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**FREE PRODUCT REMOVAL REPORT
FORMER GLOVATORIUM FACILITY
3815 BROADWAY
OAKLAND, CALIFORNIA**

June 28, 2004

Alameda County

JUL 02 2004

Environmental Health

Project 2513

Prepared for:

**Smiland and Khachigian
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Prepared by:

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June 28, 2004

Mr. Robert Schultz
Alameda County Department of
Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Alameda County
JUL 1 2004
Environmental Health

Subject: Site Located at 3815 Broadway, Oakland, California
Former Glovatorium Facility

Dear Mr. Schultz:

Enclosed for your review is a copy of SOMA's report entitled "Free Product Removal"
for the subject property.

Thank you for your time in reviewing our report. Please do not hesitate to call me at
(925) 244-6600, if you have any questions or comments.

Sincerely,

Mansour Sepehr, Ph.D., P.E.
Principal Hydrogeologist

Stuart Depper

Enclosure

cc: Mr. Albert M. Cohen, Smiland & Khachigian w/enclosure
Ms. Betty Graham, Regional Water Quality Control Board w/enclosure
Dr. Bruce Page, Bruce W. Page Consulting w/enclosure
Mr. Peter W. McGaw, ARCHER.NORRIS w/enclosure

CERTIFICATION

This report has been prepared by SOMA Environmental Engineering, Inc. for Smiland & Khachigian, to comply with the Alameda County Department of Environmental Health's requirements for delineation and removal of free product from the subsurface at the former Glovatorium, and to provide information necessary to defend claims brought against the owners by Earl Thompson and Grace Johnson.



Mansour Sepehr, Ph.D., P.E.
Principal Hydrogeologist



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INTRODUCTION

This report has been prepared by SOMA Environmental Engineering, Inc. (SOMA) for the Law Offices of Smiland and Khachigian on behalf of their client, the owners of the former Glovatorium, which is located at 3815 Broadway Avenue, Oakland, California (the "Site"), as shown in Figure 1. The Site is located in an area consisting primarily of commercial and residential land uses. This report is being submitted to the Alameda County Department of Environmental Health (ACDEH) to comply with their requirements of free product delineation and removal to the extent practicable as set forth in the California Regional Water Quality Control Board's (RWQCB) Interim Guidance Document, dated November 1995, for Site closure.

This report summarizes the results of free product discovery, its subsequent investigation and removal, and finally the current horizontal extent of free product at the Site. This report also proposes the installation of additional free product recovery wells for complete removal of free product from the subsurface, as required for the Site's closure.

Background

In the past, the sporadic presence of free product or sheen detected in wells B-2, B-3, B-7, B-8, B-9 and B-10, was reported in the groundwater monitoring reports. These wells are located inside the Glovatorium building. The maximum reported thickness of free product in these wells was approximately 2.1 feet inside monitoring well B-8, on October 18, 2001, during a groundwater monitoring event.

In October 2001, SOMA installed four additional groundwater monitoring wells, SOMA-2 through SOMA-5, inside the Glovatorium building to evaluate the Site's hydrogeology and the chemical plume beneath the Site. Approximately two months after the installation of these monitoring wells, in early 2002, a significant

thickness of free product (up to 8.5 feet) was discovered in SOMA-4. SOMA-4 is a 2-inch diameter shallow groundwater monitoring well with a total depth of 20 feet; the screen interval is between 10 and 20 feet below ground surface (bgs). After observing the presence of a significant thickness of free product inside SOMA-4, SOMA initiated an extensive field investigation to delineate the extent of free product and remedial activities to remove free product from SOMA-4.

On March 28, 2002, SOMA drilled nine hydropunches (HP-1 through HP-9) for the following purposes:

1. To evaluate the extent of free product in the subsurface;
2. To determine if there is another undiscovered underground storage tank (UST) inside the building; and
3. To evaluate the water quality conditions, especially with respect to tetrachloroethene (PCE) beneath the former dry-cleaning machines.

