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Alameda County
Environmental Health

ConocoPhillips
76 Broadway
Sacramento, California 95818

October 1, 2010

Mr. Jerry Wickham
Alameda County Health Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: 76 Service Station No. 7376
4191 First Street
Pleasanton, California

RE: Revised Corrective Action Plan

Dear Mr. Wickham,

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 (916) 558-7612.

Sincerely,

Bill Borgh

Bill Borgh
Site Manager – Risk Management and Remediation

Attachment

REVISED CORRECTIVE ACTION PLAN
76 SERVICE STATION NO. 7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA
ALAMEDA COUNTY FUEL LEAK CASE NO. RO0000361

Prepared for:

ConocoPhillips Company
76 Broadway
Sacramento, CA 95818

Prepared by:

DELTA

Delta Consultants
312 Piercy Road
San Jose, California 95138

September 30, 2010

CERTIFICATION

The following report was prepared under the supervision and direction of the undersigned California Professional Geologist.

DELTA CONSULTANTS

PROFESSIONAL GEOLOGIST
R. LEE DOOLEY
NO. 0183
CERTIFIED
HYDROGEOLOGIST
STATE OF CALIFORNIA

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California Certified Hydrogeologist #0831

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1.0 INTRODUCTION

Delta Consultants, (Delta), on behalf of ConocoPhillips (COP) has prepared this *Corrective Action Plan (CAP)* for the 76 Service Station No. 7376, located at 4191 First Street in Pleasanton, California and the adjacent property to the north and northeast (site) (**Figures 1 and 2**). Soil and groundwater beneath the site is contaminated with volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and wide range of both refined and unrefined petroleum hydrocarbons. The CAP presents the selected remedial action for the site which involves source removal activities through soil vapor extraction and management of groundwater migration control through groundwater extraction and treatment. Monitoring of groundwater will be necessary during a post remediation phase in order to ensure the effectiveness of the remedies. Following completion of active remediation, the anticipated future use of site is as a commercial gasoline retail station and the property to the north and northwest as a City of Pleasanton landscaped parking area.

The CAP provides;

- the site investigative background
- summarizes results of feasibility testing,
- identifies chemical of concern (COCs),
- provides baseline risks represented by the COCs,
- provides a review of various remedial alternatives,
- describes the selection and description of a selected remedial alternative(s),
- provides remedial alternative implementation details
- provides a project schedule

2.0 SITE LOCATION AND DESCRIPTION

The following sections provide a description of the site and surrounding area.

2.1 Site Location

The site (Alameda County Assessor's Parcel # 94-110-12-4) is a rectangular property located at the intersection of Ray Street and First Street in Pleasanton, California (**Figures 1 and 2**).

2.2 Site Description

The site is currently an active 76 Service Station. Current site facilities consist of a cashier's kiosk, four product dispenser islands and two 12,000-gallon double-wall fiberglass gasoline underground storage tanks (USTs) – **Figure 2**. There are currently 12 active groundwater-monitoring wells and four former groundwater monitoring wells at and in the site vicinity. Properties in the immediate site vicinity are used for a mix of residential and commercial purposes. The site is bounded to the north by a former Southern Pacific Railroad right-of-way currently owned by Alameda County, to northeast by a commercial building, to the southeast by First Street, and to the southwest by Ray Street. There is an underground KinderMorgan petroleum pipeline located on Alameda County property (former Southern Pacific right-of way) adjacent to the northwest station property boundary (**Figure 2**). A Shell service station is located southeast of the site across First Street.

The property was developed around 1907 as a warehouse to store grain and hay (Sanborn Insurance Maps). As shown on a Sanborn map, an "in-ground" bunker fuel storage tank was installed north of the property as early as 1907 to support the railway. A service station was first constructed on the site in approximately 1976. The station was acquired by Unocal Corporation in 1988, and then ConocoPhillips.

3.0 SITE SETTING

The following sections provide a summary of the regional geologic and hydrogeologic setting.

3.1 Regional Geologic Setting

The subject site is located near the southwest portion of the Livermore Valley. The site is situated on a northern facing hill, and slopes slightly to the north at an elevation of approximately 360 feet above mean sea level (MSL). The Arroyo Valle stream is located approximately 1,100 feet northeast of the site (**Figure 1**). The site is underlain by Holocene age alluvial fan deposits, described by the Department of Water Resources (DWR) in Bulletin 118-3 as "unconsolidated, moderately sorted, permeable fine sand and silt, with gravel becoming more abundant toward fan heads with canyons." The site is approximately three miles east of the northwest trending Pleasanton Fault (USGS 2006). Holocene alluvial fan deposits under the site are underlain by the Livermore Formation, consisting of northward dipping sand and gravel deposits. In 1999, Gettler Ryan interpreted deposits beneath the site to be steeply dipping beds.

3.2 Regional Hydrogeologic Setting

The site is located within the Amador Sub-basin of the Livermore Valley Groundwater Basin. The Amador Sub-basin is bounded on the east by the Livermore Fault and on the west by the Pleasanton Fault. The main watercourses in the basin are the Arroyo Valle and Arroyo Mocho, which both drain into the Arroyo de la Laguna. Gravel pits which locally impact groundwater levels are present in the central portion of the subbasin. The estimated depth to the regional groundwater is 40 feet below ground surface (bgs) and the regional flow direction is north and northeast (ACWD-Zone 7, 1993-2006).

Groundwater in the Amador subbasin occurs in both unconfined and confined conditions. In the shallower, unconfined aquifers, groundwater is first encountered generally about 30 to 50 feet bgs. Deeper aquifers are encountered within sand and gravel deposits at a depth of approximately 90 to 100 feet bgs (DWR, 2003). A Zone 7 contour map shows groundwater flow in both confined and unconfined aquifers toward the gravel pits in the center of the subbasin. A contour map from the Zone 7 Well Master Plan shows a flow within the "deeper aquifer" to the west. Sand and gravel pit groundwater extraction areas are located greater than one mile north of the site in the central portion of the subbasin. The site appears to be outside the area of influence of any groundwater extraction wells.

The City of Pleasanton is served by the Zone 7 Water Agency. Based on information provided by personnel from the Zone 7 Water Agency, the City of Pleasanton obtains 80% of its water from the Hetch-Hetchy reservoir, the San Joaquin/Sacramento Delta and multiple deep-water wells located in the Fremont area. The remaining water is pumped from wells in Pleasanton that range in depth from 50-600 feet bgs (ACWD 1993-2006).

3.3 Site Hydrogeologic Conditions

The site is underlain by complexly interlayered clay (Unified Soil Classification CL), silt (ML), silty sand (SM), clayey sand (SC), silty gravel (GM), sand (SP, SW), and gravel (GW). Contacts between soil types are often gradational. All soils contain various percentages of silt and sand. Site subsurface conditions are illustrated on cross-sections from the current investigation on **Figures 3, 3b, 4 and 4b.** Soils have been combined into three units; 1) generally fine grained silts sand clays (CL, ML), 2) mixed fine and coarse grained deposits consisting of gravelly and sandy clay and silt to clayey/silty sands and gravels (SM, SC, GM), and 3) generally coarse-grained, moderate to high permeable soils consisting of sand and gravel (SP, SW, GP, GW).

Continuous coring of the deep boring at location CWA and CWB (**Figure 2**) provided a detailed boring log. Borings for wells encountered a mix of coarse grained deposits consisting of sands and gravels with varying amount of silt and clay, separated by thick layers of silt and clay. Beds appeared to be discontinuous and sloping slightly to the north. An approximately 20-foot section of damp orange-tan silt with quartz gravel fragments was used as marker bed to correlate between clusters. From approximately 32 to 35 feet bgs, soil was reportedly wet, indicating the presence of a perched water zone. This perched water zone has also been reported in previous borings at the site. Groundwater was encountered in the deep boring CWB-1 at a depth of approximately 60 feet bgs. Depth to groundwater in adjacent monitoring well MW-5 was 68 feet below top of casing (BTOC).

Petroleum hydrocarbons including separate phase hydrocarbons (SPH) were found throughout the vadose zone. TPH-G and TPH-D concentrations are shown on geologic cross-sections **Figures 3 and 4**.

SPH was reported in the CWA well cluster at a depth of 33 to 39 feet bgs in moist/ wet silt and gravel zones. Directly beneath this zone, the orange clay/ silt zone was reported to a depth of approximately 53.5 feet bgs. No SPH was reported in the orange clay/silt zone indicating a perched zone above. Photo-ionization detector (PID) readings in CWA ranged from 1.5 parts per million volume (ppmv) at a depth of 55 feet bgs (clayey gravel) to 766 ppmv at a depth of 34 feet bgs within a saturated silt zone in which SPH was reported, directly above a gravel zone also with SPH.

In cluster CWB, SPH was reported at a depth of 62 feet bgs within gravelly sand. PID readings in CWA ranged from 0.3 at a depth of 10 feet bgs to 1,620 at a depth of 61 feet bgs within silty sand, directly above the gravelly sand layer in which SPH was observed.

SPH was reported the CWA cluster observation well OWA from 34 feet bgs to 50 feet bgs within a gravel zone and underlying clay zone. SPH in CWB and OWA was reportedly black and "oily", while SPH in CWA was described as lighter in color with a gasoline odor. PID readings in OWA ranged from 38.6 ppmv at a depth of 20 feet bgs to 1275 ppmv at a depth of 30 feet bgs. The maximum PID reading was reported in a contact between gravelly sand and clay at approximately 30 feet. SPH was not reported in soil samples collected from the OWB boring or MW-13. PID readings in the OWB boring ranged from 1.4 ppmv at a depth of 10 feet bgs to 1,230 ppmv at a depth of 44 feet bgs within a lean clay layer underlying a sandy gravel zone. Below this depth, PID readings decreased and were reported at less than 5 ppmv from 55 feet bgs to the maximum depth of 65 feet bgs.

4.0 NATURE AND EXTENT OF SOURCE(S)

The following sections describe the source(s) of the petroleum hydrocarbons that have been detected in soil and groundwater beneath and adjacent to the site. A summary of site assessment activities is presented as **Appendix A**.

4.1 Former USTs

The first soil and groundwater investigation report dated September 9, 1987 shows four 12,000-gallon petroleum product USTs near the current tank pit location in the northeastern portion of the site. The four former USTs were replaced with two 12,000 gallon double-walled steel USTs in December 1987 as part of the property sale agreement. A Union Oil Company of California drawing dated November 17, 1987 shows the two 12,000- gallon fuel USTs to be located in the northeastern end of the site in their current location (Enviros 1995).

4.2 Release Reports 1984-1994

November 8, 1982: The Pleasanton Fire Department reported that approximately nine gallons of gasoline had leaked from a damaged fuel filter and collected in the base sand area directly below the pumps.

November 23, 1982: The Valley Times Newspaper (volume 97 No. 230 dated November 23, 1982) reported that approximately 100 gallons of gasoline was discovered welling from an underground storage tank and pooling in a nearby parking lot. The nearby stream, Arroyo Del Valle, was reportedly not affected by the gasoline release.

