	ND	0.131	mg/Kg	20	3/8/06	3/9/2006 11:25:07 PM	13134	
Benzo(a)pyrene	ND	0.131	mg/Kg	20				
Fluoranthene	***0.169***	0.131	mg/Kg	20				
Naphthalene	ND	0.131	mg/Kg	20				
Surr: 2-Fluorobiphenyl	74.0	30-115	%REC	20				
Surr: 4-Terphenyl-d14	74.6	18-137	%REC	20				
Surr: Nitrobenzene-d5	67.4	23-120	%REC	20				

Qualifiers

ND - Not Detected at the Reporting Limit
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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-5
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:10
Lab ID:	0603039-05A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
PCBS IN SOIL OR SOLID WASTE					**SW3550**	**SW8082**		**C01**
Aroclor 1016	ND	0.0326	mg/Kg	1	3/7/06	3/9/2006 12:05:00 AM	13131	
Aroclor 1221	ND	0.0651	mg/Kg	1				
Aroclor 1232	ND	0.0326	mg/Kg	1				
Aroclor 1242	ND	0.0326	mg/Kg	1				
Aroclor 1248	ND	0.0326	mg/Kg	1				
Aroclor 1254	ND	0.0326	mg/Kg	1				
Aroclor 1260	***0.184***	0.0326	mg/Kg	1				
Surr: Decachlorobiphenyl	67.2	24-154	%REC	1				
PERCENT MOISTURE						**SW3550**		
Percent Moisture	***20.3***	0.100	wt%	1	3/13/06	3/14/2006 8:15:00 AM	R32221	

Qualifiers

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-5
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:10
Lab ID:	0603039-05B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
GASOLINE RANGE ORGANICS (GRO)/BTEX				**SW5035**	**SW8015B/8021B**			
Benzene	ND	0.00175	mg/Kg	1	3/7/06	3/7/2006 2:10:00 PM	13136	
Ethylbenzene	ND	0.00175	mg/Kg	1				
GRO	ND	1.75	mg/Kg	1				
m,p-Xylene	ND	0.00349	mg/Kg	1				
o-Xylene	ND	0.00175	mg/Kg	1				
Toluene	ND	0.00175	mg/Kg	1				
Surr: Chlorobenzene	111	67.1-117	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-5
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:10
Lab ID:	0603039-05C	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
HALOGENATED VOLATILE ORGANICS				**SW5035**	**SW8260B**			
1,1,1-Trichloroethane	ND	0.00933	mg/Kg	1	3/8/06	3/8/2006 3:50:00 PM	13144	
1,1,2,2-Tetrachloroethane	ND	0.00933	mg/Kg	1				
1,1,2-Trichloroethane	ND	0.00933	mg/Kg	1				
1,1-Dichloroethane	ND	0.00933	mg/Kg	1				
1,1-Dichloroethene	ND	0.00933	mg/Kg	1				
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00933	mg/Kg	1				
1,2-Dibromoethane (EDB)	ND	0.00933	mg/Kg	1				
1,2-Dichlorobenzene	ND	0.00933	mg/Kg	1				
1,2-Dichloroethane	ND	0.00933	mg/Kg	1				
1,2-Dichloropropane	ND	0.00933	mg/Kg	1				
1,3-Dichlorobenzene	ND	0.00933	mg/Kg	1				
1,4-Dichlorobenzene	ND	0.00933	mg/Kg	1				
Bromodichloromethane	ND	0.00933	mg/Kg	1				
Bromoform	ND	0.00933	mg/Kg	1				
Bromomethane	ND	0.0933	mg/Kg	1				
Carbon tetrachloride	ND	0.00933	mg/Kg	1				
Chlorobenzene	ND	0.00933	mg/Kg	1				
Chloroethane	ND	0.0466	mg/Kg	1				
Chloroform	ND	0.00933	mg/Kg	1				
Chloromethane	ND	0.0466	mg/Kg	1				
cis-1,2-Dichloroethene	ND	0.00933	mg/Kg	1				
cis-1,3-Dichloropropene	ND	0.00933	mg/Kg	1				
Dibromochloromethane	ND	0.00933	mg/Kg	1				
Dichlorodifluoromethane	ND	0.0466	mg/Kg	1				
Methylene chloride	ND	0.0466	mg/Kg	1				
Tetrachloroethene	ND	0.00933	mg/Kg	1				
trans-1,2-Dichloroethene	ND	0.00933	mg/Kg	1				
trans-1,3-Dichloropropene	ND	0.00933	mg/Kg	1				
Trichloroethene	ND	0.00933	mg/Kg	1				
Trichlorofluoromethane	ND	0.00933	mg/Kg	1				
Vinyl chloride	ND	0.0466	mg/Kg	1				
Surr: 1,2-Dichloroethane-d4	97.7	58.3-156	%REC	1				
Surr: 4-Bromofluorobenzene	112	72.1-156	%REC	1				
Surr: Dibromofluoromethane	90.7	63.2-149	%REC	1				
Surr: Toluene-d8	103	70.5-145	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-6
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:25
Lab ID:	0603039-06A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
DIESEL/ RESIDUAL RANGE ORGANICS (DRO/RRO)				**SW3550A**	**SW8015M**			
DRO	***31.7***	18.9	mg/Kg-dry	2	3/7/06	3/16/2006 1:48:00 PM	13125	D09
RRO	***109***	56.9	mg/Kg-dry	2				
Surr: O-Terphenyl	72.3	34.7-135	%REC	2				
FLAMMABILITY						**ASTM D4982-95B**		
Flammability	***Neg***	0	Pos/Neg	1	3/15/06	3/15/2006 11:05:00 A	R32219	
ICP METALS, TCLP LEACHED				**SW3015**	**SW1311/6010B**			
Arsenic	ND	0.500	mg/L	1	3/14/06	3/14/2006 7:13:00 PM	13178	
Barium	ND	1.00	mg/L	1				
Cadmium	ND	0.0500	mg/L	1				
Chromium	ND	0.100	mg/L	1				
Lead	ND	0.200	mg/L	1				
Selenium	ND	0.500	mg/L	1				
Silver	ND	0.200	mg/L	1				
ICP METALS-RCRA, TOTAL				**SW3050A**	**SW6010B**			
Arsenic	***10.6***	6.29	mg/Kg-dry	1	3/8/06	3/9/2006 2:37:56 PM	13140	
Barium	***75.4***	12.6	mg/Kg-dry	1				
Cadmium	***8.77***	2.52	mg/Kg-dry	1				
Chromium	***97.1***	6.29	mg/Kg-dry	1				
Lead	***133***	12.6	mg/Kg-dry	1				
Selenium	ND	12.6	mg/Kg-dry	1				
Silver	ND	6.29	mg/Kg-dry	1				
MERCURY, TCLP LEACHED				**SW7470**	**SW1311/7470**			
Mercury	ND	0.00250	mg/L	1	3/16/06	3/17/2006 12:28:00 PM	13190	
MERCURY, TOTAL				**SW7471**	**SW7471**			
Mercury	***0.453***	0.0188	mg/Kg	1	3/20/06	3/20/2006 4:59:00 PM	13200	
PAH BY EPA 8270 SIM				**SW3550A**	**SW8270C**			
Acenaphthene	ND	0.0651	mg/Kg	10	3/8/06	3/9/2006 9:41:16 PM	13134	
Benzo(a)pyrene	ND	0.0651	mg/Kg	10				
Fluoranthene	ND	0.0651	mg/Kg	10				
Naphthalene	ND	0.0651	mg/Kg	10				
Surr: 2-Fluorobiphenyl	80.8	30-115	%REC	10				
Surr: 4-Terphenyl-d14	81.1	18-137	%REC	10				
Surr: Nitrobenzene-d5	75.6	23-120	%REC	10				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-6
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:25
Lab ID:	0603039-06A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
PCBS IN SOIL OR SOLID WASTE					**SW3550**	**SW8082**		**C01**
Aroclor 1016	ND	0.0333	mg/Kg	1	3/7/06	3/9/2006 1:22:00 AM	13131	
Aroclor 1221	ND	0.0667	mg/Kg	1				
Aroclor 1232	ND	0.0333	mg/Kg	1				
Aroclor 1242	ND	0.0333	mg/Kg	1				
Aroclor 1248	ND	0.0333	mg/Kg	1				
Aroclor 1254	ND	0.0333	mg/Kg	1				
Aroclor 1260	*0.0532*	0.0333	mg/Kg	1				
Surr: Decachlorobiphenyl	80.3	24-154	%REC	1				
PERCENT MOISTURE						**SW3550**		
Percent Moisture	*29.7*	0.100	wt%	1	3/13/06	3/14/2006 8:15:00 AM	R32221	

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-6
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:25
Lab ID:	0603039-06B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
GASOLINE RANGE ORGANICS (GRO)/BTEX				**SW5035**	**SW8015B/8021B**			
Benzene	ND	0.00189	mg/Kg	1	3/7/06	3/7/2006 2:41:00 PM	13136	
Ethylbenzene	ND	0.00189	mg/Kg	1				
GRO	ND	1.89	mg/Kg	1				
m,p-Xylene	ND	0.00377	mg/Kg	1				
o-Xylene	ND	0.00189	mg/Kg	1				
Toluene	ND	0.00189	mg/Kg	1				
Surr: Chlorobenzene	102	67.1-117	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-6
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:25
Lab ID:	0603039-06C	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
HALOGENATED VOLATILE ORGANICS				**SW5035**	**SW8260B**			
1,1,1-Trichloroethane	ND	0.00942	mg/Kg	1	3/8/06	3/8/2006 4:28:00 PM	13144	
1,1,2,2-Tetrachloroethane	ND	0.00942	mg/Kg	1				
1,1,2-Trichloroethane	ND	0.00942	mg/Kg	1				
1,1-Dichloroethane	ND	0.00942	mg/Kg	1				
1,1-Dichloroethene	ND	0.00942	mg/Kg	1				
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00942	mg/Kg	1				
1,2-Dibromoethane (EDB)	ND	0.00942	mg/Kg	1				
1,2-Dichlorobenzene	ND	0.00942	mg/Kg	1				
1,2-Dichloroethane	ND	0.00942	mg/Kg	1				
1,2-Dichloropropane	ND	0.00942	mg/Kg	1				
1,3-Dichlorobenzene	ND	0.00942	mg/Kg	1				
1,4-Dichlorobenzene	ND	0.00942	mg/Kg	1				
Bromodichloromethane	ND	0.00942	mg/Kg	1				
Bromoform	ND	0.00942	mg/Kg	1				
Bromomethane	ND	0.0942	mg/Kg	1				
Carbon tetrachloride	ND	0.00942	mg/Kg	1				
Chlorobenzene	ND	0.00942	mg/Kg	1				
Chloroethane	ND	0.0471	mg/Kg	1				
Chloroform	ND	0.00942	mg/Kg	1				
Chloromethane	ND	0.0471	mg/Kg	1				
cis-1,2-Dichloroethene	ND	0.00942	mg/Kg	1				
cis-1,3-Dichloropropene	ND	0.00942	mg/Kg	1				
Dibromochloromethane	ND	0.00942	mg/Kg	1				
Dichlorodifluoromethane	ND	0.0471	mg/Kg	1				
Methylene chloride	ND	0.0471	mg/Kg	1				
Tetrachloroethene	ND	0.00942	mg/Kg	1				
trans-1,2-Dichloroethene	ND	0.00942	mg/Kg	1				
trans-1,3-Dichloropropene	ND	0.00942	mg/Kg	1				
Trichloroethene	ND	0.00942	mg/Kg	1				
Trichlorofluoromethane	ND	0.00942	mg/Kg	1				
Vinyl chloride	ND	0.0471	mg/Kg	1				
Surr: 1,2-Dichloroethane-d4	92.6	58.3-156	%REC	1				
Surr: 4-Bromofluorobenzene	97.2	72.1-156	%REC	1				
Surr: Dibromofluoromethane	86.4	63.2-149	%REC	1				
Surr: Toluene-d8	95.2	70.5-145	%REC	1				

Qualifiers

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-7
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:45
Lab ID:	0603039-07A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
DIESEL/ RESIDUAL RANGE ORGANICS (DRO/RRO)				**SW3550A**	**SW8015M**			
DRO	***281***	198	mg/Kg-dry	20	3/7/06	3/16/2006 5:18:00 PM	13125	D09
RRO	***1140***	594	mg/Kg-dry	20				
Surr: O-Terphenyl	87.4	34.7-135	%REC	20				
FLAMMABILITY						**ASTM D4982-95B**		
Flammability	***Neg***	0	Pos/Neg	1	3/15/06	3/15/2006 11:05:00 A	R32219	
ICP METALS, TCLP LEACHED				**SW3015**	**SW1311/6010B**			
Arsenic	ND	0.500	mg/L	1	3/14/06	3/14/2006 7:17:34 PM	13178	
Barium	ND	1.00	mg/L	1				
Cadmium	ND	0.0500	mg/L	1				
Chromium	ND	0.100	mg/L	1				
Lead	ND	0.200	mg/L	1				
Selenium	ND	0.500	mg/L	1				
Silver	ND	0.200	mg/L	1				
ICP METALS-RCRA, TOTAL				**SW3050A**	**SW6010B**			
Arsenic	***6.75***	4.13	mg/Kg	1	3/8/06	3/9/2006 5:43:17 PM	13141	
Barium	***103***	8.26	mg/Kg	1				
Cadmium	***6.36***	1.65	mg/Kg	1				
Chromium	***57.0***	4.13	mg/Kg	1				
Lead	***333***	8.26	mg/Kg	1				
Selenium	ND	8.26	mg/Kg	1				
Silver	ND	4.13	mg/Kg	1				
MERCURY, TCLP LEACHED				**SW7470**	**SW1311/7470**			
Mercury	ND	0.00250	mg/L	1	3/16/06	3/17/2006 12:29:00 PM	13190	
MERCURY, TOTAL				**SW7471**	**SW7471**			
Mercury	***2.02***	0.0779	mg/Kg	5	3/20/06	3/20/2006 5:15:00 PM	13200	
PAH BY EPA 8270 SIM				**SW3550A**	**SW8270C**			
Acenaphthene	ND	0.128	mg/Kg	20	3/8/06	3/9/2006 10:15:54 PM	13134	
Benzo(a)pyrene	ND	0.128	mg/Kg	20				
Fluoranthene	ND	0.128	mg/Kg	20				
Naphthalene	ND	0.128	mg/Kg	20				
Surr: 2-Fluorobiphenyl	79.8	30-115	%REC	20				
Surr: 4-Terphenyl-d14	80.1	18-137	%REC	20				
Surr: Nitrobenzene-d5	70.7	23-120	%REC	20				

Qualifiers

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B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-7
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:45
Lab ID:	0603039-07A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
PCBS IN SOIL OR SOLID WASTE					**SW3550**	**SW8082**		**C01**
Aroclor 1016	ND	0.0322	mg/Kg	1	3/7/06	3/9/2006 1:47:00 AM	13131	
Aroclor 1221	ND	0.0643	mg/Kg	1				
Aroclor 1232	ND	0.0322	mg/Kg	1				
Aroclor 1242	ND	0.0322	mg/Kg	1				
Aroclor 1248	ND	0.0322	mg/Kg	1				
Aroclor 1254	ND	0.0322	mg/Kg	1				
Aroclor 1260	***0.285***	0.0322	mg/Kg	1				
Surr: Decachlorobiphenyl	79.6	24-154	%REC	1				
PERCENT MOISTURE						**SW3550**		
Percent Moisture	***32.7***	0.100	wt%	1	3/13/06	3/14/2006 8:15:00 AM	R32221	

Qualifiers

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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-7
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:45
Lab ID:	0603039-07B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
GASOLINE RANGE ORGANICS (GRO)/BTEX				**SW5035**	**SW8015B/8021B**			
Benzene	ND	0.00179	mg/Kg	1	3/7/06	3/7/2006 3:13:00 PM	13136	
Ethylbenzene	ND	0.00179	mg/Kg	1				
GRO	ND	1.79	mg/Kg	1				
m,p-Xylene	ND	0.00358	mg/Kg	1				
o-Xylene	ND	0.00179	mg/Kg	1				
Toluene	ND	0.00179	mg/Kg	1				
Surr: Chlorobenzene	104	67.1-117	%REC	1				

Qualifiers

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B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Mar 21, 2006*

Result Summary

Client:	Element Environmental	**Client Sample ID:**	PIER 29-7
Work Order:	0603039	**Tag Number:**	
Project:	Pier 29 Site	**Collection Date:**	03/06/2006 11:45
Lab ID:	0603039-07C	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyze	Batch ID	Qual Notes
HALOGENATED VOLATILE ORGANICS				**SW5035**	**SW8260B**			
1,1,1-Trichloroethane	ND	0.00839	mg/Kg	1	3/8/06	3/8/2006 5:06:00 PM	13144	
1,1,2,2-Tetrachloroethane	ND	0.00839	mg/Kg	1				
1,1,2-Trichloroethane	ND	0.00839	mg/Kg	1				
1,1-Dichloroethane	ND	0.00839	mg/Kg	1				
1,1-Dichloroethene	ND	0.00839	mg/Kg	1				
1,2-Dibromo-3-chloropropane (DBCP)	ND	0.00839	mg/Kg	1				
1,2-Dibromoethane (EDB)	ND	0.00839	mg/Kg	1				
1,2-Dichlorobenzene	ND	0.00839	mg/Kg	1				
1,2-Dichloroethane	ND	0.00839	mg/Kg	1				
1,2-Dichloropropane	ND	0.00839	mg/Kg	1				
1,3-Dichlorobenzene	ND	0.00839	mg/Kg	1				
1,4-Dichlorobenzene	ND	0.00839	mg/Kg	1				
Bromodichloromethane	ND	0.00839	mg/Kg	1				
Bromoform	ND	0.00839	mg/Kg	1				
Bromomethane	ND	0.0839	mg/Kg	1				
Carbon tetrachloride	ND	0.00839	mg/Kg	1				
Chlorobenzene	ND	0.00839	mg/Kg	1				
Chloroethane	ND	0.0419	mg/Kg	1				
Chloroform	ND	0.00839	mg/Kg	1				
Chloromethane	ND	0.0419	mg/Kg	1				
cis-1,2-Dichloroethene	ND	0.00839	mg/Kg	1				
cis-1,3-Dichloropropene	ND	0.00839	mg/Kg	1				
Dibromochloromethane	ND	0.00839	mg/Kg	1				
Dichlorodifluoromethane	ND	0.0419	mg/Kg	1				
Methylene chloride	ND	0.0419	mg/Kg	1				
Tetrachloroethene	ND	0.00839	mg/Kg	1				
trans-1,2-Dichloroethene	ND	0.00839	mg/Kg	1				
trans-1,3-Dichloropropene	ND	0.00839	mg/Kg	1				
Trichloroethene	ND	0.00839	mg/Kg	1				
Trichlorofluoromethane	ND	0.00839	mg/Kg	1				
Vinyl chloride	ND	0.0419	mg/Kg	1				
Surr: 1,2-Dichloroethane-d4	90.2	58.3-156	%REC	1				
Surr: 4-Bromofluorobenzene	106	72.1-156	%REC	1				
Surr: Dibromofluoromethane	84.6	63.2-149	%REC	1				
Surr: Toluene-d8	101	70.5-145	%REC	1				

Qualifiers

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B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

99-193 Aiea Heights Drive, Suite 121 Aiea, Hawaii 96701-3900
Telephone: (808)486-LABS (5227) Fax: (808)486-2456 E-mail: info@oceanic-labs.com

LABORATORY USE ONLY
LAB JOB NO. 0603039
LOCATION
CONTAINERS

Chain of Custody / Analysis Request Form

Report To: Element Environmental
Company Name: Ryan Yamauchi
Address:
City: State: ZIP:
Phone: 961-3952 Fax:
Sampler: # of Samples in Shipment: 7

Project Identification
Job Name: Pier 29 Site
Job Number:
P.O Number:
Date of Sample Shipment: 3-6-06
Date Results Needed: std

Indicate Analysis Requested

Item No	Client Sample I.D.	COMP	GRAB	Matrix: Water	Soil	Wastewater	Drinking water	Sludge	Liquid	Solid	Oil	Other	Preservation Method	Sampling: Date	Time	Number of Containers	Total Metals (9 RCRA)	TCLP Metals	Ignitability (ASTM D4982)	Moisture Content	TPH as Gasoline, Diesel, Oil (8015 B, M)	BTEX (8020)	PAH (8270C)	PCBs (8082)	Halogenated VOCs (8260B)	Laboratory No.
1	Pier 29-1	X			X									3/6/06	8:35	8	X	X	X	X	X	X	X	X	X	0603039-01
2	Pier 29-2	X			X									3/6/06	9:05	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	-02
3	Pier 29-3	X			X									3/6/06	10:35	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	-03
4	Pier 29-4	X			X									3/6/06	10:50	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	-04
5	Pier 29-5	X			X									3/6/06	11:10	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	-05
6	Pier 29-6	X			X									3/6/06	11:25	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	-06
7	Pier 29-7	X			X									3/6/06	11:45	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	-07
8																										
9																										
10																										

Released by (Print/Signature)	Date / Time Released	Delivery Method	Received by (Print/Signature)	Company / Agency Affiliation	Date / Time Received	Condition Noted
Steve Spengler	3/6/06 1117	hand	Laurie Elder	OAL	3/6/06 1117	0-2°C intact/wet
	/				/	
	/				/	

Comments.

Please Check Box
☐ Dispose by Lab
☐ Return to Client
☐ Archive

White – Oceanic Analytical Yellow – Oceanic Analytical Pink – Client

APPENDIX 2

SITE CHARACTERIZATION REPORT,

PIER 29,

Kimura International,

DECEMBER 2004

SITE CHARACTERIZATION REPORT

PIER 29, HONOLULU HARBOR
739 NORTH NIMITZ HIGHWAY
HONOLULU, HAWAII

TMK: (1) 1-5-038: PARCEL 2 (Portion)

Prepared for:

The State of Hawaii
Department of Transportation - Harbors Division
79 South Nimitz Highway
Honolulu, Hawaii 96813

Prepared by:

KIMURA INTERNATIONAL, INC.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, HI 96814

December 2004

SITE CHARACTERIZATION REPORT

PIER 29
HONOLULU HARBOR
739 NORTH NIMITZ HIGHWAY
HONOLULU, HAWAII 96817
TMK: (1) 5-38:002

Prepared For:

STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION
79 South Nimitz Highway
Honolulu, Hawaii 96813

Prepared By:

KIMURA INTERNATIONAL, INC.
1600 Kapiolani Boulevard, Suite 1610
Honolulu, Hawaii 96814
Tel: (808) 944-8848

December 2004

TABLE OF CONTENTS

1.0 CERTIFICATIONS AND LIMITATIONS 1

2.0 EXECUTIVE SUMMARY 2

3.0 INTRODUCTION 5
3.1 Purpose 5

4.0 BACKGROUND 6
4.1 Site Description 6
4.2 Soil Gas Survey 6
4.3 Geology and Hydrogeology 6
4.3.1 Regional Geology 6
4.3.2 Site Geology 7
4.3.3 Regional Hydrogeology 7
4.3.4 Site Hydrogeology 7

5.0 SITE CHARACTERIZATION ACTIVITIES 8
5.1 Soil Boring Activities 8
5.2 Monitoring Well Installation 8
5.3 Field Analysis 8
5.4 Soil Sampling and Analysis 9
5.5 Groundwater Sampling and Analysis 9
5.6 GPS Mapping 10

6.0 SITE CHARACTERIZATION RESULTS 11
6.1 Physical Results 11
6.2 PID Results 11
6.3 Soil Analytical Results 11
6.4 Groundwater Analytical Results 12

7.0 CONCLUSIONS AND RECOMMENDATIONS 13

8.0 REFERENCES 16

APPENDICES

Appendix A: Tables
Appendix B: Figures
Appendix C: Boring Logs
Appendix D: Photographic Documentation
Appendix E: Laboratory Analytical Report and Chain of Custody

1.0 CERTIFICATION AND LIMITATIONS

Kimura International, Inc. (Kimura International) has completed this Site Characterization Report for the project site. Kimura International's findings are based on research, site observations, government regulations, and laboratory data, which were gathered at the time and location of the study. Even with such extensive investigative efforts, the firm cannot dismiss the possibility that parts of the site may be chemically affected.

Kimura International makes 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 the State of Hawaii Department of Transportation – Harbors Division 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 the undersigned.

Prepared By: Virgil Kong
Virgil Kong
Environmental Scientist

Date: 12-14-04

Reviewed By: Bryce Hataoka
Bryce Hataoka
Project Manager

Date: 12/14/04

2.0 EXECUTIVE SUMMARY

Kimura International, Inc. (KI) has prepared this Site Characterization Report for the State of Hawaii Department of Transportation – Harbors Division (DOT-H) to document the environmental investigation activities conducted at Pier 29 of the Honolulu Harbor, 739 North Nimitz Highway, Honolulu Hawaii (Site). The project area was limited to the southern most portion of the Pier 29 along the Honolulu Harbor.

In May 2003, KI conducted a soil gas survey at the project site. A total of twenty (20) sample locations were chosen based on a grid system. The samples were collected from a depth of 4-feet below ground surface (bgs) and analyzed for volatile organic compounds (VOCs), benzene, toluene, ethylbenzene, xylenes (BTEX), total volatile hydrocarbons (TVH) and methane. The sample results indicated that two soil gas samples along the western border adjacent to the Chevron and Shell facilities contained at least one contaminant above the method detection limits. Additionally, a third soil gas sample located towards the northeast portion of the project area contained detectable levels of xylenes. The purpose of the soil gas survey was to determine areas of contamination in order to accurately position subsequent soil borings and monitoring wells for the site characterization.

On January 15, 2004, KI and Environmental Services Network (ESN) commenced the site characterization activities. A total of ten (10) soil borings (SB-1 through SB-10) were advanced around the suspect areas of contamination identified in the previous soil gas survey. Borings were advanced to the level of the capillary fringe. Two soil samples were collected from each boring. The first sample was collected at depths between 2.5 to 3.5 feet bgs and the deeper sample was collected from between 4.5 to 6 feet bgs. Soil samples collected from boring locations SB-1 and SB-2 were taken from a couple feet deeper because ground level at those locations was at a higher elevation.

During the soil boring activities, the soil was examined for olfactory and visual signs of petroleum contamination. Slight to strong petroleum odors were observed on the soil retrieved from below 3.5 feet bgs in various borings. The photoionization detector (PID) confirmed the presence of volatile organic vapors with readings greater than 2,000 ppm in SB-6 and SB-7.

All soil samples were analyzed for total petroleum hydrocarbons (TPH)-gasoline, TPH-diesel, TPH-oil, BTEX, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and the eight (8) Resource Conservation and Recovery Act (RCRA) Metals. Laboratory results indicated that lead was present above the State of Hawaii Department of Health (DOH) Tier 1 Soil Action Levels (SALs) of 400 mg/kg in samples SB-3a, SB-7a and SB-10a. The Tier 1 SALs corresponds to the United States Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRGs) for residential land use for lead. However, the levels of lead are below the PRGs for industrial land use of 750 mg/kg. All other soil sample results were below the DOH SALs or the EPA PRGs.

Four of the soil borings (SB-1, SB-3, SB-7 and SB-10) were converted to 1-inch temporary groundwater monitoring wells. The monitoring wells were positioned around the corners of the project area. Six-inches of free product was discovered on the groundwater surface in MW-4 and half an inch of product was observed in MW-2 and MW-3. One groundwater sample was collected from each well. All groundwater samples except sample MW-4 were analyzed for TPH-gasoline, TPH-diesel, TPH-oil, BTEX, PAHs, PCBs, and eight (8) RCRA Metals. Due to the amount of free product found in MW-4, sample MW-4 was analyzed for PCBs only. Laboratory results indicated that ethylbenzene levels in MW-2 and MW-3 were above the DOH Tier 1 Groundwater Action Levels (GALs). In addition, PCB-1260 was detected above the DOH GALs in MW-3. All other sample results were below the DOH action levels or the DOH Water Quality Standards for Chronic Toxicity in saltwater bodies.

Lead was present above or equal to the DOH action level in three locations (SB-3, SB-7 and SB-10) at shallow depths. These pockets of elevated lead appear to be in random locations. There is no correlation between the presence of lead and the presence of petroleum. It is possible areas of the project site may contain lead at concentrations above 750 mg/kg. KI recommends further soil sampling to locate areas of high lead concentrations. Another option to determine lead content is to field screen the soil during construction activities using an X-ray Fluorescence Analyzer.

Laboratory results suggest that the soil at the capillary fringe in the vicinity of the MW-2, MW-3 and MW-4 do not contain petroleum associated contaminants above the action levels. However, since free product was observed in those wells, it is expected that the soil should be impacted by the petroleum product due to smearing during tidal fluctuations. If future development plans include disturbing the soil in the capillary fringe around MW-2, MW-3 and MW-4, this soil should be segregated and managed as contaminated.

Contaminated soil can be stockpiled in a management area that is lined and covered with polyethylene sheeting and bermed to prevent stormwater runon/runoff. The stockpile could then be sampled at a later date to confirm contaminant levels dropped to below DOH Tier 1 action levels. Once below action level concentrations, the soil can be reused on-site as fill material. If the petroleum soil is to be disposed at a local landfill, the soil must be profiled, sampled and analyzed according to the landfill requirements. Petroleum impacted soil intended for reuse at an off-site location must comply with the DOH Office of Solid and Hazardous Waste Management guidelines.

Free product was observed on the groundwater surface in wells MW-2, MW-3 and MW-4. Approximately six-inches of product was observed in MW-4 and half an inch of product in MW-2 and MW-3. Ethylbenzene was found in MW-2 and MW-3 above the DOH GALs. Additionally, PCB-1260 was detected in MW-3 above the DOH GALs.

Previous investigations conducted in 1991 had reported two distinct plumes. At the southern (makai) end, the product was viscous with lower lead content and containing

PCBs. The product at the northern (mauka) end was less viscous, with a higher lead content and did not contain PCBs. Based on the groundwater analytical results of this investigation, there appears to be different contaminant plumes. PCBs were contained in the product at the northwest portion of the project area only. MW-3 contained relatively higher concentrations of TPH-diesel compared to TPH-gasoline. On the other hand, MW-2 contained higher concentrations of gasoline range petroleum hydrocarbons to the diesel range hydrocarbons. However, a distinct separation of plumes was not determined. The physical properties of the product found in MW-2, MW-3 and MW-4 appeared to be similar.

If future development involves dewatering activities, the groundwater should be treated as contaminated with petroleum constituents including PCBs. Dewatering in an excavation tends to lower the surrounding water table and draw groundwater/product into the depression. Installing sheet piling within the trench should restrict the free product from entering the trench unless the pump rate lowers the water table to below the sheet piling. Any petroleum impacted groundwater that is pumped from the trench should be processed through an oil/water separator. The separated petroleum product should then be disposed of appropriately.

The treated groundwater may be returned to the subsurface; however, the groundwater situated around the injection point will be influenced. Migration of petroleum plumes can further impact the project area. If approved by the DOH Clean Water Branch and the required permits are obtained, the treated and monitored water could be disposed of in a nearby storm drain.

3.0 INTRODUCTION

Kimura International was contracted by the State of Hawaii Department of Transportation – Harbors Division (DOTH) to characterize the extent of petroleum contamination located at Pier 29 of the Honolulu Harbor, 739 North Nimitz Highway, Honolulu, HI. The project area was limited to the southern end of the property along the Honolulu Harbor, an area approximately 100 feet by 145 feet. The proposed scope of work planned for the described area includes extending Pier 29 to connect with Pier 30.

All Site Characterization activities were performed in accordance with the State of Hawaii, Department of Health (DOH), Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan, December 1996. Specifically, Kimura International completed the following tasks:

- Developed a Work Plan, Field Sampling Plan, and Site Safety and Health Plan;
- Subcontracted ESN Pacific to utilize direct-push technology for soil boring advancement and groundwater monitoring well installation;
- Monitored the advancement of ten (10) soil borings to the depth of groundwater;
- Utilized a PID to monitor for volatile organic compounds in the soil headspace;
- Collected one (1) soil sample from each boring at 3 to 4 feet bgs and a second soil sample at the soil/groundwater interface;
- Converted four (4) soil borings into temporary groundwater monitoring wells;
- Examined the groundwater for visual and olfactory signs of contamination;
- Developed and purged the newly installed wells;
- Gathered water quality data during the well purging;
- Collected one (1) groundwater sample from each newly installed well;
- Analyzed all soil and groundwater samples for TPH-gasoline, TPH-diesel, TPH-oil, BTEX, PAHs, PCBs, and RCRA 8 Metals; and
- Prepared this report documenting the field activities and results of the investigation including maps, photographs, and analytical result.

3.1 Purpose

Results of the soil gas survey conducted by Kimura International showed three locations about the project site as potentially contaminated. The purpose of this investigation was to determine the horizontal and vertical extent of subsurface contamination with respect to petroleum hydrocarbons and associated constituents found in the soil and to determine whether the groundwater has been impacted by the petroleum contamination. Findings from this investigation will be incorporated during the Pier 29 construction to address health and safety hazards and environmental concerns.

4.0 BACKGROUND

4.1 Site Description

The project site is located at Pier 29 of the Honolulu Harbor located at 739 North Nimitz Highway and identified as Tax Map Key (TMK) No. (1) 5-38: 002. The parcel encompasses 4.493 acres of land; however, the project area is limited to southern portion of the property along the Honolulu Harbor, approximately 14,500 square feet.