Hydropunches (HP-1, HP-2, HP-5, HP-8 and HP-9) were drilled to a total depth of 20 feet bgs to evaluate the extent of free product in close proximity of SOMA-4 and B-8. HP-3 and HP-4 were drilled to 7 feet bgs to evaluate whether or not there are any undiscovered USTs. These hydropunches could not be drilled deeper due to accessibility problems inside the building. HP-6 and HP-7 were drilled to a total depth of 20 feet bgs in order to evaluate the presence of PCE in the groundwater beneath the former dry cleaning machines. Figure 2 shows the location of the hydropunches.

Due to the fine-grained nature of the subsurface sediments, during the drilling operation no groundwater or free product was encountered. Therefore, SOMA's field staff installed a temporary 3/4 inch diameter PVC casing inside each hydropunch hole for later inspection/monitoring of free product, if any. At each hydropunch location, the PVC casing was 20 feet long. The lower 10-foot portion of the casing was perforated while the upper 10-foot portion was blank.

On April 4, 2002, SOMA's field crew visited the Site and measured depth to product and groundwater inside the hydropunches. They reported that depth to groundwater occurred at 7.5 to 9.5 feet below surface, which was well above the perforated interval of the temporary PVC casing. During this visit the thickness of free product ranged between 0.0 and 0.7 feet. The maximum product thickness was observed in HP-5.

On April 10, 2002, SOMA's staff increased the perforated interval of the temporary casing in HP-1, HP-2, HP-5, HP-8 and HP-9 from 5 to 20 feet. As such, the casing perforations started at 5 feet bgs at those locations. This was done to ensure the flow of free product into the casing.

On April 10 and 29, 2002, SOMA's staff measured depth to water and product inside the hydropunches and the selected "B" series wells. Table 1 shows the measured product thickness at each hydropunch location and "B" wells. These results show the maximum product thickness was found in SOMA-4 and HP-5.

To determine if any additional USTs are present at the site, HP-3 and HP-4 were advanced to 7 feet bgs. Due to physical constraints, HP-3 and HP-4 could not be advanced more than 7 feet bgs. However, at HP-3 or HP-4 locations no USTs were encountered

The results of the April 2002 subsurface investigation did not reveal the potential extent of free product beneath the Site. This was largely due to the high watertable elevations because of excessive rainfall events in early 2002. As watertable rises the free product tends to submerge below the water table and becomes harder to detect. However, the investigation did indicate the presence of free product in SOMA-4 (3.2 feet), HP-5 (1.25 feet), B-8 and B-3 (0.15 feet). Due to physical constraints, the extent of free product, especially around SOMA-4, could not be defined. However, SOMA recommended the following action items as part of site closure, through the RBCA process.

1. The installation of a product removal canister inside SOMA-4;
2. Once the water levels have receded, conduct an investigation of the free product extent in the subsurface.

On June 11, 2002, SOMA installed a Durham Geo-Enterprise Model TR-254 passive skimmer in SOMA-4 and commenced free product removal on a weekly basis. SOMA's field crew also used a bailer to remove any measurable free product from the well, after disposing of the free product in the canister. The volume of removed free product is tabulated in Table 2.

On July 5, 2002, SOMA's staff measured free product thickness in SOMA-4 and nearby shallow wells B-2, B-3, B-9, and B-8. Table 1 shows the historical free product measurements. The data indicated that the product thickness in comparison with the previous product thickness measurement event, which was conducted on June 29, 2002, was decreasing.

In July 2002, SOMA proposed an additional subsurface investigation to the ACDEH in order to delineate the extent of free product in the subsurface. The proposed investigation included drilling six hydropunches, primarily around SOMA-4 and B-8, where elevated levels of free product had been encountered. On October 1, 2002, SOMA drilled the hydropunches as proposed to the ACDEH. Figure 2 illustrates the locations of all hydropunches (HP-11 through HP-16), and "B" wells.

The depths of these hydropunches range between 11.45 and 13.85 feet. Like the previous investigation, no groundwater was encountered during or after the drilling of these hydropunches. To allow water or product to accumulate, a temporary $\frac{3}{4}$ inch diameter perforated PVC casing was installed inside the hydropunches. The perforations of the temporary casing began at 5 feet bgs, which was well above the recorded depth to water in all hydropunch locations. After installing the temporary casing inside each hydropunch, depth to water or product inside the newly installed hydropunches, "B" wells and SOMA-4 were

monitored on a weekly basis for the next four weeks. Table 1 shows the reported results.