February 20, 1984: The Pleasanton Fire Department filed a fire incident report for a gasoline leak at the site. According to the report, pump #12 located on the south fuel island was observed to be leaking. Approximately 30 gallons of gasoline was estimated to have leaked from possibly damaged underground product piping. Approximately 10 gallons of pooled gasoline was recovered using a soil berm in the southeast portion of the site.

January 7, 1985: A complaint report was filed against the station, reporting a "strong odor of gasoline around storm drains." Station attendants stated that the site's gasoline USTs were filled that morning and that gasoline from a possible overfill was likely transported to the drain via rain water runoff.

February 8, 1985: The Pleasanton Fire Department filed a Leak Reporting Form documenting an unknown amount of gasoline contaminated rain runoff entering two separate sewer drains. The nature of the spill was likely due to overfilling of the gasoline USTs.

July 16, 1987: A Petro Tite System Test revealed a leak of 0.93 gallons per hour in the North No. 1 regular gasoline UST. This result was followed up by an additional test on July 25th to confirm the leak. Leakage during the confirmation test was reported at 0.028 gallons per hour, and was deemed mathematically tight. It is unclear whether repairs were made to the UST system to repair the leak, or whether the leak detection was false (Environmental Laboratories Inc., 1987).

October 17, 1994: An unauthorized Release Report was filed following soil sampling performed on September 9, 1994. The report did not specify a release date or quantity released, but identified the contaminant as gasoline/waste oil. The report was filed following product piping replacement, during which old single-walled product lines were discovered, as well as soil contamination.

4.3 Potential Offsite Sources

4.3.1 Shell Oil Service Station

A Shell service station is located approximately 75 feet southeast of the site. This site has had an open leaking underground storage tank (LUST) case since 1995. Petroleum hydrocarbons were detected below the former USTs in the northern portion of the site in 1985 during UST replacement. In January 2005, waste oil was poured into a part of the waste oil tank which releases straight to the surrounding pea gravel. Oil and grease was detected in pea gravel, but soil samples confirmed that waste oil was confined to the pea gravel. Groundwater flow at the site has historically been to the north-northeast (Delta 2006). In September 2006, Shell advanced a CPT boring (CPT-2) in First Street between the Shell and 76 sites. Groundwater samples were collected at depths of approximately 78 and 98 feet bgs. Total petroleum hydrocarbons as gasoline (TPH-G), toluene, ethylbenzene, and xylenes were all below the laboratory reporting limit (LRL) in both samples. Benzene was detected in the 78-foot sample at 0.99 micrograms per liter (μg/L) along with 15 μg/L methyl tertiary butyl ether (MTBE) and 27 μg/L tertiary butyl alcohol (TBA). MTBE was the only constituent detected in the 98-foot sample (47 μg/L) (Delta 2006b). It was concluded that the Shell service station had little or no impact on the site.

4.3.2 Bunker C Oil Tank

A Bunker C fuel oil tank was installed at the site sometime around 1907 according to Sanborn insurance maps. The bunker fuel oil tank is/was located just to the northwest of the site in the vicinity of boring SB-1 (**Figure 2**). The bunker fuel oil tank was used to service the railroad that bordered the site to the northwest. The tank is believed to have been removed from the site, but removal documents are not available. Currently, there are no documents verifying the removal of this bunker tank. Delta utilized ground penetrating radar (GPR) technology to determine the current presence or absence of the bunker tank.

The bunker tank was not detected; however, GPR results may not be conclusive depending on the material with which the tank was made.

4.3.3 KinderMorgan Pipeline

A KinderMorgan pipeline is located approximately 20 feet northwest of the site, within the former Southern Pacific right-of-way and is approximately 6 to 8 feet deep. The pipeline is a 10-inch steel pipe which transports gasoline, diesel and jet fuel. An investigation was performed by TRC in 2005 to determine whether the pipeline could be considered a potential source of contamination. The investigation reported that the pipeline is inspected every 5 years by an internal inspection device, and no damage or repairs had been reported. In 2007, BSK reported detections of TPH-jet fuel and TPH-aviation fuel in soil borings SB-5, SB-6 and SB-7, located between the pipeline and the site **(Figure 2)** , with a maximum concentration of 6,300 milligrams per kilogram (mg/kg) in boring SB-5 at a depth of 30 feet bgs. The indication of the petroleum hydrocarbons as jet fuel appeared to be questionable. A note on the soil analytical summary table stated "TPH - total petroleum hydrocarbons - Jet Fuel (Hydrocarbons reported within diesel range)" (BSK 2008).

Fuel fingerprinting was performed on free product collected from the site in 1997, 1998 and in 2009. In 1997, a fuel fingerprinting analysis determined that the free product in MW-5 was most likely composed of 50% refined gasoline and 50% heavier hydrocarbons resembling crude oil, bunker C fuel, diesel, motor oil, or some combination of the above. The gasoline portion of the product was reported to be relatively “fresh” (Entrix 1997). In 1998, SPH was collected in soil samples in boring B-11 from depths of 10.5 feet bgs and 61 feet bgs. The SPH was reported to be approximately 90% semi-volatile hydrocarbons consisting of crude oil and 10% slightly weathered gasoline (GR 1999). In 2009, soil samples from the boring for MW-2C were submitted for fuel fingerprinting. The presence of heavy hydrocarbons including diesel, kerosene and hydraulic oil were reported (Delta 2009). TRC concluded that the source of SPH on site and to the north was likely due to the former underground bunker C fuel tank that was installed at the site in 1907, and not from the Santa Fe Pacific pipeline (TRC 2005).

4.4 Site Conceptual Model

Delta provides the following site conceptual model :

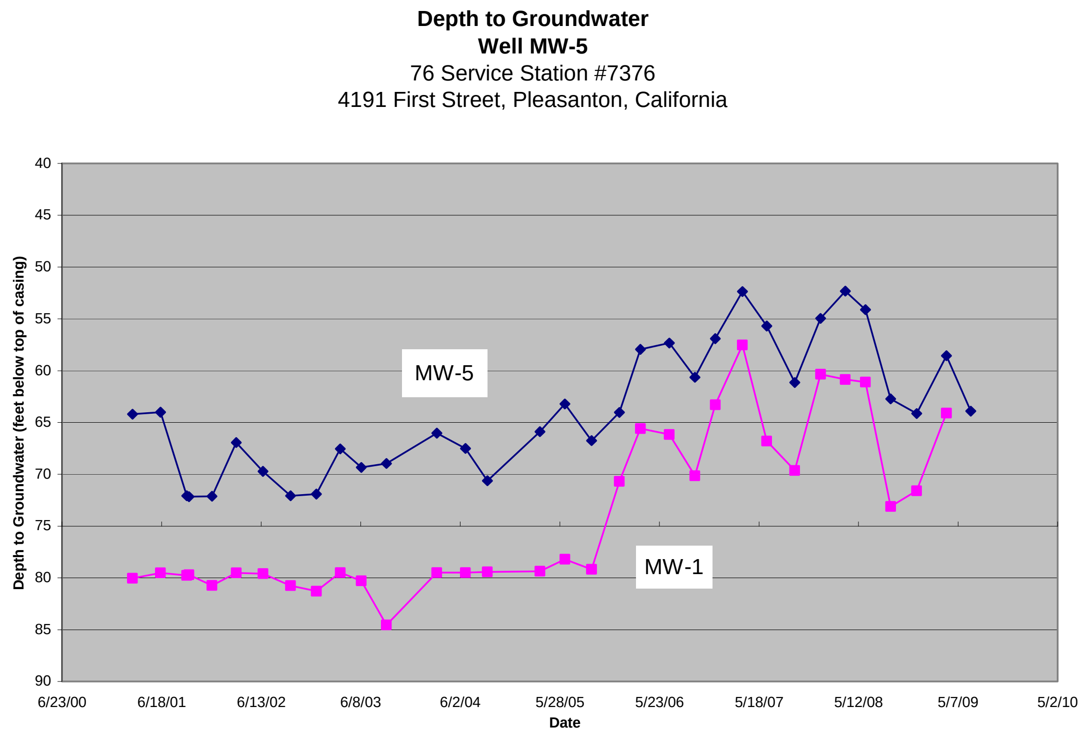
- Three interlayered main units exist beneath the site. The units consist largely of clay/silts, mixed fine and coarse grained deposits, and sands/gravels with trace fine particles. Boring logs and well construction data is contained in **Appendix B**.

- Beds dip slightly to the northwest. Onsite, beds appear to be relatively flat, then transition to more steeply dipping beneath the Alameda County open space corridor.

- Petroleum hydrocarbons are dispersed throughout the vadose zone. SPH was observed in selected samples.

- Groundwater was first encountered at approximately 70 feet bgs, and a perched groundwater bearing zone was observed at approximately 35 feet bgs in CWB-1.

- Groundwater levels rose from approximately 65 feet bgs in 2005 to approximately 52 feet bgs in 2008. Groundwater levels have returned to near original depths of approximately 65 feet bgs in 2010 (see graph below).



- Groundwater flow at the site has historically been to the northeast.

- Main contaminants of concern (COCs) are TPH-G, MTBE, and heavier hydrocarbons including crude oil and TPH-D.

- COCs were released from the site and from the former Bunker C fuel tank, moved downward through the vadose zone. COCs probably moved northwest atop sloping lithologic units beneath the site until groundwater was reached. Once the COCs reached groundwater, TPH-G and constituents originating from the site began migrating downgradient. TPH-D and crude oil have a low solubility in water, and pooled in the vicinity of MW-5 and CWB in their free phase.

- A petroleum hydrocarbon and MTBE plume underlies the northeastern portion of the site and the property to the north.

- The downgradient (northeastern) extent of MTBE has not been defined by well MW-13.

5.0 SOIL VAPOR EXTRACTION FEASIBILITY STUDY

Delta conducted a three day SVE pilot test at the site on April 20th through April 21st, 2010. The purpose of this test, as outlined in the approved Work Plan dated December 16, 2009, was to determine the feasibility of using SVE to address the vadose zone impacts that exist onsite and offsite and to collect performance data in support of a potential remedial system design. The planned pilot test was broken into three separate phases:

- Phase 1, conducted on April 20, 2010, consisted of three separate 2(+)-hour SVE step tests performed in three onsite extraction wells (CWA-1,2,3). During this phase, observation wells OWA-1,2,3, extraction wells CWA-1,2,3 and monitoring well MW-2C were utilized as monitoring points for the onsite pilot test.
- Phase 2, conducted on April 21, 2010, consisted of three separate 2(+)-hour SVE step tests performed in three offsite extraction wells (CWB-1,2,3). During this phase, observation wells OWB-1,2,3, extraction wells CWB-1,2,3 and monitoring well MW-5 were utilized as monitoring points for offsite pilot test.
- Phase 3, conducted on April 22, 2010, consisted of a combined SVE extraction test using both onsite and offsite extraction wells and the aforementioned observation and monitoring wells.

Delta arrived onsite on April 20, 2010 and coordinated setup of a mobile SVE/Thermox system with Strongarm Environmental Field Services, Inc. (Strongarm), a firm based in Norwalk, California. The SVE equipment provided included a SVE blower capable of achieving a flow of 300 cubic feet per minute (cfm) and a vacuum up to 12 inches of Mercury (in. of Hg), and a propane powered Thermox unit capable of thermally destroying the SVE effluent air to limits set forth by the Bay Area Air Quality Management District (BAAQMD). According to Mr. Darren Zuidema with Strongarm, Strongarm verified with Mr. Glenn Long at BAAQMD that a discharge permit for the SVE Pilot Test was not necessary for a pilot test that was shorter than five consecutive 8-hour days.