The property is owned by DOT-H and is currently used as a storage area for Harbor tenants. The property is bounded to the northeast by Nimitz Highway, to the southwest by Honolulu Harbor, to the northwest by a Chevron Terminal, and to the southeast by a vacant lot once occupied by Young Brothers Barge Company. The topography at the site is generally flat at an elevation of five to eight feet above mean sea level (msl). The site is located below (makai) the Underground Injection Control (UIC) line; therefore, groundwater at site is not considered suitable for drinking.

4.2 Soil Gas Survey

A soil gas survey was conducted for the project area by Kimura International on May 2, 2003. A total of twenty (20) soil gas samples were collected approximately 4 feet below ground surface. Sample locations were based on a grid system. The samples were analyzed for VOCs, BTEX compounds, TVH and methane.

Sample results indicated that petroleum hydrocarbons and/or associated compounds were detected in three of the twenty soil gas samples. Sample SG17, located along the boundary wall with the Shell and Chevron facilities, contained detectable levels of methane, BTEX, and total volatile hydrocarbons (TVH). Sample SG5, also located along the boundary wall with Shell and Chevron, was found to contain benzene and toluene above the method detection limits. Xylene was detected in sample SG19 at very low levels.

Sample locations for this site characterization were based on the results from the soil gas survey. The investigation will focus around sample SG19 and along the boundary wall with Chevron and Shell.

4.3 Geology and Hydrogeology

4.3.1 Regional Geology

The island of Oahu was formed by erosional remnants of two shield volcanoes. These are the Waianae Range to the west and the younger Koolau Range to the east. Both are the eroded remnants of shield volcanoes, and are currently long narrow ridges shaped by erosion. Lava flows from the Koolau volcano flowed into the existing slopes of the Waianae volcano to form the gently sloping surface of the Schofield Plateau. Following

a period of volcanic inactivity, volcanic activity returned and a series of lava flows, cinder cones, and tuff cones were formed. Thus, in addition to the Waianae Volcanic Series and the Koolau Volcanic Series, the most recent geological formations are from the Honolulu Volcanic Series (Macdonald, et al., 1983).

4.3.2 Site Geology

The soil at the project site is classified by the United States Department of Agriculture, Soil Conservation Service as Fill Land, mixed. This land type occurs adjacent to the ocean and consists of materials dredged from the ocean or nearby areas. This land type is used for urban development. Soils encountered during the soil boring activities consisted of fill material, fine sands, clay materials.

4.3.3 Regional Hydrogeology

The primary drinking water in the Hawaiian Islands is drawn from basal groundwater. Basal groundwater is formed by rainwater percolating down through the residual soils and permeable volcanic rock. All of the island situated below sea level, except within rift zones of the volcanoes, is saturated with ocean salt water and thus forms a basal lens called the "Ghyben-Herzberg" lens. A zone of transition between the fresh groundwater and the ocean salt water occurs due to the constant movement of the interface as a result of tidal fluctuations, seasonal fluctuations in recharge and discharge, and aquifer development (Macdonald, et al., 1983).

Downward percolation of rainwater may be stopped by impermeable layers such as dense lava flows, alluvial clay layers and volcanic ash. The groundwater then forms a perched or high level aquifer, which is not in contact with salt water. Recharge of the aquifer occurs in areas of high rainfall, which are the interior mountainous areas. The groundwater flows from the recharge areas to the areas of discharge along the shoreline. Frictional resistance to groundwater flow causes it to pile up within the island until it attains sufficient hydraulic head to overcome friction. Thus, basal groundwater tends to slope toward the shoreline.

4.3.4 Site Hydrogeology

There are two aquifers found at the project site. Both aquifers are part of the Honolulu Aquifer Sector and the Kalihi Aquifer System. The upper aquifer is classified as an unconfined basal aquifer comprised of alluvial and marine sediments. The status code for the upper aquifer indicates that groundwater is currently used though it is not used for drinking or ecologically important. Salinity is considered to be moderate. Groundwater is also considered replaceable with a high vulnerability to contamination.

The lower aquifer is classified as a confined basal aquifer with extensive horizontal lavas. Groundwater is considered to be a drinking water source with fresh salinity. The status code indicates that the groundwater is irreplaceable with a low vulnerability to contamination.

5.0 SITE CHARACTERIZATION ACTIVITIES

5.1 Soil Boring Activities

On January 15, 2004, Kimura International and ESN mobilized to the project site to conduct the site characterization activities. ESN utilized a DPT drill rig to advance ten (10) soil borings around the subject property. Boring locations were focused around the sample locations that were found to contain detectable levels of petroleum related contaminants during the May 2003 Soil Gas Survey. In addition, two additional borings were positioned along the eastern border of the project area.

Soil borings were continuously advanced to the depth of approximately 7.0 feet bgs. Soil borings SB-1 and SB-2 were advanced to a depth of 9.5 feet bgs due to higher elevations. Soil was retrieved in stainless steel sleeves that were lined within a split-spoon sampler. During the boring activities, a PID was utilized to monitor for volatile organic vapors in the soil headspace.

Two soil samples were collected from each soil boring. One sample was collected half way between ground surface and the vadose zone, approximately 2.5 to 3.5 bgs. The second sample was collected at the vadose zone, approximately 5 to 5.5 bgs. Due to higher elevations, the samples along the eastern boundary were collected at a deeper level.

5.2 Monitoring Well Installation

A total of four soil borings were converted to 1-inch temporary groundwater monitoring wells. The boring locations chosen to be converted were SB-1, SB-3, SB-7 and SB-10. Well locations were selected at the four corners of the project area.

All temporary wells consisted of a 5-foot section of slotted PVC screen and 5-foot of solid PVC casing to the surface. MW-1 was set at 11.0 feet bgs and MW-2 was set at 7.0. While MW-3 and MW-4 were both set at 9.5 feet bgs. After sample collection, the monitoring well was removed from the ground and disposed of as solid waste.

The free product on the surface of the purged water was removed using petroleum absorbent pads. The absorbent pads were disposed of as solid waste. The remaining purge water was poured back into the monitoring well. Soil cuttings generated from the drilling activities were placed back in the borehole as fill material.

5.3 Field Analysis

During the soil boring activities, the soil was inspected for visual and olfactory signs of petroleum contamination. Additionally, a PID was used to monitor for volatile organic vapors in the soil headspace. Prior to the field activities the PID was calibrated using 100 ppm isobutylene span gas. Approximately 1-cubic inch of soil was placed in a sealable

polyethylene bag and crushed through the walls of the bag. The soil was allowed to off-gas for approximately 5-minutes. The PID probe was inserted in the bag and the peak measurement was recorded. PID readings were recorded at 2.5 to 3.5 feet bgs and 5 to 5.5 feet bgs. The elevation of SB-1 and SB-2 was approximately 3 feet higher than the other soil borings. Subsequently, PID readings were recorded at 5 to 6 feet bgs and 8 to 8.5 feet bgs in soil borings SB-1 and SB-2.

5.4 Soil Sampling and Analysis

Two soil samples were collected from each boring. Sample depths were at 2.5 to 3.5 feet bgs and at 5 to 5.5 feet bgs. Due to a higher elevation, samples collected from SB-1 and SB-2 were collected at 5.5 to 6 feet bgs and 8 to 8.5 bgs. Samples were collected using stainless steel sleeves and two (2) 5-gram Encore samplers. Sample SB-1a was collected using a stainless steel sleeve only. The Encore sampler was unable to retrieve the rocky coral fill material found at sample location SB-1a.

All samples were stored in a cooler with ice and submitted to ESN along with the proper chain-of-custody. Samples were labeled with the sample identification number, project location, client name, date and time of collection, and analyses to be performed. A total of twenty (20) soil samples were analyzed for the following:

- TPH as gas, diesel, and oil via EPA method 8015b modified
- BTEX via EPA method 8021b
- PCBs via EPA method 8082
- PAHs via EPA method 8100
- RCRA 8 Metals EPA method 7000 series

Barium concentrations for all soil samples were "infinite" when analyzed by EPA method 7080. To confirm whether the barium results were false positives, all samples were re-tested for barium using ICP-MS EPA Method 6020.

All samples were extracted and analyzed within the maximum allowable holding times.

5.5 Groundwater Sampling and Analysis

One groundwater sample was collected from each of the four temporary monitoring wells installed. A minimum of three well volumes were purged from each well prior to sample collection except for MW-4. Approximately 6-inches of free product was observed in the monitoring well. The sample was collected from MW-4 without purging. Groundwater was purged using a peristaltic pump. Water quality parameters were not measured since free product was encountered during the well purging activities. The water quality instrument probe is very sensitive and used to measure pH, temperature, turbidity and conductivity in water only. Submerging the probe in petroleum product could damage the instrument.

Groundwater samples were collected with dedicated disposable bailers and poured into three (3) 40-milliliter glass vials (VOAs), two (2) 1-liter glass amber bottles, and one (1) 500-milliliter polyethylene container. The sample collected from MW-4 was placed into four (4) VOAs. Metals were filtered with a 0.45 micron filter in the field. All samples except MW-4 were analyzed for the following:

- TPH as gas, diesel, and oil via EPA method 8015b modified
- BTEX via EPA method 8021b
- PCBs via EPA method 8082
- PAHs via EPA method 8100
- RCRA 8 Metals

Sample MW-4 was analyzed for PCBs only. The amount of free product in MW-4 prevented the collection of representative groundwater sample.

All samples were stored in a cooler with ice and submitted to ESN along with the proper chain-of-custody. Samples were labeled with the sample identification number, project location, client name, date and time of collection, and analyses to be performed. Sample extraction and analysis were performed within the maximum allowable holding period.

5.6 GPS Mapping

On January 20, 2004, Kimura International returned to the project site to record exact boring locations using North American Datum (NAD) 1983 U.S. State Plane (Hawaii Zone 3) GPS coordinates. A Trimble GPS instrument was used to determine the GPS positions of the boring location and a monitoring well to act as a reference point. DOT then provided Kimura International with the coordinates for the reference monitoring well. The borehole coordinates were compensated based on the reference point coordinate. The GPS positions are presented in Table 1 in Appendix A.

6.0 SITE CHARACTERIZATION RESULTS

6.1 Physical Results

The subsurface lithology consisted of fill material from the ground surface to approximately 3 feet bgs. Fine grained sands and sandy clay material were encountered from 3 feet bgs to approximately 4 feet bgs. Dark gray clay material was observed from 4 feet bgs down to below groundwater.

No visual or olfactory evidence of petroleum contamination was observed on the soil from 0 to 4 feet. Slight petroleum odors were observed on the soil at a depth of 5 to 5.5 feet in soil borings SB-4, SB-5 and SB-8. Additionally, strong petroleum odors were observed at 5 to 5.5 feet bgs in SB-6, SB-7, and SB-10.

During well purging, the groundwater was monitored for petroleum sheen or layer. No apparent sheen was observed in MW-1. Approximately half an inch of product was observed on the groundwater while purging MW-2 and MW-3. MW-4 appeared to contain 6-inches of product. The physical properties of the product observed in MW-2, MW-3 and MW-4 appeared to be similar. The product was black with low viscosity.

6.2 PID Results

In soil borings SB-1 and SB-2, PID readings were recorded at 4.5 to 6 feet bgs and also at 8 to 8.5 feet bgs. All other readings were recorded at 3 to 3.5 feet bgs and at 5 to 5.5 feet bgs. All shallow PID readings were less than 2.0 ppm. The PID measurements collected at deeper depths ranged from 0 to greater than 2,000 ppm. Locations where PID measurements exceeded 2,000 ppm were at SB-6 and SB-7 from 5 feet bgs.

6.3 Soil Analytical Results

A total of twenty (20) soil samples were collected as part of the site characterization activities. All samples were analyzed for TPH (gasoline, diesel, and oil), BTEX, PAHs, PCBs, and RCRA 8 Metals. Sample results were compared to DOH Tier 1 SALs for site receiving less than 200 centimeters annual rainfall and where a drinking water source is not threatened. Otherwise, sample results were compared to EPA's Region 9 PRGs for residential soil.

As summarized in Table 3 of Appendix A, laboratory results indicated that several samples contained detectable levels of a particular contaminant. However, lead was the only contaminant found at levels exceeding the SALs. The PAH compounds and PCBs were not detected in any sample above the method detection limits.

TPH analyses showed that gasoline was present in samples SB-6B and SB-7B at 250 and 240 mg/kg respectively. TPH in diesel range was found in samples SB-2b, SB-4a, SB-

6b, SB-7b, SB-8a, SB-8b, and SB-9a. TPH in the oil was detected only in SB-3a at 720 mg/kg and in SB-7a at 1,400 mg/kg.

BTEX compounds were only present in two samples, SB-6b and SB-7b. Benzene and toluene were detected in SB-6b at 0.86 mg/kg for the former and at 13 mg/kg for the latter. SB-7b contained benzene at 0.4 mg/kg, toluene at 2.4 mg/kg, and xylenes at 4.8 mg/kg.

Lead was detected in all soil samples except for SB-1a and SB-10b. Only samples SB-3a, SB-7a and SB-10a contained lead at or above the DOH Tier 1 action level of 400 mg/kg but below EPA PRG for industrial land use of 750 mg/kg. Barium was detected in all samples. Chromium was detected in samples SB-1b, SB-2b, SB-4b, SB-6b, and SB-10a. Cadmium was present in samples SB-7a and SB-10a. However, barium, cadmium and chromium levels did not exceed the DOH Tier 1 SALs or EPA PRGs. All other metal concentrations were below the method detection limits.

6.4 Groundwater Analytical Results

Groundwater analytical results are presented in Table 4 of Appendix A. The sample results were compared to DOH's Tier 1 GALs for sites receiving less than 200 centimeters annual rainfall and where a drinking water source is not threatened. If a contaminant was not listed on DOH's Tier 1 Standards, the result was compared to DOH's Water Quality Standard for chronic toxicity for saltwater bodies. All samples except MW-4 were analyzed for TPH-gasoline, TPH-diesel, and TPH-oil, BTEX, PAHs, PCBs, and the RCRA 8 Metals. Sample MW-4 was analyzed for PCBs only due to the presence of a 6-inch layer of product.

All of the BTEX compounds were present in MW-2 and MW-3. However, only ethylbenzene was present in MW-2 and MW-3 above the Tier 1 GAL of 0.14 mg/kg. MW-1 did not contain and BTEX compounds above the detection limits.

PCB-1260 was found in MW-3 above the GALs. All other PCB results were below the method detection limits.

All samples analyzed for RCRA metals contained detectable levels of lead, chromium, barium, selenium, and mercury. Cadmium was the only metal not detected in any sample. Silver was present in only MW-2 and MW-3. All metal concentrations were below the regulatory limits. The DOH does not list a standard for mercury, barium, or silver.

Laboratory results indicated that TPH as gasoline, diesel, and oil was present in both MW-2 and MW-3 above the method detection limits. However, DOH does not list a standard for TPH. MW-1 did not contain TPH above the detectable limits. No PAHs were found in any sample above the detection limits.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Kimura International was retained by the State of Hawaii Department of Transportation – Harbors Division to conduct a Site Characterization Study of the southern portion of Pier 29 at the Honolulu Harbor, 739 North Nimitz Highway, Honolulu, Hawaii. The proposed scope of work at the project site includes extending Pier 29 to connect with Pier 30.

In March 2003, a soil gas survey was conducted by Kimura International at the project site as part of the first phase of the site characterization study. Based on the results from the soil gas survey, soil boring locations were selected to delineate the extent of petroleum contamination. A total of ten borings were drilled and two soil samples were collected from each boring. Additionally, four (4) temporary monitoring wells were installed at the corners of the project area in order to examine the groundwater.

Soil sampling analytical data indicated that lead was detected at concentrations above or equal to the DOH Tier 1 SALs of 400 mg/kg in borings SB-3, SB-7 and SB-10 at a depth of approximately 3 feet bgs. The areas of elevated lead appear to be in random locations and it is possible other areas about the project area contain high levels of lead. No other constituents were detected above the DOH Tier 1 SALs. It should be noted that petroleum odors and elevated PID readings were observed in borings SB-4, SB-5, SB-6, SB-7, SB-8 and SB-10 at a depth of 5 to 5.5 feet bgs.

Groundwater analytical results indicated that ethylbenzene was detected above the DOH Tier 1 GALs in MW-2 and MW-3. PCB-1260 was also detected in MW-3 above the DOH action level. During groundwater sample collection, half an inch of product was observed in both MW-2 and MW-3. Approximately 6-inches of free product was observed in MW-4. Due to the amount of product in MW-4, the sample collected from the well was analyzed for PCBs only. All other constituent levels were below the action levels.

Previous investigations at the site identified two distinct contaminant plumes. At the makai end, the product was viscous with lower lead content and containing PCBs. The product at the mauka end was less viscous, with a higher lead content and did not contain PCBs. Groundwater analytical results from this site characterization suggest the presence of different plumes. PCBs were found in MW-3 only. In addition, MW-3 contained relatively higher concentrations of TPH-D compared to TPH-G. On the other hand, MW-2 contained higher concentrations of gasoline range petroleum hydrocarbons to the diesel range hydrocarbons. However, a distinct separation of plumes was not determined. The physical properties of the product found in MW-2, MW-3 and MW-4 appeared to be similar.

Based on the laboratory results and field observations Kimura International recommends the following:

1) Although the soil is below the U.S. EPA PRG for industrial use of 750 mg/kg, further investigation may be warranted. The areas around SB-3, SB-7 and SB-10 may be further characterized for lead. A second option is to field screen the soil during construction activities with an X-ray Fluorescence Analyzer to determine lead content.

2) The soil at the capillary fringe around the boring locations SB-3, SB-7 and SB-10 should be treated as if contaminated. Free product was observed on the groundwater at those locations and the soil would be impacted through smearing during tidal fluctuations. Field observations and PID measurements indicate that the soil had been impacted to a certain degree. If future plans include disturbing or removal of this soil, it should be segregated and managed properly.

The soil could be stockpiled in a management area that is lined and covered with polyethylene sheeting and bermed to prevent stormwater runon/runoff. The stockpile could then be sampled at a later date to confirm contaminant levels dropped to below DOH Tier 1 action levels. Once below action level concentrations, the soil can be reused on-site as fill material. If the petroleum soil is to be disposed at the landfill, the soil must be profiled according to the landfill requirements.

The PVT Landfill requires that the soil be analyzed for Toxicity Characteristic Leaching Procedure (TCLP)-cadmium, TCLP-chromium, TCLP-lead, TPH-gasoline, TPH-diesel, TPH-oil, BTEX, polynuclear aromatic hydrocarbons (PAHs), BTEX, PCBs, total lead, total cadmium, halogenated volatile organic compounds (HVOCs), and ignitability. Sampling frequency is dependent on the amount of soil being disposed. At least one discreet soil sample shall be collected for every 50 tons if the quantity of soil is 200 or more tons. If the quantity of soil is less than 200 tons, at least one discreet representative soil sample per 25 tons shall be collected. Sample collection must be done in accordance with DOH UST Technical Guidance Manual and EPA SE-486. Disposal costs are $50 per ton plus a $75 handling fee per load.

Petroleum contaminated soil is accepted at the Waimanalo Gulch Landfill on a case by case basis. Representative sampling must be conducted in accordance with Test Methods for Evaluation of Solid Waste, Volume II: Field Manual, Physical/Chemical Methods, Chapter 9 (SW-846 Third Edition, 1986 EPA). Samples should be analyzed for TPH, BTEX, PCBs, ignitability, metals, and TCLP. Disposal costs are $82 per ton plus a $73 handling fee per truck load.

Petroleum impacted soil intended for reuse at an off-site location must comply with the DOH Office of Solid and Hazardous Waste Management guidelines which are more conservative than the DOH Tier 1 SALs with respect to TPH levels.

3) If future development involves dewatering activities in the areas of MW-2, MW-3 and MW-4, the groundwater should be treated as contaminated with petroleum

constituents including PCBs. Dewatering in an excavation tends to lower the surrounding water table and draw groundwater into the depression. Installing sheet piling around the excavation should restrict the free product from entering the pit unless the pump rate lowers the water table to below the sheet piling. Any petroleum impacted groundwater that is pumped from the trench should be processed through an oil/water separator. The separated petroleum product should then be disposed of appropriately.

The treated groundwater may be returned to the subsurface; however, the groundwater around the injection point will be influenced. Migration of petroleum plumes can further impact the project area. If approved by the DOH Clean Water Branch and the required permits are obtained, the treated and monitored water could be disposed of in a nearby storm drain.

4) The contractor involved in the future construction work should prepare a Health and Safety Plan to protect the workers who are in contact with the petroleum contamination. Workers should be trained in 40-hour Hazardous Waste Operations and Emergency Response.

8.0 REFERENCES

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- State of Hawaii Department of Health, "Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan, December 1996.
- U.S. Department of Agriculture Soil Conservation Service, "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii." 1972.

APPENDIX A:
TABLES

TABLE 1:
GPS COORDINATES
PIER 29 HONOLULU HARBOR

LOCATION	STATE PLANE 1983 (FEET)	
	NORTHING	EASTING
SB-1	52458.086	1683571.464
SB-2	52493.285	1683603.142
SB-3	52552.181	1683613.937
SB-4	52553.949	1683583.934
SB-5	52580.412	1683573.260
SB-6	52613.467	1683527.766
SB-7	52601.733	1683499.906
SB-8	52567.764	1683466.045
SB-9	52552.356	1683448.429
SB-10	52549.661	1683454.835
MW (reference)	52528.26	1683510.27

U.S. State Plane 1983 (Hawaii Zone 3) North American Datum 1983

TABLE 2
PID RESULTS
PIER 29 HONOLULU HARBOR

LOCATION	DEPTH (FEET BGS)	GEOLOGY	PID READING (PPM)	ODORS
SB-1	5 to 5.5	Coral	0.0	No
SB-1	8 to 8.5	Dark gray clay	0.0	No
SB-2	5.5 to 6	Fine light brown sand	0.0	No
SB-2	8 to 8.5	Black/gray sand and silt	2.5	No
SB-3	2.5 to 3	Coral sand and silt	0.0	No
SB-3	5 to 5.5	Gray clay	1.9	No
SB-4	2.5 to 3	Fine light brown sand	0.0	No
SB-4	5 to 5.5	Brown/gray clay	28.1	Slight
SB-5	2.5 to 3	Brown sandy clay	0.0	No
SB-5	5 to 5.5	Dark gray clay	37.0	Slight
SB-6	3 to 3.5	Fine light brown sand	2.0	No
SB-6	5 to 5.5	Dark gray/black clay	> 2,000	Strong
SB-7	3 to 3.5	Sandy clay fill	0.0	No
SB-7	4.5 to 5	Dark gray/black clay	> 2,000	Strong
SB-8	3 to 3.5	Coral, sand and brown clay	0.0	No
SB-8	5.5 to 6	Fine grain sand	23.5	Slight
SB-9	2.5 to 3	Fine light brown sand	0.0	No
SB-9	5 to 5.5	Gray clay	0.0	No
SB-10	3.0	Coral sand and clay mix	0.0	No
SB-10	5 to 5.5	Dark gray clay	169	Strong

TABLE 3
SOIL ANALYTICAL RESULTS
PIER 29 HONOLULU HARBOR

CONTAMINANT	DOH TIER 1 SALS	SAMPLE IDENTIFICATION									
		SB-1a	SB-1b	SB-2a	SB-2b	SB-3a	SB-3b	SB-4a	SB-4b	SB-5a	SB-5b
Fuel Scan											
TPH-Gasoline	2,000	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TPH-Diesel	5,000	< 20	< 20	< 20	61	< 20	< 20	75	< 20	< 20	< 20
TPH-Oil	5,000	< 40	< 40	< 40	< 40	720	< 40	< 40	< 40	< 40	< 40
BTEX											
Benzene	1.7	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	34	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	23	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PAHs											
Naphthalene	41	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	11	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PCBs											
PCBs	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals											
Lead	400	ND	10	11	5	**400**	16	21	15	94	16
Cadmium	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	*210	ND	20	ND	54	ND	ND	ND	20	ND	ND
Arsenic	*22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	*390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium	*5,400	61.5	39.9	29.4	48	394	44.5	76.4	39.5	34.1	50.5
Selenium	*390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	*23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

All results are listed in mg/kg.
* EPA Region 9 Preliminary Remediation Goals for residential soil for 2000

TABLE 3 (CONTINUED)
SOIL ANALYTICAL RESULTS
PIER 29 HONOLULU HARBOR

CONTAMINANT	DOH TIER 1 SALS	SAMPLE IDENTIFICATION									
		SB-6a	SB-6b	SB-7a	SB-7b	SB-8a	SB-8b	SB-9a	SB-9b	SB-10a	SB-10b
Fuel Scan											
TPH-Gasoline	2,000	< 20	250	< 20	240	< 20	< 20	< 20	< 20	< 20	< 20
TPH-Diesel	5,000	< 20	530	< 20	480	66	640	66	< 20	< 20	< 20
TPH-Oil	5,000	< 40	< 40	1,400	< 40	< 40	< 40	< 40	< 40	< 40	< 40
BTEX											
Benzene	1.7	< 0.05	0.86	< 0.05	0.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toluene	34	< 0.05	13	< 0.05	2.4	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	0.50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	23	< 0.05	< 0.05	< 0.05	4.8	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PAHs											
Naphthalene	41	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	11	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(a)pyrene	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PCBs											
PCBs	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals											
Lead	400	14	34	**740**	28	120	60	49	110	**510**	ND
Cadmium	38	ND	ND	8	ND	ND	ND	ND	ND	2	ND
*Chromium	210	ND	20	ND	ND	ND	ND	ND	ND	25	ND
*Arsenic	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Silver	390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Barium	5,400	79.1	48.9	526	50.4	57.6	71.7	139	142	116	53.7
*Selenium	390	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Mercury	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

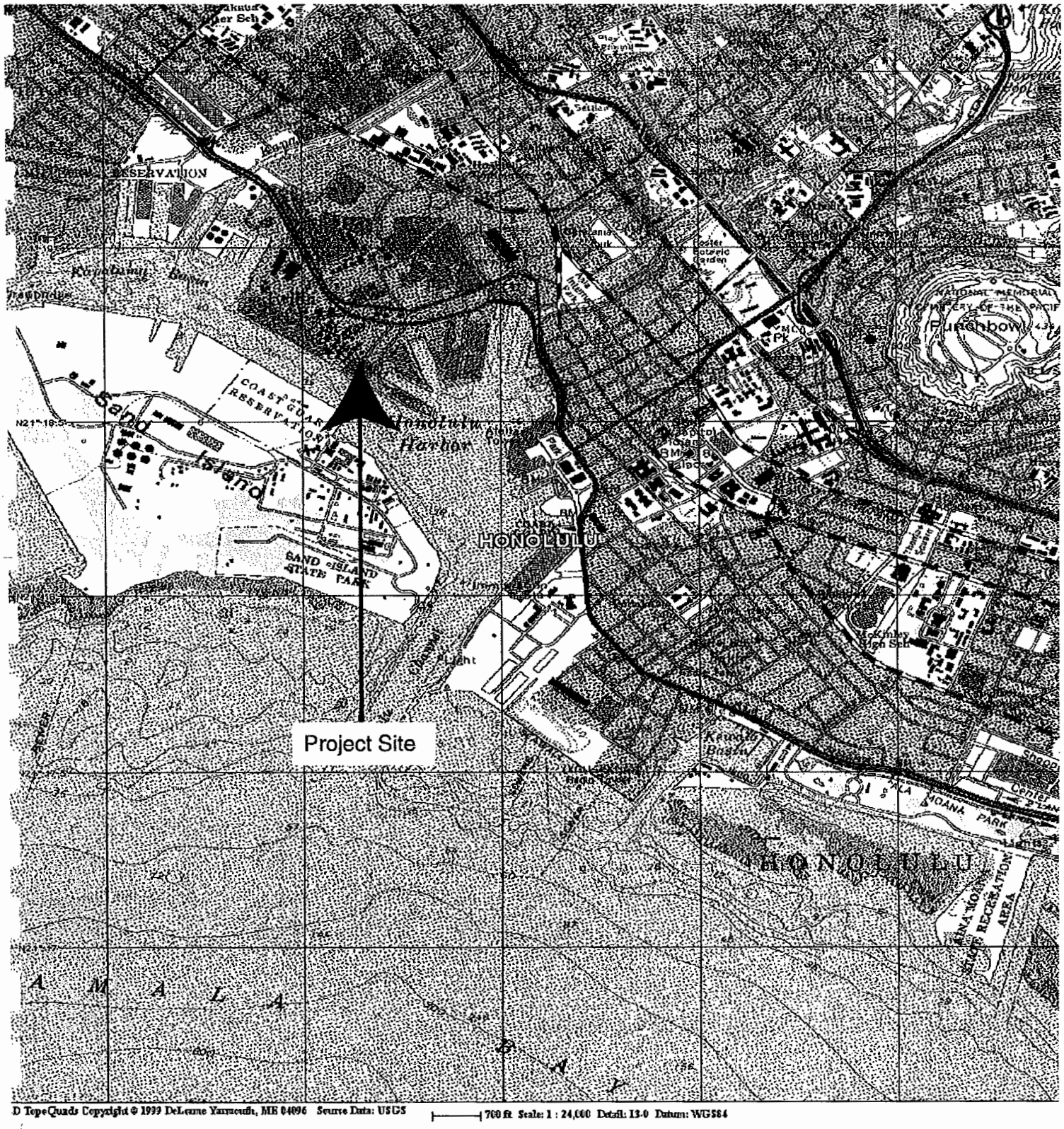
All results are listed in mg/kg.
* EPA Region 9 Preliminary Remediation Goals for residential soil for 2000
ND = not detected above the method detection limit

TABLE 4
GROUNDWATER ANALYTICAL RESULTS
PIER 29 HONOLULU HARBOR

CONTAMINANT	DOH TIER 1 SALS	SAMPLE IDENTIFICATION			
		MW-1	MW-2	MW-3	MW-4
Fuel Scan					
TPH-Gasoline	NS	< 0.60	300	220	NA
TPH-Diesel	NS	< 0.60	69	570	NA
TPH-Oil	NS	< 1.0	33	110	NA
BTEX					
Benzene	1.7	< 0.0005	0.15	0.15	NA
Toluene	2.1	< 0.0005	1.2	1.2	NA
Ethylbenzene	0.14	< 0.0005	**0.48**	**0.62**	NA
Xylenes	10	< 0.0005	2.4	2.0	NA
PAHs					
Naphthalene	0.77	< 0.0002	< 0.0002	< 0.0002	NA
Acenaphthene	0.32	< 0.0002	< 0.0002	< 0.0002	NA
Fluoranthene	0.013	< 0.0002	< 0.0002	< 0.0002	NA
Benzo(a)pyrene	0.0002	< 0.0002	< 0.0002	< 0.0002	NA
PCBs					
PCBs	0.002	ND	ND	**0.039**(1)	ND
Metals					
Lead	0.0056	0.00066	0.00196	0.000805	NA
Cadmium	0.009	ND	ND	ND	NA
*Chromium	0.050	0.00759	0.0209	0.047	NA
*Arsenic	0.036	0.00522	0.00589	0.013	NA
*Silver	NS	ND	0.00005	0.00004	NA
*Barium	NS	0.0514	0.0201	0.0591	NA
*Selenium	0.071	0.00373	0.00576	0.0146	NA
*Mercury	NS	0.000071	0.000243	0.000082	NA

All results are listed in mg/L.
* DOH's Water Quality Standards for Chronic Toxicity for Saltwater
ND = not detected above the method detection limit
NS = no standard
NA = not analyzed
(1) = concentration for PCB-1260

APPENDIX B:
FIGURES

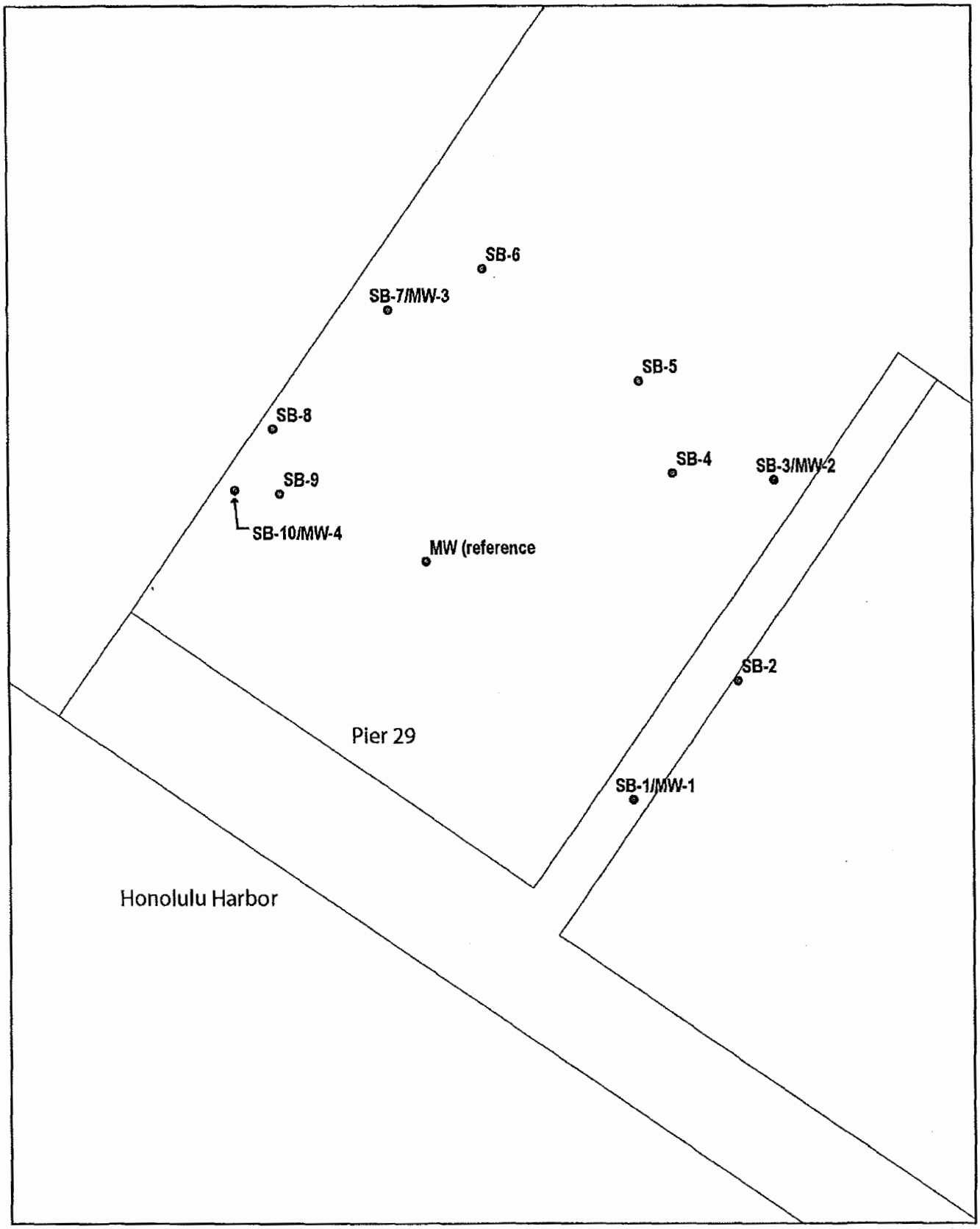


D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 700 ft Scale: 1 : 24,000 Detail: 13-0 Datum: WGS84

