

Iris - Cambria
Environmental, JV

Alameda County
DEC 26 2002
Environmental Health

To: Mr. Douglas Herman

Company: Port of Oakland

Address: EH&SC Department
530 Water Street
Oakland, California 94607

Fax: (510) 451-5916

From: Robert Marinai

Phone: 510.420.3310

Date: December 13, 2002

Re: MW Installation/Utility Corridor Sampling Report

Transmittal

Iris-Cambria, J.V. is pleased to present you with six (6) copies of the Monitoring Well Destruction, Monitoring Well Installation, Groundwater Monitoring, and Utility Trench Sampling Report for the site at 1275 The Embarcadero, Oakland, California. Please contact us at your earliest convenience to discuss the report. Thank you.

Sincerely,

Robert Marinai, R.G.

cc: (1) Chris Alger, Iris Environmental, 1615 Broadway, Suite 1003, Oakland CA 94612



PORT OF OAKLAND

December 19, 2002

Alameda County
DEC 26 2002
Environmental Health



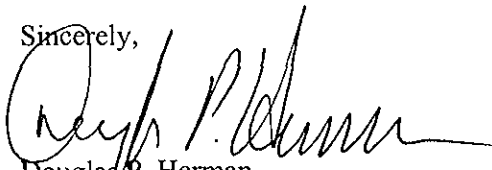
Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Dear Mr. Chan:

Please find enclosed for your review the "Monitoring Well Destruction, Monitoring Well Installation, Groundwater Monitoring, and Utility Trench Sampling Report" for the Gray & Reynolds Site (Site), 1275 Embarcadero, Oakland. The investigation was conducted in accordance with the "Monitoring Well Installation and Utility Trench Sampling Workplan," dated October 29, 2002, and your workplan approval letter dated November 1, 2002.

In the conclusions and recommendations section of the enclosed report we indicate that we will conduct two additional rounds of groundwater monitoring in February and May 2003. If at the conclusion of the groundwater monitoring in May 2003, concentrations of contaminants in groundwater have stabilized or show a diminishing trend we intend to request site closure. Please contact me at (510) 627-1184 if you would like to discuss further our proposed approach to site remediation.

Sincerely,



Douglas P. Herman
Associate Port Environmental Scientist

Cc w/encl: Tom Bender
Barbara Szudy
Betty Graham, RWQCB

Cc w/o encl: Chris Alger, Iris Environmental

C:\mydocs\projects\grey&reynolds\transmittal of utility and monitoring well report

**MONITORING WELL DESTRUCTION, MONITORING WELL INSTALLATION,
GROUNDWATER MONITORING, AND UTILITY TRENCH SAMPLING REPORT**

**Gray & Reynolds Development Site
Embarcadero Cove
1275 Embarcadero
Oakland, California**

December 13, 2002

Prepared for:


Port of Oakland
EH&SC Department
530 Water Street
Oakland, California 94607

Prepared by:

Iris-Cambria Environmental, J.V.

1615 Broadway, Suite 1003
Oakland, California 94612

1144 65th Street, Suite B
Oakland, California 94602



Robert Marinai, R.G.
Senior Project Geologist



Christopher S. Alger, C.E.G., C.Hg
Principal Engineering Geologist

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INTRODUCTION

Iris–Cambria Environmental, J.V. (Iris–Cambria), has prepared this *Monitoring Well Destruction, Monitoring Well Installation, Groundwater Monitoring, and Utility Trench Sampling Report* for the property located at 1275 Embarcadero, Oakland, California (Site) on behalf of the Port of Oakland (Port) to facilitate redevelopment of the property by Gray & Reynolds Properties, Inc. (Gray & Reynolds) for commercial use. The tasks reported in this document were performed in accordance with the October 8, 2002 *Monitoring Well Destruction Workplan*, and the October 25, 2002 *Monitoring Well Installation and Utility Trench Sampling Workplan*, modified in an agreement reached between the Alameda County Health Care Services Agency (ACHCSA) and the Port, on November 1, 2002. This document describes the monitoring well destruction that occurred during October 2002, the recent utility trench sampling and groundwater monitoring activities, and presents results of soil and groundwater sampling that occurred during November and December 2002.

The work performed by Iris-Cambria included the following:

- Destruction of monitoring wells MW-2, MW-3, and MW-4;
- Installation and development of monitoring well MW-4a;
- Completion of one round of groundwater sampling of monitoring wells MW-4a and MW-5;
- Groundwater sampling via temporary wells TW-1, TW-2, TW-3, and TW-4 within the utility trench backfill surrounding the storm drain and sanitary sewer located adjacent to the Site on The Embarcadero.

SITE DESCRIPTION

The Site is located at 1275 Embarcadero, Oakland, California (Figure 1). Current Site surface features include a parking lot and a vacant former restaurant. The Port owns the Site, and Gray & Reynolds is proposing it for commercial redevelopment.

Past investigations at the Site are described in the following documents: Draft Review of Existing Site Conditions and Environmental Risk Evaluation (Henshaw Associates, Inc., 2001 a), Soil and Groundwater Sampling and Analysis Workplan (Henshaw Associates, Inc., 2001 b), Soil and Groundwater Investigation and Workplan (Baseline Environmental Consulting, August 13, 2001), Site Investigation and Screening-Level Risk Assessment Report (Iris-Cambria, 2002a), and

Monitoring Well Installation, Groundwater Monitoring, and Soil Excavation Report (Iris-Cambria, 2002b).

MONITORING WELL DESTRUCTION

Iris-Cambria destroyed Site monitoring wells MW-2, MW-3, and MW-4 on October 10, 2002. Description of the well destruction activities is presented in Appendix A. The former well locations are illustrated on Figure 2. Standard field procedures for abandoning monitoring wells are presented in Appendix C. The well destruction permits are presented in Appendix D.

MONITORING WELL INSTALLATION AND MONITORING

Iris-Cambria installed groundwater monitoring well MW-4a at the Site on November 22, 2002. Description of the installation activities is presented in Appendix A. The well location is illustrated on Figure 2, and the boring log and well completion details are presented in Appendix B. Standard well installation and sampling procedures are presented in Appendix E. The drilling permit is presented in Appendix D.

The location of MW-4a was selected based on the November 1, 2002 Agency agreement specifying that a well be installed as close as possible to the former location of destroyed well MW-4. MW-4a is located crossgradient (northward) from the former underground storage tank (UST) at a location near the eastern Site boundary.

Groundwater monitoring of monitoring wells MW-4a and MW-5 was conducted on December 3, 2002. Well sampling forms and survey data are presented in Appendices F and G, respectively. The results of the field investigation are presented below.

Soil Analytical Results

Two soil samples collected from the MW-4a borehole were analyzed for total petroleum hydrocarbons as gasoline (TPHg); total petroleum hydrocarbons as diesel (TPHd) and total petroleum hydrocarbons as motor oil (TPHmo) with silica gel cleanup; benzene, toluene, ethylbenzene, and total xylenes (BTEX); and methyl tertiary-butyl ether (MTBE). Soil analytical results are presented in Tables 1 and 2. The laboratory analytical report is presented in Appendix H.

Chemicals detected in soil from MW-4a included TPHd, TPHmo, and benzene. No TPHg, toluene, ethylbenzene, xylenes, or MTBE was detected in either of the MW-4a soil samples. The maximum TPHd concentration of 5.0 milligrams per kilogram (mg/kg) was detected in the soil sample collected from the 6.5-7.0 feet below ground surface (ft bgs) interval, with a corresponding TPHmo concentration of 11 mg/kg. Benzene was only detected in the sample collected from the 10.0-10.5 ft bgs interval, at a concentration of 0.034 mg/kg.

Groundwater Analytical Results

Groundwater was sampled from wells MW-4a and MW-5 on December 3, 2002. Samples were analyzed for TPHg, TPHd, TPHmo, BTEX, MTBE, and polynuclear aromatic hydrocarbons (PAHs). Analytical results are presented in Figure 3 and summarized in Tables 3 and 4. The laboratory analytical reports are presented in Appendix H.

Concentrations of benzene and total xylenes were detected in the groundwater sample collected from well MW-4a at concentrations of 5.7 and 0.58 micrograms per liter ($\mu\text{g/L}$), respectively. No petroleum hydrocarbons or BTEX were detected in the groundwater sample collected from well MW-5. Samples from both well MW-4a and well MW-5 contained detectable concentrations of the PAHs fluoranthene and pyrene, at levels below their respective Regional Water Quality Control Board (RWQCB) groundwater screening level (Table 4).

Site Hydrogeology

During the December 3, 2002 monitoring event, groundwater at the Site was encountered at depths ranging from 5.5 to 7.29 ft bgs. Due to the limited number of monitoring points (two), a groundwater gradient could not be calculated from the data.

UTILITY TRENCH SAMPLING

On November 22, 2002 Iris-Cambria installed four temporary monitoring wells within utility backfills located along The Embarcadero immediately adjacent to the Site. Description of the installation activities is presented in Appendix A. The temporary well locations are illustrated on Figure 2. The drilling permits are presented in Appendix D.

The temporary well locations were selected based on the November 1, 2002 Agency agreement regarding the Site to determine whether groundwater moving from the Site is intersecting the utility backfill(s), and Site-related chemicals of concern (COCs) are impacting the backfill

materials. Temporary wells TW-1 and TW-2 were located at the upgradient property boundary along The Embarcadero to test whether groundwater present in upgradient utility corridor backfill has been impacted by offsite activities, and temporary wells TW-3 and TW-4 were located downgradient of well MW-5 to test whether groundwater present in the utility corridor backfill has been impacted by Site COCs.

Utility Trench Groundwater Analytical Results

Groundwater was sampled from temporary wells TW-1 through TW-4 on November 22, 2002. Samples were analyzed for TPHg, TPHd, TPHmo, BTEX, and MTBE. Figure 4 presents groundwater concentrations of TPHg, TPHd, TPHmo, and BTEX detected during sampling.

Low levels (<500 µg/L) of TPHd and TPHmo were detected in temporary wells TW-1 and TW-3. TW-1 and TW-3 were screened in the backfill associated with the storm drain and were located farthest from the Site. TPHd and TPHmo were not detected in temporary wells TW-2 and TW-4. Those temporary wells were screened in the backfill associated with the sanitary sewer and were located closest to the Site. TPHg, BTEX, and MTBE were not detected in any temporary well.

The analytical results for trench groundwater testing are summarized in Tables 3 and 4. The laboratory analytical reports are presented in Appendix H.

CONCLUSIONS AND RECOMMENDATIONS

Monitoring wells MW-2, MW-3, and MW-4 were destroyed on October 10, 2002, in accordance with the October 8, 2002 workplan. Monitoring well MW-4a was installed and adjacent storm drain and sanitary sewer utility trenches were sampled on November 22, 2002, in accordance with the November 1, 2002 agreement between the ACHCSA and the Port. Iris-Cambria offers the following conclusions and recommendations in summary of activities conducted at the Site:

- Soil excavation and Oxygen releasing compound (ORC) remediation was implemented at well MW-1 as requested by ACHCSA in April 2002.
- Monitoring well MW-5 was installed in April 2002 to monitor boundary conditions and impact of ORC on groundwater conditions at a location downgradient from the ORC application area.

- The trend in groundwater chemistry in well MW-5 shows a decrease in UST-related compounds to non-detectable levels by the most recent round of sampling, suggesting that ORC remediation has contributed to the reduction of petroleum hydrocarbon mass at the site.
- Monitoring well MW-4a data shows only trace levels of benzene and total xylenes, and no TPH, a substantial decrease relative to well MW-4 formerly located just a few feet away in a crossgradient direction.
- PAH detections of fluoranthene and pyrene are likely the result of turbid samples, and not evidence of groundwater migration of PAHs, suggesting that the Site is not a source for groundwater borne PAHs. The PAHs detections are well below the groundwater screening levels shown on Table 4.
- Groundwater sampled from the utility backfill associated with the storm drain (the utility farther from the Site) is a conduit for hydrocarbons migrating eastward along The Embarcadero.
- Groundwater sampled from the utility backfill associated with the sanitary sewer, the utility nearer to the Site, was non-detect for all analytes, suggesting that there is not a migration of COCs from the Site to trench backfill.
- The Site does not appear to be impacting the nearby sanitary sewer and storm drain conduits, since no analytes were detected in the sanitary sewer backfill (which is closer to the Site than the storm drain backfill), and since the concentrations along the storm drain were similar upgradient and downgradient of the Site.
- Quarterly monitoring of the Site monitoring wells is recommended for two more rounds to assess Site boundary groundwater conditions. Groundwater levels should be measured and groundwater samples collected again in February and May 2003. Groundwater samples will be analyzed for TPHg, TPHd, TPHmo, BTEX, MTBE, and PAHs (filtered and unfiltered).
- If the two additional rounds of quarterly monitoring proposed for February and May 2003 yield data consistent with the current decreasing trend for COCs, Iris-Cambria recommends that the Port request formal site closure or a No Further Action letter from ACHCSA and the RWQCB.

