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**PHASE II ENVIRONMENTAL
SITE ASSESSMENT WORK PLAN
2225 AND 2277 SEVENTH STREET,
PORT OF OAKLAND
OAKLAND, CALIFORNIA**

Prepared for

Port of Oakland
Oakland, California

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EXECUTIVE SUMMARY

The Port of Oakland is preparing to conduct a Phase II environmental site assessment on two parcels owned by the Port of Oakland (the Port) located at 2225 and 2277 Seventh Street in Oakland, California ("the Site") (Figure 1). Data collected during this assessment will be used in part for the current redevelopment program to design the future Field Support Services Complex (FFSSC) destined to be constructed at the Site. The scope of the site assessment will include installation of borings to collect soil samples at various depths for chemical analysis and to sample shallow groundwater and soil vapor in selected locations. This data will be used to develop an understanding of the environmental conditions that currently exist on each parcel and the potential impact that these conditions may have on redevelopment activities and future use.

The sampling program has been designed to supplement existing subsurface data where available. A total of 40 borings are proposed for the two parcels. The distribution of borings is based on the past site use and the quantity of existing data. Existing data area available from past investigations conducted near the Site to investigate past uses at the US Navy Former Fleet Industrial Supply Center Oakland (FISCO), and from on site investigations conducted in response to releases of petroleum hydrocarbons from leaking underground storage tanks.

Soil borings will either be drilled to approximately six feet below ground surface (bgs) or several feet into saturated soil (groundwater). Groundwater is currently estimated at approximately six to seven feet bgs in this area. A shallow soil sample will be collected from each boring from within the top one foot of soil. The remaining samples will be collected at approximately two to three-foot intervals. A total of three soil samples will be collected for laboratory analysis from each boring location, and one grab groundwater sample will be collected from the deeper borings. In addition, single or multiple depth soil gas samples will be collected at selected boring locations.

Soil samples collected from the proposed sample locations will be analyzed for volatile organic compounds (VOCs) including oxygenates; semi-volatile organic compounds; total petroleum hydrocarbons in the gasoline, diesel, jet fuel, kerosene, and motor oil ranges with silica gel cleanup; and metals. The groundwater samples will be analyzed for VOCs, and total petroleum hydrocarbons in the gasoline, diesel jet fuel, kerosene, and motor oil ranges. Soil gas samples will be analyzed for methane, fixed gases, select VOCs, volatile and purgable petroleum hydrocarbons. Data collected from the site assessments will be reviewed and compiled into a report for use by the Port to support their redevelopment planning activities.

I. INTRODUCTION

This Work Plan presents the locations, methods, and procedures for a phase II environmental site assessment on two parcels owned by the Port, located at 2225 and 2277 Seventh Street, in Oakland, California (Figure 1). Data collected during this assessment will be used in part for the current redevelopment program to design the future Field Support Services Complex (FFSSC). An expanded Phase I Environmental Site Assessment¹ (Phase I ESA) was recently prepared for the Port by Iris Environmental (Iris). Key findings presented in the Phase I ESA included:

- At least 22 USTs were removed from the Site during six excavation events between 1990 and 1993. Holes were noted in several tanks during excavation. A hydrocarbon plume has been identified that is associated with at least one excavated, leaking underground diesel tank in the area adjacent to Building C-407. Free product was noted in two wells in the most recent quarterly monitoring report of November 15, 2001, and over 7,000 gallons of product have been removed from an active skimmer in one well since December 1997 (Harding ESE 2001²).
- Three groundwater monitoring wells in the vicinity of the FISCO Building 511D (Port Building 515) fueling facility are part of a long term monitoring plan for former FISCO property. In the most recent analysis of these wells (2/24/00), total petroleum hydrocarbons as diesel (TPH-d) and gasoline (TPH-g), benzene, toluene, ethyl benzene, and xylenes (BTEX) were detected, and floating product was noted in one well. Two long term monitoring wells are located in the Lot 612 area southeast of the Site, and the most recent analysis (10/29/99) indicated the presence of trichloroethylene (TCE) and 1,2-dichloroethane (1,2-DCA). The most recent analysis (5/95) of two long term monitoring wells located near the 511F area and Building 412 also indicated the presence of TCE and 1,2-DCE.

