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Alameda County
Environmental Health



76 Broadway
Sacramento, California 95818

May 29, 2009

Barbara Jakub
Alameda County Health Agency
1131 Harbor Bay parkway, Suite250
Alameda, California 94502-577

Re: ***Ozone Injection Feasibility Testing Workplan Prior to Property Development***
Former 76 Service Station # 0843 RO # 0450
1629 Webster Street
Alameda, CA

Dear Ms. Jakub:

I declare under penalty of perjury that to the best of my knowledge the information and/or recommendations contained in the attached report is/are true and correct.

Per the several discussions of the site and the pending owner development plans your expedited review and approval of this revised plan if possible by or prior to Wednesday June 10th, would be greatly appreciated.

If you have any questions or need additional information, please call me at (916) 558-7666.

Sincerely,

A handwritten signature in black ink, appearing to read "Terry L. Grayson", written over a horizontal line.

Terry L. Grayson
Site Manager
Risk Management & Remediation

June 1, 2009

Ms. Barbara Jakub
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

**RE: Ozone Injection Feasibility Testing Workplan
Former 76 Station No. 0843
1629 Webster Street
Alameda, California**

Dear Ms. Jakub:

On behalf of Conoco Phillips Company (COP), Delta Consultants (Delta) has prepared this *Ozone Injection Feasibility Testing Workplan* in order to assess the feasibility and radius of influence of proposed oxygen injection activities into test sparge point TSP-1 at the site located at 1629 Webster Street in Alameda, California (Figure 1).

The vertical extent of the petroleum hydrocarbon impact to the soil and the groundwater has been defined by previous assessment activities. Additionally, it appears that the hydrocarbon plume at this site has commingled with the hydrocarbon plume originating from the up-gradient Shell station and has migrated off-site, down-gradient of the site.

SITE DESCRIPTION

The site is located at the southwest corner of the intersection of Webster Street and Pacific Avenue in Alameda California (Figure 2). The site is currently an inactive service station with the fuel dispenser, one underground waste-oil tank, and two underground gasoline storage tanks (UST's) having been previously removed. Former and current site features are shown on Figure 2.

PREVIOUS ASSESSMENT

June 1998 - Tosco Marketing Company (Tosco, now ConocoPhillips) removed two 10,000-gallon gasoline underground storage tanks (USTs), one 550-gallon used oil UST, product lines and dispensers. Two holes approximately $\frac{3}{4}$ -inch in diameter were observed in the used oil tank during removal. Approximately 338 tons of hydrocarbon impacted soil and backfill were removed from beneath the former USTs, dispensers, and product lines during the UST removal activities.

March 1999 - Four soil borings (B1 through B4) were advanced at the site and were subsequently converted into monitoring wells MW-1 through MW-4. Groundwater was encountered from 8 to 15 feet below ground surface (bgs). Static water was observed between 4 and 6 feet bgs subsequent to well installation.

December 1999 - Two offsite soil borings (B5 and B6) were advanced and subsequently converted to monitor wells MW-5 and MW-6. Groundwater was initially present at approximately 10 feet below bgs. Static water was observed at 7 feet bgs subsequent to well installation.

March 2001 - An underground utility survey was conducted to identify and locate underground utilities beneath and in the vicinity of the site that could provide potential preferential pathways for groundwater flow.

May 2001 - Five direct-push soil borings (GP-1 through GP-5) were installed to evaluate whether underground utilities in the vicinity of the site are providing preferential pathways for groundwater flow and the migration of dissolved hydrocarbons. The results of the investigation indicated insufficient evidence that underground utility lines were providing preferential pathways for the off-site migration of dissolved petroleum hydrocarbons.

December 2001 - Twelve direct-push soil borings (GP-6 through GP-17) were completed to further assess the extent of residual hydrocarbons in the vadose zone beneath the site. The results of the investigation indicated that the extent of the residual hydrocarbon impact detected in the previous investigations was limited.

December 2002 - One on-site monitoring well (MW-2) was destroyed during remedial excavation of hydrocarbon-impacted soil. This well was completed in the vicinity of the former eastern dispenser island and was replaced with on-site backfill monitoring well MW-2A. Approximately 292 tons of hydrocarbon-impacted soil was removed from beneath the former eastern dispenser island.