The following inserted Table summarizes the construction details for the extraction, observation and monitoring wells construction details utilized during the three day pilot test.

Well Name	Well Diameter (inches)	Total Depth (ft bgs)	Well Screen (feet bgs)
CWA-1	4	55	44 to 55
CWA-2	4	40	36 to 40
CWA-3	4	35	30 to 35
CWB-1	4	65	55 to 65
CWB-2	4	57	47 to 57
CWB-3	4	40	30 to 40
OWA-1	1	50	45 to 50
OWA-2	1	40	38 to 40
OWA-3	1	34	31 to 34
OWB-1	1	65	55 to 65
OWB-2	1	53	48 to 53
OWB-3	1	40	30 to 40
MW-2C	2	82	80-82
MW-5	2	72	52 to 72

Ft bgs = feet below ground surface

5.1 SVE Pilot Test Results

The purpose of the SVE Pilot test was to determine the feasibility of the technology for site cleanup by establishing optimum system operating conditions with individual steps tests, determining the radius of influence for extraction wells installed in specific soil lithologies and depths and to determine the effluent concentrations, mass removal rates and operational requirements for a future off-gas treatment system. General industry practices for SVE test analysis consider a measured vacuum at an observation well of 1% of the applied/system vacuum or greater to be a significant indicator of influence. Note that system and extraction wellhead vacuums, recorded as in. of Hg and were converted to inches of water using the following conversion: 1.0 in. of Hg equals 13.6 inches of water. Due to the dipping and extensive interbedded lithology encountered at this site, and the presence of SPH in several wells, Delta assumes 0.5% as a significant indicator of SVE influence. Other variables affecting the SVE feasibility determination include measured recovered air flow rates and the calculated hydrocarbon mass removal rates.

5.2 April 20, 2010 – Onsite SVE Step Test

Prior to initiating the step test, the static depth to water measurement at the site (collected from site well MW-2C) was 75.83 ft. bgs. A small amount of water was found in the bottom of the casings of the onsite extraction and observation wells, however this negligible volume is assumed to be due to condensation inside the casing and is not reflective of an actual water table.

5.3 SVE Pilot Test Conclusions

Based on the three day SVE Step Test, the following general conclusions can be inferred:

- Onsite extraction pressures ranging from -6.5 to -11.0 in. of Hg induced flow rates ranging from 14 to 34 scfm; and offsite extraction well pressures ranging from -2.0 to -12.0 in. of Hg induced flow rates ranging from 49 to 82 scfm. Generally the higher flow rates were measured when extraction occurred in the sandy/gravely units, decreasing when extracted from silty units, and showing little to no influence measured in lean clay units.
- Despite the extraction flow rates and variable ROI, SVE was effective at removing almost 372 pounds of petroleum hydrocarbons during the 6.5 hour combined SVE test on April 22, 2010.
- The calculated radius of influence (ROI) for wells installed varied depending on the lithologic unit the extraction screen interval was exposed across. Using 0.5% induced vacuum as a significant indicator of SVE influence, the ROIs varied between 8.0 and 53.4 feet, averaging 20.9 ft. Using 1.0% induced vacuum as a significant indicator of SVE influence, the ROIs varied between 15.5 and 21.0 feet, averaging 18.3 feet.

Generally, SVE is a feasible remedial technology for the removal of vadose soil impacts at the site. SVE is not an effective strategy in the lean clay to silty-clay interbedded layers at the site, but is feasible in the more permeable sandy to silty units.

6.0 GROUNDWATER EXTRACTION FEASIBILITY STUDY

The following sections provide details regarding the GWE FS and field testing program.

6.1 Step Drawdown Test

On April 26, 2010, Delta attempted to perform a step drawdown test utilizing well MW-5. Well MW-5 is located in the Alameda County corridor (**Figure 2**). The well has historically contained SPH and the highest concentration of dissolved petroleum hydrocarbons. SPH was encountered in soil in the boring for the adjacent SVE well cluster CWA.

6.1.2 Well MW-5

Well MW-5 is 72 feet deep constructed of 2-inch diameter PVC casing and well screen. The well screen extends from 52 feet bgs to 72 feet bgs with 0.010-inch slots.

The boring for well drilled on July 23, 1996, encountered three soil zones 1) interlayered silt (ML), silty gravel (GM), well graded gravel (GW), well graded sand (SW), and silty sand to a depth of approximately 32.5 feet bgs, 2) silt (ML) from 32.5 feet bgs to 57.5 feet bgs, 3) interlayered silty sand (SM), well graded sand (SW), clay (CL), and clayey sand (SC) was encountered from 57.5 feet bgs to the bottom of the boring at 73.5 feet bgs.

6.1.3 Step Drawdown Test

On April 26, 2010, the depth to groundwater in well MW-5 was 66.74 feet below top of casing (BTOC) with a total well depth of 72.80 feet. Available drawdown was 6.06 feet. A submersible pump was lowered to the bottom of the well reducing available drawdown to approximately 5 feet. The pump was initially set at 1.25 gallons per minute (gpm), however, the well dewatered within 6 minutes. The well was allowed to recover and was pumped at a minimal rate of 0.25 gpm. The pump shut off after approximately 16 minutes. The depth to water in the well was measured at 70.0 feet BTOC.

The pump was withdrawn from the well. The pump and bottom 4 feet of hose was covered with an oily substance. The SVE test performed on adjacent well cluster B, may have temporarily increased the SPH level in well MW-5. The pump was cleaned and replaced into the well. The pump ran for several minutes and then shutdown. The pump was unable to operate in what appeared to be a SPH environment. The sustainable pumping rate for the well is estimated to be less than 0.25 gpm. On June 18, 2010, Delta received an email from TRC regarding groundwater sampling from well MW-5. The email stated "When the technician gauged MW-5 this morning it did not register any product but when he went to hand bail it after gauging was done, he said what he called 'chunks of product' in his bailer and visible product." These observations are similar to those during the Delta pumping test.

6.2 Conclusions

GWE does not appear to be a feasible remediation method in the area of well MW-5 due to the generally low permeability of much of soil beneath that portion of the site and the viscosity of the "heavy" relatively insoluble oil encountered in well MW-5 and other borings. Groundwater sampling purge data indicates that wells to the northeast (MW-7 and MW-8) produce more water than well MW-5. Groundwater sampling field notes dated 12-17-09 indicate that both wells allowed purging at a rate of approximately one gpm.

7.0 CORRECTIVE ACTION PLAN

Delta has evaluated the currently applicable remedial approaches for addressing the COCs identified beneath the site and property to the north. The following sections present Delta's evaluation of remedial alternatives.

7.1 Contaminants of Concern

Contaminants beneath the site are a mixture of fuel oil and gasoline constituents. While all contaminants must be addressed, COCs were selected for soil and groundwater based on screening against regulatory criteria for potential human health and ecological risks.

7.1.1 Soil

Compounds detected in soil samples from the vadose zone of well MW-2C included the following (EPA Methods 8260 and 8270C);

Compound	Max. Conc. (mg/kg) Well MW-2C	Soil Sample Depth (feet)	RWQCB ESL (mg/kg)
• **benzene**	28	30	0.044
• n-butylbenzene	5.3	25	NA
• ethylbenzene	14	25	3.3
• isopropylbenzene	0.52	25	NA
• methyl tert-butyl ether	8.7	30	0.023
• **napthelene**	10	25	3.4
• n-propylbenzene	6.8	25	NA
• toluene	2.9	35	2.9
• 1,2,4-trimethylbenzene	39	25	NA
• xylene	15	35	2.3
• 2-methylnapthalene	7.2	25	0.25
• Fluorine	6.2	35	8.9
• TPH-diesel	15,000	35	83
• TPH-hydraulic Oil/Motor Oil	11,000	35	5,000

Notes:

1. Soil analysis from vadose zone samples
2. ESLs from RWQCB Table C, Deep soils (>3m bgs), groundwater is a current or potential source of drinking water; residential and commericial/industrial land use.
3. NA = ESL not available
4. Bolded compounds considered as carcinogens

In addition, a wide range of petroleum hydrocarbons were detected including the carbon chain range of C6 through C28 (gasoline and diesel) and total petroleum hydrocarbons as hydraulic oil/motor oil/fuel oil #6 in the C20 through C70 carbon range.

7.1.2 SPH

SPH from the MW-5 well contains hydrocarbons in the C3 to C33 carbon range - gasoline, diesel, and residual ranges. The heavier hydrocarbon mixture has a carbon distribution ranging from about C13 to C33, and based on the hydrocarbon distribution – diesel #2, motor oil, lube oil, etc (Entrix 1997). Entrix reported "The distribution is similar in nature to what might be expected from the analysis of a very weathered crude oil."

7.1.3 Groundwater

The lighter carbon range petroleum hydrocarbon constituents have dissolved into groundwater. The "heavier" petroleum hydrocarbons remain throughout the vadose zone but are not expected to dissolve and migrate in groundwater (see Section 6.1.5). The following compounds were detected in groundwater samples from wells MW-7 and MW-8 located downgradient of well MW-5.

Compound	**Max. Conc. (µg/L) Wells MW-7 and MW-8 12-17-09**	**Well**	**RWQCB ESL (µg/L)**
• **benzene**	6.6	MW-7	1.0
• n-butylbenzene			
• ethylbenzene	0.69	MW-7	30
• isopropylbenzene			
• methyl tert-butyl ether	430	MW-8	5
• **napthelene**			17
• n-propylbenzene			
• toluene	ND<0.50		40
• 1,2,4-trimethylbenzene			
• xylene	1.0		20
• 2-methylnapthalene			2.1
• Fluorine			
• Tert-butyl alcohol			12
• TPH-gasoline	2,300	MW-7	100
• TPH-diesel			100
• TPH-hydraulic Oil/Motor Oil			100

Notes:

1. Well MW-5 was dry during the December 2009 sampling event.
2. ESLs from RWQCB Table C, Deep soils (>3m bgs), groundwater is a current or potential source of drinking water; residential and commercial/industrial land use.
3. NA = ESL not available
4. Bolded compounds considered as carcinogens

7.2 Potential Exposure Pathways

The following five exposure pathways were evaluated ;

