

October 15, 1998  
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Ms. Susan Hugo  
Division of Environmental Protection  
Department of Environmental Health  
Alameda County Health Agency  
1131 Harbor Bay Parkway, 2nd Floor  
Alameda, California 94502

Subject: Request for Site Closure  
City of Emeryville Fire Station No. 2 UST Site  
Emeryville, California

Dear Ms. Hugo:

On behalf of the City of Emeryville Redevelopment Agency, Woodward-Clyde is requesting case closure for the City of Emeryville Fire Station No. 2 Underground Fuel Storage Tank (UST) Site, which is located at 6303 Hollis Street, Emeryville, California (Figure 1). The case history is summarized below.

In preparation for the removal of two USTs on the fire station, the City retained Woodward-Clyde to conduct an initial soil and groundwater investigation in March 1995. One 1,000-gallon gasoline UST and one 1,000-gallon diesel UST had supplied fuels to the station fire engines since at least 1980s. Both USTs were single-wall steel tanks. Five borings were installed in areas near the two USTs in the initial investigation (Figure 2). Soil samples were generally collected at 2, 5, and 10 feet below groundwater surface (bgs). Groundwater was encountered at approximately 5 feet bgs. Grab groundwater samples were collected from two boreholes immediately downgradient of the two tanks. Samples were analyzed for TPH as gasoline, diesel and BTEX. Diesel was not detected in any of the groundwater and soil samples analyzed. TPH gas and benzene were measured in groundwater samples at concentrations up to 0.99 mg/L and 220 ug/L, respectively. Gasoline and BTEX were also detected in soil samples collected at 2 and 5 feet bgs, but not in samples at 10 feet bgs. Gasoline was detected up to 540 mg/kg and benzene up to 0.63 mg/kg. Based on these initial findings, a Workplan for Phase II site investigation was prepared and submitted to Alameda County Department of Environmental Health (ACDEH) on June 20, 1995.

The Phase II investigation results were documented in the *Preliminary Investigation and Evaluation Report* (Woodward-Clyde, August 1995), which was submitted to ACDEH in August 1995. The Phase II investigation included soil and groundwater sampling from seven borings

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(Figure 2). Gasoline and benzene were detected in groundwater up to 5.5 mg/L and 40 ug/L, respectively. Soil impacts were limited to less than 10 feet bgs, and gasoline and benzene were measured up to 480 mg/kg and 1.2 mg/kg, respectively. Results from the initial and the Phase II investigations indicate that the site had only been moderately impacted by gasoline and its constituents.

The two USTs were removed on October 12, 1995 following the approval of the closure plan by the ACDEH. Soil samples collected within the excavation pits were analyzed for gasoline, diesel, BTEX, and MTBE. Diesel was again below the detection limit. TPH gas was detected up to 560 mg/kg, benzene up to 0.58 mg/kg, and MTBE in one sample at 0.28 mg/kg. No soil was excavated for off-site disposal. The excavation area was backfilled with clean imported fill. Tank removal activities were documented in a report (Woodward-Clyde, January 1996) which was submitted to ACDEH.

In a letter to the City dated May 29, 1996, the ACDEH requested additional site characterization in the downgradient area and groundwater monitoring. In response to the request, a *Workplan for Additional Site Investigation* (Woodward-Clyde, August 1996) was submitted to ACDEH. The workplan presented the scope of additional soil and groundwater investigation, installation of one groundwater monitoring well, one-year quarterly groundwater monitoring program, and site closure based on risk-based corrective action (RBCA). ACDEH approved the workplan in October 8, 1996.

Results of the additional site investigation were submitted to ACDEH (Woodward-Clyde, July 1997). A non-detection boundary in the downgradient area was established. A 2"-diameter groundwater monitoring well was installed in the downgradient direction within 15 feet of the former gasoline UST. A RBCA evaluation based on the ASTM Standard E 1739-95 was used to develop site-specific target levels (SSTLs) for chemicals detected in soil and groundwater at the fire station. The results of the RBCA evaluation indicate that the site does not present unacceptable risks to human health and the environment based on the current site use and the maximum detected concentrations of chemicals in soil and groundwater. One-year of quarterly groundwater monitoring was recommended to monitor the stability of the chemicals in groundwater. The RBCA evaluation was presented in a report and submitted to the ACDEH (Woodward-Clyde, May 1997). ACDEH accepted the RBCA evaluation results and recommendations and agreed that "no further action for soil is warranted and groundwater monitoring program should be implemented to demonstrate plume stability and chemical degradation" (ACDEH letter, November 6, 1997).

