



February 25, 2015

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RECEIVED

By Alameda County Environmental Health at 1:12 pm, Mar 02, 2015

RE: Conceptual Site Model and Closure Request

1629 Webster Street, Alameda, California
Fuel Leak Case No.: RO0000450

Dear Mr. Nowell,

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.

If you have any questions or need additional information, please contact me at (925) 790-6463.

Sincerely,

A handwritten signature in blue ink, appearing to read "Nicole Arceneaux".

Nicole Arceneaux
Union Oil of California – Project Manager

Attachment
Conceptual Site Model and Closure Request

**Chevron Environmental Management
Company**

**Conceptual Site Model and
Closure Request**

Former Unocal Station No. 0843
1629 Webster Street
Alameda, California
Case No. RO0000450

February 25, 2015

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**Conceptual Site Model and
Closure Request**

Former Unocal Station No. 0843
1629 Webster Street
Case No. RO0000450

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Our Ref.:
B0047584.2014

Date:
February 25, 2015

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Acronyms and Abbreviations

ACEH	Alameda County Environmental Health
ARCADIS	ARCADIS U.S., Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
COPC	constituent of potential concern
CPT	cone penetrometer test
CRA	Conestoga-Rovers & Associates
CSM	conceptual site model
Delta	Delta Consultants
DIPE	di-isopropyl ether
EBMUD	East Bay Municipal Utilities District
EDB	1,2-dibromoethane
EDC	1,2-dichloroethane
ERI	Environmental Resolutions, Inc.
ESL	Environmental Screening Level
ETBE	ethyl tertiary butyl ether
ft/ft	foot per foot
LNAPL	light nonaqueous phase liquid
Low-Threat Closure Policy	Low-Threat Underground Storage Tank Case Closure Policy
LUST	leaking underground storage tank
mg/kg	milligrams per kilogram
MRL	method reporting limit



Conceptual Site Model and Closure Request

Unocal Station No. 0843
Alameda, California

MTBE	methyl tertiary butyl ether
R ² value	coefficient of determination
request	Conceptual Site Model and Closure Request
SFRWQCB	San Francisco Regional Water Quality Control Board
site	Unocal Service Station No. 0843, located at 1629 Webster Street, Alameda, California
SWRCB	State Water Resources Control Board
TAME	tertiary amyl methyl ether
TBA	tertiary butyl alcohol
TPH-g	total petroleum hydrocarbons as gasoline
TPPH	total purgeable petroleum hydrocarbons
Union Oil	Union Oil Company of California
UST	underground storage tank
WQO	water quality objective
°F	degrees Fahrenheit
µg/L	micrograms per liter



Conceptual Site Model and Closure Request

Unocal Station No. 0843
Alameda, California

1. Introduction

On behalf of Chevron Environmental Management Company's affiliate, Union Oil Company of California (Union Oil), ARCADIS U.S., Inc. (ARCADIS) prepared this Conceptual Site Model and Closure Request (request) for former Union Oil Station No. 0843, located at 1629 Webster Street in Alameda, California (site). This request summarizes current and historical site data to support a request for low-threat closure under the State Water Resources Control Board's (SWRCB's) resolution 2012-0016 adopted on May 1, 2012, otherwise known as the Low-Threat Underground Storage Tank Case Closure Policy (Low-Threat Closure Policy; SWRCB 2012a). A completed Low-Threat Closure Checklist is included as Appendix A.

2. Site Description

The site is currently divided into two lots: a paved vacant lot and a lot for SK Auto with a paved parking area (Alameda County Assessor's Parcel Number 74-430-1-1) located at 1629 Webster Street in Alameda, California (Figure 1). All underground storage tanks (USTs), dispenser islands, and associated product piping were removed when the former Unocal Service Station was decommissioned in 1988. Property near the site is mixed-use residential and commercial. The site is bound to the north by Pacific Avenue, to the east by Webster Street, and to the south and west by commercial property. Twelve groundwater monitoring wells (MW-1, MW-1AR, MW-1BR, MW-3 through MW-11) are currently associated with the site (Figure 2).

Proposed future development of the site consists of a two or three-story mixed-use building including ground floor retail, two residential units, and a storage/office space on the upper floors. The building does not have plans for sub-terrain parking or basements.

3. Conceptual Site Model

This section summarizes the conceptual site model (CSM), including the regional setting, regional and site geology and hydrogeology, previous work, offsite sources, distribution of fuel hydrocarbons and oxygenates in the subsurface, and linear regression analysis and plume stability; evaluates risks to human health and the environment; and summarizes potential exposure pathways.

3.1 Regional Setting

3.1.1 Topography and Site Elevation

The site is located on relatively flat land, at an elevation of approximately 19 feet above mean sea level.

3.1.2 Geography

The site is bounded to the north by Pacific Avenue, to the east by Webster Street, to the south by commercial property, and to the west by a parking lot. Commercial properties run along Webster Street and residential properties are located along Pacific Avenue.

3.1.3 Surface-Water Drainage

The nearest surface-water body is San Francisco Bay, located approximately 0.5 mile southwest (upgradient) of the site. The Oakland Inner Harbor is located approximately 1 mile north-northeast (downgradient) from the site.

3.1.4 Climate

The average annual rainfall for the area is approximately 22.61 inches. The average high temperature is 65 degrees Fahrenheit (°F) and the average low temperature is 49°F (Western Regional Climate Center 2014).

3.1.5 Vegetation

Half of the site is currently a paved vacant lot and the other half is SK Auto with a paved parking area. Vegetation onsite consists of small areas used for landscaping.

3.2 Regional and Site Geology and Hydrogeology

The site is located on the eastern side of the San Francisco Bay. The site is underlain by interbedded Holocene-age marine beach and near-shore deposits, primarily composed of semiconsolidated, well-graded to poorly graded sand, silty sand/sandy silt, silt, and clayey sand (Delta Consultants [Delta] 2010).

During previous site investigation activities, borings were advanced to a maximum depth of 55 feet below ground surface (bgs). As determined from the borings, the site is underlain by clays, silty sands, and sands (ARCADIS 2014a). A site map with historical boring locations is included on Figure 2. Copies of available boring logs are provided in Appendix B. Well construction and soil boring details are included in Tables 1 and 2, respectively. Historical soil data are included in Table 3.

Quarterly groundwater monitoring and sampling have been conducted at the site since March 1999. During the most recent groundwater monitoring and sampling event (August 13, 2014), the depth to groundwater ranged from 7.70 to 9.65 feet below top of casing in MW-5 and MW-1AR, respectively.

Groundwater elevations varied from 8.75 to 9.70 feet mean sea level in MW-5 and MW-1, respectively. Groundwater flow direction was 0.003 foot per foot (ft/ft) to the northeast in the shallow zone and 0.002 ft/ft in the submerged zone (ARCADIS 2014b).

3.3 Summary of Previous Work

Investigation and remediation activities at the site commenced in 1998 during UST product line and dispenser removal. This section summarizes previous work, including release history, site assessment, and site remediation activities.

3.3.1 Release History

In June 1998, two single-walled steel 10,000-gallon gasoline USTs, one 550-gallon waste oil UST, associated product lines, and fuel dispensers were removed from the site. During removal of the waste oil tank, two ¾-inch holes were observed. Approximately 338 tons of hydrocarbon impacted soil and backfill were removed during UST removal activities. To facilitate possible periodic groundwater sampling and/or groundwater extraction, a conductor casing was installed within the former UST cavity (Environmental Resolutions, Inc. [ERI] 1998).

3.3.2 Site Assessment and Remediation History

In March 1999, four onsite soil borings (B1 through B4) were advanced and then converted to monitoring wells MW-1 through MW-4. Soil samples were collected at each location at approximately 10.5 feet bgs and analyzed for total petroleum hydrocarbons as gasoline (TPH-g); benzene, toluene, ethylbenzene, and total xylenes (BTEX, collectively); and methyl tertiary butyl ether (MTBE). The soil sample collected from B-2 was the only sample that contained concentrations of benzene (0.0295 milligrams per kilogram [mg/kg]), toluene (0.0658 mg/kg), ethylbenzene (0.0359 mg/kg), and total xylenes (0.119 mg/kg). Concentrations of MTBE were detected in the samples collected from soil borings B-2 (0.561 mg/kg) and B-4 (0.109 mg/kg). TPH-g was not detected above the respective method reporting limit (MRL) in any of the soil samples (Delta 2010).

In December 1999, two offsite soil borings (B5 and B6) were advanced and subsequently converted to monitoring wells MW-5 and MW-6 (Delta 2010).

On May 23, 2001, five direct-push soil borings (GP-1 through GP-5) were advanced to investigate potential pathways for groundwater flow and the migration of dissolved-phase hydrocarbons facilitated by underground utilities near the site. The results showed insufficient evidence of contaminant transport. The only detections were total xylenes in GP-3 (0.011 mg/kg at 5 feet bgs) and MTBE in GP-5 (0.18 mg/kg at 10 feet bgs) (ERI 2001).

On December 4, 2001, twelve direct-push soil borings (GP-6 through GP-17) were advanced to further assess the extent of residual hydrocarbons in the vadose zone. Ethylbenzene (0.010 mg/kg) and total xylenes (0.015 mg/kg) were detected in GP-12 at 6 feet bgs. GP-12 was the only boring with detections, suggesting that the extent of the impacts is limited to soil and groundwater onsite (ERI 2002).

In November and December 2002, during remedial excavation of hydrocarbon impacted soil, ERI destroyed monitoring well MW-2 (located near the former eastern dispenser island) and replaced it with monitoring well MW-2A (same location). Approximately 292 tons of hydrocarbon impacted soil were removed during the excavation activities (ERI 2003a). Four soil samples (S-10-EX1N, S-10-EX1S, S-10-EX1W, and S-10-EX1E) were collected approximately 10 feet bgs at the edges of the excavation area and analyzed for TPH-g, BTEX, and MTBE. Toluene was detected in soil samples S-10-EX1W (4.1 mg/kg) and S-10-EX1E (1.2 mg/kg). Ethylbenzene was detected in soil samples S-10-EX1N (0.73 mg/kg), S-10-EX1W (20 mg/kg), and S-10-

EX1E (0.34 mg/kg). Total xylenes were detected in soil samples S-10-EX1N (4.9 mg/kg), S-10-EX1W (120 mg/kg), and S-10-EX1E (0.82 mg/kg). MTBE was detected in the samples collected from soil boring S-10-EX1E (0.36 mg/kg). TPH-g and benzene were not detected in any of the soil samples (ERI 2003a).

On August 14, 2008, Delta advanced one cone penetrometer test (CPT) boring (CPT-01) to a depth of 55 feet bgs. One soil sample was collected at CPT-01 at 7 feet bgs and was analyzed for TPH-g, BTEX, MTBE, tertiary butyl alcohol (TBA), tertiary amyl methyl ether (TAME), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), ethylene dibromide (EDB), ethylene dichloride (EDC), and ethanol. No concentrations were detected in the sample collected (Delta 2008).

Between May 12 and 28, 2009, seven groundwater monitoring wells (MW-1AR, MW-1BR, MW-7 through MW-11) and one ozone injection well (TSP-1) were installed at the site. In addition, one onsite monitoring well (MW-2A) was destroyed. Soil samples were collected at all locations between 10 and 20 feet bgs and analyzed for TPH-g, BTEX, MTBE, TBA, TAME, DIPE, ETBE, EDC, ethanol, sulfate, and manganese. Maximum concentrations of TPH-g (4,100 mg/kg), ethylbenzene (38 mg/kg), and total xylenes (770 mg/kg) were detected in the soil sample collected from MW-7 at 10 feet bgs. The maximum concentration of MTBE (0.25 mg/kg) was detected in the sample collected from MW-1AR at 20 feet bgs. The maximum concentration of sulfate (51 mg/kg) was detected in the sample collected from MW-11 at 10 feet bgs. The maximum concentration of manganese (190 mg/kg) was detected in the soil samples collected from MW-9 and MW-11, both at 10 feet bgs. Benzene, toluene, TBA, TAME, DIPE, ETBE, EDC, and ethanol were not detected above their respective MRLs in any of the soil samples collected (Delta 2009a).

Between August 10 and September 4, 2009, Delta performed an ozone injection feasibility test at ozone injection point TSP-1. The testing included continuous ozone injection into well TSP-1 for 8 hours per day at an approximate rate of 0.45 pound of ozone per day. Depth to water, dissolved oxygen, and oxidation-reduction potential were monitored before, during, and after the injection in surrounding onsite monitoring wells MW-1AR, MW-1BR, MW-7, MW-8, MW-9, MW-10, and MW-11 (Delta 2009b).

Remediation of the onsite MTBE plume was the main focus of the injection. Ozone injection reduced the MTBE concentrations from the previous sampling event in wells MW-1 (from 4,100 µg/L to 2,100 µg/L), MW-1AR (from 930 µg/L to 890 µg/L), MW-1BR (810 µg/L to 680 µg/L), MW-8 (13,000 µg/L to 5,600 µg/L), and MW-9 (13,000 µg/L to

390 µg/L). However, MTBE concentrations increased in wells MW-6, MW-10, and MW-11, and stayed consistent in well MW-7 (Delta 2009b).

Between 2009 and 2014, quarterly groundwater monitoring was conducted.

From September 22 through 25 and November 7 through 17, 2014, ARCADIS completed the offsite groundwater investigation (ARCADIS 2014a). Using a direct-push drill rig, CPT borings were advanced to collect soil lithology and depth-discrete groundwater samples using HydroPunch™ technology. All CPT locations are shown on Figure 2 and soil boring logs are provided in Appendix B.

The CPT investigation provided additional site lithology and groundwater analytical data. Site lithology data are consistent with previous observations that the site is underlain by silty sand and sand. Twenty-two water samples were collected from six locations between 25 and 44 feet bgs. Water samples were analyzed for total purgeable petroleum hydrocarbons (TPPH), BTEX, MTBE, and TBA. The maximum concentration of TPPH was 290 micrograms per liter (µg/L) in CPT-01 at 35 to 39 feet bgs. The maximum concentration of benzene was 0.62 µg/L in CPT-01 at 30 to 34 feet bgs. The maximum concentration of MTBE was 450 µg/L in CPT-01 at 25 to 29 feet bgs. Toluene, ethylbenzene, total xylenes, and TBA were not detected in any of the water samples collected. CPT analytical results are summarized in Table 4.

3.4 Offsite Sources

Based on a review of the Geotracker Environmental Information Management System (<http://geotracker.waterboards.ca.gov>), nine closed leaking underground storage tank (LUST) cleanup sites and two open LUST cleanup site are located within 1,000 feet of the site. Each site is summarized below:

- Devon Home Center, located at 1701 Webster Street, approximately 100 feet north-northeast of the site, was a LUST cleanup site with gasoline impacts. A leak was reported in May 1989 and the site was closed on March 9, 1996.
- Pacific Properties, located at 1628 Webster Street, approximately 200 feet west-southwest of the site, was a LUST cleanup site with gasoline impacts. A leak was reported in April 1989 and the site was closed on August 28, 1996.

- Ogden Service Corporation, located at 1700 Webster Street, approximately 226 feet northeast of the site, was a LUST cleanup site with waste oil impacts. A leak was reported in April 1991 and the site was closed on April 24, 1992.
- City of Alameda Fire Station #2, located at 635 Pacific Avenue, approximately 316 feet to the northwest of the site, was a LUST cleanup site with gasoline impacts. A leak was reported in November 1991 and the site was closed on February 28, 1994.
- British Petroleum Station #11104, located at 1716 Webster Street, approximately 380 feet north-northeast of the site, was a LUST cleanup site with diesel, gasoline, and waste oil impacts. The case was opened when a leak was discovered in September 1990. September 1990, soil samples were collected from beneath the pump islands and the product piping for the three USTs (12,000-gallon, 10,000-gallon, and 6,000-gallon) containing super unleaded, regular unleaded, and regular leaded gasoline during a routine dispenser modification. Analytical results indicated an unauthorized release of petroleum hydrocarbons had occurred.

Additional soil excavation of hydrocarbon impacted soil was conducted near the dispenser islands to a depth of 9 feet bgs; however, the extent of the impacted soil was not completely delineated. Soil and groundwater samples were analyzed for TPH-g, BTEX, and total lead. The maximum TPH-g concentration in soil was 7,500 mg/kg. Maximum concentrations of TPH-g and benzene in water were 38,000 and 4,900 µg/L, respectively.

The site was closed on September 30, 2014 according to the Low-Threat Closure Policy (SWRCB 2012a).

- Shell Station #13-5032, located at 1601 Webster Street, approximately 188 feet south of the site, is an open LUST cleanup site with gasoline impacts. This was a closed LUST site that was re-opened in August 2004 when a filled, 10,000-gallon UST was unknowingly punctured during installation. Approximately 2,100 gallons of gasoline were released.

During remediation activities, an estimated 196,000 gallons of groundwater were extracted with an estimated 1,980 gallons of product recovered. Groundwater monitoring has been conducted at the site since 2005 and free product has not been observed since November 2007. The site is currently undergoing verification monitoring.

- Delong Oil, located at 1716 Webster Street, approximately 454 feet to the north-northeast of the site, is an open LUST cleanup site with diesel and waste oil impacts. The case was opened in July 2011 when a leak was discovered. The site is currently undergoing a site assessment.
- Chevron Station #9-0290, located at 1802 Webster Street, approximately 550 feet north-northeast of the site, was a LUST cleanup site with diesel, gasoline, and waste oil impacts. Wells A-1 and A-2 were installed following replacement of all USTs in 1982. After 1,400 gallons of diesel were inadvertently pumped into well A-1, it was also discovered that waste oil may have inadvertently disposed of in well A-1. Between September and December 1991, approximately 1,888 gallons of product were recovered. In May 1994, two USTs and approximately 700 cubic yards of soil were removed. The case was closed on June 25, 2014.
- Bank of America, located at 1528 Webster Street, approximately 580 feet south-southeast of the site, was a LUST cleanup site with gasoline impacts. A leak was reported in August 1993 and the site was closed on December 20, 1996.
- A private residence, located at 748 Lincoln Avenue, approximately 860 feet southeast of the site, was a LUST cleanup site with heating oil/fuel oil impacts. A leak was reported in June 2005 and the site was closed on January 5, 2007.
- Taco Bell, located at 1900 Webster Avenue, approximately 875 feet north of the site, was a LUST cleanup site with benzene and other non-petroleum hydrocarbon impacts. A leak was reported in March 1996 and the site was closed on November 4, 1996.

3.5 Current and Historical Distribution of Residual Hydrocarbons and Oxygenates

Constituents of potential concern (COPCs) at the site include TPH-g, BTEX, and MTBE. The current distribution of residual petroleum hydrocarbons and fuel oxygenates in soil, groundwater, LNAPL, and soil vapor are described in the following sections.

3.5.1 Soil

Forty soil samples have been collected at the site at depths ranging from 4 to 20 feet bgs to characterize concentrations of fuel hydrocarbons and oxygenates in site soil.

Soil analytical results are summarized in Table 3. Soil sample locations are provided on Figure 2.

Detectable petroleum hydrocarbon impacts were identified between 5 and 20 feet bgs. Soil samples collected below approximately 5 feet bgs represent saturated soil conditions. Therefore, soil samples collected below 5 feet bgs do not accurately represent vadose zone soil conditions due to potential interactions with groundwater.

Petroleum hydrocarbon impacts were reported in vadose and saturated zone soil samples collected underneath the USTs, dispenser islands, and product lines. Generally, the highest concentrations of COPCs were reported at 10 feet bgs near the product dispensers and in the eastern portion of the site.

Maximum historical concentrations of fuel hydrocarbons and oxygenates in soil extending to 10 feet bgs include:

- TPH-g at 4,100 mg/kg in MW-7 at 10 feet bgs
- Toluene at 4.1 mg/kg in S-10-EX1W at 10 feet bgs
- Ethylbenzene at 38 mg/kg in MW-7 at 10 feet bgs
- Total xylenes at 770 mg/kg in MW-7 at 10 feet bgs
- MTBE at 0.36 mg/kg in S-10-EX1E at 10 feet bgs
- Benzene, TBA, ETBE, TAME, DIPE, EDB, EDC, and ethanol were not detected above MRLs in soil samples analyzed.

Maximum historical concentrations of fuel hydrocarbons and oxygenates in soil extending from 10 to 20 feet bgs are not representative of vadose zone impacts based on depth to groundwater. Data are summarized below:

- TPH-g at 0.26 mg/kg in MW-1AR at 20 feet bgs
- Benzene at 0.0295 mg/kg in S-10.5-B-2 at 10.5 feet bgs
- Toluene at 0.0658 mg/kg in S-10.5-B-2 at 10.5 feet bgs
- Ethylbenzene at 0.0359 mg/kg in S-10.5-B-2 at 10.5 feet bgs
- Total xylenes at 0.119 mg/kg in S-10.5-B-2 at 10.5 feet bgs
- MTBE at 0.561 mg/kg in S-10.5-B-2 at 10.5 feet bgs
- TBA, ETBE, TAME, DIPE, EDC, and ethanol were not detected above MRLs in soil samples analyzed.

Overall, petroleum hydrocarbon impacts appear to be limited and confined to saturated soil approximately 10 feet bgs near the dispenser islands.

Commercial/industrial and utility worker soil screening levels presented in Table 1 of the Low-Threat Closure Policy (SWRCB 2012a) were compared to available site data. Historical benzene and ethylbenzene concentrations in historical soil samples between 0 and 10 feet bgs do not exceed the commercial/industrial or utility worker direct contact and outdoor air exposure screening levels presented in Table 1 of the Low-Threat Closure Policy (SWRCB 2012a). The ethylbenzene concentration of 38 mg/kg in MW-7 at 10 feet bgs does exceed the residential exposure screening level of 32 mg/kg (SWRCB 2012a). The location of MW-7 is currently located in an asphalt parking lot and will likely be covered by a building or pavement during future construction. This location is not considered a direct contact risk to future residents.

3.5.2 Groundwater

COPCs in groundwater at the site have been monitored since March 1999 (Table 5). The current monitoring well network consists of 12 wells (MW-1, MW-1AR, MW-1BR, and MW-3 through MW-11). Well construction details are provided in Table 1. The wells are sampled semiannually (quarterly prior to 2014). The most recent sampling event occurred during third quarter 2014. Shallow zone and submerged zone groundwater elevation contour maps are shown on Figures 3 and 4, respectively.

Impacted groundwater is delineated to the northwest (crossgradient) by wells MW-10 and MW-3 and to the northeast (downgradient) by well MW-5. Groundwater is delineated to the southeast (upgradient) by well S-3 located on the Shell Service Station property at 1601 Webster Street. Well S-3 is located approximately 60 feet southeast from well MW-1. Well S-3 was last sampled August 13, 2012. Benzene was not detected in the sample and MTBE was detected at a level of 0.51 µg/L which is well below the ESL of 5 µg/L (CRA 2012). Groundwater is delineated to the east by GP1. Groundwater at GP1 was sampled May 23, 2001 at a depth of 10 feet bgs. Benzene was not detected in groundwater collected from GP1. MTBE was detected in GP1 at 3.7 µg/L, which is below the ESL of 5 µg/L (ERI 2001).

Dissolved-phase COPC concentrations in groundwater samples collected during the third quarter 2014 indicates the following:

- *TPH-g*. TPH-g concentrations at the site ranged from less than the MRL of 50 µg/L, up to 88 µg/L in well MW-11, which is located in the southeastern portion of the site. The historical maximum concentration of TPH-g was 87,500 µg/L in MW-2 on December 1, 2000.

- *Benzene*. There were no benzene detections during the third quarter sampling event at the site. The historical maximum concentration of benzene was 3,000 µg/L in MW-2 on December 14, 1999.
- *Toluene*. There were no toluene detections during the third quarter sampling event at the site. The historical maximum concentration of toluene was 22,000 µg/L in MW-2 on December 14, 1999.
- *Ethylbenzene*. There were no ethylbenzene detections during the third quarter sampling event at the site. The historical maximum concentration of ethylbenzene was 5,590 µg/L in MW-2 on December 1, 2000.
- *Total xylenes*. There were no total xylenes detections during the third quarter sampling event at the site. The historical maximum concentration of total xylenes was 19,400 µg/L in MW-2 on December 1, 2000.
- *MTBE*. MTBE concentrations ranged from less than the MRL of 0.50 µg/L, up to 2,300 µg/L in well MW-11. The historical maximum concentration of MTBE was 21,000 µg/L in MW-6 on March 14, 2000.

Third quarter 2014 isoconcentration maps for TPH-g, benzene, shallow zone MTBE, and submerged zone MTBE, are shown on Figures 5, 6, 7, and 8 respectively.

3.5.3 Light Nonaqueous Phase Liquid

Light nonaqueous phase liquid (LNAPL) has never been observed in any of the onsite or offsite monitoring wells.

3.5.4 Soil Vapor

Soil vapor samples have not been collected at the site.

3.6 Linear Regression Analysis and Plume Stability

A statistical analysis of historical groundwater monitoring data was completed to assess trends in COPC concentrations through time. Graphs of log-normalized concentration data versus time were created and a linear regression trend test was used to evaluate the statistical significance of COPC concentration trends (Appendix C).

For this analysis, data from 10 onsite monitoring wells (MW-1, MW-1AR, MW-1BR, MW-3, MW-4, and MW-7 through MW-11) and two offsite monitoring wells (MW-5 and MW-6) were considered for evaluation. Data from monitoring wells MW-2 and MW-2A were not evaluated with statistical trend analysis because they were destroyed in 2002 (ERI 2003a) and 2009 (Delta 2009b), respectively. Groundwater monitoring data are available from 1999 through the third quarter 2014 for monitoring wells MW-1 through MW-6 and from 2009 through the third quarter 2014 for monitoring wells MW-1AR, MW-1BR, and MW-7 through MW-11.

COPC concentrations were compared to the water quality objectives (WQOs), defined as the relevant San Francisco Regional Water Quality Control Board (SFRWQCB) environmental screening limits (ESLs; SFRWQCB 2013). The COPCs at the site include TPH-g, BTEX, and MTBE. The ESL for TPH-g is 100 µg/L. The ESLs for benzene, toluene, ethylbenzene, and xylenes are 1, 40, 30, and 20 µg/L, respectively. The ESLs for MTBE is 5 µg/L.

Linear regression analysis was completed for those monitoring wells and COPC pairs where:

1. Concentrations of COPCs were above their respective MRL for at least 50 percent of the data collected during the last 4 years.
2. Concentrations of COPCs were above the MRL for at least 75 percent of the data collected historically.
3. At least eight data points above the MRL were present in the dataset.

Satisfaction of these criteria assures that trend analyses are statistically robust and focused on relevant monitoring well and constituent pairs. Based on these criteria, the following monitoring well and constituent pairs were selected for analysis: MTBE: MW-1, MW-1AR, MW-1BR, MW-6 through MW-9, and MW-11

Concentrations of COPCs in groundwater for TPH-g and BTEX constituents did not meet the criteria listed above; however, concentrations of COPCs in groundwater for these constituents are currently below their respective WQOs or are below laboratory detection limits. Additionally, all analyte/well pairs for MTBE that did not meet the criteria for linear regression analysis are currently below their respective WQOs.

Based on a preliminary evaluation of COPC concentration data at these monitoring wells, the first 7 years of MTBE data for MW-1 were excluded from linear regression analyses. These data were excluded for the following reasons:

- Concentrations measured during the initial events were significantly lower than those measured during subsequent events.
- Concentrations are not representative of the overall temporal trend.
- Concentrations resulted in a poor fit of the linear model to the data.

Excluding these data allow for a more robust estimate of trend directions.

3.6.1 Linear Regression Methodology

Linear regression analyses using natural log-normalized concentration data were conducted to estimate trend direction, attenuation rates, and approximate time to achieve WQOs for the selected locations and COPCs (United States Environmental Protection Agency 2002). Results of the linear regression analyses, including coefficients of determination (R^2 values), p-values of the correlation, and trend directions, are summarized in Table 6; individual analyses are included in Appendix C. The R^2 value is a measure of how well the linear regression model fits the site data. R^2 values less than 0.1 indicate a weak model fit, while R^2 values greater than 0.5 indicate a strong model fit. For this analysis, datasets with R^2 values less than 0.1 and p-values greater than 0.05 were defined as having no apparent trend. The p-value of the correlation provides a measure of the level of significance of the slope of the trend line. Trends were accepted as significant for p-values less than or equal to 0.05 (95 percent confidence level) and were considered not significant for p-values greater than 0.05. The trend direction was defined as decreasing if the slope of the linear regression was negative, and increasing if the slope of the regression was positive.

Where concentrations were below the MRL (nondetect), the concentrations were set equal to the MRL. Use of the MRL for concentrations not detected provides a conservative estimate for evaluating the concentration trends through time.

3.6.2 Linear Regression Results

Results of the linear regression analyses are summarized in Table 6.

MTBE concentrations in monitoring wells MW-1, MW-1AR, MW-1BR, MW-6, MW-7, MW-8, and MW-11 show statistically significant decreasing trends. Linear regression analysis projected monitoring wells MW-1, MW-6, MW-7, MW-8, and MW-11 to be below the MTBE WQO of 5 µg/L between 2016 and 2021. MTBE was projected to reach the WQO in 2013 for MW-1AR and MW-1BR. MTBE was just above the WQO in August 2014 in groundwater at MW-1AR at a concentration of 5.9 µg/L. MTBE in groundwater at MW-1BR has been below the WQO since March 2013.

No trend was observed for concentrations of MTBE at onsite monitoring well MW-9. The most recent observed MTBE concentration was 600 µg/L in third quarter 2014. Concentrations at downgradient monitoring wells indicate statistically significant decreasing trends. MTBE concentrations in MW-9 are expected to remain stable in the future as the dissolved-phase plume footprint continues to decrease.

3.6.3 Summary

Trend analyses were performed for site monitoring wells and constituent pairs exceeding WQOs and that met the criteria listed above. MTBE concentrations are expected to reach their WQOs in all wells by 2021, except MTBE in MW-9. MTBE concentrations in MW-9 show no trend. The MTBE concentration is stable and expected to shift to a decreasing trend as the plume continues to shrink. The analyses provide evidence to support that natural attenuation of COPCs is occurring and has resulted in an overall stable to decreasing groundwater plume. Natural attenuation is expected to further reduce concentrations of COPCs at the site.