Site Location Map

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 N. Nimitz Highway
Honolulu, HI



0 50 100 Feet

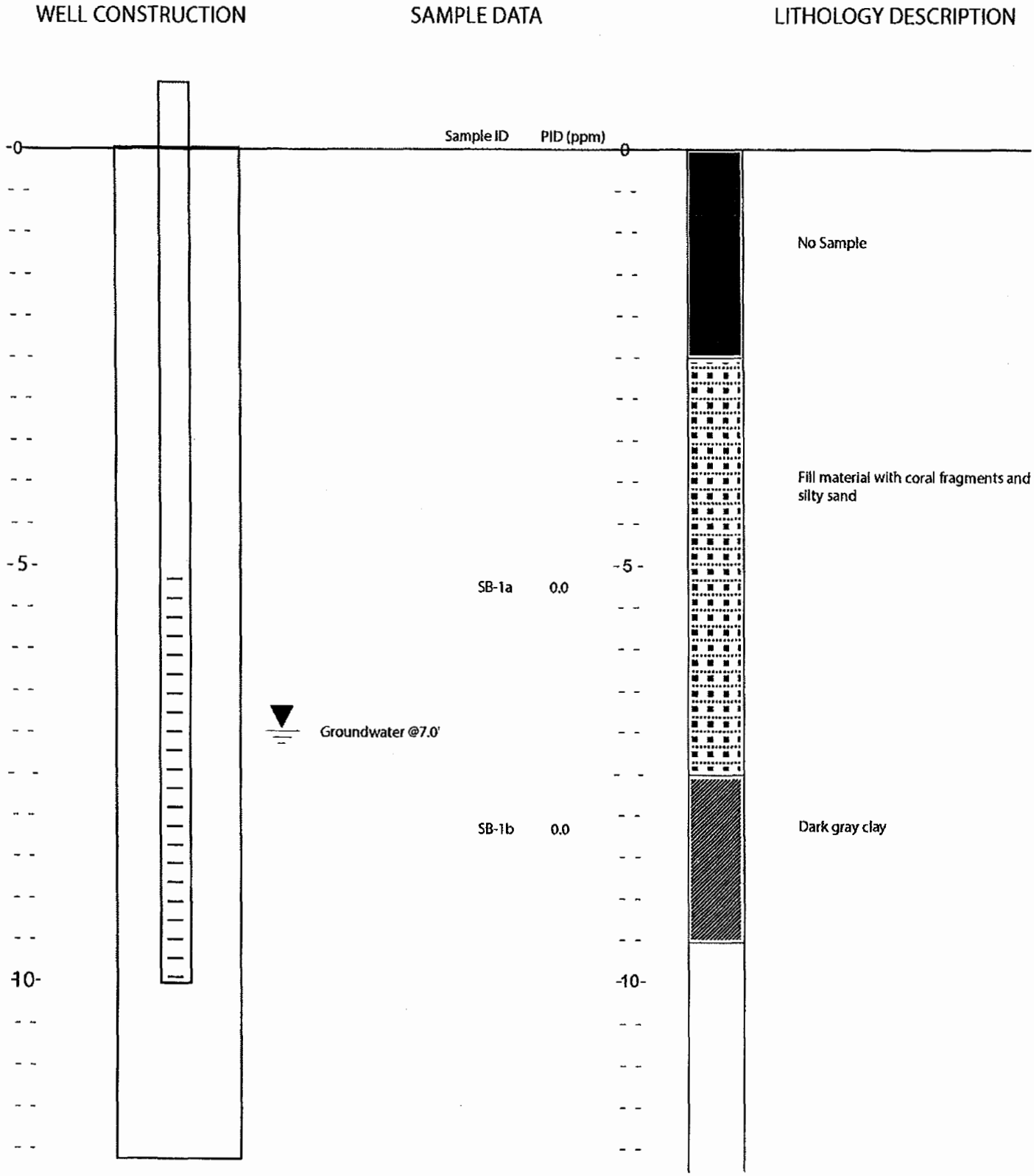
N

Boring Sites

1 inch equals 40 feet 1:480

Boring Locations
Pier 29 Honolulu Harbor

APPENDIX C:
BORING LOGS



BORING LOG SB-1/MW-1

KIMURA INTERNATIONAL, INC.

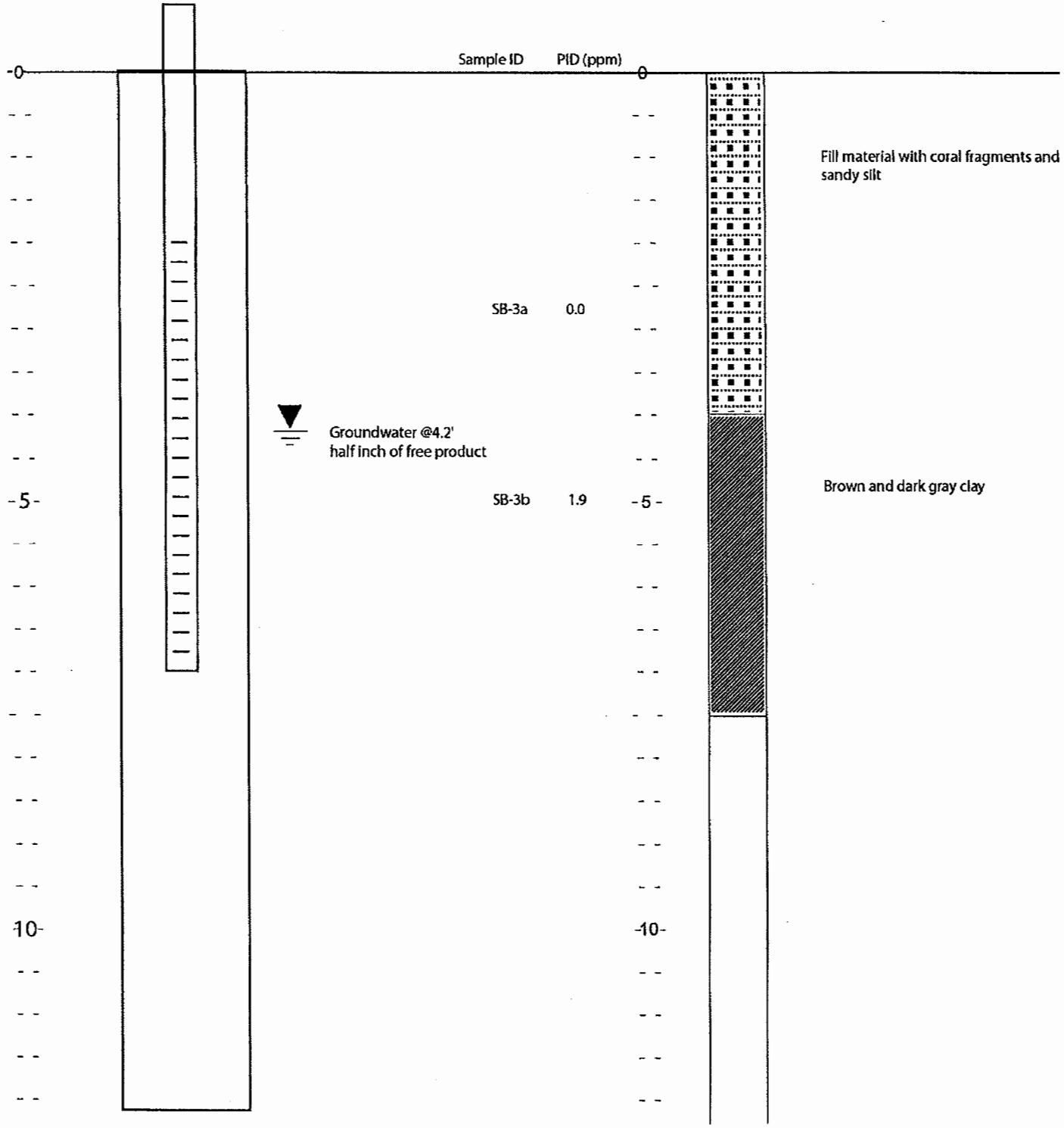
Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI

WELL CONSTRUCTION	SAMPLE DATA		LITHOLOGY DESCRIPTION
	Sample ID	PID (ppm)	
0			No Sample
5	SB-2a	0.0	Fill material
			Light brown fine grained sand, moist
10	SB-2b	2.5	Black to dark gray fine grained sand and silt

BORING LOG SB-2

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI



BORING LOG SB-3/MW-2

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI

WELL CONSTRUCTION	SAMPLE DATA			LITHOLOGY DESCRIPTION
	Sample ID	PID (ppm)		
0			0	Fill material with coral fragments and sandy silt
	SB-4a	0.0		Light brown fine grained sand
5	SB-4b	28.1	5	Brown and dark gray clay
10			10	

BORING LOG SB-4

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI

WELL CONSTRUCTION	SAMPLE DATA		LITHOLOGY DESCRIPTION
	Sample ID	PID (ppm)	
0			Fill material with coral fragments and sandy silt
	SB-5a	0.0	
5	SB-5b	37.0	Brown and dark gray clay
10			

BORING LOG SB-5

KIMURA INTERNATIONAL, INC.

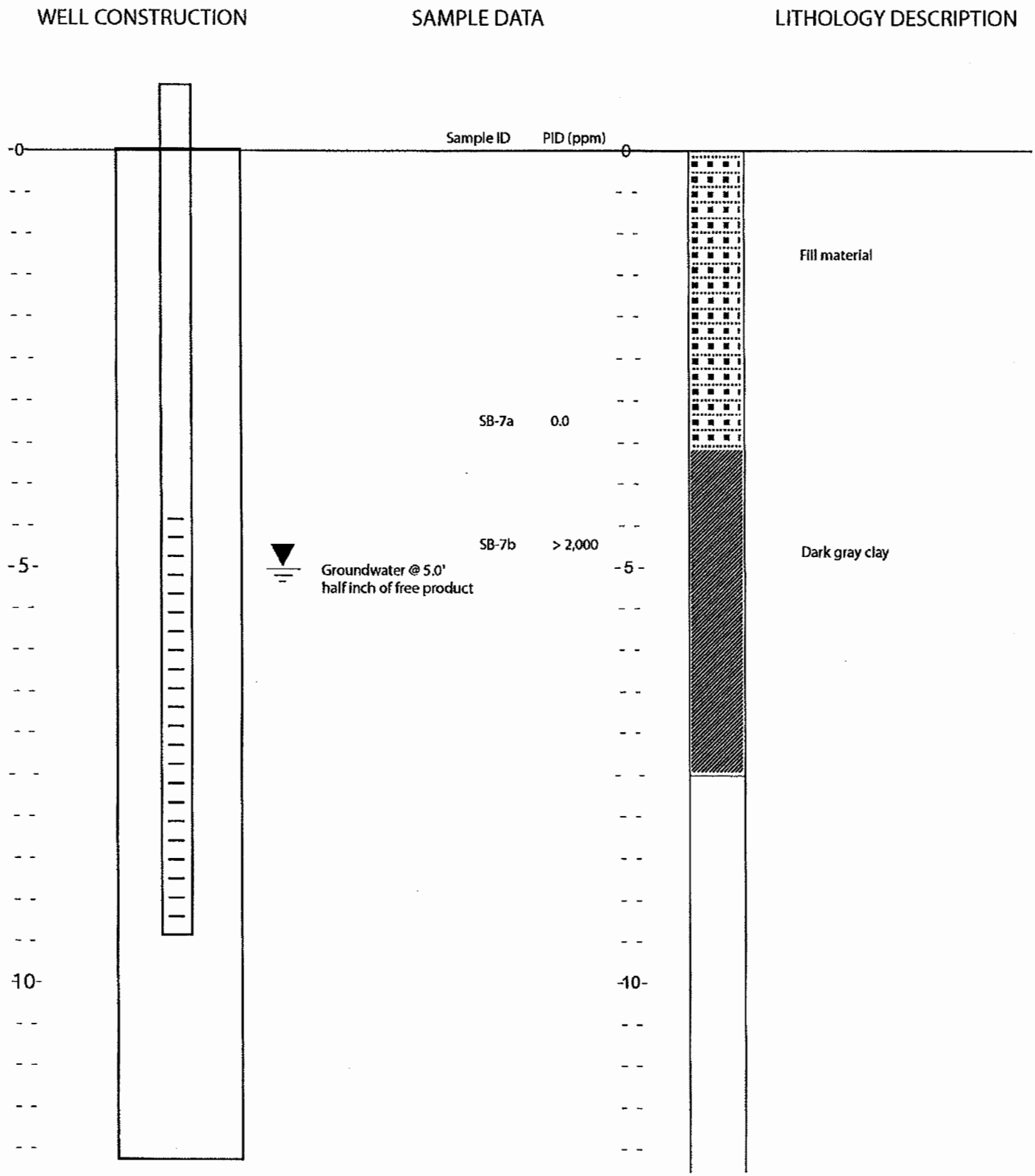
Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI

WELL CONSTRUCTION	SAMPLE DATA			LITHOLOGY DESCRIPTION
	Sample ID	PID (ppm)		
0			0	
				Fill material with coral fragments and sandy silt
	SB-6a	2.0		Light brown fine grained sand
				Brown and dark gray clay
5	SB-6b	> 2,000	5	
10			10	

BORING LOG SB-6

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI



BORING LOG SB-7/MW-3

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI

WELL CONSTRUCTION	SAMPLE DATA			LITHOLOGY DESCRIPTION
	Sample ID	PID (ppm)		
0			0	
				Fill material
	SB-8a	0.0		
				Fine grained sand
5			5	
	SB-8b	23.5		
				Dark gray clay
10			10	

BORING LOG SB-8

KIMURA INTERNATIONAL, INC.

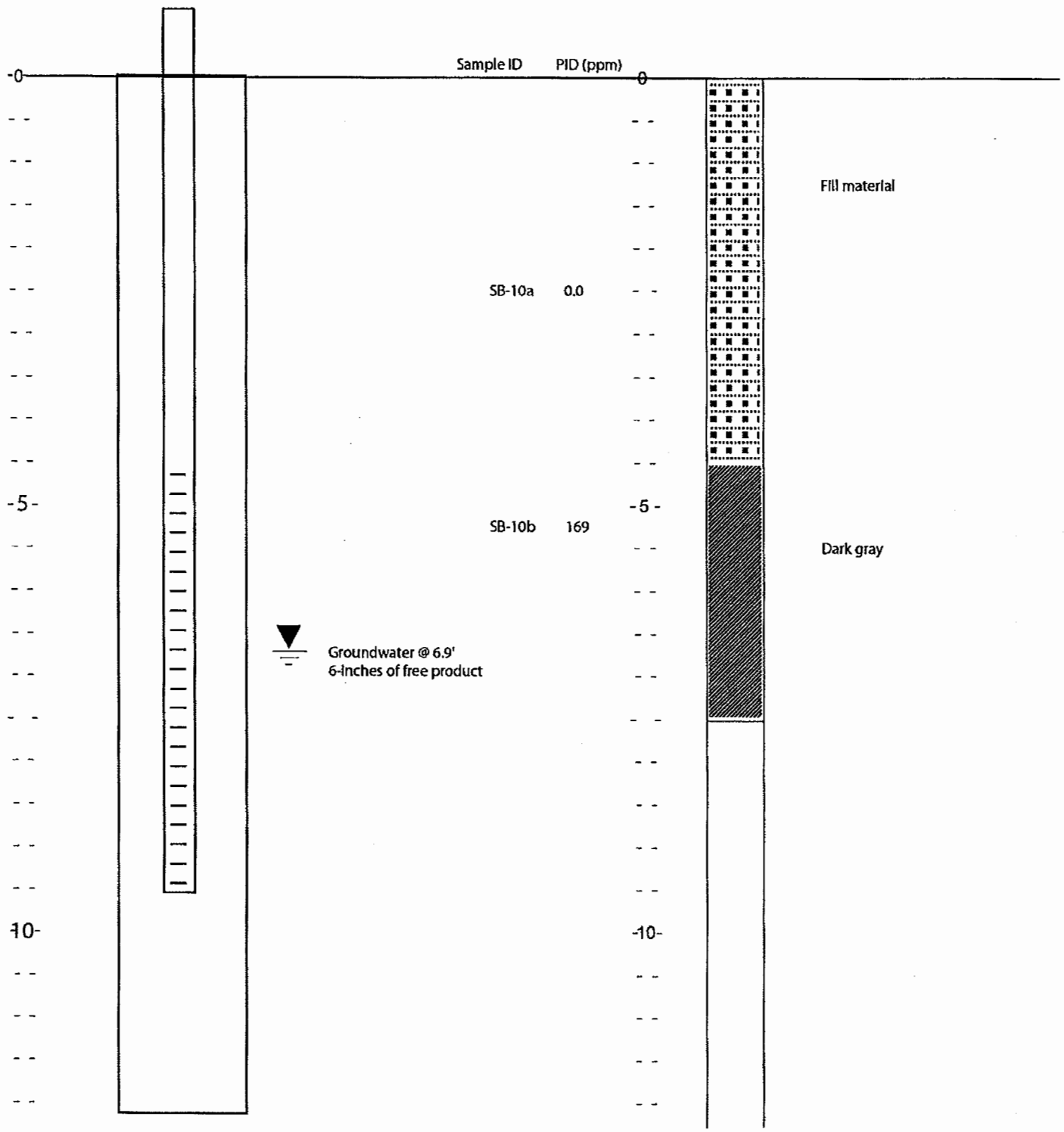
Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI

WELL CONSTRUCTION	SAMPLE DATA		LITHOLOGY DESCRIPTION
	Sample ID	PID (ppm)	
0			Fill material
	SB-9a	0.0	Fine grained sand
5	SB-9b	0.0	Dark gray and brown clay
10			

BORING LOG SB-9

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI



BORING LOG SB-10/MW-4

KIMURA INTERNATIONAL, INC.

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, HI

APPENDIX D:
PHOTOGRAPHIC DOCUMENTATION

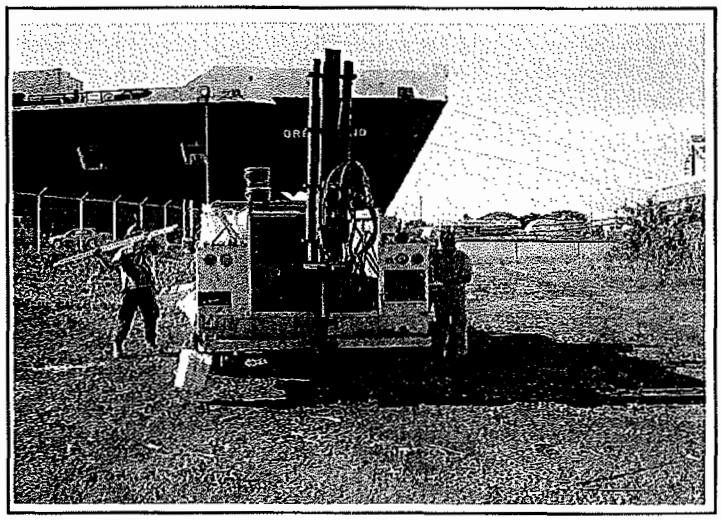


Photo 1:
A total of ten (10) soil borings were drilled at the project site using a DPT drill rig. Two soil samples were collected from each boring. View of SB-4

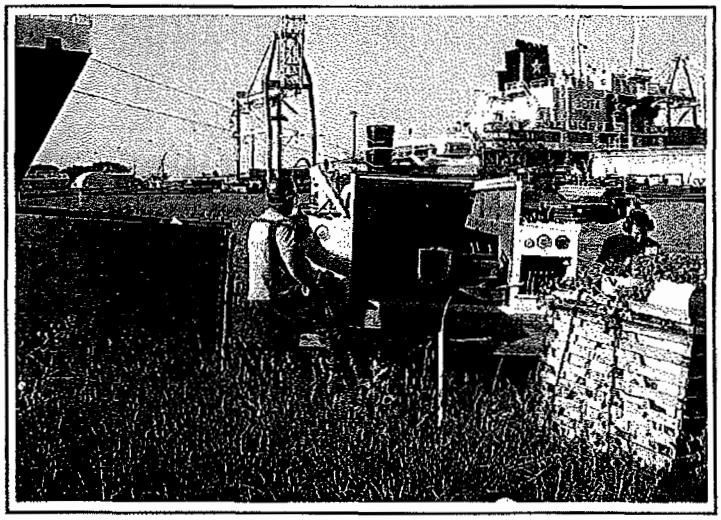


Photo 2:
Four temporary monitoring wells were installed at locations SB-1, SB-3, SB-7 and SB-10. View of MW-2.

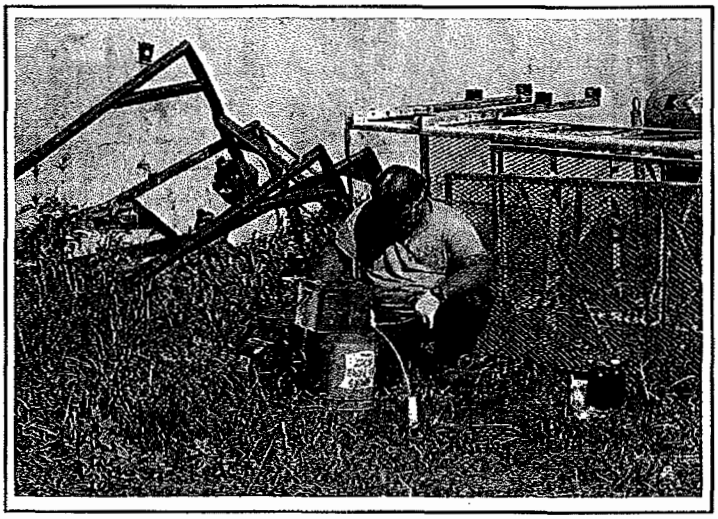


Photo 3:
A groundwater sample was collected from each installed well. View of MW-3.

PHOTOGRAPHIC DOCUMENTATION

Pier 29 Honolulu Harbor
739 North Nimitz Highway
Honolulu, Hawaii

KIMURA INTERNATIONAL, INC.

APPENDIX E:
LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY

ESN
PACIFIC

February 6, 2004

Bryce Hataoka
Kimura International
1600 Kapiolani Blvd., Ste 1610
Honolulu, HI 96814

SUBJECT: DATA REPORT – Pier 29

ESN Project #F40115

Mr. Hataoka:

Please find enclosed a data report for the samples analyzed from the above referenced project for Kimura International. The samples were collected by ESN personnel using the Direct-Push system and analyzed in ESN's laboratory (Cert. #1887A). ESN conducted the following tests:

- 23 analyses for aromatic volatile organics by EPA 8021b.
- 23 analyses for TPH as gasoline by CA-LUFT 8015 mod.
- 23 analyses for TPH as diesel by CA-LUFT 8015 mod.
- 23 analyses for TPH as oil by CA-LUFT 8015 mod.
- 24 analyses for polychlorinated biphenyls by EPA 8082.
- 23 analyses for polynuclear aromatic hydrocarbons by EPA 8100.
- 20 analyses for Total RCRA 8 by EPA 7000 series.

The results of the analyses are summarized in the enclosed table. Applicable detection limits and QA/QC data are included on the table. Additionally, 3 samples were sent to Severn Trent Services, Inc. for the following analyses: RCRA 8. These data are also included with this report.

Also enclosed is a brief description of the analytical procedures employed for the samples analyzed as well as a copy of Direct-Push sampling procedures. Direct-Push boring logs are also included as an addendum.

ESN appreciates the opportunity to have provided analytical services to Kimura International on this project. If you have any further questions relating to the data or report, please do not hesitate to contact us.

Sincerely,

Christina B. Poma
Vice President
ESN Pacific

Environmental Services Network
1818 Kahai St., Honolulu, HI 96819 Phone: (808) 847-0067 Fax: (808) 847-0917

ESN
PACIFIC

Kimura International
Pier 29

ESN Project #F40115

PCB ANALYSES OF WATER BY EPA 8082

SAMPLE NUMBER	DATE ANALYZED	PCB-1016 (ug/l)	PCB-1221 (ug/l)	PCB-1232 (ug/l)	PCB-1242 (ug/l)	PCB-1248 (ug/l)	PCB-1254 (ug/l)	PCB-1260 (ug/l)	SURROGATE RECOVERY (TCMX) (%)	FLAGS
Blank	1/22/2004	nd	nd	nd	nd	nd	nd	nd	100%	
Blank	1/23/2004	nd	nd	nd	nd	nd	nd	nd	113%	
MW-1	1/22/2004	nd	nd	nd	nd	nd	nd	nd	122%	
MW-2	1/22/2004	nd	nd	nd	nd	nd	nd	nd	75%	
MW-3	1/23/2004	nd	nd	nd	nd	nd	nd	39	82%	
MW-4	1/22/2004	nd	nd	nd	nd	nd	nd	nd	76%	
MW-4 Dup	1/22/2004	nd	nd	nd	nd	nd	nd	nd	76%	
DETECTION LIMITS		1	1	1	1	1	1	1		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (TCMX): 65% - 135%

QA/QC Data - PCB Analyses - WATERS

	Matrix Spike			Matrix Spike Duplicate					FLAGS
	Spiked Conc. (ug/l)	Measured Conc. (ug/l)	Spike Recovery (%)	Spiked Conc. (ug/l)	Measured Conc. (ug/l)	Spike Recovery (%)	RPD (%)	Acceptable Recovery Limits	
PCB 1260	1.00	1.09	108.5%	1.00	0.990	99.0%	9.2%	65%-135%	

CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma

ESN PACIFIC

Kimura International
Pier 29

ESN Project #F40115

PCB ANALYSES OF SOILS BY EPA 8082

SAMPLE NUMBER	DATE ANALYZED	PCB-1016 (mg/kg)	PCB-1221 (mg/kg)	PCB-1232 (mg/kg)	PCB-1242 (mg/kg)	PCB-1248 (mg/kg)	PCB-1254 (mg/kg)	PCB-1260 (mg/kg)	SURROGATE RECOVERY (TCMX) (%)	FLAGS
Blank	1/20/2004	nd	nd	nd	nd	nd	nd	nd	100%	
Blank	1/21/2004	nd	nd	nd	nd	nd	nd	nd	100%	
SB-1A	1/20/2004	nd	nd	nd	nd	nd	nd	nd	100%	
SB-1A Dup	1/20/2004	nd	nd	nd	nd	nd	nd	nd	100%	
SB-1B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	127%	
SB-2A	1/20/2004	nd	nd	nd	nd	nd	nd	nd	90%	
SB-2B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	130%	
SB-3A	1/21/2004	nd	nd	nd	nd	nd	nd	nd	93%	
SB-3B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	108%	
SB-4A	1/20/2004	nd	nd	nd	nd	nd	nd	nd	131%	
SB-4B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	115%	
SB-5A	1/20/2004	nd	nd	nd	nd	nd	nd	nd	133%	
SB-5B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	130%	
SB-6A	1/20/2004	nd	nd	nd	nd	nd	nd	nd	73%	
SB-6B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	89%	
SB-7A	1/21/2004	nd	nd	nd	nd	nd	nd	nd	105%	
SB-7B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	129%	
SB-8A	1/20/2004	nd	nd	nd	nd	nd	nd	nd	68%	
SB-8B	1/20/2004	nd	nd	nd	nd	nd	nd	nd	133%	
SB-9B	1/21/2004	nd	nd	nd	nd	nd	nd	nd	84%	
SB-10A	1/21/2004	nd	nd	nd	nd	nd	nd	nd	88%	
SB-10B	1/21/2004	nd	nd	nd	nd	nd	nd	nd	114%	
SB-10B Dup	1/21/2004	nd	nd	nd	nd	nd	nd	nd	66%	
DETECTION LIMITS		0.20	0.20	0.20	0.05	0.05	0.05	0.05		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (TCMX): 65% - 135%

QA/QC Data - PCB Analyses - SOILS

	Matrix Spike			Matrix Spike Duplicate					FLAGS
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	RPD (%)	Acceptable Recovery Limits	
PCB 1260	1.00	1.02	102.0%	1.00	0.989	98.9%	3.1%	65%-135%	

CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma

Environmental Services Network

ESN
PACIFIC

Kimura International

Pier 29

ESN Project #F40115

TPH ANALYSES OF SOILS BY EPA 8015-MOD.

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C5-C12 (mg/kg)	TPH-DIESEL C12-C24 (mg/kg)	TPH-OIL C20-C40 (mg/kg)	SURROGATE RECOVERY (%)	FLAGS
Blank	1/19/2004	nd	nd	nd	100%	
Blank	1/20/2004	nd	nd	nd	88%	
SB-1A	1/20/2004	nd	nd	nd	116%	
SB-1A Dup	1/20/2004	nd	nd	nd	131%	
SB-1B	1/20/2004	nd	nd	nd	69%	
SB-2A	1/19/2004	nd	nd	nd	100%	
SB-2B	1/19/2004	nd	61	nd	MI	not typical diesel pattern
SB-3A	1/20/2004	nd	nd	720	72%	
SB-3B	1/20/2004	nd	nd	nd	111%	
SB-4A	1/19/2004	nd	75	nd	MI	not typical diesel pattern
SB-4B	1/19/2004	nd	nd	nd	96%	
SB-5A	1/19/2004	nd	nd	nd	66%	
SB-5B	1/19/2004	nd	nd	nd	122%	
SB-6A	1/19/2004	nd	nd	nd	134%	
SB-6B	1/19/2004	250	530	nd	MI	
SB-7A	1/20/2004	nd	nd	1400	130%	
SB-7B	1/20/2004	240	460	nd	MI	
SB-8A	1/19/2004	nd	66	nd	MI	not typical diesel pattern
SB-8B	1/19/2004	nd	640	nd	MI	
SB-9A	1/19/2004	nd	66	nd	MI	not typical diesel pattern
SB-9B	1/19/2004	nd	nd	nd	66%	
SB-10A	1/19/2004	nd	nd	nd	66%	
SB-10B	1/19/2004	nd	nd	nd	135%	
SB-10B Dup	1/19/2004	nd	nd	nd	117%	
DETECTION LIMITS		20	20	40		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-FBP): 65% TO 135%

QA/QC DATA - MATRIX SPIKE ANALYSES

Sample Name: F40115 SB-1A

Spike Added	500	500	500
Measured Conc.	516	408	417
% Recovery	103.2%	81.5%	83.5%
Spike Added	500	500	500
Measured Conc.	479	468	436
% Recovery	95.7%	93.6%	87.2%
RPD	7.5%	13.8%	4.4%

RPD LIMITS: 20%
CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma

ESN
PACIFIC

Kimura International
Pier 29

ESN Project #F40115

TPH ANALYSES OF WATERS BY EPA 8015-MOD.