September 2003 - A *Request and Work Plan for Closure* prepared by ERI was submitted to the Alameda County Health Care Services Agency (ACHCSA),

dated September 10, 2003. The report summarized why no further action is needed for the site; the report also included plans to destroy the existing wells upon regulatory acceptance for no further action. Closure was not granted.

June 2004 – A work plan was submitted for two monitor wells down-gradient of monitoring well MW-5.

May 2005 – A work plan titled *Work Plan Addendum – Site Assessment Activity* dated May 17, 2005 was prepared by ATC Associates Inc. for the installation of two offsite monitor wells.

September 2005 – A work plan was prepared by ATC Associates Inc., titled *Work Plan Subsurface Investigation*, for the installation of one onsite monitor well.

September 2005 – Site environmental consulting responsibilities were transferred to Delta.

November 2006 – A Sensitive Receptor Survey was performed by Delta to identify wells within the survey area.

January 24, 2007 – A work plan was submitted to the ACHCSA recommending the advancement of one soil boring and the installation of three ozone injection wells at the site.

August 14, 2008 – Gregg Drilling, under supervision of Delta, advanced one cone penetration test (CPT) boring to a depth of 55 feet.

October 29, 2008 – A Site Investigation Report was submitted to ACHCSA detailing the results of the August 14, 2008, CPT borings.

May 2009 – Delta oversaw the installation of on-site monitoring wells MW-1AR, MW-1BR, MW-7, MW-8, MW-9, MW-10, MW-11, and test sparge point TSP-1. During installation activities, Delta also oversaw the destruction of on-site monitoring well MW-2A. Subsequent to completion of the installation activities, all newly installed monitoring wells were developed by using a surge block and purging 10 casing volumes from each well. As of the submittal of this workplan, the soil and groundwater analytical results from samples collected during installation activities have not yet been received. The locations of these new wells are shown on Figure 2. A report presenting the details of these installation activities will be submitted to the Alameda County Health Care Services Agency upon receipt and analysis of the soil and groundwater laboratory analytical results.

SENSITIVE RECEPTORS

June/July 2002 - A groundwater receptor survey was conducted. Three irrigation wells are located within a one-half mile radius of the site. The wells are located approximately 1,980 feet west and 2,245 feet southwest of the site, cross-gradient and up-gradient of the site.

November 2006 – A survey entailing a visit to the DWR office in Sacramento was conducted to examine well log records and to identify domestic wells within the survey area. The DWR survey provided 15 potential receptors within one mile of the site; one domestic well located 0.5 mile southwest of the site; one domestic/irrigation well located 0.7 mile southeast of the site; 11 irrigation wells with three located 0.1 mile northwest, west, and southeast of the site; and two industrial wells located 0.3 miles southwest and 0.9 mile northeast of the site.

PROPOSED ACTIVITIES

Pre-Field Activities and Permitting

Before commencing field operations Delta will prepare a Health and Safety Plan (HASP) specific to the site and work being performed in accordance with Title 8, Section 5192 of the California Code of Regulations. The HASP will contain a list of emergency contacts, as well as a hospital route map to the nearest emergency facility.

According to the City of Alameda Public Works Department and Alameda County Public Works Agency (ACPWA), additional permits for the ozone injection feasibility testing activities are not required.

OZONE INJECTION FEASIBILITY TESTING

Prior to the start of the feasibility test, baseline groundwater samples will be collected from all site monitoring wells, including test sparge well TSP-1. The baseline groundwater samples will be analyzed for TPHg, BTEX, fuel oxygenates by EPA Method 8260B, manganese, total chromium, vanadium, selenium and molybdenum by EPA Method 200.8, bromide, nitrate (NO₃) and sulfate (SO₄) by EPA Method 300.0, bromate by EPA Method 300.1, hexavalent chromium by EPA Method 7199, and ferrous iron (FE) by EPA Standard Method 3500. In addition, measurements of groundwater elevation, dissolved oxygen (DO), oxygen reducing potential (ORP), and temperature will be collected from the monitoring wells and test sparge well. Delta proposes that, if possible, this baseline testing be performed during a scheduled groundwater monitoring and sampling event prior to the feasibility test.