REFERENCES

Baseline Environmental Consulting. *Soil and Groundwater Investigation and Workplan*. Gray & Reynolds Development Project. Embarcadero Cove, Oakland, California. August 13, 2001.

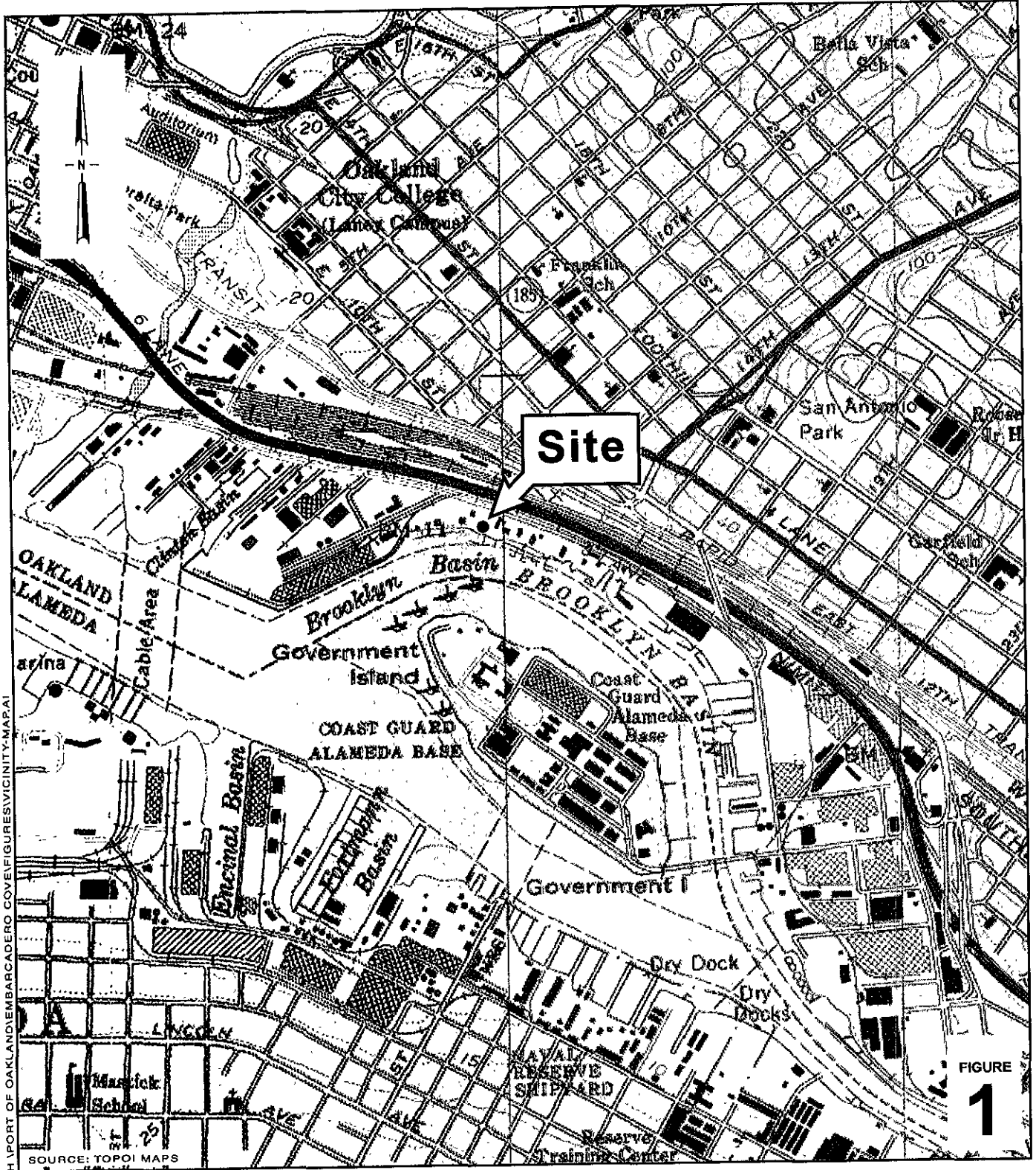
California Regional Water Quality Control Board, San Francisco Bay Region, Groundwater Committee. *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report*. June 1999.

Henshaw Associates, Inc. *Draft Review of Existing Site Conditions and Environmental Risk Evaluation*. Embarcadero Cove Project, Oakland, California. March 14, 2001 a.

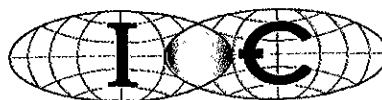
Henshaw Associates, Inc. *Soil and Groundwater Sampling and Analysis Workplan*. Embarcadero Cove Project, Oakland, California. April 23, 2001 b.

Iris-Cambria Environmental, JV. *Site Investigation and Screening-Level Risk Assessment Report*. Gray and Reynolds Development Site. Embarcadero Cove, 1275 Embarcadero, Oakland, California. January 17, 2002 a.

Iris-Cambria Environmental, JV. *Monitoring Well Installation, Groundwater Monitoring, and Soil Excavation Report*. Gray and Reynolds Development Site. Embarcadero Cove, 1275 Embarcadero, Oakland, California. July 24, 2002 b.



Port of Oakland
 1275 Embarcadero
 Embarcadero Cove Project
 Oakland, California

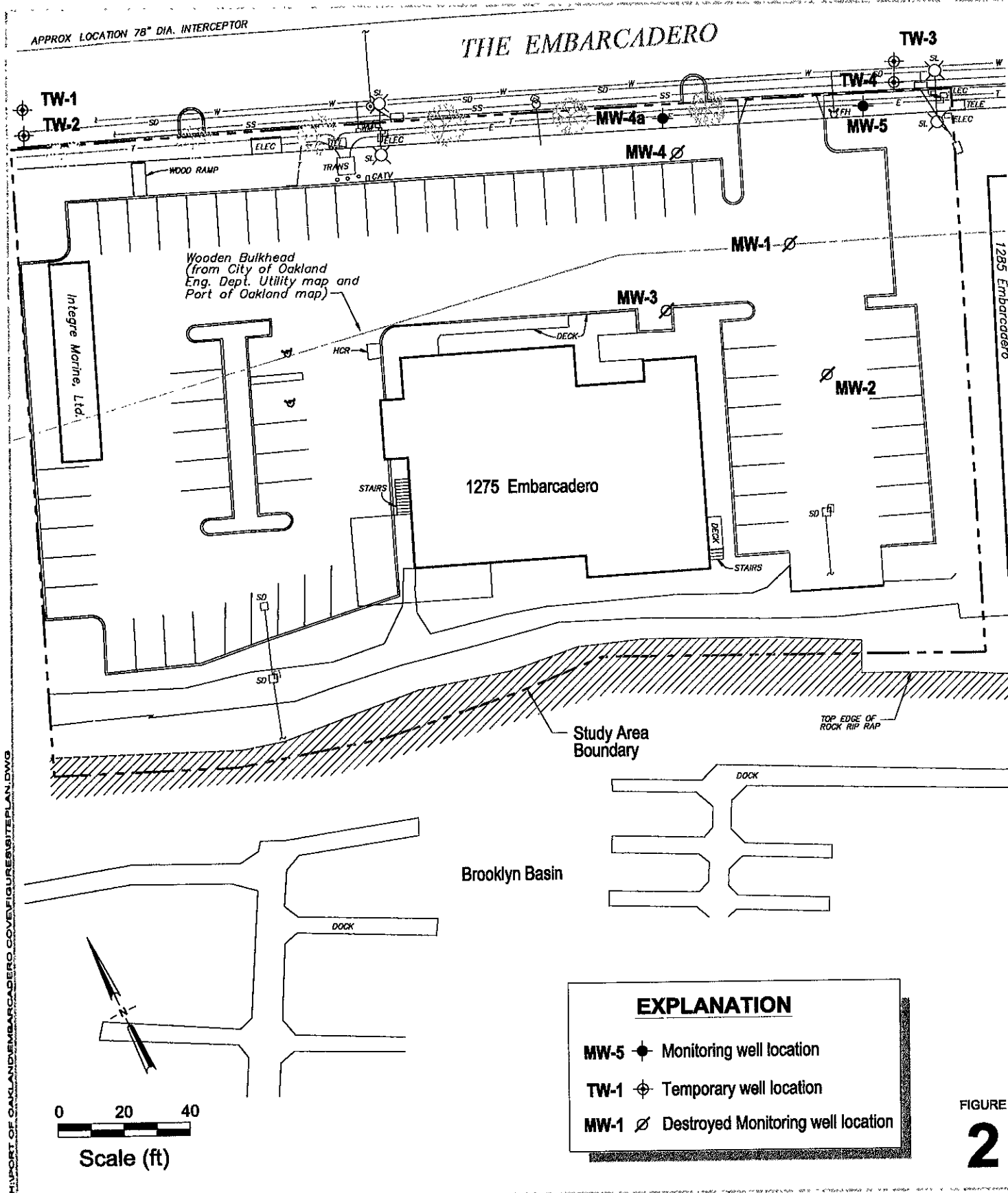


**Iris - Cambria
 Environmental, JV**

Vicinity Map

APPROX LOCATION 78" DIA. INTERCEPTOR

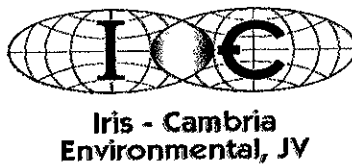
THE EMBARCADERO



REPORT OF OAKLAND EMBARCADERO COVERED AREAS SITE PLAN.DWG

FIGURE 2

Port of Oakland
 1275 Embarcadero
 Embarcadero Cove Project
 Oakland, California



Site Plan

APPROX. LOCATION 78" DIA. INTERCEPTOR

THE EMBARCADERO

MW-4a	
TPHmol	<250
TPHd	<50
TPHg	<50
B	5.7
T	<1.0
E	<0.5
X	0.58

MW-5	
TPHmol	<250
TPHd	<50
TPHg	<50
B	<0.5
T	<1.0
E	<0.5
X	<0.5

MW-4

MW-1

MW-3

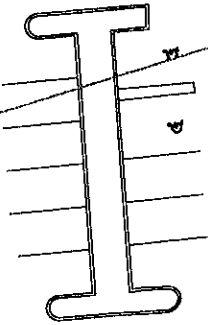
MW-2

1275 Embarcadero

1285 Embarcadero

Wooden Bulkhead
(from City of Oakland
Eng. Dept. Utility map and
Port of Oakland map)

Integre Marine, Ltd.



HCR

DECK

STAIRS

DECK

STAIRS

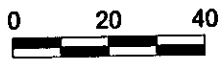
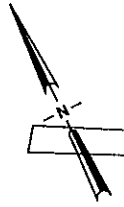
Study Area Boundary

TOP EDGE OF ROCK RIP RAP

Brooklyn Basin

DOCK

DOCK



Scale (ft)