The proposed investigation program was developed with the objective of characterizing the lateral and vertical extent of the chemical impacts identified during the Phase I ESA, within the areas being considered for redevelopment. A description of the proposed investigation program is presented in Section II.

¹ Expanded Environmental Site Assessment, Future Field Support Services Complex, Port Of Oakland, Oakland, California. February 2002.

² Harding ESE. 2001. *Third Quarter 2001 Quarterly Groundwater Monitoring and Product Recovery Report, 2277 and 2225 Seventh Street, Oakland, California.* November 15.

II. WORK PLAN

The following sections describe the scope of work proposed for the Phase II environmental site assessment. Soil and groundwater sample locations have been selected to meet the objectives of the site assessment. The objectives include:

- Define the lateral and vertical extent of the existing petroleum hydrocarbon plume in both soil and groundwater.
- Assess whether chemicals of concern other than petroleum hydrocarbons are present within the redevelopment area.
- Collect adequate soil, groundwater, and soil vapor data to support risk screening and potential risk assessment for redevelopment planning.

The sampling program has been designed to supplement existing subsurface data where available. A total of 40 borings are currently proposed, with the distribution of borings based on the past site use and existing data. Proposed soil and grab groundwater sampling locations are shown on Figures 2 and 3. Locations for soil gas sampling borings will be determined in the field. A summary of the proposed environmental sampling and analysis plan is presented in Table 1.

2.1. Pre-Mobilization Tasks

2.1.1 Permits

Before fieldwork begins, permits to install the soil borings will be obtained from the Alameda County Public Works Agency.

2.1.2. Utility Locating

Before beginning intrusive work, utilities will be cleared at all proposed drilling locations. The proposed locations will be measured and marked with spray paint. Underground Service Alert will be notified a minimum of 48 hours before any drilling activities and an independent utility locator subcontractor will be retained to clear each location for detectable utilities in the vicinity of the borings. Proposed boring locations will be adjusted if necessary to avoid striking underground utilities and pipelines. A minimum clearance of three feet will be maintained from identified utility lines and pipelines. Port personnel, including the Wharfinger, will also be notified of the proposed field program and schedule.

2.1.3. Health and Safety

A site-specific Health and Safety Plan (HASP) will be prepared and distributed to on-site field personnel. Personnel engaged in field activities will be briefed on the contents and procedures of the HASP. Field activities will be monitored by field staff to ensure that

appropriate health and safety procedures are followed. Daily safety meetings will be conducted each field day to communicate potential risks and safety procedures.

2.2. Environmental Field Program

The environmental field program will include the collection of soil, groundwater, and soil vapor samples to meet the objectives described above. Descriptions of sample collection methods for each media are presented in the following sections.

2.2.1. Soil Sampling

A total of 40 borings plus two potential, step out borings are proposed for soil sample collection, as shown on Figure 3. As shown on Figure 3 and in Table 1, soil borings will either be drilled to approximately six feet below ground surface (bgs) or several feet into saturated soil (groundwater). Groundwater is currently estimated at approximately 6 to 7 feet bgs in this area. Three soil samples will be collected for laboratory analysis from each boring location. One grab groundwater sample will be collected from each of the deeper borings.

A shallow soil sample will be collected from within the top one foot of soil. The remaining samples will be collected at approximately 2 to 3 foot intervals to the bottom of the boring, or immediately above the first occurrence of groundwater. Samples collected for chemical analysis will be submitted to an analytical laboratory certified through the California Department of Health Services laboratory validation program. An overview of the analytical program is presented in Table 1 and described in Section 2.2.4.

A geologist, under the oversight of a California Registered Geologist will be present during drilling to obtain samples of subsurface materials, maintain a log of the borings, make observations of the work area conditions, conduct health and safety monitoring of possible organic vapors encountered during drilling, screen and log soil samples, and provide technical assistance as required.