To evaluate the horizontal extent of free product, the previous and recent hydropunch data on free product thickness, along with product thickness measurements from the "B" wells and SOMA-4 were compiled. The data were used to a plot product thickness contour map for the Site. As Figure 3 illustrates that there are two distinct but small free product plumes inside the Glovatorium building. The first plume is generally located around SOMA-4 and HP-5. The second free product plume is a smaller and isolated. The maximum free product thickness was observed in SOMA-4. As discussed earlier, a passive free product removal canister was installed in SOMA-4 in June 2002.

The free product removal from SOMA-4 was performed on a weekly basis until mid-October 2002. During this period, a total of 19.75 gallons of free product was removed from SOMA-4. Table 2 presents the volume of free product removed from SOMA-4.

In early 2004, the total product thickness inside SOMA-4 was still over 10 feet. In February 2004, due to the limited capacity of the existing product removal canister (Durham Geo-Enterprise Model TR-254 passive skimmer) inside SOMA-4, and the presence of significant product in SOMA-4, it was decided that an active product removal device should be installed inside SOMA-4. On February 11, 2004, a Flexible Axial Peristaltic Pump (FAP) was installed. The FAP, which is a pneumatic system, is operated by an air compressor. Per the neighbors' request, to reduce the noise levels, the FAP was not operated during the nighttime, and a noise reduction unit was added to the system.

From mid-February 2004 until the present time, over 400 gallons of oil and water has been removed from SOMA-4. As a result, the product inside SOMA-4 has been completely removed.

On April 29, 2004, the free product thicknesses inside all existing groundwater monitoring wells were measured. No free product was measured inside SOMA-4, which in the past had contained over 10 feet of free product. The results indicated that free product still exists in B-3 and B-8 at 1.1 feet and 0.6 feet, respectively. Table 1 shows the historical product thickness measurements.

RECOMMENDATION

It appears that recent product removal efforts have been effective in removing free product from SOMA-4. However, as Table 1 shows, residual levels of free product still remain inside B-3 and B-8. Since B-3 and B-8 have an inside diameter of ¾-inch, no free product removal device can be installed inside these wells. To effectively remove free product from this area of the Site, SOMA proposes the following action items:

- 1) Convert B-3 and B-8 into 2-inch diameter monitoring wells;
- 2) Remove the FAP from SOMA-4 and install it inside the new B-3;
- 3) Start removing free product from B-3; and
- 4) After depleting free product inside B-3 repeat the same process for the new B-8, until all product from both B-3 and B-8 is removed.

FIGURES



Figure 1: Site vicinity map.