EXPLANATION

MW-4a ● Monitoring well location

MW-1 ∅ Destroyed well location

MW-1	
TPHmol	XXXX
TPHd	XXXX
TPHg	XXXX
B	XXXX
T	XXXX
E	XXXX
X	XXXX

Monitoring well designation

TPHmo
TPHd
TPHg
Benzene
Toluene
Ethylbenzene
Xylene

concentration (µg/L)
in groundwater

FIGURE

3

PORT OF OAKLAND EMBARCADERO COVERAGES 4002-TPHG-STEX.DWG

APPROX. LOCATION 78" DIA. INTERCEPTOR

THE EMBARCADERO

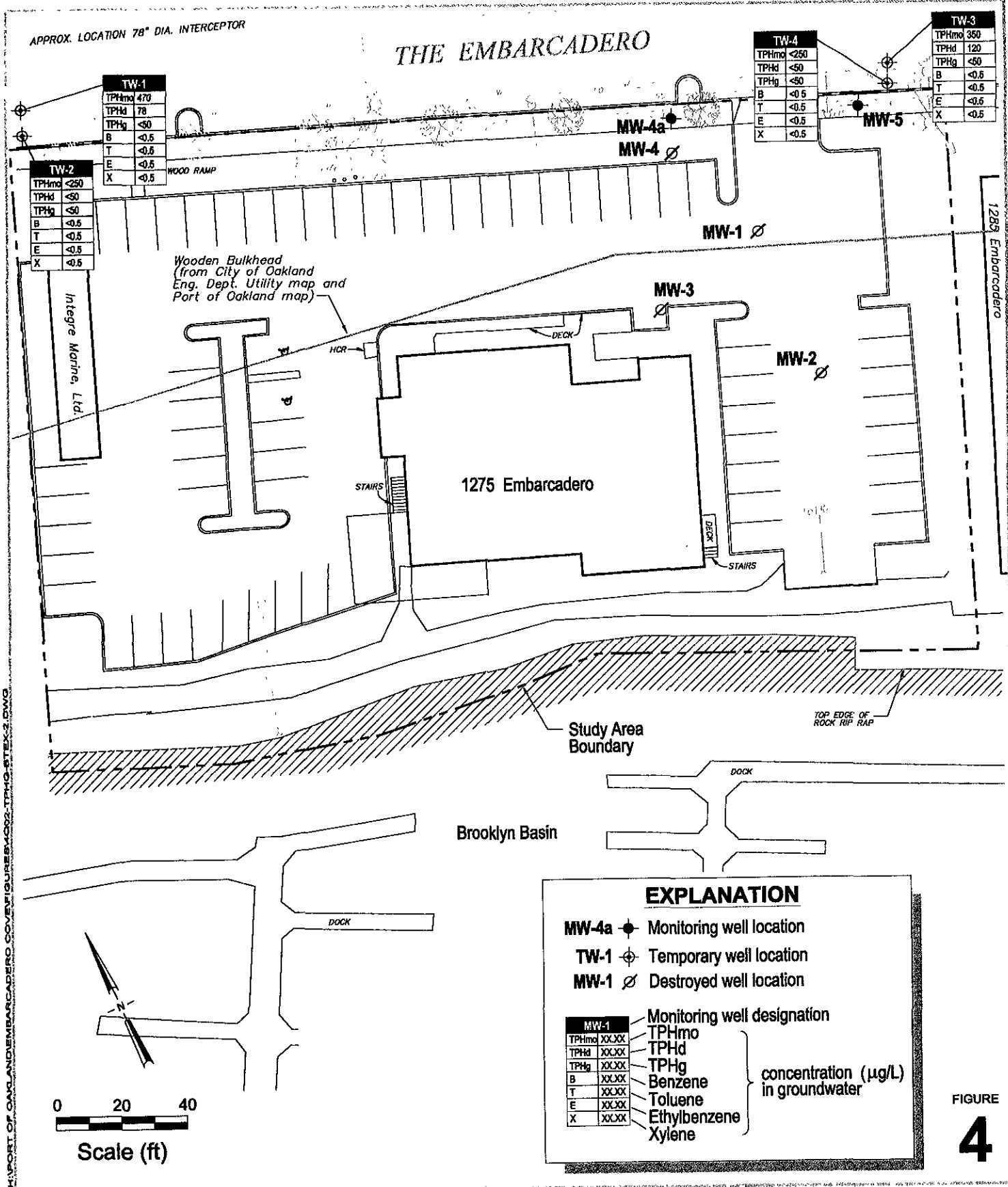


FIGURE 4

CAMBRIA

Table 1: Soil Analytical Data - Light-Range Petroleum Hydrocarbons and MTBE - 1275 Embarcadero, Oakland, CA

Sample ID	Date Sampled	Sample Depth (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
			← mg/kg →					
<i>Baseline Samples</i>								
RN-A1;1.5-2	05/01/01	1.5	--	< 0.005	< 0.005	< 0.005	< 0.005	< 1.0
RN-A2;1-1.5	05/01/01	1.0	--	< 0.005	< 0.005	< 0.005	< 0.005	< 1.0
RN-A3;0.5-1	05/01/01	0.5	--	< 0.005	< 0.005	< 0.005	< 0.005	< 1.0
RN-A4;1.0-1.5	05/01/01	1.0	--	< 0.005	< 0.005	< 0.005	< 0.005	< 1.0
RN-B1;1-1.5	05/01/01	1.0	--	< 0.005	< 0.005	< 0.005	< 0.005	< 1.0
RN-B2;1-1.5	05/01/01	1.0	--	< 0.005	< 0.005	< 0.005	< 0.005	< 1.0
SB-1;0.75-1.25	05/01/01	0.75	< 1.1	< 0.0056	< 0.0056	< 0.0056	< 0.0056	--
SB-1;3-3.5	05/01/01	3.0	< 1.0	0.013	< 0.0052	< 0.0052	< 0.0052	--
SB-1A;0-0.5	05/02/01	0.0	< 1.1	< 0.0054	< 0.0054	< 0.0054	< 0.0054	--
SB-1A;5-5.5	05/02/01	5.0	500	< 0.130	1.1	5.0	16.1	--
SB-1B;1-1.5	05/02/01	1.0	< 1.0	< 0.005	< 0.005	< 0.005	0.0074	--
SB-2;1-1.5	05/01/01	1.0	< .98	< 0.0049	< 0.0049	< 0.0049	< 0.0049	--
SB-2;4-4.5	05/01/01	4.0	< 1.1	< 0.0054	< 0.0054	< 0.0054	< 0.0054	--
SB-2C;0-0.5	05/02/01	0.0	< 0.96	< 0.0048	< 0.0048	< 0.0048	< 0.0048	--
SB-2C;3-3.5	05/02/01	3.0	< 1.0	< 0.0052	< 0.0052	< 0.0052	< 0.0052	--
<i>Cambria Samples</i>								
SB-A-3.5	08/30/01	3.5	< 1.0	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05
SB-B-3.5	08/30/01	3.5	< 1.0	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05
SB-D-3.5	08/30/01	3.5	< 1.0	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05
SB-E-3.5	08/30/01	3.5	1.4	0.014	0.0080	< 0.005	0.026	< 0.05
SB-F-3.5	08/30/01	3.5	2.5	0.021	0.010	< 0.005	0.005	< 0.05
M-1-5	09/17/01	5.0	2,300	1.8	3.7	48	7.2	5.1
MW-1-8.3	10/09/01	8.3	30	0.48	0.067	0.70	0.52	< 0.05
MW-2-5.0	10/09/01	5.0	7.5	0.027	0.051	0.041	0.087	< 0.05
MW-3-5.0	10/09/01	5.0	1.6	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05
MW-4-5.3	10/09/01	5.3	34	0.70	0.068	0.41	0.97	< 0.05

CAMBRIA

Table 1: Soil Analytical Data - Light-Range Petroleum Hydrocarbons and MTBE - 1275 Embarcadero, Oakland, CA

Sample ID	Date Sampled	Sample Depth (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
←----- mg/kg -----→								
MW-5-7.0	04/26/02	7.0	<1	< 0.005	< 0.005	< 0.005	< 0.005	<0.05
MW-5-10.0	04/26/02	10.0	<1	< 0.005	< 0.005	< 0.005	< 0.005	<0.05
MW-5-10.5D*	04/26/02	10.5	<1	< 0.005	< 0.005	< 0.005	< 0.005	<0.05
<i>Current Cambria Investigation</i>								
MW-4a-6.5	11/22/02	6.5	<1	< 0.005	< 0.005	< 0.005	< 0.005	<0.05
MW-4a-10.0	11/22/02	10.0	<1	0.034	< 0.005	< 0.005	< 0.005	<0.05
<i>Soil Screening Values</i>								
Surface Soil (<3 m) Commercial Worker [non-drinking water source] ¹								
Human Health Risk-Based			11,000	0.39	89	220	210 sat	69
Soil Leaching-Based for Protection of Aquatic Life			400	2.1	8.4	24	1	1
Urban Area Ecotoxicity-Based			--	25	150	--	--	--
Construction Worker ²								
Human Health Risk-Based			16,000	16	520 sat	230 sat	210 sat	4900

Abbreviations and Methods:

ft = feet
 mg/kg = milligrams per kilogram
 -- = not available, not analyzed, or does not apply
 MTBE = methyl tert-butyl ether by EPA Method 8020
 Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020 or 8021B
 TPHg = total petroleum hydrocarbons as gasoline by EPA Methods modified 8015, 5030, and 8020 or 602
 sat = saturation limit

Notes:

*Duplicate Sample.
¹ Soil screening values from RWQCB's (2000) Table B-2
² Soil screening values from RWQCB's (2000) Table K-3
Bolded values indicate exceedance of soil screening values

CAMBRIA

Table 2: Soil Analytical Data - Heavy-Range Petroleum Hydrocarbons and SVOCs - 1275 Embarcadero, Oakland, CA

Sample ID	Date Sampled	Sample Depth (ft)	TPHd	TPHmo	bis(2-ethylhexyl) phthalate	Fluoranthene mg/kg	2 - methyl naphthalene	Naphthalene	Pyrene
<i>Baseline Samples¹</i>									
RN-A1;1.5-2	05/01/01	1.5	--	--	--	--	--	< 0.0046	--
RN-A2;1-1.5	05/01/01	1.0	--	--	--	--	--	< 0.005	--
RN-A3;0.5-1	05/01/01	0.5	--	--	--	--	--	< 0.005	--
RN-A4;1.0-1.5	05/01/01	1.0	--	--	--	--	--	< 0.0046	--
RN-B1;1-1.5	05/01/01	1.0	--	--	--	--	--	< 0.0049	--
RN-B2;1-1.5	05/01/01	1.0	--	--	--	--	--	< 0.0047	--
SB-1;0.75-1.25	05/01/01	0.75	62 ²	--	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
SB-1;3-3.5	05/01/01	3.0	13 ²	--	0.61	< 0.33	< 0.33	< 0.33	< 0.33
SB-1A;0-0.5	05/02/01	0.0	240 ²	--	< 6.60	< 6.60	< 6.60	< 6.60	< 6.60
SB-1A;5-5.5	05/02/01	5.0	40 ²	--	< 0.33	< 0.33	2.2	2.2	< 0.33
SB-1B;1-1.5	05/02/01	1.0	60 ²	--	--	--	--	--	--
SB-2;1-1.5	05/01/01	1.0	43 ²	--	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
SB-2;4-4.5	05/01/01	4.0	43 ²	--	< 0.33	< 0.33	< 0.33	< 0.33	< 0.33
SB-2C;0-0.5	05/02/01	0.0	25 ²	--	--	--	--	--	--
SB-2C;3-3.5	05/02/01	3.0	37 ²	--	--	--	--	--	--
<i>Cambria Samples</i>									
SB-A-3.5	08/30/01	3.5	1.4	5.2	--	< 0.25	--	< 0.25	< 0.25
SB-B-3.5	08/30/01	3.5	< 1.0	< 5.0	--	< 0.062	--	< 0.062	< 0.062
SB-D-3.5	08/30/01	3.5	< 1.0	< 5.0	--	< 0.062	--	< 0.062	< 0.062
SB-E-3.5	08/30/01	3.5	2.4	6.1	--	< 0.062	--	< 0.062	< 0.062
SB-F-3.5	08/30/01	3.5	4.6	16	--	< 0.25	--	< 0.25	< 0.25
M-1-5	09/17/01	5.0	850	97	--	--	--	--	--
MW-1-8.3	10/09/01	8.3	5.7	< 5.0	< 0.33	< 0.33	< 0.33	< 0.33 / 0.58 ³	< 0.33
MW-2-5.0	10/09/01	5.0	74	300	< 1.0	< 1.0	< 1.0	< 1.0 / < 0.005 ³	< 1.0
MW-3-5.0	10/09/01	5.0	17	160	< 0.33	< 0.33	< 0.33	< 0.33 / < 0.005 ³	< 0.33
MW-4-5.3	10/09/01	5.3	8.3	10	< 0.33	< 0.33	< 0.33	0.62 / 0.62 ³	< 0.33

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Table 2: Soil Analytical Data - Heavy-Range Petroleum Hydrocarbons and SVOCs - 1275 Embarcadero, Oakland, CA

Sample ID	Date Sampled	Sample Depth (ft)	TPHd	TPHmo	bis(2-ethylhexyl) phthalate	Fluoranthene	2 - methyl naphthalene	Naphthalene	Pyrene
			← mg/kg →						
MW-5-7.0	04/26/02	7.0	8.6	15	--	--	--	--	--
MW-5-10.0	04/26/02	10.0	14	22	--	--	--	--	--
MW-5-10.5D*	04/26/02	10.5	12	26	--	--	--	--	--
<i>Current Cambria Investigation</i>									
MW-4a-6.5	11/22/02	6.5	5.0	11					
MW-4a-10.0	11/22/02	10.0	2.9	< 5.0	--	--	--	--	--
<i>Soil Screening Values</i>									
Surface Soil (<3 m) Commercial Worker [non-drinking water source] ⁴									
Human Health Risk-Based			11,000	11,000	180	6,000	280	5.7	11,000
Soil Leaching-Based for Protection of Aquatic Life			500	1,000	530	60	0.25	4.9	55
Urban Area Ecotoxicity-Based			--	--	--	40	--	40	--
Construction Worker ⁵									
Human Health Risk-Based			16,000	16,000	1,200	12,000	18,000	450	16,000