Relatively undisturbed soil samples will be collected continuously during drilling for stratigraphic logging purposes. Soil samples will be collected using either a California split-spoon sampler (2-inch inside diameter, 18-inches long) or an Enviro-core™-type sample barrel. Samplers will be lined with either pre-cleaned 6-inch long stainless steel sample tubes or with clear, plastic liners. Samples selected for chemical analyses will have the exposed ends of the sample tube covered with Teflon™ film, fitted with plastic end caps, and secured with self-adhesive silicone tape. These samples will be labeled and placed in an iced cooler for transport to a California certified laboratory under chain-of-custody protocol.

Prior to sample collection from each boring location, the sampler will be washed using a dilute solution of Alconox, or equivalent, and rinsed with potable water. The California split-spoon sampler or the outer casing of the Enviro-core™ system (if retracted from the borehole between soil sampling intervals) will be similarly washed and rinsed between sampling intervals

at each location. All rinsate and residual solids from decontamination of equipment will be contained for proper disposal.

2.2.2. Grab Groundwater Sampling

Grab groundwater samples will be collected from approximately 26 selected borings by placing a temporary well into the bore hole following soil sampling. The temporary well will be constructed using factory cleaned, 1-inch diameter PVC casing with machine cut slots. The casing will be placed in the borehole and allowed to equilibrate for at least 45 minutes prior to sampling. The upper water column in the well casing will be inspected for evidence of free product prior to sampling. If free product in a thickness greater than a sheen is present, groundwater samples will not be collected from the boring. Samples will be collected using a small diameter disposal bailer. These samples will be labeled and placed in an iced cooler for transport to a California certified laboratory under chain-of-custody protocol. An overview of the analytical program is presented in Table 1 and described in Section 2.2.4.

2.2.3. Soil Gas Sampling

Soil gas samples will be collected from selected boring locations to be determined during the field program. Either single or multiple depth samples will be collected, based on field conditions. Sampling will be performed using a one-inch diameter drill rod equipped with a retractable tip. Polyethylene tubing will be connected between the tip and a vacuum sampling chamber. The rod assembly will be hydraulically pushed the target depth interval, then retracted. Vacuum will be mechanically applied to the tubing and a minimum of three liters of soil gas will be purged. Samples will be collected using either a Summa™ canister or a tedlar bag. If tedlar bags are used for sampling collection, then they will be filled by being connected to the tubing, and then placed into the sampling chamber. The bag will be inflated with soil gas when the pressure in the chamber is reduced to a level below the ambient soil pressure. The tedlar bag will then be sealed, label, and secured in a clean, dry storage container for transmittal to a California certified laboratory under chain-of-custody protocol. An overview of the analytical program is presented in Table 1 and described in Section 2.2.4.

2.2.4. Proposed Chemical Analyses

The proposed scope of soil sample analyses is summarized in Table 1. Soil samples collected from the proposed sample locations will be analyzed for volatile organic compounds (VOCs) and oxygenates by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, total petroleum hydrocarbons in the gasoline, diesel, jet fuel (jet-A), kerosene, and motor oil ranges by EPA Method 8015 modified with a silica gel cleanup, and seventeen metals by EPA Method 6010/7000 series. The shallowest soil sample from each boring location will not be analyzed for VOCs, as these compounds are unlikely to persist in the shallow subsurface due to their chemical volatility. As detailed in Table 1, some analyses will be run only on composited soil samples.

Groundwater samples will be analyzed for VOCs, oxygenates, and total petroleum hydrocarbons in the gasoline through motor oil ranges, as shown in Table 1. Groundwater samples will not be collected from deeper borings when and where measurable free product is encountered.

Soil gas samples will be analyzed for methane and fixed gases by ASTM Method D1946, total purgable petroleum hydrocarbons (TPPH) by Standard Method TO-3, and total volatile petroleum hydrocarbons (TVPH) by EPA Method 8260. Fixed gases include carbon dioxide, carbon monoxide, nitrogen, and oxygen.

2.3. Waste Management

Investigation-derived waste (IDW) generated during the investigation will be placed in DOT approved, 55-gallon drums and stored on the Port property pending off site disposal by the Port's waste disposal contractor. Each drum will be labeled with the appropriate information regarding contents, waste type, source, date, and contact information. The Port of Oakland will monitor the stored drums and maintain responsibility for all IDW. The volume of IDW generated is estimated at approximately one drum of soil and one drum of purge and decon wastewater per parcel. Soil and groundwater sample chemical data will be used to classify the IDW for offsite disposal.