SAMPLE NUMBER	DATE ANALYZED	TPH-GAS C5-C12 (mg/L)	TPH-DIESEL C12-C24 (mg/L)	TPH-OIL C20-C40 (mg/L)	SURROGATE RECOVERY (%)	FLAGS
Blank	1/20/2004	nd	nd	nd	121%	
MW-1	1/20/2004	nd	nd	nd	67%	
MW-1 Dup	1/20/2004	nd	nd	nd	100%	
MW-2	1/20/2004	300	69	33	MI	
MW-3	1/20/2004	220	570	110	MI	
DETECTION LIMITS		0.60	0.60	110		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-FBP): 65% TO 135 %

QA/QC DATA - LABORATORY CONTROL SPIKE ANALYSES

Spike Added	15.15	15.15	15.15
Measured Conc.	14.94	17.49	18.12
% Recovery	98.6%	115.4%	119.6%
Spike Added	15.15	15.15	15.15
Measured Conc.	14.15	16.33	17.27
% Recovery	93.4%	107.8%	114.0%
RPD	5.4%	6.8%	4.8%

RPD LIMITS: 20%
CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma

ESN PACIFIC

Kimura International
Pier 29

ESN Project #F40115

PAH ANALYSES OF SOILS BY EPA 8100

SAMPLE NUMBER	DATE ANALYZED	NAPHTHALENE (mg/kg)	ACENAPHTHENE (mg/kg)	FLUORANTHENE (mg/kg)	BENZO(a)PYRENE (mg/kg)	SURROGATE RECOVERY (%)	FLAGS
Blank	1/19/2004	nd	nd	nd	nd	71%	
Blank	1/20/2004	nd	nd	nd	nd	75%	
SB-1A	1/20/2004	nd	nd	nd	nd	93%	
SB-1A Dup	1/20/2004	nd	nd	nd	nd	108%	
SB-1B	1/20/2004	nd	nd	nd	nd	69%	
SB-2A	1/20/2004	nd	nd	nd	nd	77%	
SB-2B	1/19/2004	nd	nd	nd	nd	77%	
SB-3A	1/20/2004	nd	nd	nd	nd	108%	
SB-3B	1/20/2004	nd	nd	nd	nd	128%	
SB-4A	1/20/2004	nd	nd	nd	nd	87%	
SB-4B	1/20/2004	nd	nd	nd	nd	89%	
SB-5A	1/19/2004	nd	nd	nd	nd	65%	
SB-5B	1/19/2004	nd	nd	nd	nd	87%	
SB-6A	1/19/2004	nd	nd	nd	nd	86%	
SB-6B	1/19/2004	nd	nd	nd	nd	114%	
SB-7A	1/20/2004	nd	nd	nd	nd	103%	
SB-7B	1/20/2004	nd	nd	nd	nd	98%	
SB-8A	1/20/2004	nd	nd	nd	nd	94%	
SB-8B	1/19/2004	nd	nd	nd	nd	66%	
SB-9A	1/19/2004	nd	nd	nd	nd	75%	
SB-9B	1/19/2004	nd	nd	nd	nd	77%	
SB-10A	1/19/2004	nd	nd	nd	nd	81%	
SB-10B	1/19/2004	nd	nd	nd	nd	81%	
SB-10B Dup	1/19/2004	nd	nd	nd	nd	67%	
DETECTION LIMITS		1.0	1.0	1.0	1.0		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-FBP): 65% TO 135%

QA/QC DATA - MATRIX SPIKE ANALYSES

Sample Name:F40115 SB-1A

Spike Added	10.0	10.0	10.0	10.0
Measured Conc.	11.0	10.8	10.2	10.1
% Recovery	110.3%	107.9%	101.6%	101.0%
Spike Added	10.0	10.0	10.0	10.0
Measured Conc.	11.4	11.4	11.1	10.9
% Recovery	114.0%	114.3%	111.3%	109.5%
RPD	3.3%	5.8%	9.1%	8.0%

RPD LIMIT: 20%
CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma

Environmental Services Network

ESN
PACIFIC

Kimura International
Pier 29

ESN Project #F40115

PAH ANALYSES OF WATERS BY EPA 8100

SAMPLE NUMBER	DATE ANALYZED	NAPHTHALENE (mg/L)	ACENAPHTHENE (mg/L)	FLUORANTHENE (mg/L)	BENZO(a)PYRENE (mg/L)	SURROGATE RECOVERY (%)	FLAGS
Blank	1/21/2004	nd	nd	nd	nd	100%	
MW-1	1/21/2004	nd	nd	nd	nd	102%	
MW-1 Dup	1/21/2004	nd	nd	nd	nd	114%	
MW-2	1/21/2004	nd	nd	nd	nd	MI	
MW-3	1/21/2004	nd	nd	nd	nd	MI	
DETECTION LIMITS		0.0002	0.0002	0.0002	0.0002		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-FBP): 65% TO 135%

QA/QC DATA - LABORATORY CONTROL SPIKE ANALYSES

Spike Added	0.0100	0.0100	0.0100	0.0100
Measured Conc.	0.0104	0.0095	0.0096	0.0098
% Recovery	103.6%	94.9%	96.1%	97.5%
Spike Added	0.0100	0.0100	0.0100	0.0100
Measured Conc.	0.0098	0.0095	0.0098	0.0102
% Recovery	98.4%	95.0%	98.4%	102.4%
RPD	5.1%	0.1%	2.4%	4.9%

RPD LIMITS: 20%
CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma CP

Environmental Services Network

ESN PACIFIC

Kimura International

Pier 29

ESN Project #F40115

BTEX ANALYSES OF SOILS BY EPA 8021B

SAMPLE NUMBER	DATE ANALYZED	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYLBENZENE (mg/kg)	XYLENES (mg/kg)	SURROGATE RECOVERY (%)	FLAGS
Blank	1/19/2004	nd	nd	nd	nd	100%	
Blank	1/20/2004	nd	nd	nd	nd	98%	
SB-1A	1/19/2004	nd	nd	nd	nd	102%	
SB-1A Dup	1/19/2004	nd	nd	nd	nd	111%	
SB-1B	1/19/2004	nd	nd	nd	nd	96%	
SB-2A	1/19/2004	nd	nd	nd	nd	72%	
SB-2B	1/19/2004	nd	nd	nd	nd	125%	
SB-3A	1/19/2004	nd	nd	nd	nd	100%	
SB-3B	1/19/2004	nd	nd	nd	nd	116%	
SB-4A	1/19/2004	nd	nd	nd	nd	119%	
SB-4B	1/19/2004	nd	nd	nd	nd	97%	
SB-5A	1/19/2004	nd	nd	nd	nd	84%	
SB-5B	1/19/2004	nd	nd	nd	nd	99%	
SB-6A	1/19/2004	nd	nd	nd	nd	92%	
SB-6B	1/20/2004	0.86	13	nd	nd	MI	
SB-7A	1/19/2004	nd	nd	nd	nd	123%	
SB-7B	1/20/2004	0.40	2.4	nd	4.8	MI	
SB-8A	1/19/2004	nd	nd	nd	nd	106%	
SB-8B	1/19/2004	nd	nd	nd	nd	106%	
SB-9A	1/19/2004	nd	nd	nd	nd	111%	
SB-9B	1/19/2004	nd	nd	nd	nd	92%	
SB-10A	1/19/2004	nd	nd	nd	nd	94%	
SB-10B	1/19/2004	nd	nd	nd	nd	102%	
SB-10B Dup	1/19/2004	nd	nd	nd	nd	115%	
DETECTION LIMITS		0.05	0.05	0.05	0.05		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (4-BFB): 65% TO 135%

QA/QC DATA - MATRIX SPIKE ANALYSES

Sample Name: F40115 SB-1A

Spike Added	10.0	10.0	10.0	30.0
Measured Conc.	10.3	10.4	10.6	31.9
% Recovery	103.0%	104.2%	105.7%	106.2%
Spike Added	10.0	10.0	10.0	30.0
Measured Conc.	10.5	9.97	10.0	30.1
% Recovery	104.7%	99.7%	100.4%	100.5%
RPD	1.6%	4.5%	5.0%	5.6%

RPD LIMITS: 20%
CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma

Environmental Services Network

ESN PACIFIC

Kimura International
Pier 29

ESN Project #F40115

MBTEX ANALYSES OF WATERS BY EPA 8021B

SAMPLE NUMBER	DATE ANALYZED	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYLBENZENE (mg/L)	XYLENES (mg/L)	SURROGATE RECOVERY (%)	FLAGS
Blank	1/20/2004	nd	nd	nd	nd	98%	
MW-1	1/20/2004	nd	nd	nd	nd	71%	
MW-1 Dup	1/20/2004	nd	nd	nd	nd	69%	
MW-2	1/20/2004	0.15	1.2	0.48	2.4	MI	
MW-3	1/20/2004	0.15	1.2	0.62	2.0	MI	
DETECTION LIMITS		0.0005	0.0005	0.0005	0.0005		

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (4-BFB): 65% TO 135%

QA/QC DATA - LABORATORY CONTROL SPIKE ANALYSES

Spike Added	0.3030	0.3030	0.3030	0.9090
Measured Conc.	0.3384	0.3179	0.3087	0.9351
% Recovery	111.7%	104.9%	101.9%	102.9%
Spike Added	0.3030	0.3030	0.3030	0.9090
Measured Conc.	0.3360	0.3119	0.3296	0.8979
% Recovery	110.9%	102.9%	108.8%	98.8%
RPD	0.7%	1.9%	6.5%	4.1%

RPD LIMITS: 20%
CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma CP

ESN PACIFIC

Kimura International
Pier 29

ESN Project #F40115

TOTAL METAL ANALYSES OF SOILS

SAMPLE NUMBER	DATE ANALYZED	Lead (Pb) EPA 7420 (mg/kg)	Cadmium (Cd) EPA 7130 (mg/kg)	Chromium (Cr) EPA 7190 (mg/kg)	Arsenic (As) EPA 7061M (mg/kg)	Silver (Ag) EPA 7760 (mg/kg)	Barium (Ba) EPA 7080 (mg/kg)	Selenium (Se) EPA 7741M (mg/kg)	Mercury (Hg) EPA 7471 (mg/kg)	FLAGS
Blank	1/22/2004	nd	nd	nd	nd	nd	sent to STL	nd	nd	
SB-1A	1/22/2004	nd	nd	nd	nd	nd	sent to STL	nd	nd	
SB-1A Dup	1/22/2004	nd	nd	nd	nd	nd	sent to STL	nd	nd	
SB-1B	1/22/2004	10	nd	20	nd	nd	sent to STL	nd	nd	
SB-2A	1/22/2004	11	nd	nd	nd	nd	sent to STL	nd	nd	
SB-2B	1/22/2004	6	nd	54	nd	nd	sent to STL	nd	nd	
SB-3A	1/22/2004	400	nd	nd	nd	nd	sent to STL	nd	nd	
SB-3B	1/22/2004	16	nd	nd	nd	nd	sent to STL	nd	nd	
SB-4A	1/22/2004	21	nd	nd	nd	nd	sent to STL	nd	nd	
SB-4B	1/22/2004	15	nd	20	nd	nd	sent to STL	nd	nd	
SB-5A	1/22/2004	94	nd	nd	nd	nd	sent to STL	nd	nd	
SB-5B	1/22/2004	18	nd	nd	nd	nd	sent to STL	nd	nd	
SB-6A	1/22/2004	14	nd	nd	nd	nd	sent to STL	nd	nd	
SB-6B	1/22/2004	34	nd	20	nd	nd	sent to STL	nd	nd	
SB-7A	1/22/2004	740	8	nd	nd	nd	sent to STL	nd	nd	
SB-7B	1/22/2004	26	nd	nd	nd	nd	sent to STL	nd	nd	
SB-8A	1/22/2004	120	nd	nd	nd	nd	sent to STL	nd	nd	
SB-8B	1/22/2004	60	nd	nd	nd	nd	sent to STL	nd	nd	
SB-9A	1/22/2004	49	nd	nd	nd	nd	sent to STL	nd	nd	
SB-9B	1/22/2004	110	nd	nd	nd	nd	sent to STL	nd	nd	
SB-10A	1/22/2004	510	2	25	nd	nd	sent to STL	nd	nd	
SB-10B	1/22/2004	nd	nd	nd	nd	nd	sent to STL	nd	nd	
SB-10B Dup	1/22/2004	nd	nd	nd	nd	nd	sent to STL	nd	nd	
DETECTION LIMITS		5.0	1.0	20	5.0	20	50	50	0.5	

QA/QC DATA - MATRIX SPIKE ANALYSES

Sample Name:F40115 SB-1A

Spike Added	250	25	250	150
Measured Conc.	209	24	207	122
% Recovery	83.5%	96.8%	82.8%	81.1%
Spike Added	250	25	250	150
Measured Conc.	208	24	202	123
% Recovery	83.0%	97.9%	80.8%	82.2%
RPD	0.6%	1.2%	2.4%	1.4%

ACCEPTABLE RECOVERY LIMITS: 65% TO 135%

RPD LIMITS: 20%
CA-DOHS-ELAP CERTIFICATION #1887A
ANALYSES PERFORMED BY : B. Capps
DATA REVIEWED BY: C. Poma

Environmental Services Network

SEVERN TRENT STL

STL Seattle
5755 8th Street East
Tacoma, WA 98424

Tel: 253 922 2310
Fax: 253 922 5047
www.stl-inc.com

TRANSMITTAL MEMORANDUM

DATE: January 23, 2004

TO: Christina Poma
ESN Pacific, Inc.
1818 Kahai Street
Honolulu, HI 96819

PROJECT: F40115

REPORT NUMBER: 118918

TOTAL NUMBER OF PAGES: 16

Enclosed are the test results for three samples received at STL Seattle on January 20, 2004.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Tom Watson

Tom Watson
Project Manager

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender immediately at 253-922-2310 and destroy this report immediately.

STL Seattle

Sample Identification:

Lab. No.	Client ID	Date/Time Sampled	Matrix
118918-1	MW1	01-15-03 *	Liquid
118918-2	MW2	01-15-03 *	Liquid
118918-3	MW3	01-15-03 *	Liquid

* - Sampling time not specified for this sample

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender immediately at 253-922-2310 and destroy this report immediately.

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	MW1
Lab ID:	118918-01
Date Received:	1/20/04
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	5

Dissolved Metals by ICP-MS - USEPA Method 6020

Analyte	Result (mg/L)	PQL	MDL	Flags
Arsenic	0.00522	0.0005	0.000379	
Barium	0.0514	0.0005	0.000238	
Cadmium	ND	0.0005	0.000208	
Chromium	0.00759	0.0015	0.000371	
Lead	0.00066	0.0005	0.0000329	
Selenium	0.00373	0.001	0.00154	
Silver	ND	0.0005	0.000038	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	MW2
Lab ID:	118918-02
Date Received:	1/20/04
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	5

Dissolved Metals by ICP-MS - USEPA Method 6020

Analyte	Result (mg/L)	PQL	MDL	Flags
Arsenic	0.00589	0.0005	0.000379	
Barium	0.0201	0.0005	0.000238	
Cadmium	ND	0.0005	0.000208	
Chromium	0.0209	0.0015	0.000371	
Lead	0.00196	0.0005	0.0000329	
Selenium	0.00576	0.001	0.00154	
Silver	0.00005	0.0005	0.000038	J

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	MW3
Lab ID:	118918-03
Date Received:	1/20/04
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	5

Dissolved Metals by ICP-MS - USEPA Method 6020

Analyte	Result (mg/L)	PQL	MDL	Flags
Arsenic	0.013	0.0005	0.000379	
Barium	0.0591	0.0005	0.000238	
Cadmium	ND	0.0005	0.000208	
Chromium	0.047	0.0015	0.000371	
Lead	0.000805	0.0005	0.0000329	
Selenium	0.0146	0.001	0.00154	
Silver	0.00004	0.0005	0.000038	J

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	MW1
Lab ID:	118918-01
Date Received:	1/20/04
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	1

Dissolved Mercury by CVAA - USEPA Method 7470

Analyte	Result (mg/L)	PQL	MDL	Flags
Mercury	0.000071	0.0002	0.000053	J

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	MW2
Lab ID:	118918-02
Date Received:	1/20/04
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	1

Dissolved Mercury by CVAA - USEPA Method 7470

Analyte	Result (mg/L)	PQL	MDL	Flags
Mercury	0.000243	0.0002	0.000053	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	MW3
Lab ID:	118918-03
Date Received:	1/20/04
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	1

Dissolved Mercury by CVAA - USEPA Method 7470

Analyte	Result (mg/L)	PQL	MDL	Flags
Mercury	0.000082	0.0002	0.000053	J

STL Seattle

Lab ID:	Method Blank - DP579
Date Received:	-
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	1

Dissolved Metals by ICP-MS - USEPA Method 6020

Analyte	Result (mg/L)	PQL	MDL	Flags
Arsenic	ND	0.0001	0.0000758	
Barium	ND	0.0001	0.0000476	
Cadmium	ND	0.0001	0.0000416	
Chromium	ND	0.0003	0.0000741	
Lead	ND	0.0001	0.00000657	
Selenium	ND	0.0002	0.000307	
Silver	ND	0.0001	0.00000759	

STL Seattle

Matrix Spike Report

Client Sample ID:	MW1
Lab ID:	118918-01
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
QC Batch ID:	DP579

Dissolved Metals by ICP-MS - USEPA Method 6020

Parameter Name	Sample Result (mg/L)	Spike Amount (mg/L)	MS Result (mg/L)	MS % Rec.	Flag
Arsenic	0.00522	4	3.78	95	
Barium	0.051	4	3.74	92	
Cadmium	0	0.1	0.0966	97	
Chromium	0.0076	0.4	0.403	99	
Lead	0.00066	1	0.926	93	
Selenium	0.0037	4	3.8	95	
Silver	0	0.6	0.581	97	

STL Seattle

Duplicate Report

Client Sample ID:	MW1
Lab ID:	118918-01
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
QC Batch ID:	DP579

Dissolved Metals by ICP-MS - USEPA Method 6020

Parameter Name	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD %	Flag
Arsenic	0.0052	0.0049	5.9	
Barium	0.051	0.052	-1.9	
Cadmium	0	0	NC	
Chromium	0.0076	0.0067	13.0	
Lead	0.00066	0.0018	-93.0	X4a
Selenium	0.0037	0.0032	14.0	
Silver	0	0	NC	

STL Seattle

Lab ID:	Method Blank - ZD1568
Date Received:	-
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
Dilution Factor	1

Dissolved Mercury by CVAA - USEPA Method 7470

Analyte	Result (mg/L)	PQL	MDL	Flags
Mercury	ND	0.0002	0.000053	

STL Seattle

Matrix Spike Report

Client Sample ID:	MW1
Lab ID:	118918-01
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
QC Batch ID:	ZD1568

Dissolved Mercury by CVAA - USEPA Method 7470

Parameter Name	Sample Result (mg/L)	Spike Amount (mg/L)	MS Result (mg/L)	MS % Rec.	Flag
Mercury	0.000071	0.002	0.00177	85	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-5B
Lab ID:	119060-10
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	60.83

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	50.5	1.62	0.0769	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-6A
Lab ID:	119060-11
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	73.22

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	79.1	1.36	0.0645	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-6B
Lab ID:	119060-12
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	66.47

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	48.9	1.21	0.0577	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-7A
Lab ID:	119060-13
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	82.83

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	526	1.14	0.0543	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-7B
Lab ID:	119060-14
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	56.14

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	50.4	1.64	0.078	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-8A
Lab ID:	119060-15
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	76.16

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	57.6	1.29	0.0613	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-8B
Lab ID:	119060-16
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	76.39

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	71.7	1.29	0.0615	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-9A
Lab ID:	119060-17
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	80.65

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	139	1.12	0.0533	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-9B
Lab ID:	119060-18
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	64.08

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	142	1.42	0.0676	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-10A
Lab ID:	119060-19
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	83.2

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	116	1.14	0.0541	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-10B
Lab ID:	119060-20
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	60.39

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	53.7	1.58	0.0751	

STL Seattle

Lab ID:	Method Blank - SP598
Date Received:	-
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	1

Metals by ICP-MS - USEPA Method 6020

Sample results are on an as received basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	ND	0.1	0.00476	

STL Seattle

Matrix Spike Report

Client Sample ID:	SB-4A
Lab ID:	119060-07
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
QC Batch ID:	SP598

Metals by ICP-MS - USEPA Method 6020

Parameter Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	Flag
Barium	76	538	582	94	

STL Seattle

Duplicate Report

Client Sample ID:	SB-4A
Lab ID:	119060-07
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
QC Batch ID:	SP598

Metals by ICP-MS - USEPA Method 6020

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Barium	76	79	-3.9	

119060

3.7

CHAIN-OF-CUSTODY RECORD

TURNAROUND TIME: 5 Day

CLIENT: ESN Pacific
ADDRESS: 1818 Kalani St. Honolulu, HI 96819
PHONE: 808-847-0067 FAX: 808-847-0917
CLIENT PROJECT #: PROJECT MANAGER: C. Oma

DATE: 1/26/04 PAGE 1 OF 2
ESN PROJECT #: F46115
LOCATION: Kimura - Pier 29
COLLECTOR: DATE OF COLLECTION: 1/15

	Sample Number	Depth	Time	Sample Type	Container Type	8021B HVOC	8021B BTEX	8021B MtBE	8015 GASOLINE	8015 DIESEL	8015 OIL	418.1 TRPH	8082 PCB	8100 PAH	TOTAL LEAD	TOTAL CADMIUM	TOTAL CHROMIUM	Total Ba	Pb	TCLP-MS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
1	SB-1A			Soil	Sleeve												X						
2	SB-1B																X						
3	SB-2A																X						
4	SB-2B																X						
5	SB-3A																X						
6	SB-3B																X						
7	SB-4A																X						
8	SB-4B																X						
9	SB-5A																X						
10	SB-5B																X						
11	SB-6A																X						
12	SB-6B																X						
13	SB-7A																X						
14	SB-7B																X						
15	SB-8A																X						
16	SB-8B																X						
17	SB-9A																X						
18	SB-9B																X						

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	1-26-04 11:00 AM	[signature]	1/27 9:15
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS
CHAIN OF CUSTODY SEALS Y/N/NA
SEALS INTACT? Y/N/NA
RECEIVED GOOD COND./COLD
NOTES:

LABORATORY NOTES:

119060 3.4

CHAIN-OF-CUSTODY RECORD

TURNAROUND TIME: _____

CLIENT: _____
ADDRESS: _____
PHONE: _____ FAX: _____
CLIENT PROJECT #: _____ PROJECT MANAGER: _____

DATE: _____ PAGE 2 OF 2
ESN PROJECT #: _____
LOCATION: _____
COLLECTOR: _____ DATE OF COLLECTION: _____

	Sample Number	Depth	Time	Sample Type	Container Type	8021B HVOC	8021B BTEX	8021B MtBE	8015 GASOLINE	8015 DIESEL	8015 OIL	418.1 TRPH	8082 PCB	8100 PAH	TOTAL LEAD	TOTAL CADMIUM	TOTAL CHROMIUM	Total Ba	Total Ba TRP-MS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
19	SB-10A			soil	Sleeve													X				
20	SB-10B			↓	↓													X				

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	1-26-04 / 1:00pm	[signature] / ESN	9:15
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

CHAIN-OF-CUSTODY RECORD

TURNAROUND TIME: 5-Day

CLIENT: Kimura International (KI)
ADDRESS: 1600 Kapiolani Blvd. Ste 1610
PHONE: 944-8848 FAX: 941-8999
CLIENT PROJECT #: PROJECT MANAGER: B. Hatzoko

DATE: 1-15-04 PAGE ___ OF ___
ESN PROJECT #: FH0775
LOCATION: Pier 29
COLLECTOR: V. Kong / B. Hatzoka DATE OF COLLECTION: 1/15

Sample Number	Depth	Time	Sample Type	Container Type	8021B HVOC	8021B BTEX	8021B MtBE	8015 GASOLINE	8015 DIESEL	8015 OIL	418.1 TRPH	8082 PCB	8100 PAH	TOTAL LEAD	TOTAL CADMIUM	TOTAL CHROMIUM	RCRA 8 METALS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
SB-1a	5-5.5	2:48	S	1 sleeve	X	X	X	X				X	X					X	1	
SB-1b	8-8.5	3:00		1) sleeve 2) encore	X	X	X	X				X	X					X	3	
SB-2a	5.5-6	3:20			X	X	X	X				X	X					X	3	
SB-2b	8-8.5	3:30			X	X	X	X				X	X					X	3	
SB-3a	2.5-3	8:55			X	X	X	X				X	X					X	3	
SB-3b	5	900			X	X	X	X				X	X					X	3	
SB-4a	2.5-3	920			X	X	X	X				X	X					X	3	
SB-4b	5-5.5	930			X	X	X	X				X	X					X	3	
SB-5a	2.5-3	9:45			X	X	X	X				X	X					X	3	
SB-5b	5-5.5	9:52			X	X	X	X				X	X					X	3	
SB-6a	3.0	10:20			X	X	X	X				X	X					X	3	
SB-6b	5-5.5	1030			X	X	X	X				X	X					X	3	
SB-7a	3-3.5	10:35			X	X	X	X				X	X					X	3	
SB-7b	4.5-5	1040			X	X	X	X				X	X					X	3	
SB-8a	3-3.5	1105			X	X	X	X				X	X					X	3	
SB-8b	5.5-6	1117			X	X	X	X				X	X					X	3	
SB-9a	2.5-3	210			X	X	X	X				X	X					X	3	
SB-9b	5	215			X	X	X	X				X	X					X	3	

RELINQUISHED BY: (Signature) V. Kong DATE/TIME 1-15-04 / 355 RECEIVED BY (Signature) DATE/TIME 1/15/04 1685
RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

CHAIN-OF-CUSTODY RECORD

TURNAROUND TIME: 5-Day

CLIENT: Kimura International
ADDRESS: 1600 Kapiolani Blvd. Ste 1610
PHONE: 944-8848 FAX: 941-8999
CLIENT PROJECT #: PROJECT MANAGER: B. Hatanaka

DATE: 1-15-04 PAGE OF
ESN PROJECT #: E40115
LOCATION: Pier 29
COLLECTOR: V. Kong / B. Hatanaka DATE OF COLLECTION: 1/15

Sample Number	Depth	Time	Sample Type	Container Type	8021B HVOC	8021B BTEX	8021B MtBE	8015 GASOLINE	8015 DIESEL	8015 OIL	418.1 TRPH	8082 PCB	8100 PAH	TOTAL LEAD	TOTAL CADMIUM	TOTAL CHROMIUM	RCRA 8 METALS	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
SB-10a	30	115	S	(1) sleeve (2) encore.		X	X	X	X			X	X				X		3	
SB-10b	5-55	120	S	"		X	X	X	X			X	X				X		3	
			LAST ENTRY																	

RELINQUISHED BY: (Signature) V. Kong DATE/TIME 1-15-04 / 355 RECEIVED BY (Signature) DATE/TIME 1/15/04
RELINQUISHED BY (Signature) DATE/TIME RECEIVED BY (Signature) DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

CHAIN-OF-CUSTODY RECORD

TURNAROUND TIME: 5-Day

CLIENT: Kimura International
ADDRESS: 1600 Kapiolani Blvd.
PHONE: 944-8848 FAX: 941-8999
CLIENT PROJECT #: PROJECT MANAGER: B. Hatzaka

DATE: 1-15-04 PAGE ___ OF ___
ESN PROJECT #: F40115
LOCATION: Pier 29
COLLECTOR: V. Kong / B. Hatzaka DATE OF COLLECTION: 1/15

Sample Number	Depth	Time	Sample Type	Container Type	8021B HVOC	8021B BTEX	8021B MtBE	8015 GASOLINE	8015 DIESEL	8015 OIL	418.1 TRPH	8082 PCB	8100 PAH	TOTAL LEAD	TOTAL CADMIUM	TOTAL CHROMIUM	RCRA 8 Metals	FIELD NOTES	Total Number Of Containers	Laboratory Note Number
MW-1			GW	(3) VOA (1) plastic (2) amber	X	X	X	X			X	X					X	Metals Filtered in Field.	6	
MW-2				(3) VOA (1) plastic (2) amber	X	X	X	X			X	X					X		6	
MW-3				(3) VOA (1) plastic (2) amber	X	X	X	X			X	X					X		6	
MW-4				(3) VOAs							X								4	
				LAST ENTRY																
				1 product																

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
V. Kong	1-15-04 / 3:55	[signature]	1605 / 1/15/04
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

ESN
PACIFIC

THE MEGAPROBE SYSTEM

DIRECT PUSH TECHNOLOGY FOR SOIL, WATER AND SOIL VAPOR SAMPLING

Overview

The *MEGAPROBE* is a rugged, lightweight hydraulic drive point system designed to perform sampling and monitoring services specific to the environmental industry. The *MEGAPROBE* carrier vehicle is a four wheel drive, one ton pickup truck with a reliable power take-off hydraulic system. One of the most versatile systems of its kind the *MEGAPROBE* can drive an assortment of sampling devices to fifty feet or deeper in many soil formations.

The direct push hydraulic unit consists of a rear-mounted, dual ram configuration mounted in conjunction with a hydraulic hammer that is capable of producing high-frequency impact energy. A 5,000 pound static reaction weight and 15,000 pound pullback capacity provide ample force to overcome most common geologic conditions. The low profile mast is only eleven feet high when fully extended and the framework of the machine is fully articulated to allow for a full range of positioning, including up to a 20 degree angle for boring underneath structures.

The *MEGAPROBE*'s low profile and articulated boom provide for easy access when sampling under canopies, adjacent to structures and inside buildings. Hand held portable equipment is also available where truck access is not possible.

Soil Sampling

The *MEGAPROBE* obtains discrete soil samples using a retractable piston sampler. The sampler consists of a standard split spoon with a piston assembly added to allow for discrete sampling intervals. Upon reaching the desired depth, the piston is unlocked and the sampler advanced into the soil as the piston retracts. Samples are collected in standard retainer sleeves made of stainless steel, brass or clear acrylic. Samples are obtained at any interval specified in a workplan.

Groundwater Sampling

The *MEGAPROBE* provides for high quality groundwater sampling using a tool similar to a Hydropunch™ or via direct pumping to the surface. In areas of low hydraulic conductivity, small diameter sampling tubes can be implanted using the *MEGAPROBE* and sampled at a later date. The sampling tools are pushed directly into the aquifer in a shielded position. The sampling ports are then unsheathed to expose them to groundwater. Clean sample tubing or bailers are used to move the water sample to the surface.

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Soil Vapor Sampling

The *MEGAPROBE* is the ideal tool for performing deep soil vapor surveys in difficult soil conditions. The drive probes are custom, high strength steel tubes with a uniform diameter machined the full length of the probe. The soil vapor collection system begins with a detachable tip held by the leading rod, which shields the sampling tube during the driving process. Vapor is collected through a continuous, inert 1/8" nylaflow tube connected to the surface. Once the desired sampling depth is reached the entire drive string is raised slightly opening a clear path for vapor. After sampling the probe can be pushed deeper for multiple depth vapor profiling.

Soil vapor is withdrawn from the nylaflow tubing using a small calibrated syringe connected via an on-off valve. The first three dead volumes of the sample tube are discarded to flush the tube and fill it with in-situ soil vapor. The next twenty cc's of gas are withdrawn in the syringe, plugged and immediately transferred to a mobile lab for analysis within minutes of collection. Additional soil vapor samples may be collected and stored in gas-tight containers as desired.

Vapor Wells

The *MEGAPROBE* provides a low cost alternative for installing multiple high quality vapor wells. Each individual well is installed by driving to the desired depth and then placing a vapor inlet tip attached to an inert, continuous length of 1/8" nylaflow tubing down the hollow center of the rod. Clean silica sand is poured through the rod around the vapor tip and then a hydrated granular bentonite grout is used to seal the annular space of the borehole as the rod is withdrawn. Multiple wells can be placed in either a cluster or in the same borehole as specified by the workplan. Each well or cluster of wells will be completed at the top with sample fittings, labels and covers to the client's specifications.

Accessory Equipment

The *MEGAPROBE* sampling systems are fully equipped with the equipment necessary to operate unsupported in the field. Full provision has been made for power, water, decontamination of sampling equipment and work site cleanup.

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ANALYTICAL PROCEDURES

SAMPLE PREPARATION

Waters

Separate water aliquots are extracted for TPH, PAH and volatile aromatics (EPA 602) analyses by liquid-liquid extraction using a modified EPA Method 3510.

Soils

Soil samples are extracted with methanol for volatile chlorinated hydrocarbon compounds (EPA 8021B), with freon 113 for volatile aromatic hydrocarbon compounds (EPA 8021B), fuel compounds (EPA 8015M) and for PAH's (EPA 8100). All extracts are then hand-shaken and sonicated. PCB's are extracted by hand shaking with hexane followed by sonication.

GAS CHROMATOGRAPHY

Volatile Chlorinated Hydrocarbons

Water samples and soil extracts are analyzed on a gas chromatograph equipped with a capillary column, photoionization detector (PID) and Hall electrolytic conductivity detector following EPA Methods 601/8021B and 602/8021B.

Volatile Aromatic Hydrocarbons (BTEX), Semivolatile hydrocarbons (PAH) & Total Fuel Hydrocarbons (TPH)

The soil extract is injected on-column into a gas chromatograph equipped with capillary columns, photoionization (PID) and flame ionization detectors (FID).

PCB's/Pesticides

PCB's are analyzed on a gas chromatograph using a capillary column with an ECD detector per EPA protocols.

TOTAL RECOVERABLE HYDROCARBONS

Extracts are cleaned with silica gel and measured on a BUCK 404 Infrared Analyzer following EPA 418.1 protocols.

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ABBREVIATIONS

MDL:	Method Detection Limit
ND:	Not Detected above detection limit.
PQL:	Practical Quantitation Limit
MS/MSD:	Matrix Spike/Matrix Spike Duplicate samples
LCS/LCSD:	Laboratory Control Sample/Laboratory Control Sample Duplicate
-:	Not analyzed for particular analyte
RPD:	Relative Percent Difference
RSD:	Relative Standard Deviation
CCV:	Continuous Calibration Verification standard

DATA QUALIFIERS

DO:	Surrogate spike Diluted Out
MI:	Matrix Interference prevents quantifying surrogate spike
DFXX:	Reported result calculated from Dilution Factor (XX = numerical value)
EST:	Concentration exceeded calibration range, reported value is an estimated quantity
CON1:	Analyte detected in method blank, sample concentration not significantly higher as in method blank (<10x)
CON2:	Analyte detected in method blank, analyte concentration in sample significantly higher as in method blank (>10x).
CONF1:	Second column confirmation, RPD between results less than 35%. Highest result reported.
CONF2:	Second column confirmation, RPD between results less than 35%. Lowest result reported.
CONF3:	Second column confirmation, RPD between results more than 35%. Lowest result reported.
CONF4:	Second column confirmation, RPD between results more than 35%. Highest result reported.
DETCONF!:	Components in bold print have been confirmed using a second detector (HALL/PID). RPD between results less than 35%.
DETCONF2:	Components in bold print have been confirmed using a second detector (HALL/PID). RPD between results more than 35%.
UNK:	Not identified as a typical product.
UNK"XXX":	Not a typical product. Chromatogram suggests it may be "XXXX".
DOUT1:	RPD for duplicates outside acceptable limits (65%-135%). Reanalysis did not improve result. Matrix probably nonhomogeneous.
DOUT2:	RPD for duplicates outside acceptable limits (65%-135%) as a result of analyte concentration near the MDL/PQL.
MSOUT1:	MS/MSD recovery outside acceptable limits (65%-135%). Reanalysis did not improve result.
MSOUT2:	MS/MSD RPD outside acceptable limits (65%-135%). Reanalysis did not improve results.
MSOUT3:	MS/MSD recovery or RPD outside acceptable limits (65%-135%). Reanalysis did not improve result. Matrix interference suspected.

