SOMA CORPORATION

ADDITIONAL GROUND-WATER INVESTIGATIONWORKPLAN
1600 63rd Street
Emeryville, California

LOP 147

February 23, 1999
SOMA Project 96-2081

Prepared for

1600 63rd Street Associates, Inc.
c/o Wareham Development Group
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Prepared by

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SOMA
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February 22, 1999 SOMA 96-2081

Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: Additional Ground-Water Investigation Workplan for 1600 63rd Street, Emeryville, California

Dear Ms. Hugo:

Pursuant to your request, enclosed are two copies of the Additional Ground-Water Investigation Workplan ("the Workplan") is submitted to the Alameda County Health Care Services Agency (ACHCSA) on behalf of the property owner, 1600 63rd Street Associates, Inc., for property at 1600 63rd Street, Emeryville, California ("the Site"). This Workplan presents SOMA's recommended scope of work to address the ACHCSA request for a workplan to investigate the possible presence of chemicals in deep ground water at the Site. Recommendations for additional ground-water investigations at the Site were presented in SOMA's report entitled "Summary of Remedial Activities and Recommended Site Closure Measures" dated July 30, 1998 (SOMA, 1998). This Workplan is submitted in response to a request from Susan Hugo of the ACHCSA to Glenn Leong of SOMA on January 20, 1999. It is SOMA's understanding that the Workplan will be reviewed concurrently by ACHCSA and the San Francisco Bay Regional Water Quality Control Board (RWQCB).

If you have any questions, please call me at (510) 654-3900. I will call you in the next week to schedule a meeting with ACHCSA and the RWQCB to address potential concerns or comments to the Workplan. Our client is most interested in initiating the proposed work at the earliest time possible.

Sincerely,

Glenn M. Leong
Vice President and Senior Scientist

cc: Dan Nourse, 1600 63rd Street Associates, Inc.
Jeff Hennier, R.G.

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TABLE OF CONTENTS

1.0 INTRODUCTION **1**

1.1 Site Description 1
1.2 Site Background Summary 2
1.3 Summary of Previous Ground-Water Investigations 2
1.3.1 Deep Industrial Water Well Investigations 2
1.3.2 Shallow Ground-Water Investigations 3

2.0 WORKPLAN OBJECTIVES AND TECHNICAL RATIONALE **5**

3.0 WORKPLAN SCOPE OF WORK **5**

4.0 SCHEDULE **8**

5.0 SELECTED REFERENCES **8**

TABLES

Table 1 Summary of Historical Ground-Water Analytical Results

FIGURES

Figure 1 Site Vicinity Map

Figure 2 Site Map Showing Historical Site Features and Proposed CPT Sampling Location

Figure 3 Site Map Showing Sampling Locations and Excavation Areas

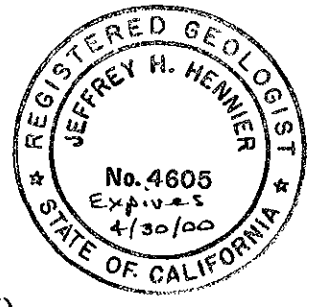
Figure 4 Site Map Showing HLA Monitoring Well Locations

APPENDICES

Appendix A: ES Summary of Well Closure Sampling Results

SIGNATURE PAGE

All hydrogeologic and geologic information, conclusions, and recommendations contained in this report have been prepared by a California Certified Hydrogeologist.



Jeff Hennier
California Registered Geologist (4605)
California Certified Hydrogeologist (105)

2/23/99
Date

February 23, 1999 SOMA 96-2081

ADDITIONAL GROUND-WATER INVESTIGATION WORKPLAN
1600 63rd Street
Emeryville, California

1.0 INTRODUCTION

This Additional Ground-Water Investigation Workplan ("the Workplan") is submitted to the Alameda County Department of Environmental Health Services (ACDEHS) on behalf of the property owner, 1600 63rd Street Associates, Inc., for property at 1600 63rd Street, Emeryville, California ("the Site"). This Workplan presents SOMA's recommended scope of work to address the Alameda County Health Care Services Agency's (ACHCSA) request for a workplan to investigate the possible presence of chemicals in deep ground water at the Site. Recommendations for additional ground-water investigations at the Site were presented in SOMA's report entitled "Summary of Remedial Activities and Recommended Site Closure Measures" dated July 30, 1998 (SOMA, 1998). This Workplan is submitted in response to a request from Susan Hugo of the ACHCSA to Glenn Leong of SOMA on January 20, 1999.

The objectives of this Workplan are to assess the possible presence of residual chemicals in ground water near the location of a former deep industrial water well at the Site. Previous investigations and remedial actions conducted of the deep industrial water well at the Site in 1988 indicated petroleum hydrocarbons and other chemicals, including floating product, were reported in ground water samples collected from depth intervals between 90- and 300-feet below grade. The floating product was pumped out and approximately 13,000 gallons of water were reportedly purged from the industrial well in 1988.

As part of Site closure actions, this Workplan describes deeper ground-water sampling activities to assess the possible presence of residual petroleum hydrocarbons in the vicinity of the former deep industrial water well. This Workplan also includes a scope of work to collect a confirmation round of ground-water samples from shallow Site monitoring wells. Results of additional ground-water investigations will be evaluated to assess whether additional ground-water corrective actions may be warranted and to develop a final plan for Site closure.

1.1 Site Description

The Site is located at 1600 63rd Street in Emeryville, approximately 2,000 feet east of the San Francisco Bay (Figure 1). The Site is approximately 2.75-acres in size and is currently occupied by Fedex. The Site vicinity consists primarily of commercial and industrial land uses. The Site is bounded by 63rd and 64th Streets to the south and north, respectively City of Emeryville Fire Station No. 2 to the east, and Overland Avenue and the Southern Pacific Railroad right-of-way to the west (Figure 1).