III. SCHEDULE AND DELIVERABLES

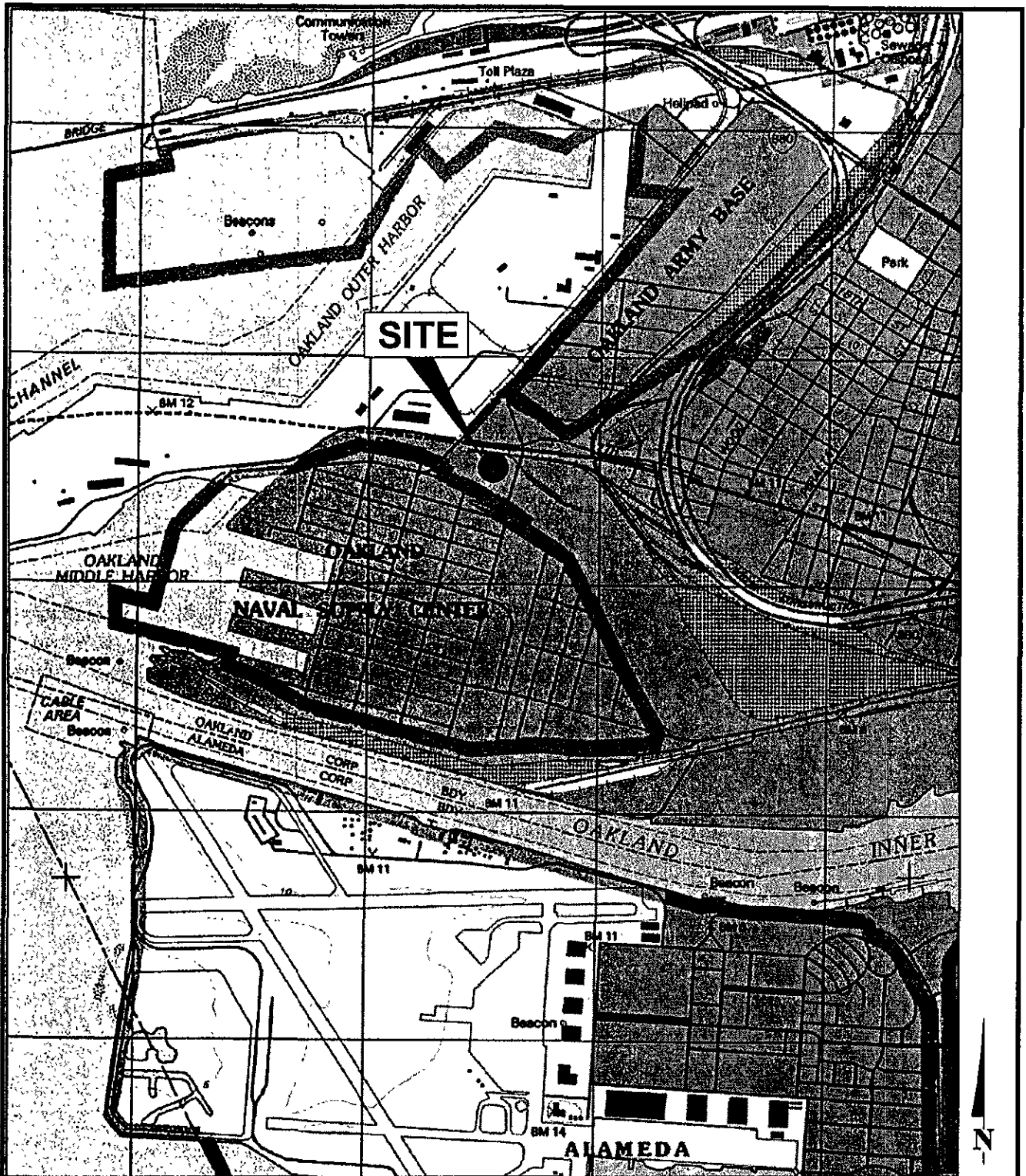
Environmental drilling will be scheduled and conducted following receipt of an Alameda County Department of Public Works drilling permit. The intention is to initiate fieldwork as soon as possible once access is permitted. Approximately one week of drilling is anticipated. A Phase II environmental site assessment report will be prepared to facilitate Agency review and to support risk screening or potential site specific risk assessment.