3.7 Assessment of Impacts of Residual Constituents on Public Health and the Environment

Based on the assessment of data presented in this request, the residual concentrations of COPCs in site environmental media are unlikely to pose adverse effects to human health and the environment. This section summarizes sensitive receptors observed near the site, including a water-supply well survey, mechanisms through which COPCs may migrate at the site, and potentially complete exposure pathways.

3.7.1 Sensitive Receptors and Water-Supply Well Survey

The site is a former gasoline station surrounded by commercial and residential properties. The closest residences are approximately 75 feet offsite to the west (crossgradient). Potential receptors were identified based on current and expected

future land use(s) at the site. Proposed future redevelopment of the property consists of a two or three-story mixed-use building including ground floor retail, two residential units, and a storage/office space on the upper floors. If the site is redeveloped in the future, future onsite receptors may also include construction/utility workers. Current and future receptors on adjacent properties downgradient of the site may include offsite commercial workers.

Sensitive populations include people with an increased susceptibility to risks resulting from exposure to site-related petroleum hydrocarbons, such as school-age children, medically compromised people, and the elderly. The nearest sensitive receptor (an elementary school) is located approximately 0.3 mile west (crossgradient) of the site.

Shallow groundwater beneath the site is not currently used as a potable source and is not expected to be used as a drinking water source in the future. The City of Alameda gets its water from the East Bay Municipalities Utilities District (EBMUD). EBMUD currently supplies water to the site and surrounding properties and is expected to provide water to these areas in the future (EBMUD 2013).

A groundwater receptor survey was completed in 2002. Two irrigation wells were identified approximately 0.4 mile west and one irrigation well was identified 0.4 mile southwest of the site (ERI 2003b). A table and map detailing these well locations are provided in Appendix D.

In November 2006, Delta reviewed well log records from the California Department of Water Resources to identify domestic wells within 1 mile of the site. Nineteen potential receptors were identified within 1 mile of the site including one domestic well, one domestic/irrigation well, 11 irrigation wells, two industrial wells, three cathodic protection wells, and one dewatering well. The nearest receptors are two irrigation wells located 0.1 mile northwest and west of the site (Delta 2010). A table and map detailing these well locations are provided in Appendix D.

The Oakland Inner Harbor is located approximately 1 mile north-northeast (downgradient) from the site and San Francisco Bay is located approximately 0.5 mile southwest (upgradient) from the site. The site is devoid of ecological habitat and surface water. Therefore, ecological receptors are assumed to be generally absent from the site. Given these features at the site, potential exposure pathways for ecological receptors are incomplete.

3.7.2 Potential Transport and Release Mechanisms and Receptors

The site is currently divided into two lots: a paved vacant lot and a lot for SK Auto with a paved parking area. Proposed future development of the site consists of a two or three-story mixed-use building including ground floor retail, two residential units, and a storage/office space on the upper floors. The building does not have plans for sub-terrain parking or basements. The remainder of the site is planned to be paved with asphalt for parking/walkways.

3.7.2.1 Volatilization

A potential release mechanism at the site may include the volatilization of COPCs in subsurface soil or groundwater to indoor air, outdoor air, or air within a trench used by a future onsite utility worker.

In general, exposure to petroleum vapors migrating from soil or groundwater to indoor air may pose unacceptable human health risks. However, in many petroleum release cases, potential human exposure to vapors are mitigated by bioattenuation processes as vapors migrate toward the ground surface. COPCs in groundwater, not including MTBE, have been below ESLs (SFRWQCB 2013) since the February 2012 sampling events. Soil samples collected at the site were below the volatilization to outdoor air levels specified in Table 1 of the Low-Threat Closure Policy (SWRCB 2012a) for commercial/industrial workers, utility workers, or residential occupants, except ethylbenzene in MW-7 at 10 feet bgs. The soil sample at MW-7 is located below the water table and is not representative of vadose zone conditions. Therefore, inhalation of indoor and outdoor air from volatilization of groundwater and soil constituents is considered incomplete for potential future onsite and offsite commercial workers, future onsite utility workers, and future onsite residents.

The closest existing residence to the site lies approximately 75 feet to the west of the site boundary. Based on the groundwater flow direction at the site (northeast), the residence is crossgradient from the petroleum hydrocarbon impacted area. Therefore, the pathway for inhalation of indoor air from volatilization of groundwater and soil constituents is incomplete for current and future offsite residents.

Typically, utility trenches are located at a depth of no greater than 8 feet bgs. Historically, the depth to groundwater ranged from approximately 4.46 to 9.65 feet below top of casing. Concentrations of COPCs in groundwater have significantly decreased since initial groundwater monitoring and are near their MRLs. Soil

detections exceeding standards are all greater than 8 feet bgs. Therefore, inhalation of air from volatilization of groundwater and soil constituents within a trench is considered incomplete for potential future onsite utility worker.

3.7.2.2 Leaching to Groundwater

Petroleum hydrocarbons released from former USTs and associated piping may leach from soil to groundwater. Distributions of residual petroleum hydrocarbons and fuel oxygenates in groundwater (Sections 3.5.2 and 3.5.3) indicate that this is not a significant release mechanism and has likely been mitigated through excavation of petroleum hydrocarbon impacted soil, weathering, and natural attenuation.

3.7.2.3 Direct Contact with Groundwater

As described in Section 3.7.1, groundwater at the site is currently not used as a potable source and is not expected to be used as a drinking water source in the future. Upon review of well survey information, the nearest wells are two irrigation wells located 0.1 mile northwest and west of the site (Delta 2010). It is unlikely that the groundwater plume will reach the nearest receptor given the sizable distance and directionality from the site. Figures 9 through 12 show the two irrigation wells, as well as research-based plume migration analysis for TPH-g, shallow zone MTBE, submerged zone MTBE, and benzene, respectively. Potential direct contact exposures to COPCs in groundwater, such as tap/drinking water ingestion, dermal contact with tap water, and inhalation of volatile organic compounds released from tap water, are incomplete for potential future onsite commercial workers, current and future offsite commercial workers, and offsite and onsite residents.

Typically, utility trenches are located at a depth of no greater than 8 feet bgs. Historically, the depth to groundwater ranged from approximately 4.46 to 9.65 feet below top of casing, resulting in the depth to groundwater at the site is relatively shallow. Concentrations of COPCs (except MTBE) have significantly decreased since initial groundwater monitoring and are near their MRLs (Table 5). Any potential groundwater that might infiltrate the bottom of a utility trench will likely be dewatered before a construction worker would have a direct contact exposure.

The groundwater plume is concentrated in a limited area, primarily centralized onsite (except MTBE). MTBE was detected offsite in MW-6 at a concentration of 93 µg/L. MTBE concentrations in MW-6 indicate a decreasing trend since March 2000 and are

expected to reach the WQO of 13 µg/L by 2021. Thus, the direct contact with groundwater pathway is complete but insignificant for future onsite utility workers.

3.7.2.4 Direct Contact with Soil

During development of the site, future onsite utility workers may be directly exposed to petroleum hydrocarbon constituents in subsurface soil during intrusive soil activities. Impacted soil is encountered at a depth of approximately 10 feet bgs. It is unlikely that construction, excavation, and utility workers will work at depths below 8 feet bgs. Therefore, future onsite utility workers' potential direct contact exposure to constituents in surface and subsurface soil is considered to be complete but insignificant.

3.7.2.5 Wind Erosion/Suppression

Constituents adhered to dust particles may migrate from exposed subsurface soil by wind erosion to outdoor air and be inhaled by potential onsite and offsite receptors. The site is expected to be redeveloped into mixed commercial/residential units with the remainder of the site paved with asphalt or concrete. In addition, depth to groundwater ranges from 4.5 to 9.5 feet bgs and petroleum hydrocarbon impacted soil concentrations start at approximately 10 feet bgs. Thus, exposure from wind erosion/suspension is unlikely because the impacted media is located at or below the water table.

3.7.2.6 Potential Ecological Receptors

The site is devoid of ecological habitat and surface water. The site is expected to remain used for commercial purposes, with little to no vegetation or surface water. The nearest surface-water body (San Francisco Bay) is located 0.5 mile southwest (upgradient) of the site. Possible impacts to the nearest surface-water body are unlikely because the impacted groundwater is present downgradient of the bay. Based on this information, potential exposure pathways for ecological receptors are incomplete.

3.7.3 Summary of Potential Exposure Pathways

Potential human receptors at the site were identified based on current and future land use(s) at and near the site. As discussed previously, current and reasonably anticipated future land use is mixed use, commercial and residential (i.e., retail store and homes). Potential receptors include current onsite commercial workers, current and future offsite commercial workers, future onsite and offsite residents, and future

onsite utility/construction workers. As described above, no complete and potentially significant exposure pathways were identified. Potentially complete but insignificant exposure pathways include:

- Potential future onsite commercial workers and current and future offsite commercial workers: inhalation of COPCs migrating to indoor air.
- Potential future onsite and offsite residents: inhalation of COPCs migrating to indoor air.
- Future onsite utility workers:
 - Ingestion of surface and subsurface soil/groundwater
 - Dermal contact with surface and subsurface soil/groundwater.

4. Assessment of Site Conditions Relative to Low-Threat Closure Policy

The Low-Threat Closure Policy (SWRCB 2012a) outlines eight General Criteria to assess whether sites are candidates for low-threat case closure and three categories of Media-Specific Criteria (groundwater, petroleum vapor intrusion to indoor air, and direct contact and outdoor air exposure). This section evaluates current site conditions against the General and Media-Specific Criteria. Based on this evaluation, ARCADIS concludes that the site meets the General and Media-Specific Criteria requirements for low-threat case closure.

4.1 Evaluation of Low-Threat Closure General Criteria

This section evaluates the site conditions related to each of the eight General Criteria.

4.1.1 Criteria A – The unauthorized release is located within the service area of a public water system

As discussed in Section 3.7.1, the nearest receptors are two irrigation wells located 0.1 mile northwest and 0.1 mile west of the site (Delta 2010). Shallow groundwater beneath the site is not currently used as a potable source and is not expected to be used as a drinking water source in the future. As detailed in Section 3.7.1, the City of Alameda gets its water from EBMUD. Approximately 90 percent of the EBMUD's water supply comes from the Mokelumne River watershed in the Sierra Nevada Mountains (EBMUD 2013).

4.1.2 Criteria B – The unauthorized release consists only of petroleum

Soil and groundwater impacts occurred as a result of past releases from USTs, dispenser islands, and/or product piping. COPCs at the site include TPH-g, BTEX, and MTBE. There have been no non-petroleum impacts or releases documented at the site.

4.1.3 Criteria C – The unauthorized (“primary”) release from the UST system has been stopped

In June 1998, two 10,000-gallon gasoline USTs, one 550-gallon waste oil UST, associated product lines, and fuel dispensers were removed from the site. Approximately 338 tons of hydrocarbon impacted soil and backfill were removed during the UST removal activities (Delta 2010). An additional 292 tons of hydrocarbon impacted soil were removed during remedial excavation activities in November and

December 2002 (ERI 2003a). The equipment removal and excavations suggest that the release has been stopped.

4.1.4 Criteria D – Free product has been removed to the maximum extent practicable

Site monitoring wells have been screened for free-product accumulation during groundwater monitoring events from 1999 to the present. LNAPL has never been observed at the site.

4.1.5 Criteria E – A conceptual site model assessing the nature, extent, and mobility of the release has been developed

A CSM that includes a comprehensive site assessment, remediation history, regional and site-specific geology and hydrogeology, review of the soil and groundwater conditions at the site, and evaluation of potential human health exposure from site-related COPCs is presented in Section 3 of this request.

4.1.6 Criteria F – Secondary source has been removed to the extent practicable

In June 1998, approximately 338 tons of hydrocarbon impacted soil and backfill were removed during UST removal activities (Delta 2010). An additional 292 tons of hydrocarbon impacted soil were removed during remedial excavation activities in November and December 2002 (ERI 2003a). Confirmation soil samples were collected at 10 feet bgs at the edges of the excavation and analyzed for TPH-g, BTEX, and MTBE. Detected COPCs were below their ESLs (Table 3), except one outlier soil sample from MW-7 at a depth of 10 feet bgs in 2009. All wells surrounding MW-7 have either no detection of TPH-g or detections significantly lower than the ESL in soil (SWRCB 2012a). The proposed future construction will be slab on grade, eliminating the need to excavate to 10 feet bgs, where this sample was collected. The outlier soil sample from MW-7 was collected below the groundwater elevation and is not representative of vadose zone soil conditions. Secondary sources of impacted soil and groundwater have been removed to the extent practicable.

4.1.7 Criteria G – Soil and groundwater have been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15

MTBE was analyzed in soil samples collected from 1999 to 2009 (Table 3) and in groundwater samples collected during monitoring events from 1999 to the present (Table 5). MTBE was detected at a maximum concentration of 0.561 mg/kg in the soil

sample collected at 10.5 feet bgs from boring B-2. During the most recent groundwater monitoring event, MTBE detections ranged from 2.3 µg/L (MW-1BR) to 2,300 µg/L (MW-11).

4.1.8 Criteria H – Nuisance as defined by Water Code Section 13050 does not exist at the site

No nuisance exists at the site, as defined by Water Code Section 13050. Site conditions and the treatment and disposal of site wastes are not injurious to health, are not indecent or offensive to the senses, and do not obstruct free use of property or interfere with the comfortable enjoyment of life or property. Site conditions and the treatment and disposal of site wastes do not affect an entire community or neighborhood or any considerable number of persons. Site impacts are restricted to the subsurface and are present in a limited area that does not adversely affect the community at large.

4.2 Evaluation of Low-Threat Closure: Media-Specific Criteria

This section evaluates the site conditions related to each of the three categories of Media-Specific Criteria.

4.2.1 Groundwater

Groundwater at the site does not currently pose a risk to existing or anticipated future beneficial uses of groundwater and meets the Groundwater-Specific Criteria outlined in the Low-Threat Closure Policy (SWRCB 2012a). The Low-Threat Closure Policy (SWRCB 2012a) states “the contaminant plume that exceeds water quality objectives (WOQs) must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites.”

4.2.1.1 Plume Stability

According to the Technical Justification for Groundwater Media Specific Criteria (SWRCB 2012b), plume stability can be demonstrated in two ways:

1. “[R]outinely observed non-detect values for groundwater parameters in down-gradient wells”
2. “[S]table or decreasing concentration levels in down-gradient wells.”

Plume stability is discussed in Section 3.6 of this request. The results of the linear regression analyses are summarized in Table 6 and individual analyses are included in Appendix C. MTBE concentrations are expected to reach WQOs in all wells by 2021, except MTBE in MW-9. MTBE concentrations in MW-9 show no trend (stable) and are expected to shift to a decreasing trend as the plume continues to shrink. The analyses provide evidence to support that natural attenuation of COPCs is occurring and has resulted in an overall stable to decreasing groundwater plume. Natural attenuation is expected to further reduce concentrations of COPCs at the site. Evaluation of groundwater monitoring data indicates plume stability at the site as defined by the Technical Justification for Groundwater Media-Specific Criteria (SWRCB 2012b).

4.2.1.2 Additional Groundwater-Specific Criteria

As described in the Low-Threat Closure Policy (SWRCB 2012a), a site can meet the Groundwater -Specific Criteria through one of five main classes. This site falls into **Class 3**, as described below.

3a. The contaminant plume that exceeds water quality objectives is less than 250 feet in length.

To classify groundwater impacts for the site, the length of the plume exceeding WQOs for each of the current site COPCs was measured using the most recent isoconcentration maps included on Figures 5, 6, 7, and 8. Plume lengths were conservatively measured from between the dispenser islands (i.e., source area) to the furthest downgradient isoconcentration contour and are summarized below:

- TPH-g does not exceed the ESL.
- Benzene does not exceed the ESL.
- The shallow MTBE plume exceeding 5 µg/L is approximately 140 feet long.
- The submerged MTBE plume exceeding 5 µg/L is approximately 40 feet long. CPT-1 was not considered in the plume length because it is a detached plume.

3b. Free product has been removed to the maximum extent practicable, may still be present below the site where the release originated, but does not extend offsite.

No free product (LNAPL) has been observed in site monitoring wells since monitoring started in 1999, as detailed in General Criteria (d).

3c. The plume has been stable or decreasing for a minimum of five years.

As described in Sections 3.5.3 and 3.6, the plume continues to decrease in size. According to the linear regression, the COPCs have decreasing or stable trends, indicating a stable plume.

3d. The nearest existing water supply well or surface water body is greater than 1,000 feet from the defined plume boundary.

As described in General Criteria (a) and Section 3.7.1, the 2006 sensitive receptor survey identified water-supply wells within a 1-mile radius from the site. The nearest water-supply wells were two irrigation wells located approximately 575 feet northwest and 550 feet west of the site. The closest surface-water body (San Francisco Bay) is located approximately 0.5 mile southwest (upgradient) of the site (Section 3.1.3).

3e. The property owner is willing to accept a land use restriction if the regulatory agency requires a land use restriction as a condition of use.

The land owner understands that there may be land use restrictions as a condition of use and is willing to accept these terms.

4.2.2 Petroleum Vapor Intrusion to Indoor Air

As described in the Low-Threat Closure Policy (SWRCB 2012a), sites will meet the Media-Specific Criteria for vapor intrusion into indoor air if the criteria of Scenarios 1, 2, or 3 (a, b or c) as applicable or all of the characteristics and criteria of Scenario 4 (a or b) applies. The scenarios are described as follows

- *Scenario 1.* The bioattenuation zone shall be a continuous zone that provides a separation of at least 30 feet vertically between the LNAPL in groundwater and the foundation of existing or potential buildings; total TPH are less than 100 mg/kg throughout the entire depth of the bioattenuation zone.
- *Scenario 2.* The bioattenuation zone shall be a continuous zone that provides a separation of at least 30 feet both laterally and vertically between the LNAPL in soil and the foundation of existing or potential buildings; total TPH are less than 100 mg/kg throughout the entire lateral and vertical extents of the bioattenuation zone.
- *Scenario 3a.* Where benzene concentrations are less than 100 µg/L without oxygen data or oxygen is less than 4 percent, the bioattenuation zone shall be a continuous zone that provides a separation of at least 5 feet vertically between the

dissolved-phase benzene and the foundation of existing or potential buildings; total TPH are less than 100 mg/kg throughout the entire depth of the bioattenuation zone.

- *Scenario 3b.* Where benzene concentrations are greater than 100 µg/L but less than 1,000 µg/L and there are no oxygen data or oxygen is less than 4 percent, the bioattenuation zone shall be a continuous zone that provides a separation of at least 10 feet vertically between the dissolved-phase benzene and the foundation of existing or potential buildings; total TPH are less than 100 mg/kg throughout the entire depth of the bioattenuation zone.
- *Scenario 3c.* Where benzene concentrations are less than 1000 µg/L and oxygen is greater than or equal to 4 percent, the bioattenuation zone shall be a continuous zone that provides a separation of at least 5 feet vertically between the dissolved-phase benzene and the foundation of existing or potential buildings; total TPH are less than 100 mg/kg throughout the entire lateral and vertical extents of the bioattenuation zone.
- *Scenario 4a:* Where there is no bioattenuation zone and soil gas sampling is used, the soil gas sample must be collected from at least 5 feet below the bottom of the building location. Where there are no existing buildings, the soil gas sample must be collected from at least 5 feet bgs. The soil gas samples must meet the requirements presented in the table below.

Constituent	Residential	Commercial
	Soil Gas Concentration (µg/m ³)	
Benzene	<85	<280
Ethylbenzene	<1,100	<3,600
Naphthalene	<93	<310

Note:

µg/m³ = micrograms per cubic meter

< = less than

- *Scenario 4b.* Where there is a bioattenuation zone and soil gas sampling is used, the soil gas sample must be collected from at least 5 feet below the bottom of the building location. Where there are no existing buildings, the soil gas sample must

be collected from at least 5 feet bgs. Total TPH must be less than 100 mg/kg and oxygen must be greater than or equal to 4 percent at the bottom of the 5-foot zone. The soil gas samples must meet the requirements presented in the table below.

Constituent	Residential	Commercial
	Soil Gas Concentration ($\mu\text{g}/\text{m}^3$)	
Benzene	<85,000	<280,000
Ethylbenzene	<1,100,000	<3,600,000
Naphthalene	<93,000	<310,000

This site meets Scenario 1 and 2 by virtue of the lack of NAPL in soil and/or groundwater. The site meets Scenario 3a based on depth to groundwater, benzene concentrations in groundwater, and TPH in soil above the water table. All groundwater samples collected and analyzed for benzene during the most recent sampling in August, 2014 had benzene concentrations below the MRL of 0.05 $\mu\text{g}/\text{L}$. All soil samples collected and analyzed for TPH-g within the bioattenuation zone have had concentrations below the MRL. Therefore, the site meets the requirements for petroleum vapor intrusion to indoor air.

4.2.3 Direct Contact and Outdoor Air Exposure

As described in the Low-Threat Closure Policy (SWRCB 2012a), sites will meet the Media-Specific Criteria for direct contact with contaminated soil or inhalation of contaminants volatilized to outdoor air if any of the following apply:

- Maximum concentrations of COPCs in soil are less than or equal to those listed in Table 1 of the Low-Threat Closure Policy (SWRCB 2012a).
- A site-specific risk assessment shows that COPCs present in soil will not adversely affect human health.
- Exposure to COPCs is mitigated through engineering controls.

This site meets the first criteria. Historical soil data are included in Table 3; site maximum concentrations are shown in the table below. Benzene and ethylbenzene concentrations were evaluated using the residential and commercial/industrial

standards for exposure because a mixed-use building is anticipated to be developed onsite (SWRCB 2012a). Polycyclic aromatic hydrocarbons, including naphthalene, are not considered COPCs at the site.

Chemical	Residential				Commercial/Industrial				Utility Worker	
	Direct Contact 0 to 5 feet bgs (mg/kg)		Volatilization to Outdoor Air 5 to 10 feet bgs (mg/kg)		Direct Contact 0 to 5 feet bgs (mg/kg)		Volatilization to Outdoor Air 5 to 10 feet bgs (mg/kg)		Direct Contact 0 to 10 feet bgs (mg/kg)	
	Low-Threat Closure Policy Table 1	Site Maximum	Low-Threat Closure Policy Table 1	Site Maximum	Low-Threat Closure Policy Table 1	Site Maximum	Low-Threat Closure Policy Table 1	Site Maximum	Low-Threat Closure Policy Table 1	Site Maximum
Benzene	1.9	ND	2.8	ND	8.2	ND	12	ND	14	ND
Ethylbenzene	21	ND	32	38 (MW-7)	89	ND	134	38 (MW-7)	314	38 (MW-7)

Note:

ND = nondetect

As shown in the table above, the maximum concentrations of benzene and ethylbenzene are below the Low-Threat Closure Policy standards (SWRCB 2012a), except for ethylbenzene, compared to residential standards. The ethylbenzene concentration (38 mg/kg) in MW-7 at 10 feet bgs is above the standard of 32 mg/kg. Nearby soil samples from upgradient location GP13 (12 feet bgs), crossgradient location GP2 (10 feet bgs), crossgradient location MW-8 (15 feet bgs), and downgradient location GP3 (5 feet bgs) were all nondetect. In addition, the sample from MW-7 was collected below the water table and is not representative of vadose zone soil conditions. Based on delineation of the soil contamination, the occurrence of natural attenuation for more than 5 years, and the detection slightly more than the standard, this detection can be considered insignificant. Therefore, the site meets requirements for low-threat closure (SWRCB 2012a).

5. Recommendations

ARCADIS respectfully requests the Alameda County Environmental Health (ACEH) department to grant low-threat site closure for this site. All General and Media-Specific Criteria established in the Low-Threat Closure Policy (SWRCB 2012a) are met. The site poses a low threat to human health, safety, and the environment, and satisfies the case closure requirements of Health and Safety Code Section 25296.10. In addition, case closure is consistent with Resolution 92-49, requiring WQOs be met within a reasonable timeframe.

Impacted groundwater is not expected to pose a significant threat to human health or the environment. Groundwater data presented in this request support this conclusion.

ARCADIS recommends no further action and the site be granted regulatory closure. Suspension of groundwater monitoring and reporting is also recommended during the low-threat case closure evaluation process.

6. References

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Tables

Table 1
Well Construction Details
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Well ID	Installation Date	TOC Elevation (feet MSL)	Boring Depth (feet bgs)	Well Depth (feet bgs)	Boring Diameter (inches)	Well Diameter (inches)	Screen Interval (feet bgs)	Screen Size (inches)	Sand Filter Pack	Screen Zone Within Soil Type	Filter Pack Interval (feet bgs)	Seal Interval (feet bgs)	Location	Historical High GWE (feet MSL)	Historical Low GWE (feet MSL)	Status
MW-1	3/2/1999	19.13	20.5	20.5	8	2	4.5-20.5	0.020	#3	SP/SC	5-20.5	4-5	Onsite	12.68	6.67	Active
MW-1AR	5/13/2009	19.29	30.5	30.5	8	2	25-30	0.020	#3	SM	23-30.5	21-23	Onsite	12.57	9.64	Active
MW-1BR	5/15/2009	19.13	35	35	8	2	30-35	0.020	#3	SM	28-35	26-28	Onsite	12.46	9.58	Active
MW-2	3/2/1999	15.57	20.5	20.5	8	2	4.5-20.5	0.020	#3	SP	5-20.5	4-5	Onsite	10.31	7.92	Destroyed
MW-2A	12/5/2002	15.56	NA	11.5	NA	2	NA	NA	NA	NA	NA	NA	Onsite	12.32	7.44	Destroyed
MW-3	3/2/1999	18.05	20.5	20.5	8	2	5-20	0.020	#3	ML	5-20.5	4-5	Onsite	12.41	7.38	Active
MW-4	3/2/1999	18.14	20.5	20.5	8	2	4.5-20.5	0.020	#3	ML	5-20.5	4-5	Onsite	12.59	7.46	Active
MW-5	12/8/1999	16.45	21.5	20	8	2	5-20	0.010	#2/12	CL/SM	4.5-21.5	3.5-4.5	Offsite	11.35	6.52	Active
MW-6	12/8/1999	16.97	21.5	20	8	2	5-20	0.010	#2/12	SM	4.5-21.5	3.5-4.5	Offsite	11.77	7.07	Active
MW-7	5/14/2009	17.81	30	30	8	2	25-30	0.020	#3	SC	23-30	21-23	Onsite	12.24	9.31	Active
MW-8	5/14/2009	18.13	30	30	8	2	25-30	0.020	#3	SW-SM	23-30	21-23	Onsite	12.22	9.50	Active
MW-9	5/13/2009	18.75	25	25	8	2	20-25	0.020	#3	SW-SM	18-25	16-18	Onsite	12.51	9.60	Active
MW-10	5/20/2009	18.84	30	30	8	2	25-30	0.020	#3	SM	23-30	21-23	Onsite	12.42	9.57	Active
MW-11	5/15/2009	18.72	28	28	8	2	23-28	0.020	#3	SC	21-28	19-21	Onsite	12.54	9.29	Active
TSP-1	5/14/2009	N/A	30.5	30	8	0.75	NA	0.020	#3	SM	25-30.5	20-25	Onsite	NA	NA	Active

Standard Abbreviations

bgs below ground surface
 CL clay
 GWE groundwater elevation
 ML silty gravel
 MSL relative to mean sea level
 NA not applicable
 SC clayey sand
 SM silty sand
 SP poorly graded sand
 SW well-graded sand
 TOC top of casing

Table 2
Soil Boring Details
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Boring ID	Installation Date	Boring Depth (feet bgs)	First Water (feet bgs)	Location
GP-1	5/23/2001	12	4	Offsite
GP-2	5/23/2001	12	5	Offsite
GP-3	5/23/2001	12	5	Offsite
GP-4	5/23/2001	12	5	Offsite
GP-5	5/23/2001	12	5	Offsite
GP-6	12/4/2001	8	7	Onsite
GP-7	12/4/2001	8	7	Onsite
GP-8	12/4/2001	8	6.5	Onsite
GP-9	12/4/2001	8	6.5	Onsite
GP-10	12/4/2001	8	7	Onsite
GP-11	12/4/2001	8	7	Onsite
GP-12	12/4/2001	16	6.5	Onsite
GP-13	12/4/2001	8	7	Onsite
GP-14	12/4/2001	8	7.5	Onsite
GP-15	12/4/2001	16	7	Onsite
GP-16	12/4/2001	16	7	Onsite
GP-17	12/4/2001	8	7	Onsite

Standard Abbreviations

bgs below ground surface

Table 3
Historical Soil Analytical Data
Unocal Service Station No. 0843
1629 Webster Street
Alameda, California

Sample Location	Date	Sample Depth (feet bgs)	TPH-G /TPPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	DIPE (mg/kg)	EDB (mg/kg)	EDC (mg/kg)	Ethanol (mg/kg)	Sulfate (mg/kg)	Manganese (mg/kg)
ESL			2,700	71	4,300	490	2,500	3,800	--	--	--	--	--	--	--	--	--
S-10.5-B-1	3/2/1999	10.5	<0.40	<0.010	<0.0020	<0.0020	<0.0020	<0.010	--	--	--	--	--	--	--	--	--
S-10.5-B-2	3/2/1999	10.5	<2.0	0.0295	0.0658	0.0359	0.119	0.561	--	--	--	--	--	--	--	--	--
S-10.5-B-3	3/2/1999	10.5	<0.40	<0.010	<0.0020	<0.0020	<0.0020	<0.010	--	--	--	--	--	--	--	--	--
S-10.5-B-4	3/2/1999	10.5	<0.40	<0.010	<0.0020	<0.0020	<0.0020	0.109	--	--	--	--	--	--	--	--	--
S-4-GP1	5/23/2001	4	<0.20	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-5-GP-2	5/23/2001	5	<0.20	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-10-GP2	5/23/2001	10	<0.20	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-5-GP3	5/23/2001	5	<0.20	<0.0050	<0.0050	<0.0050	0.011	<0.050	--	--	--	--	--	--	--	--	--
S-5-GP4	5/23/2001	5	<0.20	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-4-GP5	5/23/2001	4	<0.20	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-10-GP5	5/23/2001	10	<0.20	<0.0050	<0.0050	<0.0050	<0.0050	0.18	--	--	--	--	--	--	--	--	--
S-6.5-GP6	12/4/2001	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6.5-GP7	12/4/2001	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6-GP8	12/4/2001	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6-GP9	12/4/2001	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6.5-GP10	12/4/2001	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6.5-GP11	12/4/2001	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6-GP12	12/4/2001	6	<1.0	<0.0050	<0.0050	0.010	0.015	<0.050	--	--	--	--	--	--	--	--	--
S-12-GP12	12/4/2001	12	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6.5-GP13	12/4/2001	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-12-GP13	12/4/2001	12	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-7-GP14	12/4/2001	7	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6-GP15	12/4/2001	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-16-GP-15	12/4/2001	16	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6.5-GP-16	12/4/2001	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-12-GP16	12/4/2001	12	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-6.5-GP17	12/4/2001	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	--	--	--	--	--	--	--	--	--
S-10-EX1N	12/4/2002	10	<50	<0.25	<0.25	0.73	4.9	<0.25	--	--	--	--	--	--	--	--	--
S-10-EX1S	12/4/2002	10	<1.0	<0.0050	<0.0050	<0.0053	<0.10	<0.0050	--	--	--	--	--	--	--	--	--
S-10-EX1W	12/4/2002	10	<1,000	<0.25	4.1	20	120	<0.25	--	--	--	--	--	--	--	--	--
S-10-EX1E	12/4/2002	10	<50	<0.25	1.2	0.34	0.82	0.36	--	--	--	--	--	--	--	--	--
CPT-1	8/14/2008	7	<0.20	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	--	--
MW-1AR	5/14/2009	20	0.26	<0.0050	<0.0050	<0.0050	<0.010	0.25	<0.050	<0.0050	<0.0050	<0.0050	--	<0.0050	<1.0	15	160
MW-1BR	5/14/2009	20	<0.20	<0.0050	<0.0050	<0.0050	<0.0050	0.15	<0.050	<0.0050	<0.0050	<0.0050	--	<0.0050	<1.0	15	150
MW-7	5/14/2009	10	4,100	<0.50	<0.50	38	770	<0.50	<5.0	<0.50	<0.50	<0.50	--	<0.50	<100	16	110
MW-8	5/14/2009	15	<0.20	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.050	<0.0050	<0.0050	<0.0050	--	<0.0050	<1.0	10	120
MW-9	5/14/2009	10	46	<0.12	<0.12	2	9.5	<1.2	<1.2	<0.12	<0.12	<0.12	--	<0.12	<25	<10	190
MW-10	5/14/2009	10	0.4	<0.0050	<0.0050	<0.0050	<0.010	<0.0081	<0.050	<0.0050	<0.0050	<0.0050	--	<0.0050	<1.0	<10	180
MW-11	5/14/2009	10	0.4	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.050	<0.0050	<0.0050	<0.0050	--	<0.0050	<1.0	51	190
TSP-1	5/14/2009	20	0.24	<0.0050	<0.0050	<0.0050	<0.010	0.23	<0.050	<0.0050	<0.0050	<0.0050	--	<0.0050	<1.0	18	140

Table 3
Historical Soil Analytical Data
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Sample Location	Date	Sample Depth (feet bgs)	TPH-G /TPPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	DIPE (mg/kg)	EDB (mg/kg)	EDC (mg/kg)	Ethanol (mg/kg)	Sulfate (mg/kg)	Manganese (mg/kg)
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Note

Soil samples S-10.5-B-1 through S-10.5-B-4 were later converted into monitoring wells MW-1 through MW-4.