Abbreviations and Methods:

ft = feet
 mg/kg = milligrams per kilogram
 -- = not available, not analyzed, or does not apply
 TPHd = total petroleum hydrocarbons as diesel by EPA method 8015
 TPHd analyses with silica gel clean-up prior to extraction unless otherwise noted
 TPHmo = total petroleum hydrocarbons as motor oil by EPA method 8015
 SVOC = semi-volatile organic compounds by EPA Method 8270 (modified 8100) and 3550 or 625 and 3510 unless otherwise noted

Notes:

Only those compounds above laboratory reporting limits are shown
 *Duplicate sample.
¹ Baseline samples analyzed for SVOCs by EPA Method 8260 or 8270
² No silica gel cleanup performed, prepared by shaker table.
³ Analyzed by EPA Method 8270 and additionally by EPA Method 8260
⁴ Soil screening values from RWQCB's (2000) Table B-2.
⁵ Soil screening values from RWQCB's (2000) Table K-3.
Bolded values indicate exceedance of soil screening values

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Table 3: Groundwater Analytical and Elevation Data - Light-Range Petroleum Hydrocarbons and MTBE - 1275 Embarcadero, Oakland, CA

Sample ID TOC (ft)	Date Sampled	Groundwater Elevation (ft ¹)	Depth to Water (ft)	TPHg	Benzene	Toluene	Ethylbenzene µg/L	Xylenes	MTBE
<i>Baseline Grab Samples</i>									
SB-1	05/01/01	--	--	80,000	8,600	8,200	3,900	14,600	--
SB-1A	05/02/01	--	--	25,000	260	170	760	2,290	--
SB-2	05/01/01	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	--
<i>Cambria Grab Samples</i>									
SB-A	08/30/01	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
SB-B	08/30/01	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
SB-D	08/30/01	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
SB-E	08/30/01	--	--	39,000	3,200	750	1,200	3,600	< 200
SB-F	08/30/01	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
TW-1	11/22/02	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
TW-2	11/22/02	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
TW-3	11/22/02	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
TW-4	11/22/02	--	--	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
<i>Cambria Monitoring Well Samples</i>									
MW-1	10/12/01	4.88	7.15	--	--	--	--	--	--
12.03	10/19/01	4.81	7.22	11,000	900	300	470	1,000	--
	12/05/01 ²	5.33	6.70	13,000	1,300	180	1,200	860	< 20
	12/05/01 ³	4.74	7.29	3,100	270	12	150	74	< 5.0
	12/19/01 ⁴	4.95	7.08	--	--	--	--	--	--
	05/03/02	6.12	5.91	20,000	1,400	160	580	630	< 500
MW-2	10/12/01	5.71	5.75	--	--	--	--	--	--
11.46	10/19/01	5.52	5.94	< 50	< 0.5	< 0.5	< 0.5	< 0.5	--
	12/05/01 ²	6.11	5.35	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
	12/05/01 ³	5.66	5.80	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
	12/19/01 ⁴	5.65	5.81	--	--	--	--	--	--
	05/03/02	6.46	5.00	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
	6/10/2002 ⁷	6.57	4.89	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0

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Table 3: Groundwater Analytical and Elevation Data - Light-Range Petroleum Hydrocarbons and MTBE - 1275 Embarcadero, Oakland, CA

Sample ID TOC (ft)	Date Sampled	Groundwater Elevation (ft ¹)	Depth to Water (ft)	← μg/L →					
				TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-3	10/12/01	5.89	6.60	--	--	--	--	--	--
12.49	10/19/01 ⁵	5.84	6.65	290	2.0	6.6	0.54	1.2	--
	12/05/01 ^{2,5}	6.69	5.8	310	0.72	2.2	<0.5	<0.5	<5.0
	12/05/01 ^{3,5}	5.54	6.95	320	0.84	2.6	<0.5	0.76	<5.0
	12/19/01 ⁴	6.10	6.39	--	--	--	--	--	--
	05/03/02	7.29	5.20	280	0.74	0.87	<0.5	0.76	<5.0
	6/10/2002 ⁷	7.44	5.05	220	<0.5	1	<0.5	<0.5	<5.0
MW-4	10/12/01	4.98	8.15	--	--	--	--	--	--
13.13	10/19/01	4.91	8.22	44,000	1,900	270	1,500	3,300	--
	12/05/01 ²	5.61	7.52	13,000	120	28	170	380	<10
	12/05/01 ³	5.08	8.05	20,000	420	78	390	870	<20
	12/19/01 ⁴	5.09	8.04	--	--	--	--	--	--
	05/03/02	6.93	6.20	19,000	1,500	240	730	1,400	<1,000
	6/10/2002 ⁷	7.15	5.98	28,000	1,700	230	930	2,100	<500
MW-4a	12/03/02	Not yet surveyed	5.90	<50	5.7 ⁸	<1.0 ⁸	<0.5 ⁸	0.58 ⁸	<0.5 ⁸
MW-5	05/03/02	5.50	4.69	<50	<0.5	<0.5	<0.5	<0.5	<0.5
10.19	6/10/2002 ⁷	5.58	4.61	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	12/03/02	5.22	4.97	<50	<0.5 ⁸	<1.0 ⁸	<0.5 ⁸	<0.5 ⁸	<0.5 ⁸
<i>Trip Blank</i>				--	--	--	--	--	--
TB	12/05/01	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
<i>Groundwater Screening Values⁶</i>									
Indoor Air Impacts				--	84	76,000	170,000 ^{sol}	150,000	290,000
Aquatic Life Protection				3,700 ^a	700 ^b	5,000 ^b	430 ^c	13 ^d	8,000 ^c

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Table 3: Groundwater Analytical and Elevation Data - Light-Range Petroleum Hydrocarbons and MTBE - 1275 Embarcadero, Oakland, CA

Sample ID TOC (ft)	Date Sampled	Groundwater Elevation (ft ¹)	Depth to Water (ft)	TPHg	Benzene	Toluene	Ethylbenzene μg/L	Xylenes	MTBE
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Abbreviations and Methods:

ft = feet
 μg/L = micrograms per liter
 -- = not available, not analyzed, or does not apply
 msl = mean sea level
 Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020 unless otherwise noted
 MTBE = methyl tert-butyl ether by EPA Method 8020 unless otherwise noted
 TPHg = total petroleum hydrocarbons as gasoline by EPA Methods modified 8015, 5030, and 8020 or 602
 TOC Elev (ft) = top of casing elevation in feet (Port of Oakland datum)
 Depth to water in monitoring wells is ft below TOC
 sol = solubility threshold

Notes:

¹ Elevation in feet, Port of Oakland datum
² Wells gauged between 6:00 am and 6:30 am on 12/5 near lower high tide
³ Wells gauged between 11:40 am and 12:00 pm on 12/5 near higher high tide.
⁴ Wells gauged between 9:00 pm and 9:15 pm on 12/19 at lower low tide
⁵ Sample was collected pre-purge.
⁶ Groundwater screening values from RWQCB's (2000) Table F-2, F-4a, b, and c
⁷ Depth to water measurement collected on July 2, 2002.
⁸ Benzene, toluene, ethylbenzene, xylenes, and MTBE by EPA Method 8260B.
Bolded values indicate exceedance of groundwater screening values
^a California Toxic Rule, Saltwater Criteria for Continuous Concentration
^b USEPA Saltwater Chronic Lowest Observable Effect Level
^c USEPA Saltwater Acute Lowest Observable Effect Level
^d USDOE Freshwater Chronic Preliminary Remedial Goal
^e RWQCB Saltwater Criteria for Continuous Concentration (Interim)

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Table 4: Groundwater Analytical and Elevation Data - Heavy-Range Petroleum Hydrocarbons, SVOCs and PAHs
1275 Embarcadero, Oakland, CA

Sample ID	Date Sampled	Groundwater Elevation (ft')	Depth to Water (ft)	µg/L									
				TPHd	TPHmo	Acenaphthalene	bis(2-ethylhexyl) phthalate	Fluoranthene	1-methyl-naphthalene	2-methyl-naphthalene	Naphthalene	Phenanthrene	Pyrene
Baseline Grab Samples													
SB-1	05/01/01	--	--	2,900	--	< 94	< 94	< 94	--	260	610	< 94	< 94
SB-1A	05/02/01	--	--	800	--	< 9.6	< 9.6	< 9.6	--	130	170	< 9.6	< 9.6
SB-2	05/01/01	--	--	180	--	< 9.7	< 9.7	< 9.7	--	< 9.7	< 9.7	< 9.7	< 9.7
Cambria Grab Samples													
SB-A	08/30/01	--	--	1,500	7,200	< 10	--	< 10	--	--	< 10	< 10	< 10
SB-B	08/30/01	--	--	63	550	< 10	--	< 10	--	--	< 10	< 10	< 10
SB-D	08/30/01	--	--	1,100	3,400	< 10	--	11	--	--	< 10	< 10	11
SB-E	08/30/01	--	--	5,800	350	< 50	--	< 50	--	--	370	< 50	< 50
SB-F	08/30/01	--	--	480	1,400	< 10	--	< 10	--	--	< 10	< 10	< 10
TW-1	11/22/02	--	--	78	470	--	--	--	--	--	--	--	--
TW-2	11/22/02	--	--	< 50	< 250	--	--	--	--	--	--	--	--
TW-3	11/22/02	--	--	120	350	--	--	--	--	--	--	--	--
TW-4	11/22/02	--	--	< 50	< 250	--	--	--	--	--	--	--	--
Cambria Monitoring Well Samples													
MW-1	10/12/01	4.88	7.15	--	--	--	--	--	--	--	--	--	--
12.03	10/19/01	4.81	7.22	3,300	< 250	< 10	< 10	< 10	--	54	66	< 10	< 10
	12/05/01 ²	5.33	6.70	3,800	< 250	72	--	< 10	150	220	360	< 10	< 10
	12/05/01 ^{3,4}	4.74	7.29	680	< 250	9.6	--	< 10	18	14	22	1.3	< 10
	12/19/01 ⁵	4.95	7.08	--	--	--	--	--	--	--	--	--	--
	5/3/2002 ⁸	6.12	5.91	5,300	450	--	--	--	--	--	--	--	--

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Table 4: Groundwater Analytical and Elevation Data - Heavy-Range Petroleum Hydrocarbons, SVOCs and PAHs
1275 Embarcadero, Oakland, CA

Sample ID TOC (ft)	Date Sampled	Groundwater Elevation (ft ¹)	Depth to Water (ft)	µg/L									
				TPHd	TPHmo	Acenaphthalene	bi(2-ethylhexyl) phthalate	Fluoranthene	1 - methyl- naphthalene	2 - methyl- naphthalene	Naphthalene	Phenanthrene	Pyrene
MW-2 11.46	10/12/01	5.71	5.75	--	--	--	--	--	--	--	--	--	--
	10/19/01	5.52	5.94	210	460	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10
	12/5/01 ²	6.11	5.35	150	560	< 0.5	--	< 0.25	< 1.0	< 1.0	< 0.25	< 0.25	< 0.25
	12/05/01 ^{3,4}	5.66	5.80	75	270	< 0.5	--	< 0.25	< 1.0	< 1.0	< 0.25	< 0.25	< 0.25
	12/19/01 ⁵	5.65	5.81	--	--	--	--	--	--	--	--	--	--
	5/3/2002 ⁸	6.46	5.00	440	440	--	--	--	--	--	--	--	--
	6/10/2002 ⁹	6.57	4.89	220	370	<10*	--	<10*	--	--	<10*	<50*	<10*
MW-3 12.49	10/12/01	5.89	6.60	--	--	--	--	--	--	--	--	--	--
	10/19/01 ⁶	5.84	6.65	1,600	1,300	< 25	< 25	< 25	--	670	420	< 25	< 25
	12/05/01 ^{2,6}	6.69	5.80	480	480	< 0.5	--	< 0.25	< 1.0	< 1.0	< 0.25	< 0.25	< 0.25
	12/05/01 ^{3,6}	5.54	6.95	530	550	< 0.5	--	< 0.25	< 1.0	< 1.0	< 0.25	< 0.25	0.31
	12/19/01 ⁵	6.10	6.39	--	--	--	--	--	--	--	--	--	--
	5/3/2002 ⁸	7.29	5.2	770	430	--	--	--	--	--	--	--	--
	6/10/2002 ⁹	7.44	5.05	390	470	<10*	--	<10*	--	--	<10*	<50*	<10*
MW-4 13.13	10/12/01	4.98	8.15	--	--	--	--	--	--	--	--	--	--
	10/19/01	4.91	8.22	33,000	900	< 50	< 50	< 50	--	< 50	< 50	< 50	< 50
	12/05/01 ²	5.61	7.52	6,400	430	24	--	< 10	99	190	60	18	< 10
	12/05/01 ³	5.08	8.05	5,400	450	21	--	< 10	100	180	96	12	< 10
	12/19/01 ⁵	5.09	8.04	--	--	--	--	--	--	--	--	--	--
	5/3/2002 ⁸	6.93	6.20	3,600	300	--	--	--	--	--	--	--	--
	6/10/2002 ⁹	7.15	5.98	4,500	<250	<50*	--	<50*	--	--	250*	<250*	0.12*
MW-4a	12/3/2002	Not yet surveyed	5.90	<50	<250	<0.5*	--	<0.062*	<1.0*	<1.0*	<0.2*	<0.05*	<50*
MW-5 10.19	5/3/2002 ⁸	5.50	4.69	74	<250	--	--	--	--	--	--	--	--
	6/10/2002 ⁹	5.58	4.61	110	330	<10*	--	<10*	--	--	<10*	<50*	<10*
	12/03/02	5.22	4.97	<50	<250	<0.5*	--	0.24*	<1.0*	<1.0*	<0.2*	<0.05*	1.0*