The ozone injection feasibility testing will be performed using a mobile ozone injection unit capable of delivering up to 1.0 to 2.0 pounds of ozone per day

into the subsurface. The ozone injection feasibility testing will be conducted for 8 hours a day, five days a week, for the duration of the 4 weeks test. Before, during and after completion of the injection process, operating pressures, groundwater elevation, DO, and ORP levels in nearby wells MW-1, MW-9, MW-10, and MW-11 will be measured and recorded. Based on observed measurements during the beginning of the feasibility testing, Delta may also include MW-7 and MW-8 in the observation process. Measurements during the injection process will be made at specific intervals to be determined in the field. These measurements will assist in determining the radius of influence from the test sparge point TSP-1.

Approximately one week after completion of the ozone injection feasibility testing, groundwater samples will be collected from the test sparge point TSP-1 and monitoring wells MW-1, MW-9, MW-10, and MW-11. The samples will be decanted into properly labeled sample bottles and placed on ice as noted above pending transportation to a California-certified laboratory. A chain-of-custody will accompany the samples during transportation to the laboratory. The collected groundwater samples will be analyzed for the same constituents as the baseline sampling event.

Disposal of Wastewater

Decontamination water generated during the feasibility testing activities will be placed into properly labeled 55-gallon Department of Transportation (DOT) approved steel drums and stored on the property. Samples of the wastewater will be collected, properly labeled and placed on ice for submittal to a California-certified laboratory and analyzed for TPPH, BTEX, and MTBE by EPA Method 8260B and total lead by EPA Method 6010B. A chain-of-custody will accompany the samples during transportation to the laboratory. Subsequent to receiving the laboratory analytical results, the wastewater will be profiled, transported, and disposed of at a COP approved facility.

Reporting

Following completion of the field work and receipt of final analytical results, a site investigation report will be prepared and submitted within 60 days. The report will present the details of the injection activities, including copies of field data measurement sheets, and details of disposal activities and copies of disposal documents. Required electronic submittals will be uploaded to the State Geotracker database.

REMARKS/SIGNATURES

The recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the client. The Contract between Delta and its client outlines the scope of work, and only those tasks

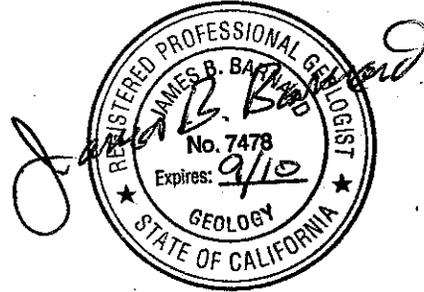
specifically authorized by that contract or outlined in this report will be performed. This report is intended only for the use of Delta's Client and anyone else specifically listed on this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.

If you have any questions regarding this project, please contact me at (916) 503-1279 or Mr. Terry Grayson of COP at (916) 558-7666.

Sincerely,
DELTA CONSULTANTS

James B. Barnard

James B. Barnard, P.G.
Senior Project Manger
California Registered Professional Geologist No. 7478