Standard Abbreviations



BOLD	analyte detected above its laboratory reporting limit	ETBE	ethyl tertiary butyl ether		detection above ESL
bgs	below ground surface	MTBE	methyl tertiary butyl ether		
mg/kg	milligrams per kilogram	TAME	tertiary amyl methyl ether		
<	not detected at or above method reporting limit	TBA	tertiary butyl alcohol		
--	not analyzed	TPH-G	total petroleum hydrocarbons as gasoline		
DIPE	di-isopropyl ether	TPPH	total purgeable petroleum hydrocarbons		
EDB	1,2-dibromoethane	ESL	San Francisco Regional Water Quality Control Board Environmental Screening Level (December 2013)		
EDC	1,2-dichloroethane (same as ethylene dichloride)		soil removed during excavation		

Table 4
CPT Grab Groundwater Analytical Data
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Well ID	Date Sampled	Screen Interval (feet bgs)	TPPH 8260B (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TBA (ug/L)	Comments
ESL			100	1	40	30	20	5	12	
CPT-01	9/24/2014	25-29	54	<0.50	<0.50	<0.50	<1.0	450	<10	
CPT-01	9/24/2014	30-34	76	0.62	<0.50	<0.50	<1.0	6.4	<10	
CPT-01	9/24/2014	35-39	290	<0.50	<0.50	<0.50	<1.0	9.7	<10	
CPT-01	9/24/2014	40-44	<50	<0.50	<0.50	<0.50	<1.0	0.56	<10	
CPT-02	9/25/2014	25-29	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-02	9/25/2014	30-34	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-02	9/25/2014	35-39	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-02	9/25/2014	40-44	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-03	9/25/2014	25-29	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-03	9/25/2014	40-44	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-04	9/22/2014	25-29	<50	<0.50	<0.50	<0.50	<1.0	0.69	<10	
CPT-04	9/22/2014	30-34	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-04	9/22/2014	35-39	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-04	9/22/2014	40-44	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-05	Not installed. Not needed based on Phase 1 data									
CPT-06	11/7/2014	25-28	<50	<0.50	<0.50	<0.50	<1.0	0.82	<10	
CPT-06-D	11/7/2014	25-28	<50	<0.50	<0.50	<0.50	<1.0	0.88	<10	Blind Duplicate
CPT-06	11/7/2014	30-33	0.6	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.050	Ran as soil due to the presence of silt in the VOAs. Data in mg/kg
CPT-06	11/7/2014	35-39	140	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-07	11/17/2014	25-29	<50	<0.50	<0.50	<0.50	<1.0	0.69	<10	
CPT-07	11/17/2014	30-34	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-07	11/17/2014	35-39	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	
CPT-07	11/17/2014	40-44	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	

Note

EPA Method 8260B used for BTEX/MTBE/Oxygenates

Standard Abbreviations

- < not detected at or above method reporting limit
- µg/L micrograms per liter (approx. equivalent to parts per billion, ppb)
- BOLD** detection above reporting limit
- bgs feet below ground surface
- ESL San Francisco Regional Water Quality Control Board's Environmental Screening Level (December 2013)
- MTBE methyl tertiary butyl ether
- TBA tertiary butyl alcohol
- TPPH total purgeable petroleum hydrocarbons
- detection above ESL

Table 5
Historical Groundwater Gauging and Analytical Data
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Well ID	Date Sampled	TOC Elevation (feet MSL)	DTW (feet bTOC)	LPH Thickness (feet)	GW Elevation (feet MSL)	TPH-G (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl- benzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TBA (ug/L)	TAME (ug/L)	ETBE (ug/L)	DIPE (ug/L)	EDB (ug/L)	EDC (ug/L)	Ethanol (ug/L)	Comments
MW-2	5/23/2001	15.57	6.97	0.00	8.60	45,400	374	4,490	2,790	10,900	406	--	--	--	--	--	--	--	
MW-2	9/24/2001	15.57	7.56	0.00	8.01	76,000	430	13,000	4,700	18,000	480	--	--	--	--	--	--	--	
MW-2	12/10/2001	15.57	6.52	0.00	9.05	82,000	320	9,100	4,400	16,000	270	--	--	--	--	--	--	--	
MW-2	3/11/2002	15.57	5.51	0.00	10.06	14,000	75	1,400	1,100	3,600	150	--	--	--	--	--	--	--	
MW-2	6/7/2002	15.57	5.73	0.00	9.84	14,000	120	1,200	1,400	4,700	200	--	--	--	--	--	--	--	
MW-2	9/3/2002	15.57	6.81	0.00	8.76	10,000	150	1,200	610	2,800	460	--	--	--	--	--	--	--	
MW-2	12/12/2002	15.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Replaced with MW-2A
MW-2A	12/12/2002	15.56	7.45	0.00	8.11	3,400	80	260	210	1,000	400	--	--	--	--	--	--	--	
MW-2A	3/13/2003	--	5.85	0.00	--	<50	<0.50	<0.50	<0.50	1.8	2.4	--	--	--	--	--	--	--	
MW-2A	6/12/2003	--	6.08	0.00	--	<50	0.59	0.69	<0.50	1.2	4.7	--	--	--	--	--	--	--	
MW-2A	9/12/2003	15.56	6.54	0.00	9.02	--	1.8	4.2	6.1	20	6.6	--	--	--	--	--	--	--	
MW-2A	12/31/2003	15.56	5.63	0.00	9.93	88	0.79	1.8	3.6	14	2.9	--	--	--	--	--	--	--	
MW-2A	2/12/2004	15.56	5.68	0.00	9.88	160	2.6	4.8	13	48	7.9	--	--	--	--	--	--	--	
MW-2A	6/7/2004	15.56	6.21	0.00	9.35	94	0.80	1.2	2.1	9.1	3.7	--	--	--	--	--	--	--	
MW-2A	9/17/2004	15.56	7.16	0.00	8.40	230	3.5	6.1	13	41	83	--	--	--	--	--	--	--	
MW-2A	12/11/2004	15.56	5.84	0.00	9.72	<50	<0.50	<0.50	<0.50	<1.0	1.2	--	--	--	--	--	--	--	
MW-2A	3/15/2005	15.56	5.52	0.00	10.04	92	0.84	1.7	2.4	9.8	<10	--	--	--	--	--	--	--	
MW-2A	5/17/2005	15.56	5.55	0.00	10.01	54	2.1	1.7	1.9	7.0	2.9	--	--	--	--	--	--	--	
MW-2A	7/27/2005	15.56	6.16	0.00	9.40	<50	0.66	1.1	1.3	4.2	3.7	--	--	--	--	--	--	--	
MW-2A	11/23/2005	15.56	6.88	0.00	8.68	120	1.3	2.8	7.8	30	10	--	--	--	--	--	--	--	
MW-2A	2/24/2006	15.56	5.79	0.00	9.77	84	0.51	1.2	4.2	16	7.2	--	--	--	--	--	--	--	
MW-2A	5/30/2006	15.56	5.62	0.00	9.94	69	0.90	2.2	3.7	14	4.1	--	--	--	--	--	--	--	
MW-2A	8/30/2006	15.56	6.38	0.00	9.18	77	<0.50	0.50	1.0	3.3	2.5	--	--	--	--	--	--	--	
MW-2A	11/22/2006	15.56	6.60	0.00	8.96	<50	<0.50	<0.50	<0.50	2.2	0.59	--	--	--	--	--	--	--	
MW-2A	2/23/2007	15.56	6.05	0.00	9.51	<50	<0.50	0.66	<0.50	1.1	0.72	--	--	--	--	--	--	--	
MW-2A	5/18/2007	15.56	6.29	0.00	9.27	<50	<0.50	<0.50	0.68	1.6	0.81	--	--	--	--	--	--	--	
MW-2A	8/10/2007	15.56	6.90	0.00	8.66	<50	<0.50	<0.50	1.6	3.9	<0.50	--	--	--	--	--	--	--	
MW-2A	11/9/2007	15.56	6.96	0.00	8.60	<50	<0.50	<0.50	2.4	4.4	<0.50	--	--	--	--	--	--	--	
MW-2A	2/8/2008	15.56	5.76	0.00	9.80	<50	<0.50	<0.50	<0.50	<1.0	<0.50	--	--	--	--	--	--	--	
MW-2A	5/16/2008	15.56	6.50	0.00	9.06	<50	<0.50	<0.50	0.56	1.2	<0.50	--	--	--	--	--	--	--	
MW-2A	8/15/2008	15.56	7.35	0.00	8.21	78	<0.50	0.79	2.9	6.5	<0.50	--	--	--	--	--	--	--	
MW-2A	11/26/2008	15.56	8.12	0.00	7.44	120	0.56	0.66	4.6	6.0	1.8	--	--	--	--	--	--	--	
MW-2A	2/24/2009	18.51	6.19	0.00	12.32	<50	<0.50	<0.50	<0.50	<1.0	<0.50	--	--	--	--	--	--	--	
MW-3	3/5/1999	15.11	--	0.00	--	135	ND	ND	ND	4.84	2.46	--	--	--	--	--	--	--	
MW-3	6/3/1999	15.11	5.57	0.00	9.54	ND	ND	ND	ND	ND	12.7	--	--	--	--	--	--	--	
MW-3	9/2/1999	15.11	6.50	0.00	8.61	ND	ND	ND	ND	ND	11	--	--	--	--	--	--	--	
MW-3	12/14/1999	15.11	7.28	0.00	7.83	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	
MW-3	3/14/2000	15.11	4.87	0.00	10.24	ND	ND	ND	ND	ND	6.3	--	--	--	--	--	--	--	
MW-3	5/31/2000	15.11	5.58	0.00	9.53	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	
MW-3	8/29/2000	15.11	6.06	0.00	9.05	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	
MW-3	12/1/2000	15.11	6.76	0.00	8.35	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	
MW-3	3/17/2001	15.11	5.09	0.00	10.02	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	
MW-3	5/23/2001	15.11	5.72	0.00	9.39	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	
MW-3	9/24/2001	15.11	6.34	0.00	8.77	<50	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--	--	
MW-3	12/10/2001	15.11	6.31	0.00	8.80	<50	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--	--	
MW-3	3/11/2002	15.11	5.15	0.00	9.96	<50	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--	--	
MW-3	6/7/2002	15.11	5.45	0.00	9.66	<50	<0.50	<0.50	<0.50	<0.50	--	--	--	--	--	--	--	--	
MW-3	12/12/2002	15.11	7.15	0.00	7.96	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/13/2003	15.11	5.37	0.00	9.74	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	6/12/2003	15.11	5.51	0.00	9.60	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	9/12/2003	15.11	6.03	0.00	9.08	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/31/2003	15.11	5.62	0.00	9.49	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	2/12/2004	15.11	5.51	0.00	9.60	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	6/7/2004	15.11	5.92	0.00	9.19	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 5
Historical Groundwater Gauging and Analytical Data
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Well ID	Date Sampled	TOC Elevation (feet MSL)	DTW (feet bTOC)	LPH Thickness (feet)	GW Elevation (feet MSL)	ESL														Comments
						TPH-G (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TBA (ug/L)	TAME (ug/L)	ETBE (ug/L)	DIPE (ug/L)	EDB (ug/L)	EDC (ug/L)	Ethanol (ug/L)		
						100	1	40	30	20	5	12								
MW-10	11/13/2009	18.84	7.70	0.00	11.14	1,500	<2.5	<2.5	<2.5	<5.0	3,300	--	--	--	--	--	--	--	--	
MW-10	2/5/2010	18.84	6.66	0.00	12.18	110	<0.50	<0.50	<0.50	<1.0	260	--	--	--	--	--	--	--	--	
MW-10	6/7/2010	18.84	6.56	0.00	12.28	<50	<0.50	<0.50	<0.50	<1.0	8	--	--	--	--	--	--	--	--	
MW-10	8/3/2010	18.84	7.14	0.00	11.70	<50	<0.50	<0.50	<0.50	<1.0	2	--	--	--	--	--	--	--	--	
MW-10	11/11/2010	18.84	8.16	0.00	10.68	<50	<0.50	<0.50	<0.50	<1.0	2	--	--	--	--	--	--	--	--	
MW-10	2/14/2011	18.84	6.71	0.00	12.13	<50	<0.50	<0.50	<0.50	<1.0	2	--	--	--	--	--	--	--	--	
MW-10	8/4/2011	18.84	6.73	0.00	12.11	<50	<0.50	<0.50	<0.50	<1.0	7.4	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	11/21/2011	18.84	7.52	0.00	11.32	<50*	<0.50	<0.50	<0.50	<1.0	1.4	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	2/2/2012	18.84	7.52	0.00	11.32	<50	<0.50	<0.50	<0.50	3.2	1.4	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	5/14/2012	18.84	6.42	0.00	12.42	<50	<0.50	<0.50	<0.50	<1.0	1.5	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	8/13/2012	18.84	7.24	0.00	11.60	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	10/25/2012	18.84	7.95	0.00	10.89	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	3/5/2013	18.84	6.64	0.00	12.20	<50	<0.50	<0.50	<0.50	<1.0	1.2	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	5/7/2013	18.84	6.92	0.00	11.92	<50	<0.50	<0.50	<0.50	<1.0	2.1	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	8/8/2013	18.84	7.93	0.00	10.91	<50	<0.50	<0.50	<0.50	<1.0	3.6	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	11/6/2013	18.84	8.75	0.00	10.09	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	2/5/2014	18.84	8.99	0.00	9.85	<50	<0.50	<0.50	<0.50	<1.0	1.2	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-10	8/13/2014	18.84	9.27	0.00	9.57	<50	<0.50	<0.50	<0.50	<1.0	<0.5	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-11	5/28/2009	18.72	6.18	0.00	12.54	920	<0.50	<0.50	<0.50	<1.0	15,000	--	--	--	--	--	--	--	--	
MW-11	9/14/2009	18.72	7.45	0.00	11.27	11,000	<25	<25	<25	<50	18,000	--	--	--	--	--	--	--	--	
MW-11	11/13/2009	18.72	7.51	0.00	11.21	6,200	<10	<10	<10	<20	13,000	--	--	--	--	--	--	--	--	
MW-11	2/5/2010	18.72	7.50	0.00	11.22	4,500	<12	<12	<12	<25	13,000	--	--	--	--	--	--	--	--	
MW-11	6/7/2010	18.72	6.36	0.00	12.36	4,300	<10	<10	<10	<20	9,500	--	--	--	--	--	--	--	--	
MW-11	8/3/2010	18.72	6.90	0.00	11.82	1,400	<5.0	<5.0	<5.0	<10	6,000	--	--	--	--	--	--	--	--	
MW-11	11/11/2010	18.72	8.00	0.00	10.72	1,600	<5.0	<5.0	<5.0	<10	6,100	--	--	--	--	--	--	--	--	
MW-11	2/14/2011	18.72	6.52	0.00	12.20	3,500	<6.2	<6.2	<6.2	<12	7,400	--	--	--	--	--	--	--	--	
MW-11	8/4/2011	18.72	6.54	0.00	12.18	1,400	<0.50	<0.50	<0.50	<1.0	2,000	110	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01, A90
MW-11	11/21/2011	18.72	7.36	0.00	11.36	850*	<0.50	<0.50	<0.50	<1.0	2,100	270	2.1	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
MW-11	2/2/2012	18.72	7.32	0.00	11.40	<50	<0.50	<0.50	<0.50	<1.0	2,500	730	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	5/14/2012	18.72	6.21	0.00	12.51	<50	<0.50	<0.50	<0.50	<1.0	1,700	570	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	8/13/2012	18.72	7.03	0.00	11.69	<50	<0.50	<0.50	<0.50	<1.0	1,100	280	0.87	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	10/25/2012	18.72	7.77	0.00	10.95	<50	<0.50	<0.50	<0.50	<1.0	1,000	590	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	3/5/2013	18.72	6.47	0.00	12.25	<50	<0.50	<0.50	<0.50	<1.0	750	180	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	5/7/2013	18.72	6.75	0.00	11.97	<50	<0.50	<0.50	<0.50	<1.0	1,100	140	0.81	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	8/8/2013	18.72	7.75	0.00	10.97	<50	<0.50	<0.50	<0.50	<1.0	880	680	0.91	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	11/6/2013	18.72	8.64	0.00	10.08	<50	<0.50	<0.50	<0.50	<1.0	380	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	2/5/2014	18.72	8.88	0.00	9.84	<50	<0.50	<0.50	<0.50	<1.0	1,100	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<250	A01
MW-11	8/13/2014	18.72	9.43	0.00	9.29	88	<0.50	<0.50	<0.50	<1.0	2,300	180	2.9	<0.50	<0.50	<0.50	<0.50	<0.50	<250	
W-10-GP1	5/23/2001	--	--	--	--	ND	ND	ND	ND	ND	4	--	--	--	--	--	--	--	--	Collected from 10' bgs
W-10-GP2	5/23/2001	--	--	--	--	ND	1.1	0.67	ND	ND	ND	--	--	--	--	--	--	--	--	Collected from 10' bgs
W-9-GP3	5/23/2001	--	--	--	--	ND	1.2	ND	0.55	3.9	ND	--	--	--	--	--	--	--	--	Collected from 9' bgs
W-6-GP4	5/23/2001	--	--	--	--	ND	0.70	ND	ND	0.011	96	--	--	--	--	--	--	--	--	Collected from 6' bgs
W-10-GP5	5/23/2001	--	--	--	--	2100	39	16	ND	17	2,200	--	--	--	--	--	--	--	--	Collected from 10' bgs

Table 5
Historical Groundwater Gauging and Analytical Data
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Well ID	Date Sampled	TOC Elevation (feet MSL)	DTW (feet bTOC)	LPH Thickness (feet)	GW Elevation (feet MSL)	TPH-G (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TBA (ug/L)	TAME (ug/L)	ETBE (ug/L)	DIPE (ug/L)	EDB (ug/L)	EDC (ug/L)	Ethanol (ug/L)	Comments	
		ESL				100	1	40	30	20	5	12								

Notes

Gas chromatography-mass spectrometry method for TPH-g was used August 17, 2004 through February 14, 2011
 EPA Method 8015B used for TPH-G from March 5, 1999 through June 7, 2004 and August 4, 2011 to present
 EPA Method 8260B used for BTEX/MTBE/Oxygenates

Standard Abbreviations

<	not detected at or above MRL	EDC	1,2-dichloroethane (same as ethylene dichloride)	TOC	top of casing (surveyed reference elevation)
--	not analyzed	ETBE	ethyl tertiary butyl ether	TPH-G	total petroleum hydrocarbons as gasoline
*	TPH-g (C6 through C12)	GW	groundwater		detection above ESL
µg/L	micrograms per liter (approx. equivalent to parts per billion, ppb)	J	estimated value		
A01	PQL's and MDL's are raised due to sample dilution	LPH	liquid-phase hydrocarbons		
A90	TPH-g does not exhibit a "gasoline" pattern; TPH-g is entirely due to MTBE	MDL	method detection limit		
BOLD	detection above reporting limit	MSL	relative to mean sea level		
bTOC	below top of casing	MTBE	methyl tertiary butyl ether		
DIPE	di-isopropyl ether	PQL	practical quantitation limit		
DTW	depth to water	TAME	tertiary amyl methyl ether		
EDB	1,2-dibromoethane	TBA	tertiary butyl alcohol		

Table 6
Summary of Statistical Analysis of Groundwater Analytical Data
 Unocal Service Station No. 0843
 1629 Webster Street
 Alameda, California

Constituent	Well	Cleanup Goal/Screening Level/Remediation goal (µg/L) ¹	Data Range						Linear Regression Analysis					
			Minimum Concentration (µg/L)	Maximum Concentration (µg/L)	Concentration Measured Most Recently (µg/L)	% of Data Above Laboratory Reporting Limit	Start Date	End Date	Coefficient of Determination, R-squared ²	p-value of Correlation (Significance of Slope)	Attenuation Half-life (days)	Trend Direction	Significance of Trend ³	Projected Year to Screening Level
MTBE	MW-1	5	25	5,400	230	100	2/24/2006	11/6/2013	0.61	<0.01	560	Decreasing	Significant	2021
MTBE	MW-1AR	5	0.9	930	6	100	5/28/2009	8/13/2014	0.91	<0.01	196	Decreasing	Significant	2013
MTBE	MW-1BR	5	0.5	810	2	90	5/28/2009	8/13/2014	0.94	<0.01	174	Decreasing	Significant	2013
MTBE	MW-6	5	6	21,000	93	100	12/14/1999	8/13/2014	0.68	<0.01	721	Decreasing	Significant	2020
MTBE	MW-7	5	2	16,000	940	100	5/28/2009	8/13/2014	0.45	<0.01	297	Decreasing	Significant	2019
MTBE	MW-8	5	0.5	12,000	60	95	5/28/2009	8/13/2014	0.69	<0.01	197	Decreasing	Significant	2016
MTBE	MW-9	5	6	13,000	600	100	5/28/2009	8/13/2014	<0.01	0.77	NA	No Trend	NS	NA
MTBE	MW-11	5	380	18,000	2,300	100	5/28/2009	8/13/2014	0.81	<0.01	385	Decreasing	Significant	2021

Notes and Assumptions

- ¹ Environmental Screening Levels are from the San Francisco Regional Water Quality Control Board (December 2013)
- ² Linear regression analysis with R² values <0.1 and no statistically significant trend were defined as having no apparent trend (No Trend)
- ³ Statistically significant trend defined as having p-value ≤ 0.05

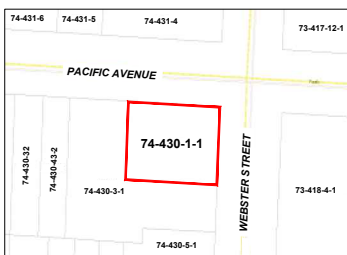
Standard Abbreviations

- < less than
- µg/L micrograms per liter
- MTBE methyl tertiary butyl ether
- NA not applicable due to non-significant trend
- NS not significant
- italic* Non-detect taken at reporting limit/reported value

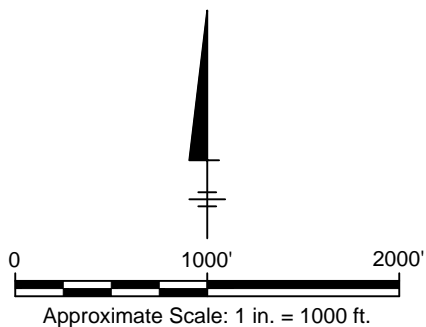
Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., OAKLAND WEST, CALIFORNIA, 2012.



APN MAP



CALIFORNIA

UNION OIL
 FORMER FACILITY NO. 0843
 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

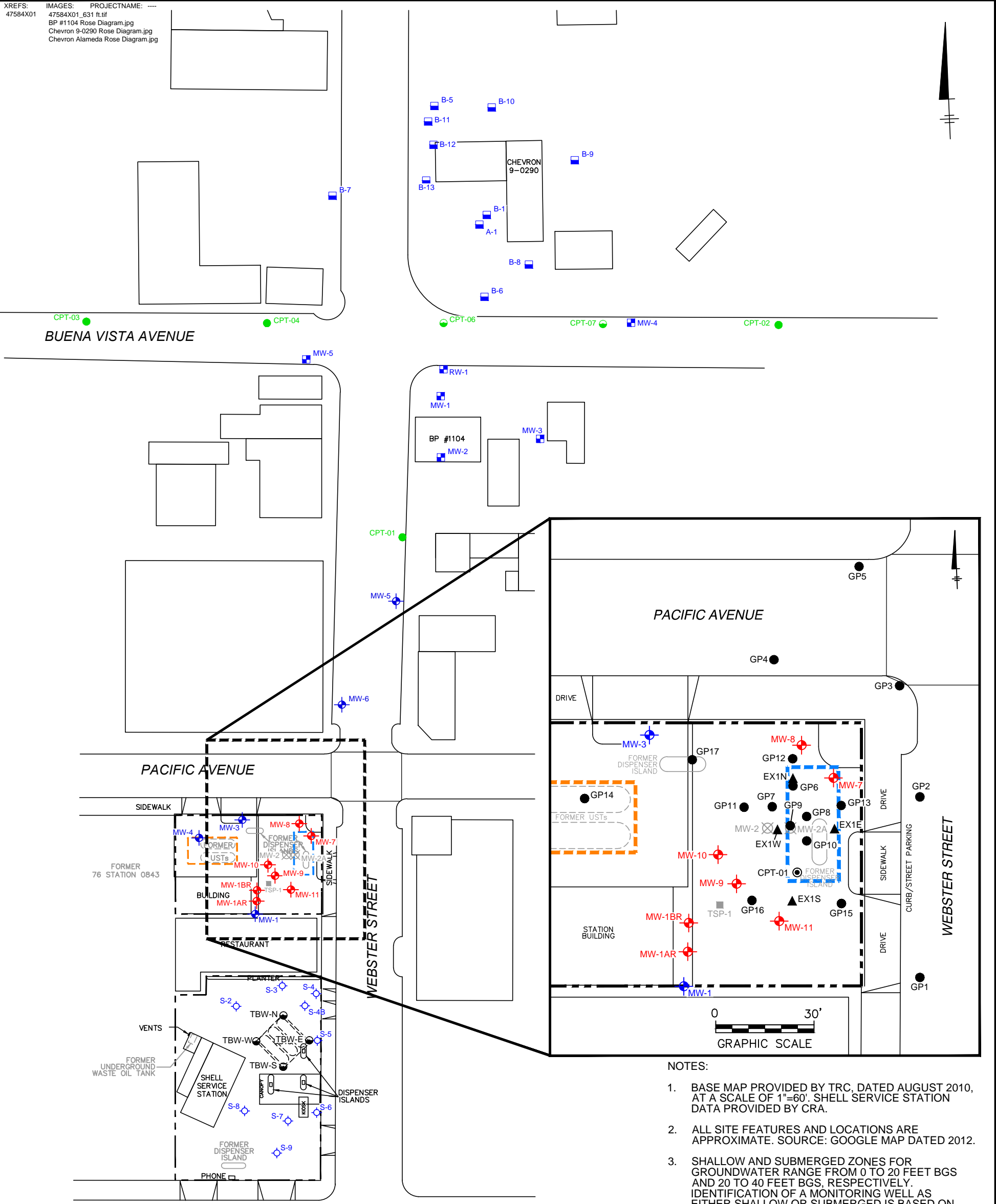
VICINITY MAP



FIGURE

1

XREFS: 47584X01
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 BP #1104 Rose Diagram.jpg
 Chevron 9-0290 Rose Diagram.jpg
 Chevron Alameda Rose Diagram.jpg

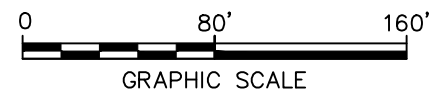


NOTES:

1. BASE MAP PROVIDED BY TRC, DATED AUGUST 2010, AT A SCALE OF 1"=60'. SHELL SERVICE STATION DATA PROVIDED BY CRA.
2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE. SOURCE: GOOGLE MAP DATED 2012.
3. SHALLOW AND SUBMERGED ZONES FOR GROUNDWATER RANGE FROM 0 TO 20 FEET BGS AND 20 TO 40 FEET BGS, RESPECTIVELY. IDENTIFICATION OF A MONITORING WELL AS EITHER SHALLOW OR SUBMERGED IS BASED ON THE SCREEN INTERVAL.
4. FT BGS = FEET BELOW GROUND SURFACE
5. PHASE 2 CPT BORINGS WERE INSTALLED IF GROUNDWATER CONCENTRATIONS IN PHASE 1 CPT BORINGS INDICATED ADDITIONAL INVESTIGATIONAL BORINGS WERE NEEDED.