The ground surface in the Site vicinity is approximately 10- to 15-feet above mean sea level and slopes gently towards the Bay. Due to the Site's proximity to the Bay, shallow-depth sediments in the Site vicinity consist primarily of fine-grained silt and clay sediments deposited in tidal marsh and estuarine environments.

1.2 Site Background Summary

The current tenant has operated a Fedex shipping facility at the Site since the Site was redeveloped and construction of the Fedex building was completed in 1989. The Site was originally developed and operated as a tallow manufacturing plant by Peterson Manufacturing Company ("Peterson") in 1914 (ES, 1988). In 1987, the Site was purchased by 1600 63rd Street Associates, Inc. and the manufacturing plant was demolished during redevelopment. Historical records indicate six underground storage tanks (UST) were previously located at the Site (Figure 2). Four USTs, six sumps, seven aboveground storage tanks (AST), a water-supply well and other appurtenances related to Peterson's manufacturing operations were removed during redevelopment activities in 1988 (ES, 1988). Two USTs were reported to have been previously removed from the Site (ES, 1988). No other USTs are known or suspected to be present at the Site.

During the period of Site demolition and the UST, sump and AST removal in 1988, ES conducted soil and ground-water investigations at the Site (ES, 1988). In addition to tank and sump removals, remedial actions were conducted at the Site in 1988 that included excavation, remediation and replacement of petroleum hydrocarbon impacted soil and closure of the industrial water well located at the Site.

1.3 Summary of Previous Ground-Water Investigations

1.3.1 Deep Industrial Water Well Investigations

Investigations and remedial actions were conducted of the deep industrial water well at the Site in 1988. The well was located within the central portion of the Site and was apparently used by Peterson in their manufacturing operations (Figure 2). ES contracted a well driller to clear obstructions in the well to the well bottom, conduct a video inspection of the well to assess the perforated intervals in the well, and close the well in accordance with regulatory guidelines.

Upon clearing obstructions from the deep well and conducting a video inspection, it was determined that the well was 322 feet deep with perforated intervals from 72 to 113 feet, 134 to 166 feet, and 195 to 227 feet below ground surface (ES, 1988). ES reportedly measured 24 feet of floating product in the well after the well was cleared of obstructions. Product samples from the well indicated concentrations of TPH as gasoline (TPHg) (780 ppm), TPH as diesel (TPHd) (250 ppm) and PCBs (Aroclor at 59 ppm)(Appendix A, ES Table 4-6). The floating product was pumped out and approximately 13,000 gallons of water were purged from the well. Lower concentrations of TPH (550 ppm), benzene (0.007 ppm), and PCBs (Aroclor 1254 at 0.01 ppm) were detected (Appendix A, ES Table 4-6).

In April and May 1988, ground-water samples were collected from discrete, perforated depth intervals in the deep well at depths of 90-, 150- and 300 feet (ES, 1988). Analytical results for samples collected from the deep well are summarized in Appendix A. The results indicate a trace concentration of PCBs (Aroclor 1254 at 0.0024 ppm) was detected only in the 90-foot depth sample. TPH (up to 40 ppm) was detected in the 90- and 150-foot samples, and was not detected in the 300-foot sample. Concentrations of volatile organic compounds (i.e., acetone at 0.1 ppm) and semi-volatile compounds (i.e., pyrene at 0.016 ppm) were also detected in the 300-foot depth sample. Following completion of investigation and sampling activities, the well was decommissioned by cutting linear perforations in the metal well casing and filling the well with neat cement on May 12, 1988 (ES, 1988).

In summary, investigations conducted of a deep industrial water well at the Site in 1988 indicate 24 feet of floating product was reportedly measured in the well. The floating product was pumped out and approximately 13,000 gallons of water were reportedly purged from the well (ES, 1988). Ground-water samples collected from discrete depth intervals in the well at depths of 90-, 150- and 300 feet indicate a trace concentration of PCBs (Aroclor 1254 at 0.0024 ppm) was detected only in the 90-foot depth sample; TPH (up to 40 ppm) was detected in the 90- and 150-foot samples; and concentrations of volatile organic compounds (i.e., acetone at 0.1 ppm) and semi-volatile compounds (i.e., pyrene at 0.016 ppm) were detected in the 300-foot depth sample (ES, 1988). Following completion of investigation and sampling activities, the well was decommissioned (ES, 1988).

1.3.2 Shallow Ground-Water Investigations

In November 1987, ES installed three temporary ground-water monitoring wells to assess the presence and extent of petroleum hydrocarbons in ground water at the Site. The locations of monitoring wells ES/MW-1 through ES/MW-3 are shown in Figure 3. The well locations were selected to assess ground-water quality at areas of the Site where relatively high concentrations of petroleum hydrocarbons were detected in soil samples (ES, 1988). ES installed monitoring wells adjacent to UST 1 (well ES/MW-3) and USTs 2 and 3 (well ES/MW-1). Additionally, one monitoring well was installed at the downgradient (west) boundary of the Site (well ES/MW-1). The wells were completed to depths between approximately 21 and 25 feet below grade and constructed with well screens placed across the interval from the total depth of each well to within 6 feet of the ground surface. Samples were collected from wells ES/MW-1 and ES/MW-2 in November 1987 and well ES/MW-3 in January 1988. The ES wells were decommissioned in February 1988 to accommodate remedial and redevelopment construction activities at the Site.