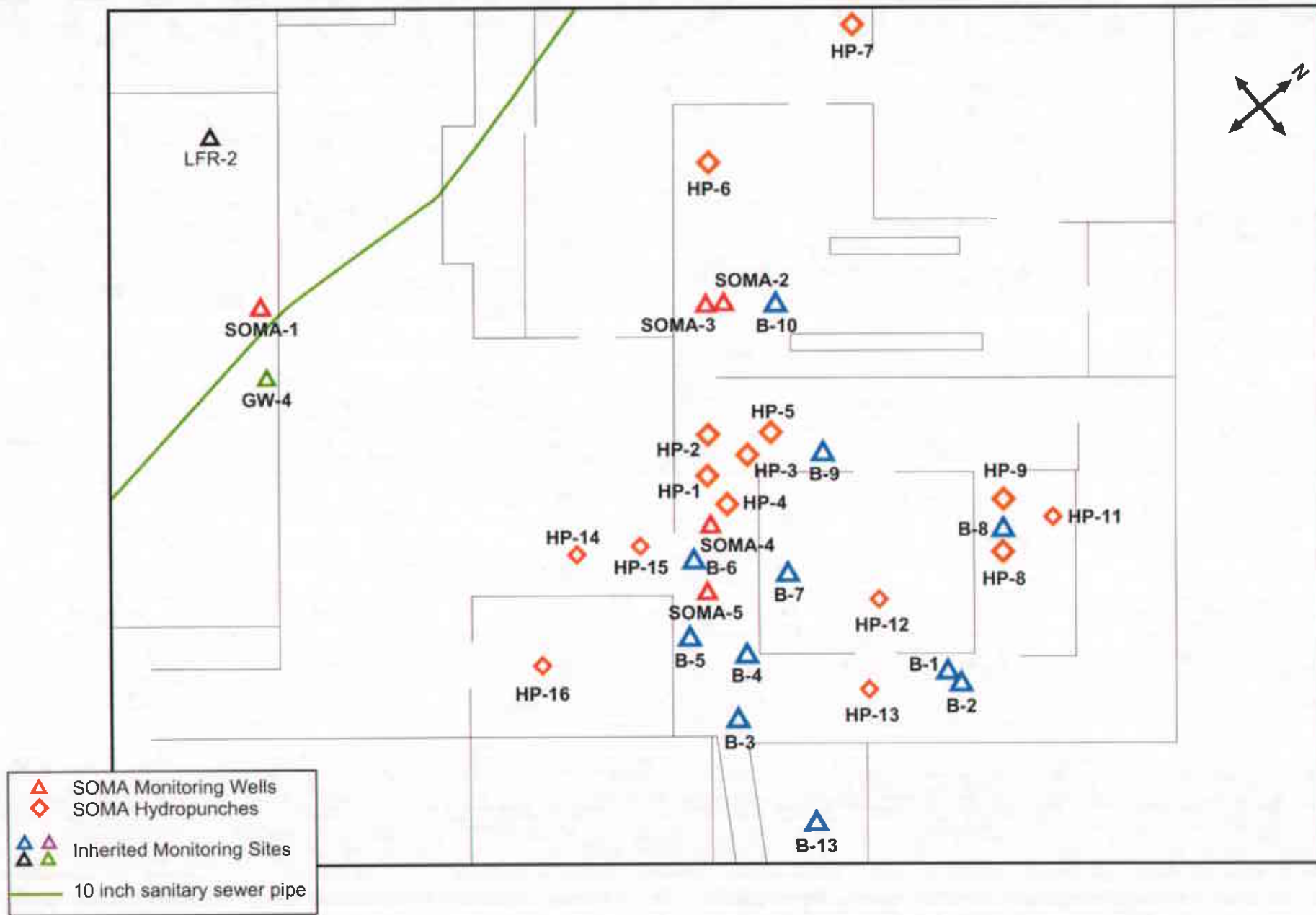
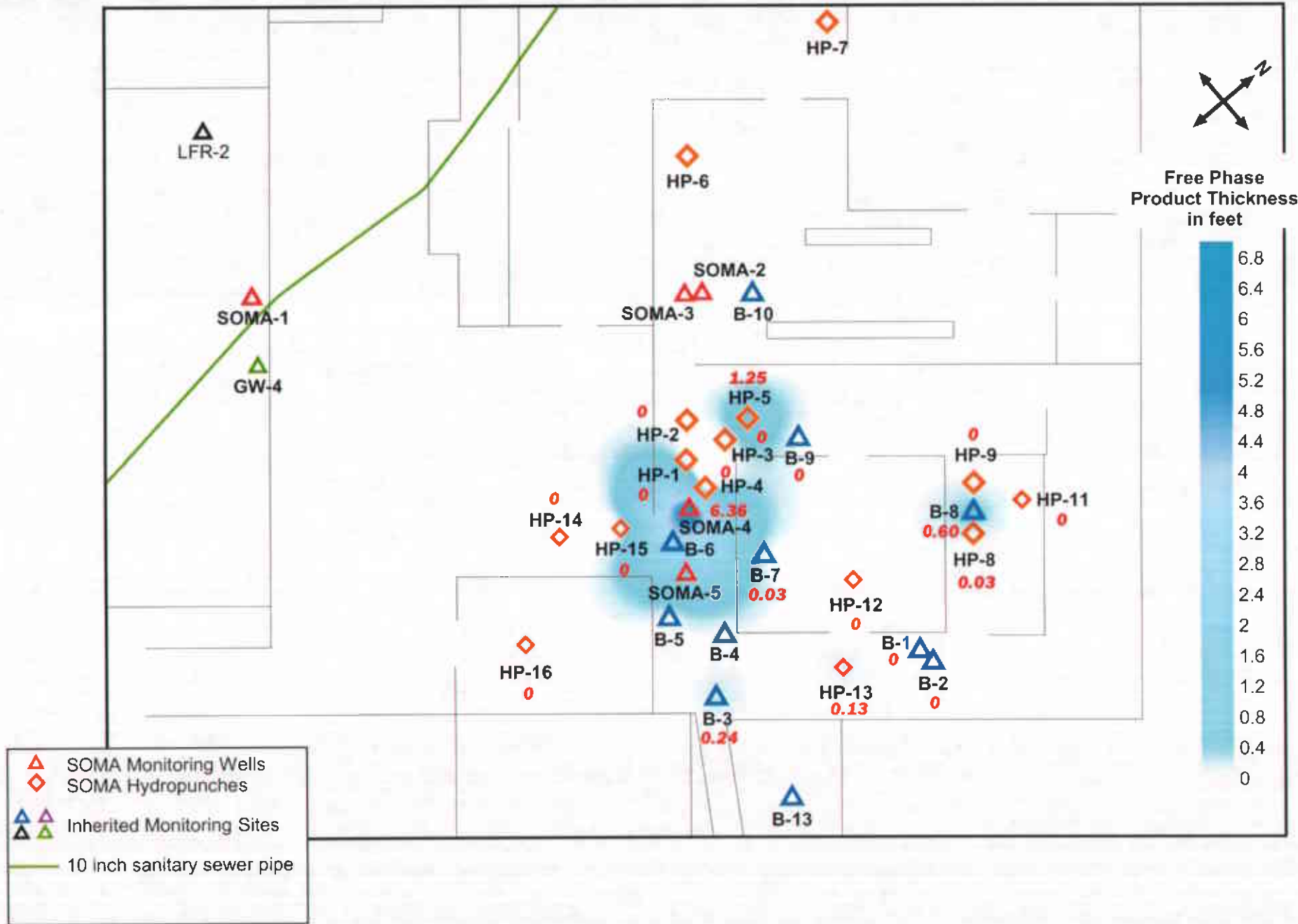