TABLE 1: SUMMARY OF PROPOSED SOIL SAMPLING AND ANALYTICAL TESTING
Port of Oakland, Phase II Environmental Site Assessment
2225 and 2277 Seventh Street
Oakland, California

Boring Location	Sample Depths ⁽²⁾	Matrix	Sample Type	Analyses ⁽¹⁾								
				SVOCs	VOCs ⁽³⁾	Metals	TPH/g & BTEX	TPH/d/j/k/mo	Methane ⁽⁶⁾	Fixed Gases ⁽⁶⁾	TPPH & BTEX ⁽⁶⁾	TVPH ⁽⁶⁾
Soil Boring and Grab Water	0.5 - 1.0'	Soil	Discrete	--	--	X	X	X	--	--	--	--
	2.5 - 3.0'	Soil	Discrete	--	X	X	X	X	--	--	--	--
	5.5 - 6' ⁽⁵⁾	Soil	Discrete	--	X	X	X	X	--	--	--	--
	NA	Soil	Composite ⁽⁴⁾	X	--	--	--	--	--	--	--	--
	4' ⁽⁷⁾	Soil gas	Gas	--	--	--	--	--	X	X	X	X
	NA	Water	Grab	--	X	--	X	X	--	--	--	--
Soil Boring Only	0 - 0.5'	Soil	Discrete	--	--	X	X	X	--	--	--	--
	2.5 - 3.0'	Soil	Discrete	--	X	X	X	X	--	--	--	--
	5.5 - 6' ⁽⁵⁾	Soil	Discrete	--	X	X	X	X	--	--	--	--
	NA	Soil	Composite ⁽⁴⁾	X	--	--	--	--	--	--	--	--
	4' ⁽⁷⁾	Soil gas	Gas	--	--	--	--	--	X	X	X	X

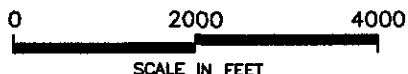
Notes:

- (1) "VOCs" indicates volatile compounds by EPA Method 8260.
 "SVOCs" indicates semi-volatile organic compounds by EPA Method 8270.
 "Metals" indicates Title 22 Metals (Ag, As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Sb, Se, Tl, V, Zn) by EPA Method 6010/6020/7470, and Hexavalent Chrome by EPA Method 7196.
 "TPH/g & BTEX" indicates Total Petroleum Hydrocarbons as gasoline, and benzene, toluene, ethylbenzene and total xylenes by EPA Methods 8015 Modified and 8020.
 "TPH/d/j/k/mo" indicates Total Petroleum Hydrocarbons as diesel, jet fuel (A), kerosene, and motor oil by EPA Method 8015 modified.
 Samples treated with silica gel column clean-up.
- (2) Sample depths indicated in feet below ground surface.
- (3) The uppermost soil sample (0.5-1.0' sample) will not be tested for VOCs since it is unlikely that these compounds have their volatile nature.
- (4) Aliquots of equal volume will be collected from each depth interval in the boring, composited in the lab, and analyzed for SVOCs
- (5) Assumes groundwater is approximately 6.5 feet below ground surface, or slightly deeper. Sample interval to be adjusted to match field conditions.
- (6) "Methane" and Fixed Gases indicates laboratory analysis of soil gas sample by ASTM Method D1946. Fixed gases include CO, CO₂, O₂, and N. Total purgable petroleum hydrocarbons (TPPH) by Standard Method TO-3. Total volatile petroleum hydrocarbons (TVPH) by EPA Method 8260.
- (7) Depth and number of soil gas samples per boring will be determined in field.