LEGEND

- PROPERTY BOUNDARY
- MW-1 [Symbol] SITE MONITORING WELL (SHALLOW)
- MW-1 [Symbol] SITE MONITORING WELL (SUBMERGED)
- TSP-1 [Symbol] SPARGE WELL
- S-9 [Symbol] SHELL SERVICE STATION MONITORING WELL (SHALLOW)
- B-1 [Symbol] CHEVRON SERVICE STATION MONITORING WELL (SHALLOW)
- MW-1 [Symbol] BP SERVICE STATION MONITORING WELL (SHALLOW)
- TBW-N [Symbol] SHELL TANK BACKFILL MONITORING WELL
- MW-2A [Symbol] ABANDONED WELL
- CPT-01 [Symbol] PHASE 1 CPT BORING LOCATION
- CPT-04 [Symbol] PHASE 2 CPT BORING LOCATION
- CPT-01 [Symbol] DELTA CPT BORING COMPLETED AUGUST 14, 2008
- GP1 [Symbol] DIRECT-PUSH SOIL BORING
- EX1E [Symbol] SOIL SAMPLE
- [Symbol] APPROXIMATE AREA OF EXCAVATION (1999)
- [Symbol] APPROXIMATE LIMIT OF EXCAVATION (2002)



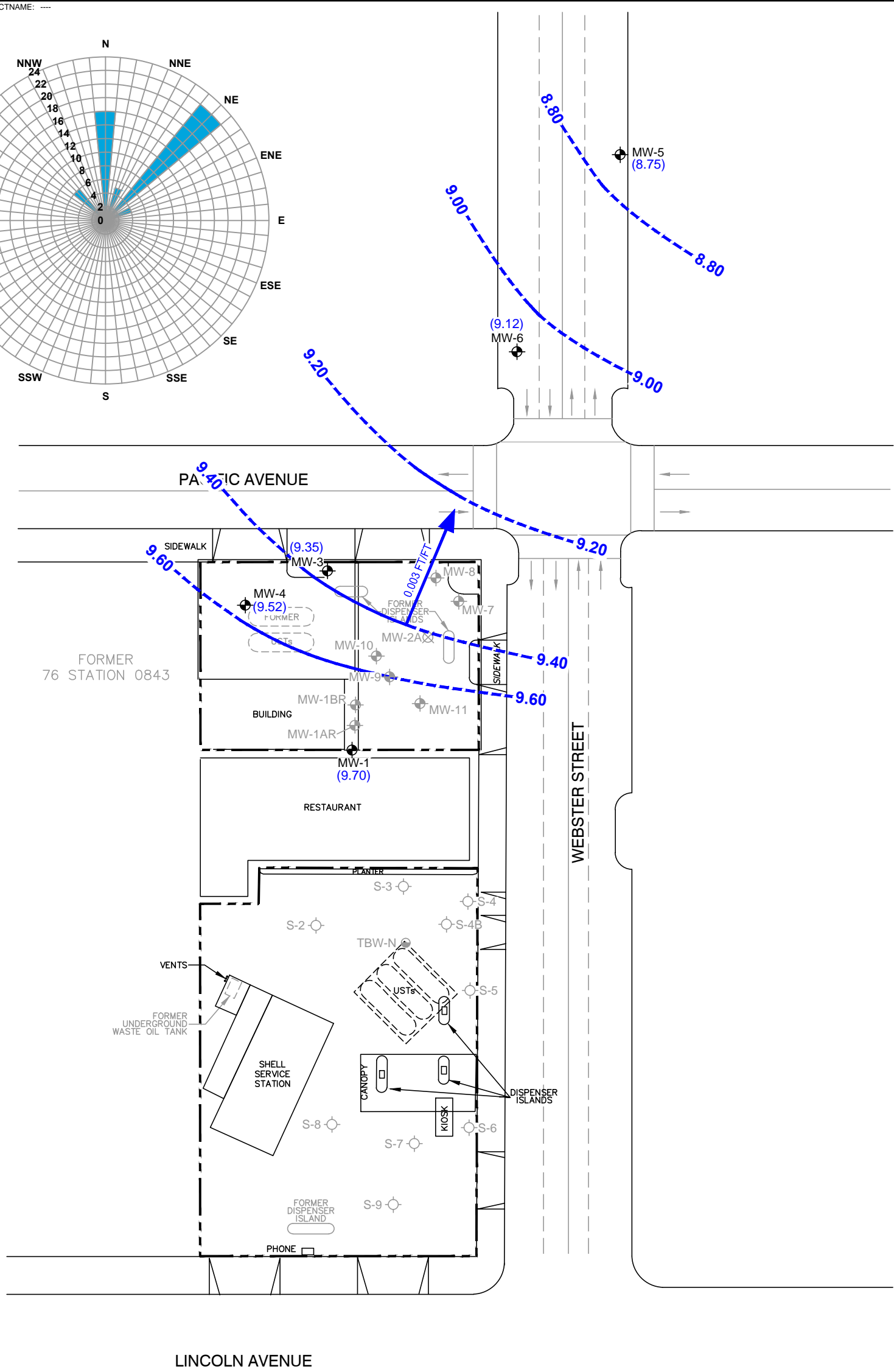
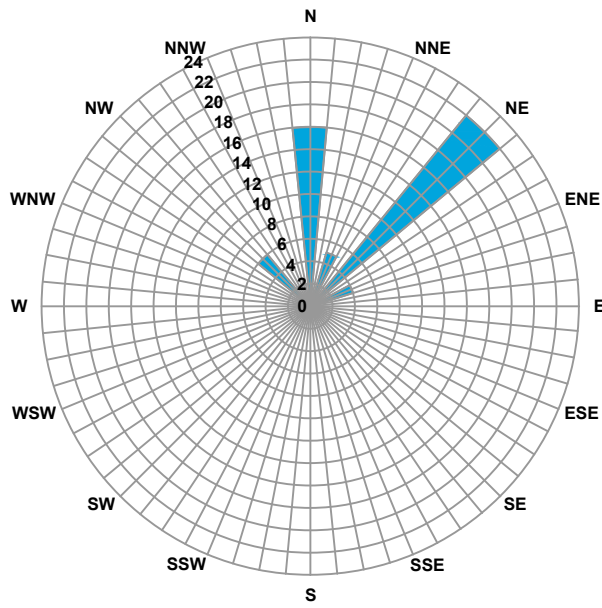
UNION OIL COMPANY OF CALIFORNIA
 FORMER FACILITY NO. 0843
 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

SITE PLAN

ARCADIS

FIGURE
2

XREFS: IMAGES: PROJECTNAME: ----
 47584X01_OLD



LEGEND

- PROPERTY BOUNDARY
- FORMER 76 STATION SHALLOW ZONE MONITORING WELL
- FORMER 76 STATION SUBMERGED ZONE MONITORING WELL
- SHELL SERVICE STATION MONITORING WELL
- SHELL TANK BACKFILL MONITORING WELL
- ABANDONED WELL
- GROUNDWATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL (FT MSL)
- GROUNDWATER ELEVATION CONTOUR (FT MSL; DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION AND GRADIENT (FOOT PER FOOT)

NOTES:

1. BASE MAP PROVIDED BY TRC, DATED AUGUST 2010, AT A SCALE OF 1"=60'. SHELL SERVICE STATION DATA PROVIDED BY CRA.
2. LL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. THE ADJACENT SHELL SITE HAS RECEIVED CLOSURE AND WILL NO LONGER BE SAMPLED.
4. SITE GROUNDWATER FLOW DIRECTION DATA ARE BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.



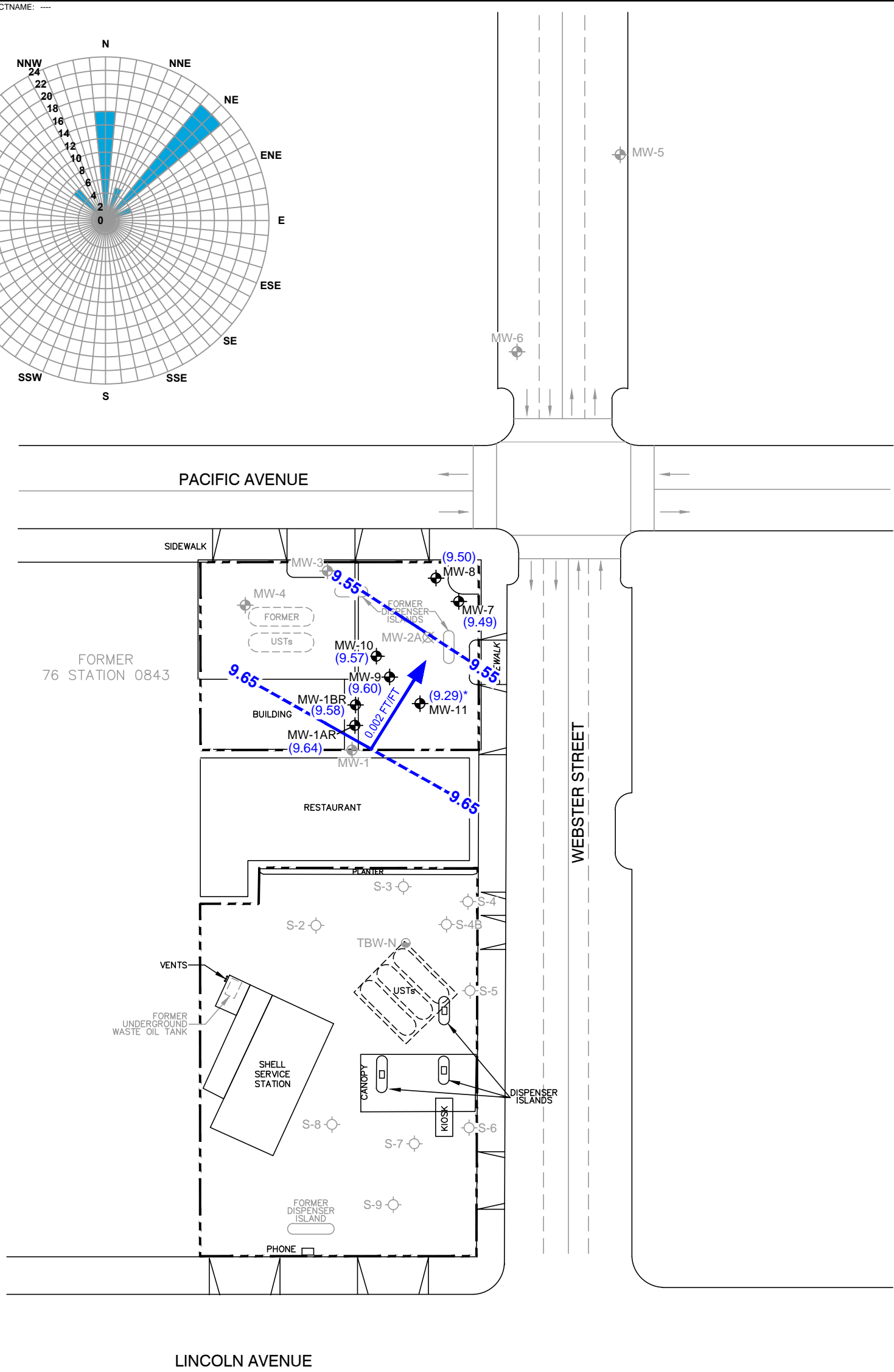
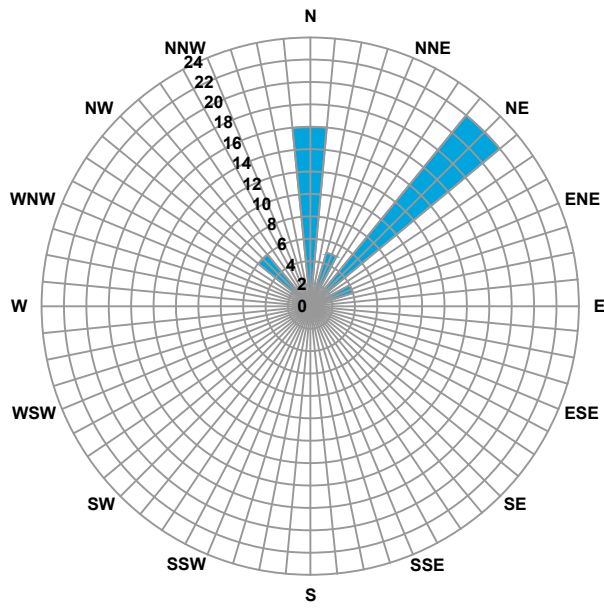
UNION OIL
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**SHALLOW ZONE GROUNDWATER
 ELEVATION CONTOUR MAP
 AUGUST 13, 2014**

ARCADIS

FIGURE
3

XREFS: IMAGES: PROJECTNAME: ----
 47584X01_OLD



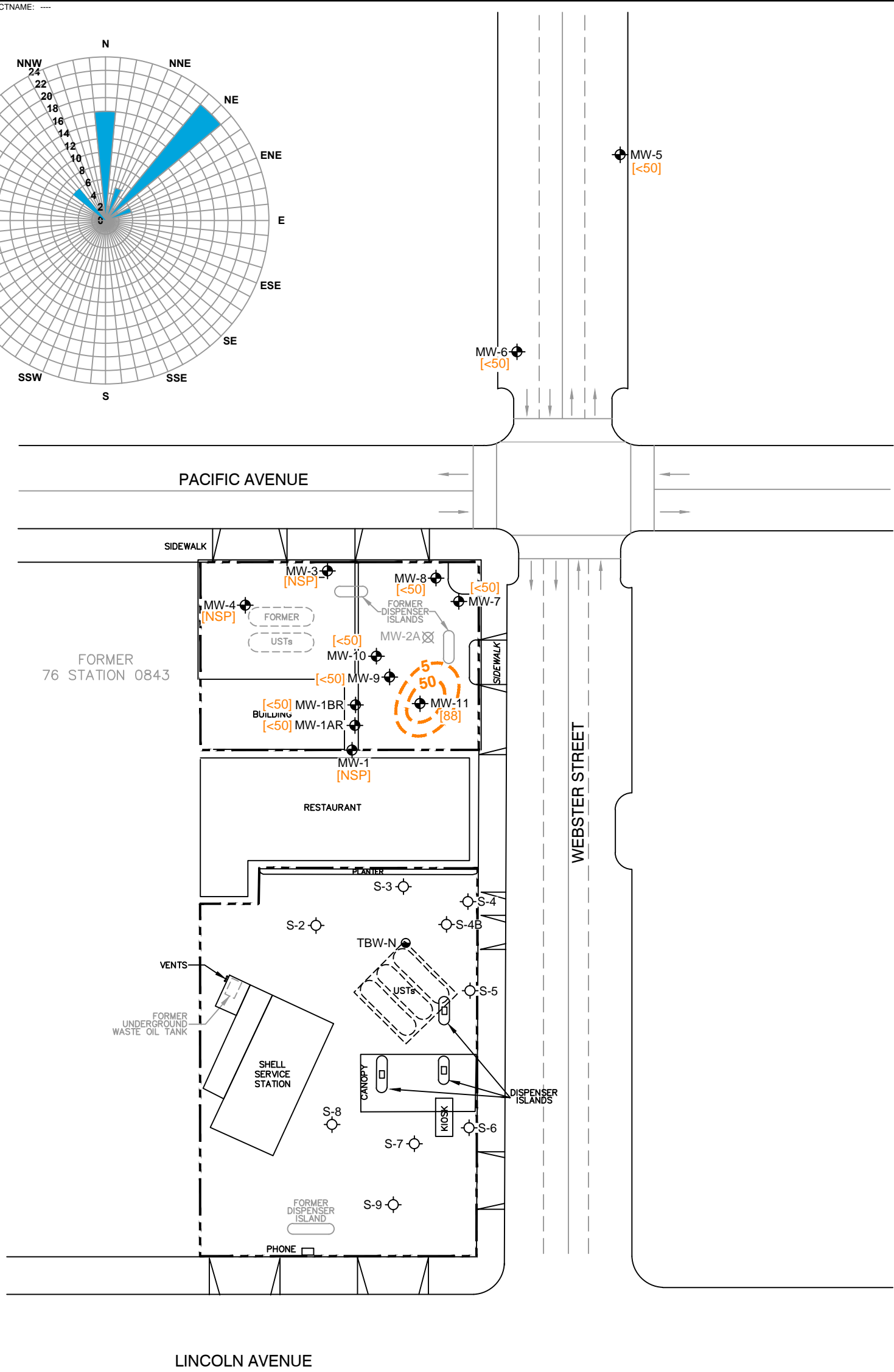
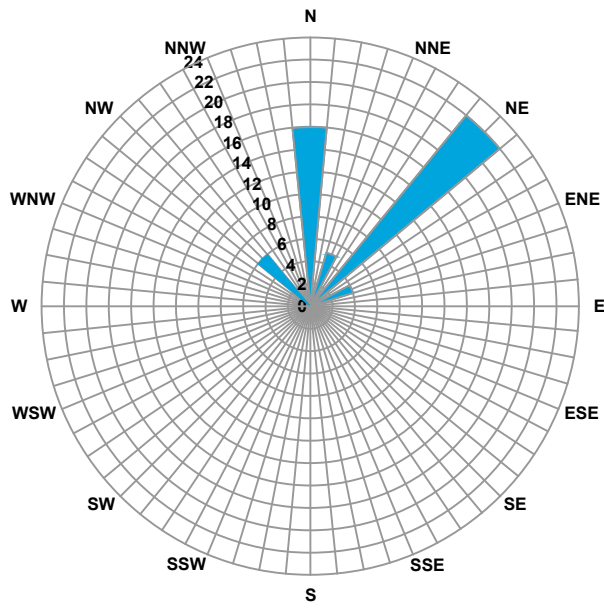
- LEGEND**
- PROPERTY BOUNDARY
 - MW-1 ◉ FORMER 76 STATION SHALLOW ZONE MONITORING WELL
 - MW-1AR ◉ FORMER 76 STATION SUBMERGED ZONE MONITORING WELL
 - S-9 ◉ SHELL SERVICE STATION MONITORING WELL
 - TBW-N ◉ SHELL TANK BACKFILL MONITORING WELL
 - MW-2A ◉ ABANDONED WELL
 - (9.64) GROUNDWATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL (FT MSL)
 - 9.65 - - - GROUNDWATER ELEVATION CONTOUR (FT MSL; DASHED WHERE INFERRED)
 - 0.002 FT/FT → APPROXIMATE GROUNDWATER FLOW DIRECTION AND GRADIENT (FOOT PER FOOT)
 - * NOT USED FOR CONTOURING; SHORT SCREEN INTERVAL; DIFFERENT CONSTRUCTION

- NOTES:**
1. BASE MAP PROVIDED BY TRC, DATED AUGUST 2010, AT A SCALE OF 1"=60'. SHELL SERVICE STATION DATA PROVIDED BY CRA.
 2. LL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
 3. THE ADJACENT SHELL SITE HAS RECEIVED CLOSURE AND WILL NO LONGER BE SAMPLED.
 4. SITE GROUNDWATER FLOW DIRECTION DATA ARE BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.

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SUBMERGED ZONE GROUNDWATER ELEVATION CONTOUR MAP
 AUGUST 13, 2014

XREFS: IMAGES: PROJECTNAME: ----
 47584X01_OLD

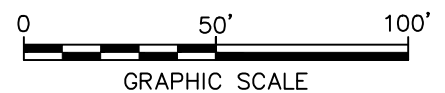


LEGEND

- PROPERTY BOUNDARY
- FORMER 76 STATION MONITORING WELL
- SHELL SERVICE STATION MONITORING WELL
- SHELL TANK BACKFILL MONITORING WELL
- ABANDONED WELL
- [TPH-g]** TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (C4-C12) CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- <** DENOTES LESS THAN LABORATORY REPORTING LIMIT
- [NSP]** NOT SAMPLED THIS EVENT IN ACCORDANCE WITH GROUNDWATER SAMPLING SCHEDULE
- 50** ——— TPH-g ISOCONCENTRATION CONTOUR (µg/L; DASHED WHERE INFERRED)

NOTES:

1. BASE MAP PROVIDED BY TRC, DATED AUGUST 2010, AT A SCALE OF 1"=60'. SHELL SERVICE STATION DATA PROVIDED BY CRA.
2. LL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. THE ADJACENT SHELL SITE HAS RECEIVED CLOSURE AND WILL NO LONGER BE SAMPLED.
4. SITE GROUNDWATER FLOW DIRECTION DATA ARE BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.

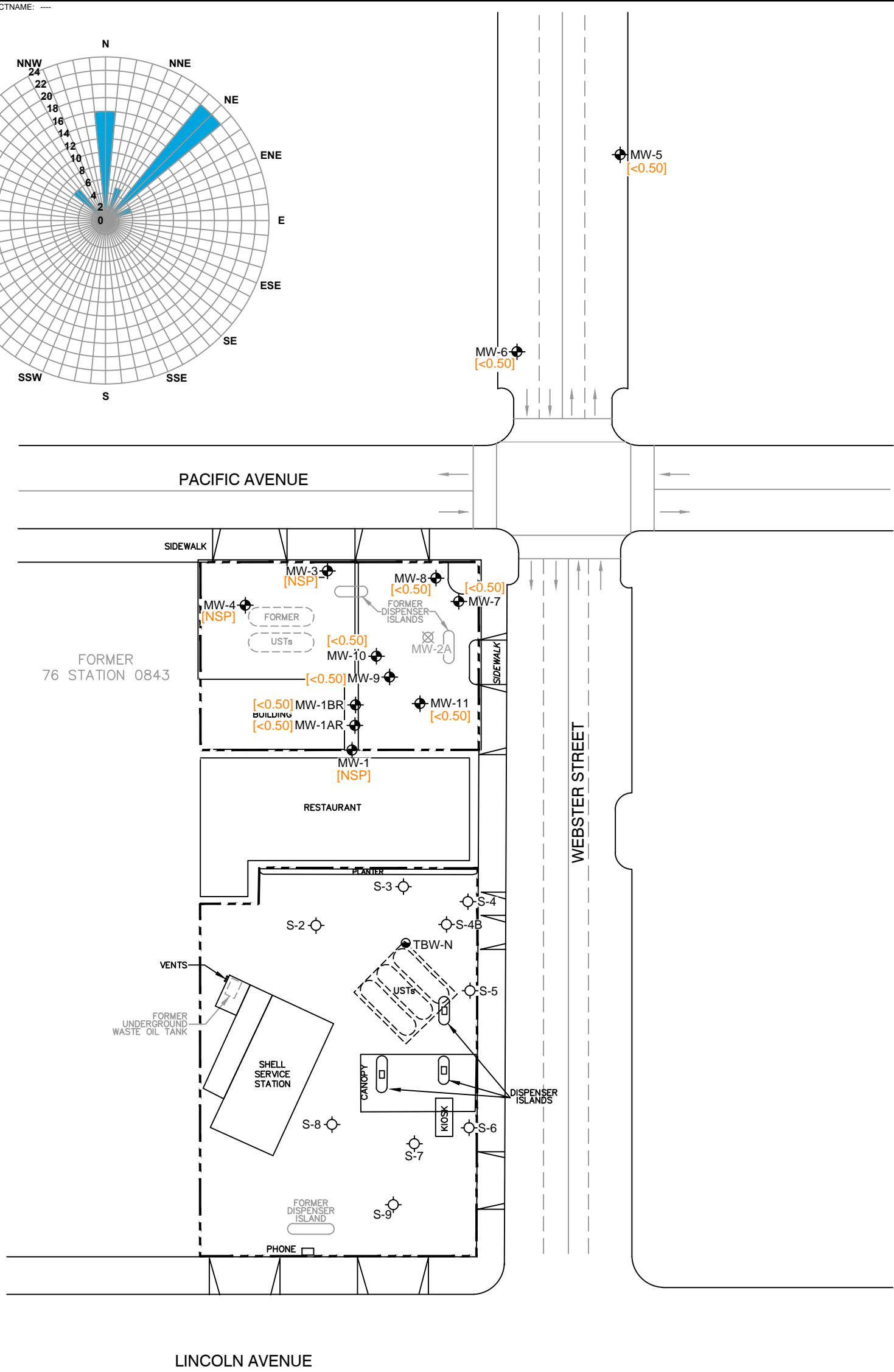
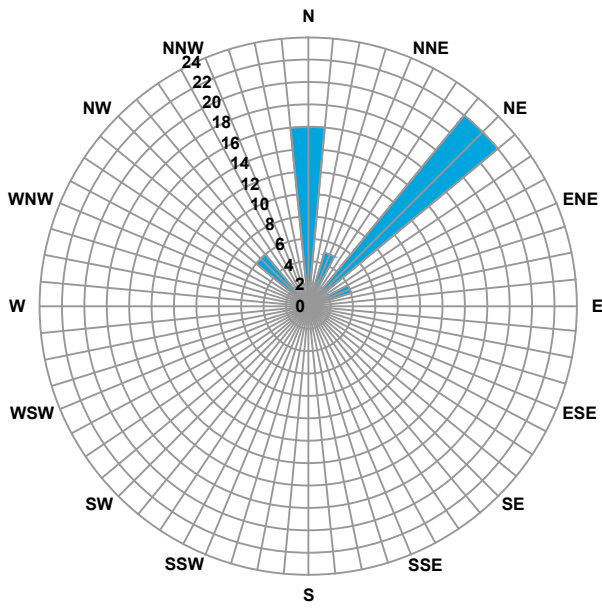


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**TPH-g CONCENTRATION MAP
 AUGUST 13, 2014**

FIGURE
5

XREFS: IMAGES: PROJECTNAME: ----
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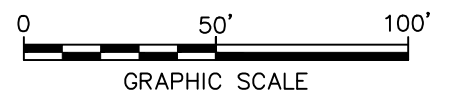


LEGEND

- PROPERTY BOUNDARY
- MW-1 ◉ FORMER 76 STATION MONITORING WELL
- S-9 ◉ SHELL SERVICE STATION MONITORING WELL
- TBW-N ◉ SHELL TANK BACKFILL MONITORING WELL
- MW-2A ⊗ ABANDONED WELL
- [BENZ] BENZENE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- < DENOTES LESS THAN LABORATORY REPORTING LIMIT
- [NSP] WELL NOT SAMPLED THIS EVENT IN ACCORDANCE WITH GROUNDWATER SAMPLING SCHEDULE

NOTES:

1. BASE MAP PROVIDED BY TRC, DATED AUGUST 2010, AT A SCALE OF 1"=60'. SHELL SERVICE STATION DATA PROVIDED BY CRA.
2. LL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. THE ADJACENT SHELL SITE HAS RECEIVED CLOSURE AND WILL NO LONGER BE SAMPLED.
4. SITE GROUNDWATER FLOW DIRECTION DATA ARE BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.