Figure 2: Location of SOMA monitoring wells, SOMA hydropunches, and inherited monitoring locations within the former Glovatorium building.



approximate scale in feet



Figure 3: Contour map of free phase product thickness in feet.
Oct. 8, 2002.

TABLES

**Table 1: Free Product Thickness Measurements at
Former Glovatorium Site, 3815 Broadway
Oakland, California**

Date	Well	Depth to F.P. ft	Depth To Water ft	Thickness of F.P. ft
4/4/2002	HP1	ND	8.14	0.00
	HP2	8.09	8.10	0.01
	HP5	8.80	9.50	0.70
	HP8	9.33	9.34	0.01
	HP9	ND	7.50	0.00
4/10/2002	SOMA 4	9.58	12.45	2.87
	B8	8.09	8.22	0.13
	B9	ND	8.00	0.00
	B3	7.15	7.27	0.12
	B2	ND	7.95	0.00
	HP1	ND	8.56	0.00
	HP2	ND	8.36	0.00
	HP5	9.25	10.28	1.03
	HP8	9.77	9.80	0.03
	HP9	ND	8.15	0.00
4/29/2002	SOMA 4	9.80	13.00	3.20
	B8	8.45	8.55	0.10
	B9	ND	8.30	0.00
	B3	7.42	7.57	0.15
	B2	ND	7.40	0.00
	HP1	ND	8.40	0.00
	HP2	ND	8.80	0.00
	HP5	8.45	9.70	1.25
	HP8	ND	10.15	0.00
	HP9	ND	8.60	0.00
7/5/2002	SOMA 4	11.55	11.80	0.25
	B8	9.0	9.27	0.27
	B9	ND	8.6	0.0
	B3	7.91	8.66	0.75
	B2	ND	7.9	0.0
8/16/2002	SOMA 4*	NM	NM	13.20
	B8	NM	NM	NM
	B9	NM	NM	NM
	B3	NM	NM	NM
	B2	NM	NM	NM
8/23/2002	SOMA 4	NM	NM	10.35
	B8	NM	NM	NM
	B9	ND	9	0.00
	B3	NM	NM	NM
	B2	NM	NM	NM
8/30/2002	SOMA -4	10.90	16.32	5.42
	B13	ND	8.9	0.00
	B10	ND	9.16	0.00
	B9	ND	8.97	0.00
	B8	ND	9.4	0.00