Quarterly groundwater monitoring was performed from the third quarter 1997 through second quarter 1998. Quarterly monitoring reports were submitted to ACDEH. Concentrations of detected chemicals were significantly below their respective SSTLs (RBCA Tier 2) at all times. The unusually heavy rain in the past winter and spring seasons (El Nino year) was probably responsible for the wide variation in groundwater concentrations during the monitoring period. As discussed above, soil contamination is limited to depths less than 10 feet. Heavy groundwater

recharge due to the rain likely caused the release of the adsorbed contaminants into the groundwater, which resulted in a concentration increase in the first quarter 1998. When the heavy rain subsided in the second quarter 1998, concentrations of contaminants also decreased correspondingly with the exception of MTBE as discussed below.

MTBE is the only monitored constituent that showed consistent increase in concentrations during the one-year monitoring period. It was detected sequentially in concentrations of 18, 120, 720, and 1,100 ug/L. Its increase in concentrations is unusual in that: 1) MTBE was not detected in any of the groundwater samples analyzed for it prior to the start of the monitoring program; 2) MTBE was not detected in most of the soil samples analyzed for it and the highest detected soil concentration was 0.28 mg/kg (sample ID GW-1-7). It does not appear that an on-site MTBE source exist that could have contributed to its increase in groundwater concentrations. Because MTBE is highly soluble and mobile in groundwater, the data indicates that MTBE may be migrating from off-site source(s) to this site.

Therefore, we propose to close this UST case with post-closure monitoring of TPH gas, BTEX, and MTBE semi-annually from the on-site monitoring well MW-1 for two years. No further action should be required if all monitored constituents stabilize or decrease in concentrations. On the other hand, if MTBE continues its rising trend in the post-closure monitoring, the City will take necessary actions to investigate its source(s), both on-site and off-site potential sources.

Please call me at (510) 874-3060 or Mr. Ignacio Dayrit at the City of Emeryville Redevelopment Agency at (510) 596-4356 for questions or comments.

Sincerely,



Xinggang Tong, P.E., Ph.D.  
Project Manager



Enclosures.