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Table 4: Groundwater Analytical and Elevation Data - Heavy-Range Petroleum Hydrocarbons, SVOCs and PAHs
1275 Embarcadero, Oakland, CA

Sample ID	Date Sampled	Groundwater Elevation (ft ¹)	Depth to Water (ft)	µg/L										
				TPHd	TPHmo	Acenaphthalene	bis(2-ethylhexyl) phthalate	Fluoranthene	1-methyl-naphthalene	2-methyl-naphthalene	Naphthalene	Phenanthrene	Pyrene	
<i>Groundwater Screening Values⁷</i>														
Indoor Air Impacts				--	--	--	--	--	26,000 sol	26,000 sol	9,200	--	135 sol	
Aquatic Life Protection				640 ^a	640 ^a	310 ^g	32 ^b	11 ^c	2.1 ^d	2.1 ^d	2,350 ^e	4.6 ^f	300 ^e	

Abbreviations and Methods:

ft = feet
 µg/L = micrograms per liter
 -- = not available, not analyzed, or does not apply
 msl = mean sea level
 TOC Elev (ft) = top of casing elevation in feet (Port of Oakland datum)
 TPHd analyses with silica gel clean-up prior to extraction unless otherwise noted
 TPHmo = total petroleum hydrocarbons as motor oil by EPA method 8015
 SVOC = semi-volatile organic compound analyses performed by EPA Method 8270 (modified 8100) and 3550 unless otherwise noted
 PAH = polynuclear aromatic hydrocarbon analyses performed by EPA Method 8270D
 TPHd = total petroleum hydrocarbons as diesel by EPA method 8015, and 3550 or 3510
 Only those compounds above laboratory reporting limits are shown
 Depth to water in monitoring wells is ft below TOC
 sol = solubility threshold

Notes:

¹ Elevation in feet, Port of Oakland datum
² Wells gauged between 6:00 am and 6:30 am on 12/5 near lower high tide.
³ Wells gauged between 11:40 am and 12:00 pm on 12/5 near higher high tide
⁴ SVOC extraction performed past standard 7day hold time per SW-846 Table 2-36 Revision 3, 1
⁵ Wells gauged between 9:00 pm and 9:15 pm on 12/19 at lower low tide.
⁶ Sample was collected pre-purge.
⁷ Groundwater screening values from RWQCB's (2000) Table F-2, F-4a, b, and c
⁸ Sample was analyzed without silica gel clean-up.
⁹ Depth to water measurement collected on July 2, 2002.
 * PAH analysis
Bolded values indicate exceedance of groundwater screening values
^a RWQCB Saltwater and Freshest Water Criteria
^b USEPA Freshwater Chronic Ecotoxicity Criteria
^c USEPA Saltwater Chronic Ecotoxicity Criteria
^d USDOE Freshwater Chronic Preliminary Remedial Goal
^e USEPA Saltwater Acute Lowest Observable Effect Level
^f USEPA Saltwater Criterion for Continuous Concentration
^g Ontario Ministry of Environment and Energy Drinking Water Screening Level

APPENDIX A

FIELD ACTIVITY DESCRIPTIONS

October 2002 Monitoring Well Destruction

Field activities completed during the destruction of monitoring wells MW-2, MW-3, and MW-4 are presented below. The discussion is organized according to the nature of the individual activity.

- Field Date:* October 10, 2002.
- Scope of Work:* Iris-Cambria destroyed three (3) Site monitoring wells (MW-2, MW-3, and MW-4).
- Personnel Present:* Ian Young, Cambria Senior Staff Geologist; and Robert Marinai, R.G., Cambria Project Geologist.
- Drilling Company:* HEW Drilling of Palo Alto, California (C-57 License No. 604987).
- Destruction Methods:* Hollow-stem auger drill rig. Each well was sounded to confirm the depth of the well. The well box of each monitoring well was chipped out with a breaker bar and the top 5 ft was overdrilled with an 8-inch diameter hollow-stem auger. The well casing was then pulled out in full using the drill rig winch and again measured to confirm that the full length had been removed. Once the well casing was removed, the well cavities were filled with Portland cement injected under pressure through a tremie pipe extended to the bottom of the boring.
- Waste Disposal:* All soil cuttings were left onsite in DOT-approved, 55-gallon drums pending disposal by the Port.

November 2002 Monitoring Well Installation

Field activities completed during the installation of monitoring well MW-4a are presented below. The discussion is organized according to the nature of the individual activity.

- Field Date:* November 22, 2002.
- Scope of Work:* Iris-Cambria advanced one (1) boring and completed it as a monitoring well MW-4a. Two soil samples were collected from the boring. The well was developed and sampled per Tri-Regional procedural guidelines.

Personnel Present: Ian Young, Cambria Senior Staff Geologist; and Robert Marinai, R.G., Cambria Project Geologist.

Drilling Company: Woodward Drilling of Rio Vista, California (C-57 License No. 710079).

Drilling Methods: Hollow-stem auger drill rig. The boring was hand-augered to 5 ft bgs as a safeguard to prevent damage to subsurface utilities.

Boring Depths: Prior to well installation, the boring was drilled to a depth of 12 ft bgs.

Soil Sampling: Soil samples were collected continuously at 0.5-ft intervals during drilling and logged in accordance with the Unified Soil Classification System.

Well Development: On November 27, 2002, Iris-Cambria developed monitoring well MW-4a. Well depth measurements are included in Appendix E.

Groundwater Gauging: Groundwater was gauged during sampling in Site wells December 3, 2002. Well caps were removed and water levels allowed to equilibrate for at least 15 minutes and until stable. During each gauging event, all four wells were gauged within a 30-minute time period. Field forms are included in Appendix F.

Groundwater Sampling: Two (2) site wells were sampled on December 3, 2002. The samples collected for volatile analyses were placed in 40-ml VOAs while samples collected for petroleum hydrocarbons were placed in 1 liter unpreserved ambers. The sample bottles were labeled and placed in a cooled container for transport to McCampbell Analytical in Pacheco, California. Cambria's standard sampling procedures are presented in Appendix E. Well sampling forms are included in Appendix F.

Chemical Analysis: Soil and groundwater samples were sent under chain of custody control to McCampbell Analytical, Inc., of Pacheco, California, and analyzed for: TPHg by EPA Method 8015; TPHd and TPHmo by EPA Method 8015 with silica-gel cleanup; and BTEX and MTBE by EPA Method 8260. Laboratory analytical results are included in Appendix H.

Waste Disposal: All soil cuttings and well development and purge water were left onsite in DOT-approved, 55-gallon drums pending disposal by the Port.

November 2002 Utility Trench Sampling

Field activities completed during the utility trench sampling are presented below. The discussion is organized according to the nature of the individual activity.

- Field Date:** November 22, 2002.
- Scope of Work:** Iris-Cambria advanced four (4) borings adjacent to underground utilities in The Embarcadero adjacent to the Site, converting each to a temporary well (TW-1, TW-2, TW-3, and TW-4).
- Personnel Present:** Ian Young, Cambria Senior Staff Geologist; and Robert Marinai, R.G., Cambria Project Geologist.
- Drilling Company:** Woodward Drilling of Rio Vista, California (C-57 License No. 710079).
- Concrete Coring:** Osborne Concrete Coring of Oakland, California (Osborne), performed asphalt and concrete coring at the four boring locations.
- Excavation Method:** Water jet cutting and vacuum rig as a safeguard to prevent damage to subsurface utilities. The volume of water used in water jet cutting was gauged and compared against the amount extracted. All water introduced during the water jet cutting was recovered.
- Boring Depths:** The borings were advanced to depths between 6.0 and 7.0 ft bgs.
- Well Construction:** Two-inch diameter, 5-ft length screened PVC well sections and associated PVC risers were placed through each excavation. Screen slot size was 0.010 inches wide.
- Well Development:** Iris-Cambria developed each temporary well prior to sampling using a combination of ground water surging and extraction. Between 5 and 10 casing volumes of water were extracted from each temporary well to ensure that any water potentially introduced during excavation activities was removed.
- Groundwater Sampling:** Four (4) temporary wells were sampled on November 22, 2002. The samples collected for volatile analyses were placed in 40-ml VOA vials while samples collected for petroleum hydrocarbons were placed in 1 liter unpreserved ambers. The sample bottles were labeled and placed in a cooled container for transport to McCampbell Analytical in Pacheco, California. Cambria's standard sampling procedures are presented in Appendix E.

Chemical Analysis:

Groundwater samples were sent under chain of custody control to McCampbell Analytical, Inc., of Pacheco, California, and analyzed for: TPHg by EPA Method 8015; TPHd and TPHmo by EPA Method 8015 with silica-gel cleanup; and BTEX by EPA Method 8020. Laboratory analytical results are included in Appendix H.

Backfill Method:

PVC screen and risers were removed from the borings, and all borings were backfilled to the surface with neat cement and completed with concrete patch.

Waste Disposal:

All soil cuttings well development and purge water were left onsite in DOT-approved, 55-gallon drums pending analytical results and disposal by the Port.

ATTACHMENT B

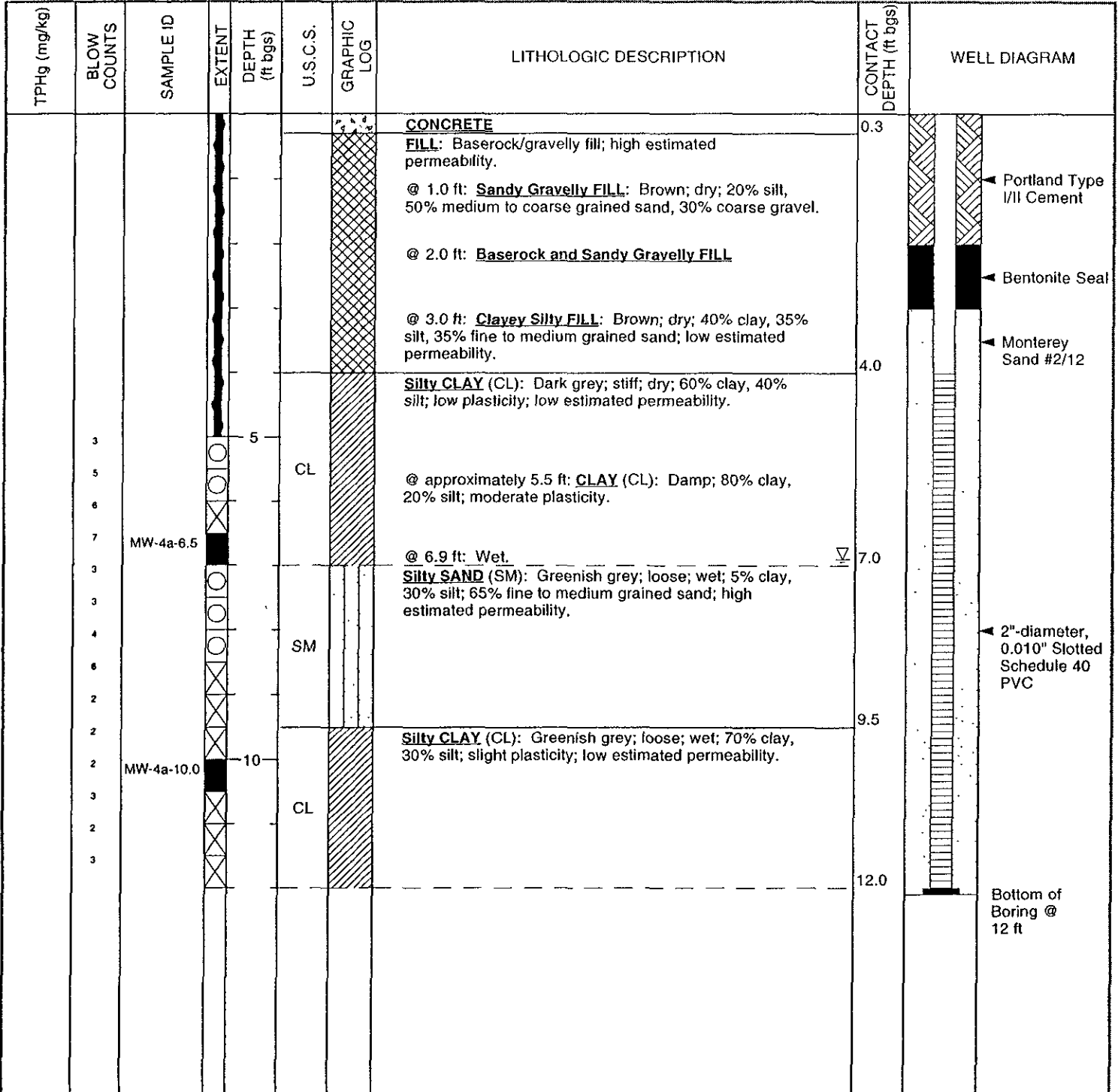
Soil Boring Log / Well Construction Diagram