STL Seattle

Duplicate Report

Client Sample ID:	MW1
Lab ID:	118918-01
Date Prepared:	1/21/04
Date Analyzed:	1/21/04
QC Batch ID:	ZD1568

Dissolved Mercury by CVAA - USEPA Method 7470

Parameter Name	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD %	Flag
Mercury	0.000071	0.00026	-110.0	X4a

SEVERN TRENT STL

STL Seattle
5755 8th Street East
Tacoma, WA 98424

Tel: 253 922 2310
Fax: 253 922 5047
www.stl-inc.com

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be < 40%.

C2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 40%. The higher result was reported unless anomalies were noted.

C3: Second analysis confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be ≤ 30%.

C4: Second analysis confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 30%. The original analysis was reported unless anomalies were noted.

M: GC/MS confirmation was performed. The result derived from the original analysis was reported.

D: The reported result for this analyte was calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

MRL: Method Reporting Limit

N: See analytical narrative

ND: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____.

X2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

X4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike recovery was not determined due to the required dilution.

X6: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8: Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.

TURNAROUND TIME: 5 Day

2.6a Feb 04 118918

CHAIN-OF-CUSTODY RECORD

CLIENT: ESN Pacific
ADDRESS: 1818 Kalai St Honolulu HI 96819
PHONE: 808-847-0067 FAX: 808-847-0917
CLIENT PROJECT #: PROJECT MANAGER: C Poma

DATE: 1/19/04 PAGE 1 OF 1
ESN PROJECT #: F40115
LOCATION: Kimura - Pier 29
COLLECTOR: DATE OF COLLECTION: 1/15

Sample Number	Depth	Time	Sample Type	Container Type	80218 HVOC	80218 BTEX	80218 MtBE	8015 GASOLINE	8015 DIESEL	8015 OIL	418.1 TRPH	8082 PCB	8100 PAH	TOTAL LEAD	TOTAL CADMIUM	TOTAL CHROMIUM	RCRA 8 diss metals		FIELD NOTES	Total Number Of Containers	Laboratory Note Number
MW1			H_2O	plastic													X		* Samples	1	
MW2																	X		already filtered	1	
MW3																	X		& preservated	1	
																			* RCRA 8:		
																			Silver (Ag), lead (Pb)		
																			Arsenic (As), Barium (Ba)		
																			Chromium (Cr), mercury (Hg)		
																			Cadmium (Cd), Selenium (Se)		

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	1-19-04 11:00am	Khase	1/20/04 9:30A
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS
CHAIN OF CUSTODY SEALS Y/N/NA
SEALS INTACT? Y/N/NA
RECEIVED GOOD COND./COLD
NOTES:

LABORATORY NOTES:

SEVERN TRENT STL

STL Seattle
5755 8th Street East
Tacoma, WA 98424

Tel: 253 922 2310
Fax: 253 922 5047
www.stl-inc.com

TRANSMITTAL MEMORANDUM

DATE: January 30, 2004

TO: Christina Poma
ESN Pacific, Inc.
1818 Kahai Street
Honolulu, HI 96819

PROJECT: F40115

REPORT NUMBER: 119060

TOTAL NUMBER OF PAGES: 27

Enclosed are the test results for twenty samples received at STL Seattle on January 27, 2004.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

for

Tom Watson
Project Manager

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender immediately at 253-922-2310 and destroy this report immediately.

STL Seattle

Sample Identification:

Lab. No.	Client ID	Date/Time Sampled	Matrix
119060-1	SB-1A	01-15-04 *	solid
119060-2	SB-1B	01-15-04 *	solid
119060-3	SB-2A	01-15-04 *	solid
119060-4	SB-2B	01-15-04 *	solid
119060-5	SB-3A	01-15-04 *	solid
119060-6	SB-3B	01-15-04 *	solid
119060-7	SB-4A	01-15-04 *	solid
119060-8	SB-4B	01-15-04 *	solid
119060-9	SB-5A	01-15-04 *	solid
119060-10	SB-5B	01-15-04 *	solid
119060-11	SB-6A	01-15-04 *	solid
119060-12	SB-6B	01-15-04 *	solid
119060-13	SB-7A	01-15-04 *	solid
119060-14	SB-7B	01-15-04 *	solid
119060-15	SB-8A	01-15-04 *	solid
119060-16	SB-8B	01-15-04 *	solid
119060-17	SB-9A	01-15-04 *	solid
119060-18	SB-9B	01-15-04 *	solid
119060-19	SB-10A	01-15-04 *	solid
119060-20	SB-10B	01-15-04 *	solid

* - Sampling time not specified for this sample

STL Seattle is a part of Severn Trent Laboratories, Inc.

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STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-1A
Lab ID:	119060-01
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	89.73

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	61.5	1.1	0.0523	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-1B
Lab ID:	119060-02
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	56.07

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	39.9	1.53	0.0726	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-2A
Lab ID:	119060-03
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	86.44

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	29.4	1.1	0.0522	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-2B
Lab ID:	119060-04
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	49.19

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	48	2.01	0.0958	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-3A
Lab ID:	119060-05
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	86.18

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	394	1.09	0.052	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-3B
Lab ID:	119060-06
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	63.59

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	44.5	1.51	0.072	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-4A
Lab ID:	119060-07
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	72.64

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	76.4	1.3	0.0619	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-4B
Lab ID:	119060-08
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	60.88

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	39.5	1.44	0.0684	

STL Seattle

Client Name	ESN Pacific, Inc.
Client ID:	SB-5A
Lab ID:	119060-09
Date Received:	1/27/04
Date Prepared:	1/29/04
Date Analyzed:	1/29/04
Dilution Factor	10
% Solids	88.08

Metals by ICP-MS - USEPA Method 6020

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	MDL	Flags
Barium	34.1	1.11	0.0528	

APPENDIX 3

SEDIMENT AND WATER TESTING,

PIER 29,

Marine Research Consultants,

APRIL 2006

MARINE RESEARCH CONSULTANTS, INC

SEDIMENT AND WATER TESTING

PIER 29 IMPROVEMENTS

Pier 29, Honolulu Harbor
Oahu, Hawaii

Prepared for:

R.M. Towill Corporation
420 Waiakamilo Rd., Suite 411
Honolulu, HI 96817

Prepared by:

Marine Research Consultants, Inc.
1039 Waakaua Pl.
Honolulu HI 96822

April 10, 2006

PROJECT BACKGROUND and PURPOSE

The State of Hawaii, Department of Transportation, Harbors Division (HDOT Harbors) is planning to make improvements to Pier 29, located in Honolulu Harbor. The Pier 29 improvement project involves extending the bulkhead piers 145 feet from Pier 29 to Pier 30 to create a continuous docking frontage.

Site characterization has indicated that soils within 45 feet of the existing edge of the Pier and groundwater near the proposed area of work on the land side of Pier 29 contain petroleum products and lead. Installation of new bulkhead piers will also require removal of an estimated 600 cubic yards of marine sediment in the area where the new piers will be installed. The sediment dredge depth is estimated to be 1-2 feet. Owing to the contamination of soils abutting Pier 29, it is also a concern during the planning process to evaluate the degree of contamination of sediments that will be removed during the excavation.

The purpose of the present report is to present the results of sampling and chemical analysis of sediment and water samples collected off of Pier 29. These results will provide an indication of the degree of contamination, and concentrations of constituents of concern. These data will also be used to complete a waste profile for acceptance approval from the PVT Landfill.

METHODS

In order to meet landfill requirements, the following constituents were analyzed from surface sediment and overlying water in the area of proposed dredging between Piers 29 and 30 in Honolulu Harbor:

- Toxicity Characteristic Leaching Procedure (TCLP) metals including
  - -TCLP cadmium (EPA method 1311 / 7130 or 6010),
  - -TCLP chromium (EPA method 1311 / 7190 or 6010), and
  - -TCLP lead (EPA method 1311 / 7420 or 6010;
- Ignitability;
- Total metals including
  - -Total cadmium (EPA 3050 / 6010 or 7130), and
  - -Total lead (EPA 3050 / 6010 or 7420;

- Total petroleum hydrocarbons (TPH) appropriate to the contaminant(s):
  - -TPH as gasoline (EPA method 5030 / 8015),and/or
  - -TPH as diesel (EPA method 3550 / 8015), and/or
  - -TPH as oil (EPA method 418.1 or 503E);
- Benzene, toluene, ethylbenzene, xylenes (BTEX;EPA method 5030 / 8020 or 8240);
- Polynuclear aromatic hydrocarbons (PAHs; EPA method 3550 / 8270 or 8310)
- Polychlorinated biphenyl's (PCBs; EPA method 3550 / 8080)
- Halogenated volatile organic compounds (HVOCs; EPA method 5030 / 8010)

Four sampling stations were established in a linear array between Piers 29 and 30 (Figure 1). Station 1 was located closest to Pier 30, and Station 4 was located closest to Pier 29. Sediment samples were collected at the base of the sloping harbor walls where soft sediment occurred.

Sediment and water samples were collected on March 4, 2006 by divers working from a small boat. All sampling was conducted between 0800 and 0915. Weather conditions were clear with light tradewinds. No vessel traffic transited the channel off the collection site during the period of work.

Sediment was collected in pre-labeled, sterile 1-liter amber glass jars. Upon entering the water, jars were opened on the surface and filled with water as the diver descended to the harbor floor. At the sampling location, the jar was inserted into the sediment and pushed along the sediment surface collecting material to a depth of approximately 3-4 inches, which was the general depth when hard bottom was encountered. When the jar was full, the cap was replaced underwater and the sample returned to the surface where it was immediately placed on ice. Water samples were collected with a 1.8 liter Niskin bottle. The Niskin bottle is lowered from the surface with spring-loaded end-caps cocked in an open position to allow free flow of water through the bottle. At the desired depth (approximately 3 feet above the sediment surface), a messenger released from the surface closes the endcaps, isolating a parcel of water. Upon retrieval of the bottle, water was poured into pre-labeled, sterile containers and placed on ice.

Samples were refrigerated at 4°C until March 6, 2006 when they were overnight air-shipped to Associated Labs in Orange CA. All samples were received in good condition well within the required holding times for all methods.

RESULTS

In order to meet landfill acceptance requirements, a wide variety of potential contaminants were analyzed in both sediments and overlying water. Table 1 provides a summary of the analytical results, while Appendix A consists of the complete analytical reports.

Several generalizations can be made regarding the analytical results. Several groups of compounds, including BTEX, Polychlorinated Biphenyls (PCB's) and Halogenated volatile organic compounds (HVOC's) were below the detection limits for all samples. Likewise, Ignitability of all sediment samples "passed", and all water samples were greater than 200° F.

In addition, analyses of water samples showed no concentrations of TCLP metals, Polychlorinated aromatic hydrocarbons (PAH's), Total Recoverable Petroleum Hydrocarbons (TRPH), Gasoline, and Diesel above detection limits (Table 1).

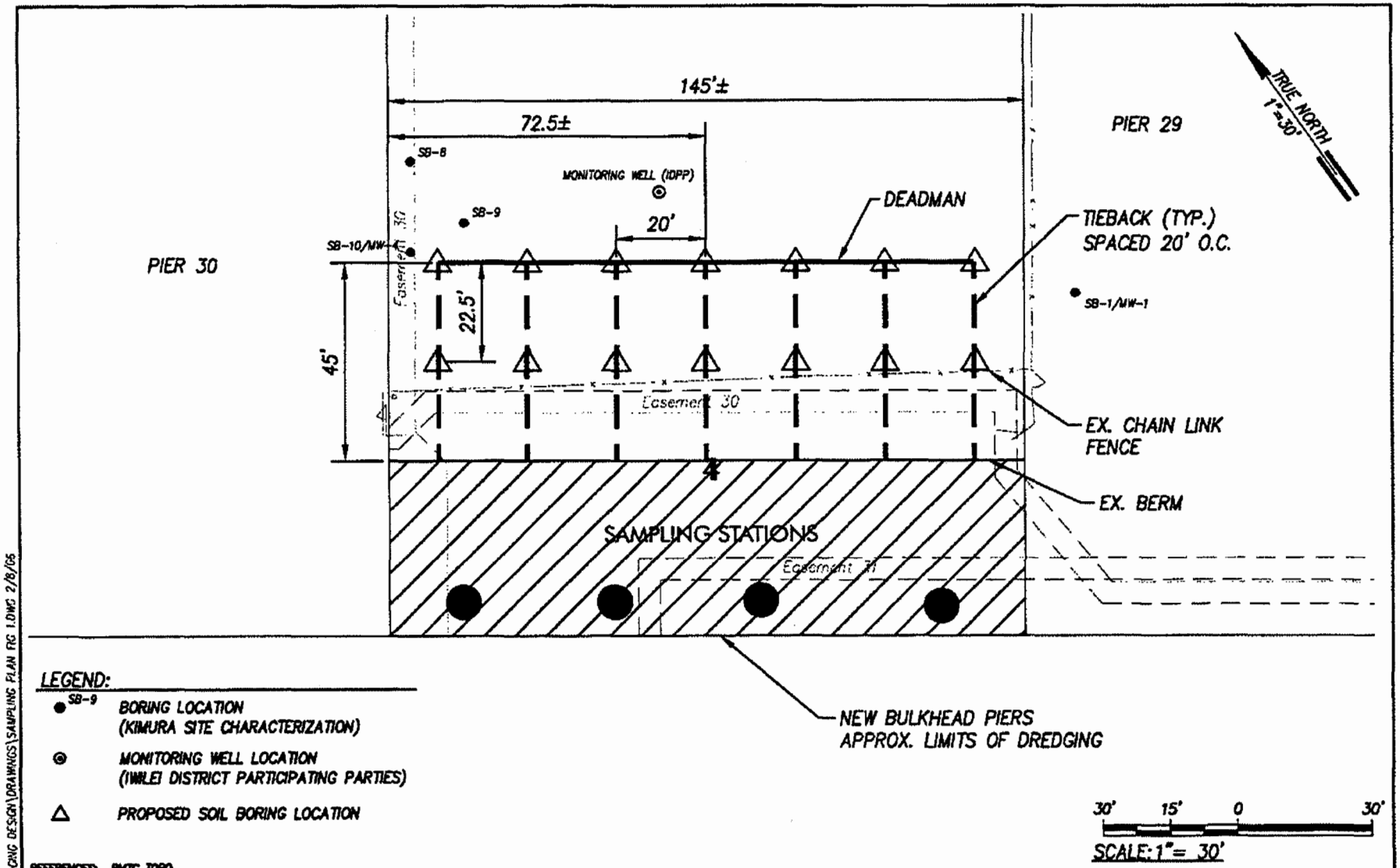
With respect to ICP metals, none of the sediment or water samples revealed detectable levels of Cadmium, Silver or Thallium. In addition, none of the water samples contained Mercury, or Nickel.

Considering the ICP metals that were measured in sediment and water samples, concentrations were relatively similar at all four stations, indicating uniform distribution across the subject area. Metals with the highest concentration in sediment were Chromium (30.3 - 33.0 mg/Kg), Barium (12.8 - 24.1 mg/Kg), Copper (21.2 - 34.2 mg/Kg), Nickel (20.5 - 32.7 mg/Kg), Vanadium (27.9 - 34.3 mg/Kg) and Zinc (65.7 - 91.4 mg/Kg) (Table 1).

TEPH Diesel was detected in all four sediment samples at concentrations ranging from 1.6 - 2.3 mg/Kg, while Total Recoverable Petroleum Hydrocarbons was detectable at concentrations of 44 to 112 mg/Kg at Stations 2-4. While Diesel was detected at Station 1 (2.2 mg/Kg), TRPH was not detectable at this site owing to the limit of detection of 10 mg/Kg (see Appendix A).

Several Polyaromatic hydrocarbons (PAH's) were detected in all sediment samples. These include Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, and Pyrene (Table 1). Several other PAH's occurred in at least one sediment sample. These compounds included Benzo(a)pyrene (Station 2), Benzo(k) fluoroanthene (Stations 1, 2), Chrysene (Station 2), Fluoroanthene (Stations 1,2 and 4), Indeno(1,2,3-cd)pyrene (Stations 2, 3 and 4) and Naphthalene (Station 1) (Table 1).

Principal Investigator	April 10, 2006 Date



REFERENCES: RMTC TOPO

element environmental, llc
environmental · engineering · water resources

PIER 29 SOIL AND SEDIMENT SAMPLING PLAN

SEDIMENT AND WATER SAMPLING STATIONS - PIER 29, HONOLULU HARBOR

FIGURE 1

\\406-002 PIER 29 DREDGING DESIGN\DRAWINGS\SAMPLING PLAN FIG 1.DWG 2/8/05

TABLE 1. Summary of results of sediment and water chemistry in the proposed area of dredging at Pier 29, Honolulu Harbor collected on March 4, 2006. Abbreviations are as follows: ND = not detected below indicated detection limit; NA= not applicable. For complete analytical reports, see Appendix A. For location of sampling sites, see Figure 1.

METHOD	ANALYTE	SED-1	SED-2	SED-3	SED-4	WATER-1	WATER-2	WATER-3	WATER-4
ICP CAM Metals (mg/Kg sed) (mg/L water)									
6010B	Antimony	ND	ND	ND	ND	0.045	ND	ND	ND
"	Arsenic	13.5	13.3	13.0	12.8	0.044	0.034	0.040	0.035
"	Barium	24.1	23.6	22.2	12.8	0.010	0.004	0.019	0.005
"	Beryllium	0.335	0.355	0.273	0.213	0.001	0.001	0.002	0.001
"	Cadmium	ND	ND	ND	ND	ND	ND	ND	ND
"	Chromium, total	32.4	33.0	30.3	30.3	0.006	0.006	0.007	0.006
"	Cobalt	7.20	9.39	6.83	5.93	0.001	0.001	0.001	0.001
"	Copper	34.2	21.1	22.5	24.1	0.001	0.002	0.001	0.001
"	Lead	24.5	23.1	21.2	25.0	0.014	0.015	0.015	0.014
"	Mercury	0.15	0.15	0.17	0.18	ND	ND	ND	ND
"	Molybdenum	ND	ND	ND	ND	0.014	ND	0.012	0.011
"	Nickel	24.4	32.7	23.1	20.5	ND	ND	ND	ND
"	Selenium	ND	ND	ND	ND	0.043	0.035	0.038	0.041
"	Silver	ND	ND	ND	ND	ND	ND	ND	ND
"	Thallium	ND	ND	ND	ND	ND	ND	ND	ND
"	Vanadium	34.3	32.9	28.6	27.9	0.020	0.021	0.022	0.022
"	Zinc	91.4	65.7	68.5	67.7	0.006	0.001	0.007	0.005
Total Recoverable Petroluem Hydrocarbons									
418.1	TRPH (mg/Kg sed) (mg/L water)	ND	98	112	44	ND	ND	ND	ND
Gasoline									
8015B	TPH-DHS (mg/Kg sed) (µg/L water)	ND	ND	ND	ND	ND	ND	ND	ND
TEPH Diesel									
8015	TEPH Diesel (mg/Kg sed)(mg/L water)	2.2	1.6	1.7	2.3	ND	ND	ND	ND
PAH's by HPLC (mg/Kg sed) (µg/L water)									
8310	Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND
"	Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND
"	Anthracene	ND	ND	ND	ND	ND	ND	ND	ND
"	Benzo(a)anthracene	ND	0.13	ND	ND	ND	ND	ND	ND
"	Benzo(a) pyrene	0.41	0.28	0.17	0.20	ND	ND	ND	ND
"	Benzo(b)fluoranthene	0.20	0.23	0.12	0.14	ND	ND	ND	ND
"	Benzo(ghi)perylene	0.23	0.24	0.18	0.22	ND	ND	ND	ND
"	Benzo(k)fluoranthene	0.14	0.12	ND	ND	ND	ND	ND	ND
"	Chrysene	ND	0.20	ND	ND	ND	ND	ND	ND
"	Dibenzo(a,h)anthrocene	ND	ND	ND	ND	ND	ND	ND	ND
"	Fluoranthene	0.12	0.62	ND	0.18	ND	ND	ND	ND
"	Fluorene	ND	ND	ND	ND	ND	ND	ND	ND
"	Indeno(1,2,3-cd)pyrene	ND	0.20	0.13	0.16	ND	ND	ND	ND
"	Naphthalene	0.16	ND	ND	ND	ND	ND	ND	ND
	Phenanthrene	ND	0.49	ND	ND	ND	ND	ND	ND
"	Pyrene	0.19	0.66	0.20	0.26	ND	ND	ND	ND
BTEX + MTBE (mg/Kg sed) (µg/L water)									
8021B/AVO	Benzene	ND	ND	ND	ND	ND	ND	ND	ND
"	Ethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
"	Toluene	ND	ND	ND	ND	ND	ND	ND	ND
"	Xylene (total)	ND	ND	ND	ND	ND	ND	ND	ND
Polychlorinated Biphenyls (PCBs) by GC (mg/Kg) (µg/L water)									
8082	PCB-1016	ND	ND	ND	ND	ND	ND	ND	ND
"	PCB-1221	ND	ND	ND	ND	ND	ND	ND	ND
"	PCB-1232	ND	ND	ND	ND	ND	ND	ND	ND
"	PCB-1242	ND	ND	ND	ND	ND	ND	ND	ND
"	PCB-1248	ND	ND	ND	ND	ND	ND	ND	ND
"	PCB-1254	ND	ND	ND	ND	ND	ND	ND	ND
"	PCB-1260	ND	ND	ND	ND	ND	ND	ND	ND
TCLP (ICP Metals) (mg/L)									
1311/6010	Arsenic TCLP	0.051	ND	ND	ND	ND	ND	ND	ND
"	Barium TCLP	0.902	0.824	0.910	0.689	ND	ND	ND	ND
"	Cadmium TCLP	ND	ND	ND	ND	ND	ND	ND	ND
"	Chromium TCLP	ND	ND	ND	ND	ND	ND	ND	ND
"	Lead TCLP	ND	ND	ND	ND	ND	ND	ND	ND
"	Selenium TCLP	0.051	ND	ND	ND	ND	ND	ND	ND
"	Silver TCLP	ND	ND	ND	ND	ND	ND	ND	ND
HVO Halogenated Volatile Organics (µg/Kg sed) (µg/L water)									
8021B/HVO	31 compounds (see Appendix A)	ND	ND	ND	ND	ND	ND	ND	ND
Ignitability of Solids									
1030	Ignitability/Burn rate	PASSES	PASSES	PASSES	PASSES	NA	NA	NA	NA
Ignitability by PM Closed Cup Method (deg. F)									
1010		NA	NA	NA	NA	>200	>200	>200	>200

APPENDIX A

LABORATORY RESULTS
ASSOCIATED LABS

PIER 29, HONOLULU HARBOR

SEDIMENT & WATER TESTING

ASSOCIATED LABORATORIES
806 North Batavia - Orange, California 92868 - 714/771-6900 *FAX 714/538-1209*

CLIENT Marine Research Consultants (5188)
ATTN: Steven Dollar
1039 Waakaua Pl.
Honolulu, HI 96822-1173

LAB REQUEST 165796
REPORTED 03/28/2006
RECEIVED 03/06/2006

SUBMITTER Client

COMMENTS

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods as indicated on the report. This cover letter is an integral part of the final report.

Order No.	Client Sample Identification
693148	#1 Pier 29
693349	#2 Pier 29
693350	#3 Pier 29
693351	#4 Pier 29

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

ASSOCIATED LABORATORIES by,

Robert A. Webber
Vice President

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 30 days from date reported.

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TESTING & CONSULTING
Chemical
Microbiological
Environmental

Order #: 693148 **Client Sample ID:** #1 Pier 29 **Log Date:** 03/07/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	TTLC Limit	STLC Limit	Result	DLR	Units	Date/Analyst
Cam Inorganics							
6010B	Antimony	500	15	ND	3.0	mg/Kg	03/15/06 KN
6010B	Arsenic	500	5.0	13.5	1.0	mg/Kg	03/15/06 KN
6010B	Barium	10,000	100	24.1	1.0	mg/Kg	03/15/06 KN
6010B	Beryllium	75	0.75	0.335	0.5	mg/Kg	03/15/06 KN
6010B	Cadmium	100	1.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Chromium, Total	2,500	560	32.4	1.0	mg/Kg	03/15/06 KN
6010B	Cobalt	8,000	80	7.20	0.5	mg/Kg	03/15/06 KN
6010B	Copper	2,500	25	34.2	1.0	mg/Kg	03/15/06 KN
6010B	Lead	1,000	5.0	24.5	0.5	mg/Kg	03/15/06 KN
7471A	Mercury	20	0.2	0.15	0.14	mg/Kg	03/10/06 MJ
6010B	Molybdenum	3,500	350	ND	1.0	mg/Kg	03/15/06 KN
6010B	Nickel	2,000	20	24.4	1.5	mg/Kg	03/15/06 KN
6010B	Selenium	100	1.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Silver	500	5.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Thallium	700	7.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Vanadium	2,400	24	34.3	0.5	mg/Kg	03/15/06 KN
6010B	Zinc	5,000	250	91.4	5.0	mg/Kg	03/15/06 KN
418.1 Total Recoverable Petroleum Hydrocarbons							
418.1	Total Recoverable Petroleum Hydrocarbons			ND	10	mg/Kg	03/09/06 TN
8015B - Gasoline							
TPH-DHS	Gasoline			ND	3	mg/Kg	03/10/06 LT
8310 PAH's by HPLC							
8310	Acenaphthene			ND	1.0	mg/Kg	03/15/06 RB
8310	Acenaphthylene			ND	1.0	mg/Kg	03/15/06 RB
8310	Anthracene			ND	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)anthracene			ND	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)pyrene			0.41	0.1	mg/Kg	03/15/06 RB
8310	Benzo(b)fluoranthene			0.20	0.1	mg/Kg	03/15/06 RB
8310	Benzo(ghi)perylene			0.23	0.1	mg/Kg	03/15/06 RB
8310	Benzo(k)fluoranthene			0.14	0.1	mg/Kg	03/15/06 RB
8310	Chrysene			ND	0.1	mg/Kg	03/15/06 RB
8310	Dibenzo(a,h)anthracene			ND	0.1	mg/Kg	03/15/06 RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693148 **Client Sample ID:** #1 Pier 29 **Log Date:** 03/07/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8310 PAH's by HPLC					
8310	Fluoranthene	0.12	0.1	mg/Kg	03/15/06 RB
8310	Fluorene	ND	0.3	mg/Kg	03/15/06 RB
8310	Indeno(1,2,3-cd)pyrene	ND	0.1	mg/Kg	03/15/06 RB
8310	Naphthalene	0.16	1.0	mg/Kg	03/15/06 RB
8310	Phenanthrene	ND	0.2	mg/Kg	03/15/06 RB
8310	Pyrene	0.19	0.1	mg/Kg	03/15/06 RB
8021B BTEX + MTBE					
8021B/AVO	Benzene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Ethyl benzene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Toluene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Xylene (total)	ND	0.015	mg/Kg	03/12/06 LZ
8082 - Polychlorinated Biphenyls (PCBs) by GC					
8082	PCB-1016	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1221	ND	0.06	mg/Kg	03/10/06 RB
8082	PCB-1232	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1242	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1248	ND	0.08	mg/Kg	03/10/06 RB
8082	PCB-1254	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1260	ND	0.03	mg/Kg	03/10/06 RB
1311/6010B TCLP (ICP Metals)					
1311/6010	Arsenic TCLP	0.051	0.05	mg/L	03/15/06 KN
1311/6010	Barium TCLP	0.902	0.10	mg/L	03/15/06 KN
1311/6010	Cadmium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Chromium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Lead TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Selenium TCLP	0.051	0.05	mg/L	03/15/06 KN
1311/6010	Silver TCLP	ND	0.05	mg/L	03/15/06 KN
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1,1-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1,2,2-Tetrachloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1,2-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LZ

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693148 **Client Sample ID:** #1 Pier 29 **Log Date:** 03/07/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1-Dichloroethane	ND	8.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1-Dichloroethene	ND	8.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dibromoethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichlorobenzene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichloropropane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,3-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,4-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	2-Chloroethylvinyl ether	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Bromoform	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Bromomethane	ND	20.0	ug/Kg	03/12/06 LZ
8021B/HVO	Carbon tetrachloride	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chlorobenzene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloroethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloroform	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloromethane	ND	20.0	ug/Kg	03/12/06 LZ
8021B/HVO	cis-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	cis-1,3-Dichloropropene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Dibromochloromethane	ND	10	ug/Kg	03/12/06 LZ
8021B/HVO	Dichlorobromomethane	ND	10	ug/Kg	03/12/06 LZ
8021B/HVO	Dichlorodifluoromethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Methylene Chloride	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Tetrachloroethene	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	trans-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	trans-1,3-Dichloropropene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Trichloroethene	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Trichlorofluoromethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Vinyl chloride	ND	20.0	ug/Kg	03/12/06 LZ
8015 TEPH Diesel					
8015	TEPH Diesel	2.2	1.0	mg/Kg	03/11/06 AF
1030 Ignitability of Solids					
1030	Ignitability / Burn Rate	Passes		mm/sec	03/14/06 HK

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693349 **Client Sample ID:** #2 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	TTLC Limit	STLC Limit	Result	DLR	Units	Date/Analyst
Cam Inorganics							
6010B	Antimony	500	15	ND	3.0	mg/Kg	03/15/06 KN
6010B	Arsenic	500	5.0	13.3	1.0	mg/Kg	03/15/06 KN
6010B	Barium	10,000	100	23.6	1.0	mg/Kg	03/15/06 KN
6010B	Beryllium	75	0.75	0.355	0.5	mg/Kg	03/15/06 KN
6010B	Cadmium	100	1.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Chromium, Total	2,500	560	33.0	1.0	mg/Kg	03/15/06 KN
6010B	Cobalt	8,000	80	9.39	0.5	mg/Kg	03/15/06 KN
6010B	Copper	2,500	25	21.1	1.0	mg/Kg	03/15/06 KN
6010B	Lead	1,000	5.0	23.1	0.5	mg/Kg	03/15/06 KN
7471A	Mercury	20	0.2	0.15	0.14	mg/Kg	03/10/06 MJ
6010B	Molybdenum	3,500	350	ND	1.0	mg/Kg	03/15/06 KN
6010B	Nickel	2,000	20	32.7	1.5	mg/Kg	03/15/06 KN
6010B	Selenium	100	1.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Silver	500	5.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Thallium	700	7.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Vanadium	2,400	24	32.9	0.5	mg/Kg	03/15/06 KN
6010B	Zinc	5,000	250	65.7	5.0	mg/Kg	03/15/06 KN
418.1 Total Recoverable Petroleum Hydrocarbons							
418.1	Total Recoverable Petroleum Hydrocarbons			98	10	mg/Kg	03/09/06 TN
8015B - Gasoline							
TPH-DHS	Gasoline			ND	3	mg/Kg	03/10/06 LT
8310 PAH's by HPLC							
8310	Acenaphthene			ND	1.0	mg/Kg	03/15/06 RB
8310	Acenaphthylene			ND	1.0	mg/Kg	03/15/06 RB
8310	Anthracene			ND	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)anthracene			0.13	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)pyrene			0.28	0.1	mg/Kg	03/15/06 RB
8310	Benzo(b)fluoranthene			0.23	0.1	mg/Kg	03/15/06 RB
8310	Benzo(ghi)perylene			0.24	0.1	mg/Kg	03/15/06 RB
8310	Benzo(k)fluoranthene			0.12	0.1	mg/Kg	03/15/06 RB
8310	Chrysene			0.20	0.1	mg/Kg	03/15/06 RB
8310	Dibenzo(a,h)anthracene			ND	0.1	mg/Kg	03/15/06 RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693349 **Client Sample ID:** #2 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8310 PAH's by HPLC					
8310	Fluoranthene	0.62	0.1	mg/Kg	03/15/06 RB
8310	Fluorene	ND	0.3	mg/Kg	03/15/06 RB
8310	Indeno(1,2,3-cd)pyrene	0.20	0.1	mg/Kg	03/15/06 RB
8310	Naphthalene	ND	1.0	mg/Kg	03/15/06 RB
8310	Phenanthrene	0.49	0.2	mg/Kg	03/15/06 RB
8310	Pyrene	0.66	0.1	mg/Kg	03/15/06 RB
8021B BTEX + MTBE					
8021B/AVO	Benzene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Ethyl benzene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Toluene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Xylene (total)	ND	0.015	mg/Kg	03/12/06 LZ
8082 - Polychlorinated Biphenyls (PCBs) by GC					
8082	PCB-1016	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1221	ND	0.06	mg/Kg	03/10/06 RB
8082	PCB-1232	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1242	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1248	ND	0.08	mg/Kg	03/10/06 RB
8082	PCB-1254	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1260	ND	0.03	mg/Kg	03/10/06 RB
1311/6010B TCLP (ICP Metals)					
1311/6010	Arsenic TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Barium TCLP	0.924	0.10	mg/L	03/15/06 KN
1311/6010	Cadmium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Chromium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Lead TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Selenium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Silver TCLP	ND	0.05	mg/L	03/15/06 KN
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1,1-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1,2,2-Tetrachloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1,2-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LZ