- **Ingestion of soil and dust.** The ingestion of soil and generation of dust containing COCs is unlikely as impacted soil is encountered below a depth of 15 feet bgs. The service station is paved as will the future parking areas on the property to the north.
- **Dermal Contact with soils** - Direct contact with impacted soil is unlikely to occur as COCs are below a depth of approximately 15 feet bgs. Delta is unaware of any plans for redevelopment of the site with underground parking or basements. The service station is paved as will the future parking areas on the property to the north.
- **Soil vapor impact to outdoor air** – The upper 10 to 20 feet of soil are composed primarily of low permeability silt and clay. These fine-grained soils will retard the upward migration of any COCs to the atmosphere.
- **Soil vapor intrusion into buildings.** The upper 10 to 20 feet of soil are composed primarily of low permeability silt and clay. These fine-grained soils would retard the upward movement of any COCs to building foundations. Only one small kiosk is located on the site. Impacted soil underlies the portion of the commercial building northeast of the site at depths of approximately 30 feet to 40 feet bgs. Delta is unaware of any plans by the City of Pleasanton to construct buildings on the property adjacent to the site.
- **Impact to surface water environment.** Impacted groundwater has the potential to discharge to surface water. The groundwater plume appears to be moving downgradient toward the Arroyo Valle stream. The downgradient extent of the groundwater plume has not been defined northeast of well MW-13 (**Figure 2**). Well MW-13 is located approximately 225 feet from Arroyo Valle stream.
- **Ingestion of groundwater.** Water supply wells are not threatened by the groundwater plume. Well surveys were performed in 2004 by Toxichem Management Systems, Inc and in 2005 by Delta. The 2004 survey identified 18 wells within a ½-mile radius. No field verifications were made during this survey. The surveys were performed on behalf of a Shell branded service station located at 4221 First Street, across first street from the site. Delta's 2005 survey identified a total of 14 wells within a one-mile radius. These well locations were field verified. The following excerpt is contained in Delta's *Site Conceptual Model* dated February 6, 2006:

<u>Well Survey</u> – In May 2004, Toxichem Management Systems, Inc. (Toxichem) obtain information from the Zone 7 Water District (Zone 7) and the DWR. A copy of Toxichem's well survey map and summary table are attached. The nearest wells identified were a well of "unknown" use (3S/1E-21B) and a municipal well (3S/1E-21B1) both located approximately 900 feet northeast of the site. Toxichem was unable to locate either well in the field and concluded that they were likely abandoned. In November 2005, Delta observed an old water tower building near the location of the two wells. A municipal well (3S/1E-16P1) was identified to be located >1,200 feet north of the site. Again, Toxichem could not field locate the well.

In September 2005, Delta performed an additional well survey for the site area. A well location map was obtained from Zone 7. The map identified three wells approximately 1,000 feet northwest of the site (3S/1E-21C1, -21C3, and -21C4.) Well -21C1 was classified as a "supply well", -21C3 as "abandoned or unlocatable", and -21C4 as "other designated well." Delta was only able to field located Well -21C4. The well provides irrigation water for a small city park. Delta also located a similar well in Kottinger Park located approximately 800 feet east of the site.

7.3 Targeted Cleanup Goals

Initial targeted cleanup goals are the California Regional Water Quality Control Board, San Francisco Bay (RWQCB) Environmental Screening Levels (ESLs). The ESLs are summarized below;

CoC	Soil (mg/kg)	Groundwater (ug/L)
Benzene	0.044	1.0
MTBE		
TPH-G	83	100
TPH-residual fuels	5,000	100

7.4 Evaluation of Alternatives

Each remedial action was reviewed for technical feasibility based on the technical potential of implementing the reviewed action, potential to reach cleanup goals, time for completion of remediation to cleanup levels, economic feasibility based on the cost to implement the reviewed action, and regulatory acceptance of the reviewed action. These components are defined below:

- **Technical Feasibility** is based on the ease of implementation, availability of equipment and applicability of the technology to the site-specific parameters. Excellent technical feasibility means that the remedial action is easily implemented, with readily available equipment and applies directly to the constituents to be remediated. A poor feasibility means that equipment is not readily available, the process is difficult, or in the experimental stages of development.

- **Potential to Reach Cleanup Goals** is based on the ability of the remedial technology to attain soil and groundwater cleanup goals within a reasonable time frame.

- **Duration of Remediation** is an evaluation of the selected technology to reach targeted soil and groundwater cleanup goals within 5 to 10 years.

- **Economic Feasibility** was rated on the basis of a base cost of $250,000 for system installation and operation and maintenance (O&M) costs over the life of the project. The ratings are applied as excellent, good, fair and poor. Excellent being low in cost and poor being extremely costly for implementation of the remedial action when compared against the plume concentration, orientation and distribution in the site lithology.

- **Regulatory Feasibility** is based on past experience of regulatory acceptance of the remedial method reviewed as it applies to the specific parameters of the site. An excellent rating means that it has had a high regulatory acceptance and is currently in use on similar sites. A poor regulatory rating means that the remedial method under review is unlikely to be accepted by regulators, is not currently being utilized on similar sites, or is not applicable to the parameters of the site.

The following remedial actions were evaluated for soil and groundwater remediation feasibility at the site:

- No Action
- Natural Attenuation/Long Term Monitoring
- Excavation
- In-Situ Bioremediation
- SVE

- Groundwater Pump and Treat
- SVE and Groundwater Pump and Treat

The following table presents a list of remedial alternatives that were considered for this site, along with the level of technical, economic, and regulatory feasibility:

Remedial Alternative	Technical Feasibility to Implement	Potential to Reach Cleanup Goals	Ability to Reach Cleanup Goals Within 5 to 10 Years	Ability to Reach Cleanup Goals for less than $250,000	Regulatory Feasibility
No Action	Good	Poor	Very Poor	Excellent	Poor
Natural Attenuation / Long Term Monitoring	Good	Poor	Very Poor	Excellent	Poor
Excavation	Poor	Excellent	Excellent	Poor	Fair
In-Situ Bioremediation	Poor	Poor	Poor	Fair	Poor
SVE	Good	Poor	Poor	Poor	Good
Groundwater Pump and Treat	Good	Poor	Poor	Poor	Fair
SVE and Groundwater Pump and Treat	Good	Fair	Fair	Poor	Good

7.5 Evaluation Results

While **no action** is economically and technically feasible, it is not feasible in its ability to reach targeted cleanup goals. Natural attenuation is not anticipated to reduce soil and groundwater contamination to cleanup levels. The same logic applies to the alternative of **natural attenuation/long term monitoring**, which has not been effective at reducing the highest concentrations in the hydrocarbon plume. Residual "heavy" petroleum hydrocarbons will remain after remediation due to their low mobility especially in clay and silt soils. Long term monitoring will be required for groundwater downgradient of the source areas.

The third option, **excavation,** has both technical and economic limitations. The depth to soils described has having a "strong" petroleum hydrocarbon odor is greater than 15 feet bgs. Soil containing SPH was encountered in the 30- to 40-foot depth interval well beyond the reach of any standard excavation. The costs and logistics involved with utilizing a large diameter auger excavation methodology would outweigh the remedial benefit due to the size of the impacted area.

The **SVE** option for soil remediation has relatively high costs for installation and O&M. Feasibility tests showed that SVE was effective in removing low carbon range hydrocarbons and VOC mass from sand layers within the vadose zone. SVE is not expected to remove significant mass from intervening clay and silt layers. SVE also will have only limited effect on the Bunker fuel oil and heavier end petroleum hydrocarbons detected in the vadose zone. The potential to reach cleanup targets is rated poor due to the reasons stated above and the fact that SVE does not directly address impacted groundwater.

In-situ bioremediation is relatively low in cost, giving it a good economic feasibility. However, issues with delivery of nutrients and the length of time to remediate give this option a poor technical feasibility. Because of the poor technical feasibility and inablility to reach cleanup goals in a reasonable time frame, it is unlikely that the regulatory issues could be easily resolved. The methodology is given a poor potential to reach cleanup goals.

From a technical standpoint, **Groundwater Pump and Treat** is good for containment and control of a plume. Therefore, pump and treat is given a good rating for technical feasibility. However, pump and treat has a poor rating for economic feasibility due to the length of time needed to reduce TPH-g and MTBE concentrations. For the same reasons, and due to the fact that groundwater pump and treat does not address vadose zone impacts, the pump and treat option has poor potential to reach soil and groundwater cleanup goals.

SVE with Groundwater Pump and Treat is the one combination of methodologies that would effectively address both vadose and saturated zone impacts beneath the site. The potential to reach cleanup levels is rated only fair due to the presence of non-mobile Bunker C fuel in fine grained clay and silt soils. SVE is not expected to have a significant impact on these layers. SVE is anticipated in removing petroleum hydrocarbons from sand layers where the contaminants are able to migrate.

Groundwater extraction and treatment will be effective in containing the migration of petroleum hydrocarbons and MTBE toward Arroyo Valle stream. A permit for discharge of treated water to the sanitary sewer will need to be obtained. Contaminant mass reduction may require the placement of extraction within the source area. The presence of heavy SPH in wells requires special well(s) designed with sumps for product removal.

7.6 Proposed Remedial Approach

Based on the review of remedial alternatives, SVE with groundwater pump and treat was selected as the best active remedial action for the site.

The conceptual design will consist of a series of SVE wells screened in the depth of permeable vadose zone layers of sand and gravel. The purpose of these wells is to reduce VOC and petroleum hydrocarbon mass from the vadose zone prior to migration to the groundwater. The wells will be located within the area between boring SB-1 and wells CWA-1 and MW-5 (**Figure 5**). The spacing of the wells will be based on the results of the feasibility testing performed in April 2010.

The nearest sensitive receptor to the site is the Arroyo Valle stream. The existing groundwater plume has moved beyond downgradient of wells MW-7 and MW-8 and is within approximately 225 feet of the stream. Delta proposes to install a groundwater extraction well between wells MW-7 and MW-8 to provide migration control of the existing groundwater plume. Coarse-grained sand and gravel (GW) was encountered from 60 feet to 73 feet in the boring for well MW-7 and from 67 feet to 77 feet in the boring for well MW-8.

Delta proposes to install a groundwater extraction well near existing well MW-5 for removal of SPH and associated dissolved constituents. The well will be design to accept a SPH skimmer and with a bottom sump for collection and removal of heavy fuels.

7.7 SVE System Details

The SVE system will consist of a total of twenty-four (24) soil vapor extraction wells, installed at locations onsite and offsite. The wells, shown on **Figure 2**, are named as follows: CWB-3 (previously installed), VE-1 to VE-6, VE-7A, VE-7B, VE-7A, VE-7B, VE-8A, VE-8B, VE-9, VE-10A, VE-10B, VE-11A, VE-11B, VE-12 through VE-19. Generally these wells will be completed to depth to intersect the coarse grained and gravelly sand layers where the TPHg impacts are most prevalent and the lithology most conducive to SVE remedial technology. Listed below are the proposed well construction details for the 24 SVE wells.

These well depths and screen intervals are tentative and actual installation may be different based on field geologic interpretations during drilling activities. To complete the proper depth setting of the SVE well screens adjacent to the coarse grained/more permeable units, field geologists will inspect continuous cores at each location, field screen with a photo-ionization detector (PID), make visual notes of any soil staining or NAPL presence and will classify each core sample according to USCS guidelines. These lithologic determinations will be reviewed by a senior hydrogeologist for accuracy, compared against the current lithologic and contaminant conceptual model and approved prior to setting the final well depth and screen interval.