Following completion of remedial actions and redevelopment construction activities at the Site, HLA conducted additional ground water investigations in June 1989. HLA installed five monitoring wells (MW-1 through MW-5) to assess the extent of petroleum hydrocarbons in ground water. HLA monitoring wells were installed to: 1) assess potential upgradient off-site sources of petroleum hydrocarbons (i.e., well MW-3); 2) assess the extent of petroleum hydrocarbons in ground water adjacent to the former UST locations (i.e., wells MW-1, MW-2

and MW-5); and 3) assess the extent of petroleum hydrocarbons at the downgradient (west) boundary of the Site (i.e., well MW-4).

The HLA wells were completed to depths between approximately 18.5 and 32 feet below grade and constructed with the well screens placed across various depth intervals between 10 and 32 feet below ground surface in each well. Samples were initially collected from wells in June 1989 and quarterly monitoring was conducted at the wells until May 1991. Certified collected ground-water samples from well MW-2 in November 1992 and July 1994.

Shallow ground-water zone sediments encountered in the HLA well borings (i.e., depth interval between approximately 6 and 25 feet below ground surface) consisted primarily of clay and silty clay sediments with relatively thin silty sand sediment intervals that represent the primary water yielding zones (see Appendix A in HLA, 1989).

Ground-water quality data was collected at the Site during the following sampling events: 1) initial sampling of ES temporary monitoring wells in November 1987 and January 1988; 2) quarterly monitoring conducted at the HLA wells between June 1989 and May 1991; and 3) sampling at one well (MW-2) in November 1992 and July 1994. At various sampling events, ground-water samples were analyzed for TPH as oil and grease, gasoline, diesel and kerosene; aromatic and halogenated volatile organic compounds (EPA method 8010/8020 and 8240 analytes); organochlorine pesticide and PCB compounds (EPA method 8080 analytes); semi-volatile organic compounds (EPA method 8270 analytes); and priority pollutant metals. An historical summary of ground-water sample analyses results from monitoring wells MW-1 through MW-5 are presented in Table 1.

Historical analysis results for Site monitoring wells MW-1 through MW-5 indicate benzene and halogenated volatile organic compounds were not detected (Table 1). Only trace concentrations (less than 0.043 ppm) of toluene, ethylbenzene or total xylenes were historically detected and none of those compounds were detected in the most recent samples collected. The following petroleum hydrocarbon compounds and maximum concentrations were detected: TPHd (61 ppm) and TPHg (380 ppm); however, only TPHd (6 ppm) was detected in the most recent samples collected. Historically, the highest concentrations of petroleum hydrocarbons were detected in the downgradient well MW-2 (Table 1). Petroleum hydrocarbons were only sporadically detected in other Site monitoring wells.

In summary, ground-water investigation results indicate relatively low concentrations of total petroleum hydrocarbons as diesel (up to 6 ppm) are present in shallow ground water at the Site. Based on these data, it appears that the petroleum hydrocarbon plume in shallow ground water at the Site has stabilized. Additionally, the presence of low permeability sediments at the Site (i.e., silty and sandy clays), the relatively flat ground-water gradient, and the biodegradable characteristics of petroleum hydrocarbons remaining in soil and shallow ground-water at the Site make it unlikely that significant hydrocarbon migration in ground water will occur before natural degradation occurs.

2.0 WORKPLAN OBJECTIVES AND TECHNICAL RATIONALE

To complete Site closure actions, SOMA recommends collection of a confirmation round of samples from shallow Site monitoring wells and collection of deeper ground-water samples to assess the possible presence of residual petroleum hydrocarbons in the vicinity of the former deep industrial water well at the Site. The deeper ground water assessment is recommended to include review of available information on regional deep ground-water quality in the Site vicinity, and performance of cone penetrometer test (CPT) in-situ methodology to collect deep ground water samples from the 90- and 150-foot depth intervals. These depth intervals correlate to reported perforated intervals in the former deep industrial well. In the event that deeper ground-water sampling results indicate that residual hydrocarbons are not detected or are measured at concentrations that are not expected to impact ground water beneficial uses, no further work is recommended and the Site should be considered for case closure.

The objectives of this Workplan are to assess the extent of petroleum hydrocarbons in soil and ground water at the Site. The following tasks are proposed to address the objectives of this Workplan:

- Collect ground water samples from the 90- and 150-foot depth intervals at one CPT boring location in the assumed downgradient direction (southwest) from the former industrial well location (Figure 2) to assess the presence of chemicals in deeper ground water at the Site.
- Collect ground-water samples from the five existing monitoring wells (MW-1 through MW-5) to confirm previous sampling results.
- Evaluate investigation data and assess whether additional investigation and/or corrective actions may be warranted.

Descriptions of the proposed Scope of Work tasks are provided below.

3.0 WORKPLAN SCOPE OF WORK

The Scope of Work for the proposed additional ground-water investigations has been organized into specific tasks as follows:

Task 1: Permitting and Utility Clearance

Task 2: Deeper Ground-Water Investigation

Task 3: Monitoring Well Sampling

Task 4: Preparation of Ground-Water Investigation Report

A detailed description of each task follows.

Task 1: Permitting and Utility Clearance

As described below under Task 2, one CPT ground-water sampling location is proposed at the Site. Prior to drilling, a subsurface drilling permit will be obtained from Alameda County Public Works Agency. Underground Services Alert (USA) will be notified and the CPT location will be cleared for underground utilities using a private underground utility locating subcontractor.

As required by the Occupational Health and Safety Administration (OSHA) 29 CFR 1910.120, Hazardous Waste Operations and Emergency Responses, a site Health and Safety Plan (HSP) will be prepared for use while conducting proposed field sampling activities. The HSP will be read and approved by the SOMA Project Manager, a Quality Assurance Reviewer, and the On-site Safety Officers of all subcontractors working at the Site.