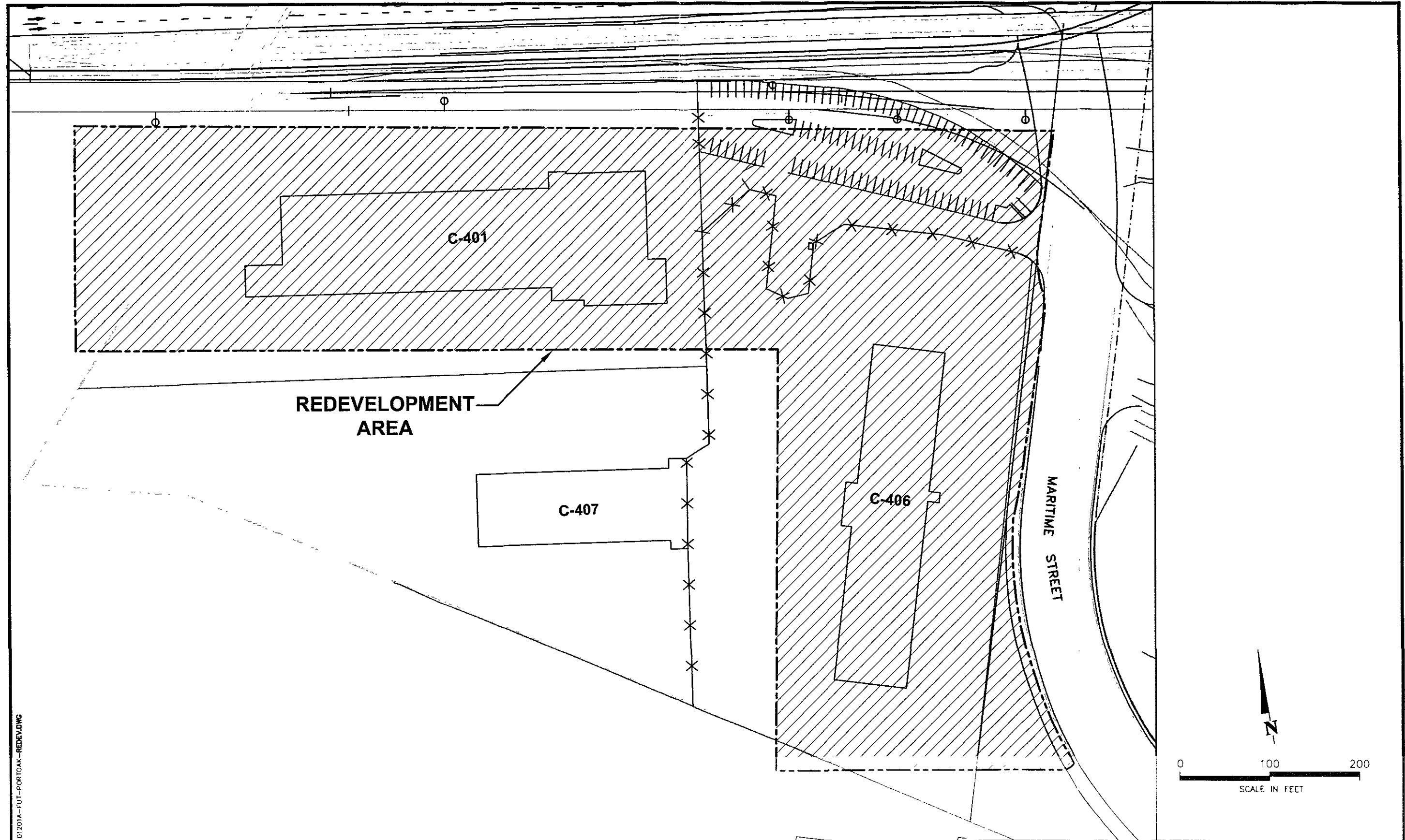


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SOURCE MAP: USGS 7.5 Minute OAKLAND Quad, California.



<p>IRIS ENVIRONMENTAL 1615 Broadway, Suite 1003, Oakland, California 94612</p>	<p>Site Location Map Future Port Field Support Services Complex Oakland, California</p>	<p>Figure 1</p>		
<p>Drafter: MS</p>	<p>Date: 1/13/02</p>	<p>Contract Number: 01-201A</p>	<p>Approved:</p>	<p>Revised:</p>



01201A-FUT-PORT OAK-REDEV.DWG

IRIS ENVIRONMENTAL

1615 Broadway, Suite 1003, Oakland, California 94612

Proposed Redevelopment Area
 Port of Oakland Future Port Field Support Services Complex
 2225 and 2277 7th Street
 Oakland, California