cc: Ignacio Dayrit, City of Emeryville

**TABLE 1**  
**GROUNDWATER ANALYTICAL RESULTS**  
**CITY OF EMERYVILLE FIRE STATION NO. 2**

Sample No.	Date Sampled	Water level		TPH <sup>a</sup>				Total	MTBE (ug/L)	Total	Notes
		TOC (ft)	MSL (ft)	Gasoline (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)		Lead (ug/L)	
RBCA Tier 1 *					73.9	85,000	>152,000	>198,000			
RBCA Tier 2 *					2,300	540,000	150,000	200,000	5.10E+07		
MW-1	6/2/98	3.06	13.96	0.078	34	ND (5)	ND (5)	ND (5)	1100	NA	2nd quarter 98
Trip Blank	6/2/98			ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2)	NA	2nd quarter 98
MW-1	3/13/98	3.02	14.00	0.76	66	5.7	6.1	17	720	NA	1st quarter 98
Trip Blank	3/13/98			ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	NA	1st quarter 98
MW-1	12/5/97	3.02	14.00	0.06	0.7	ND (0.5)	ND (0.5)	ND (2)	120	ND (40)	4th quarter 97
Trip Blank	12/5/97			ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2)	ND (5)	NA	4th quarter 97
MW-1	9/26/97	4.36	12.66	ND (0.05)	1.0	ND (0.5)	0.6	ND (2)	18	ND (40)	3rd quarter 97
Trip Blank	9/26/97			ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2)	ND (5)	NA	3rd quarter 97
SB-3	3/15/95	NA	NA	NA	220	3,800	2,500	14,000	NA	NA	Phase I
SB-1	3/15/95	NA	NA	0.99	6.1	40	33	160	NA	NA	investigation
Trip Blank	3/15/95	NA	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	
SB-6-W	6/17/95	NA	NA	0.41	24	27	27	110	NA	NA	Phase II
SB-7-W	6/17/95	NA	NA	5.50	36	30	180	510	NA	NA	investigation
SB-8-W	6/17/95	NA	NA	0.46	18	36	27	100	NA	NA	
SB-9-W	6/17/95	NA	NA	ND (0.05)	ND (0.5)	ND (0.5)	0.7	3.7	NA	NA	Phase II
SB-10-W	6/17/95	NA	NA	ND (0.05)	ND (0.5)	ND (0.5)	0.6	3.3	NA	NA	investigation
SB-11-W	6/17/95	NA	NA	0.23	12	8.6	12	44	NA	NA	
SB-12-W	6/17/95	NA	NA	0.97	40	130	38	170	NA	NA	Phase II
Trip Blank	6/17/95	NA	NA	ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	investigation
SB-13-W	3/26/97	NA	NA	ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	NA	additional
SB-14-W	3/26/97	NA	NA	ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	NA	investigation
SB-15-W	3/26/97	NA	NA	ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	NA	
SB-16-W	3/26/97	NA	NA	29	430	1,200	1,000	4,700	ND (500)	NA	additional
Trip Blank	3/26/97	NA	NA	ND (0.05)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	NA	investigation