Task 2: Deeper Ground-Water Investigation

Available records and information on regional deep ground-water quality in the Site vicinity will be reviewed prior to conducting additional ground-water investigations at the Site. The regional water-quality data will be reviewed to assess the locations of deep wells (if any) and ground-water quality in the Site vicinity. To assess the possible presence of chemicals in deeper ground water at the 90- and 150-foot depth intervals at the Site, ground-water samples are proposed to be collected using a Hydropunch™ ground-water sampling device. Prior to collecting the ground-water samples, a cone penetrometer test (CPT) is proposed to collect geologic information to a depth of approximately 150 feet, or to a shallower depth if refusal is met during drilling. The sampling location shown in Figure 2 is contingent upon access limitations (i.e., site features, utilities) and the final location may be moved to the closest accessible location. The ground-water samples will be submitted to a California state-certified laboratory for TPH analysis characterized as gasoline and diesel using EPA Method 8015/5030; volatile organic compounds (VOCs) using EPA Method 8260; semi-volatile organic compounds (SVOCs) using EPA Method 8270; and polychlorinated biphenols (PCBs) using EPA Method 8080.

A CPT drilling rig will be used to drill a pilot boring to collect geologic information and to use a Hydropunch™ ground-water sampling device to collect ground-water samples from the target sampling depth intervals. The CPT sampling will be conducted by Gregg Drilling and Testing, Inc. using their CPT rig and support equipment. The CPT rig uses hydraulic direct push equipment to advance the cone penetrometer in the boring and collect soil parameters such as cone bearing, sleeve friction, friction ratio, pore water pressure and resistivity. These parameters are processed and graphically plotted by an on-board data acquisition computer system to allow interpretation of subsurface soil stratigraphy. After collecting the soil parameter data, the CPT borehole will be sealed with a bentonite-grout mix through PVC tremie pipe, and the ground surface restored using replacement materials (i.e., asphalt patch, concrete).

Following completion of the CPT sounding and interpretation of soil stratigraphic conditions, a Hydropunch™ ground-water sampling device will be advanced in an adjacent CPT boring to collect ground-water samples at the specified target depth intervals. In the event that a

Hydropunch™ ground-water sample cannot be collected from the selected depth interval in the CPT boring due to the presence of low permeability sediments, attempts will be made to collect a ground-water sample from the closest depth to the target sampling depth that yields a water sample for collection. The ground-water samples will be placed in a chilled cooler immediately after collection for transport to the laboratory under standard chain-of-custody protocol. After collecting the ground-water samples, the borehole will be sealed with a bentonite-grout mix through PVC tremie pipe, and the ground surface restored using replacement materials (i.e., asphalt patch, concrete). All work will be performed under the direction of a California Certified Hydrogeologist.

In the event that waste soil or ground water is generated during CPT drilling and sampling, the waste materials will be securely stored on-site in 55-gallon drums. Results of ground-water sample analyses will be evaluated and appropriate disposal facilities contacted to arrange for transport and disposal of the waste materials.

Task 3: Monitoring Well Sampling Activities

Ground-water samples are proposed to be collected from monitoring wells MW-1 through MW-5 to confirm the results of previous monitoring results (Table 1). The ground-water samples will be submitted to a California state-certified laboratory for TPH analysis characterized as gasoline and diesel using EPA Method 8015/5030 and VOCs using EPA Method 8240. The ground-water samples collected from the wells will be placed in a chilled cooler immediately after collection for transport to the laboratory. Waste water produced from well sampling will be stored on-site in 55-gallon drums. Results of ground-water sample analyses will be evaluated and appropriate disposal facilities contacted to arrange for transport and disposal of the waste materials.

Water-level measurements will be collected from the wells prior to sampling to obtain data of ground-water flow direction and gradients at the Site. Depth to water measurements will be measured using an electric water-level meter. Ground-water elevations will be calculated based on the measured depths to ground water.

Task 4: Preparation of Ground-Water Investigation Report

Geologic, hydrogeologic and chemical data collected from the ground-water investigation activities will be evaluated, summarized, and a report prepared in accordance with the Tri-Regional Guidelines. The report will include the following:

- Detailed descriptions of the methodologies used to collect and analyze the data.
- Descriptions of the Site and site geology, including appropriately scaled base maps showing all boring locations and CPT logs illustrating measurements of the CPT equipment in the field.

- Presentation and interpretation of ground-water analytical results and laboratory data certificates, including an assessment of the presence and extent of chemicals in shallow and deeper ground water at the Site.

- Evaluation of available records and information on regional deep ground-water quality in the Site vicinity.

- Evaluation of the need for additional investigations, remediation and/or ground-water monitoring at the site, if warranted, and an evaluation of Site closure criteria.

4.0 SCHEDULE

Once we have received approval of the Workplan from the ACHCSA, it is estimated that the total time to complete the ground-water investigation and well sampling tasks of the proposed Scope of Work is 12 to 16 weeks. It is anticipated that Tasks 1 through 3 could be completed within about 8 to 12 weeks of receiving the ACHCSA's approval of the Workplan, assuming a normal two-week laboratory turnaround time for sample analysis. A technical report of the results of the ground-water investigation (Task 4) can be prepared within 4 weeks of SOMA's receipt of the laboratory data.

5.0 SELECTED REFERENCES

Certified Engineering and Testing Company (Certified). 1994. Subsurface Investigation, 1600 63rd Street, Emeryville. November 22.

Engineering-Science (ES). 1988. Site Characterization Report for Soil and Ground-Water Contamination at 1600 63rd Street Site, Emeryville. December 22.

Harding Lawson Associates (HLA). 1989. Ground-Water Quality Investigation, 1600 63rd Street Emeryville. October 2.