Cambria Environmental Technology, Inc.
 1144 - 65th St.
 Oakland, CA 94608
 Telephone: (510) 420-0700
 Fax: (510) 420-9170

BORING/WELL LOG

CLIENT NAME	Port of Oakland	BORING/WELL NAME	MW-4a
JOB/SITE NAME	Embarcadero Cove	DRILLING STARTED	22-Nov-02
LOCATION	1275 Embarcadero, Oakland, CA	DRILLING COMPLETED	22-Nov-02
PROJECT NUMBER	458-1705	WELL DEVELOPMENT DATE (YIELD)	NA
DRILLER	Woodward Drilling	GROUND SURFACE ELEVATION	Not Surveyed
DRILLING METHOD	Hollow-stem auger	TOP OF CASING ELEVATION	NA
BORING DIAMETER	8"	SCREENED INTERVAL	4 to 12 ft bgs
LOGGED BY	J. Young	DEPTH TO WATER (First Encountered)	6.9 ft (22-Nov-02) ∇
REVIEWED BY	R. Mannai, RG# 5479	DEPTH TO WATER (Static)	NA ∇
REMARKS	Hand augered to 5 ft bgs; located in sidewalk approximately 22 ft north of driveway.		



WELL LOG (TPHg) H:\PORTOF-1\EMBARC-1\GINTRECOVEMW GPJ_DEFAULT.GDT 12/5/02

ATTACHMENT C

Standard Field Procedures for Abandoning Monitoring Wells

STANDARD FIELD PROCEDURES FOR ABANDONING MONITORING WELLS

This document presents standard field methods for abandoning ground water monitoring wells. The objective of well abandonment is to destroy wells in a manner that is protective of potential water resources. The procedures most commonly used are pressure grouting, drilling out the well, and removal of well casing. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Pressure Grouting

Pressure grouting consists of injecting neat Portland cement through a tremie pipe under pressure to the bottom of the well. The cement is composed of about five gallons of water to a 94 lb. sack of Portland I/II Cement. Once the well casing is full of grout, it remains pressurized by applying pressure with a grout pump. The well casing can also be pressurized by extending the well casing to the appropriate height and filling it with grout. In either case, the additional pressure allows the grout to be forced into the sand pack. After grouting the sand pack and casing, the well vault is removed and the area resurfaced or backfilled as required.

Well Drill Out

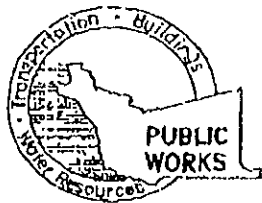
When well drill out is required, a hollow-stem auger drilling rig is used to drill out the well casing and pack materials. First, drill rods are dropped down the well and used to guide the augers as they drill out the well. Once the well is drilled out, the boring is filled with Portland cement injected through the augers or a tremie pipe under pressure to the bottom of the boring. The well vault is removed and the area resurfaced or backfilled as required.

Well Removal

When well removal is required, the winch of a hollow-stem auger drilling rig is used pull out the well casing. First, the well vault is removed and the well casing exposed. Once the well casing is exposed, a cable is attached to the casing and the casing is pulled upwards and out by means of the drilling rig's raised mast and winch. Once the well casing has been removed and confirmed to match the full length of the well's recorded depth, the boring is filled with Portland cement injected through a tremie pipe under pressure to the bottom of the boring. The area is resurfaced or backfilled as required.

ATTACHMENT D

Permits



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
 399 ELMHURST ST. HAYWARD CA, 94544-1395
 PHONE (510) 670-6633 James Yoo
 FAX (510) 782-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING PERMIT APPLICATIONS
 DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT _____
 1275 Embarcadero, Oakland CA _____

CLIENT
 Name Port of Oakland - Doug Herman
 Address 530 Water Street Phone 510-627-1184
 City Oakland CA Zip 94607

APPLICANT
 Name Cambria Environmental Technology, Inc.
 Address 1144 65th Street, Suite B Phone 510-420-0700
 City Oakland CA Zip 94608

TYPE OF PROJECT

Well Construction	<input type="checkbox"/>	Geotechnical Investigation	<input type="checkbox"/>
Cathodic Protection	<input type="checkbox"/>	General	<input type="checkbox"/>
Water Supply	<input type="checkbox"/>	Contamination	<input type="checkbox"/>
Monitoring	<input type="checkbox"/>	Well Destruction	<input checked="" type="checkbox"/>

PROPOSED WATER SUPPLY WELL USE

New Domestic	<input type="checkbox"/>	Replacement Domestic	<input type="checkbox"/>
Municipal	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	Other _____	<input type="checkbox"/>

DRILLING METHOD:

Mud Rotary	<input type="checkbox"/>	Air Rotary	<input type="checkbox"/>	Auger	<input checked="" type="checkbox"/>
Cable	<input type="checkbox"/>	Other			

DRILLER'S NAME Gregg Drilling

DRILLER'S LICENSE NO. 485165

WELL PROJECTS

Drill Hole Diameter _____ in.	Maximum
Casing Diameter _____ in.	Depth <u>15</u> ft.
Surface Seal Depth _____ ft.	Owner's Well Number <u>MW-2</u>

GEOTECHNICAL PROJECTS

Number of Borings _____	Maximum
Hole Diameter _____ in.	Depth _____ ft.

ESTIMATED STARTING DATE 10/10/02
 ESTIMATED COMPLETION DATE 10/10/02

I hereby agree to comply with all requirements of this Ordinance and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [Signature] DATE 10/10/02

PLEASE PRINT NAME Tom Young For Cambria Rev.5-13-00

FOR OFFICE USE

PERMIT NUMBER W02-0596
 WELL NUMBER _____
 APN _____

PERMIT CONDITIONS
 Circled Permit Requirements Apply

A. GENERAL

1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 30 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. GEOTECHNICAL

Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

E. CATHODIC

Fill hole annular zone with concrete placed by tremie.

F. WELL DESTRUCTION

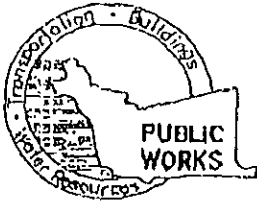
Attach a map of work site. A separate permit is required for wells deeper than 45 feet.

G. SPECIAL CONDITIONS

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

APPROVED [Signature] DATE 10-10-02

FAXED
10-10-02



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
399 ELMHURST ST. HAYWARD CA. 94544-1395
PHONE (510) 670-6633 James Yoo
FAX (510) 782-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING PERMIT APPLICATIONS
DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT _____
175 Embarcadero, Oakland CA _____

CLIENT
Name Part of Oakland - Doug Norman _____
Address 530 Water Street Phone 510-627-1184 _____
City Oakland CA Zip 94607 _____

APPLICANT
Name Cambria Environmental Technology, Inc. _____
Address 1144 65th Street, Suite B Phone 510-420-0700 _____
City Oakland CA Zip 94608 _____

TYPE OF PROJECT
Well Construction Geotechnical Investigation
Cathodic Protection General
Water Supply Contamination
Monitoring Well Destruction

PROPOSED WATER SUPPLY WELL USE
New Domestic Replacement Domestic
Municipal Irrigation
Industrial Other _____

DRILLING METHOD:
Mud Rotary Air Rotary Auger
Cable Other _____

DRILLER'S NAME Green Drilling _____

DRILLER'S LICENSE NO. 485165 _____

WELL PROJECTS
Drill Hole Diameter _____ in. Maximum _____
Casing Diameter _____ in. Depth 25 ft.
Surface Seal Depth _____ ft. Owner's Well Number MW-3 _____

GEOTECHNICAL PROJECTS
Number of Borings _____ Maximum _____
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE 10/10/02 _____
ESTIMATED COMPLETION DATE 10/10/02 _____

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE _____ DATE 10/1/02 _____

PLEASE PRINT NAME Ian Young For Cambria Rev. 5-13-00

FOR OFFICE USE

PERMIT NUMBER W02-0997
WELL NUMBER _____
APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

A. GENERAL

1. A permit application should be submitted to us to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. GEOTECHNICAL

Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

E. CATHODIC

Fill hole anode zone with concrete placed by tremie.

F. WELL DESTRUCTION - Addressed - PG #1

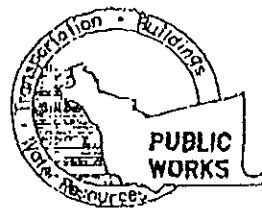
Send a map of work site. A separate permit is required for wells deeper than 45 feet.

G. SPECIAL CONDITIONS

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

APPROVED _____ DATE 10-4-02

FAXED
10-4-02



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
 399 ELMHURST ST. HAYWARD CA. 94544-1395
 PHONE (510) 670-6633 James Yoo
 FAX (510) 781-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING PERMIT APPLICATIONS
 DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE **FOR OFFICE USE**

LOCATION OF PROJECT _____
 1275 Embarcadero, Oakland CA _____

PERMIT NUMBER 1402-0598
 WELL NUMBER _____
 APN _____

CLIENT
 Name Port of Oakland - Doug Herman
 Address 530 Water Street Phone 510-627-1184
 City Oakland CA Zip 94607

APPLICANT
 Name Cambria Environmental Technology, Inc.
 Address 1144 65th Street, Suite B Phone 510-420-0700
 City Oakland CA Zip 94608

TYPE OF PROJECT

Well Construction	<input type="checkbox"/>	Geotechnical Investigation	<input type="checkbox"/>
Cathodic Protection	<input type="checkbox"/>	General	<input type="checkbox"/>
Water Supply	<input type="checkbox"/>	Contamination	<input type="checkbox"/>
Monitoring	<input type="checkbox"/>	Well Destruction	<input checked="" type="checkbox"/>

PROPOSED WATER SUPPLY WELL USE

New Domestic	<input type="checkbox"/>	Replacement Domestic	<input type="checkbox"/>
Municipal	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	Other _____	<input type="checkbox"/>

DRILLING METHOD:

Mud Rotary	<input type="checkbox"/>	Air Rotary	<input type="checkbox"/>	Auger	<input checked="" type="checkbox"/>
Cable	<input type="checkbox"/>	Other			

DRILLER'S NAME Gregg Drilling
 DRILLER'S LICENSE NO. 485165

WELL PROJECTS

Drill Hole Diameter _____ in.	Maximum
Casing Diameter _____ in.	Depth <u>15</u> ft.
Surface Seal Depth _____ ft.	Owner's Well Number <u>MW-4</u>

GEOTECHNICAL PROJECTS

Number of Borings _____	Maximum
Hole Diameter _____ in.	Depth _____ ft.