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693349 **Client Sample ID:** #2 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1-Dichloroethane	ND	8.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1-Dichloroethene	ND	8.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dibromoethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichlorobenzene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichloropropane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,3-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,4-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	2-Chloroethylvinyl ether	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Bromoform	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Bromomethane	ND	20.0	ug/Kg	03/12/06 LZ
8021B/HVO	Carbon tetrachloride	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chlorobenzene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloroethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloroform	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloromethane	ND	20.0	ug/Kg	03/12/06 LZ
8021B/HVO	cis-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	cis-1,3-Dichloropropene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Dibromochloromethane	ND	10	ug/Kg	03/12/06 LZ
8021B/HVO	Dichlorobromomethane	ND	10	ug/Kg	03/12/06 LZ
8021B/HVO	Dichlorodifluoromethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Methylene Chloride	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Tetrachloroethene	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	trans-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	trans-1,3-Dichloropropene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Trichloroethene	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Trichlorofluoromethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Vinyl chloride	ND	20.0	ug/Kg	03/12/06 LZ
8015 TEPH Diesel					
8015	TEPH Diesel	1.6	1.0	mg/Kg	03/11/06 AF
1030 Ignitability of Solids					
1030	Ignitability / Burn Rate	Passes		mm/sec	03/14/06 HK

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693350 **Client Sample ID:** #3 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	TTLC Limit	STLC Limit	Result	DLR	Units	Date/Analyst
Cam Inorganics							
6010B	Antimony	500	15	ND	3.0	mg/Kg	03/15/06 KN
6010B	Arsenic	500	5.0	13.0	1.0	mg/Kg	03/15/06 KN
6010B	Barium	10,000	100	22.2	1.0	mg/Kg	03/15/06 KN
6010B	Beryllium	75	0.75	0.273	0.5	mg/Kg	03/15/06 KN
6010B	Cadmium	100	1.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Chromium, Total	2,500	560	30.3	1.0	mg/Kg	03/15/06 KN
6010B	Cobalt	8,000	80	6.83	0.5	mg/Kg	03/15/06 KN
6010B	Copper	2,500	25	22.5	1.0	mg/Kg	03/15/06 KN
6010B	Lead	1,000	5.0	21.2	0.5	mg/Kg	03/15/06 KN
7471A	Mercury	20	0.2	0.17	0.14	mg/Kg	03/10/06 MJ
6010B	Molybdenum	3,500	350	ND	1.0	mg/Kg	03/15/06 KN
6010B	Nickel	2,000	20	23.1	1.5	mg/Kg	03/15/06 KN
6010B	Selenium	100	1.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Silver	500	5.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Thallium	700	7.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Vanadium	2,400	24	28.6	0.5	mg/Kg	03/15/06 KN
6010B	Zinc	5,000	250	68.5	5.0	mg/Kg	03/15/06 KN
418.1 Total Recoverable Petroleum Hydrocarbons							
418.1	Total Recoverable Petroleum Hydrocarbons			112	10	mg/Kg	03/09/06 TN
8015B - Gasoline							
TPH-DHS	Gasoline			ND	3	mg/Kg	03/10/06 LT
8310 PAH's by HPLC							
8310	Acenaphthene			ND	1.0	mg/Kg	03/15/06 RB
8310	Acenaphthylene			ND	1.0	mg/Kg	03/15/06 RB
8310	Anthracene			ND	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)anthracene			ND	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)pyrene			0.17	0.1	mg/Kg	03/15/06 RB
8310	Benzo(b)fluoranthene			0.12	0.1	mg/Kg	03/15/06 RB
8310	Benzo(ghi)perylene			0.18	0.1	mg/Kg	03/15/06 RB
8310	Benzo(k)fluoranthene			ND	0.1	mg/Kg	03/15/06 RB
8310	Chrysene			ND	0.1	mg/Kg	03/15/06 RB
8310	Dibenzo(a,h)anthracene			ND	0.1	mg/Kg	03/15/06 RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693350 **Client Sample ID:** #3 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8310 PAH's by HPLC					
8310	Fluoranthene	ND	0.1	mg/Kg	03/15/06 RB
8310	Fluorene	ND	0.3	mg/Kg	03/15/06 RB
8310	Indeno(1,2,3-cd)pyrene	0.13	0.1	mg/Kg	03/15/06 RB
8310	Naphthalene	ND	1.0	mg/Kg	03/15/06 RB
8310	Phenanthrene	ND	0.2	mg/Kg	03/15/06 RB
8310	Pyrene	0.20	0.1	mg/Kg	03/15/06 RB
8021B BTEX + MTBE					
8021B/AVO	Benzene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Ethyl benzene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Toluene	ND	0.005	mg/Kg	03/12/06 LZ
8021B/AVO	Xylene (total)	ND	0.015	mg/Kg	03/12/06 LZ
8082 - Polychlorinated Biphenyls (PCBs) by GC					
8082	PCB-1016	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1221	ND	0.06	mg/Kg	03/10/06 RB
8082	PCB-1232	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1242	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1248	ND	0.08	mg/Kg	03/10/06 RB
8082	PCB-1254	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1260	ND	0.03	mg/Kg	03/10/06 RB
1311/6010B TCLP (ICP Metals)					
1311/6010	Arsenic TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Barium TCLP	0.910	0.10	mg/L	03/15/06 KN
1311/6010	Cadmium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Chromium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Lead TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Selenium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Silver TCLP	ND	0.05	mg/L	03/15/06 KN
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1,1-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1,2,2-Tetrachloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1,2-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LZ

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693350 **Client Sample ID:** #3 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1-Dichloroethane	ND	8.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,1-Dichloroethene	ND	8.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dibromoethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichlorobenzene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichloroethane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,2-Dichloropropane	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,3-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	1,4-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	2-Chloroethylvinyl ether	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Bromoform	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Bromomethane	ND	20.0	ug/Kg	03/12/06 LZ
8021B/HVO	Carbon tetrachloride	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chlorobenzene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloroethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloroform	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Chloromethane	ND	20.0	ug/Kg	03/12/06 LZ
8021B/HVO	cis-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	cis-1,3-Dichloropropene	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Dibromochloromethane	ND	10	ug/Kg	03/12/06 LZ
8021B/HVO	Dichlorobromomethane	ND	10	ug/Kg	03/12/06 LZ
8021B/HVO	Dichlorodifluoromethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Methylene Chloride	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Tetrachloroethene	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	trans-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	trans-1,3-Dichloropropene	ND	10.0	ug/Kg	03/12/06 LZ
8021B/HVO	Trichloroethene	ND	5.0	ug/Kg	03/12/06 LZ
8021B/HVO	Trichlorofluoromethane	ND	15.0	ug/Kg	03/12/06 LZ
8021B/HVO	Vinyl chloride	ND	20.0	ug/Kg	03/12/06 LZ
8015 TEPH Diesel					
8015	TEPH Diesel	1.7	1.0	mg/Kg	03/11/06 AF
1030 Ignitability of Solids					
1030	Ignitability / Burn Rate	Passes		mm/sec	03/14/06 HK

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693351 **Client Sample ID:** #4 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	TTLC Limit	STLC Limit	Result	DLR	Units	Date/Analyst
Cam Inorganics							
6010B	Antimony	500	15	ND	3.0	mg/Kg	03/15/06 KN
6010B	Arsenic	500	5.0	12.8	1.0	mg/Kg	03/15/06 KN
6010B	Barium	10,000	100	12.8	1.0	mg/Kg	03/15/06 KN
6010B	Beryllium	75	0.75	0.213	0.5	mg/Kg	03/15/06 KN
6010B	Cadmium	100	1.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Chromium, Total	2,500	560	30.3	1.0	mg/Kg	03/15/06 KN
6010B	Cobalt	8,000	80	5.93	0.5	mg/Kg	03/15/06 KN
6010B	Copper	2,500	25	24.1	1.0	mg/Kg	03/15/06 KN
6010B	Lead	1,000	5.0	25.0	0.5	mg/Kg	03/15/06 KN
7471A	Mercury	20	0.2	0.18	0.14	mg/Kg	03/10/06 MJ
6010B	Molybdenum	3,500	350	ND	1.0	mg/Kg	03/15/06 KN
6010B	Nickel	2,000	20	20.5	1.5	mg/Kg	03/15/06 KN
6010B	Selenium	100	1.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Silver	500	5.0	ND	0.5	mg/Kg	03/15/06 KN
6010B	Thallium	700	7.0	ND	1.0	mg/Kg	03/15/06 KN
6010B	Vanadium	2,400	24	27.9	0.5	mg/Kg	03/15/06 KN
6010B	Zinc	5,000	250	67.7	5.0	mg/Kg	03/15/06 KN
418.1 Total Recoverable Petroleum Hydrocarbons							
418.1	Total Recoverable Petroleum Hydrocarbons			44	10	mg/Kg	03/09/06 TN
8015B - Gasoline							
TPH-DHS	Gasoline			ND	3	mg/Kg	03/10/06 LT
8310 PAH's by HPLC							
8310	Acenaphthene			ND	1.0	mg/Kg	03/15/06 RB
8310	Acenaphthylene			ND	1.0	mg/Kg	03/15/06 RB
8310	Anthracene			ND	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)anthracene			ND	0.1	mg/Kg	03/15/06 RB
8310	Benzo(a)pyrene			0.20	0.1	mg/Kg	03/15/06 RB
8310	Benzo(b)fluoranthene			0.14	0.1	mg/Kg	03/15/06 RB
8310	Benzo(ghi)perylene			0.22	0.1	mg/Kg	03/15/06 RB
8310	Benzo(k)fluoranthene			ND	0.1	mg/Kg	03/15/06 RB
8310	Chrysene			ND	0.1	mg/Kg	03/15/06 RB
8310	Dibenzo(a,h)anthracene			ND	0.1	mg/Kg	03/15/06 RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693351 **Client Sample ID:** #4 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8310 PAH's by HPLC					
8310	Fluoranthene	0.18	0.1	mg/Kg	03/15/06 RB
8310	Fluorene	ND	0.3	mg/Kg	03/15/06 RB
8310	Indeno(1,2,3-cd)pyrene	0.16	0.1	mg/Kg	03/15/06 RB
8310	Naphthalene	ND	1.0	mg/Kg	03/15/06 RB
8310	Phenanthrene	ND	0.2	mg/Kg	03/15/06 RB
8310	Pyrene	0.26	0.1	mg/Kg	03/15/06 RB
8021B BTEX + MTBE					
8021B/AVO	Benzene	ND	0.005	mg/Kg	03/12/06 LT
8021B/AVO	Ethyl benzene	ND	0.005	mg/Kg	03/12/06 LT
8021B/AVO	Toluene	ND	0.005	mg/Kg	03/12/06 LT
8021B/AVO	Xylene (total)	ND	0.015	mg/Kg	03/12/06 LT
8082 - Polychlorinated Biphenyls (PCBs) by GC					
8082	PCB-1016	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1221	ND	0.06	mg/Kg	03/10/06 RB
8082	PCB-1232	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1242	ND	0.05	mg/Kg	03/10/06 RB
8082	PCB-1248	ND	0.08	mg/Kg	03/10/06 RB
8082	PCB-1254	ND	0.03	mg/Kg	03/10/06 RB
8082	PCB-1260	ND	0.03	mg/Kg	03/10/06 RB
1311/6010B TCLP (ICP Metals)					
1311/6010	Arsenic TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Barium TCLP	0.689	0.10	mg/L	03/15/06 KN
1311/6010	Cadmium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Chromium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Lead TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Selenium TCLP	ND	0.05	mg/L	03/15/06 KN
1311/6010	Silver TCLP	ND	0.05	mg/L	03/15/06 KN
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1,1-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	1,1,2,2-Tetrachloroethane	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	1,1,2-Trichloroethane	ND	5.0	ug/Kg	03/12/06 LT

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

Order #: 693351 **Client Sample ID:** #4 Pier 29 **Log Date:** 03/08/20

Matrix: SOLID

Date Sampled: 03/04/2006
Time Sampled: 08:00

Method	Analyte	Result	DLR	Units	Date/Analyst
8021B/HVO Halogenated Volatile Organics					
8021B/HVO	1,1-Dichloroethane	ND	8.0	ug/Kg	03/12/06 LT
8021B/HVO	1,1-Dichloroethene	ND	8.0	ug/Kg	03/12/06 LT
8021B/HVO	1,2-Dibromoethane	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	1,2-Dichlorobenzene	ND	10.0	ug/Kg	03/12/06 LT
8021B/HVO	1,2-Dichloroethane	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	1,2-Dichloropropane	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	1,3-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LT
8021B/HVO	1,4-Dichlorobenzene	ND	15.0	ug/Kg	03/12/06 LT
8021B/HVO	2-Chloroethylvinyl ether	ND	10.0	ug/Kg	03/12/06 LT
8021B/HVO	Bromoform	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	Bromomethane	ND	20.0	ug/Kg	03/12/06 LT
8021B/HVO	Carbon tetrachloride	ND	10.0	ug/Kg	03/12/06 LT
8021B/HVO	Chlorobenzene	ND	10.0	ug/Kg	03/12/06 LT
8021B/HVO	Chloroethane	ND	15.0	ug/Kg	03/12/06 LT
8021B/HVO	Chloroform	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	Chloromethane	ND	20.0	ug/Kg	03/12/06 LT
8021B/HVO	cis-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LT
8021B/HVO	cis-1,3-Dichloropropene	ND	15.0	ug/Kg	03/12/06 LT
8021B/HVO	Dibromochloromethane	ND	10	ug/Kg	03/12/06 LT
8021B/HVO	Dichlorobromomethane	ND	10	ug/Kg	03/12/06 LT
8021B/HVO	Dichlorodifluoromethane	ND	15.0	ug/Kg	03/12/06 LT
8021B/HVO	Methylene Chloride	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	Tetrachloroethene	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	trans-1,2-Dichloroethene	ND	10.0	ug/Kg	03/12/06 LT
8021B/HVO	trans-1,3-Dichloropropene	ND	10.0	ug/Kg	03/12/06 LT
8021B/HVO	Trichloroethene	ND	5.0	ug/Kg	03/12/06 LT
8021B/HVO	Trichlorofluoromethane	ND	15.0	ug/Kg	03/12/06 LT
8021B/HVO	Vinyl chloride	ND	20.0	ug/Kg	03/12/06 LT
8015 TEPH Diesel					
8015	TEPH Diesel	2.3	1.0	mg/Kg	03/11/06 AF
1030 Ignitability of Solids					
1030	Ignitability / Burn Rate	Passes		mm/sec	03/14/06 HK

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit

CHAIN OF CUSTODY

SUBMITTED BY:

MARINE RESEARCH CONSULTANTS, INC.
1039 Waakaua Pl. Honolulu, HI 96822

SUBMITTED TO:

ASSOCIATED LABS
806 N. BATAVIA ORANGE, CA 92868

PROJECT: PIER 29

SAMPLE NO.	SAMPLE ID	DATE	TIME	SAMPLE TYPE	# OF CONTAINERS	REQUESTED ANALYSES	PRESERVE
1	PIER 29	3/4/06	0800		4	SEE ATTACHED LIST	ICE
2	SEDIMENT						
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

SAMPLED BY:	RELINQUISHED BY:	RECEIVED BY:
S Dolan 3/4/06	S Dolan 3/6/06	
PRINT DATE	PRINT DATE	PRINT DATE
0800	0700	3/6/06 10:2
SIGNATURE TIME	SIGNATURE TIME	SIGNATURE TIME

PLEASE SIGN AND RETURN WITH SAMPLE RESULTS 3-9-06 4:20

ASSOCIATED LABORATORIES
806 North Batavia - Orange, California 92868 - 714/771-6900 *FAX 714/538-1209*

CLIENT Marine Research Consultants (5188)
ATTN: Steven Dollar
1039 Waakaua Pl.
Honolulu, HI 96822-1173

LAB REQUEST 165797
REPORTED 03/28/2006
RECEIVED 03/06/2006

SUBMITTER Client

COMMENTS

This laboratory request covers the following listed samples which were analyzed for the parameters indicated on the attached Analytical Result Report. All analyses were conducted using the appropriate methods as indicated on the report. This cover letter is an integral part of the final report.

Order No.	Client Sample Identification
693150	#1 Pier 29
693417	#2 Pier 29
693418	#3 Pier 29
693419	#4 Pier 29

Thank you for the opportunity to be of service to your company. Please feel free to call if there are any questions regarding this report or if we can be of further service.

ASSOCIATED LABORATORIES by,

Robert A. Webber
Vice President

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 30 days from date reported.

The reports of the Associated Laboratories are confidential property of our clients and may not be reproduced or used for publication in part or in full without our written permission. This is for the mutual protection of the public, our clients, and ourselves.

TESTING & CONSULTING
Chemical
Microbiological
Environmental

Order #: 693150
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #1 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
1010 Ignitability by PM Closed Cup Method						
Ignitability by PM Closed Cup Method	>200	1		deg F	03/14/06	HK
1311/6010B TCLP (ICP Metals)						
Arsenic TCLP	ND	1	0.05	mg/L	03/15/06	KN
Barium TCLP	ND	1	0.10	mg/L	03/15/06	KN
Cadmium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Chromium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Lead TCLP	ND	1	0.05	mg/L	03/15/06	KN
Selenium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Silver TCLP	ND	1	0.05	mg/L	03/15/06	KN
418.1 Total Recoverable Petroleum Hydrocarbons						
Total Recoverable Petroleum Hydrocarbons	ND	1	1.0	mg/L	03/09/06	TN
6010B ICP CAM Metals Only (W/S/W)						
Antimony	0.045	1	0.02	mg/L	03/15/06	KN
Arsenic	0.044	1	0.005	mg/L	03/15/06	KN
Barium	0.010	1	0.01	mg/L	03/15/06	KN
Beryllium	0.001	1	0.005	mg/L	03/15/06	KN
Cadmium	ND	1	0.005	mg/L	03/15/06	KN
Chromium	0.006	1	0.01	mg/L	03/15/06	KN
Cobalt	0.001	1	0.005	mg/L	03/15/06	KN
Copper	0.001	1	0.01	mg/L	03/15/06	KN
Lead	0.014	1	0.005	mg/L	03/15/06	KN
Molybdenum	0.014	1	0.01	mg/L	03/15/06	KN
Nickel	ND	1	0.02	mg/L	03/15/06	KN
Selenium	0.043	1	0.01	mg/L	03/15/06	KN
Silver	ND	1	0.005	mg/L	03/15/06	KN
Thallium	ND	1	0.005	mg/L	03/15/06	KN

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693150
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #1 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
6010B ICP CAM Metals Only (W/S/W)						
Vanadium	0.020	1	0.005	mg/L	03/15/06	KN
Zinc	0.006	1	0.02	mg/L	03/15/06	KN
7470A Mercury in Water						
Mercury	ND	1	0.0004	mg/L	03/10/60	MJ
8015 TEPH Diesel						
TEPH Diesel	ND	1	0.1	mg/L	03/09/06	AF
Surrogates				**Units**	**Control Limits**	
o-Terphenyl (sur)	100			%	55 - 200	
8021B BTEX + MTBE						
Benzene	ND	1	0.3	ug/L	03/11/06	LZ
Ethyl benzene	ND	1	0.3	ug/L	03/11/06	LZ
Toluene	ND	1	0.3	ug/L	03/11/06	LZ
Xylene (total)	ND	1	0.6	ug/L	03/11/06	LZ
8021B/HVO Halogenated Volatile Organics						
1,1,1-Trichloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,1,2,2-Tetrachloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,1,2-Trichloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,1-Dichloroethane	ND	1	0.8	ug/L	03/11/06	LZ
1,1-Dichloroethene	ND	1	0.8	ug/L	03/11/06	LZ
1,2-Dibromoethane	ND	1	1.0	ug/L	03/11/06	LZ
1,2-Dichlorobenzene	ND	1	1.0	ug/L	03/11/06	LZ
1,2-Dichloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,2-Dichloropropane	ND	1	0.5	ug/L	03/11/06	LZ
1,3-Dichlorobenzene	ND	1	2.0	ug/L	03/11/06	LZ
1,4-Dichlorobenzene	ND	1	1.0	ug/L	03/11/06	LZ

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693150
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #1 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
8021B/HVO Halogenated Volatile Organics						
2-Chloroethylvinyl ether	ND	1	0.7	ug/L	03/11/06	LZ
Bromoform	ND	1	0.5	ug/L	03/11/06	LZ
Bromomethane	ND	1	1.0	ug/L	03/11/06	LZ
Carbon tetrachloride	ND	1	0.7	ug/L	03/11/06	LZ
Chlorobenzene	ND	1	1.0	ug/L	03/11/06	LZ
Chloroethane	ND	1	0.5	ug/L	03/11/06	LZ
Chloroform	ND	1	0.5	ug/L	03/11/06	LZ
Chloromethane	ND	1	1.0	ug/L	03/11/06	LZ
cis-1,2-Dichloroethene	ND	1	0.5	ug/L	03/11/06	LZ
cis-1,3-Dichloropropene	ND	1	1.5	ug/L	03/11/06	LZ
Dibromochloromethane	ND	1	0.5	ug/L	03/11/06	LZ
Dichlorobromomethane	ND	1	0.5	ug/L	03/11/06	LZ
Dichlorodifluoromethane	ND	1	2.0	ug/L	03/11/06	LZ
Methylene Chloride	ND	1	1.0	ug/L	03/11/06	LZ
Tetrachloroethene	ND	1	0.5	ug/L	03/11/06	LZ
trans-1,2-Dichloroethene	ND	1	0.8	ug/L	03/11/06	LZ
trans-1,3-Dichloropropene	ND	1	1.5	ug/L	03/11/06	LZ
Trichloroethene	ND	1	0.6	ug/L	03/11/06	LZ
Trichlorofluoromethane	ND	1	0.5	ug/L	03/11/06	LZ
Vinyl chloride	ND	1	1.0	ug/L	03/11/06	LZ
Surrogates				**Units**	**Control Limits**	
Sur-2-Bromochlorobutane (Hall)	88			%	55 - 156	

8082 - Polychlorinated Biphenyls (PCBs) by GC

PCB-1016	ND	1	0.5	ug/L	03/15/06	RB
PCB-1221	ND	1	0.5	ug/L	03/15/06	RB
PCB-1232	ND	1	0.5	ug/L	03/15/06	RB
PCB-1242	ND	1	0.5	ug/L	03/15/06	RB
PCB-1248	ND	1	0.5	ug/L	03/15/06	RB
PCB-1254	ND	1	0.5	ug/L	03/15/06	RB
PCB-1260	ND	1	0.5	ug/L	03/15/06	RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693150
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #1 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	

8082 - Polychlorinated Biphenyls (PCBs) by GC

Surrogates		Units	Control Limits
DCB(Sur)	81	%	60 - 130

8310 PAH's by HPLC

Acenaphthene	ND	1	18	ug/L	03/15/06	MP
Acenaphthylene	ND	1	23	ug/L	03/15/06	MP
Anthracene	ND	1	6.6	ug/L	03/15/06	MP
Benzo(a)anthracene	ND	1	0.13	ug/L	03/15/06	MP
Benzo(a)pyrene	ND	1	0.23	ug/L	03/15/06	MP
Benzo(b)fluoranthene	ND	1	0.18	ug/L	03/15/06	MP
Benzo(ghi)perylene	ND	1	0.76	ug/L	03/15/06	MP
Benzo(k)fluoranthene	ND	1	0.17	ug/L	03/15/06	MP
Chrysene	ND	1	1.5	ug/L	03/15/06	MP
Dibenzo(a,h)anthracene	ND	1	0.3	ug/L	03/15/06	MP
Fluoranthene	ND	1	2.1	ug/L	03/15/06	MP
Fluorene	ND	1	2.1	ug/L	03/15/06	MP
Indeno(1,2,3-cd)pyrene	ND	1	0.43	ug/L	03/15/06	MP
Naphthalene	ND	1	18	ug/L	03/15/06	MP
Phenanthrene	ND	1	6.4	ug/L	03/15/06	MP
Pyrene	ND	1	2.7	ug/L	03/15/06	MP

Surrogates		Units	Control Limits
p-Terphenyl (sur)	99	%	50 - 135

8015B - Gasoline

Gasoline	ND	1	50	ug/L	03/09/06	SU

Surrogates		Units	Control Limits
a,a,a-Trifluorotoluene	98	%	55 - 200

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693417
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #2 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
1010 Ignitability by PM Closed Cup Method						
Ignitability by PM Closed Cup Method	>200	1		deg F	03/14/06	HK
1311/6010B TCLP (ICP Metals)						
Arsenic TCLP	ND	1	0.05	mg/L	03/15/06	KN
Barium TCLP	ND	1	0.10	mg/L	03/15/06	KN
Cadmium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Chromium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Lead TCLP	ND	1	0.05	mg/L	03/15/06	KN
Selenium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Silver TCLP	ND	1	0.05	mg/L	03/15/06	KN
418.1 Total Recoverable Petroleum Hydrocarbons						
Total Recoverable Petroleum Hydrocarbons	ND	1	1.0	mg/L	03/09/06	TN
6010B ICP CAM Metals Only (W/S/W)						
Antimony	ND	1	0.02	mg/L	03/15/06	KN
Arsenic	0.034	1	0.005	mg/L	03/15/06	KN
Barium	0.004	1	0.01	mg/L	03/15/06	KN
Beryllium	0.001	1	0.005	mg/L	03/15/06	KN
Cadmium	ND	1	0.005	mg/L	03/15/06	KN
Chromium	0.006	1	0.01	mg/L	03/15/06	KN
Cobalt	0.001	1	0.005	mg/L	03/15/06	KN
Copper	0.002	1	0.01	mg/L	03/15/06	KN
Lead	0.015	1	0.005	mg/L	03/15/06	KN
Molybdenum	ND	1	0.01	mg/L	03/15/06	KN
Nickel	ND	1	0.02	mg/L	03/15/06	KN
Selenium	0.035	1	0.01	mg/L	03/15/06	KN
Silver	ND	1	0.005	mg/L	03/15/06	KN
Thallium	ND	1	0.005	mg/L	03/15/06	KN

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693417
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #2 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
6010B ICP CAM Metals Only (W/S/W)						
Vanadium	0.021	1	0.005	mg/L	03/15/06	KN
Zinc	0.006	1	0.02	mg/L	03/15/06	KN
7470A Mercury in Water						
Mercury	ND	1	0.0004	mg/L	03/10/06	MJ
8015 TEPH Diesel						
TEPH Diesel	ND	1	0.1	mg/L	03/09/06	AF
Surrogates				**Units**	**Control Limits**	
o-Terphenyl (sur)	85			%	55 - 200	
8021B BTEX + MTBE						
Benzene	ND	1	0.3	ug/L	03/10/06	LZ
Ethyl benzene	ND	1	0.3	ug/L	03/10/06	LZ
Toluene	ND	1	0.3	ug/L	03/10/06	LZ
Xylene (total)	ND	1	0.6	ug/L	03/10/06	LZ
8021B/HVO Halogenated Volatile Organics						
1,1,1-Trichloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,1,2,2-Tetrachloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,1,2-Trichloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,1-Dichloroethane	ND	1	0.8	ug/L	03/10/06	LZ
1,1-Dichloroethene	ND	1	0.8	ug/L	03/10/06	LZ
1,2-Dibromoethane	ND	1	1.0	ug/L	03/10/06	LZ
1,2-Dichlorobenzene	ND	1	1.0	ug/L	03/10/06	LZ
1,2-Dichloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,2-Dichloropropane	ND	1	0.5	ug/L	03/10/06	LZ
1,3-Dichlorobenzene	ND	1	2.0	ug/L	03/10/06	LZ
1,4-Dichlorobenzene	ND	1	1.0	ug/L	03/10/06	LZ

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693417
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #2 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
8021B/HVO Halogenated Volatile Organics						
2-Chloroethylvinyl ether	ND	1	0.7	ug/L	03/10/06	LZ
Bromoform	ND	1	0.5	ug/L	03/10/06	LZ
Bromomethane	ND	1	1.0	ug/L	03/10/06	LZ
Carbon tetrachloride	ND	1	0.7	ug/L	03/10/06	LZ
Chlorobenzene	ND	1	1.0	ug/L	03/10/06	LZ
Chloroethane	ND	1	0.5	ug/L	03/10/06	LZ
Chloroform	ND	1	0.5	ug/L	03/10/06	LZ
Chloromethane	ND	1	1.0	ug/L	03/10/06	LZ
cis-1,2-Dichloroethene	ND	1	0.5	ug/L	03/10/06	LZ
cis-1,3-Dichloropropene	ND	1	1.5	ug/L	03/10/06	LZ
Dibromochloromethane	ND	1	0.5	ug/L	03/10/06	LZ
Dichlorobromomethane	ND	1	0.5	ug/L	03/10/06	LZ
Dichlorodifluoromethane	ND	1	2.0	ug/L	03/10/06	LZ
Methylene Chloride	ND	1	1.0	ug/L	03/10/06	LZ
Tetrachloroethene	ND	1	0.5	ug/L	03/10/06	LZ
trans-1,2-Dichloroethene	ND	1	0.8	ug/L	03/10/06	LZ
trans-1,3-Dichloropropene	ND	1	1.5	ug/L	03/10/06	LZ
Trichloroethene	ND	1	0.6	ug/L	03/10/06	LZ
Trichlorofluoromethane	ND	1	0.5	ug/L	03/10/06	LZ
Vinyl chloride	ND	1	1.0	ug/L	03/10/06	LZ
Surrogates				**Units**	**Control Limits**	
Sur-2-Bromochlorobutane (Hall)	87			%	55 - 156	

8082 - Polychlorinated Biphenyls (PCBs) by GC

PCB-1016	ND	1	0.5	ug/L	03/15/06	RB
PCB-1221	ND	1	0.5	ug/L	03/15/06	RB
PCB-1232	ND	1	0.5	ug/L	03/15/06	RB
PCB-1242	ND	1	0.5	ug/L	03/15/06	RB
PCB-1248	ND	1	0.5	ug/L	03/15/06	RB
PCB-1254	ND	1	0.5	ug/L	03/15/06	RB
PCB-1260	ND	1	0.5	ug/L	03/15/06	RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693417
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #2 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
8082 - Polychlorinated Biphenyls (PCBs) by GC						
Surrogates				**Units**	**Control Limits**	
DCB(Sur)	89			%	60 - 130	
8310 PAH's by HPLC						
Acenaphthene	ND	1	18	ug/L	03/15/06	MP
Acenaphthylene	ND	1	23	ug/L	03/15/06	MP
Anthracene	ND	1	6.6	ug/L	03/15/06	MP
Benzo(a)anthracene	ND	1	0.13	ug/L	03/15/06	MP
Benzo(a)pyrene	ND	1	0.23	ug/L	03/15/06	MP
Benzo(b)fluoranthene	ND	1	0.18	ug/L	03/15/06	MP
Benzo(ghi)perylene	ND	1	0.76	ug/L	03/15/06	MP
Benzo(k)fluoranthene	ND	1	0.17	ug/L	03/15/06	MP
Chrysene	ND	1	1.5	ug/L	03/15/06	MP
Dibenzo(a,h)anthracene	ND	1	0.3	ug/L	03/15/06	MP
Fluoranthene	ND	1	2.1	ug/L	03/15/06	MP
Fluorene	ND	1	2.1	ug/L	03/15/06	MP
Indeno(1,2,3-cd)pyrene	ND	1	0.43	ug/L	03/15/06	MP
Naphthalene	ND	1	18	ug/L	03/15/06	MP
Phenanthrene	ND	1	6.4	ug/L	03/15/06	MP
Pyrene	ND	1	2.7	ug/L	03/15/06	MP
Surrogates				**Units**	**Control Limits**	
p-Terphenyl (sur)	104			%	50 - 135	
8015B - Gasoline						
Gasoline	ND	1	50	ug/L	03/28/06	SU
Surrogates				**Units**	**Control Limits**	
a,a,a-Trifluorotoluene	72			%	55 - 200	

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693418
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #3 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
1010 Ignitability by PM Closed Cup Method						
Ignitability by PM Closed Cup Method	>200	1		deg F	03/14/06	HK
1311/6010B TCLP (ICP Metals)						
Arsenic TCLP	ND	1	0.05	mg/L	03/15/06	KN
Barium TCLP	ND	1	0.10	mg/L	03/15/06	KN
Cadmium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Chromium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Lead TCLP	ND	1	0.05	mg/L	03/15/06	KN
Selenium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Silver TCLP	ND	1	0.05	mg/L	03/15/06	KN
418.1 Total Recoverable Petroleum Hydrocarbons						
Total Recoverable Petroleum Hydrocarbons	ND	1	1.0	mg/L	03/09/06	TN
6010B ICP CAM Metals Only (W/S/W)						
Antimony	ND	1	0.02	mg/L	03/15/06	KN
Arsenic	0.040	1	0.005	mg/L	03/15/06	KN
Barium	0.019	1	0.01	mg/L	03/15/06	KN
Beryllium	0.002	1	0.005	mg/L	03/15/06	KN
Cadmium	ND	1	0.005	mg/L	03/15/06	KN
Chromium	0.007	1	0.01	mg/L	03/15/06	KN
Cobalt	0.001	1	0.005	mg/L	03/15/06	KN
Copper	0.001	1	0.01	mg/L	03/15/06	KN
Lead	0.015	1	0.005	mg/L	03/15/06	KN
Molybdenum	0.012	1	0.01	mg/L	03/15/06	KN
Nickel	ND	1	0.02	mg/L	03/15/06	KN
Selenium	0.038	1	0.01	mg/L	03/15/06	KN
Silver	ND	1	0.005	mg/L	03/15/06	KN
Thallium	ND	1	0.005	mg/L	03/15/06	KN