Well ID	Well Diameter (inches)	Total Well Depth (ft. bgs)	Screen Interval (ft. bgs)	Pump Casing Interval (ft. bgs)	Comments
CWB-3	4	35	30 to 35	none	Previously Installed
VE-1	4	40	22 to 37	37 to 40	
VE-2	4	40	22 to 37	37 to 40	
VE-3	4	40	22 to 37	37 to 40	
VE-4	4	40	22 to 37	37 to 40	
VE-5	4	40	22 to 37	37 to 40	
VE-6	4	40	22 to 37	37 to 40	
VE-7A	4	40	22 to 37	37 to 40	
VE-7B	4	66	58 to 63	63 to 66	
VE-8A	4	44	31 to 41	41 to 44	
VE-8B	4	66	58 to 63	63 to 66	
VE-9	4	44	31 to 41	41 to 44	
VE-10A	4	44	31 to 41	41 to 44	
VE-10B	4	68	55 to 65	65 to 68	
VE-11A	4	44	31 to 41	41 to 44	
VE-11B	4	68	55 to 65	65 to 68	
VE-12	4	44	31 to 41	41 to 44	
VE-13	4	44	31 to 41	41 to 44	
VE-14	4	44	31 to 41	41 to 44	
VE-15	4	44	31 to 41	41 to 44	
VE-16	4	44	31 to 41	41 to 44	
VE-17	4	44	31 to 41	41 to 44	
VE-18	4	44	31 to 41	41 to 44	
VE-19	4	44	31 to 41	41 to 44	

Notes: ft. bgs = feet below ground surface

In addition to utilizing these 24 wells for vapor extraction, there is the possibility of recovering bunker fuel/weathered oil in these wells that has migrated from the former redwood UST area, as discovered during the groundwater pumping feasibility study in April 2010. The three foot, non-screened casing section at the bottom of each well will be used to house a pneumatic product pump or alternative product skimmer to pump out any collected bunker fuel oil. An additional groundwater/SPH extraction well is proposed in the area of well MW-5 and CWA-1.

Based on the results of the April 2010 SVE Feasibility Pilot, the minimum expected radius of influence (ROI) for the wells installed in the coarse grained, sandy lithologic unit is estimated to be 12 feet. **Figure 5** depicts the estimated ROI's for the 24 wells. The ROI is based on calculations of 1% vacuum response at adjacent monitoring points. During the pilot test, the minimum ROI based on 1% significant vacuum response as measured by actual field measurements was 15.6 feet. At selected onsite SVE wells, a 1% induced vaccum was not noted in adjacent monitoring points during the pilot test. In these cases, the maximum ROI based on 0.5% significant vacuum response as measured by actual field measurements onsite was 8.75 feet.

To account for these varying ROIs encountered during the pilot test and to ensure to ensure adequate capture zones in the stratified site lithology. overlapping of these ROIs was designed. This overlapping, along with a conservative design ROI of 12 feet, should allow maximum vapor recovery in the targeted area.

A complete remedial design will be prepared in a future Remedial Action Plan (RAP), however, generally designs have each SVE well with an appropriately sized individual process line leading from the well back towards the site where it will connect at the manifold in the onsite Remediation Compound. In addition, Delta proposes to install a pneumatic product/skimmer model pump into each well that will be used to pump any bunker fuel from the well to a storage unit in the remedial compound. Flexible, oil grade tubing contained inside a secondary containment process pipe will be used to transport any recovered oil from the well to the compound storage unit. Design considerations will be made to pump from the wellhead to a drum if necessary later in the remediation effort. Recovered oil will be temporarily stored onsite in a double containment storage unit or 55-gallon DOT rated drums and will be disposed of at frequent intervals.

General industry practices for trenching installation methodologies will be utilized, including process pipe materials selection, use of sweep angles in the trench layout to minimize flow restrictions, trenching depth, sloping of the process lines, trench backfill and trench compaction. Field and engineering determinations will be made for the reuse of excavated soil in the trenching backfill, If soil is deemed clean and appropriate for compaction, it will be place back into the trench. If soil is deemed impacted or unsuitable for compaction, appropriate protocols for separating, stockpiling, classifying and disposing of clean, non-hazardous and hazardous waste will be implemented.

Recovered vapors from the SVE system will be treated using a skid mounted SVE blower equipped with a Thermal Oxidizing (Thermox) Unit. Based on the SVE system performance data collected during the April 2010 SVE Feasibility Study, a minimum 500 cubic feet per minute SVE Blower/Thermox will be needed to run all 24 wells simultaneously. Delta is investigating what, if any, air discharge permit restrictions might be imposed by the Bay Area Air Quality Management District (BAAQMD) on the discharge flow rates. If the BAAQMD will only approve a lower discharge flow rate, then RAP design considerations will be made to operate the onsite and offsite wells on a periodic or timed basis. A compressor installed in the remedial compound will be used to power the pneumatic product pumps in the SVE wells.

Two design items should be noted for the proposed SVE system. On the offsite property, a KinderMorgan underground petroleum pipeline is noted as running southwest to northeast. Any drilling or trenching work in this area should to be coordinated with KinderMorgan in the RAP design phase and prior to conducting any field activities. The second design item is that several offsite SVE well and their associated process pipe trench line is located on a third party stakeholder's private property. Access negotiations for this well installation and remedial work will need to be completed prior to the final RAP design and implementation activities.

7.8 Groundwater Extraction System Details

Delta will construct a 4-inch diameter well for groundwater extraction. The well will be placed between existing wells MW-7 and MW-8 both 2-inch diameter wells. The well will be constructed with PVC casing with a total depth of approximately 85 feet bgs. Depths to groundwater in wells MW-7 and MW-8 on 2-14-10 were 65.53 feet and 70.55 feet, respectively. The well will be screened from approximately 65 to 85 feet bgs in order to be able to extract groundwater from the saturated sand and gravel layers currently contaminated with petroleum hydrocarbons and MTBE. SPH is not anticipated at this downgradient location.

Once the well is installed, the capture radius will be determined by a 24-hour pumping test using wells MW-7 and MW-8 as observation wells. Groundwater extraction flow rate is anticipated to be approximately 1.0 gpm. Extracted groundwater will be conveyed by underground piping to a treatment area in the northern portion of the service station property. The extracted groundwater will be treated by granular activated carbon (GAC) and then discharged to the sanitary sewer upon obtaining a discharge permit from the local sanitation district.

8.0 SCHEDULE

Delta is prepared to proceed with development of detailed engineering drawings within 30 days of approval of this CAP. Completion of the a Remedial Action Plan (RAP) containing engineering plans will require approximately 45 days. Delta will provide Alameda County Environmental Health (ACEH) monthly system installation progress reports.

9.0 REMARKS

The descriptions, conclusions, and recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently acceptable professional standards. For any reports cited that were not generated by Delta, the data from those reports is used "as is" and is assumed to be accurate. Delta does not guarantee the accuracy of this data for the referenced work performed nor the inferences or conclusions stated in these reports. This report is based upon a specific scope of work requested by the client. The Contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were conducted. This report is intended only for the use of Delta's Client and anyone else specifically listed on this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.

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TABLES

Table 1: Soil Analytical Data
76 Service Station No. 7376
4191 First Street
Pleasanton, California

Sample Location	Sample Name	Sample Depth (feet)	Sample Date	TPPH mg/kg	TPH-d mg/kg	Benzene mg/kg	Ethyl-benzene mg/kg	Toluene mg/kg	Xylenes mg/kg	MTBE mg/kg	TBA mg/kg	TPH-Crude Oil mg/kg
				EPA 8260B	EPA 8015 Mod.	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B		
CWB-1	CWB-1@23.5-25	23.5-25	03/29/10	ND< 0.2	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	ND< 0.005	NA	NA
CWB-1	CWB-1@33.5-35	33.5-35	03/29/10	**0.62**	<2.0	**0.024**	ND< 0.005	ND< 0.005	ND< 0.01	**0.12**	NA	NA
CWB-1	CWB-1@38.5-40	38.5-40	03/29/10	**70** A01	**270** A01	ND< 0.5 A01	ND< 0.5 A01	ND< 0.5 A01	ND< 1 A01	ND< 0.5 A01	NA	NA
CWB-1	CWB-1@47-48.5	47-48.5	03/29/10	**33** A01	**49** A01	ND< 0.05 A01	ND< 0.05 A01	ND< 0.05 A01	ND< 0.1 A01	**0.18** A01	NA	NA
CWB-1	CWB-1@50-52	50-52	03/29/10	**43** A01	**58** A01	**0.5** A01	**0.079**	**0.051**	**5** A01	**0.28**	NA	NA
CWB-1	CWB-1@55-57	55-57	03/29/10	**42** A01	**30**	**0.25** A01	**0.41** A01	ND< 0.25 A01	**2.2** A01	ND< 0.25 A01	NA	NA
MW-13	MW-13@54-54.5	54-54.5	04/01/10	ND< 0.2	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	ND< 0.005	NA	NA
MW-13	MW-13@59-59.5	59-59.5	04/01/10	ND< 0.2	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	ND< 0.005	NA	NA
MW-13	MW-13@64.5-65	64.5-65	04/01/10	ND< 0.2	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	**0.0063**	NA	NA
MW-13	MW-13@69-69.5	69-69.5	04/01/10	ND< 0.2	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	ND< 0.005	NA	NA
CWA-1	CWA-1@17.5-18	17.5-18	04/05/10	**1.2** A01	<2.0	ND< 0.01 A01	ND< 0.01 A01	ND< 0.01 A01	ND< 0.02 A01	**0.67** A01	**1.5** A01	ND< 10
CWA-1	CWA-1@26-26.5	26-26.5	04/05/10	**0.5**	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	**0.21**	**1**	ND< 10
CWA-1	CWA-1@31-31.5	31-31.5	04/05/10	**20** A01	**120** A01	ND< 0.025 A01	ND< 0.025 A01	ND< 0.025 A01	ND< 0.05 A01	**1.7** A01	**2** A01	**370** A01
CWA-1	CWA-1@36.5-37	36.5-37	04/05/10	**350** A01	**1000** A01	**0.062**	**0.015**	**0.0098**	**0.1**	**0.086**	ND< 0.05	**3,300** A01
CWA-1	CWA-1@44-44.5	44-44.5	04/05/10	ND< 0.2	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	**0.09**	**0.2**	ND< 10
CWA-1	CWA-1@52.5-53	52.5-53	04/05/10	ND< 0.2	<2.0	ND< 0.005	ND< 0.005	ND< 0.005	ND< 0.01	**0.015**	ND< 0.05	ND< 10
ESL	--	--	--	83	83	0.044	2.9	3.3	2.3	0.023	0.075	250

Notes:
mg/kg - milligrams per kilogram
ND - Not detected above laboratory detection limits
NA - Not analyzed
TPPH - Total Purgeable Petroleum Hydrocarbons
TPH-d - Total Petroleum Hydrocarbons as diesel
MTBE - Methyl tert-butyl ether
TBA - Tert-butyl alcohol
ESL - Environmental Screening Level - Established by the RWQCB for deep soil.

Data Qualifiers and Definitions:
A01 - PQL's and MDL's are raised due to sample dilution.