Harding Lawson Associates. 1991. Quarterly Ground-Water Monitoring, 1600 63rd Street Emeryville. November 21.

Kaldveer Associates (Kaldveer). 1988. Foundation Investigation for Federal Express Building at Peterson Manufacturing Site, Emeryville. April 11.

SOMA Corporation. 1998. Summary of Remedial Activities and Recommended Site Closure Measures, 1600 63rd Street, Emeryville. July 30.

TABLES

TABLE 1
SUMMARY OF HISTORICAL GROUND WATER ANALYTICAL RESULTS
1600 63rd Street, Emeryville, California

Sample No.	Date Sampled	Notes	Chemical Concentrations Detected (ppm)									
			TPHd	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	PCB's	EPA 8080 Analytes	EPA 8270 Analytes	EPA 8240 Analytes
Engineering Science												
ES/MW-1	11/12/87	(1)	NA	NA	**1.7**	**2.6**	NA	**4.2**	NA	NA	NA	NA
ES/MW-2	11/12/87	(2)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ES/MW-3	1/13/88	(3)	NA	NA	NA	NA	NA	NA	<0.0003	NA	NA	**0.002 (12)**
HLA												
MW-1	6/18/89		<0.5	<0.5	<0.001	<0.001	<0.001	<0.001	NA	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	**0.0005**	**(4)**	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		**0.17**	<0.05	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		**0.16**	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		**0.2**	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		**0.7**	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
MW-2	6/25/89		<0.5	**0.3**	<0.005	<0.005	<0.005	<0.005	<0.0005	NA	**(7)**	<0.01
	9/21/89		**1**	<0.5	<0.005	<0.005	<0.005	<0.005	<0.0005	**(5)**	**(8)**	<0.01
	12/20/89		<0.5	**0.53**	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	**(9)**	<0.01
	2/20/90		**49**	**0.42**	<0.005	<0.005	<0.005	<0.005	<0.0005	**(6)**	**(10)**	**0.044 (13)**
	5/11/90		**8.4**	**1.2**	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	<0.01
	5/11/90		<2.5	<0.5	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	<0.02
	7/20/90		**27**	**3.9**	<0.005	<0.005	<0.005	**0.011**	NA	ND	NA	NA
	7/20/90		**30**	**2.3**	<0.005	<0.0025	<0.0025	**0.0033**	NA	ND	NA	NA
	11/12/90		**61**	**380**	<0.005	<0.0005	<0.0005	**0.0005**	<0.0005	ND	NA	NA
	11/12/90		**35**	**7**	<0.005	**0.0009**	**0.0001**	**0.0079**	<0.0005	ND	NA	NA
	2/7/91		**41**	**11**	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	ND	NA	NA
	2/7/91		**27**	**13**	<0.005	<0.0005	<0.0005	**0.043**	<0.0005	ND	NA	NA
	5/8/91		**43**	**88**	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91	ppm	**26**	**150**	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
MW-3	7/18/89		<0.5	<0.5	<0.001	<0.001	<0.001	<0.001	NA	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		<0.05	**0.11**	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		**0.12**	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA

TABLE 1 (cont.)

Sample No.	Date Sampled	Notes	Chemical Concentrations Detected (ppm)									
			TPHd	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	PCB's	EPA 8080 Analytes	EPA 8270 Analytes	EPA 8240 Analytes
MW-4	6/25/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	12/20/89		NA	NA	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		<0.05	**0.12**	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
MW-5	6/30/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	NA	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	**0.0009**	**(11)**	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
Certified												
MW-2	11/19/92		**22**	**0.59**	<0.0003	**0.0014**	<0.0003	**0.0015**	NA	NA	NA	NA
	7/13/94		**6**	<2	<0.001	<0.001	<0.001	<0.001	NA	NA	NA	NA

NOTES:

TOG = Total Petroleum Hydrocarbons as Oil and Grease.
TPHg = Total Petroleum Hydrocarbons as Gasoline.
TPHd = Total Petroleum Hydrocarbons as Diesel.
< = Below Specified Reporting Limits.
NA = Not Analyzed.

(1) 0.031 ppm lead and 21 ppm total fuel hydrocarbons detected.
(2) 200 ppm TOG detected.
(3) 2.7 ppm total fuel hydrocarbons detected.
(4) 0.0001 ppm endrin aldehyde detected.
(5) 0.00016 ppm heptachlor and 0.00015 ppm 4,4'-DDD detected.
(6) 0.00035 ppm Gamma-BHC detected.
(7) Trace fluorene detected.
(8) 0.006 ppm fluroene, 0.005 ppm bis(2-ethyl-hexyl) phthalate and 0.0061 ppm 2-methyl-naphthalene detected.
(9) 0.012 ppm 2-methyl-naphthalene detected.
(10) 0.0061 ppm fluorene, 0.018 ppm 2-methyl-naphthalene and 0.0055 phenanthrene detected.
(11) 0.00015 ppm endrin aldehyde detected.
(12) 0.002 ppm unknown EPA 8240 analyte detected.
(13) 0.044 ppm acetone detected.