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693418
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #3 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
6010B ICP CAM Metals Only (W/S/W)						
Vanadium	0.022	1	0.005	mg/L	03/15/06	KN
Zinc	0.007	1	0.02	mg/L	03/15/06	KN
7470A Mercury in Water						
Mercury	ND	1	0.0004	mg/L	03/10/06	MJ
8015 TEPH Diesel						
TEPH Diesel	ND	1	0.1	mg/L	03/09/06	AF
Surrogates				**Units**	**Control Limits**	
o-Terphenyl (sur)	102			%	55 - 200	
8021B BTEX + MTBE						
Benzene	ND	1	0.3	ug/L	03/10/06	LZ
Ethyl benzene	ND	1	0.3	ug/L	03/10/06	LZ
Toluene	ND	1	0.3	ug/L	03/10/06	LZ
Xylene (total)	ND	1	0.6	ug/L	03/10/06	LZ
8021B/HVO Halogenated Volatile Organics						
1,1,1-Trichloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,1,2,2-Tetrachloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,1,2-Trichloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,1-Dichloroethane	ND	1	0.8	ug/L	03/10/06	LZ
1,1-Dichloroethene	ND	1	0.8	ug/L	03/10/06	LZ
1,2-Dibromoethane	ND	1	1.0	ug/L	03/10/06	LZ
1,2-Dichlorobenzene	ND	1	1.0	ug/L	03/10/06	LZ
1,2-Dichloroethane	ND	1	0.5	ug/L	03/10/06	LZ
1,2-Dichloropropane	ND	1	0.5	ug/L	03/10/06	LZ
1,3-Dichlorobenzene	ND	1	2.0	ug/L	03/10/06	LZ
1,4-Dichlorobenzene	ND	1	1.0	ug/L	03/10/06	LZ

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693418 **Client:** Marine Research Consultants
Matrix: WATER **Client Sample ID:** #3 Pier 29
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Analyte	Result	DF	DLR	Units	Date/Analyst	
8021B/HVO Halogenated Volatile Organics						
2-Chloroethylvinyl ether	ND	1	0.7	ug/L	03/10/06	LZ
Bromoform	ND	1	0.5	ug/L	03/10/06	LZ
Bromomethane	ND	1	1.0	ug/L	03/10/06	LZ
Carbon tetrachloride	ND	1	0.7	ug/L	03/10/06	LZ
Chlorobenzene	ND	1	1.0	ug/L	03/10/06	LZ
Chloroethane	ND	1	0.5	ug/L	03/10/06	LZ
Chloroform	ND	1	0.5	ug/L	03/10/06	LZ
Chloromethane	ND	1	1.0	ug/L	03/10/06	LZ
cis-1,2-Dichloroethene	ND	1	0.5	ug/L	03/10/06	LZ
cis-1,3-Dichloropropene	ND	1	1.5	ug/L	03/10/06	LZ
Dibromochloromethane	ND	1	0.5	ug/L	03/10/06	LZ
Dichlorobromomethane	ND	1	0.5	ug/L	03/10/06	LZ
Dichlorodifluoromethane	ND	1	2.0	ug/L	03/10/06	LZ
Methylene Chloride	ND	1	1.0	ug/L	03/10/06	LZ
Tetrachloroethene	ND	1	0.5	ug/L	03/10/06	LZ
trans-1,2-Dichloroethene	ND	1	0.8	ug/L	03/10/06	LZ
trans-1,3-Dichloropropene	ND	1	1.5	ug/L	03/10/06	LZ
Trichloroethene	ND	1	0.6	ug/L	03/10/06	LZ
Trichlorofluoromethane	ND	1	0.5	ug/L	03/10/06	LZ
Vinyl chloride	ND	1	1.0	ug/L	03/10/06	LZ
Surrogates				**Units**	**Control Limits**	
Sur-2-Bromochlorobutane (Hall)	87			%	55 - 156	

8082 - Polychlorinated Biphenyls (PCBs) by GC

PCB-1016	ND	1	0.5	ug/L	03/15/06	RB
PCB-1221	ND	1	0.5	ug/L	03/15/06	RB
PCB-1232	ND	1	0.5	ug/L	03/15/06	RB
PCB-1242	ND	1	0.5	ug/L	03/15/06	RB
PCB-1248	ND	1	0.5	ug/L	03/15/06	RB
PCB-1254	ND	1	0.5	ug/L	03/15/06	RB
PCB-1260	ND	1	0.5	ug/L	03/15/06	RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693418
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #3 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
8082 - Polychlorinated Biphenyls (PCBs) by GC						
Surrogates				**Units**	**Control Limits**	
DCB(Sur)	82			%	60 - 130	
8310 PAH's by HPLC						
Acenaphthene	ND	1	18	ug/L	03/15/06	MP
Acenaphthylene	ND	1	23	ug/L	03/15/06	MP
Anthracene	ND	1	6.6	ug/L	03/15/06	MP
Benzo(a)anthracene	ND	1	0.13	ug/L	03/15/06	MP
Benzo(a)pyrene	ND	1	0.23	ug/L	03/15/06	MP
Benzo(b)fluoranthene	ND	1	0.18	ug/L	03/15/06	MP
Benzo(ghi)perylene	ND	1	0.76	ug/L	03/15/06	MP
Benzo(k)fluoranthene	ND	1	0.17	ug/L	03/15/06	MP
Chrysene	ND	1	1.5	ug/L	03/15/06	MP
Dibenzo(a,h)anthracene	ND	1	0.3	ug/L	03/15/06	MP
Fluoranthene	ND	1	2.1	ug/L	03/15/06	MP
Fluorene	ND	1	2.1	ug/L	03/15/06	MP
Indeno(1,2,3-cd)pyrene	ND	1	0.43	ug/L	03/15/06	MP
Naphthalene	ND	1	18	ug/L	03/15/06	MP
Phenanthrene	ND	1	6.4	ug/L	03/15/06	MP
Pyrene	ND	1	2.7	ug/L	03/15/06	MP
Surrogates				**Units**	**Control Limits**	
p-Terphenyl (sur)	88			%	50 - 135	
8015B - Gasoline						
Gasoline	ND	1	50	ug/L	03/28/06	SU
Surrogates				**Units**	**Control Limits**	
a,a,a-Trifluorotoluene	69			%	55 - 200	

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693419
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #4 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
1010 Ignitability by PM Closed Cup Method						
Ignitability by PM Closed Cup Method	>200	1		deg F	03/14/06	HK
1311/6010B TCLP (ICP Metals)						
Arsenic TCLP	ND	1	0.05	mg/L	03/15/06	KN
Barium TCLP	ND	1	0.10	mg/L	03/15/06	KN
Cadmium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Chromium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Lead TCLP	ND	1	0.05	mg/L	03/15/06	KN
Selenium TCLP	ND	1	0.05	mg/L	03/15/06	KN
Silver TCLP	ND	1	0.05	mg/L	03/15/06	KN
418.1 Total Recoverable Petroleum Hydrocarbons						
Total Recoverable Petroleum Hydrocarbons	ND	1	1.0	mg/L	03/09/06	TN
6010B ICP CAM Metals Only (W/S/W)						
Antimony	ND	1	0.02	mg/L	03/15/06	KN
Arsenic	0.035	1	0.005	mg/L	03/15/06	KN
Barium	0.005	1	0.01	mg/L	03/15/06	KN
Beryllium	0.001	1	0.005	mg/L	03/15/06	KN
Cadmium	ND	1	0.005	mg/L	03/15/06	KN
Chromium	0.006	1	0.01	mg/L	03/15/06	KN
Cobalt	0.001	1	0.005	mg/L	03/15/06	KN
Copper	0.001	1	0.01	mg/L	03/15/06	KN
Lead	0.014	1	0.005	mg/L	03/15/06	KN
Molybdenum	0.011	1	0.01	mg/L	03/15/06	KN
Nickel	ND	1	0.02	mg/L	03/15/06	KN
Selenium	0.041	1	0.01	mg/L	03/15/06	KN
Silver	ND	1	0.005	mg/L	03/15/06	KN
Thallium	ND	1	0.005	mg/L	03/15/06	KN

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693419
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #4 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
6010B ICP CAM Metals Only (W/S/W)						
Vanadium	0.022	1	0.005	mg/L	03/15/06	KN
Zinc	0.005	1	0.02	mg/L	03/15/06	KN
7470A Mercury in Water						
Mercury	ND	1	0.0004	mg/L	03/10/06	MJ
8015 TEPH Diesel						
TEPH Diesel	ND	1	0.1	mg/L	03/09/06	AF
Surrogates				**Units**	**Control Limits**	
o-Terphenyl (sur)	101			%	55 - 200	
8021B BTEX + MTBE						
Benzene	ND	1	0.3	ug/L	03/11/06	LZ
Ethyl benzene	ND	1	0.3	ug/L	03/11/06	LZ
Toluene	ND	1	0.3	ug/L	03/11/06	LZ
Xylene (total)	ND	1	0.6	ug/L	03/11/06	LZ
8021B/HVO Halogenated Volatile Organics						
1,1,1-Trichloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,1,2,2-Tetrachloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,1,2-Trichloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,1-Dichloroethane	ND	1	0.8	ug/L	03/11/06	LZ
1,1-Dichloroethene	ND	1	0.8	ug/L	03/11/06	LZ
1,2-Dibromoethane	ND	1	1.0	ug/L	03/11/06	LZ
1,2-Dichlorobenzene	ND	1	1.0	ug/L	03/11/06	LZ
1,2-Dichloroethane	ND	1	0.5	ug/L	03/11/06	LZ
1,2-Dichloropropane	ND	1	0.5	ug/L	03/11/06	LZ
1,3-Dichlorobenzene	ND	1	2.0	ug/L	03/11/06	LZ
1,4-Dichlorobenzene	ND	1	1.0	ug/L	03/11/06	LZ

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693419
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #4 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
8021B/HVO Halogenated Volatile Organics						
2-Chloroethylvinyl ether	ND	1	0.7	ug/L	03/11/06	LZ
Bromoform	ND	1	0.5	ug/L	03/11/06	LZ
Bromomethane	ND	1	1.0	ug/L	03/11/06	LZ
Carbon tetrachloride	ND	1	0.7	ug/L	03/11/06	LZ
Chlorobenzene	ND	1	1.0	ug/L	03/11/06	LZ
Chloroethane	ND	1	0.5	ug/L	03/11/06	LZ
Chloroform	ND	1	0.5	ug/L	03/11/06	LZ
Chloromethane	ND	1	1.0	ug/L	03/11/06	LZ
cis-1,2-Dichloroethene	ND	1	0.5	ug/L	03/11/06	LZ
cis-1,3-Dichloropropene	ND	1	1.5	ug/L	03/11/06	LZ
Dibromochloromethane	ND	1	0.5	ug/L	03/11/06	LZ
Dichlorobromomethane	ND	1	0.5	ug/L	03/11/06	LZ
Dichlorodifluoromethane	ND	1	2.0	ug/L	03/11/06	LZ
Methylene Chloride	ND	1	1.0	ug/L	03/11/06	LZ
Tetrachloroethene	ND	1	0.5	ug/L	03/11/06	LZ
trans-1,2-Dichloroethene	ND	1	0.8	ug/L	03/11/06	LZ
trans-1,3-Dichloropropene	ND	1	1.5	ug/L	03/11/06	LZ
Trichloroethene	ND	1	0.6	ug/L	03/11/06	LZ
Trichlorofluoromethane	ND	1	0.5	ug/L	03/11/06	LZ
Vinyl chloride	ND	1	1.0	ug/L	03/11/06	LZ

Surrogates		Units	Control Limits
Sur-2-Bromochlorobutane (Hall)	86	%	55 - 156

8082 - Polychlorinated Biphenyls (PCBs) by GC

PCB-1016	ND	1	0.5	ug/L	03/15/06	RB
PCB-1221	ND	1	0.5	ug/L	03/15/06	RB
PCB-1232	ND	1	0.5	ug/L	03/15/06	RB
PCB-1242	ND	1	0.5	ug/L	03/15/06	RB
PCB-1248	ND	1	0.5	ug/L	03/15/06	RB
PCB-1254	ND	1	0.5	ug/L	03/15/06	RB
PCB-1260	ND	1	0.5	ug/L	03/15/06	RB

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

Order #: 693419
Matrix: WATER
Date Sampled: 03/04/2006
Time Sampled: 08:00
Sampled By:

Client: Marine Research Consultants
Client Sample ID: #4 Pier 29

Analyte	Result	DF	DLR	Units	Date/Analyst	
8082 - Polychlorinated Biphenyls (PCBs) by GC						
Surrogates				**Units**	**Control Limits**	
DCB(Sur)	79			%	60 - 130	
8310 PAH's by HPLC						
Acenaphthene	ND	1	18	ug/L	03/15/06	MP
Acenaphthylene	ND	1	23	ug/L	03/15/06	MP
Anthracene	ND	1	6.6	ug/L	03/15/06	MP
Benzo(a)anthracene	ND	1	0.13	ug/L	03/15/06	MP
Benzo(a)pyrene	ND	1	0.23	ug/L	03/15/06	MP
Benzo(b)fluoranthene	ND	1	0.18	ug/L	03/15/06	MP
Benzo(ghi)perylene	ND	1	0.76	ug/L	03/15/06	MP
Benzo(k)fluoranthene	ND	1	0.17	ug/L	03/15/06	MP
Chrysene	ND	1	1.5	ug/L	03/15/06	MP
Dibenzo(a,h)anthracene	ND	1	0.3	ug/L	03/15/06	MP
Fluoranthene	ND	1	2.1	ug/L	03/15/06	MP
Fluorene	ND	1	2.1	ug/L	03/15/06	MP
Indeno(1,2,3-cd)pyrene	ND	1	0.43	ug/L	03/15/06	MP
Naphthalene	ND	1	18	ug/L	03/15/06	MP
Phenanthrene	ND	1	6.4	ug/L	03/15/06	MP
Pyrene	ND	1	2.7	ug/L	03/15/06	MP
Surrogates				**Units**	**Control Limits**	
p-Terphenyl (sur)	98			%	50 - 135	
8015B - Gasoline						
Gasoline	ND	1	50	ug/L	03/28/06	SU
Surrogates				**Units**	**Control Limits**	
a,a,a-Trifluorotoluene	74			%	55 - 200	

DLR = Detection limit for reporting purposes, ND = Not Detected below indicated detection limit, DF = Dilution Factor

CHAIN OF CUSTODY

165797

SUBMITTED BY:

MARINE RESEARCH CONSULTANTS, INC.
1039 Waakaua Pl. Honolulu, HI 96822

SUBMITTED TO:

ASSOCIATED LABS
806 N. BATAVIA ORANGE, CA 92868

PROJECT: PIER 29

SAMPLE NO.	SAMPLE ID	DATE	TIME	SAMPLE TYPE	# OF CONTAINERS	REQUESTED ANALYSES	PRESERVE
1	PIER 29	3/5/06	0800		12 AMBER	SEE ATTACHED LIST	ICE
2	WATER				12 GLASS		
3					16 VOA		
4					8 PLASTIC		
5							
6							
7							
8							
9							
10							
11							
12							
13							

SAMPLED BY:		RELINQUISHED BY:		RECEIVED BY:	
S. Dallas	3/5/06	S Dallas	3/6/06		
PRINT	DATE	PRINT	DATE	PRINT	DATE
	0800		0700	DVANON	3/6/06 1022
SIGNATURE	TIME	SIGNATURE	TIME	SIGNATURE	TIME

PLEASE SIGN AND RETURN WITH SAMPLE RESULTS

Worksheet for Triangular Channel - 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.014	
Channel Slope	0.01500	ft/ft
Left Side Slope	6.00	ft/ft (H:V)
Right Side Slope	6.00	ft/ft (H:V)
Discharge	2.03	ft^3/s

Results

Normal Depth	0.30	ft
Flow Area	0.55	ft^2
Wetted Perimeter	3.70	ft
Top Width	3.65	ft
Critical Depth	0.37	ft
Critical Slope	0.00509	ft/ft
Velocity	3.67	ft/s
Velocity Head	0.21	ft
Specific Energy	0.51	ft
Froude Number	1.66	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.30	ft
Critical Depth	0.37	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.00509	ft/ft

APPENDIX 4

ENVIRONMENTAL CONSIDERATION,

Element Environmental,

MAY 2008

element environmental llc
environmental · engineering · water resources

Design Sheet

Project:: Construction of Pier 29 Container Yard, H.C. 10354

Date: 03/06/09

Design By: RSY

E2 Project No.: 080008

Check By:

Subject: Environmental Considerations

Environmental Considerations:

CONTAMINATED SOILS AND GROUNDWATER

Petroleum contamination (gasoline and diesel) is present in the subsurface of the site. Contamination exists in both the soil and groundwater. Free product (i.e. separate phase hydrocarbons (SPH)) is present on top of the groundwater and in the saturated zone soils. SPH thicknesses on top of groundwater have been measured to be up to 4 feet within the project area (SES, 2007b). [See Figure 7 from SES Report] SPH saturation in subsurface soil is present from the Mean Lower Low Water (MLLW) to approximately 3.2 ft MLLW (or -0.82 ft MSL to 2.5 ft MSL) (Huntley, 2006). [See Figure 5 from Huntley Report]

Groundwater at the site is tidally influenced. The groundwater gradient direction varies with the incoming high and outgoing low tides. A tidal study completed in 2004 indicates a tidal efficiency of close to 100% along the seaward boundary of the project site and 58% at the inland boundary near Nimitz Highway (CH2M Hill, 2004). Tidal lags range from zero minutes at the seaward boundary to 30 minutes at the inland boundary (CH2M Hill, 2004). The Remedial Design Plan for Operable Unit 1C (OU1C), which includes the project site, indicates the following tidal elevation considerations for design (SES, 2007b):

- Mean Lower Low Water (MLLW) = 0.0 ft (equivalent to -0.82 ft MSL)
- Maximum Tide Level = 4.0 ft MLLW (equivalent to 3.2 ft MSL)

The Remedial Design Plan for OU1C recommends that the inverts of storm drains and other utilities be kept above the Maximum Tide Level to prevent the creation of preferred SPH migration pathways.

The recent topographic survey indicates that the ground elevations at the project site vary from 5.7 ft MSL to 8.0 ft MSL. It should be anticipated that contaminated soil and/or groundwater may be encountered below the Maximum Tide Level during installation of all subsurface utilities. Based on the existing ground elevations, contaminated soil and groundwater may be expected to be encountered beginning from 2.5 to 4.8 ft below the ground surface.

DESIGN CONSIDERATIONS

The Contractor will need to prepare and submit a Site Safety and Health Plan (SSHP) for the protection of their workers during construction. The SSHP shall be prepared by a Certified Industrial Hygienist (CIH) and shall meet all requirement set forth in OSHA. The SSHP shall

address minimum worker training and certifications for handling of hazardous materials. The SSHP shall also address personal protective equipment and personnel monitoring during construction.

Contaminated soil requiring excavation (i.e. utility trenching) will be stockpiled on site for waste profiling and proper disposal by the Iwilei District Participating Parties, LLC (IDPP). The Contractor will be responsible for the excavation and proper stockpiling of contaminated soil. Similarly, contaminated groundwater requiring dewatering will be properly stored and/or treated by the Contractor prior to waste profiling and proper disposal by IDPP. A staging area for contaminated materials will need to be set aside within or adjacent to the project site.

Utility conduit materials will need to be appropriate for use in a petroleum contaminated environment. Previous studies have indicated that PVC and HDPE materials are not appropriate for use in environments where gasoline is present (USACE, 2002). The presence of shallow groundwater also presents concerns regarding corrosion especially for steel materials. It is recommended that appropriate fiberglass materials be utilized for underground electrical conduits. In addition, if ductile iron pipe is utilized for water and wastewater force mains, gaskets compatible with petroleum contamination should be utilized.

In order to prevent creation of preferred SPH migration pathways, it is recommended that concrete barriers/plugs be placed in utility trenches at a minimum of 50 ft on center.

Subsurface utility boxes should be of sufficient thickness and have appropriate protective barriers to prevent infiltration of petroleum hydrocarbons and gases.

It is assumed that all existing monitoring wells to be maintained on site will be protected and the well heads will be re-done flush to grade with covers rated to handle the types of equipment and container weights to be encountered. All monitoring wells to be abandoned will be closed in accordance to State regulations. There are approximately 51 monitoring wells present within the project site, of which, IDPP has indicated that all but three will be abandoned (SES, 2007b). [See Figure 9 from SES Report]

ENVIRONMENTAL COST CONSIDERATIONS

Lump Sum Cost for Environmental Concerns **$100,000**

Includes: Preparation of SSHP, Personnel Monitoring, Environmental Oversight for Project Duration

Cost Considerations for Subsurface Utility Work

Subsurface excavation and form work – recommend **25% increase in cost** due to inefficiencies of working in personal protective equipment for all work expected in contaminated soils (i.e. excavations greater than 2.5 feet to 4.8 feet below ground surface).

Excavation and Stockpiling of Contaminated Soil - **$40/cubic yard** (for all excavation expected in contaminated soils)

If dewatering is expected, IDPP will need to be consulted for storage and disposal options.

Concrete barriers/plugs – include cost for installation of concrete barriers in trench excavations at 50' on center

Piping Materials and Utility Boxes – include cost for installation of materials compatible with petroleum contamination

Restoration of Monitoring Well Wellheads – approximately 51 wells need to be restored

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APPENDIX 5

TECHNICAL MEMORANDUM,
GEOTECHNICAL RECOMMENDATIONS,

Geolabs Hawai'i,

MAY 2008.

GEOLABS, INC.

Geotechnical Engineering and Drilling Services

TECHNICAL MEMORANDUM

DATE:	May 12, 2008	**TIME:**	1:47 PM
TO:	R.M. Towill Corporation	**FROM:**	Robin M. Lim / Teddy Kwok
ATTN:	Mr. Craig Luke	**W.O. No.:**	5989-10
SUBJECT:	Pier 29 Container Yard, Phase 1 Preliminary Recommendations	**NO. OF PAGES:**	13
COPY TO:	File / Original		

REMARKS: This technical memorandum presents our preliminary geotechnical recommendations for the Pier 29 Container Yard, Phase 1 project. A detailed summary of our findings and recommendations will be contained in our geotechnical engineering report. The final report should be consulted when it becomes available.

Subsurface Conditions

Based on the geotechnical engineering exploration conducted at the site, it appears the majority of the existing container yard generally is underlain by an asphaltic concrete (AC) paving varying from about 2 to 8 inches thick. Below the AC paving, our borings generally encountered base course and/or granular fills extending to depths of about 2 to 5.5 feet below the existing pavement or ground surface. The relative density of the granular materials ranges from dense directly below the AC paving and transitions to medium dense with increased depth. The granular materials were underlain by lagoonal deposits consisting of soft to very soft sandy silts with clays and organic matter extending to depths of about 10 to 15 feet deep. Coralline detritus materials consisting of medium dense sands and gravel then were encountered and extended to the maximum depth explored of about 31.5 feet below the existing pavement or ground surface.

Groundwater was encountered at depths of about 5.4 to 6.6 feet below the existing pavement or ground surface at the time of our field exploration. It should be noted that we also encountered some petroleum products above the groundwater in some of the borings drilled. Please note that groundwater levels could change due to tidal fluctuation, storm surge condition, seasonal precipitation, surface water runoff, and other factors.

Hard Copy will be in the Mail ( ) **Hard Copy will not be Sent (X)**

Please call our fax operator should any problems occur with the receipt of facsimile message.

2006 Kalihi Street, Honolulu, Hawaii 96819
Telephone: (808) 841-5064 • Facsimile: (808) 847-1749 • E-mail: hawaii@geolabs.net
Hawaii • California

Pavement Design

The design procedures used in determining the new rigid pavement section is based on the "Design of Heavy Industrial Concrete Pavements" developed by the Portland Cement Association.

Design Traffic Loading Conditions

We envision the new rigid pavement section at the Pier 29 container yard will be subjected to traffic loads from various types of container handlers similar to the current operations at the Pier 1 container yard. Based on our site visit to the Pier 1 container yard, we understand the heaviest container handler would be the Hyster H1050E Container Handler Forklift Truck. Therefore, the design vehicle of the new pavements at Pier 29 will be controlled by the Hyster H1050E Container Handler Forklift Truck.

Based on our research and discussions with the manufacturer, we understand this equipment is no longer in production and detailed specifications were not available at the time this technical memorandum was prepared. However, we understand the load capacity of the Hyster H1050E is identical to that of the Hyster H1050HD, the current model under production by the manufacturer. Therefore, we performed our pavement analyses using the specification parameters obtained for Hyster H1050HD. Detailed information and design parameters for the controlling vehicle are presented in the following table.

DESIGN TRAFFIC PARAMETERS Hyster H1050HD Container Handler Forklift Truck	
Pavement Classification	Heavy Industrial
Maximum Front Axle Load	213,842 pounds
Maximum Single Wheel Load	53,460 pounds
Tire Ground Contact Pressure	140 psi
Tire Ground Contact Area	382 square inches
Dual Tire Separation (Center-to-Center Spacing)	26.8 inches

Design Subgrade Conditions

Based on our field exploration, the existing AC pavement at the Pier 29 container yard generally is underlain by base course and/or granular fills extending to depths of about 24 to 66 inches (2 to 5.5 feet) below the existing pavement or ground surface. The granular materials at the site tend to have lower relative densities (loose to medium dense) starting at about 30 to 36 inches below the existing pavement or ground surface. The granular materials are underlain by lagoonal deposits consisting of soft to very soft sandy silts with clays and organic matter extending to depths of about 10 to 15 feet deep.

Based on our field exploration and the anticipated design grades for the project, we assumed the pavement subgrade soils will consist of the loose to medium dense granular materials overlying the soft to very soft lagoonal deposits anticipated at shallow depths. Laboratory California Bearing Ratio (CBR) tests performed on the recompacted lagoonal deposits consisting of sandy silts obtained from our field exploration indicated that the materials exhibited a CBR value of about 7, or a modulus of subgrade reaction (k-value) of about 75 pounds per square inch of deflection (pci).

To provide a stable subgrade for the concrete pavement, we recommend providing a minimum of 18 inches of aggregate base course between the concrete pavement and the underlying loose to medium dense granular materials overlying the soft to very soft lagoonal deposits. Based on this recommendation, an effective subgrade k-value of 150 pci was adopted for our pavement analyses. Additional subgrade preparation requirements are presented in the "Subgrade Preparation Below Pavement Section" subsection of this technical memorandum.

Design Pavement Section

We performed our pavement analyses by varying the concrete thickness to determine the corresponding number of allowable load repetitions of the Hyster Container Handler Forklift Truck during the pavement life. Results of our pavement analyses are shown in the following table.

PAVEMENT DESIGN Hyster H1050E Container Handler Forklift Truck	
Concrete Thickness (inches)	Total Repetitions Allowed During Pavement Life
15	769
16	5,773
17	32,292

PAVEMENT DESIGN Hyster H1050E Container Handler Forklift Truck	
18	142,284
19	515,545
20	Unlimited

Detailed information pertaining to the container handler traffic was not available for our pavement analyses. However, we understand the annual number of tractor/chassis and trailer combo entering and leaving through the Pier 29 gate is on the order of about 22,788 count, or about 569,700 count for a 25-year pavement design life. Assuming 80 percent of the truck traffic consists of fully-loaded containers, this would correspond to approximately 455,760 containers (or repetitions) being handled by the Hyster equipment. Based on the above assumptions and a properly prepared subgrade, the rigid pavement structural section for the Pier 29 container yard project should consist of the following. Detailed calculation of the recommended pavement design is attached to this technical memorandum for reference.

Heavy Industrial Concrete Pavement Section

19.0-inch Portland Cement Concrete (Minimum Flexural Strength of 650 psi)
18.0-Inch Aggregate Base Course (Minimum 95% Relative Compaction)
37.0-Inch Total Rigid Pavement Section on a Properly Prepared Subgrade

Subgrade Preparation Below Pavement Section

As mentioned previously, we anticipate loose to medium dense granular materials overlying the soft to very soft lagoonal deposits at or near the bottom of the aggregate base course layer based on the anticipated finished grades planned at the site. In order to provide a working platform during construction and a stable subgrade for the pavement structural section, we recommend proof-rolling the subgrade soils (at the bottom of the aggregate base course layer) to a firm and unyielding surface, where possible. A layer of woven geotextile fabric, such as Mirafi 500X or equivalent, should be placed over the prepared subgrade to reduce the potential for migration of fines content into the aggregate base course above.

In addition, a layer of biaxial geogrid, such as Tensar BX-1200 or equivalent, should be placed over the woven geotextile fabric and also at the mid-point of the 18-inch aggregate base course layer to increase the supporting capability of the subgrade soils and aggregate base course. The 18-inch thick aggregate base course should consist of basaltic aggregates, placed in two equal lifts, with each lift compacted to a minimum of 95 percent relative

compaction. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil established in accordance with AASHTO T 180 or ASTM D 1557. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.

Due to the poor subsoil conditions anticipated at the subgrade level (bottom of the aggregate base course layer), it should be noted that some areas may require additional over-excavation beyond the 18-inch thick aggregate base course layer as recommended above. The need for additional over-excavation due to the soft and/or loose subgrade soil conditions should be further evaluated by a Geolabs representative in the field.

Therefore, contract documents should include unit prices for additional over-excavation and compacted fill placement to account for variations in the over-excavation quantities. For preliminary budgeting purposes, we recommend a contingency fund be allocated for an additional over-excavation of 12 inches below the aggregate base course layer and replacement with compacted granular fill (or ASTM C 33, No, 67 gradation) underlain by a layer of woven geotextile fabric, such as Mirafi 500X or equivalent. Based on our field exploration, we envision the additional over-excavation may entail approximately 50 percent of the pavement area within the majority of the Phase 1 area.

Below-Grade Structures

Based on the information provided, we understand below-grade structures, such as storm drain inlets, electrical hand holes, and valve vaults, will be installed as part of the container yard improvement project. We anticipate that the bottom of these below-grade structures may be embedded within the upper 10 feet below the existing ground surface. Based on our field exploration results, we envision that the bottom of these structures will be underlain by the soft lagoonal deposits encountered at depths of about 3 to 15 feet below the existing ground surface. On this basis, we believe that an allowable bearing pressure of up to 1,500 psf may be used for the foundation design of the below-grade structures bearing on a stabilization layer as described below. This allowable bearing pressure is for dead-plus-live loads and may be increased by one-third (1/3) for transient loads, such as temporary wind and/or seismic forces.

Due to the presence of very soft subsurface soils near the foundation subgrade level of the below-grade structures, we recommend that a stabilization layer consisting of 2 feet of No. 2 Rock (ASTM C 33, No. 4 gradation) wrapped in a filter fabric, such as Mirafi 180N or equivalent, be provided below the underground structures for uniform bearing support. In addition, the stabilization layer also would serve as a working platform

during construction. In order to reduce the potential for significant settlement of the underground structures, we recommend that the filter fabric be sewn (in-lieu of overlapping) and that light compaction equipment be utilized during installation of the below-grade structures. In addition, the 2-foot thick stabilization layer should extend a minimum of 2 feet beyond the edges of the structures.

Due to the shallow groundwater levels anticipated at the project site, the proposed below-grade structures will be subjected to buoyant uplift forces. Resistance to uplift loads may be mobilized by the dead weight of the underground structure. Contribution of dead weight from the backfill, if applicable, may be estimated using a unit weight of 110 pounds per cubic foot (pcf) above the groundwater table and 46 pcf below the groundwater table. For side shear between the structure and the backfill material, a nominal value of 100 psf may be used in design. For evaluating uplift forces due to hydrostatic pressures, a high groundwater level of Elevation +3 feet MSL may be used for design to take into consideration tidal fluctuations.

Settlements of the underground structures may result from compression of the soft and/or loose soil layer due to the placement of the backfill material and/or disturbance of the soft and/or loose subsurface soils during construction. We estimate the total settlement of the underground structures to be on the order of about 1 to 2 inches. We believe that most (more than one-half) of the settlements should occur during the construction period.

Because of the soft and/or loose subsurface soils encountered, some movement of soils around the underground structure excavations should be anticipated due to changes in the earth stresses during and after construction, especially during extraction of the sheet pile shoring system, where provided. In addition, it should be noted that dewatering for construction of adjacent structures in the future may result in settlement of these underground structures. Therefore, we recommend that some flexibility in the connection of the piping network to the underground structures be incorporated in the design to accommodate possible earth movements.

Lateral Earth Pressures

The lateral earth pressures acting on the proposed underground structures will depend on the type of backfill used, the extent of backfill, and the compactive effort on the backfill material around the structures. For backfill below the groundwater table, we anticipate that it may be desirable to backfill behind the retaining structure using a free-draining type of backfill, such as No. 3B Fine gravel (ASTM C 33, No. 67 gradation). This is to reduce the compactive effort required and to facilitate backfill below the groundwater table or in a wet environment. If a free-draining type of backfill

is used, a filter fabric should be used to wrap around the free-draining backfill.

Underground structures planned at the container yard site should be designed to resist the lateral earth pressures due to the adjacent soil and surcharge effects. Based on the subsurface conditions encountered at the site, we recommend that the following lateral earth pressures, expressed in equivalent fluid pressures of pounds per square foot per foot of depth (pcf), be used in the design of retaining structures planned at the container yard site.