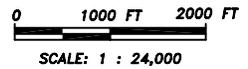
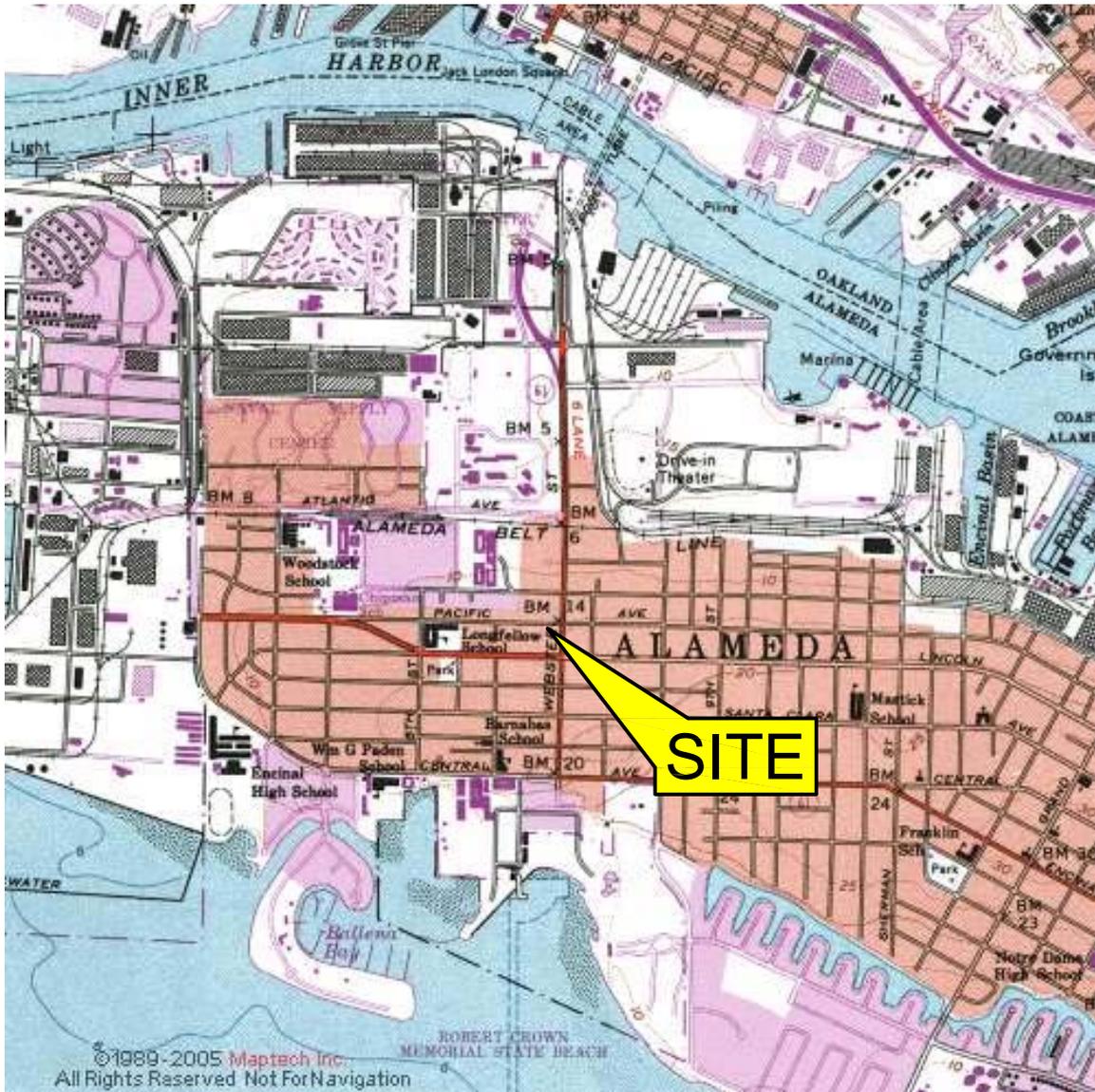
Figures:

- Figure 1 - Site Location Map
- Figure 2 - Site Plan with Test Sparge and Monitoring Well Locations

cc: Mr. Terry Grayson, ConocoPhillips (electronic copy only)

Figures

Figure 1
Site Location Map



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP, OAKLAND WEST QUADRANGLE, 1996