ESTIMATED STARTING DATE 10/10/02
 ESTIMATED COMPLETION DATE 10/10/02

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE _____ DATE 10/1/02

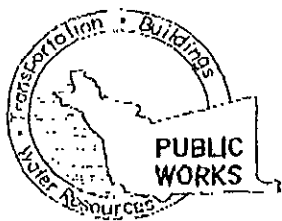
PLEASE PRINT NAME James Yoo Rev. 5-13-00

- PERMIT CONDITIONS**
 Circled Permit Requirements Apply
- A. GENERAL**
1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
 2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
 3. Permit is void if project not begun within 90 days of approval date.
- B. WATER SUPPLY WELLS**
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
- C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS**
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
- D. GEOTECHNICAL**
- Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.
- E. CATHODIC**
- Fill hole anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION** Attached - PG# 1
- Send a map of work site. A separate permit is required for wells deeper than 45 feet.
- G. SPECIAL CONDITIONS**

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

APPROVED _____ DATE 10/4/02

FAXED
10-4-02



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
 399 ELMHURST ST. HAYWARD CA. 94544-1395
 PHONE (510) 670-6633 James Yoo
 FAX (510) 782-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING PERMIT APPLICATIONS
 DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT _____
 1275 Embarcadero, Oakland CA _____

PERMIT NUMBER W02-1240
 WELL NUMBER _____
 APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

CLIENT
 Name Port of Oakland - Doug Herman
 Address 530 Water Street Phone 510-627-1184
 City Oakland CA Zip 94607

A. GENERAL

1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date

APPLICANT
 Name Candria Environmental Technology, Inc.
 Address 1144 65th Street, Suite B Phone 510-420-0700
 City Oakland CA Zip 94608

B. WATER SUPPLY WELLS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

TYPE OF PROJECT

Well Construction	Geotechnical Investigation
Cathodic Protection	General
Water Supply	Contamination
Monitoring	<input checked="" type="checkbox"/> Well Destruction

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

PROPOSED WATER SUPPLY WELL USE

New Domestic	Replacement Domestic
Municipal	Irrigation
Industrial	Other _____

D. GEOTECHNICAL

Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

DRILLING METHOD:

Mud Rotary	Air Rotary	Auger	<input checked="" type="checkbox"/>
Cable	Other		

E. CATHODIC

Fill hole anode zone with concrete placed by tremie.

DRILLER'S NAME: Woodward Drilling

F. WELL DESTRUCTION

Send a map of work site. A separate permit is required for wells deeper than 45 feet.

DRILLER'S LICENSE NO. 710079

G. SPECIAL CONDITIONS *"After the fact"*

WELL PROJECTS

Drill Hole Diameter	<u>8</u> in	Maximum
Casing Diameter	<u>2</u> in	Depth <u>15</u> ft.
Surface Seal Depth	<u>3</u> ft.	Owner's Well Number <u>MW-4a</u>

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

GEOTECHNICAL PROJECTS

Number of Borings	_____	Maximum
Hole Diameter	_____ in	Depth _____ ft.

ESTIMATED STARTING DATE 11/22/02
 ESTIMATED COMPLETION DATE 11/22/02

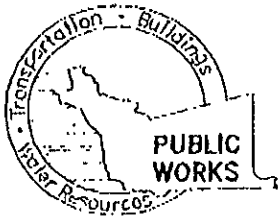
APPROVED _____

DATE 12-11-02

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE: [Signature] DATE 12/6/02

PLEASE PRINT NAME: James Yoo For Candria Rev. 5-13-00



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
 399 ELMHURST ST. HAYWARD CA. 94544-1395
 PHONE (510) 670-6633 James You
 FAX (510)782-1939

APPLICANTS: PLEASE ATTACH A SITE MAP FOR ALL DRILLING PERMIT APPLICATIONS
 DESTRUCTION OF WELLS OVER 45 FEET REQUIRES A SEPARATE PERMIT APPLICATION

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT _____
 1275 Embarcadero, Oakland CA _____

PERMIT NUMBER 1002-1241
 WELL NUMBER _____
 APN _____

PERMIT CONDITIONS
 Circled Permit Requirements Apply

CLIENT
 Name Port of Oakland - Doug Herman
 Address 530 Water Street Phone 510-627-1184
 City Oakland CA Zip 94607

A. GENERAL

1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted original Department of Water Resources-Well Completion Report.
3. Permit is void if project not begun within 90 days of approval date

APPLICANT
 Name Cambria Environmental Technology, Inc.
 Address 1144 65th Street, Suite B Phone 510-420-0700
 City Oakland CA Zip 94608

B. WATER SUPPLY WELLS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

TYPE OF PROJECT

Well Construction	Geotechnical Investigation X
Cathodic Protection	General
Water Supply	Contamination
Monitoring	Well Destruction

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

PROPOSED WATER SUPPLY WELL USE

New Domestic	Replacement Domestic
Municipal	Irrigation
Industrial	Other _____

D. GEOTECHNICAL

Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings.

DRILLING METHOD:

Mud Rotary	Air Rotary	Auger
Cable	Other <u>Water Jet / Vacuum Extraction</u>	

E. CATHODIC

Fill hole anode zone with concrete placed by tremie.

DRILLER'S NAME Woodward Drilling

F. WELL DESTRUCTION

Send a map of work site. A separate permit is required for wells deeper than 45 feet.

DRILLER'S LICENSE NO 710079

G. SPECIAL CONDITIONS - After the Test

WELL PROJECTS

Drill Hole Diameter _____ in.	Maximum
Casing Diameter _____ in.	Depth _____ ft.
Surface Seal Depth _____ ft.	Owner's Well Number _____

NOTE: One application must be submitted for each well or well destruction. Multiple borings on one application are acceptable for geotechnical and contamination investigations.

GEOTECHNICAL PROJECTS

Number of Borings <u>4</u>	Maximum
Hole Diameter <u>4</u> in.	Depth <u>7</u> ft.

ESTIMATED STARTING DATE 11/22/02
 ESTIMATED COMPLETION DATE 11/22/02

APPROVED _____ DATE 12/10/02

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE _____ DATE 12/10/02

PLEASE PRINT NAME James You Rev.5-13-00

ATTACHMENT E

Standard Field procedures for Soil Borings and Monitoring Wells

CAMBRIA

STANDARD FIELD PROCEDURES FOR SOIL BORINGS AND MONITORING WELLS

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe[®]. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4° C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater depth to select soil samples for analysis.

CAMBRIA

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

CAMBRIA

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

F:\TEMPLATE\SOPs\Wells-borings-gw.wpd

Groundwater Monitoring Field Sheet

Well ID	Time	DTP	DTW	Product Thickness	Amount of Product Removed	Casing Diam.	Comment
MW-4a	5:40		5.90			2"	
MW-5	5:42		4.97			2"	

Project Name: Embarradero Cove

Project Number: 458-1808 / 007

Measured By: S. Hill

Date: 12-3-02

WELL SAMPLING FORM

Project Name: Embarcadero Cove	Cambria Mgr: IY	Well ID: MW-4a
Project Number: 458-1808	Date: 12/03/02	Well Yield:
Site Address: 1275 Embarcadero Oakland, CA	Sampling Method:	Well Diameter: 2" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 5.90	Total Well Depth: 12.35	Water Column Height: 6.45
Volume/ft: 0.16	1 Casing Volume: 1.032	3 Casing Volumes: 3.09
Purging Device: disposable bailer	Did Well Dewater?: no	Total Gallons Purged: 3
Start Purge Time: 5:55	Stop Purge Time: 6:09	Total Time: 14 mins

1 Casing Volume = Water column height x Volume/ ft

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp.	pH	Cond.	Comments
6:00	1	19.3	7.20	3999	
6:05	2	19.5	7.25	3999	
6:10	3	19.8	7.23	3999	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-4a	12/03/02	6:15	4VOAs 2 Amber	HCL	TPHg BTEX MTBE TPHd/mo/PAH's	

WELL SAMPLING FORM

Project Name: Embarcadero Cove	Cambria Mgr: IY	Well ID: MW-5
Project Number: 458-1808	Date: 12/03/02	Well Yield:
Site Address: 1275 Embarcadero Oakland, CA	Sampling Method:	Well Diameter: 2" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 4.97	Total Well Depth: 12.00	Water Column Height: 7.03
Volume/ft: 0.16	1 Casing Volume: 1.12	3 Casing Volumes: 336
Purging Device: disposable bailer	Did Well Dewater?: NO	Total Gallons Purged: 3
Start Purge Time: 6:35	Stop Purge Time: 6:49	Total Time: 14mins

1 Casing Volume = Water column height x Volume/ ft

Well Diam	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp.	pH	Cond.	Comments
6:40	1	19.9	7.39	3999	
6:45	2	19.9	7.33	3999	
6:50	3	20.1	7.37	3999	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-5	12/03/02	6:55	4VOAs 2 Amber	HCL	TPHg BTEX MTBE TPHd/mo/PAH's	

ATTACHMENT G

Survey Data

ATTACHMENT H

Laboratory Analytical Reports



Cambria Env. Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: #458-1789; Embarcadero Cove	Date Sampled: 11/22/02
	Client Contact: Rob Marinai/Ian Young	Date Received: 11/25/02
	Client P.O.:	Date Extracted: 11/25/02
		Date Analyzed: 11/25/02-11/26/02

Diesel (C10-23) and Oil (C18+) Range Extractable Hydrocarbons with Silica Gel Clean-Up*

Extraction method: SW3550C

Analytical methods SW8015C

Work Order 0211430

Lab ID	Client ID	Matrix	TPH(d)	TPH(mo)	DF	% SS
0211430-001A	MW-4a-6.5	S	5.0,g	11	1	83.9
0211430-002A	MW-4a-10.0	S	2.9,b	ND	1	86.3
0211430-003B	TW-1	W	78,g	470	1	102
0211430-004B	TW-2	W	ND	ND	1	105
0211430-005B	TW-3	W	120,g	350	1	83.4
0211430-006B	TW-4	W	ND	ND	1	103
Reporting Limit for DF = 1, ND means not detected at or above the reporting limit		W	50	250		µg/L
		S	1.0	5.0		mg/Kg

* water and vapor samples are reported in µg/L, wipe samples in ug/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, and all TCLP / STLC / SPLP extracts in µg/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation a) unmodified or weakly modified diesel is significant, b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant; d) gasoline range compounds are significant; e) unknown medium boiling point pattern that does not appear to be derived from diesel; f) one to a few isolated peaks present, g) oil range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment, k) kerosene/kerosene range; l) bunker oil; m) fuel oil; n) stoddard solvent / mineral spirit.



QC SUMMARY REPORT FOR SW8021B/8015Cm

Matrix: S

WorkOrder: 0211430

EPA Method: SW8021B/8015Cm		Extraction: SW5030B		BatchID: 5056		Spiked Sample ID N/A				
Compound	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/Kg	mg/Kg	% Rec.	% Rec	% RPD	% Rec.	% Rec.	% RPD	Low	High
TPH(gas)	N/A	0.60	N/A	N/A	N/A	113	114	1.36	80	120
MTBE	N/A	0.10	N/A	N/A	N/A	107	100	6.30	80	120
Benzene	N/A	0.10	N/A	N/A	N/A	101	101	0.733	80	120
Toluene	N/A	0.10	N/A	N/A	N/A	105	113	6.87	80	120
Ethylbenzene	N/A	0.10	N/A	N/A	N/A	104	105	1.25	80	120
Xylenes	N/A	0.30	N/A	N/A	N/A	110	110	0	80	120
%SS	N/A	100	N/A	N/A	N/A	88.7	88.9	0.284	80	120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
 NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate, LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate, RPD = Relative Percent Deviation

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / (MS + MSD) * 2.

* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.



QC SUMMARY REPORT FOR SW8021B/8015Cm

Matrix: W

WorkOrder. 0211430

EPA Method: SW8021B/8015Cm		Extraction: SW5030B		BatchID: 5051			Spiked Sample ID 0211436-001A			
Compound	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
TPH(gas)	ND	60	112	112	0.366	95	95	0.0515	80	120
MTBE	ND	10	92.4	93.3	0.953	80.8	86.8	7.05	80	120
Benzene	ND	10	99.3	97.7	1.72	98.4	96.5	1.98	80	120
Toluene	ND	10	95.4	99.8	4.49	101	99.6	1.32	80	120
Ethylbenzene	ND	10	97.7	98.6	0.986	103	102	1.13	80	120
Xylenes	ND	30	93.3	93.3	0	103	103	0	80	120
%SS	107	100	104	100	3.61	99.6	100	0.562	80	120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions
 NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate, LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content

$\% \text{ Recovery} = 100 * (\text{MS} - \text{Sample}) / (\text{Amount Spiked}), \text{RPD} = 100 * (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) * 2.$

* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.



QC SUMMARY REPORT FOR SW8015C

Matrix: S

WorkOrder 0211430

EPA Method: SW8015C		Extraction SW3550C		BatchID: 5053			Spiked Sample ID: N/A			
Compound	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
TPH(d)	N/A	150	N/A	N/A	N/A	96	85.6	200	70	130
%SS	N/A	100	N/A	N/A	N/A	88.4	103	18.6	70	130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions
 NONE

MS = Matrix Spike, MSD = Matrix Spike Duplicate, LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content

% Recovery = $100 * (MS - Sample) / (Amount Spiked)$; $RPD = 100 * (MS - MSD) / (MS + MSD) * 2$.

* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.



QC SUMMARY REPORT FOR SW8015C

Matrix W

WorkOrder 0211430

EPA Method: SW8015C		Extraction: SW3510C			BatchID: 5045			Spiked Sample ID: N/A		
Compound	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec	% Rec.	% RPD	% Rec.	% Rec.	% RPD	Low	High
PH(d)	N/A	7500	N/A	N/A	N/A	105	106	0.961	70	130
%SS.	N/A	100	N/A	N/A	N/A	94.4	93.6	0.787	70	130
All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions NONE										

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate, RPD = Relative Percent Deviation.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

% Recovery = $100 * (MS - Sample) / (Amount\ Spiked)$; RPD = $100 * (MS - MSD) / (MS + MSD) * 2$.

* MS and / or MSD spike recoveries may not be near 100% or the RPDs near 0% if: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) if that specific sample matrix interferes with spike recovery.

0211700

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553

Telephone: (925) 798-1620

Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

RUSH

FOUND TIME RUSH 24 HOUR 48 HOUR 5 DAY

Report To: Rob Marina / Ian King Bill To: Port of Oakland

Company: Cambria Environmental Technology

1144 65th Street, Suite C

Oakland, CA 94608

Tele: (510) 420-0700

Fax: (510) 420-9170

Project #: 458-1789

Project Name: Embroiderer Cove

Project Location: 1725 Embroiderer Oakland CA

Sampler Signature: [Signature]

Analysis Request

Other

Comments

SAMPLING

MATRIX

METHOD PRESERVED

SAMPLE ID	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED				BTEX & TPH as Gas (602/8020 + 8015) MTBE	TPH as Diesel (8015) and TPH _{mo}	Total Petroleum Oil & Grease (5320 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8080	EPA 608 / 8080 PCB's ONLY	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/7239.2/6010)	RCI								
		Date	Time			Water	Soil	Air	Sludge	Other	Ice	HCl	HNO ₃	Other																							
MW-4a-65		11/22/02	10:15a	1	Steel	X	X					X	X																								
MW-4a-10.0			10:25a	1	Steel	X	X					X	X																								
TW-1			12:50p	5	NVA Air	X						X	X																								
TW-2			12:40p	5		X						X	X																								
TW-3			1:23p	5		X						X	X																								
TW-4			1:05p	5		X						X	X																								

IORA
 GOOD CONDITION
 HEAD SPACE ARSENT
 UNEMPLOYED IN LAB
 PRESERVATION APPROPRIATE
 CONTAINERS PRESERVED IN LAB
 VOAS
 O&G
 METALS
 OTHER

Relinquished By: [Signature] Date: 11/23/02 Time: Received By: [Signature]
 Relinquished By: [Signature] Date: 11/25/02 Time: 12:20p Received By: [Signature] 298
 Relinquished By: [Signature] Date: 11/25/02 Time: 6:50 Received By: [Signature]

Remarks: Silica gel clean-up for diesel and motor oil

McC Campbell Analytical Inc.

CHAIN-OF-CUSTODY RECORD



110 Second Avenue South, #D7
 Pacheco, CA 94553-5560
 (925) 798-1620

WorkOrder: 0211430

Client:

Cambria Env. Technology
 1144 65th Street, Suite C
 Oakland, CA 94608

TEL: (510) 420-0700
 FAX: (510) 420-9170
 ProjectNo: #458-1789; Embarcadero Cove
 PO:

Date Received 11/25/02
 Date Printed 11/25/02

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests	
					SW8015C	8021B/8015
0211430-001	MW-4a-6.5	Soil	11/22/02 10:15:00 AM		A	A
0211430-002	MW-4a-10.0	Soil	11/22/02 10:25:00 AM		A	A
0211430-003	TW-1	Water	11/22/02 12:50:00 PM		B	A
0211430-004	TW-2	Water	11/22/02 12:40:00 PM		B	A
0211430-005	TW-3	Water	11/22/02 1:23:00 PM		B	A
0211430-006	TW-4	Water	11/22/02 1:05:00 PM		B	A

Prepared by:

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense



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<http://www.mccampbell.com> E-mail: nam@mccampbell.com

Cambria Env Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: #458-1808; Embarcadero Cove	Date Sampled: 12/03/02
	Client Contact: Ian Young	Date Received: 12/03/02
	Client P.O.:	Date Extracted: 12/04/02
		Date Analyzed: 12/04/02

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*

Extraction method SW5030B

Analytical methods SW8015Cm

Work Order 0212033

Lab ID	Client ID	Matrix	TPH(g)	DF	% SS
001D	MW-4a	W	ND,i	1	103
002D	MW-5	W	ND	1	104

Reporting Limit for DF=1; ND means not detected at or above the reporting limit	W	50	μg/L
	S	NA	NA

*water and vapor samples are reported in μg/L, soil and sludge samples in mg/kg, wipe samples in μg/wipe, and TCLP extracts in μg/L.

clustered chromatogram; sample peak coelutes with surrogate peak.

† The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant (aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline[®]; e) TPH pattern that does not appear to be derived from gasoline (stoddard solvent / mineral spirit[®]); f) one to a few isolated non-target peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol % sediment; j) reporting limit raised due to high MTBE content; k) TPH pattern that does not appear to be derived from gasoline (aviation gas); m) no recognizable pattern.



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Cambria Env. Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: #458-1808; Embarcadero Cove	Date Sampled: 12/03/02
	Client Contact: Ian Young	Date Received: 12/03/02
	Client P.O.:	Date Extracted: 12/03/02
		Date Analyzed: 12/04/02

Diesel (C10-23) and Oil (C18+) Range Extractable Hydrocarbons with Silica Gel Clean-Up*

Extraction method: SW83510C

Analytical methods: SW8015C

Work Order: 0212033

Lab ID	Client ID	Matrix	TPH(d)	TPH(mo)	DF	% SS
0212033-001A	MW-4a	W	ND,i	ND	1	110
0212033-002A	MW-5	W	ND	ND	1	83.8
Reporting Limit for DF=1, ND means not detected at or above the reporting limit		W S	50 NA	250 NA		µg/L mg/Kg

* water and vapor samples are reported in µg/L, wipe samples in ug/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, and all TCLP / STLC / SPLP extracts in µg/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

† The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant; d) gasoline range compounds are significant; e) unknown medium boiling point pattern that does not appear to be derived from diesel; f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; k) kerosene/kerosene range; l) bunker oil; m) fuel oil; n) stoddard solvent / mineral spirit.



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Cambria Env. Technology
 1144 65th Street, Suite C
 Oakland, CA 94608

Client Project ID: #458-1808;
 Embarcadero Cove

Client Contact: Ian Young

Client P.O.:

Date Sampled: 12/03/02

Date Received: 12/03/02

Date Extracted: 12/04/02

Date Analyzed: 12/04/02

MTBE & BTEX by P&T and GC/MS*

Extraction Method: SW503DB

Analytical Method: SW8260B

Work Order: 0212033

Lab ID	0212033-001C	0212033-002C	Reporting Limit for DF = 1	
Client ID	MW-4a	MW-5		
Matrix	W	W		
DF	1	1		

Compound	Concentration		ug/kg	ug/l
	Benzene	5.7	ND	NA
Ethylbenzene	ND	ND	NA	0.5
Methyl t-butyl ether (MTBE)	ND	ND	NA	0.5
Toluene	ND<1.0	ND<1.0	NA	0.5
Xylenes	0.58	ND	NA	0.5

Surrogate Recoveries (%)

%SS:	99	96.5		
Comments				

* water and vapor samples and all TCLP & SPLP extracts are reported in ug/L, soil/sludge/solid samples in ug/kg, wipe samples in ug/wipe, product/oil/non-aqueous liquid samples in mg/l

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content



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 Telephone: 925-798-1620 Fax: 925-798-1622
 http://www.mccampbell.com E-mail: main@mccampbell.com

Cambria Env. Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: #458-1808; Embarcadero Cove	Date Sampled: 12/03/02
	Client Contact: Ian Young	Date Received: 12/03/02
	Client P.O.:	Date Extracted: 12/03/02
		Date Analyzed: 12/03/02

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) by HPLC*

Extraction Method: SW3510C

Analytical Method: SW8310

Work Order: 0212033

Lab ID	0212033-001B		0212033-002B		Reporting Limit for ID: =}	
	Client ID	MW-4a	MW-5			
Matrix	W	W			S	W
DF	1	1				
Compound	Concentration				ug/kg	ug/L
Acenaphthene	ND	ND			NA	0.5
Acenaphthylene	ND	ND			NA	0.2
Anthracene	ND	ND			NA	2.0
Benzo (a) anthracene	ND	ND			NA	1.0
Benzo (a) pyrene	ND	ND			NA	0.1
Benzo (b) fluoranthene	ND	ND			NA	10
Benzo (g,h,i) perylene	ND	ND			NA	0.1
Benzo (k) fluoranthene	ND	ND			NA	2.0
Chrysene	ND	ND			NA	5.0
Dibenzo (a,h) anthracene	ND	ND			NA	0.1
Fluoranthene	0.062	0.24			NA	0
Fluorene	ND	ND			NA	0.1
Indeno (1,2,3) pyrene	ND	ND			NA	0.05
1-Methylnaphthalene	ND	ND			NA	1.0
2-Methylnaphthalene	ND	ND			NA	1.0
Naphthalene	ND	ND			NA	0.2
Phenanthrene	ND	ND			NA	0.05
Pyrene	0.12	1.0			NA	0

Surrogate Recoveries (%)


%SS1	89.5	109
%SS2	94.2	102
Comments	1	

* water and vapor samples and all TCLP & SPLP extracts are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in ug/wipe, product/oil/non-aqueous liquid samples in mg/L

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

surrogate diluted out of range.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content.

 Edward Hamilton, Lab Director

RUSH

McCAMPBELL ANALYTICAL INC.

110 2ND AVENUE SOUTH, #D7
PACHECO, CA 94553-5560

Telephone: (925) 798-1620

Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME:
RUSH 24 HOUR 48 HOUR 5 DAY

EDF Required? Yes No

Report To: Tan Young Bill To: Cambria Env

Company: Cambria Environmental Technology Inc.
6262 Hottis Street 1144 65TH St. Oakland, Ca
Emeryville, CA 94608 E-mail:

Tele: 510-420-0700 Fax: 510-450-8295

Project #: 458-1808 Project Name: Embarcadero Cove

Project Location: 1275 Embarcadero Oakland, Ca

Sampler Signature: [Signature]

Analysis Request

BTEX & TPH as Gas (602/8020 + 8015)/MCTBE
TPH as Diesel (8015) / no with clean up
Total Petroleum Oil & Grease (5520 E&F/B&F)
Total Petroleum Hydrocarbons (4181)
EPA 601 / 8010
BTEX ONLY (EPA 602 / 8020)
EPA 608 / 8080
EPA 608 / 8080 PCB's ONLY
EPA 624 / 8240 / 8260
EPA 625 / 8270
PAH's / PNA's by EPA 625 / 8270 / 8310
CAM-17 Metals
LUFT 5 Metals
Lead (7240/7421/239.2/6010)
RCI

Other
CONFIRM MIBF by 8260
TPH by 8020 BTEX MIBF # 80216
PAH's by 8310

Comments

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED					
		Date	Time			Water	Soil	Air	Sludge	Other	Ice	HCl	HNO ₃	Other		
MW-4a		12-302	6:15	5	PTB	X					X	X				
MW-5		12-302	6:55	5	PTB	X					X	X				

Relinquished By: <u>[Signature]</u>	Date: <u>12-302</u>	Time: <u>2:20</u>	Received By: <u>[Signature]</u>
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

Remarks:

VOAS | OAO | METALS |

ACQUITTANCE
RECEIVED IN LAB PRESERVED IN LAB

McC Campbell Analytical Inc.



110 Second Avenue South, #07
 Pacheco, CA 94553-5560
 (925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0212033

Client:

Cambria Env. Technology
 1144 65th Street, Suite C
 Oakland, CA 94608

TEL: (510) 420-0700
 FAX: (510) 420-9170
 ProjectNo: #458-1808; Embarcadero Cove
 PO:

Date Received: 12/3/02

Date Printed: 12/3/02

Sample ID	ClientSampleID	Matrix	Collection Date	Hold	Requested Tests			
					SW8015C	SW8021B	8021B/8015	SW8310
0212033-001	MW-4a	Water	12/3/02 6:15:00 AM		A	C	D	B
0212033-002	MW-5	Water	12/3/02 6:55:00 AM		A	C	D	B

Prepared by:

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ATTACHMENT I

Soil Disposal Waste Manifests

Soil and groundwater waste generated during the course of the activities described herein are pending disposal by the Port.