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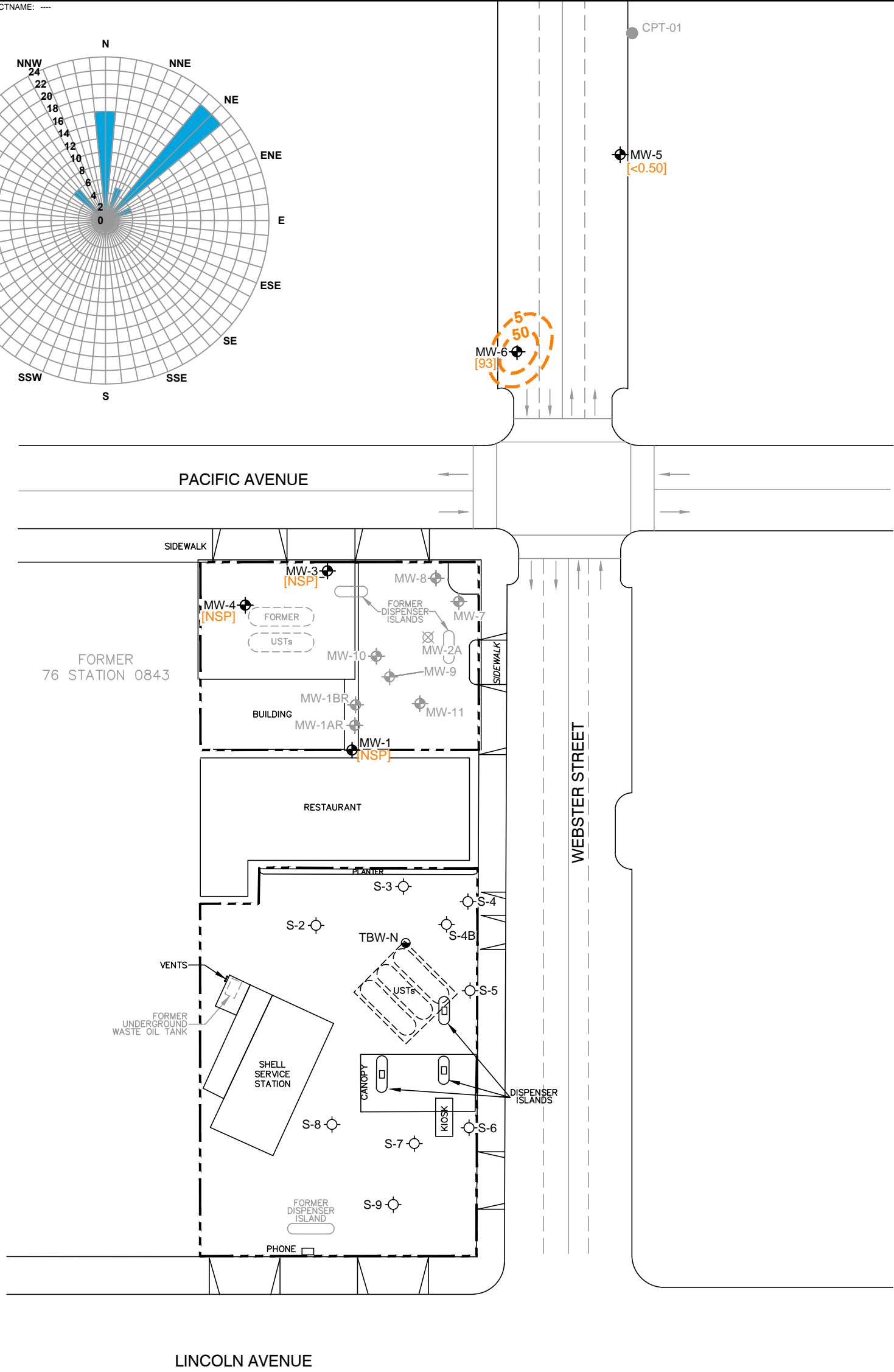
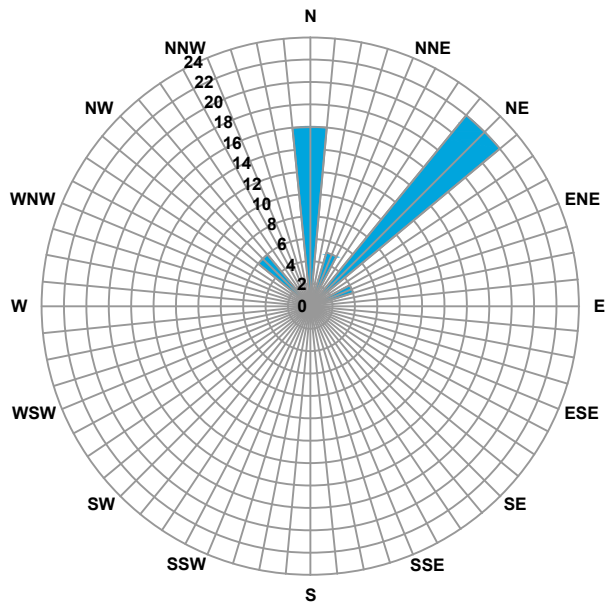
**BENZENE CONCENTRATION MAP
 AUGUST 13, 2014**



FIGURE

6

XREFS: IMAGES: PROJECTNAME: ----
 47584X01_OLD

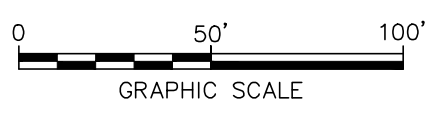


LEGEND

- PROPERTY BOUNDARY
- MW-1 FORMER 76 STATION SHALLOW ZONE MONITORING WELL
- MW-1AR FORMER 76 STATION SUBMERGED ZONE MONITORING WELL
- S-9 SHELL SERVICE STATION MONITORING WELL
- TBW-N SHELL TANK BACKFILL MONITORING WELL
- CPT-01 PHASE 1 CPT BORING LOCATION
- MW-2A ABANDONED WELL
- [MTBE] METHYL TERTIARY BUTYL ETHER CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- < DENOTES LESS THAN LABORATORY REPORTING LIMIT
- [NSP] WELL NOT SAMPLED THIS EVENT IN ACCORDANCE WITH GROUNDWATER SAMPLING SCHEDULE
- 50 MTBE ISOCONCENTRATION CONTOUR (µg/L; DASHED WHERE INFERRED)

NOTES:

1. BASE MAP PROVIDED BY TRC, DATED AUGUST 2010, AT A SCALE OF 1"=60'. SHELL SERVICE STATION DATA PROVIDED BY CRA.
2. LL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
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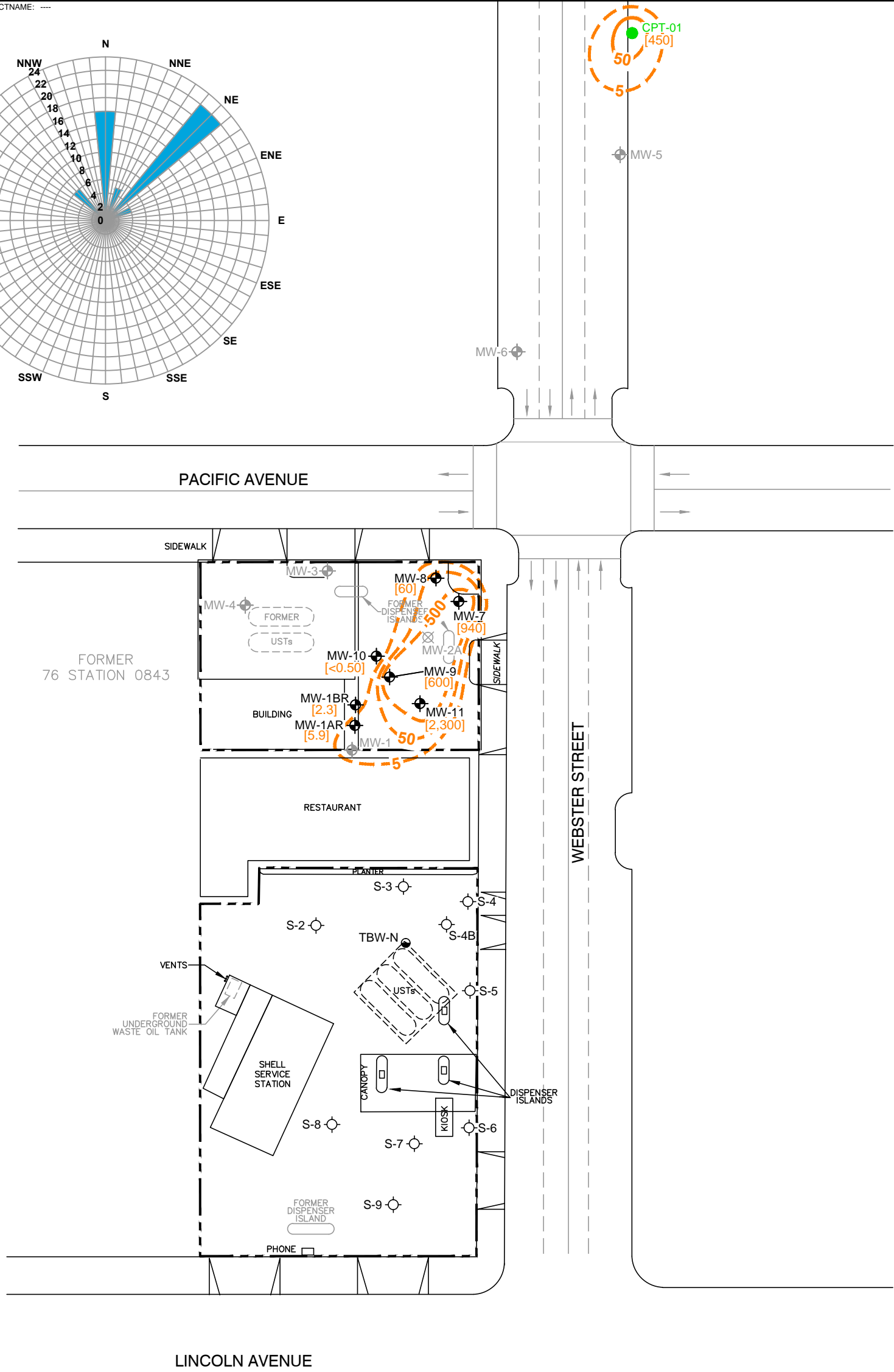
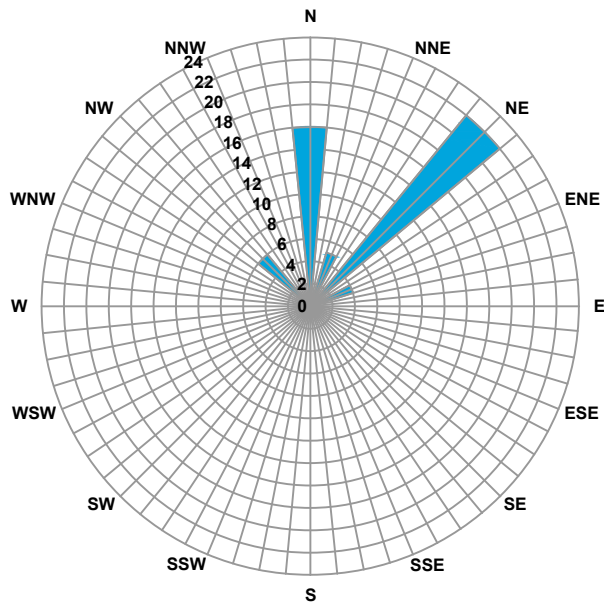
UNION OIL
 FORMER FACILITY NO. 0843
 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

**MTBE SHALLOW ZONE
 CONCENTRATION MAP
 AUGUST 13, 2014**

ARCADIS

FIGURE
7

XREFS: IMAGES: PROJECTNAME: ----
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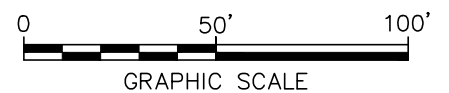


LEGEND

- PROPERTY BOUNDARY
- MW-1
 FORMER 76 STATION SHALLOW ZONE MONITORING WELL
- MW-1AR
 FORMER 76 STATION SUBMERGED ZONE MONITORING WELL
- S-9
 SHELL SERVICE STATION MONITORING WELL
- TBW-N
 SHELL TANK BACKFILL MONITORING WELL
- CPT-01
 PHASE 1 CPT BORING LOCATION
- MW-2A
 ABANDONED WELL
- [MTBE] METHYL TERTIARY BUTYL ETHER CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- < DENOTES LESS THAN LABORATORY REPORTING LIMIT
- [NSP] WELL NOT SAMPLED THIS EVENT IN ACCORDANCE WITH GROUNDWATER SAMPLING SCHEDULE
- 50 — MTBE ISOCONCENTRATION CONTOUR (µg/L; DASHED WHERE INFERRED)

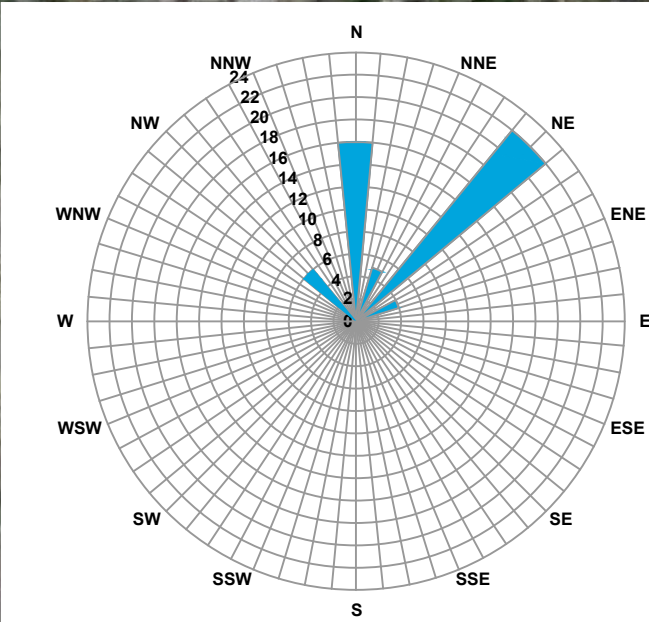
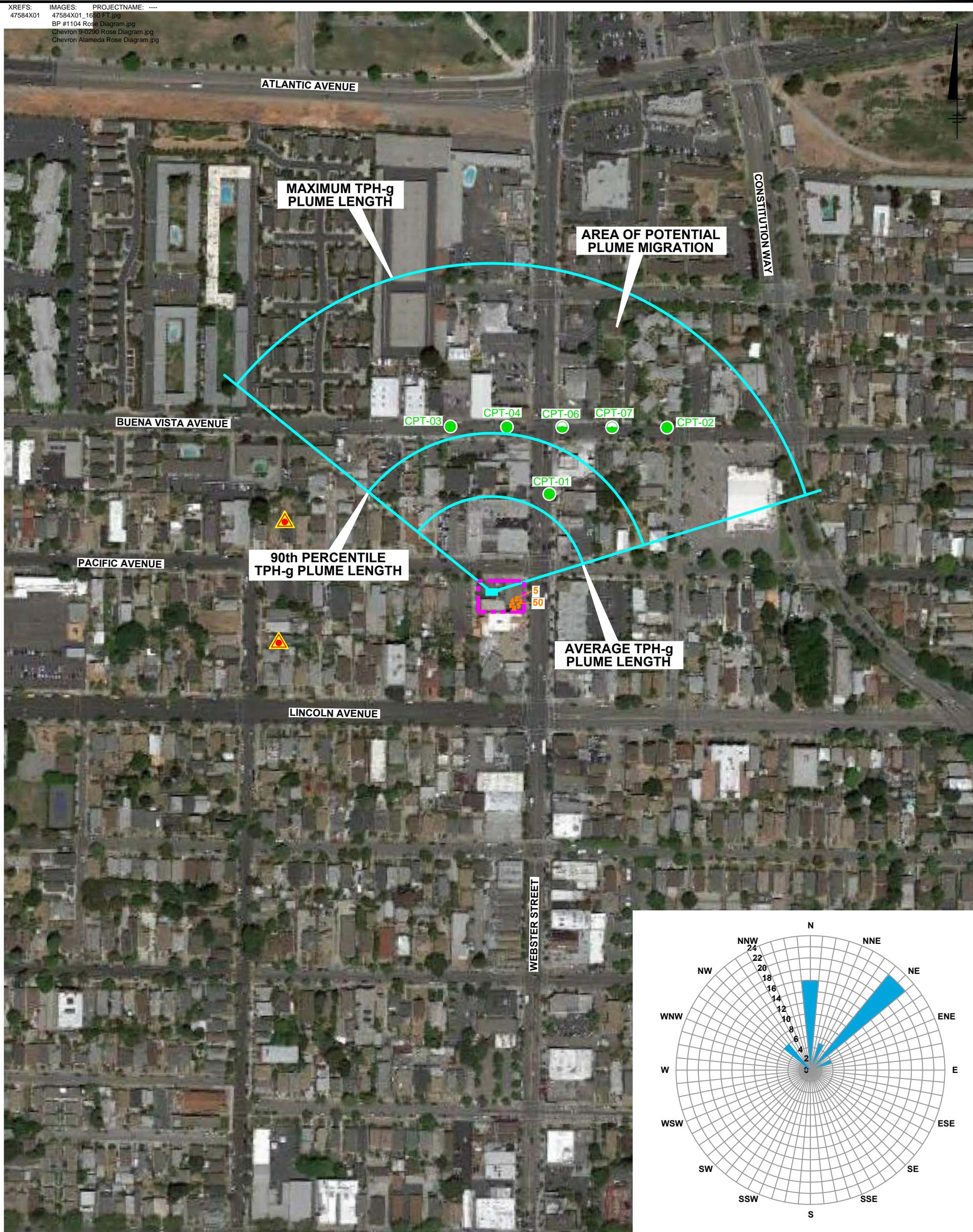
NOTES:

1. BASE MAP PROVIDED BY TRC, DATED AUGUST 2010, AT A SCALE OF 1"=60'. SHELL SERVICE STATION DATA PROVIDED BY CRA.
2. LL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. THE ADJACENT SHELL SITE HAS RECEIVED CLOSURE AND WILL NO LONGER BE SAMPLED.
4. SITE GROUNDWATER FLOW DIRECTION DATA ARE BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.



UNION OIL FORMER FACILITY NO. 0843 1629 WEBSTER STREET ALAMEDA, CALIFORNIA
MTBE SUBMERGED ZONE CONCENTRATION MAP AUGUST 13, 2014
FIGURE 8

XREFS: 47584X01
 IMAGES: 47584X01_1650_FT.jpg
 PROJECTNAME: ---
 BP #1104 Rose Diagram.jpg
 Chevron 9-0290 Rose Diagram.jpg
 Chevron Alameda Rose Diagram.jpg



0 250' 500'
 APPROXIMATE SCALE

UNION OIL COMPANY OF CALIFORNIA
 FORMER FACILITY NO. 0843
 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

**RESEARCH-BASED TPH-g PLUME
 MIGRATION ANALYSIS**



FIGURE
9

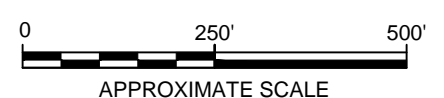
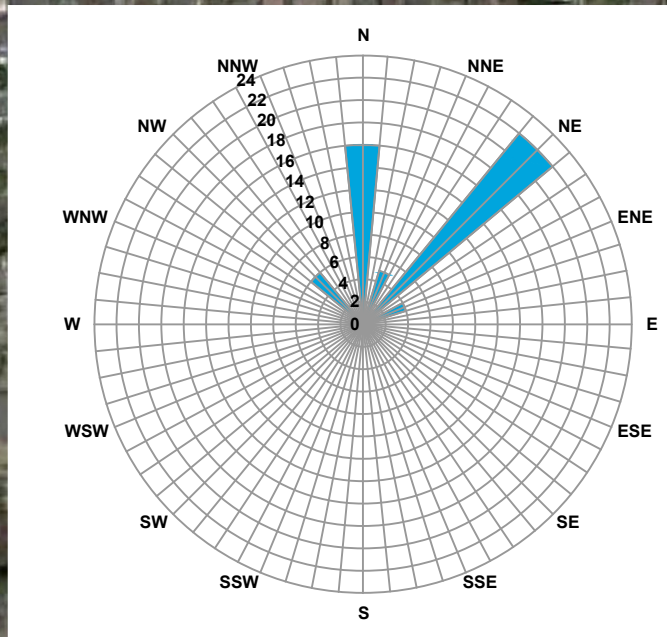
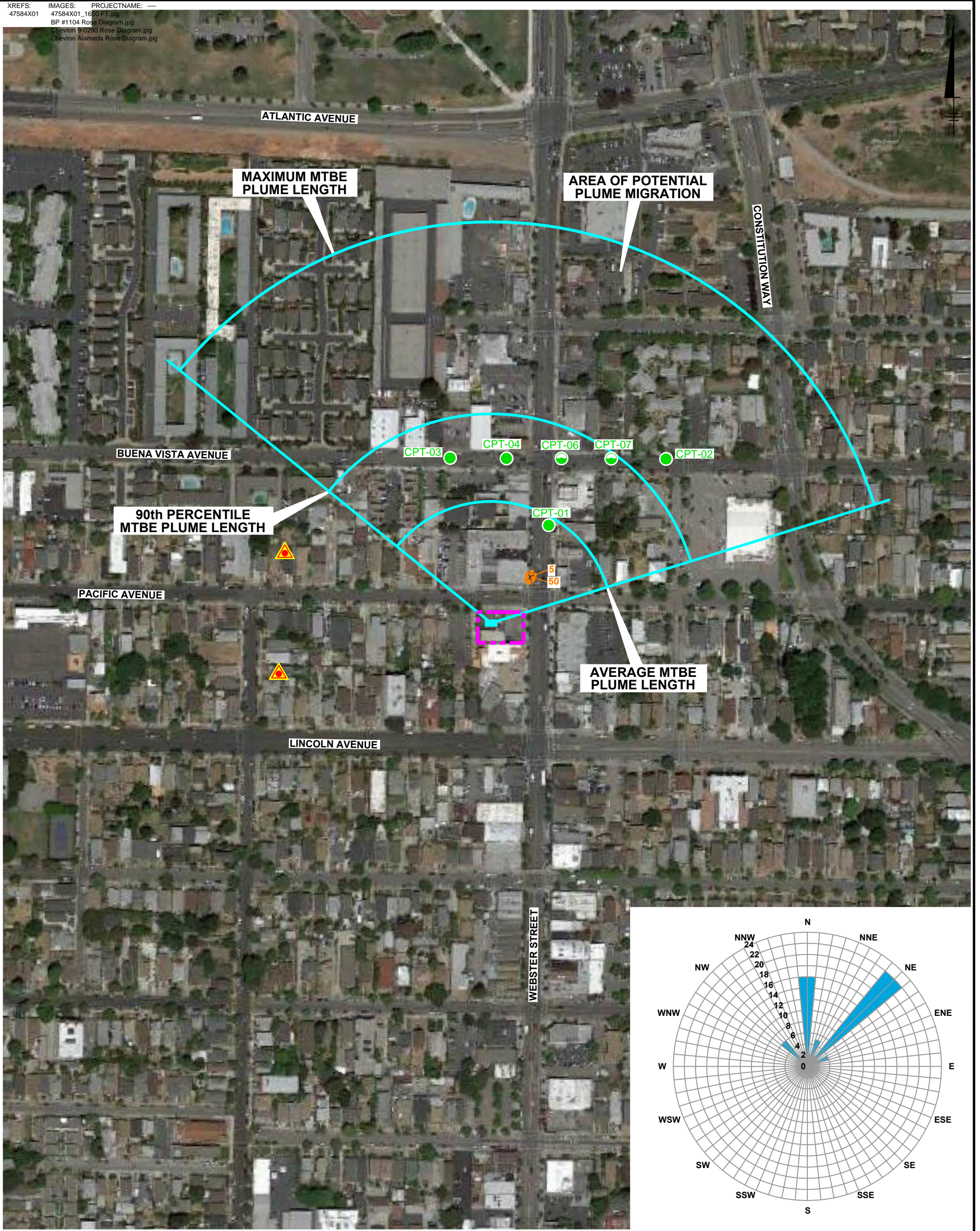
LEGEND

- SITE BOUNDARY
- TPH CONCENTRATION CONTOUR (µg/L)
- TPH-g TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- µg/L MICROGRAMS PER LITER
- SOURCE AREA
- GROUNDWATER FLOW DIRECTION
- PHASE 1 CPT BORING LOCATION
- PHASE 2 CPT BORING LOCATION
- ▲ IRRIGATION WELL

NOTES:

1. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE. SOURCE: GOOGLE™ EARTH DATE 6/9/2014.
2. SHALLOW AND SUBMERGED ZONES FOR GROUNDWATER RANGE FROM 0 TO 20 FEET BGS AND 20 TO 40 FEET BGS, RESPECTIVELY. IDENTIFICATION OF A MONITORING WELL AS EITHER SHALLOW OR SUBMERGED IS BASED ON THE SCREEN INTERVAL
3. FT BGS = FEET BELOW GROUND SURFACE
4. SITE GROUNDWATER FLOW DIRECTION DATA IS BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.
5. REFERENCE FOR PLUME LENGTH: STATE WATER RESOURCES CONTROL BOARD, 2012. *TECHNICAL JUSTIFICATION FOR GROUNDWATER MEDIA-SPECIFIC CRITERIA*. APRIL 24.
6. ONLY SENSITIVE RECEPTORS IDENTIFIED WITHIN THE MAP AREA ARE SHOWN.

XREFS: IMAGES: PROJECTNAME: ---
 47584X01 47584X01_1650 FT.jpg
 BP #1104 Rose Diagram.jpg
 Chevron 9-0290 Rose Diagram.jpg
 Chevron Alameda Rose Diagram.jpg



UNION OIL COMPANY OF CALIFORNIA
 FORMER FACILITY NO. 0843
 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

**RESEARCH-BASED MTBE PLUME
 (SHALLOW ZONE)
 MIGRATION ANALYSIS**



FIGURE
10

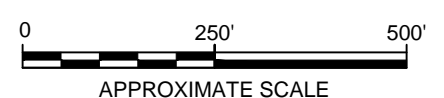
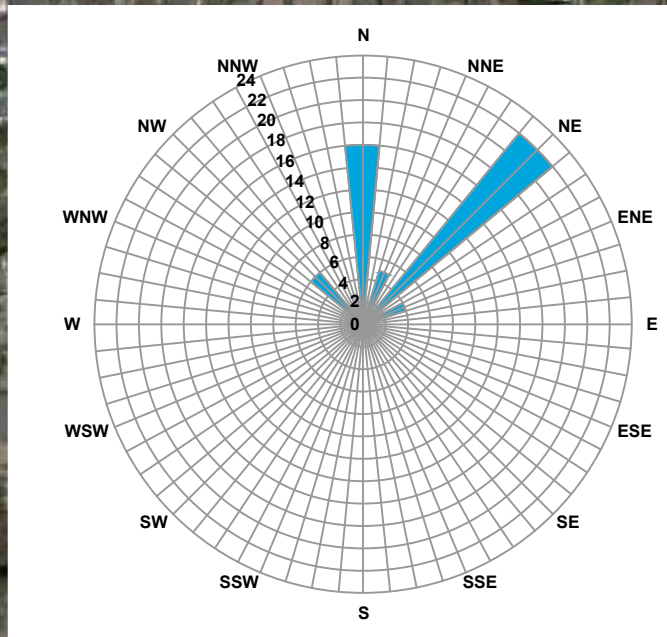
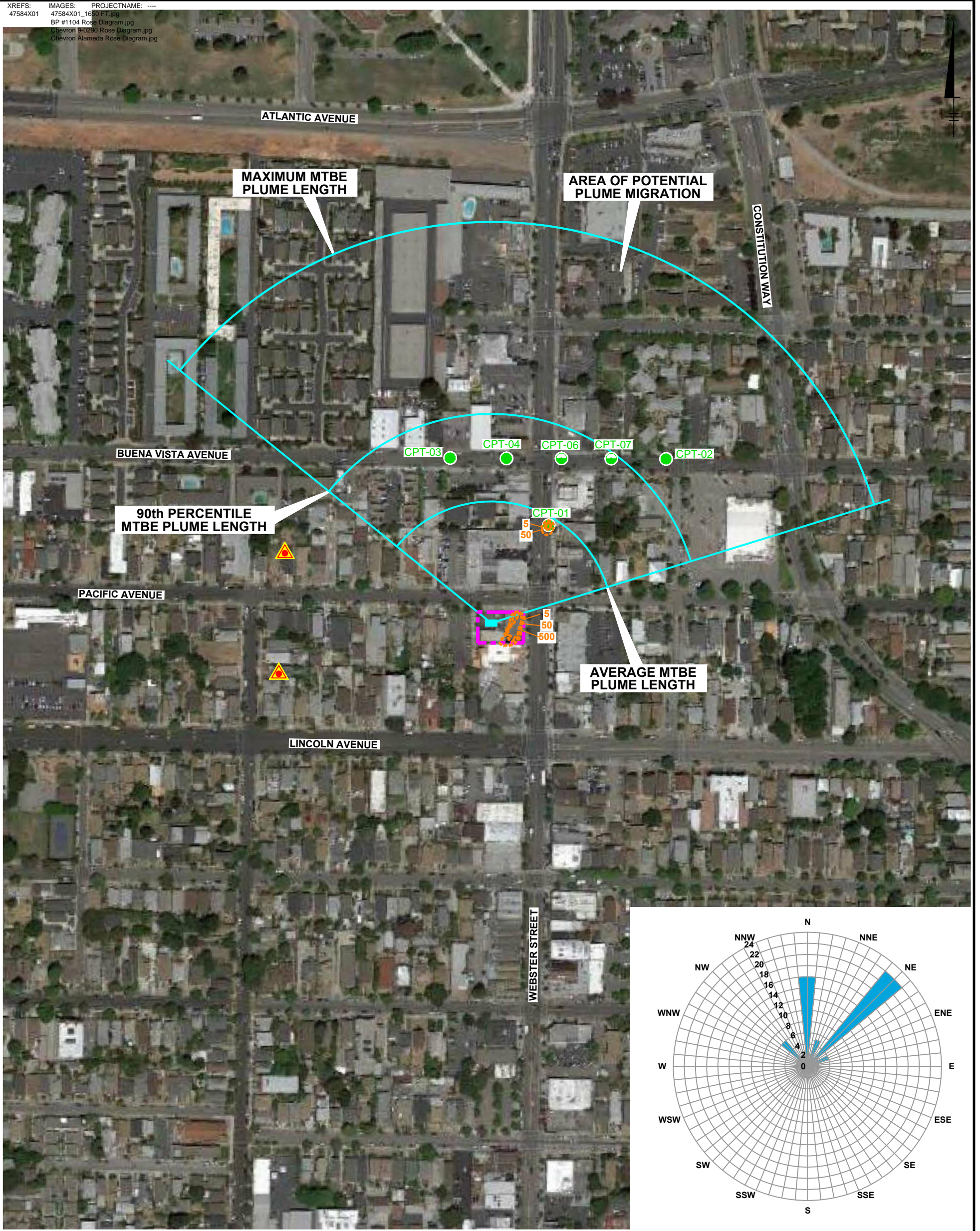
LEGEND

- SITE BOUNDARY
- MTBE CONCENTRATION CONTOUR (µg/L)
- MTBE METHYL TERTIARY BUTYL ETHER
- µg/L MICROGRAMS PER LITER
- SOURCE AREA
- ▶ GROUNDWATER FLOW DIRECTION
- CPT-01 PHASE 1 CPT BORING LOCATION
- CPT-04 PHASE 2 CPT BORING LOCATION
- ▲ IRRIGATION WELL

NOTES:

1. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE. SOURCE: GOOGLE™ EARTH DATE 6/9/2014.
2. SHALLOW AND SUBMERGED ZONES FOR GROUNDWATER RANGE FROM 0 TO 20 FEET BGS AND 20 TO 40 FEET BGS, RESPECTIVELY. IDENTIFICATION OF A MONITORING WELL AS EITHER SHALLOW OR SUBMERGED IS BASED ON THE SCREEN INTERVAL
3. FT BGS = FEET BELOW GROUND SURFACE
4. SITE GROUNDWATER FLOW DIRECTION DATA IS BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.
5. REFERENCE FOR PLUME LENGTH: STATE WATER RESOURCES CONTROL BOARD, 2012. *TECHNICAL JUSTIFICATION FOR GROUNDWATER MEDIA-SPECIFIC CRITERIA*. APRIL 24.
6. ONLY SENSITIVE RECEPTORS IDENTIFIED WITHIN THE MAP AREA ARE SHOWN.