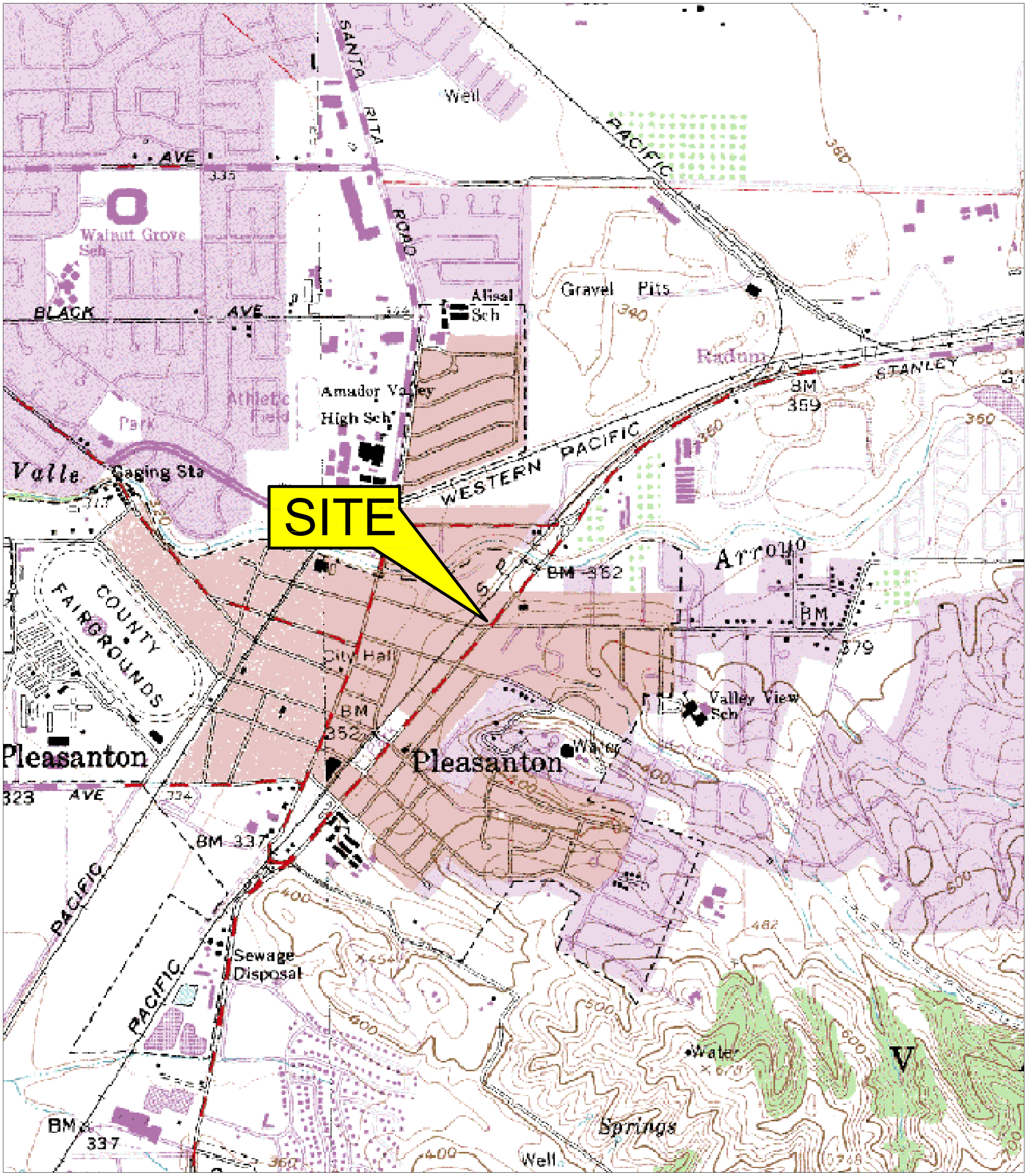
Table 2: Water Analytical Data
76 Service Station No. 7376
4191 First Street
Pleasanton, California

Sample Location	Sample Date	TPPH ug/L EPA 8260B		TPH-d ug/L EPA 8015 Mod.		Benzene ug/L EPA 8260B		Ethyl-benzene ug/L EPA 8260B	Toluene ug/L EPA 8260B	Xylenes ug/L EPA 8260B	MTBE ug/L EPA 8260B	
MW-13	04/26/10	**67**	A90	ND < 50		ND< 0.005		ND< 0.005	ND< 0.005	ND< 0.01	68	
CWB-3	04/26/10	**7200**	A01	**910**	A52	**1700**	A01	**25**	**11**	**30**	**1300**	A01

Notes:
TPH-fuel oil #6 was detected in the sample from MW-13 at 170 ug/L.
ug/L = micrograms per liter
ND - Not detected above laboratory detection limits
NA - Not analyzed
TPPH - Total Purgeable Petroleum Hydrocarbons
TPH-d - Total Petroleum Hydrocarbons as diesel
MTBE - Methyl tert-butyl ether

Data Qualifiers and Definitions:
A01 - PQL's and MDL's are raised due to sample dilution.
A52 = chromatogram not typical of diesel
A90 = TPPH does not exhibit a "gasoline" pattern. TPPH is entirely due to MTBE

FIGURES



North

0 1200 FT 2400 FT

SCALE: 1 : 24,000

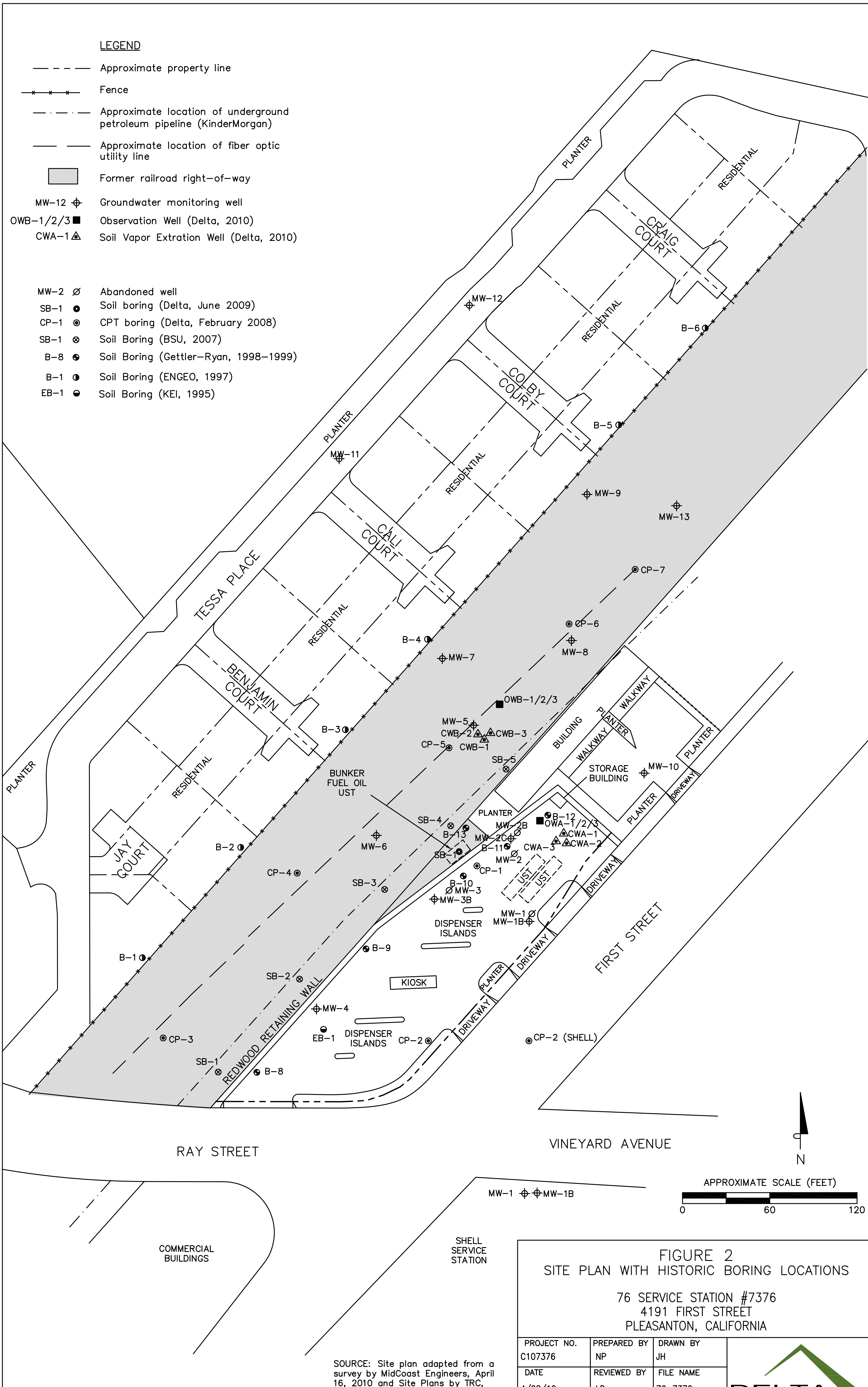
SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP, LIVERMORE QUADRANGLE (1978)

FIGURE 1

SITE LOCATION MAP

76 STATION NO. 7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA

PROJECT NO. C107376	DRAWN BY JH 03/28/08	DELTA
FILE NO. 7376-SiteLocator	PREPARED BY LS	
REVISION NO.	REVIEWED BY DD	



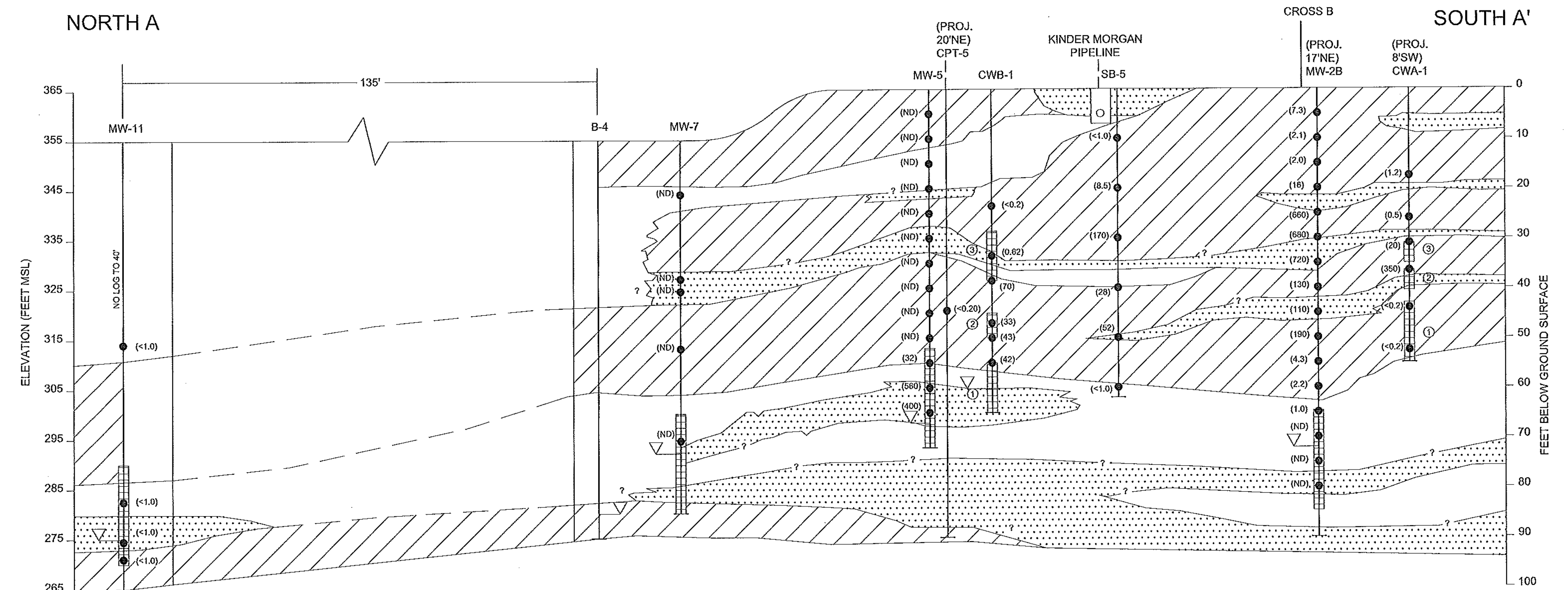
SOURCE: Site plan adapted from a survey by MidCoast Engineers, April 16, 2010 and Site Plans by TRC, 2008 and Gettler-Ryan, August 2000.