Figure

2

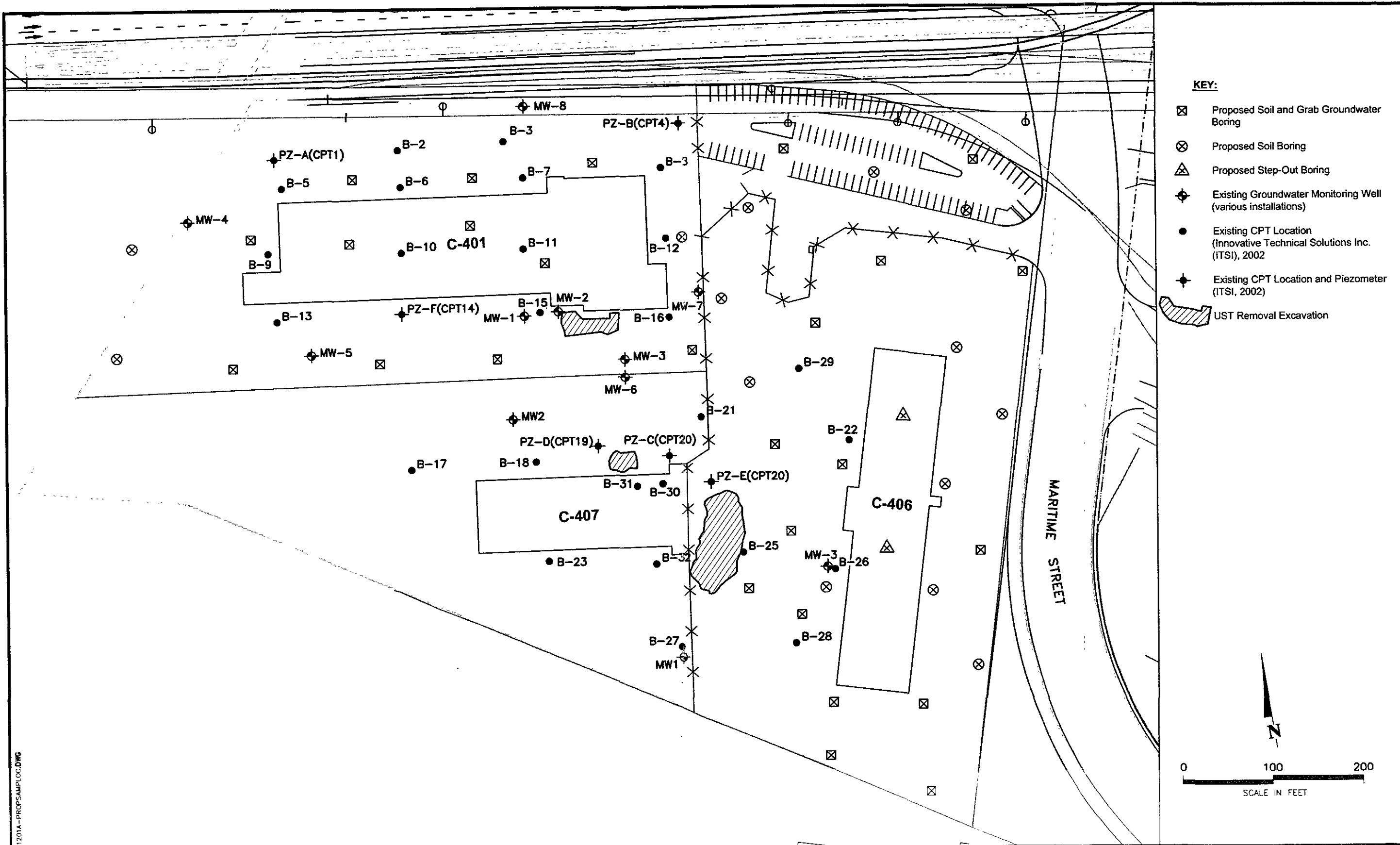
Drafter: MAS

Date 3/3/02

Contract Number 01-201A

Approved.

Revised



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Proposed Sampling Locations
Port of Oakland Future Port Field Support Services Complex
2225 and 2277 7th Street
Oakland, California

Figure
3