XREFS: IMAGES: PROJECTNAME: ---
 47584X01 47584X01_1650 FT.jpg
 BP #1104 Rose Diagram.jpg
 Chevron 9-0290 Rose Diagram.jpg
 Chevron Alameda Rose Diagram.jpg



UNION OIL COMPANY OF CALIFORNIA
 FORMER FACILITY NO. 0843
 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

**RESEARCH-BASED MTBE PLUME
 (SUBMERGED ZONE)
 MIGRATION ANALYSIS**



FIGURE
11

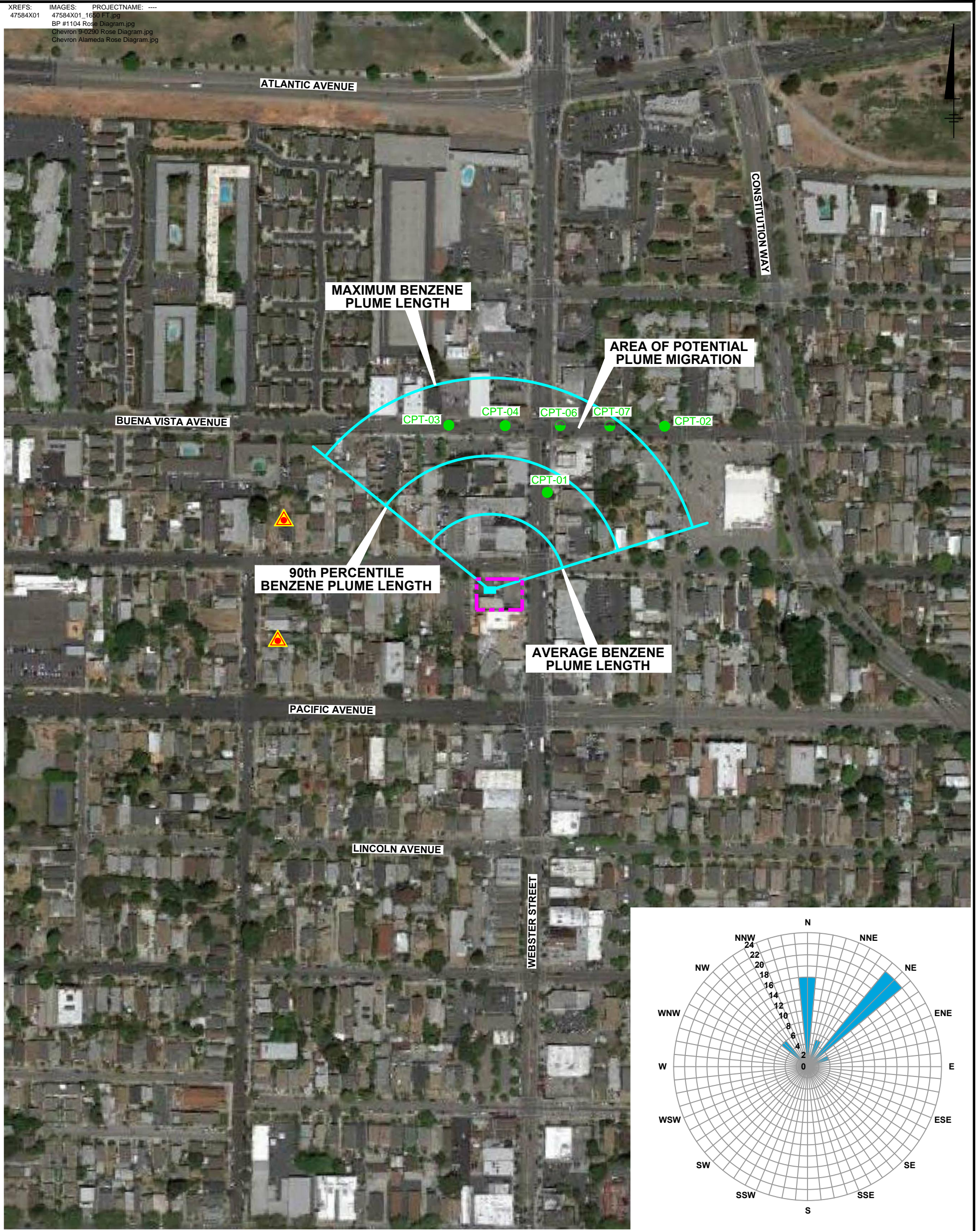
LEGEND

- SITE BOUNDARY
- MTBE CONCENTRATION CONTOUR (µg/L)
- MTBE METHYL TERTIARY BUTYL ETHER
- µg/L MICROGRAMS PER LITER
- █ SOURCE AREA
- █ GROUNDWATER FLOW DIRECTION
- CPT-01 PHASE 1 CPT BORING LOCATION
- CPT-04 PHASE 2 CPT BORING LOCATION
- ▲ IRRIGATION WELL

NOTES:

1. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE. SOURCE: GOOGLE™ EARTH DATE 6/9/2014.
2. SHALLOW AND SUBMERGED ZONES FOR GROUNDWATER RANGE FROM 0 TO 20 FEET BGS AND 20 TO 40 FEET BGS, RESPECTIVELY. IDENTIFICATION OF A MONITORING WELL AS EITHER SHALLOW OR SUBMERGED IS BASED ON THE SCREEN INTERVAL
3. FT BGS = FEET BELOW GROUND SURFACE
4. SITE GROUNDWATER FLOW DIRECTION DATA IS BASED ON APPROXIMATELY 60 MONITORING EVENTS FROM 1999 THROUGH 2014.
5. REFERENCE FOR PLUME LENGTH: STATE WATER RESOURCES CONTROL BOARD, 2012. *TECHNICAL JUSTIFICATION FOR GROUNDWATER MEDIA-SPECIFIC CRITERIA*. APRIL 24.
6. ONLY SENSITIVE RECEPTORS IDENTIFIED WITHIN THE MAP AREA ARE SHOWN.

XREFS: 47584X01
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 PROJECTNAME: ---
 BP #1104 Rose Diagram.jpg
 Chevron 9-0290 Rose Diagram.jpg
 Chevron Alameda Rose Diagram.jpg

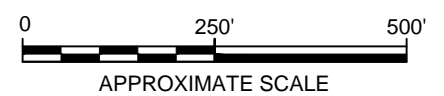
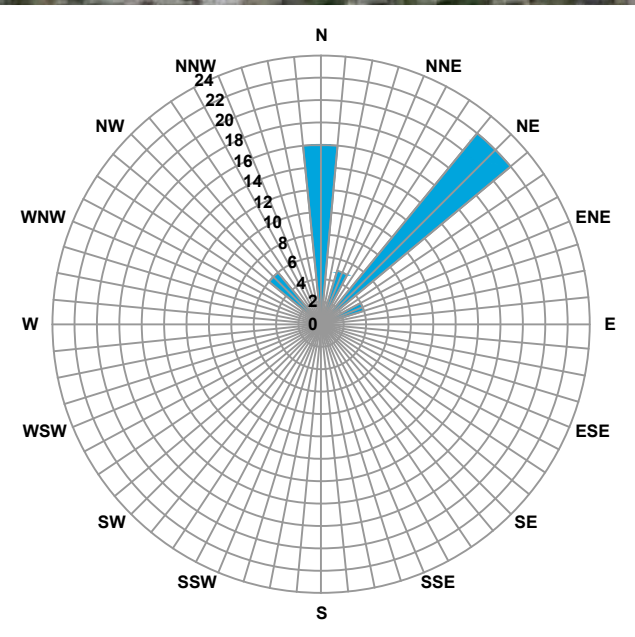


LEGEND

- SITE BOUNDARY
- SOURCE AREA
- ▶ GROUNDWATER FLOW DIRECTION
- CPT-01 PHASE 1 CPT BORING LOCATION
- CPT-04 PHASE 2 CPT BORING LOCATION
- ▲ IRRIGATION WELL

NOTES:

1. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE. SOURCE: GOOGLE™ EARTH DATE 6/9/2014.
2. SHALLOW AND SUBMERGED ZONES FOR GROUNDWATER RANGE FROM 0 TO 20 FEET BGS AND 20 TO 40 FEET BGS, RESPECTIVELY. IDENTIFICATION OF A MONITORING WELL AS EITHER SHALLOW OR SUBMERGED IS BASED ON THE SCREEN INTERVAL
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5. REFERENCE FOR PLUME LENGTH: STATE WATER RESOURCES CONTROL BOARD, 2012. *TECHNICAL JUSTIFICATION FOR GROUNDWATER MEDIA-SPECIFIC CRITERIA*. APRIL 24.
6. ONLY SENSITIVE RECEPTORS IDENTIFIED WITHIN THE MAP AREA ARE SHOWN.



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 1629 WEBSTER STREET
 ALAMEDA, CALIFORNIA

RESEARCH-BASED BENZENE PLUME MIGRATION ANALYSIS





Appendix A

Low-Threat Closure Checklist

Site Name:
 Site Address:

Site meets the criteria of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.¹

<p><u>General Criteria</u> General criteria that must be satisfied by all candidate sites:</p> <p>Is the unauthorized release located within the service area of a public water system?</p> <p>Does the unauthorized release consist only of petroleum?</p> <p>Has the unauthorized (“primary”) release from the UST system been stopped?</p> <p>Has free product been removed to the maximum extent practicable?</p> <p>Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?</p> <p>Has secondary source been removed to the extent practicable?</p> <p>Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15?</p> <p>Does nuisance as defined by Water Code section 13050 exist at the site?</p> <p>Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p><u>Media-Specific Criteria</u> Candidate sites must satisfy all three of these media-specific criteria:</p> <p>1. Groundwater: To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites:</p> <p>Is the contaminant plume that exceeds water quality objectives stable or decreasing in areal extent?</p> <p>Does the contaminant plume that exceeds water quality objectives meet all of the additional characteristics of one of the five classes of sites?</p> <p>If YES, check applicable class: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>

¹ Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.

Site Name:
 Site Address:

<p>For sites with releases that have not affected groundwater, do mobile constituents (leachate, vapors, or light non-aqueous phase liquids) contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>
<p>2. Petroleum Vapor Intrusion to Indoor Air: The site is considered low-threat for vapor intrusion to indoor air if site-specific conditions satisfy all of the characteristics of one of the three classes of sites (a through c) or if the exception for active commercial fueling facilities applies.</p> <p>Is the site an active commercial petroleum fueling facility? Exception: Satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk.</p> <p>a. Do site-specific conditions at the release site satisfy all of the applicable characteristics and criteria of scenarios 1 through 3 or all of the applicable characteristics and criteria of scenario 4? If YES, check applicable scenarios: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4</p> <p>b. Has a site-specific risk assessment for the vapor intrusion pathway been conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency?</p> <p>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>
<p>3. Direct Contact and Outdoor Air Exposure: The site is considered low-threat for direct contact and outdoor air exposure if site-specific conditions satisfy one of the three classes of sites (a through c).</p> <p>a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth below ground surface (bgs)?</p> <p>b. Are maximum concentrations of petroleum constituents in soil less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health?</p> <p>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>



Appendix B

Boring Logs



Project No.: 2248 Boring: B1/MW1 Plate: APPENDIX
 Site: Former Tosco 78 Service Station 0843 Date: 3/2/99
 Drill Contractor: Woodward Drilling

Sample Method: Split Spoon Geologist: MARK S. DOCKUM
 Drill Rig: B57 Bore Hole Diameter: 8" Signature: _____
 Location: South End of Site Approximately 50 Feet Registration: R.G. 4412
West of Southern Driveway Logged by: Dylan Crouse

DEPTH (ft)	BLOW COUNTS	PTD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
0						3" asphalt	
0 - 5	5	0			SP	Sand, trace of silt, yellowish brown, moist	
5 - 10	38	0			SC	Sands, trace of silt and some clay, brown, moist, some plasticity	
10 - 15	35	0			SP	Sand, trace of silt, light yellowish brown, wet	
15 - 20	40	0				sand, trace of silt, olive, wet	
						Total depth at 20.5 feet. Groundwater encountered at 12 feet. Static groundwater encountered at 5.8 feet.	

Casing Diameter: 2" Slot Size: 0.020, Sand Size: #3, Grout: Portland I.II

Delta Consultants

Project No: C102349210

Client: ConocoPhillips

Well No: **MW-1AR**

Logged By: Alan Buehler

Location: **1629 Webster Street**

Date Drilled: 5/13/09

Driller: RSI Drilling

Alameda, California

Page 1 of 2

Drilling Method: Hollow Stem Auger

Hole Diameter: 8"

Sampling Method: Split Spoon

Hole Depth: 35'

Casing Type: Sched. 40 PVC

Well Diameter: 2"

Slot Size: 0.02

Well Depth: 30.5'

Gravel Pack: Filter Sand

First Water Depth: N/A

▽ = First Water

▼ = Static Groundwater

Elevation Northing Easting

Well Completion	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill Casing						1			Silty sand; trace clay with gravel.
					Air-Knife	2			
						3			
						4			
	▼	moist	0.0			5		SM	Silty sand; light brown.
						6			
						7		SM	Same as above.
						8			
						9		SM	Same as above.
		moist	0.1			10		SM	Silty sand with gravel; dark brown.
						11			
						12		SM	Silty sand; light brown
						13			
		wet	1.3			14			
						15		SM	Same as above.
						16			
						17			
						18			
						19			
		sat.	2.9		11:23 @ 20'	20		SM	Encountered heaving sands to total depth of boring.
						21			
						22			

Well Box

Concrete Seal

2" Sched. 40 PVC Blank Casing

Bentonite Seal

Delta Consultants

Project No: C102349210
 Logged By: Alan Buehler
 Driller: RSI Drilling

Client: ConocoPhillips
 Location: 1629 Webster Street
 Alameda, California

Well No: MW-1AR
 Date Drilled: 5/13/09
 Page 2 of 2

Drilling Method: Hollow Stem Auger
 Sampling Method: Split Spoon
 Casing Type: Sched. 40 PVC
 Slot Size: 0.02
 Gravel Pack: Filter Sand

Hole Diameter: 8"
 Hole Depth: 30'
 Well Diameter: 2"
 Well Depth: 30.5'
 First Water Depth: N/A

▽ = First Water
 ▼ = Static Groundwater

Elevation Northing Easting

Well Completion		Static Water Level	Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Sample Recovery	Interval	Soil Type	LITHOLOGY / DESCRIPTION	
Backfill	Casing										
				N/A		23			SM	Encountered heaving sands to total depth of boring.	
						24					
						25					
						26					
						27					
						28					
						29					
						30					
Total Depth of Boring = 30.5 Feet Below Ground Surface (bgs)											
						31					
						32					
						33					
						34					
						35					
						36					
						37					
						38					
						39					
						40					
						41					
						42					
						43					
						44					

Delta Consultants

Project No: C102349210

Logged By: Alan Buehler

Driller: RSI Drilling

Drilling Method: Hollow Stem Auger

Sampling Method: Split Spoon

Casing Type: Sched. 40 PVC

Slot Size: 0.02

Gravel Pack: Filter Sand

Client: ConocoPhillips

Location: 1629 Webster Street

Alameda, California

Hole Diameter: 8"

Hole Depth: 35'

Well Diameter: 2"

Well Depth: 34.5'

First Water Depth: N/A

Well No: MW-1BR

Date Drilled: 5/15/09

Page 1 of 2

▽ = First Water

▼ = Static Groundwater

Elevation

Northing

Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Depth (feet)	Sample Recovery	Soil Type	LITHOLOGY / DESCRIPTION
						1			Silty sand; trace clay with gravel.
						2			
						3			
						4			
		moist			Air-Knife	5		SM	Silty sand; light brown.
	▼	damp				6		SM	Same as above.
		damp				7			
		damp				8		SM	Same as above.
		moist	0.2			9		SM	Same as above.
						10		SM	Silty sand with gravel; dark brown.
						11			
						12		SM	Silty sand; light brown
						13			
						14			
		moist	0.2			15		SM	Same as above.
						16			
						17			
						18			
						19			
		moist	0.6		13:41 @ 20'	20		SM	Encountered heaving sands to total depth of boring.
						21			
						22			

Well Box

Concrete Seal

2" Sched. 40 PVC Blank Casing

Delta Consultants

Project No: C102349210

Client: **ConocoPhillips**

Well No: **MW-1BR**

Logged By: Alan Buehler

Location: **1629 Webster Street**

Date Drilled: 5/15/09

Driller: **RSI Drilling**

Alameda, California

Page 2 of 2

Drilling Method: Hollow Stem Auger

Hole Diameter: 8"

Sampling Method: Split Spoon

Hole Depth: 35'

Casing Type: Sched. 40 PVC

Well Diameter: 2"

Slot Size: 0.02

Well Depth: 34.5'

Gravel Pack: Filter Sand

First Water Depth: N/A

▽ = First Water

▼ = Static Groundwater

Elevation

Northing

Easting

Well Completion		Static Water Level	Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Sample		Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing						Recovery	Interval		
						23				Continuation of heaving sands to total depth of boring.
						24				
						25				
						26				
						27				
						28				
						29				
						30				
						31				
						32				
						33				
						34				
						35				
						36				
						37				
						38				
						39				
						40				
						41				
						42				
						43				
						44				

Bentonite Seal

Filter Sand



Project No.: 2248 Boring: B2/MW2 Plate: APPENDIX
 Site: Former Tosco 76 Service Station 0843 Date: 3/2/99
 Drill Contractor: Woodward Drilling

Sample Method: Split Spoon Geologist: MARK S. DOCKUM
 Drill Rig: B57 Bore Hole Diameter: 8" Signature:
 Location: Northeast Corner of Site Approximately 10 Feet North of East Dispenser Registration: R.G. 4412
 Logged by: Dylan Crouse

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5	2	0				Sand, fine-grained, trace of silt, yellowish brown, very moist	
10	27	1023			SP	sand, trace of silt, olive gray, very moist	
15	43	46				sand, trace of silt, dark yellowish brown, wet	
20	86	9				sand, trace of silt, light olive yellow, wet	
						Total depth at 20.5 feet. Groundwater encountered at 8.5 feet. Static groundwater encountered at 5.3 feet.	

Casing Diameter: 2" Slot Size: 0.020, Sand Size: #3, Grout: Portland I.II



Project No.: 2248 Boring: B3/MW3 Plate: APPENDIX
 Site: Former Tosco 76 Service Station 0843 Date: 3/2/99
 Drill Contractor: Woodward Drilling

Sample Method: Split Spoon Geologist: MARK S. DOCKUM
 Drill Rig: B57 Bore Hole Diameter: 8" Signature: _____
 Location: North Center in the Planter Approximately 1 Registration: R.G. 4412
Foot South of the Sidewalk Logged by: Dylan Crouse

DEPTH (ft)	BLW COUNTS	PD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5	5	0				3" planter soil Silt, trace of sand and clay, fine-grained, dark yellowish brown, very moist, some plasticity	
10	35	0			ML		
15	20	1				silt, trace of sand, fine-grained, dark yellowish brown, wet, no plasticity	
20	37	7				very moist	
						Total depth at 20.5 feet. Groundwater encountered at 12 feet. Static groundwater encountered at 4.9 feet.	

Casing Diameter: 2" Slot Size: 0.020, Sand Size: #3, Grout: Portland I.II



Project No.: 2248 Boring: B4/MW4 Plate: APPENDIX
 Site: Former Tosco 76 Service Station 0843 Date: 3/2/99
 Drill Contractor: Woodward Drilling

Sample Method: Split Spoon Geologist: MARK S. DOCKUM
 Drill Rig: B57 Bore Hole Diameter: 8" Signature:
 Location: Northeast Corner of Site Approximately 13 Feet South of Driveway Registration: R.G. 4412
 Logged by: Dylan Crouse

DEPTH (ft)	BLOW COUNTS	PTD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
						3" asphalt at top	
5-10	0				ML	silt, trace of sands, fine-grained, gravel and clay 0.5, dark yellowish brown, moist, some plasticity	
10-50	5					olive, very moist	
15-33	0					light olive brown, wet, no plasticity	
20-35	0					Total depth at 20.5 feet. Groundwater encountered at 15 feet. Static groundwater encountered at 4.7 feet.	

Casing Diameter: 2" Slot Size: 0.020" Sand Size: #3 Grout: Portland 1.11



Project No.: 2248 Boring: MW5 Plate: APPENDIX
 Site: Former Tosco 76 Service Station 0843 Date: 12/8/99
 Drill Contractor: Woodward Drilling

Sample Method: Split Spoon Geologist: MARK S. BOCKUM
 Drill Rig: B57 Bore Hole Diameter: 8" Signature: *[Handwritten Signature]*
 Location: 6.3 Feet from Curb 215 North and 95 Feet East of Northeast Site Boundary Registration: R.G. 4412
 Logged by: Dylan Crouse

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
0 - 1					1' asphalt Fill, sand	
5	9	0		CL	*Sand with some clay, olive gray, moist, slight plasticity, (25% clay, 75% sand), very fine-grained	
10	26	0			Sand with some silt, yellowish orange, (25% silt, 75% sand), very fine-grained, wet, red staining	
15	36	0		SM	same as above	
20	50	0			same as above	
Total depth at 21.5 feet. First encountered groundwater at 10 feet. Static groundwater at 6.9 feet.						
*Soil description modified following field work. Original field log available upon request from ERI.						

Casing Diameter: 2" Slot Size: .010" Sand Size: 2/12" Grout: Portland I, II



Project No.: 2248 Boring: MW6 Plate: APPENDIX
 Site: Former Tosco 76 Service Station 0843 Date: 12/8/99
 Drill Contractor: Woodward Drilling

Sample Method: Split Spoon Geologist: MARK S. DOCKUM
 Drill Rig: B57 Bore Hole Diameter: 8" Signature: *Mark S. Dockum*
 Location: 6.5 Feet from Curb 130 Feet North and 18 Feet East of Northeast Site Boundary
 Registration: R.G. 4412 Logged by: Dylan Crouse

DEPTH (ft.)	BLOW COUNTS	PIID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
0 - 5	8					6" asphalt, 6" concrete Fill, sand with some gravel	
5 - 10	21	5				no recovery Sand with some silt, yellowish orange, (25% silt, 75% sand), very fine-grained, wet	
10 - 15	19	28		SM	same as above		
15 - 20	80	3			same as above		
20 - 21.5						Total depth at 21.5 feet. First encountered groundwater at 9.8 feet.	

Casing Diameter: 2" Slot Size: 0.010, Sand Size: 2/12, Grout: Portland I.I

Delta Consultants

Project No: C102349210

Client: **ConocoPhillips**

Well No: **MW-7**

Logged By: Alan Buehler

Location: **1629 Webster Street**

Date Drilled: 5/14/09

Driller: **RSI Drilling**

Alameda, California

Page 1 of 2

Drilling Method: Hollow Stem Auger

Hole Diameter: 8"

Sampling Method: Split Spoon

Hole Depth: 30'

Casing Type: Sched. 40 PVC

Well Diameter: 2"

Slot Size: 0.02

Well Depth: 29.7'

Gravel Pack: Filter Sand

First Water Depth: 9.5'

▽ = First Water

▼ = Static Groundwater

Elevation

Northing

Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION	
	▼	damp	14.0		Air-Knife	1			Silty sand with gravel; presence of non-native fill material (i.e. brick and railroad ties.)	
						2				
						3				
						4				
		▼					5		SM	Silty sand with gravel; continued presence of non-native fill described above.
							6		SC	
				1530			7			
							8		SC	Same as above. Increased strong odor.
		▽	wet				9			
				1530		16:45 @ 10'	10		SC	Same as above.
							11			
							12		SC	Same as above. Less odor.
							13			
							14			
				72.0			15		SC	Same as above.
							16			
							17		SC	Same as above. Brown mottling noticed.
							18			
							19			
							20		SC	Same as above; no odor.
				9.5			21			
							22			

Delta

Consultants

Project No: C102349210
 Logged By: Caitlin Morgan
 Driller: **RSI Drilling**
 Drilling Method: Hollow Stem Auger
 Sampling Method: Split Spoon
 Casing Type: Sched. 40 PVC
 Slot Size: 0.02
 Gravel Pack: Filter Sand

Client: **ConocoPhillips**
 Location: **1629 Webster Street**
 Alameda, California

Well No: **MW-7**
 Date Drilled: 5/14/09
 Page 2 of 2

▽ = First Water

▼ = Static Groundwater

Elevation

Northing

Easting

Well Completion		Static Water Level	Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Sample		Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing						Recovery	Interval		
						23			SC	Clayey sand; green to gray.
						24				
			Sat.	8.3		25			SC	Clayey sand; green to gray.
						26				
						27				
						28				
						29			SC	Clayey sand; green to gray.
			Sat.	8.0		30				
						31			SC	Total Depth of Boring = 30 Feet Below Ground Surface (bgs)
						32				
						33				
						34				
						35				
						36				
						37				
						38				
						39				
						40				
						41				
						42				
						43				
						44				

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Project No: C102349210
 Logged By: Caitlin Morgan
 Driller: RSI Drilling

Client: **ConocoPhillips**
 Location: **1629 Webster Street**
Alameda, CA

Well No: **MW-8**
 Date Drilled: 5/14/09
 Page 1 of 2

Drilling Method: Hollow Stem Auger Hole Diameter: 8"
 Sampling Method: Split Spoon Hole Depth: 30'
 Casing Type: Sched. 40 PVC Well Diameter: 2"
 Slot Size: 0.02 Well Depth: 29.5'
 Gravel Pack: Filter Sand First Water Depth: 18'

▽ = First Water
 ▼ = Static Groundwater

Elevation

Northing

Easting

Well Completion	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill Casing									
Well Box									
					Air-Knife	1		SW	Well graded sand with clay and gravel, trace roots.
						2			
Concrete Seal						3			
						4			
	▼	moist	0.2			5		SW	Well graded sand with clay and gravel, trace roots; dark brown.
						6			
		moist	0.2			7			
						8		SW-SM	Well graded sand with silt, trace clay. More moist than above.
						9		SM	
		moist	0.2			10		SW-SM	Same as above. Slight odor.
						11		SM	
						12			
						13			
		wet	3.1		12:36 @ 15'	15		SC	Clayey sand, trace roots; gray; more moist than above; slight odor.
						16			
						17		SC	Same as above. Some brown mottling; less clay.
	▽	sat.				18		SW-SM	Well graded sand with silt, trace clay.
						19			
		sat.	0.5			20		SW-SM	Same as above. Less mottling.
						21		SM	
Bentonite Seal						22			

Delta Consultants

Project No: C102349210 Client: **ConocoPhillips**
 Logged By: Caitlin Morgan Location: **1629 Webster Street**
 Driller: **RSI Drilling** Alameda, California
 Drilling Method: Hollow Stem Auger Hole Diameter: 8"
 Sampling Method: Split Spoon Hole Depth: 30'
 Casing Type: Sched. 40 PVC Well Diameter: 2"
 Slot Size: 0.02 Well Depth: 29.5'
 Gravel Pack: Filter Sand First Water Depth: 18'

Well No: **MW-8**
 Date Drilled: 5/14/09
 Page 2 of 2

▽ = First Water
 ▼ = Static Groundwater

Elevation Northing Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
					23			
					24			
		sat.	0.4		25		SW-SM	Same as above.
					26			
					27			
					28			
					29		SW-SM	Same as above.
		sat.	0.4		30			Total Depth of Boring = 30 Feet Below Ground Surface (bgs)
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			
					41			
					42			
					43			
					44			

Delta Consultants

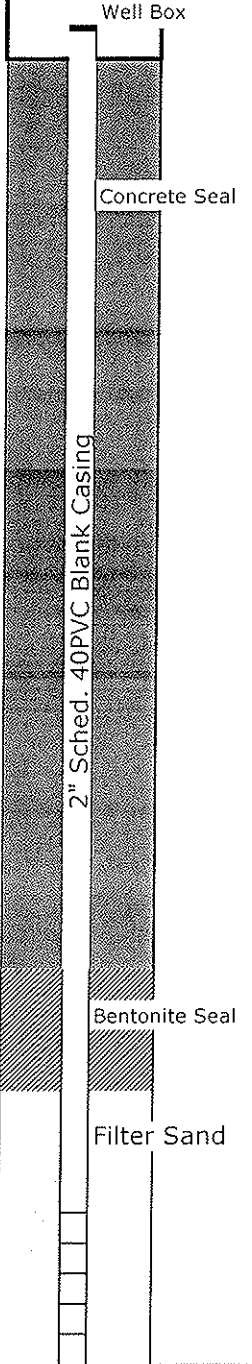
Project No: C102349210
 Logged By: Caitlin Morgan
 Driller: RSI Drilling
 Drilling Method: Hollow Stem Auger
 Sampling Method: Split Spoon
 Casing Type: Sched. 40PVC
 Slot Size: 0.02
 Gravel Pack: Filter Sand

Client: **ConocoPhillips**
 Location: **1629 Webster Street**
Alameda, California
 Hole Diameter: 8"
 Hole Depth: 25'
 Well Diameter: 8"
 Well Depth: 24.8'
 First Water Depth: N/A

Well No: **MW-9**
 Date Drilled: 5/13/09
 Page 1 of 2

▽ = First Water
 ▼ = Static Groundwater

Well Completion		Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Elevation		Northing		Easting		LITHOLOGY / DESCRIPTION
Backfill	Casing						Depth (feet)	Sample Recovery Interval	Soil Type				
						Air-Knife							Well graded sand with silt and gravel; brown.
			moist	18									
													Well graded sand with silt and gravel, trace clay, trace wood chips; brown to light brown.
			moist	2105		MW-9 @10' 14:40							Same as above; more clay. Greenish gray; strong petroleum hydrocarbon odor.
			moist	520									Same as above; brown w/ some greenish gray; less odor from the sample itself however at this point drillers note strong petroleum hydrocarbon odor coming from borehole. PID of 12.0 was obtained from above the open borehole/auger.
			sat.	183									Well graded sand with silt, trace clay; brown to light brown; moist; low odors.