*verified 8260 already*

- Notes:
- <sup>a</sup> Total petroleum hydrocarbons by EPA Method 8015 (Mod.), quantified as gasoline.
  - \* Data from "Development of Site-Specific Target Levels for Soil and Groundwater, Fire Station No. 2," by Woodward-Clyde, May 1997, and approved by the Alameda County Department of Environmental Health Services on November 6, 1997. Benzene, toluene, ethylbenzene and xylenes by EPA Method 8020.
- NA - Not analyzed; ND - Not detected at or above the detection limit given in parentheses.  
TOC - measured to top of well casing; MSL - mean sea level.

**TABLE 2**  
**SOIL ANALYTICAL RESULTS**  
**CITY OF EMERYVILLE**  
**FIRE STATION No. 2**

Sample No.	Date Sampled	Sampling Depth	TPH <sup>a</sup> Gasoline (mg/kg)	TPH <sup>b</sup> Diesel (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Total Xylenes (µg/kg)	MTBE (ug/kg)	Total Lead (mg/kg)	Notes
SB-1-2'	3/15/95	2'-2.5'	2.4	NA	280	12	200	370	NA	NA	Phase I investigation
SB-1-5'	3/15/95	5'-5.5'	540	NA	ND (1,000)	7,000	10,000	51,000	NA	NA	
SB-1-10'	3/15/95	10'-10.5'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	
SB-2-6'	3/15/95	6'-6.5'	3.0	NA	630	5.7	ND (5.0)	15	NA	NA	Phase I investigation
SB-2-10'	3/15/95	10'-10.5'	ND (1.0)	NA	110	ND (5.0)	9.7	6.1	NA	NA	
SB-3-6'	3/15/95	6'-6.5'	NA	ND (1.0)	420	11,000	5,500	27,000	NA	NA	Phase I investigation
SB-3-10'	3/15/95	10'-10.5'	NA	ND (1.0)	47	81	60	80	NA	NA	
SB-4-6'	3/15/95	6'-6.5'	NA	ND (1.0)	ND (50)	54	1,100	3,300	NA	NA	Phase I investigation
SB-4-11'	3/15/95	11'-11.5'	NA	ND (1.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	
SB-5-5.5'	3/15/95	5.5'-6'	NA	ND (1.0)	240	170	2,300	8,200	NA	NA	Phase I investigation
SB-5-10'	3/15/95	10'-10.5'	NA	ND (1.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	
SB-6-5.5	6/17/95	5.5'-6'	440	NA	1,200	4,900	8,600	47,000	NA	NA	Phase II investigation
SB-6-11	6/17/95	11'-11.5'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	
SB-7-5.5	6/17/95	5.5'-6'	480	NA	690	760	7,500	28,000	NA	NA	Phase II investigation
SB-7-11	6/17/95	11'-11.5'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	
SB-8-5.5	6/17/95	5.5'-6'	120	NA	190	230	1,500	3,500	NA	NA	Phase II investigation
SB-8-11	6/17/95	11'-11.5'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	