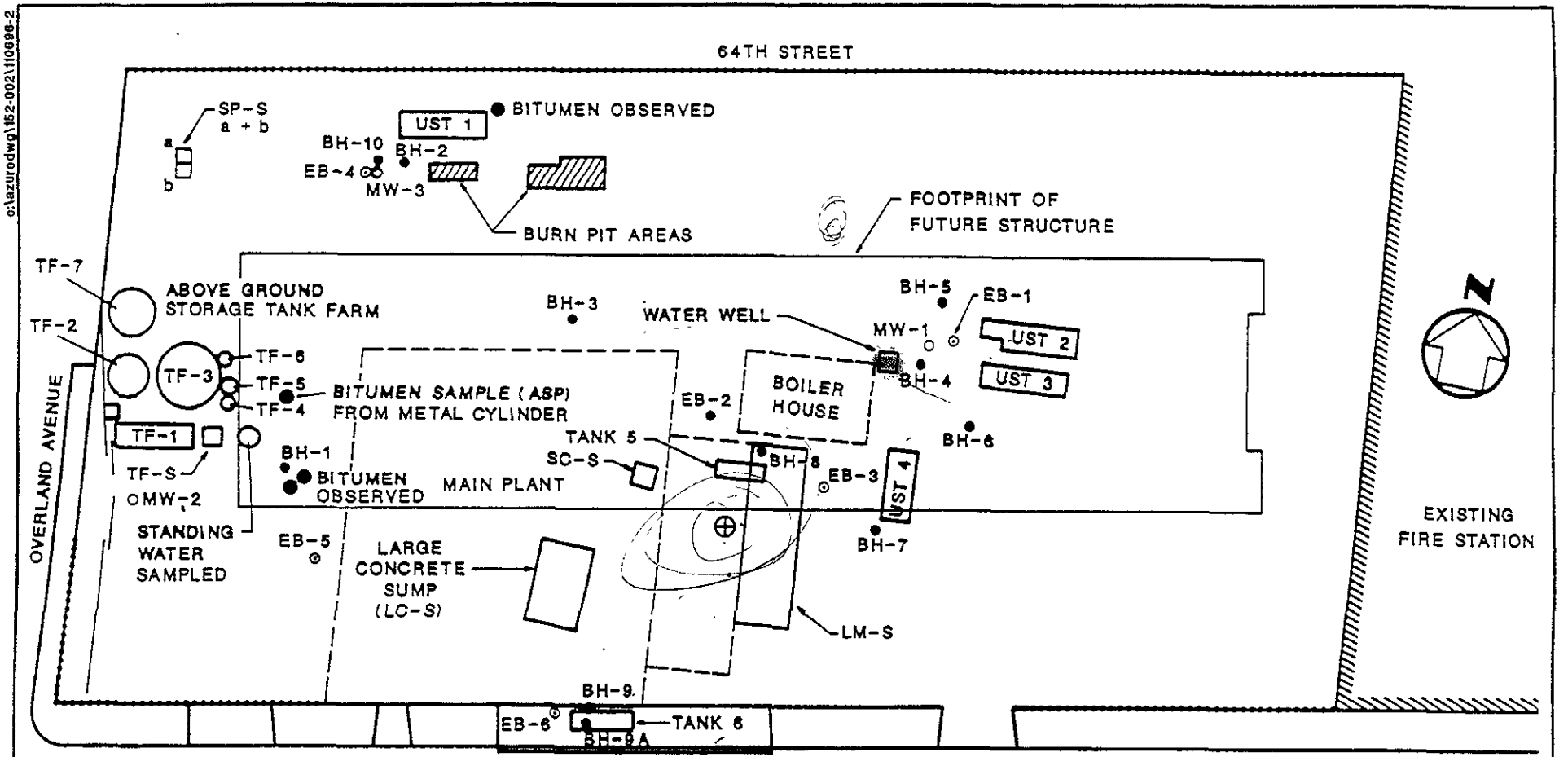
FIGURES

c:\azuredwg\152-002\110696-1

MAP SOURCE:
U.S.G.S. Oakland West, California
1:24,000 - Scale Series (Topographic)
Photo revised - 1980