FIGURE 1

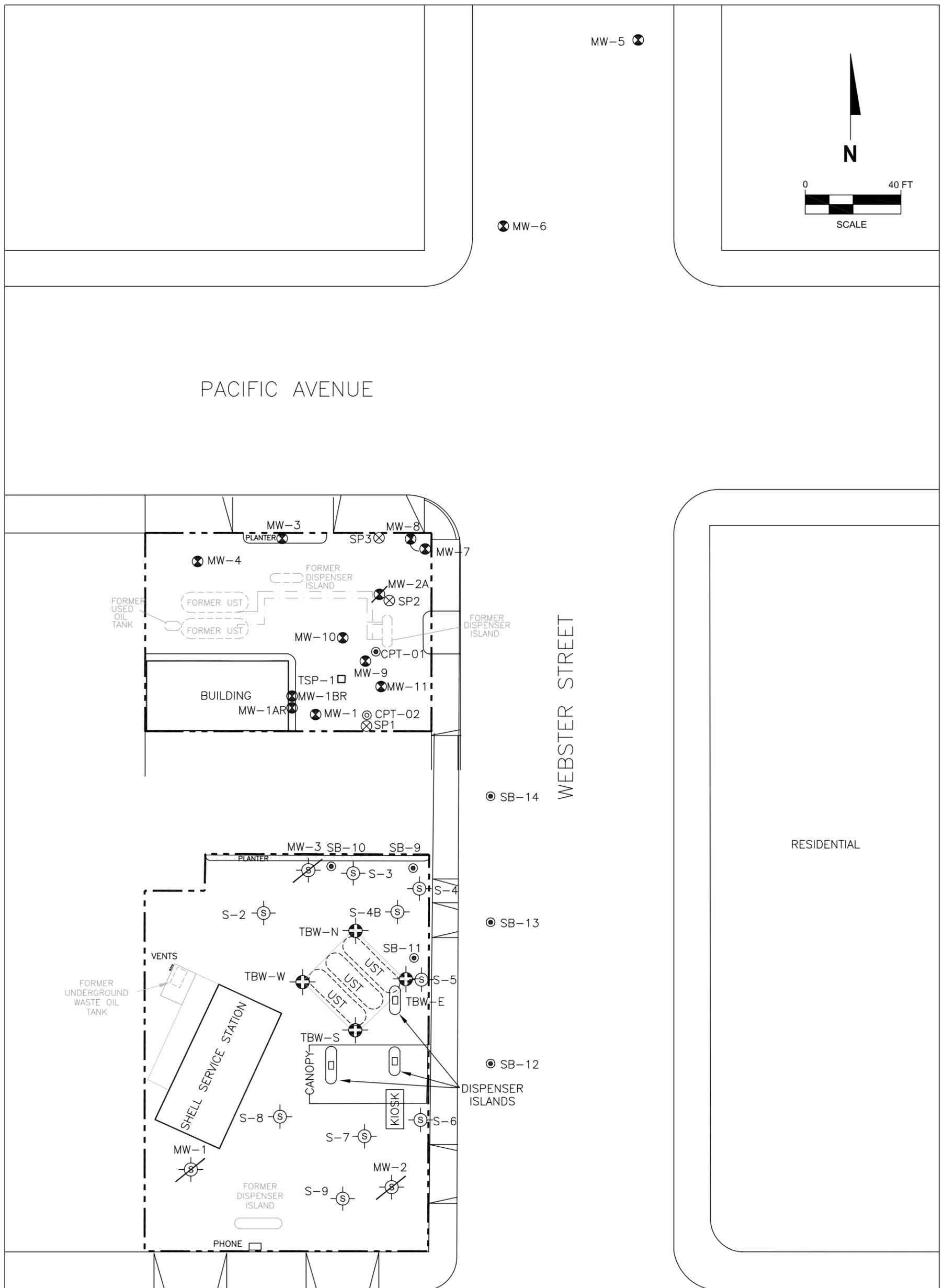
SITE LOCATION MAP

76 STATION NO. 0843
 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

PROJECT NO. C100-843	DRAWN BY JH 03/18/09
FILE NO. Site Locator 0843	PREPARED BY CM
REVISION NO. 2	REVIEWED BY JM



Figure 2
Site Plan with Sparge Test Point and Monitoring Well Locations



LEGEND:

- PROPERTY BOUNDARY
- - - FORMER PRODUCT LINE
- ⊗ FORMER 76 MONITORING WELL
- ⊗ ABANDONED 76 MONITORING WELL
- ⊙ SHELL MONITORING WELL
- ⊙ DESTROYED SHELL MONITORING WELL
- ⊙ TANK BACKFILL WELL
- ⊙ CPT SOIL BORING
- ⊙ PROPOSED CPT SOIL BORING
- TEST SPARGE POINT
- ⊗ PREVIOUSLY PROPOSED OZONE INJECTION WELL

PLAN ADAPTED FROM A DRAWING DATED 9/18/08 TITLED "SITE PLAN" PREPARED BY TRC.

FIGURE 2
 SITE PLAN WITH
 TEST SPARGE AND MONITORING WELL LOCATIONS
 FORMER 76 STATION NO. 0843
 1629 WEBSTER ROAD
 ALAMEDA, CALIFORNIA

PROJECT NO. C100843	PREPARED BY JBB	DRAWN BY JH	
DATE 05/28/09	REVIEWED BY	FILE NAME 76-0843	