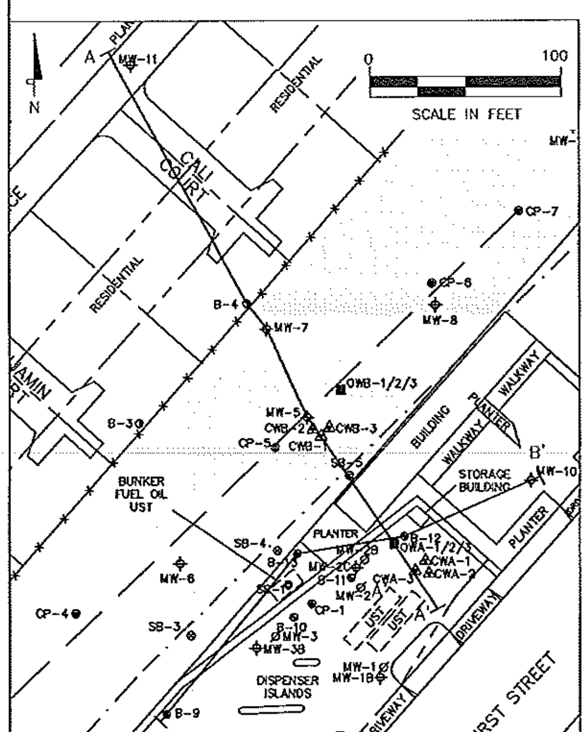
FIGURE 2
SITE PLAN WITH HISTORIC BORING LOCATIONS

76 SERVICE STATION #7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
C107376	NP	JH
DATE	REVIEWED BY	FILE NAME
4/28/10	LD	76-7376

DELTA®





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0 20 SCALE IN FEET 20

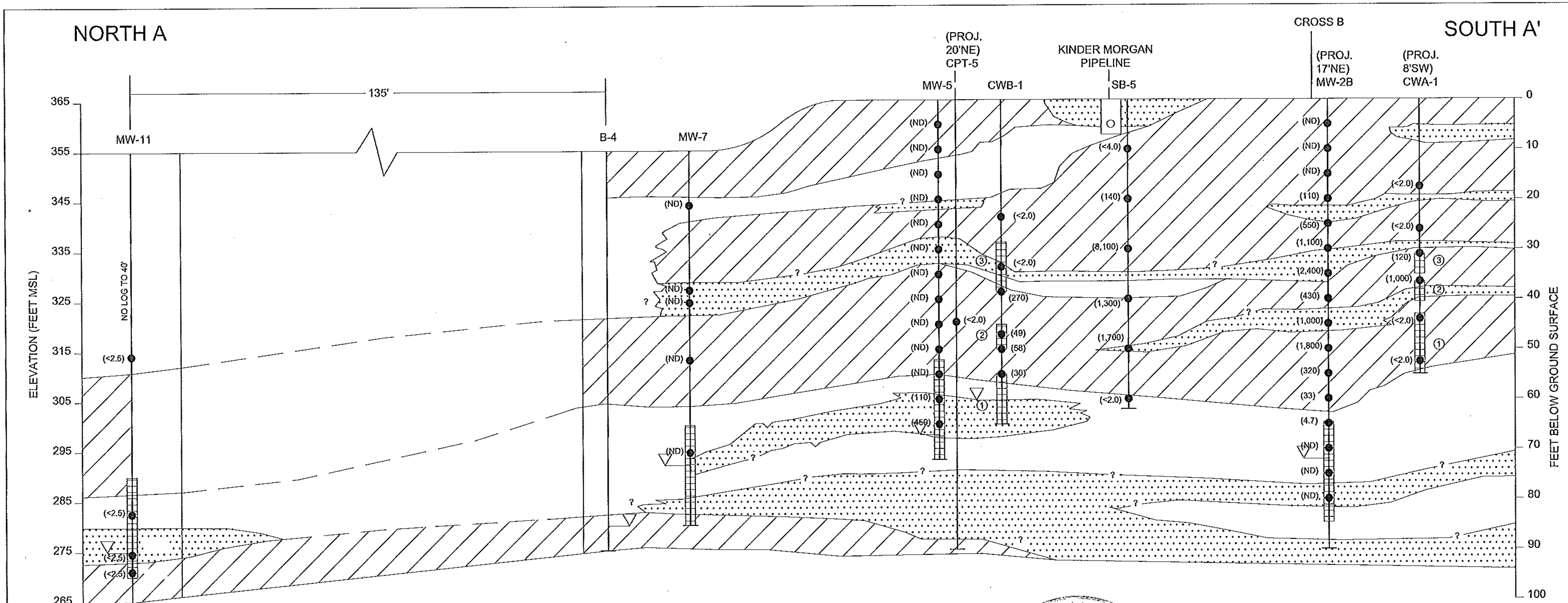
LEGEND

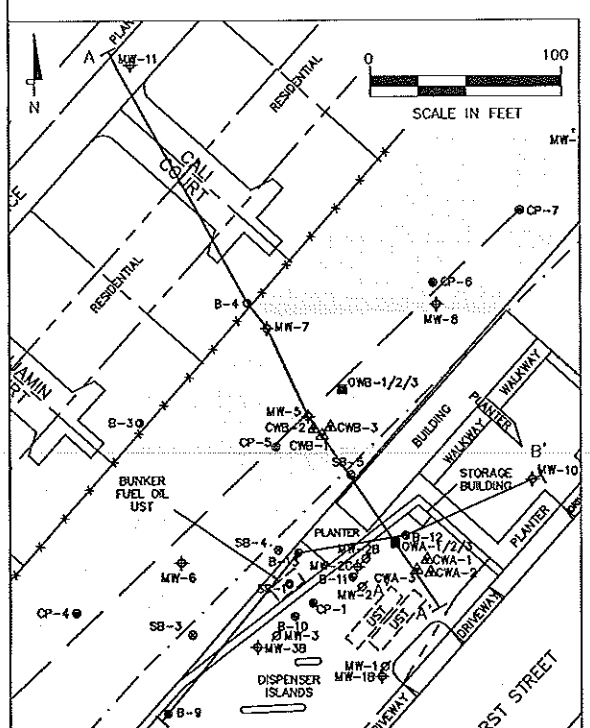
- MW-5 MONITORING WELL/BORING NAME
- WELL CASING/EXPLORATORY BORING
- (49) SOIL SAMPLE LOCATION WITH TPH-G CONCENTRATION (mg/kg) ND - NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- FIRST ENCOUNTERED GROUNDWATER
- WELL SCREEN
- CWA-1 AND CWB-1 IN INDIVIDUAL BORINGS (1, 2, 3)
- CLAY (CL) AND SILT (ML)
- CLAY, SILT, SAND, GRAVEL MIXTURES (SC, SM, GM, GC, GM, MC)
- SAND (SW) AND GRAVEL (GW)
- APPROXIMATE STRATIGRAPHIC BOUNDARY -DASHED WHERE UNCERTAIN, QUIERIED WHERE PROJECTED

FIGURE 3
CROSS SECTION A–A'
TOTAL PURGEABLE PETROLEUM HYDROCARBONS (TPH–G)
76 SERVICE STATION #7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
C107376	LD	JH
DATE	REVIEWED BY	FILE NAME
4/28/10	LD	76–7376

DELTA





LEGEND

MW-5	MONITORING WELL/BORING NAME
	WELL CASING/EXPLORATORY BORING
(49)	SOIL SAMPLE LOCATION WITH TPH-D CONCENTRATION (mg/kg) ND - NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
	FIRST ENCOUNTERED GROUNDWATER
	WELL SCREEN
	CLAY (CL) AND SILT (ML)
	CLAY, SILT, SAND, GRAVEL MIXTURES (SC, SM, GM, GC, GM, MC)
	SAND (SW) AND GRAVEL (GW)
	APPROXIMATE STRATIGRAPHIC BOUNDARY -DASHED WHERE UNCERTAIN, QUIERIED WHERE PROJECTED

CWA-1 AND CWB-1 IN INDIVIDUAL BORINGS (1, 2, 3)