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**CITY OF EMERYVILLE**  
**FIRE STATION No. 2**

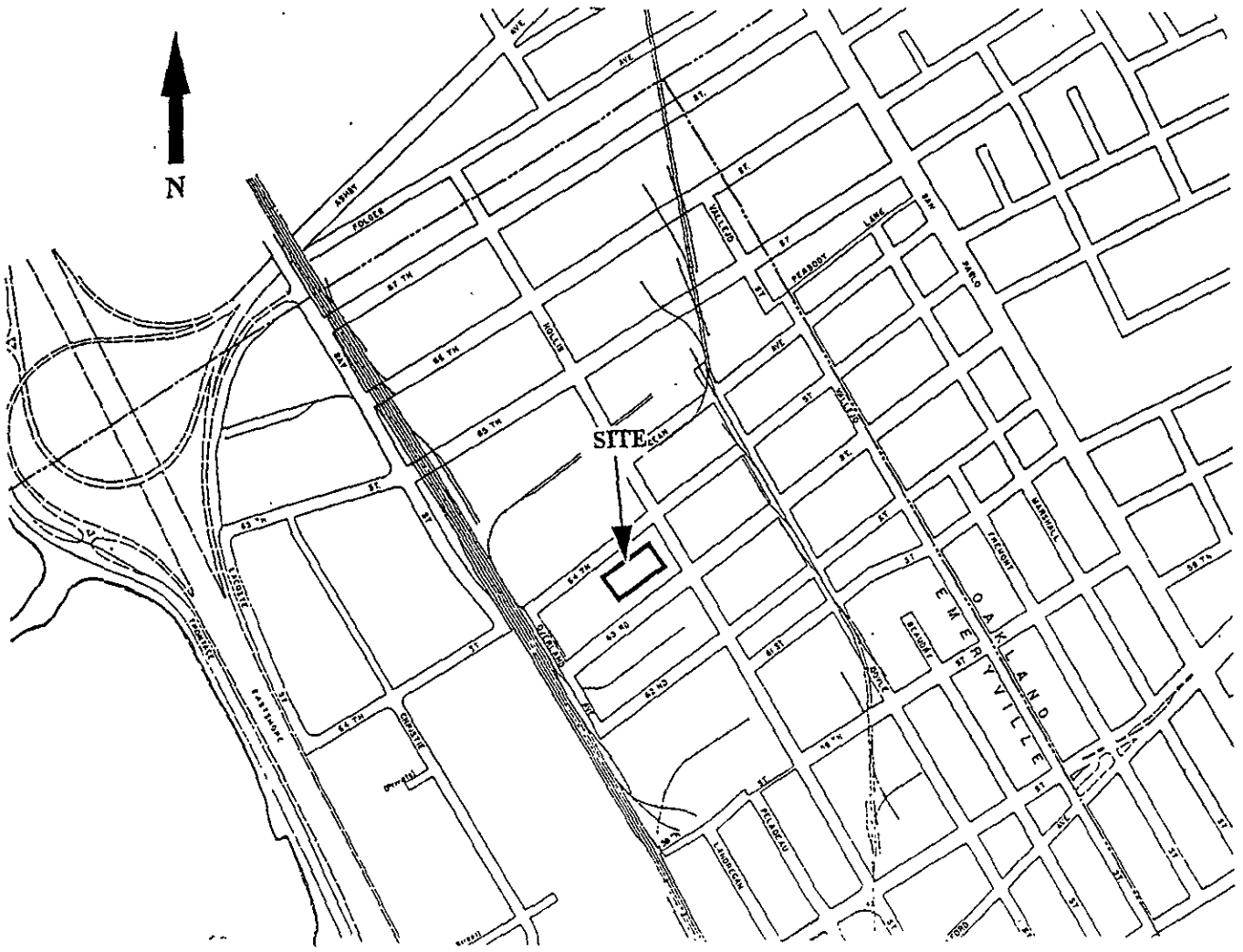
Sample No.	Date Sampled	Sampling Depth	TPH <sup>a</sup> Gasoline (mg/kg)	TPH <sup>b</sup> Diesel (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Total Xylenes (µg/kg)	MTBE (ug/kg)	Total Lead (mg/kg)	Notes
SB-9-5.5	6/17/95	5.5'-6'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	Phase II investigation
SB-9-13	6/17/95	13'-13.5'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	
SB-10-11.5	6/17/95	11.5'-12'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	Phase II investigation
SB-11-5.5	6/17/95	5.5'-6'	170	NA	1,200	5,300	3,300	17,000	NA	NA	Phase II investigation
SB-11-11	6/17/95	11'-11.5'	ND (1.0)	NA	ND (5.0)	ND (5.0)	5.7	26	NA	NA	
SB-12-5.5	6/17/95	5.5'-6'	ND (1.0)	NA	8.3	15	ND (5.0)	24	NA	NA	Phase II investigation
SB-12-11.5	6/17/95	11.5'-12'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	NA	
GE-1-7	10/12/95	7'-7.5'	380	NA	340	4	8,700	42,000	ND (3900)	NA	Tank removal
GW-1-7	10/12/95	7'-7.5'	ND (1.0)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	280	NA	
Stock-Gas-1	10/12/95		140	NA	ND (100)	220	1,600	6,600	ND (370)	NA	Tank removal
Stock-Gas-2	10/12/95		560	NA	580	1,800	12,000	56,000	ND (1300)	NA	
Stock-Diesel-1	10/12/95		NA	ND (1.0)	NA	NA	NA	NA	NA	NA	
DN-1-7.5	10/12/95	7.5'-8'	NA	ND (1.0)	NA	NA	NA	NA	NA	NA	Tank removal
DS-1-7.5	10/12/95	7.5'-8'	NA	ND (1.0)	NA	NA	NA	NA	NA	NA	
SB-13-5	3/25/97	5'-5.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	Mar-97 investigation
SB-13-10	3/25/97	10'-10.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	21	2	