Figure 1: Site Vicinity Map

SOMA CORPORATION



LEGEND

BH-1 ES BOREHOLE

EB-1 KALDVEER BORING, APPROXIMATE LOCATION

MW-1 MONITORING WELL

UST 1 UNDERGROUND STORAGE TANK LOCATIONS

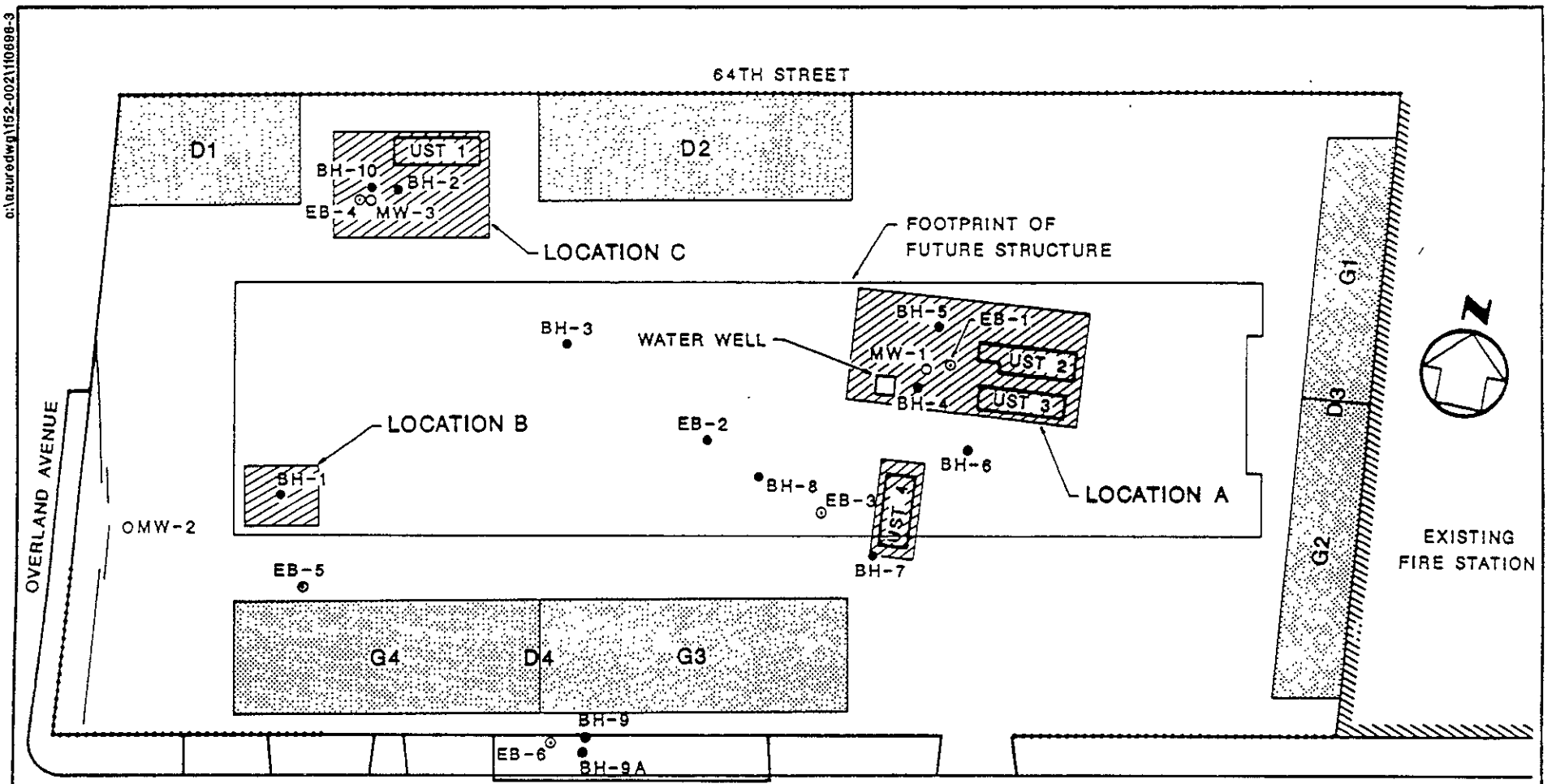
SP-S SUMP LOCATIONS

⊕ Proposed CPT Sampling Location

MAP SOURCE:
Engineering Science, 1988;
Base: "Plot Plan" by John F. Tulloch Engineers, Contractors, 1/24/68

Figure 2: Site Map Showing Historical Site Features and Sampling Locations

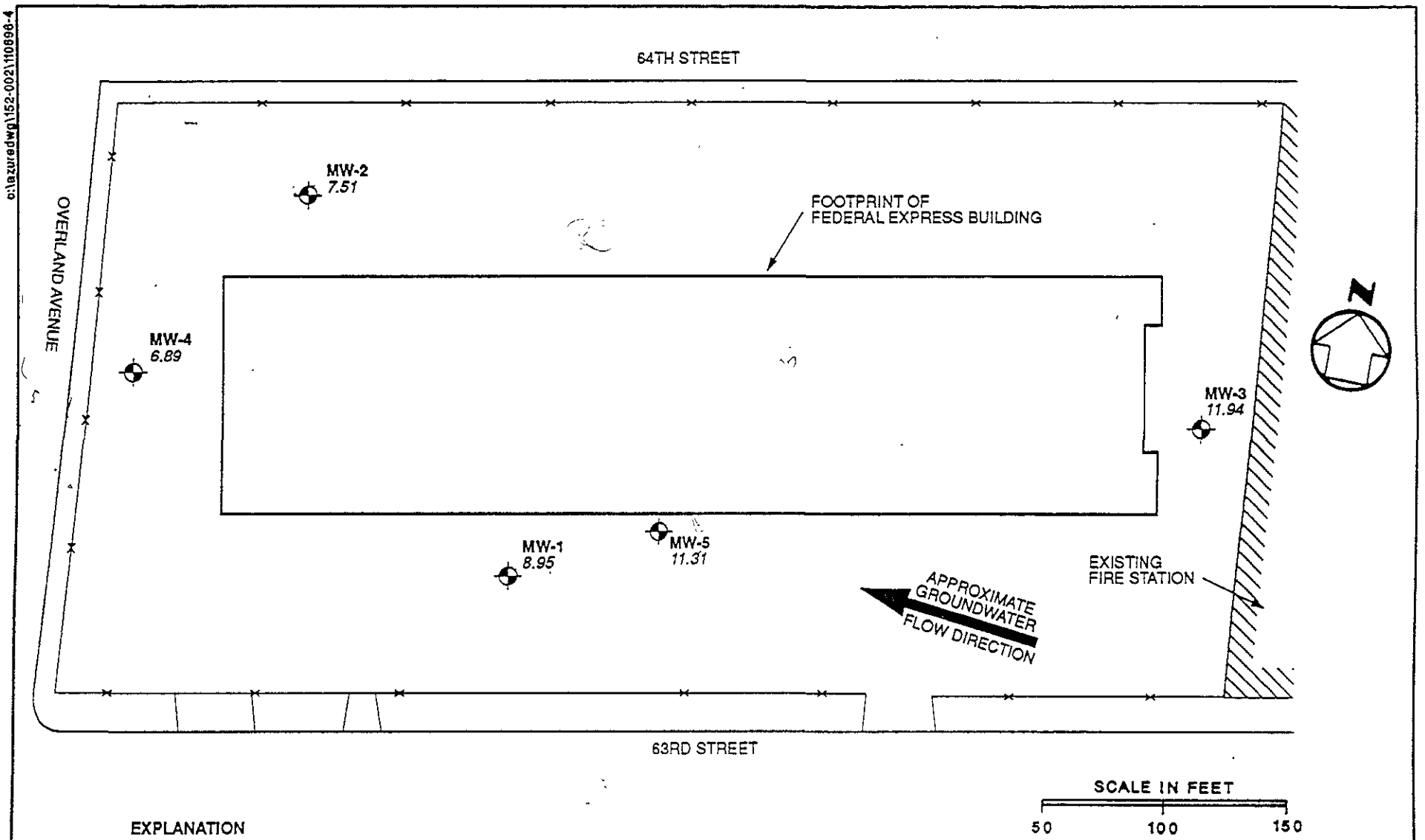
SOMA CORPORATION



MAP SOURCE:
Engineering Science, 1988;
Base: "Plot Plan" by John F. Tulloch Engineers, Contractors, 1/24/68