LATERAL EARTH PRESSURES LEVEL GROUND CONDITIONS			
Groundwater Conditions	**Active** (pcf)	**At-Rest** (pcf)	**Passive** (pcf)
Above Groundwater	39	56	250
Below Groundwater	77	84	160

The values provided above assume that the on-site sandy soils or imported non-expansive, select granular fill materials will be used to backfill behind the structures. It is assumed that the backfill behind retaining structures will be compacted to 95 percent relative compaction. Over-compaction of the retaining structure backfill should be avoided. In general, an active condition may be used for gravity retaining walls and walls that are free to deflect by as much as 0.5 percent of the wall height. If the tops of the walls are not free to deflect beyond this degree, or are restrained, the walls should be designed for the at-rest condition.

Due to the proximity of the project site to Pacific Ocean, we recommend that a static groundwater level of +3 feet MSL be used in the design of the retaining structures. Retaining structures that extend below Elevation +3 feet MSL should be designed based on the lateral earth pressures for the below groundwater condition presented in the table above.

Surcharge stresses due to areal surcharges, traffic loads, line loads, and point loads within a horizontal distance equal to the depth of the structure should be considered in the design. For uniform surcharge stresses imposed on the loaded side of the underground structure (restrained condition), a rectangular distribution with uniform pressure equal to 56 percent of the vertical surcharge pressure acting over the entire depth of the structure may be used in design. Additional analyses during design may be needed to evaluate the surcharge effects of point loads and line loads.

Light Pole Foundations

Based on the materials encountered in our field exploration, we believe the proposed light poles may be supported by drilled shaft type foundations to resist the generally high ground line moments induced by loads imposed on the poles. Foundation analyses were conducted based on a combination of axial and lateral loads in addition to the ground line moments using the computer program LPILE. The analyses were based on a free-head boundary condition and a maximum lateral deflection of not more than 0.5 inches at the top of the drilled shaft.

Based on the soft subsoil conditions encountered, we recommend 48-inch diameter drilled shafts with an embedment depth of at least 18 feet below the ground surface be used to support the proposed light poles for centerline loading conditions. An axial compression load of 4,400 pounds was used in the design of the drilled shafts. In addition, foundation analyses for the drilled shafts were performed with lateral loads of 3,000 pounds along with ground line moments of 112,000 foot-pounds.

It should be noted that difficult drilling conditions likely will be encountered and should be expected due to the potential for caving-in of the soft subsurface soils anticipated during the drilled shaft installation. Temporary casing should be required during the drilled shaft construction for the light pole foundations to reduce the potential for caving-in of the drilled holes. Performance of drilled shaft foundations depends significantly upon the contractor's method of construction, construction procedures, and workmanship. Therefore, special attention should be given to the "Construction Considerations" subsection of this technical memorandum in the preparation of the drilled shaft specifications for the project.

It should be noted that the performance of the drilled shafts is generally sensitive to changes in the consistency of the subsurface materials. Therefore, it is critical that the design assumptions and recommendations presented in this technical memorandum be confirmed in the field during construction. If the actual exposed subsurface conditions encountered during construction are different from those assumed or considered in this memorandum, then appropriate modifications to the design (extending the depths of the drilled shafts) should be made.

Lateral Load Resistance

In general, lateral load resistance of drilled shafts is a function of the stiffness of the surrounding soil, the stiffness of the shaft, allowable deflection at the top of the shaft, and induced moment in the shaft. Based on a maximum horizontal deflection of 0.5 inches at the top of the drilled shaft subjected to the ground line overturning moments and lateral forces,

we have evaluated the required drilled shaft lengths using the computer program, LPILE. This program is a microcomputer adaptation of a finite difference, laterally loaded pile program originally developed at the University of Texas at Austin. The program solves for deflection and bending moment along a drilled shaft under lateral loads as a function of depth. The analysis was carried out with the use of non-linear "p-y" curves to represent soil moduli. The lateral deflection was then computed using the estimated soil moduli at various depths. The analyses were performed for a laterally loaded, cast-in-place concrete drilled shaft. The results of our engineering analyses are summarized in the following table.

FOUNDATION ANALYSES FOR LATERAL LOAD AND MAXIMUM INDUCED MOMENT IN DRILLED SHAFTS

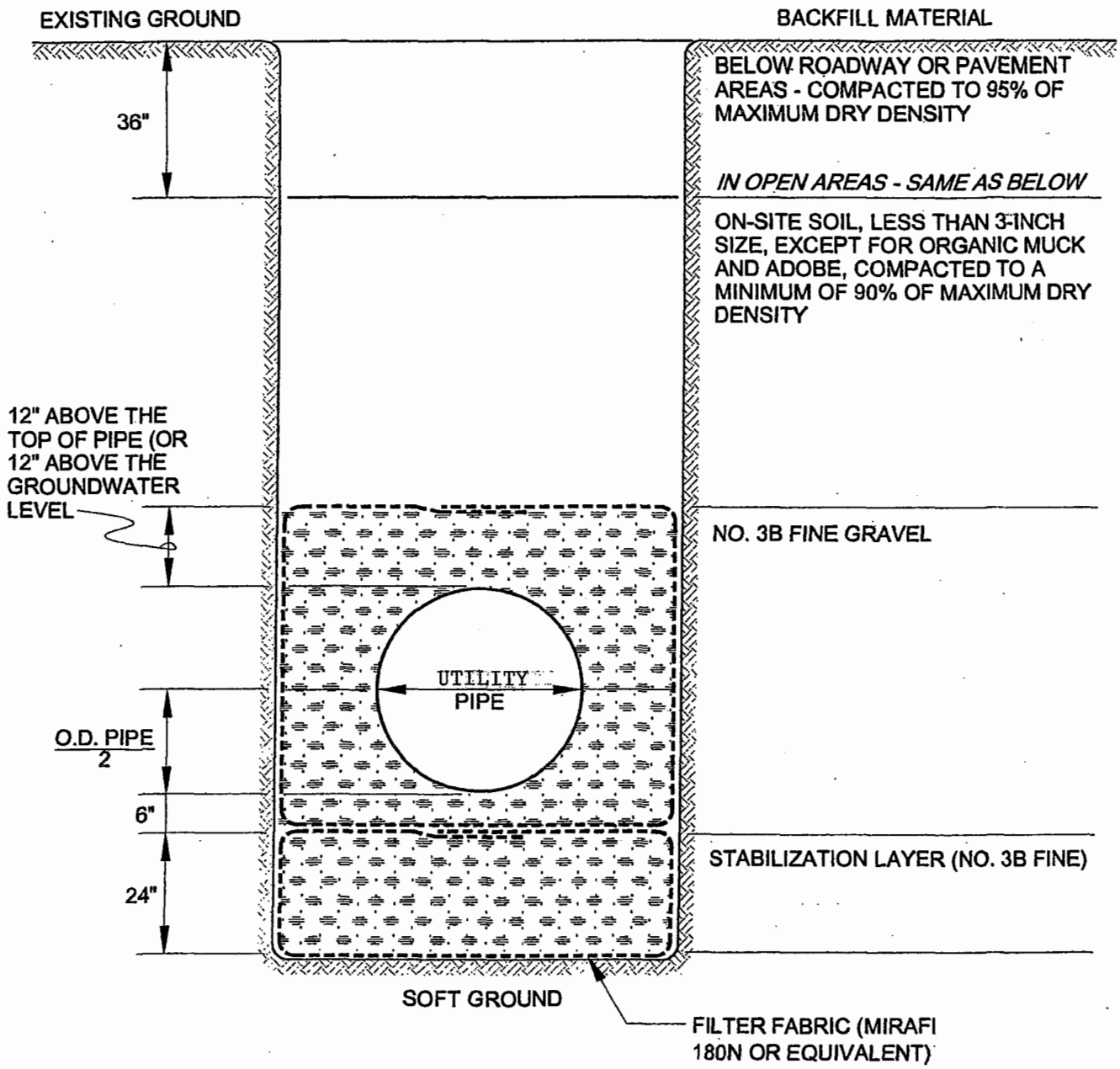
Drilled Shaft Diameter (inches)	Drilled Shaft Depth (feet)	Lateral Deflection at Ground Line (inches)	Maximum Induced Moment (kip-feet)	Depth to Maximum Moment (feet)
48	18	0.5	117.0	2.9

NOTE: Drilled Shaft Depth and Depth to Maximum Moment is measured below ground line.

Construction Considerations

The performance of drilled shafts depends significantly upon the contractor's method of construction, construction procedures, and workmanship. As a result, we recommend a Geolabs representative be present to observe the installation of drilled shafts during construction. In our opinion, the following may have an impact on the effectiveness and cost of the drilled shaft foundations at the site.

Based on the subsurface conditions encountered, we anticipate that drilling through soft soils with relatively shallow groundwater conditions will be required during construction of the drilled shaft foundations. To reduce the potential for caving-in of the drilled holes, temporary casing of the drilled holes should be required during construction. Installation of the casing may be achieved by vibration, driving or twisting to advance the casing. Therefore, the contractor should be made aware that temporary casing of the drilled holes will be required based on the subsurface conditions encountered at the site. In addition, care should be exercised during removal of the temporary casing to reduce the potential for "necking" of the drilled shaft. Therefore, a minimum 5-foot head of concrete should be maintained above the bottom of the casing and/or groundwater level during removal of the casing.



TYPICAL TRENCH DETAIL

GEOLABS, INC. Geotechnical Engineering		
DATE MAY 2008.	DRAWN BY JJP	PLATE 1
SCALE NOT TO SCALE	W.O. 5989-10	

APPENDIX 6

TRAFFIC ASSESSMENT,

Julian Ng,

MAY 2008

Julian Ng, Incorporated

Memorandum

To: Craig Luke, R. M. Towill Corporation

Date: May 15, 2008

From: Julian Ng

Subject: Pier 29 Improvements, Honolulu Harbor
Traffic Conditions at Nimitz Highway intersection with Pacific Street

Traffic to and from Pier 29 would use the signalized intersection of Pacific Street and Nimitz Highway. The "intersection" consists of two separate intersections, as the inbound (eastbound) and outbound (westbound) lanes of the highway are separated by property serving various commercial activities; the median is approximately 200 feet wide.

Traffic counts near the intersection indicate that traffic volumes in the area are stable (no increasing or decreasing trend). Level-of-service analyses of turning movement counts taken in 2004 show that there is adequate capacity and levels of service should be acceptable during peak hours. The project impact, in terms of additional vehicles using the intersection, would be minimal and would not significantly change the results of the analyses.

Field observations of traffic, however, reveal that the distance between the two intersections and downstream constraints result in poor operations. The arrangement of the intersections cause conflicts between vehicles wishing to turn left onto Nimitz Highway with traffic wishing to proceed through, remaining on Pacific Street. These conflicts are worsened by the large proportion of trailered trucks, which effectively reduce or eliminate storage for vehicles waiting to make the turning movements.

The management of exiting traffic from the pier area is a possible mitigation measure. Drivers of vehicles exiting the pier area, especially large trucks, should turn right onto the inbound lanes of Nimitz Highway, change lanes to the left, and utilize one of two U-turns that are provided in the median to access the westbound lanes of the highway. This would reduce the conflicts at both intersections. If drivers do not conform, regulatory action to prohibit through movements onto Pacific Street could be imposed.

Traffic Assessment – Pier 29 Improvements (Existing Conditions)

Vehicular access to the Pier 29 yard is through a security gate located approximately 150 feet south (*makai*) of the inbound lanes of Nimitz Highway, along an accessway that is the makai leg of the signalized intersection of Nimitz Highway and Pacific Street. The security gate also serves traffic using adjacent piers. Parking lots serving the harbor police office, several businesses, and other permittees are located between the security gate and the highway.

Nimitz Highway is a State highway that is part of a primary arterial between the Keehi Interchange with Route Interstate H-1 to the west and Kapiolani Interchange to the east, and providing access to the industrial areas in Kalihi and Iwilei, downtown Honolulu, the industrial and commercial areas of Kakaako and Ala Moana, and the McCully residential area. Within the Iwilei area where Pacific Street crosses the highway, the inbound and outbound lanes of Nimitz Highway are divided by private properties serving commercial and industrial activity and highway traffic is carried on two one-way roadways that are each four lanes wide. The width of this "median" is approximately 200 feet and in addition to the traffic signals at the Pacific Street crossing, several U-turns are provided for traffic circulation.

The northbound approach from the pier area consists of a single lane for traffic exiting the pier area controlled by the traffic signal. Right turns onto the eastbound lanes of Nimitz Highway are channelized by a small traffic island and are permitted on red, but a single truck could block access to the right turn lane for any following vehicles. There are two lanes on the southbound Pacific Street approach to the intersection with the eastbound lanes of the highway, the left lane is used for left turns only and through movements into the pier area are from the right lane. Turns from the eastbound lanes on Nimitz Highway share the outer lanes with through movements. A striped bicycle lane is provided on the right side of Nimitz Highway.

At the Pacific Street intersection with the westbound lanes of the highway, the northbound approach consists of two lanes, with left turns made from the left lane and through movements from the right lane. Two lanes are available at the southbound approach. Turns from the westbound lanes on Nimitz Highway share the outer lanes with through movements. A striped bicycle lane is provided on the right side of Nimitz Highway. Due to the proximity of the two intersections, the traffic signal is operated as a single intersection. However, the distance between the intersections and the crossing of traffic that turn left onto the highway create challenges to the efficient operation of the intersection.

Nimitz Highway is a major commuting corridor between downtown Honolulu and areas to the west. It carries high volumes of traffic during daylight hours. Table 1 shows the totals for various time periods from the most recent published reliable traffic count from the State Highways Division.

Table 1 – Traffic Count Data, Nimitz Highway east of Pacific Street

Counts taken:	August 8, 2005			August 9, 2005		
	westbound	eastbound	total	westbound	eastbound	total
24-hour total	36,979	37,701	74,680	37,090	40,460	77,550
AM Peak Hour	1,867	4,174	6,041	1,835	4,524	6,359
PM Peak Hour	2,823	2,909	5,732	2,840	3,147	5,987
Source: State of Hawaii, Department of Transportation, Highways Division.						

Highest hourly volumes were recorded between 7:15 AM and 8:15 AM and between 4:15 PM and 5:15 PM. Data from counts taken in June 2005 and in November 2006 were also available in recent publications, but these counts had 24-hour totals in one direction that exceeded the 24-total in the other direction by more than 20%, and are not considered reliable for the purpose of describing existing traffic conditions.

Table 2 presents data from manual traffic counts that were collected at the intersection in October 2004. The traffic count data indicate that the higher highway volumes during both the AM Peak Hour and the PM Peak Hour are in the eastbound direction, while the directional volumes during the Midday hours were fairly even.

These data were used to develop traffic assignments for the AM Peak Hour, Midday Peak Hour, and PM Peak Hour shown in Figure 1.

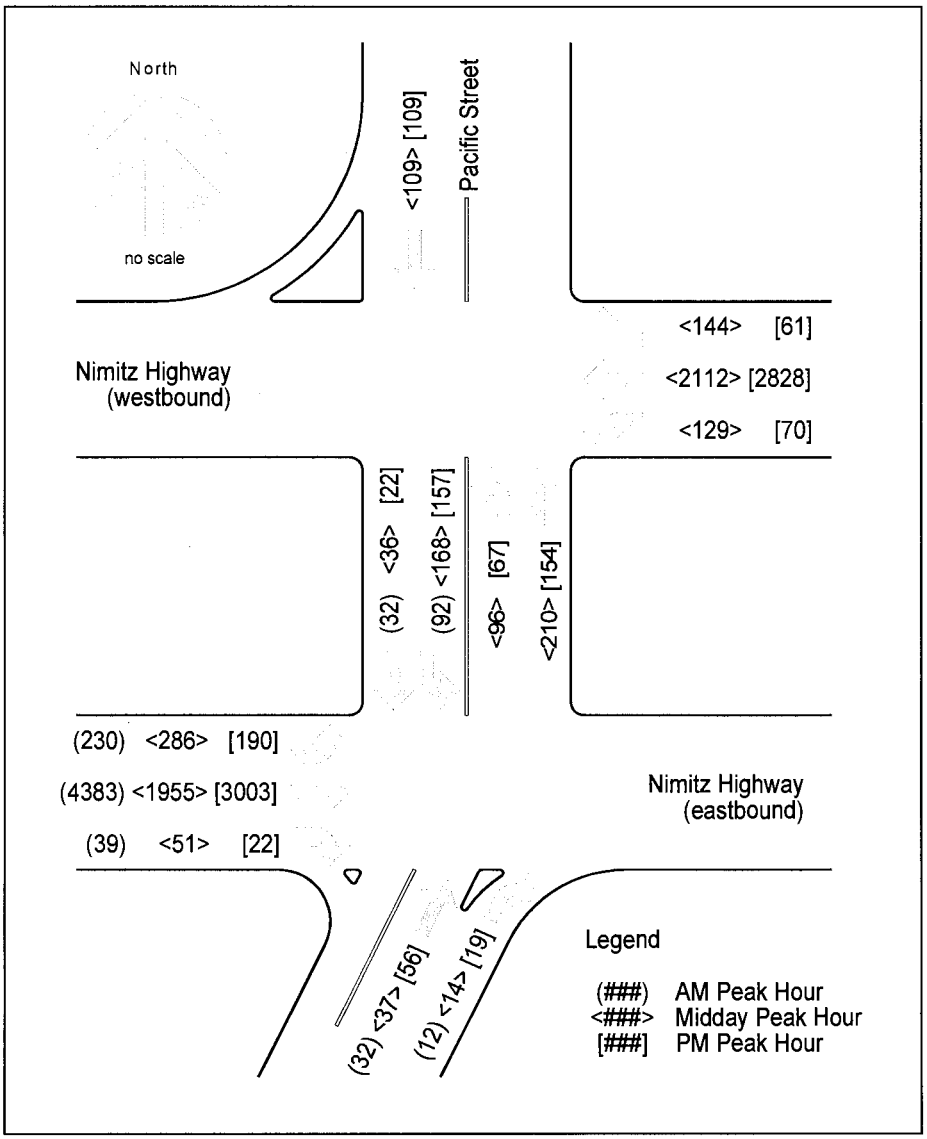


Figure 1 – Existing Traffic

Table 2 – Traffic Count Data, Nimitz Highway and Pacific Street

15-minute period ending	Pacific Street from North			Nimitz Highway from East			Pacific Street from South			Nimitz Hwy. from West		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Counts taken Tuesday, October 12, 2004												
06:45 AM	22	11						5	3	52	998	16
07:00 AM	15	13						11	3	57	981	9
07:15 AM	30	7						7	4	52	1087	11
07:30 AM	19	7						7	4	54	1141	12
07:45 AM	28	5						7	1	67	1174	7
08:00 AM	24	4						18	2	52	896	8
08:15 AM	26	6						12	0	64	1051	11
08:30 AM	34	9						16	7	62	946	10
Counts taken Tuesday, October 12, 2004												
11:45 AM	43	6						9	5	66	511	11
12:00 PM	30	7						6	4	71	504	15
12:15 PM	45	13						17	3	73	442	13
12:30 PM	50	10						5	2	76	498	12
12:45 PM	46	10						12	3	64	500	15
01:00 PM	39	10						15	1	58	464	15
01:15 PM	40	7						22	2	61	475	18
01:30 PM	30	7						13	2	49	450	11
Counts taken Thursday, October 14, 2004												
11:45 AM		15	33	21	490	35	32	49				
12:00 PM		15	49	29	509	32	20	48				
12:15 PM		24	47	31	498	33	23	38				
12:30 PM		19	46	26	530	41	43	34				
12:45 PM		27	39	23	532	40	13	51				
01:00 PM		25	40	32	475	34	20	49				
01:15 PM		24	47	43	527	41	33	56				
01:30 PM		33	37	31	578	29	30	54				
Counts taken Thursday, October 14, 2004												
04:15 PM		21	65	13	674	15	15	41				
04:30 PM		27	48	14	669	15	5	41				
04:45 PM		22	47	17	714	19	14	51				
05:00 PM		14	42	13	689	15	12	34				
05:15 PM		21	39	21	651	22	19	43				
05:30 PM		25	42	23	689	9	23	38				
05:45 PM		37	60	13	740	18	14	39				
06:00 PM		26	27	13	748	12	11	34				
Counts taken Tuesday, October 19, 2004												
04:15 PM	31	7						22	3	43	704	10
04:30 PM	37	5						6	8	58	801	5
04:45 PM	48	4						12	3	51	736	5
05:00 PM	41	6						16	5	38	762	2
05:15 PM	34	3						6	2	43	695	3
05:30 PM	31	0						9	1	46	731	2
05:45 PM	40	0						8	1	29	641	1
06:00 PM	41	0						7	2	30	609	1

Source: Julian Ng, Inc. (unpublished data)

While traffic counts at the mauka (westbound Nimitz Highway and Pacific Street) intersection in the AM Peak Hour were not available, conditions there should be better than during the PM Peak Hour as traffic volumes are less. Westbound volume on Nimitz Highway from the counts taken by the State Highways Division is about 1,000 vehicles per hour less in the AM Peak Hour than in the PM Peak Hour, and the total volume on Pacific Street mauka of the makai intersection from the manual counts taken at the makai intersection was 386 in the AM Peak Hour, compared to 425 in the PM Peak Hour.

The methodology for the analysis of signalized intersections described in the *Highway Capacity Manual 2000* was used to determine capacities and levels of service at the intersection. The levels of service,, or LOS, are based on the estimated delay per vehicle for the following criteria:

LOS	Delay per Vehicle (seconds)
A	≤10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80
Reference: *Highway Capacity Manual 2000*, Exhibit 16-2.	

Results of the analyses of the existing traffic assignments shown in Figure 1 are presented in Table 3.

Table 3 – Existing Conditions, Nimitz Highway and Pacific Street

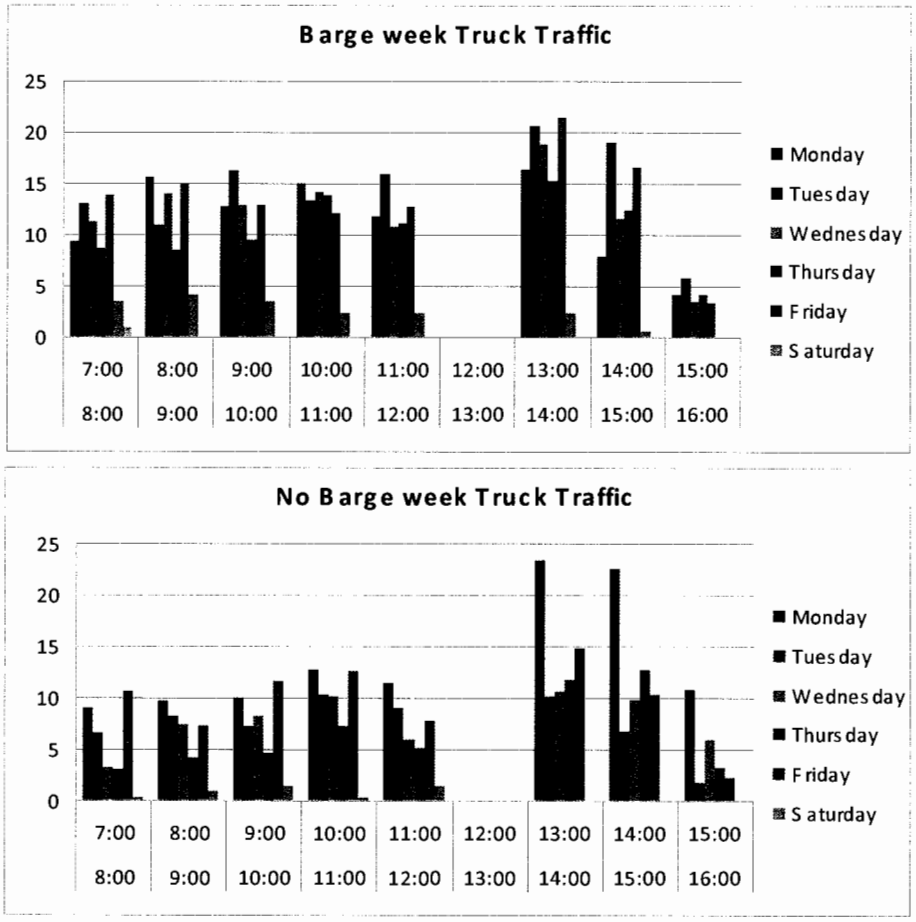
	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	v/c	AD	LOS	v/c	AD	LOS	v/c	AD	LOS
Westbound Nimitz Highway				0.61	12.9	B	0.56	15.2	B
Eastbound Nimitz Highway	0.90	23.4	C	0.72	13.4	B	0.56	12.8	B
Considered as one intersection					14.7	B		14.9	B

v/c = volume/capacity ratio AD = average delay (seconds) LOS = Level of Service
Source: Julian Ng, Inc.

The intersection analyses do not show the poor conditions that often occur in the area along Nimitz Highway during the midday period through the afternoon hours. The poor conditions result from queues of traffic in the westbound direction that begin at "downstream" signalized intersections to the west. The queuing often extends east of the Pacific Street intersection, causing inefficient use of the green time allocated to the westbound flows at the Pacific Street intersection, and preventing some of the northbound left turns from entering the westbound lanes of the highway during the signal phase for northbound traffic.

Project Impact

The proposed project supports container yard activity and will therefore add to the traffic on Nimitz Highway by increasing the existing congestion that typically occurs from midday through the afternoon peak period. The proposed project's traffic impact varies, as activity in the container yard varies. Counts of truck traffic from data collected by the user from January to March 2008 were plotted for an average "barge week" and an average "no barge week" and shown in Figure 2.



Source: ACT

Figure 2 – Truck Traffic

Traffic estimates that include passenger vehicles, such as those due to employees arriving or departing the work site or other visitors, were also developed by the user. The project is expected add up to 30 vehicles per hour during the AM Peak Hour to the intersection of Pacific Street and Nimitz Highway. Of the project traffic generated in the AM Peak Hour, approximately 80 percent would be arriving to the site and 20% departing the site. Traffic impact during the midday is estimated to be as much as much as 40 vehicles per hour, with an equal number arriving and departing. The traffic impact in the PM Peak Hour would be 5 vehicles per hour, all departing. The majority (90%) of the additional traffic would arrive from the west (right turn in from Nimitz Highway) and depart to the west.

Estimated mix of traffic is 80% automobiles and light trucks during the AM and PM peak hours with 10% medium trucks and 10% heavy trucks. During the midday, traffic mix would be 25% automobiles and light trucks, 45% medium trucks, and 30% heavy trucks. The traffic in the PM Peak Hour would consist of 100% automobiles (departing employees).

Figure 3 shows the traffic assignments with project traffic added to the existing traffic volumes (for the purpose of the analyses, medium trucks were weighted by a factor of 2 passenger cars per truck and heavy trucks by a factor of 3). These assignments should be considered conservative, since the baseline (without project) condition is based on counts that included traffic generated by uses existing in the Pier 29 area in 2004. When compared with Figure 1, the westbound traffic on Nimitz Highway west of Pacific Street would increase by less than 2% in the Midday Peak Hour and less than 0.2% in the PM Peak Hour. While not significant, these increases could result in increased congestion on westbound Nimitz Highway.

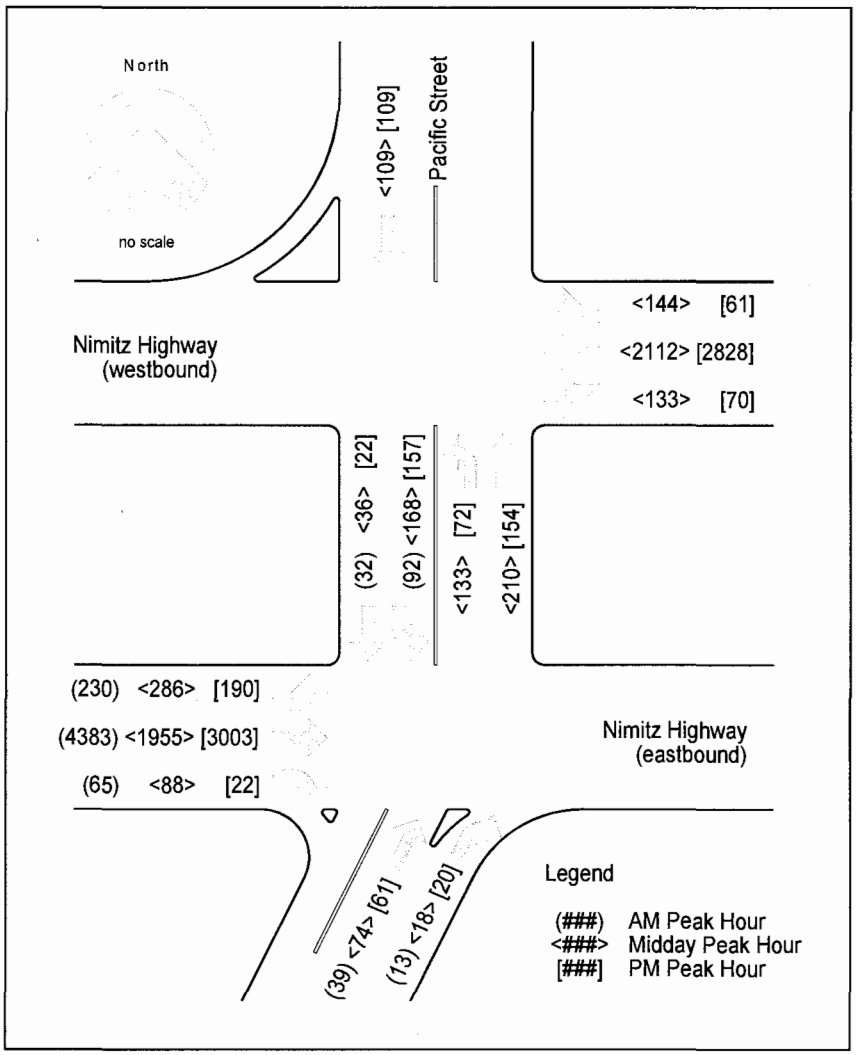


Figure 3 – Existing Traffic Plus Project Traffic

The intersection analyses show minimal impact with the additional traffic volumes. While the analyses show minimal impacts, the increased truck traffic and the short distance along Pacific Street between the two signalized intersections could result in some blockage as opposing flows on Pacific Street cross each other two times.

A possible mitigation measure is a recommendation for trucks wishing to turn left to follow an alternative path, by first turning right out of the pier area onto the eastbound lanes, then changing lanes toward the left and making a U-turn across the commercial "median" that separates the traffic on Nimitz Highway headed in opposite directions. There are two opportunities to make this U-turn within 1,500 feet of Pacific Street, as illustrated in Figure 4. Use of the alternative path would reduce the potential for blockage of Pacific Street and may decrease user delays at the intersections. If this mitigation measure were to be applied only to the project traffic, with existing traffic assumed to continue on the direct path for left turns, there would be minimal impacts. Table 4 summarizes the results of the analyses.

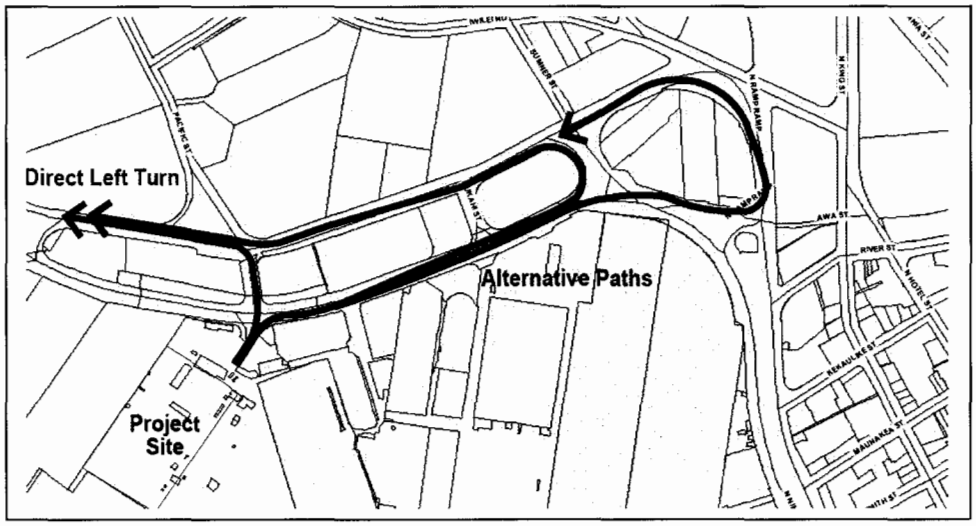


Figure 4 – Alternative Routing of Left Turns Exiting the Site

Table 4 – Project Impact, Nimitz Highway and Pacific Street

	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	v/c	AD	LOS	v/c	AD	LOS	v/c	AD	LOS
Westbound Nimitz Highway									
Existing				0.56	15.2	B	0.61	12.9	B
Plus Project				0.58	17.3	B	0.61	13.0	B
Plus Project (right turn only)				0.56	15.1	B	0.62	12.7	B
Eastbound Nimitz Highway									
Existing	0.90	23.4	C	0.56	12.8	B	0.72	13.4	B
Plus Project	0.91	24.6	C	0.58	13.6	B	0.72	13.5	B
Plus Project (right turn only)	0.90	24.6	C	0.57	13.3	B	0.72	13.5	B
Delays Aggregated (Two intersections considered as one intersection)									
Existing					14.7	B		14.9	B
Plus Project					17.4	B		14.0	B
Plus Project (right turn only)					15.9	B		14.1	B

v/c = volume/capacity ratio AD = average delay (seconds) LOS = Level of Service
Source: Julian Ng, Inc.