**Table 1: Free Product Thickness Measurements at
Former Glovatorium Site, 3815 Broadway
Oakland, California**

Date	Well	Depth to F.P. ft	Depth To Water ft	Thickness of F.P. ft
8/30/2002	B7	ND	8.59	0.00
	B3	ND	8.33	0.00
	B2	ND	8.4	0.00
9/10/2002	SOMA -4*	10.26	16.75	6.49
	B9	ND	8.98	0.00
	B8	ND	9.72	0.00
	SOMA-2	ND	9.16	0.00
	SOMA-3	ND	11.95	0.00
10/3/2002	SOMA -4	11.65	16.95	5.30
	B-2	ND	8.55	0.00
	B-3	8.75	9.1	0.35
	B-8	9.64	10.4	0.76
	B-9	ND	9.33	0.00
	HP-11	ND	11.85	0.00
	HP-12	ND	3.85	0.00
	HP-13	8.25	8.42	0.17
	HP-14	ND	9.35	0.00
	HP-15	ND	ND	0.00
	HP-16	ND	9.6	0.00
10/8/2002	SOMA -4	10.75	17.11	6.36
	B-2	ND	8.51	0.00
	B-3	8.73	8.97	0.24
	B-7	8.72	8.75	0.03
	B-8	9.68	10.28	0.60
	HP-11	ND	10.22	0.00
	HP-12	ND	6.05	0.00
	HP-13	8.35	8.48	0.13
	HP-14	ND	9.28	0.00
	HP-15	ND	13.67	0.00
	HP-16	ND	8.55	0.00
10/14/2002	SOMA -4	10.53	17.51	6.98
	B-2	ND	8.65	0.00
	B-3	8.76	9.03	0.27
	B-7	8.78	8.82	0.04
	B-8	9.69	10.3	0.61
	B-9	ND	9.15	0.00
	HP-11	ND	9.33	0.00
	HP-12	ND	7.99	0.00
	HP-13	8.42	8.48	0.06
	HP-14	ND	9.31	0.00
HP-15	ND	12.82	0.00	
4/29/2004	SOMA -4	10.75	10.75	0.00
	B-2	ND	8.51	0.00
	B-3	7.87	8.97	1.10
	B-7	8.75	8.75	0.00

**Table 1: Free Product Thickness Measurements at
Former Glovatorium Site, 3815 Broadway
Oakland, California**

Date	Well	Depth to F.P. ft	Depth To Water ft	Thickness of F.P. ft
4/29/2004	B-8	9.68	10.28	0.60

NM: Not Measured with groundwater interface probe

ND: Free Product not detected with groundwater interface probe

NOTES:

Wells HP-1 through HP-9 decommissioned by sealing with neat cement on April 29, 2002

SOMA 4 collecting free product with passive skimmer since June 11, 2002

**Table 2. Free Product Removal from Monitoring Well SOMA-4
at the Glovatorium Site, 3815 Broadway, Oakland California**

Date	Volume gal	Remarks
6/11/2002	-	Skimmer was installed in SOMA-4
6/13/2002	2	Skimmer was full, also used bailer
6/20/2002	1.5	Skimmer was full, also used bailer
6/28/2002	1	Skimmer was full, also used bailer
7/3/2002	0.75	Skimmer was full, also used bailer
8/16/2002	2.25	Skimmer was full, also used bailer
8/23/2002	2.00	Skimmer was full, also used bailer
8/30/2002	2.00	Skimmer was full, also used bailer
9/10/2002	2.25	Skimmer was full, also used bailer
9/19/2002	1.25	Skimmer was full, also used bailer
9/27/2002	1.25	Skimmer was full, also used bailer
10/14/2002	3.50	Skimmer was full, also used bailer
TOTAL	19.75	