Figure 3: Site Map Showing Sampling Locations and Excavation Areas

SOMA CORPORATION



MAP SOURCE:
Harding Lawson Associates, 5/91

Figure 4: Site Map Showing HLA Monitoring Well Locations

SOMA CORPORATION

APPENDIX A

ENGINEERING-SCIENCE SUMMARY OF WELL CLOSURE SAMPLING RESULTS

Table 4-6
Analytical Results of Water Well Samples
Wareham Development, Peterson Manufacturing Parcel

Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
WW-1-A	Grab sample from liquid surface in water well	Mod. 8015 - TPH	17,000 ppm	2/26/88
WW-1-1P	Product sample from water well	GC/FID - TPH	250 ppm Diesel #2 780 ppm Unleaded Gasoline	4/7/88
WW-1-2P	Product sample from water well	8080 - PCBs	59 ppm Arochlor	4/7/88
WW-1-1W	Grab sample of water from well after product removed	GC/FID - TPH 608 - PCBs 624 - VOCs	550 ppm 10 ppb Arochlor 1254 7 ppb Benzene 170 ppb Cyclohexane 340 ppb Methylcyclopentane 30 ppb 2,3-Dimethylbutane 130 ppb 3-Methylpentane 220 ppb 2-Methylpentane 340 ppb Hexane	4/13/88
WW-1-90	Environmental sample from 90 feet below top of casing of well, after purging	GC/FID - TPH 608 - PCBs 624 - VOCs 625 - Base Neutral Priority Pollutants	40 ppm Total Fuel Hydrocarbons 2.4 ppb ug/l Arochlor 1254 13 ppb Toluene 600 ppb 4-Methyl-2-pentanone 5 ppm C6-C11 Hydrocarbons 24 ppb Acenapthene 32 ppb Anthracene 54 ppb Benzo(a)anthracene 18 ppb Benzo(a)pyrene 28 ppb Benzo(a)fluoranthene 8 ppb Benzo(g,h,i)perylene 30 ppb Benzo(k)fluoranthene 40 ppb Chrysene 4 ppb Dibenzo(a,h)anthracene 30 ppb Fluorene 70 ppb Fluoranthene 8 ppb Indeno(1,2,3-c,d)pyrene 110 ppb Phenanthrene 130 ppb Pyrene 50 ppm C9-C30 Hydrocarbons	5/11/88

Table 4-6 (continued)

Sample	Sample Descriptions	Analyses Performed	Analytical Results	Date Sampled
WW-1-150	Environmental sample from 150 feet below top of casing of well after purging	GC/FID - TPH	3,300 ppb Total Fuel Hydrocarbons	5/11/88
		608 - PCBs	ND	
		624 - VOCs	200 ppb Acetone	
			900 ppb C6-C11 Hydrocarbons	
			500 ppb Methyl-Ethyl-Ketone	
		625 - Base Neutral Priority Pollutants	4 ppb Acenapthene	
			5 ppb Anthracene	
			5 ppb Benzo(a)anthracene	
			4 ppb Benzo(b)fluoranthene	
			4 ppb Benzo(k)fluoranthene	
			6 ppb Chrysene	
			4 ppb Fluorene	
			32 ppb Fluoranthene	
			19 ppb Phenanthrene	
			26 ppb Pyrene	
			20 ppm C9-C30 Hydrocarbons	
		General Mineral Analysis	7.5 meq/l Anions	5/11/88
			9.8 meq/l Cations	
			600 ppm TDS	
			320 ppm Total Hardness	
			21 ppm Iron	
			2.2 ppm Manganese	
WW-1-300	Environmental sample from 300 feet below top of casing of well, after purging	GC/FID - TPH	ND	5/11/88
		608 - PCBs	ND	
		624 - VOCs	100 ppb Acetone	
			400 ppb C6-C11 Hydrocarbons	
			400 ppb Methyl-ethyl-ketone	
		625 - Base Neutral Priority Pollutants	4 ppb Benzo(a)anthracene	
			2 ppb Benzo(a)pyrene	
			2 ppb Benzo(k)fluoranthene	
			4 ppb Chrysene	
			18 ppb Fluorene	
			16 ppb Pyrene	
			7 ppm C9-C30 Hydrocarbons	
		General Mineral Analysis	10.6 meq/l Anions	
			10.6 meq/l Cations	
			640 ppm TDS	
			350 ppm Total Hardness	
			12 ppm Iron	
			2.9 ppm Manganese	

Table 4-6 (continued)

Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
BT-A	Baker tank A composite from top, middle and bottom	3510/8015 - TPH	ND	5/20/88
		602 - BTX	ND	
		608 - PCBs	ND	
		Metals - 13 Priority Pollutants	100 ppb Ni	
			50 ppb Zn	
BT-B	Baker tank B composite from top, middle and bottom	3510/8015 - TPH	1,100 ppb C7-C9 & C11-C22 Hydrocarbons	5/20/88
		602 - BTX	ND	
		608 - PCBs	ND	
		Metals - 13 Priority Pollutants	60 Ppb Ni	
			200 Ppb Se	