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**SOIL ANALYTICAL RESULTS**  
**CITY OF EMERYVILLE**  
**FIRE STATION No. 2**

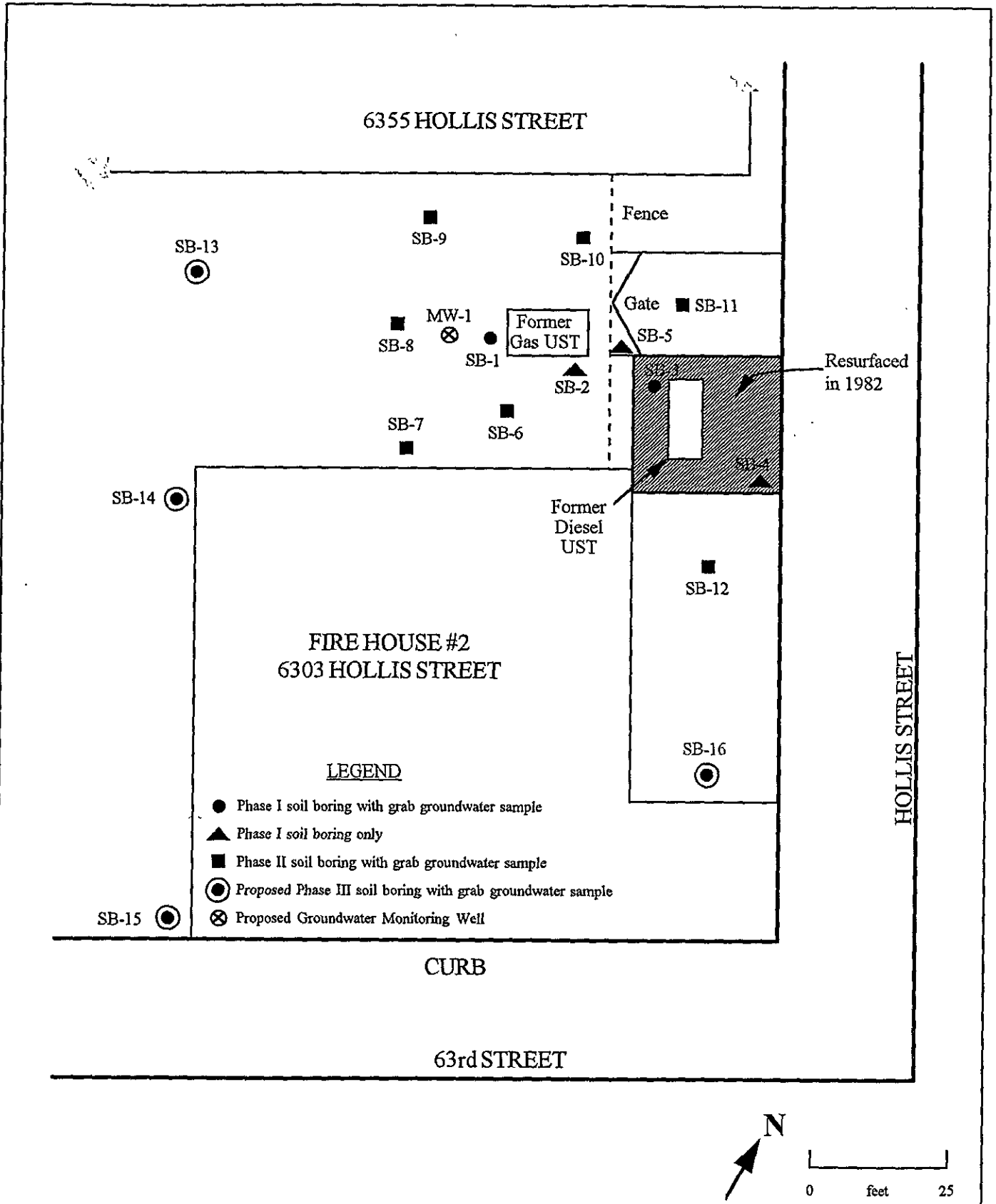
Sample No.	Date Sampled	Sampling Depth	TPH <sup>a</sup> Gasoline (mg/kg)	TPH <sup>b</sup> Diesel (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Total Xylenes (µg/kg)	MTBE (ug/kg)	Total Lead (mg/kg)	Notes
SB-14-5	3/25/97	5'-5.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	Mar-97 investigation
SB-14-10	3/25/97	10'-10.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	4	
SB-15-5	3/25/97	5'-5.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NA	Mar-97 investigation
SB-15-10	3/25/97	10'-10.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	7	
SB-16-5	3/25/97	5'-5.5'	45	NA	ND (50)	60	260	1,200	ND (50)	NA	Mar-97 investigation
SB-16-12	3/25/97	12'-12.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	7	
MW-1-6	3/24/97	6'-6.5'	270	NA	ND (500)	1,300	4,200	21,000	ND (500)	8.2	Mar-97 investigation
MW-1-11	3/24/97	11'-11.5'	ND (0.5)	NA	ND (5.0)	7	9	38	ND (5.0)	3.5	
MW-1-16	3/24/97	16'-16.5'	ND (0.5)	NA	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	5.4	

Notes: <sup>a</sup> Total petroleum hydrocarbons by EPA Method 8015 (Mod.), quantified as gasoline.  
<sup>b</sup> Total petroleum hydrocarbons by EPA Method 8015 (Mod.), quantified as diesel.  
Benzene, toluene, ethylbenzene and xylenes by EPA Method 8020.  
NA - Not analyzed; ND - Not detected at or above the detection limit given in parentheses.





Project No. 94166NA	CITY OF EMERYVILLE Fire Station Number 2	<b>SITE LOCATION</b>	Figure 1
<b>Woodward-Clyde Consultants</b> 			July 15, 1995



Project No. 941366NA	City of Emeryville Fire Station No. 2	PHASE III PROPOSED SAMPLE AND MONITORING WELL LOCATIONS	Figure 2
<b>Woodward-Clyde Consultants</b>			