Delta Consultants

Project No: C102349210 Client: **ConocoPhillips**
 Logged By: Caitlin Morgan Location: **1629 Webster Street**
 Driller: **RSI Drilling** Alameda, California
 Drilling Method: Hollow Stem Auger Hole Diameter: 8"
 Sampling Method: Split Spoon Hole Depth: 25'
 Casing Sched. 40PVC Well Diameter: 2"
 Slot Size: 0.02 Well Depth: 24.8'
 Gravel Pack: Filter Sand First Water Depth: N/A

Well No: **MW-9**
 Date Drilled: 5/13/09
 Page 2 of 2

▽ = First Water
 ▼ = Static Groundwater

Elevation Northing Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
		sat.			23		SW-SM	Well graded sand with silt, trace clay; brown to light brown; moist; low odors.
					24			
					25			Total Depth of Boring = 25 Feet Below Ground Surface (bgs)
					26			
					27			
					28			
					29			
					30			
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			
					41			
					42			
					43			
					44			

Delta Consultants

Project No: C102349210 Client: **ConocoPhillips**
 Logged By: Caitlin Morgan Location: **1629 Webster Street**
 Driller: **RSI Drilling** Alameda, California
 Drilling Method: Geoprobe Hole Diameter: 8"
 Sampling Method: Direct Push Hole Depth: 30'
 Casing Type: Sched. 40 PVC Well Diameter: 2"
 Slot Size: 0.02 Well Depth: 30'
 Gravel Pack: Filter Sand First Water Depth: 19'

Well No: **MW-10**
 Date Drilled: 5/20/09
 Page 1 of 2

▽ = First Water
 ▼ = Static Groundwater

Well Completion		Elevation				Northing		Easting		LITHOLOGY / DESCRIPTION
Backfill	Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	
	2" Sched. 40 PVC Blank Casing					Air-Knife	1			Silty sand; trace clay and gravel.
		▼	moist	23.0			2			
							3			
							4			
							5			SC Clayey sand; brown; fine to medium fine; medium plasticity; firm; slight odor.
							6			
							7			
			moist	57.4		9:23 @ 10'	8			SP-SC Poorly graded sand with clay; brown with some gray; medium plasticity; soft; slight odor.
							9			
							10			SP-SM Poorly graded sand with silt; fine grained; low plasticity; soft; odor more prevalent.
							11			
							12			
			damp	0			13			SP-SC Same as at 8-feet.
							14			
							15			SP-SM Same as at 10-feet. More moisture; no odor.
							16			
							17			*** Drillers indicate presence of heaving sands.
							18			
		▽	sat.	3			19			
							20			SM Silty sand; brown.
							21			
							22			

2" Sched. 40 PVC Blank Casing

Bentonite Seal

Delta Consultants

Project No: C102349210 Client: **ConocoPhillips**
 Logged By: Caitlin Morgan Location: **1629 Webster Street**
 Driller: **RSI Drilling** **Alameda, California**
 Drilling Method: Geoprobe Hole Diameter: 8"
 Sampling Method: Direct Push Hole Depth: 30"
 Casing Type: PVC Well Diameter: 2"
 Slot Size: 0.02 Well Depth: 30'
 Gravel Pack: Filter Sand First Water Depth: 19'

Well No: **MW-10**
 Date Drilled: 5/20/2009
 Page 2 of 2

▽ = First Water
 ▼ = Static Groundwater

Elevation Northing Easting

Well Completion		Static Water Level	Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing								
			Sat.	2.9		23		SM	Continued heaving sands.
						24			
						25			
						26			
						27			
						28			
			Sat.	2.3		29		SM	Same as above.
-----									Total Depth of Boring = 30 Feet Below Ground Surface (bgs)
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			
						41			
						42			
						43			
						44			

Delta Consultants

Project No: C102349210

Client: **ConocoPhillips**

Well No: **MW-11**

Logged By: Caitlin Morgan

Location: **1620 Webster Street**

Date Drilled: 5/15/09

Driller: **RSI Drilling**

Alameda, California

Page 1 of 2

Drilling Method: Hollow Stem Auger

Hole Diameter: 8"

Sampling Method: Split Spoon

Hole Depth: 28'

Casing Type: Sched. 40 PVC

Well Diameter: 2"

Slot Size: 0.02

Well Depth: 28.0'

Gravel Pack: Filter Sand

First Water Depth: 14'

▽ = First Water

▼ = Static Groundwater

Elevation

Northing

Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Depth (feet)	Sample Recovery	Interval	Soil Type	LITHOLOGY / DESCRIPTION	
					Air-Knife	1			SW-SM	Sandy clay, trace silt; brown to light brown; trace organics, also debris/fill including ceramic kitchenware.	
						2					
						3					
						4					
		dry	0.0			9:15 @ 10'	5		SC	Clayey sand with gravel; light brown, trace roots.	
					6						
		moist	0.0				SW-SM	7		SW-SM	Well graded sand with silt and gravel; brown.
					8						
					9						
					10						
		moist	18.3				SC	11		SC	Clayey sand with silt; gray; slight odor.
					12						
					13						
					14						
		damp	3.4			SC	15		SC	Same as above.	
					16						
					17						
					18						
						SC	19		SC	Same as above; slight petroleum hydrocarbon odor.	
					20						
					21						
					22						

Delta

Consultants

Project No: C102349210 Client: **ConocoPhillips**
 Logged By: Caitlin Morgan Location: **1629 Webster Street**
 Driller: **RSI Drilling** Alameda, California
 Drilling Method: Hollow Stem Auger Hole Diameter: 8"
 Sampling Method: Split Spoon Hole Depth: 25"
 Casing Type: Sched. 40 PVC Well Diameter: 2"
 Slot Size: 0.02 Well Depth: 28"
 Gravel Pack: Filter Sand First Water Depth: 14'

Well No: **MW-11**
 Date Drilled: 5/15/09
 Page 2 of 2

▽ = First Water
 ▼ = Static Groundwater

Elevation Northing Easting

Well Completion		Static Water Level	Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing								
			sat.	1.3		23		SC	Sandy clay with silt; gray; slight odor.
						24			
						25			
						26			
						27			
						28			Total Depth of Boring = 28 Feet Below Ground Surface (bgs)
						29			
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			
						41			
						42			
						43			
						44			

Delta Consultants

Project No: C102349210
 Logged By: Alan Buehler
 Driller: RSI Drilling
 Drilling Method: Hollow Stem Auger
 Sampling Method: Split Spoon
 Casing Type: Sched. 40 PVC
 Slot Size: 0.020
 Gravel Pack: Filter Pack

Client: ConocoPhillips
 Location: 1629 Webster Street
 Alameda, California
 Hole Diameter: 8"
 Hole Depth: 30.5' bgs
 Well Diameter: 3/4"
 Well Depth: 30'
 First Water Depth: N/A

Well No: TSP-1
 Date Drilled: 5/14/2009
 Page 1 of 2

▽ = First Water
 ▼ = Static Groundwater

Elevation Northing Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Sample Identification	Depth (feet)	Sample Recovery	Interval	Soil Type	LITHOLOGY / DESCRIPTION
		moist	0.4		Air-Knife	1				
						2				
						3				
						4				
		moist				5			SW	Well graded sand, trace fine gravel; brown.
						6				
		moist				7				
						8			SW-SM	Fine to medium sand, with trace silt; light brown.
						9				
			0.3			10			SW-SM	Same as above; trace clay.
						11				
		wet				12			SM	Silty sand; medium firmness.
						13				
						14				
			0.5			15			SM	Same as above.
						16				
						17				
						18				
						19				
		sat.	3.2	9:10 @ 20'		20			SM	Same as above.
						21				
						22				*** Encountered heaving sands to total depth explored.

Delta

Consultants

Project No: C102349210

Client: **ConocoPhillips**

Well No: **TSP-1**

Logged By: Alan Buehler

Location: 1629 Webster Street

Date Drilled: 5/14/09

Driller: **RSI Drilling**

Alameda, California

Page 2 of 2

Drilling Method: Hollow Stem Auger

Hole Diameter: 8"

Sampling Method: Split Spoon

Hole Depth: 30.5'

Casing Type: Sched. 40 PVC

Well Diameter: 3/4"

Slot Size: 0.020

Well Depth: 30'

Gravel Pack: Filter Sand

First Water Depth: N/A

▽ = First Water

▼ = Static Groundwater

Well Completion		Static Water Level	Elevation			Northing			Easting			LITHOLOGY / DESCRIPTION
Backfill	Casing		Moisture Content	PID Reading (ppm)	Sample Identification	Depth (feet)	Recovery	Interval	Soil Type			
						23						
						24						
						25						
						26						*** Encountered heaving sands to total depth explored.
						27						
						28						
						29						
						30						
						31						
						32						
						33						
						34						
						35						
						36						
						37						
						38						
						39						
						40						
						41						
						42						
						43						
						44						

*** Encountered heaving sands to total depth explored.

Total depth of boring = 30.5' bgs

Sugar Sand



Project No.: 224803 Boring: GP1 Plate: 1 OF 1

Site: Former Tosco 76 Service Station 0843 Date: 5/23/01

Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct-Push Geologist: John B. Bobbitt

Drill Rig: Maryl 25 Key Bore Hole Diameter: 2" Signature: [Handwritten Signature]

Location: Western side of Webster Street on Registration: R.G. 4313

southern property line Logged by: Rob Saur

DEPTH (ft)	BLOW COUNTS	PID/OTM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
						8-inches of asphalt	
5	0			SP		Sand, medium-grained, brown, well sorted, trace of silt, wet at 4 feet	
10							
15						Total depth at 12 feet bgs. Boring grouted to ground surface.	
20							
25							
30							
35							
40							

Casing Diameter: N/A Slot Size: N/A Sand Size: N/A Grout: Portland I, II



Project No.: 224803 Boring: GP2 Plate: 1 OF 1
 Site: Former Tosco 78 Service Station 0843 Date: 5/23/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct-Push Geologist: John E. Bobbitt
 Drill Rig: Maryl 25 Key Bore Hole Diameter: 2" Signature: [Handwritten Signature]
 Location: Approximately 60 feet north of GP1 Registration: R.G. 4313
 Logged by: Rob Saur

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
						8-inches of asphalt	
5	0				SP	Sand medium-grained, brown, well sorted, trace of silt, wet at 5 feet 6 to 8 feet slightly stained blue-green Same, brown	
10	0						
15						Total depth at 12 feet bgs. Boring grouted to ground surface.	
20							
25							
30							
35							
40							

Casing Diameter: N/A Slot Size: N/A Sand Size: N/A Grout: Portland I/II



Project No.: 224803 Boring: GP3 Plate: 1 OF 1

Site: Former Tosco 76 Service Station 0843 Date: 5/23/01

Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct-Push Geologist: John B. Bobbitt

Drill Rig: Maryl 25 Key Bore Hole Diameter: 2" Signature: *[Handwritten Signature]*

Location: Adjacent to curb on Southwest corner of Registration: R.G. 4313

Webster Street and Pacific Avenue Logged by: Rob Saur

DEPTH (ft)	BLOW COUNTS	PTD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
						6-inches of asphalt	
					SP		
5		0 ▽				Sand, medium-grained, brown, well sorted, trace of silt, wet at 5 feet At 6 feet blue-green color	
10						Unable to get soil from sampler	
15						Total Depth 12 feet Boring grouted to ground surface.	
20							
25							
30							
35							
40							

Casing Diameter: N/A Slot Size: N/A, Sand Size: N/A, Grout: Portland I/II



Project No.: 224803 Boring: GP4 Plate: 1 OF 1

Site: Former Tosco 76 Service Station 0843 Date: 5/23/01

Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct-Push Geologist: John R. Bobbitt

Drill Rig: Maryl 25 Key Bore Hole Diameter: 2" Signature: *[Handwritten Signature]*

Location: Adjacent to th curb on southern side of Registration R.G. 4313

Pacific Avenue Logged by: Rob Saur

DEPTH (ft)	BLOW COUNTS	PD/OWM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
						6 inch asphalt	
5	0				SP	Sand, medium-grained, well-sorted, trace of silt, wet at 5 feet, at 6 feet green color	Hatched pattern
10	124					Same, at 8 feet brown color Same	
15						Total depth at 12 feet bgs. Boring grouted to ground surface.	
20							
25							
30							
35							
40							

Casing Diameter: N/A Slot Size: N/A Sand Size: N/A Grout: Portland I/II



Project No.: 224803 Boring: GP5 Plate: 1 OF 1
 Site: Former Tosco 76 Service Station 0843 Date: 5/23/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct-Push Geologist: John B. Robbitt
 Drill Rig: Maryl 25 Key Bore Hole Diameter: 2" Signature: *[Handwritten Signature]*
 Location: Adjacent to curb on northern side of Pacific Avenue Registration: R.G. 4313
 Logged by: Rob Saur

DEPTH (ft)	BLOW COUNTS	PD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
						6-inches of asphalt	
5	0				SP	Sand, medium-grained, brown, well-sorted, trace of silt, wet at 5 feet	Portland I/II
10	106					Bluish-green at 6 feet, strong odor	
15						Total depth at 12 feet bgs.	N/A, Grout: N/A, Sand Size: N/A, Slot Size: N/A
20						Boring grouted to ground surface.	
25							
30							
35							
40							



Project No.: 2248 Boring: GP6 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 7' South of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PD/OWM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
					FL	Fill to 3'	
5					SP	Sand: fine grained, brown, damp, sub-rounded poorly graded	
						wet at 7' blueish gray from 7' to 8'	
10						Total depth: 8 feet	

Casing Diameter: NA Slot Size: NA Sand Size: NA Grout: Portland I,II



Project No.: 2248 Boring: GP7 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 7' West of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5		0			SP	Sand: fine grained, brown, damp, sub-rounded, poorly graded	
		0				wet	
10						Total depth = 8 feet	

Casing Diameter: NA Slot Size: NA Sand Size: NA Grout: Portland II



Project No.: 2248 Boring: GP8 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 7' North of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
0						Sand: fine grained, brown, damp, sub-rounded, poorly graded	WELL DESIGN
5				SP		wet at 6.5' blueish green from 7' to 8'	
10						Total depth = 8 feet	

Casing Diameter: NA Slot Size: NA Sand Size: NA Grout: Portland I.I



Project No.: 2248 Boring: GP9 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Babbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 7' East of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft.)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5					SP	Sand: fine grained, brown, damp, sub-rounded, poorly graded	
						wet at 6.5'	
						blueish green from 7' to 8'	
10						Total depth = 8 feet	

Casing Diameter: NA Slot Size: NA Sand Size: NA, Grout: Portland II



Project No.: 2248 Boring: GP10 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 15' South of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
					FL	Fill to 3'	WELL DESIGN
0					SP	Sand: fine grained, brown, damp sub-rounded poorly graded	
5						wet at 7' slight blue-green staining from 7' to 8'	
10						Total depth = 8 feet	

Casing Diameter: NA, Slot Size: NA, Sand Size: NA, Grout: Portland I.II



Project No.: 2248 Boring: GP11 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Robbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 15' West of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PTD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5	0				SP	Sand: fine grained, brown, damp, sub-rounded, poorly graded	
7	0					wet at 7' slight blue-green staining from 7' to 8'	
10						Total depth = 8 feet	

Casing Diameter: NA Slot Size: NA Sand Size: NA Grout: Portland I.II



Project No.: 2248 Boring: GP12 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Handwritten Signature]
 Location: 15' North of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PTD/OVM (ppm)	SAMPLE COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5					Sand: fine grained, brown, damp, sub-rounded, poorly graded	[Hatched Pattern]
6.5				SP	wet at 6.5' blueish green at 7'	
15					brown at 15'	[Hatched Pattern]
					Total depth = 16 feet	

Casing Diameter: NA Slot Size: NA, Sand Size: NA, Grout: Portland I, II



Project No.: 2248 Boring: GP13 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 15' East of MW2 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PID/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5					SP	Sand: fine grained, brown, damp, sub-rounded, poorly graded	
						wet at 7' slight blueish green from 7' to 8'	
10						Total depth = 8 feet	
15							

Casing Diameter: NA Slot Size: NA Sand Size: NA Grout: Portland I, II



Project No.: 2248 Boring: GP14 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 10' Southeast of MW4 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PIE/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
0	0				SP	Sand: fine grained, brown, damp, sub-rounded, poorly graded	[Hatched Area]
7.5	0					wet at 7.5'	
8						Total depth = 8 feet	

Casing Diameter: NA Slot Size: NA, Sand Size: NA, Grout: Portland I,II



Project No.: 2248 Boring: GP15 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Robbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 30' Southeast of MW4 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PIU/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
0							
5							
7					SP	Sand: fine grained, brown, damp, sub-rounded, poorly graded wet at 7'	
10							
15							
						Total depth = 16 feet	

Casing Diameter: NA Slot Size: NA, Sand Size: NA, Grout: Portland I,II



Project No.: 2248 Boring: GP16 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Handwritten Signature]
 Location: 30' Southwest of MW1 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
0						Sand: fine grained, brown, damp, sub-rounded, poorly graded	[Hatched Area]
5						wet at 7'	
10					SP	very slight blueish-green tint from 10' to 11' brown	[Hatched Area]
15						Total depth = 16 feet	

Casing Diameter: NA Slot Size: NA, Sand Size: NA, Grout: Portland I.II



Project No.: 2246 Boring: GP17 Plate: 1 OF 1
 Site: Former Tosco Service Station 0843 Date: 12/4/01
 Drill Contractor: Gregg Drilling & Testing, Inc.

Sample Method: Direct Push Geologist: John B. Bobbitt
 Drill Rig: Marl 2.5 Bore Hole Diameter: 2" Signature: [Signature]
 Location: 10' Southeast of MW3 Registration: R.G. 4313
 Logged by: Rob A. Saur

DEPTH (ft)	BLOW COUNTS	PD/OVM (ppm)	SAMPLE	COLUMN	USCS	GEOLOGIC DESCRIPTION	WELL DESIGN
5					SP	Sand: fine grained, brown, damp, sub-rounded, poorly graded	
						wet at 7'	
10						Total depth = 8 feet	

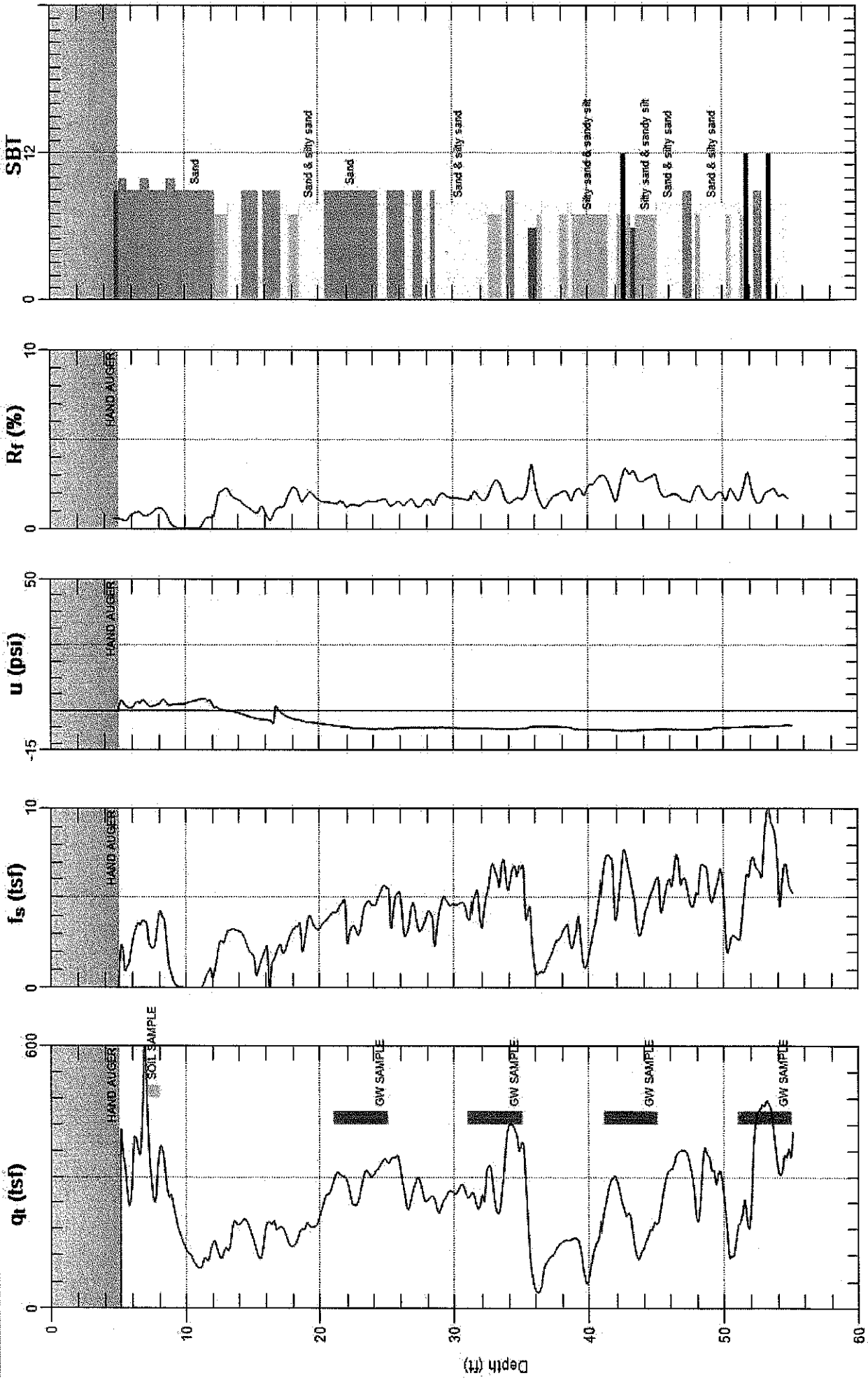
Casing Diameter: NA Slot Size: NA, Sand Size: NA, Grout: Portland I.I



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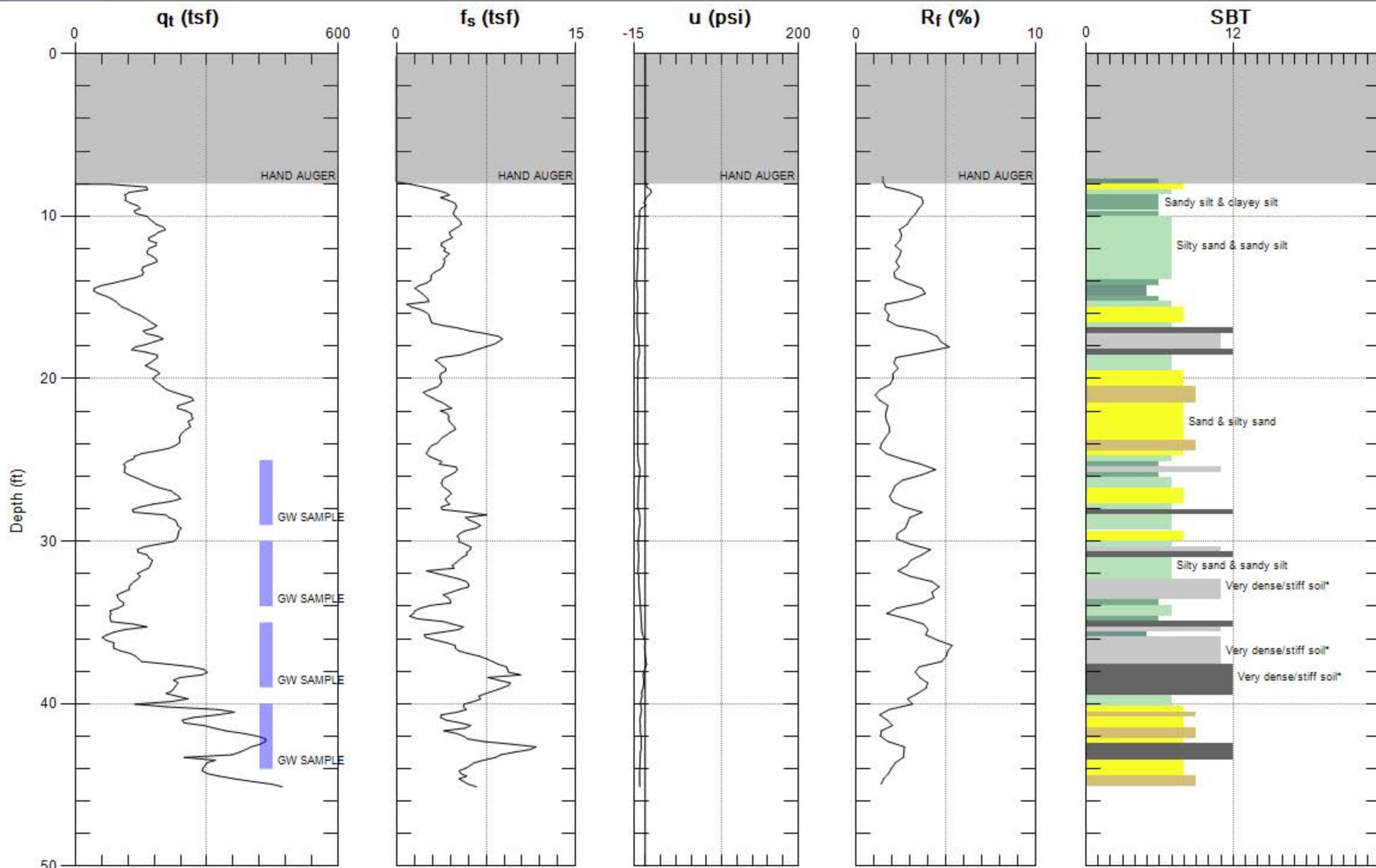
Site: 0843 ALAMEDA
Sounding: CPT-01

Engineer: J.WELSH
Date: 8/14/2008 08:21



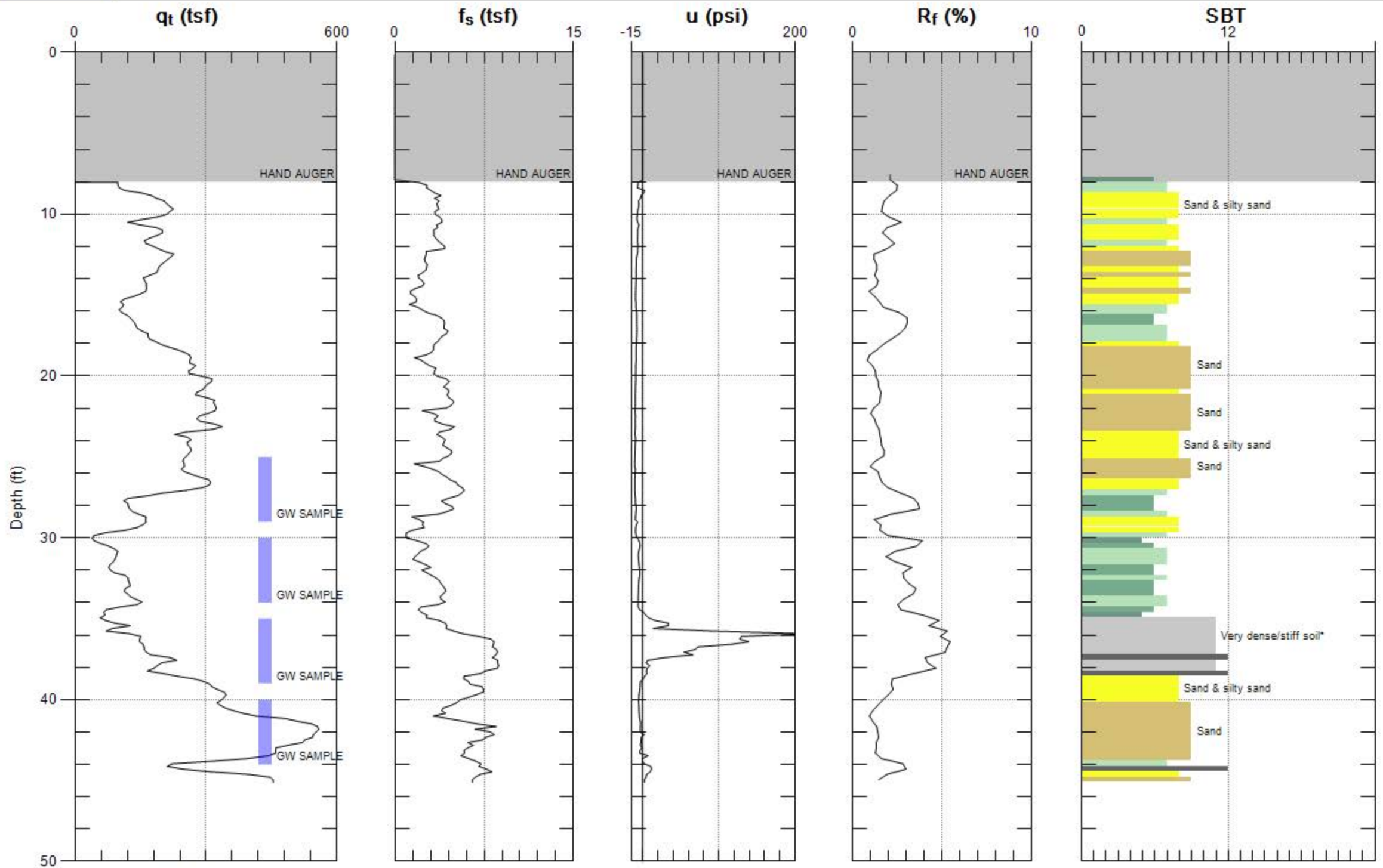
Max. Depth: 55.118 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)



Max. Depth: 45.112 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)



Max. Depth: 45.112 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)



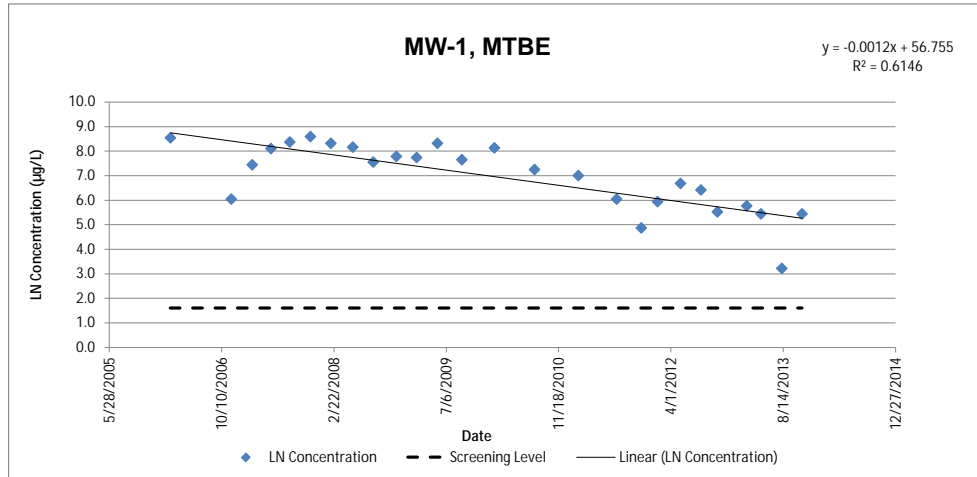
Appendix C

Linear Regression Analysis
Outputs

Sample Information
 Sample Location
 Constituent

MW-1
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
2/24/2006	5,100	8.54
11/22/2006	420	6.04
2/23/2007	1,700	7.44
5/18/2007	3,300	8.10
8/10/2007	4,300	8.37
11/9/2007	5,400	8.59
2/8/2008	4,100	8.32
5/16/2008	3,500	8.16
8/15/2008	1,900	7.55
11/26/2008	2,400	7.78
2/24/2009	2,300	7.74
5/28/2009	4,100	8.32
9/14/2009	2,100	7.65
2/5/2010	3,400	8.13
8/3/2010	1,400	7.24
2/14/2011	1,100	7.00
8/4/2011	420	6.04
11/21/2011	130	4.87
2/2/2012	380	5.94
5/14/2012	800	6.68
8/13/2012	610	6.41
10/25/2012	250	5.52
3/5/2013	320	5.77
5/7/2013	230	5.44
8/8/2013	25	3.22
11/6/2013	230	5.44



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	26
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.6146	
p-Value =	2.16E-06	
Attenuation Rate in Groundwater (K) =	0.0012	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0010	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	5.60E+02	days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	56.755
Slope	-0.0012
Date to Screening Level	12/12/2021

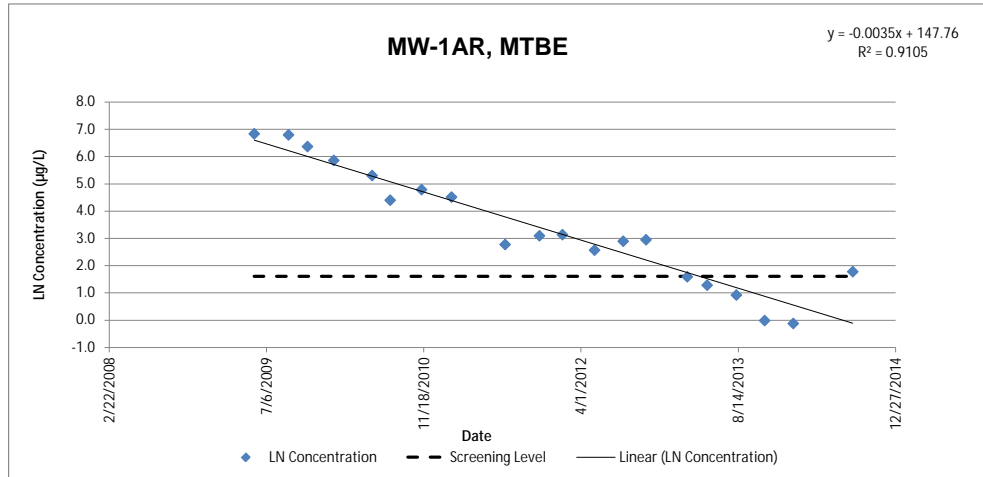
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

MW-1AR
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
5/28/2009	930	6.84
9/14/2009	890	6.79
11/13/2009	580	6.36
2/5/2010	350	5.86
6/7/2010	200	5.30
8/3/2010	81	4.39
11/11/2010	120	4.79
2/14/2011	91	4.51
8/4/2011	16	2.77
11/21/2011	22	3.09
2/2/2012	23	3.14
5/14/2012	13	2.56
8/13/2012	18	2.89
10/25/2012	19	2.94
3/5/2013	4.9	1.59
5/7/2013	3.6	1.28
8/8/2013	2.5	0.92
11/6/2013	0.98	-0.02
2/5/2014	0.88	-0.13
8/13/2014	5.9	1.77



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	20
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.9105	
p-Value =	7.16E-11	
Attenuation Rate in Groundwater (K) =	0.0035	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0032	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.96E+02	days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	147.757
Slope	-0.0035
Date to Screening Level	4/12/2013

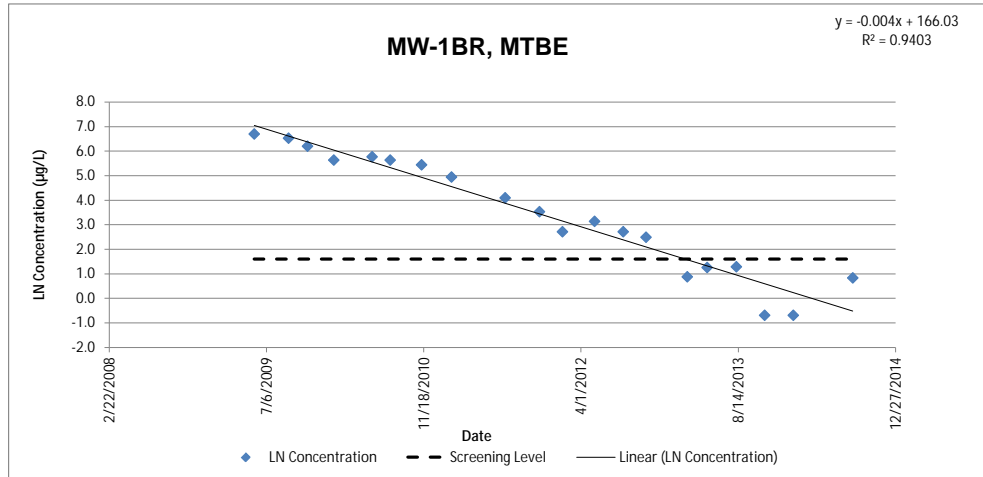
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

MW-1BR
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
5/28/2009	810	6.70
9/14/2009	680	6.52
11/13/2009	490	6.19
2/5/2010	280	5.63
6/7/2010	320	5.77
8/3/2010	280	5.63
11/11/2010	230	5.44
2/14/2011	140	4.94
8/4/2011	60	4.09
11/21/2011	34	3.53
2/2/2012	15	2.71
5/14/2012	23	3.14
8/13/2012	15	2.71
10/25/2012	12	2.48
3/5/2013	2.4	0.88
5/7/2013	3.5	1.25
8/8/2013	3.6	1.28
11/6/2013	0.5	-0.69
2/5/2014	0.5	-0.69
8/13/2014	2.3	0.83



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	20
# of nondetects	2
% of data as detects	90

Results		
Coefficient of Determination (R^2) =	0.9403	
p-Value =	1.84E-12	
Attenuation Rate in Groundwater (K) =	0.0040	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0037	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.74E+02	days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	166.033
Slope	-0.0040
Date to Screening Level	2/24/2013

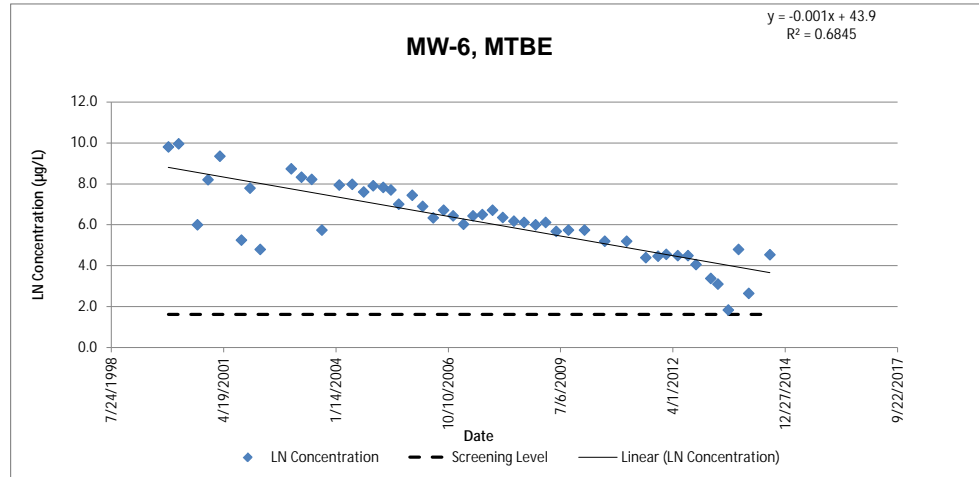
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

MW-6
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
12/14/1999	18,000	9.80
3/14/2000	21,000	9.95
8/29/2000	400	5.99
12/1/2000	3,640	8.20
3/17/2001	11,500	9.35
9/24/2001	190	5.25
12/10/2001	2,400	7.78
3/11/2002	120	4.79
12/12/2002	6,200	8.73
3/13/2003	4,100	8.32
6/12/2003	3,700	8.22
9/12/2003	310	5.74
2/12/2004	2,800	7.94
6/7/2004	2,900	7.97
9/17/2004	2,000	7.60
12/11/2004	2,700	7.90
3/11/2005	2,500	7.82
5/17/2005	2,200	7.70
7/27/2005	1,100	7.00
11/23/2005	1,700	7.44
2/24/2006	990	6.90
5/30/2006	560	6.33
8/30/2006	820	6.71
11/22/2006	620	6.43
2/23/2007	410	6.02
5/18/2007	620	6.43
8/10/2007	660	6.49
11/9/2007	820	6.71
2/8/2008	570	6.35
5/16/2008	480	6.17
8/15/2008	450	6.11
11/26/2008	400	5.99
2/24/2009	450	6.11
5/28/2009	290	5.67
9/14/2009	310	5.74
2/5/2010	310	5.74
8/3/2010	180	5.19
2/14/2011	180	5.19
8/4/2011	80	4.38
11/21/2011	86	4.45
2/2/2012	94	4.54
5/14/2012	89	4.49
8/13/2012	89	4.49
10/25/2012	57	4.04
3/5/2013	29	3.37
5/7/2013	22	3.09
8/8/2013	6.2	1.82
11/6/2013	120	4.79
2/5/2014	14	2.64
8/13/2014	93	4.53



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	50
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.6845	
p-Value =	1.29E-13	
Attenuation Rate in Groundwater (K) =	0.0010	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0008	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	7.21E+02	days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	43.900
Slope	-0.0010
Date to Screening Level	6/20/2020

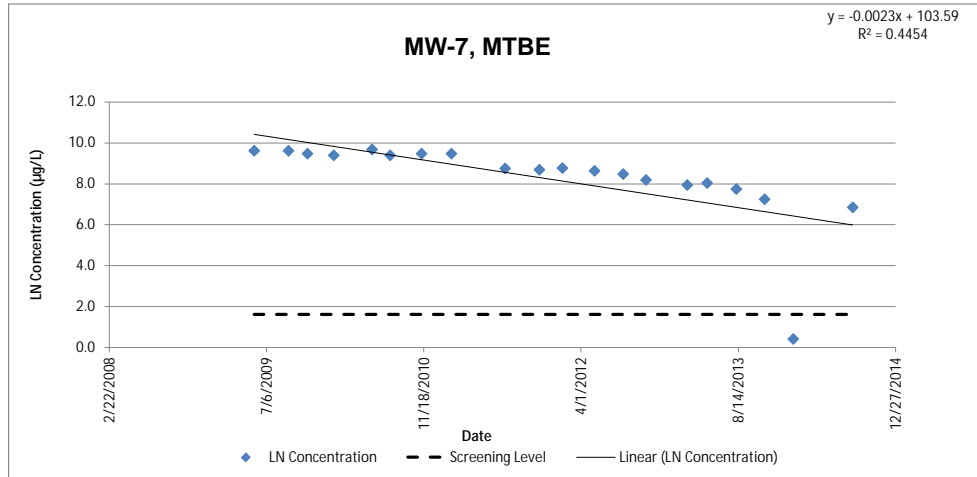
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

MW-7
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
5/28/2009	15,000	9.62
9/14/2009	15,000	9.62
11/13/2009	13,000	9.47
2/5/2010	12,000	9.39
6/7/2010	16,000	9.68
8/3/2010	12,000	9.39
11/11/2010	13,000	9.47
2/14/2011	13,000	9.47
8/4/2011	6,300	8.75
11/21/2011	5,900	8.68
2/2/2012	6,400	8.76
5/14/2012	5,600	8.63
8/13/2012	4,800	8.48
10/25/2012	3,600	8.19
3/5/2013	2,800	7.94
5/7/2013	3,100	8.04
8/8/2013	2,300	7.74
11/6/2013	1,400	7.24
2/5/2014	2	0.41
8/13/2014	940	6.85



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	20
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.4454	
p-Value =	1.31E-03	
Attenuation Rate in Groundwater (K) =	0.0023	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0015	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	2.97E+02	days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	103.591
Slope	-0.0023
Date to Screening Level	10/2/2019

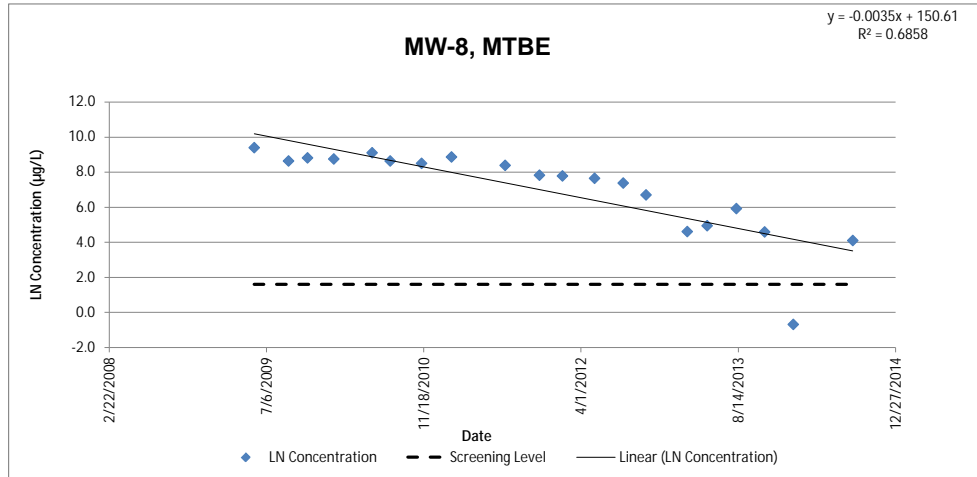
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

MW-8
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
5/28/2009	12,000	9.39
9/14/2009	5,600	8.63
11/13/2009	6,700	8.81
2/5/2010	6,300	8.75
6/7/2010	9,000	9.10
8/3/2010	5,600	8.63
11/11/2010	4,900	8.50
2/14/2011	7,100	8.87
8/4/2011	4,400	8.39
11/21/2011	2,500	7.82
2/2/2012	2,400	7.78
5/14/2012	2,100	7.65
8/13/2012	1,600	7.38
10/25/2012	810	6.70
3/5/2013	100	4.61
5/7/2013	140	4.94
8/8/2013	370	5.91
11/6/2013	98	4.58
2/5/2014	0.5	-0.69
8/13/2014	60	4.09



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	20
# of nondetects	1
% of data as detects	95

Results		
Coefficient of Determination (R^2) =	0.6858	
p-Value =	6.54E-06	
Attenuation Rate in Groundwater (K) =	0.0035	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0028	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.97E+02	days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	150.613
Slope	-0.0035
Date to Screening Level	2/6/2016

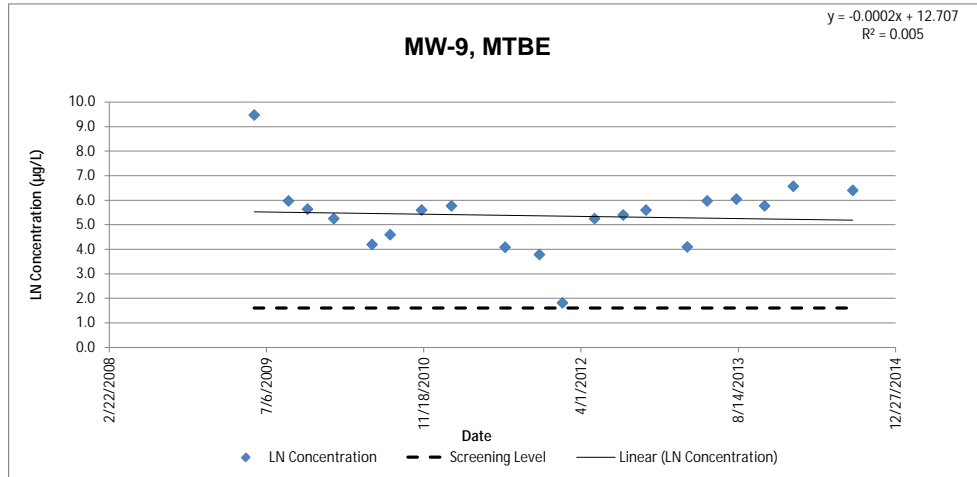
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

MW-9
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
5/28/2009	13,000	9.47
9/14/2009	390	5.97
11/13/2009	280	5.63
2/5/2010	190	5.25
6/7/2010	66	4.19
8/3/2010	99	4.60
11/11/2010	270	5.60
2/14/2011	320	5.77
8/4/2011	59	4.08
11/21/2011	44	3.78
2/2/2012	6.1	1.81
5/14/2012	190	5.25
8/13/2012	220	5.39
10/25/2012	270	5.60
3/5/2013	60	4.09
5/7/2013	390	5.97
8/8/2013	420	6.04
11/6/2013	320	5.77
2/5/2014	710	6.57
8/13/2014	600	6.40



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	20
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.0050	
p-Value =	7.67E-01	
Attenuation Rate in Groundwater (K) =	0.0002	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	-0.0006	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	NA	days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	12.707
Slope	-0.0002
Date to Screening Level	NA

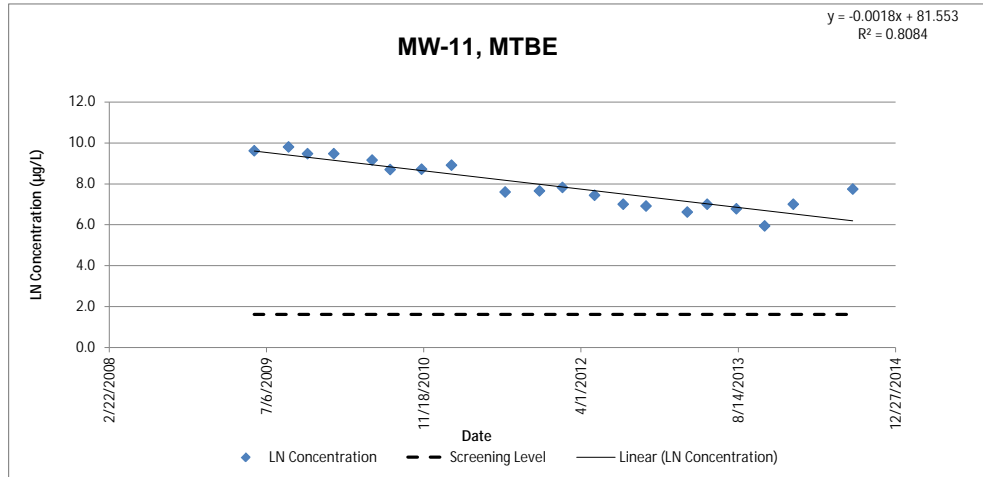
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

MW-11
 MTBE

Sample Date	Concentration (ug/L)	LN Concentration
5/28/2009	15,000	9.62
9/14/2009	18,000	9.80
11/13/2009	13,000	9.47
2/5/2010	13,000	9.47
6/7/2010	9,500	9.16
8/3/2010	6,000	8.70
11/11/2010	6,100	8.72
2/14/2011	7,400	8.91
8/4/2011	2,000	7.60
11/21/2011	2,100	7.65
2/2/2012	2,500	7.82
5/14/2012	1,700	7.44
8/13/2012	1,100	7.00
10/25/2012	1,000	6.91
3/5/2013	750	6.62
5/7/2013	1,100	7.00
8/8/2013	880	6.78
11/6/2013	380	5.94
2/5/2014	1,100	7.00
8/13/2014	2,300	7.74



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value

Data quality	
Total # of data points used in regression	20
# of nondetects	0
% of data as detects	100

Results	
Coefficient of Determination (R^2) =	0.8084
p-Value =	7.10E-08
Attenuation Rate in Groundwater (K) =	0.0018 days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0015 days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	3.85E+02 days

Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	81.553
Slope	-0.0018
Date to Screening Level	7/29/2021

Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm



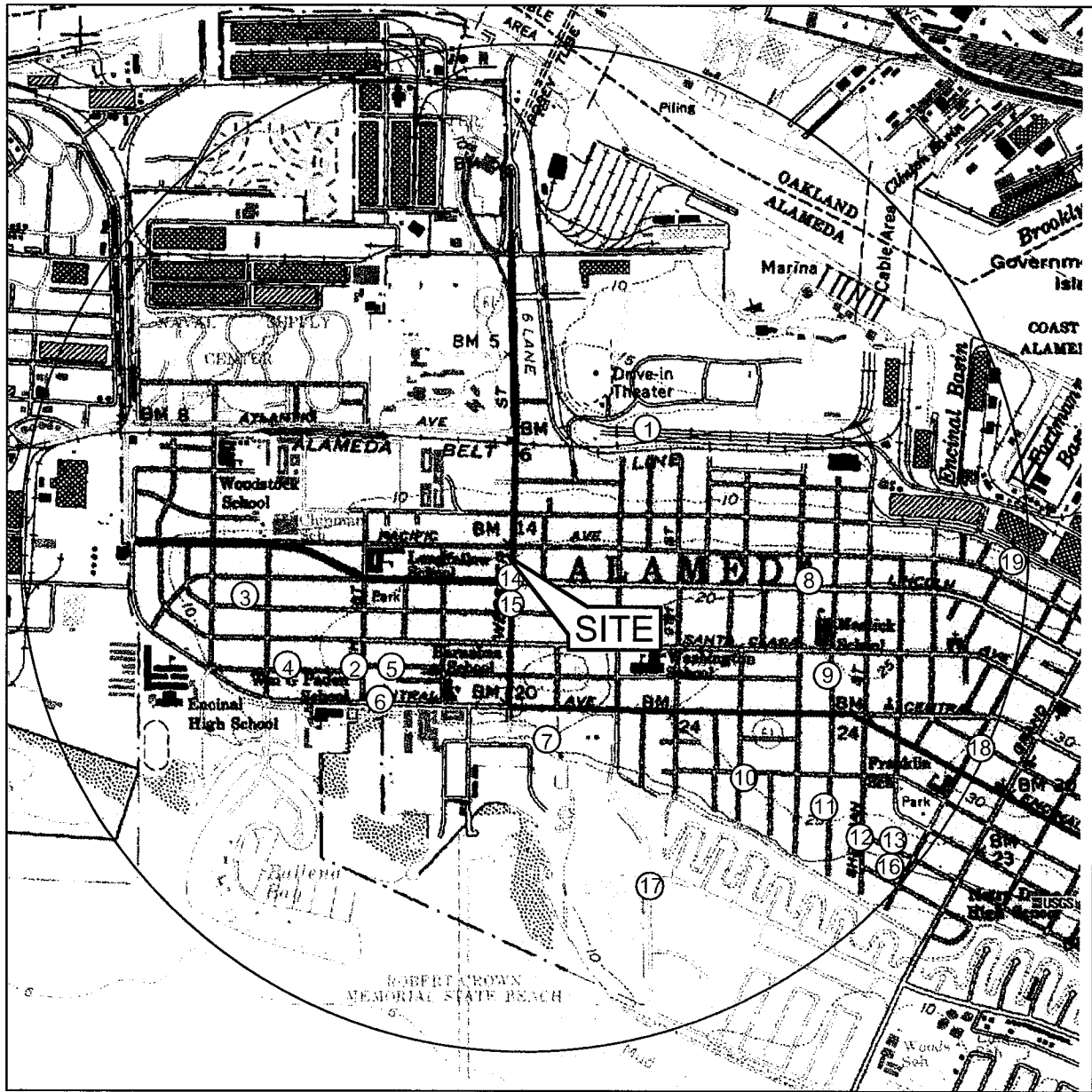
Appendix D

Historical Sensitive Receptor Survey
Map and Table

TABLE 1
RESULTS OF GROUNDWATER RECEPTOR SURVEY

Former 76 Service Station 0843
1629 Webster Street
Alameda, California
(Page 1 of 1)

Plate 3 Callout	Well Owner	Type of Well	Location	Total Depth in feet	Date of Well Driller's Report	Screened Interval in feet
A	John Cavallo	Irrigation	462 Buena Vista, Alameda	23	/35	?
B	G. S Stagnaro	Irrigation	441 Pacific, Alameda	315	/06	?
C	Richard Ruth	Irrigation	1417 5th Street, Alameda	45	11/?/77	35-40 feet



0 1000 FT 2000 FT
SCALE: 1 : 24,000



FIGURE 1

SITE LOCATOR SENSITIVE RECEPTOR
MAP

76 STATION NO. 0843
1629 WEBSTER STREET
ALAMEDA, CALIFORNIA

PROJECT NO. C100-843	DRAWN BY JH 12/12/06
FILE NO. Site Locator 0843	PREPARED BY JH
REVISION NO.	REVIEWED BY



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

Table 1
 One-Mile Agency Receptor Survey
 ConocoPhillips Station No.0843
 1629 Webster Street, Alameda, California

DWR ¹ Well No.	Address	City	State	Zip	Owner	Well Type	Distance from Site (miles)	Direction Relative to Site	
1-	2S/4W-2R1	Marina Village, off Sherman St.	Alameda	CA		Vintage Properties	Irrigation	0.7	NE
2-	2S/4W-10H2	424 Santa Clara Ave.	Alameda	CA	94501	Richard F. Fawcett	Domestic	0.5	SW
3-	2S/4W-10B1	132 Haight Ave.	Alameda	CA	94501	Idella E. McManus	Irrigation	0.7	W
4-	2S/4W-10G1	314 Santa Clara Ave.	Alameda	CA	94501	James GoLightly	Irrigation	0.6	SW
5-	2S/4W-10H3	462 Santa Clara Ave.	Alameda	CA		PG&E	Cathodic protection	0.4	SW
6-	2S/4W-10H1	447 Taylor Avenue	Alameda	CA	94501	A.E. Bryant	Irrigation	0.5	SW
7-	2S/4W-11M1	645 Central	Alameda	CA		Paul Merrett	Industrial	0.3	SW
8-	2S/4W-11A1	Pacific Ave. east of Chapin	Alameda	CA		PG&E	Cathodic protection	0.5	E
9-	2S/4W-11H1	Santa Clara east of Verdi St.	Alameda	CA		PG&E	Cathodic protection	0.6	SE
10-	2S/4W-11K2?	920 Centennial Ave.	Alameda	CA		Lawrence Picetti	Irrigation	0.5	SE
11-	2S/4W-11J2	1036 San Antonio Ave.	Alameda	CA	94501	Grover A. Chessmore	Domestic/Irrigation	0.7	SE
12-	2S/4W-11J3	1236 St. Charles	Alameda	CA	94501	Frank Weeden	Irrigation	0.8	SE
13-	2S/4W-11J4	1224 Bay St.	Alameda	CA	94501	Richard Bartalini	Irrigation	0.8	SE
14-	2S/4W-11D1	603 Pacific Ave.	Alameda	CA	94501	H.W. Moore	Irrigation	0.1	NW
15-	2S/4W-11E1	1614 6th St.	Alameda	CA	94501	Daniel C. Robinson	Irrigation	0.1	W
16-	2S/4W-11J1	1205 Bay St.	Alameda	CA	94501	W.E. Lyons	Irrigation	0.9	SE
17-	2S/4W-11Q1	900 Otis Drive	Alameda	CA		Chevron USA, Inc.	Dewatering	0.7	SE
18-	2S/4W-12M1	1401 F. Cottage St.	Alameda	CA	94501	Central West Homeowners	Irrigation	1.0	SE
19-	2S/4W-12D2	1521 Buena Vista	Alameda	CA	94501	Alameda Liquid Bulk Terminal	Industrial	0.9	NE
² 20-	2S/4W-3E1	Alameda Naval Air Station west side of Main Street	Alameda	CA		U.S. Navy			
² 21-	2S/4W-5A1	Naval Air Station (old PAA)	Alameda	CA					
² 22-	2S/4W-3E3	B Avenue, Building 17	Alameda	CA	94501	U.S. Naval Air Station	Cathodic protection		
² 23-	2S/4W-1D1	Embarcadero rail crossing (25' from rr, 300 yds from Emb.)	Oakland	CA		Union Pacific Railroad	Cathodic protection		

DWR: Department of Water Resources

¹ Well Locations shown on Figure 1.

² Specific address cannot be located on map.