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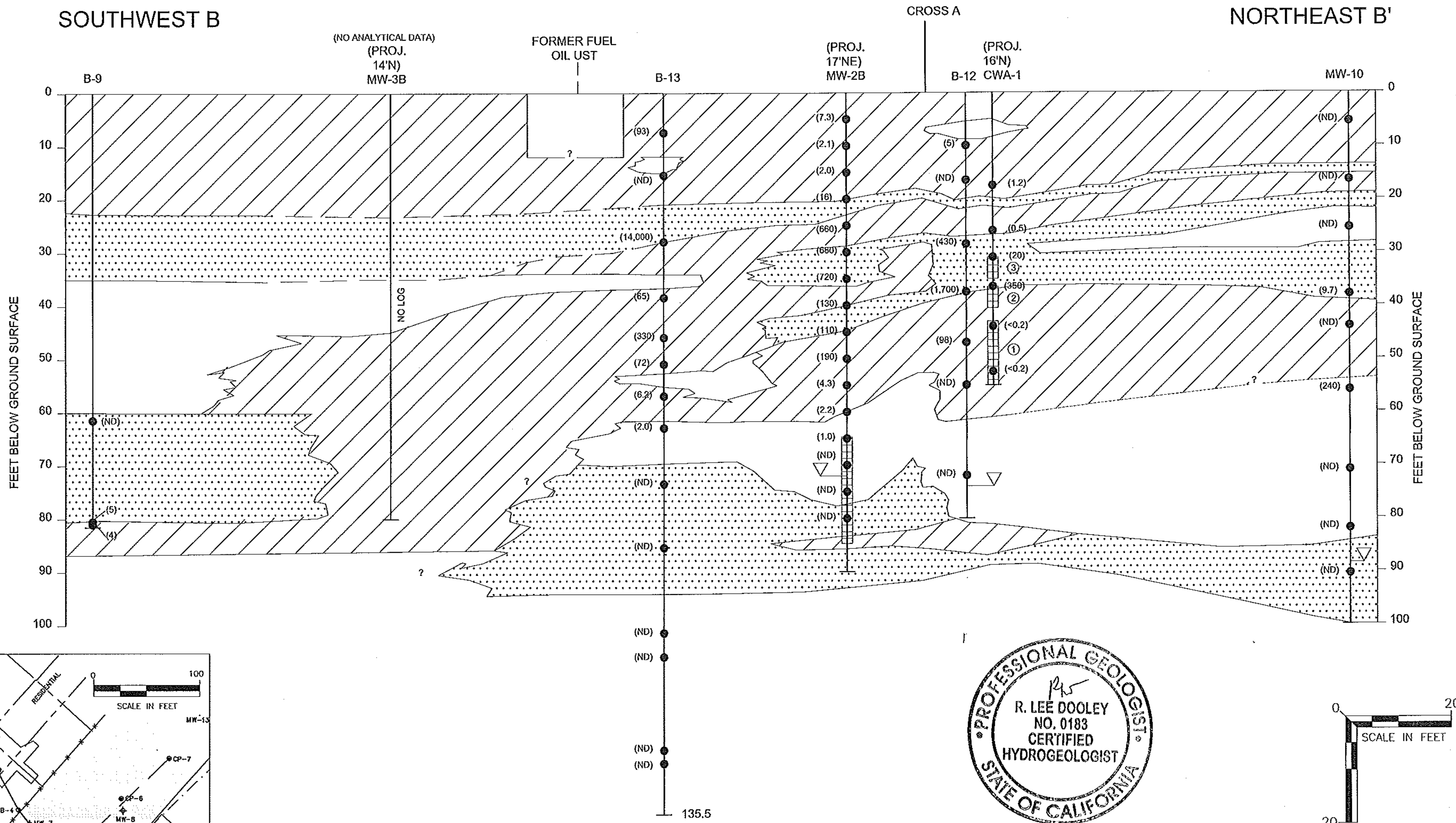
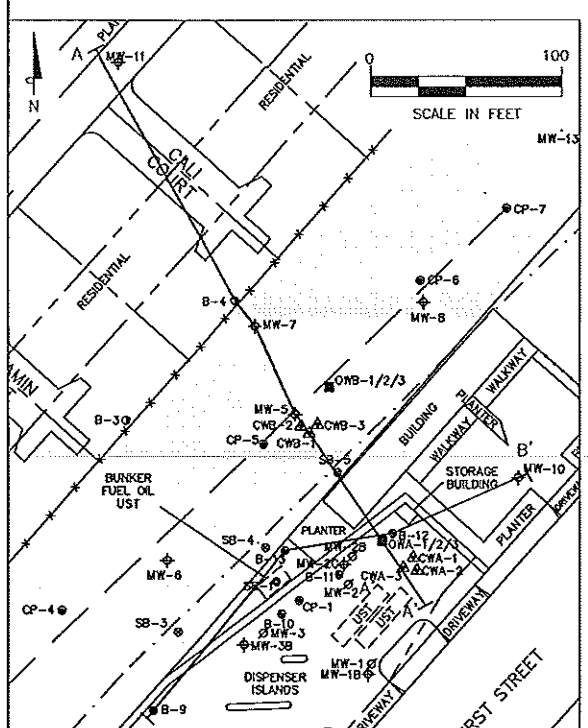
SCALE IN FEET
0
20
20

FIGURE 3b
CROSS SECTION A–A'
DIESEL RANGE ORGANICS (C12–C24) SILICA–GEL TREATED
76 SERVICE STATION #7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
C107376	LD	JH
DATE	REVIEWED BY	FILE NAME
4/28/10	LD	76-7376

DELTA





LEGEND

MW-5	MONITORING WELL/BORING NAME
	WELL CASING/EXPLORATORY BORING
(49)	SOIL SAMPLE LOCATION WITH TPH-G CONCENTRATION (mg/kg) ND - NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
	FIRST ENCOUNTERED GROUNDWATER
	WELL SCREEN

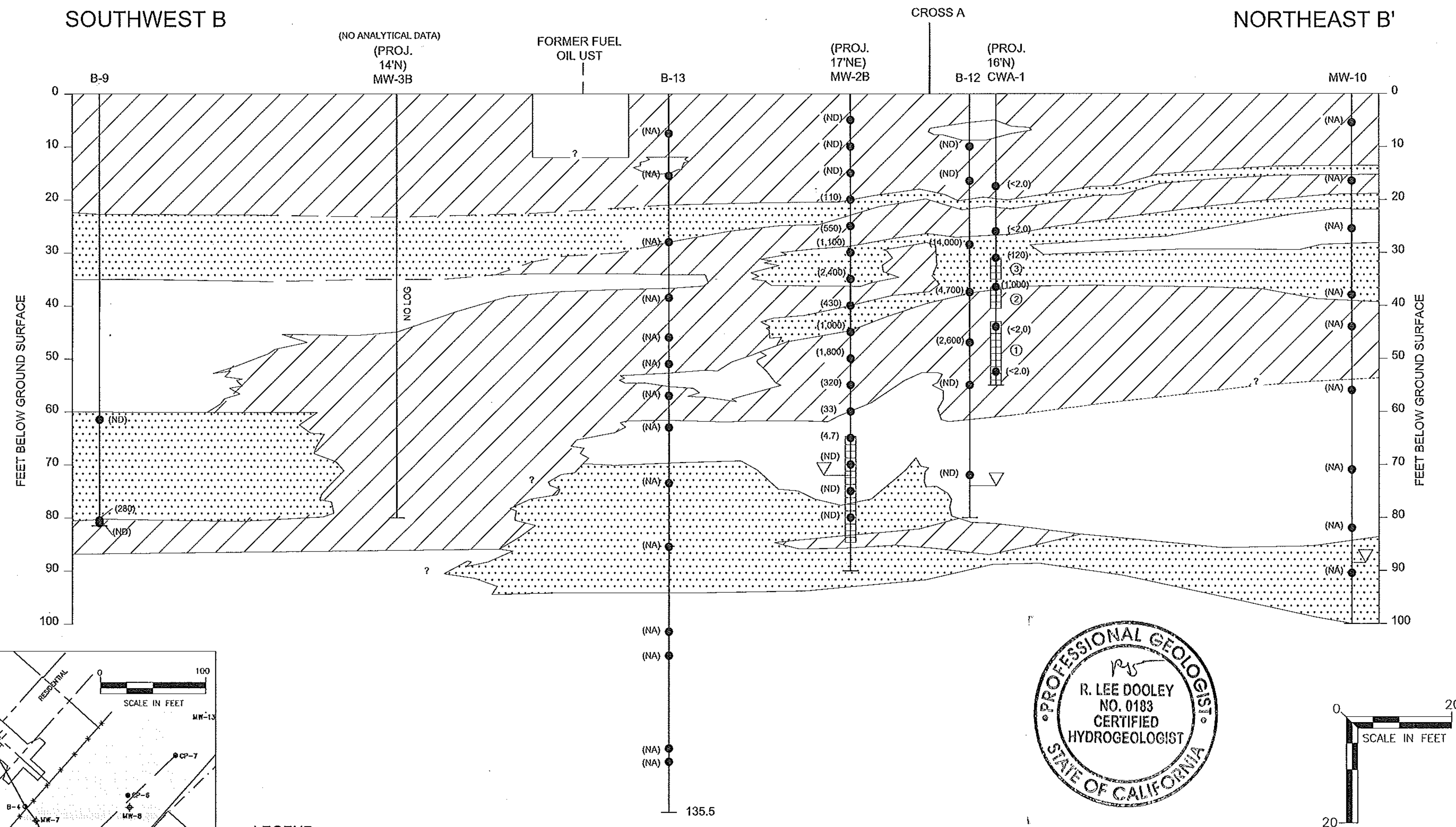
CLUSTERS A & B WELL IN INDIVIDUAL BORINGS (1, 2, 3)

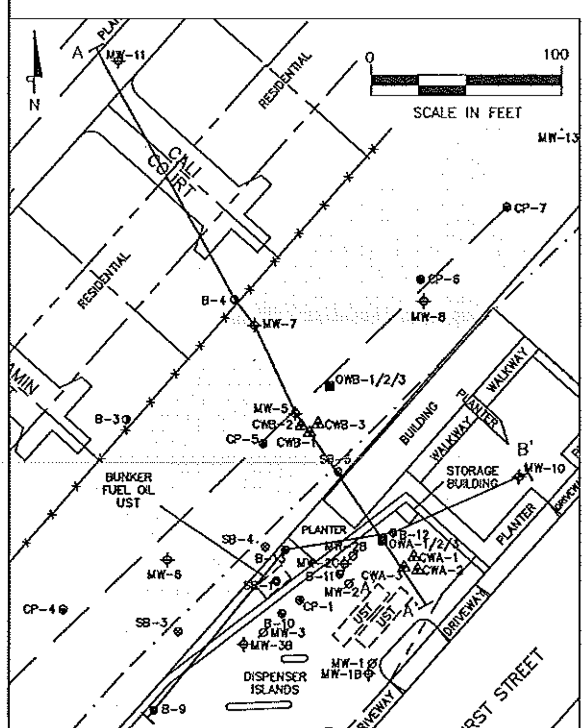
- CLAY (CL) AND SILT (ML)
- CLAY, SILT, SAND, GRAVEL MIXTURES (SC, SM, GM, GC, GM, MC)
- SAND (SW) AND GRAVEL (GW)
- APPROXIMATE STRATIGRAPHIC BOUNDARY -DASHED WHERE UNCERTAIN, QUIERIED WHERE PROJECTED

FIGURE 4
CROSS SECTION B–B'
TOTAL PURGEABLE PETROLEUM HYDROCARBONS (TPH–G)
76 SERVICE STATION #7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
C107376	LD	JH
DATE	REVIEWED BY	FILE NAME
4/28/10	LD	76-7376

DELTA





LEGEND

- MW-5 — MONITORING WELL/BORING NAME
- WELL CASING/EXPLORATORY BORING
- (49) — SOIL SAMPLE LOCATION WITH TPH-D CONCENTRATION (mg/kg); ND - NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- FIRST ENCOUNTERED GROUNDWATER
- WELL SCREEN
- CLUSTERS A & B WELL IN INDIVIDUAL BORINGS (1, 2, 3)
- CLAY (CL) AND SILT (ML)
- CLAY, SILT, SAND, GRAVEL MIXTURES (SC, SM, GM, GC, GM, MC)
- SAND (SW) AND GRAVEL (GW)
- APPROXIMATE STRATIGRAPHIC BOUNDARY -DASHED WHERE UNCERTAIN, QUIERIED WHERE PROJECTED

FIGURE 4b
CROSS SECTION B–B'
DIESEL RANGE ORGANICS (C12–C24) SILICA-GEL TREATED
76 SERVICE STATION #7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
C107376	LD	JH
DATE	REVIEWED BY	FILE NAME
4/28/10	LD	76-7376

DELTA

ConocoPhillips
76 Broadway
Sacramento, California 95818

October 1, 2010

Mr. Jerry Wickham
Alameda County Health Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: 76 Service Station No. 7376
4191 First Street
Pleasanton, California

RE: Revised Corrective Action Plan

Dear Mr. Wickham,

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.

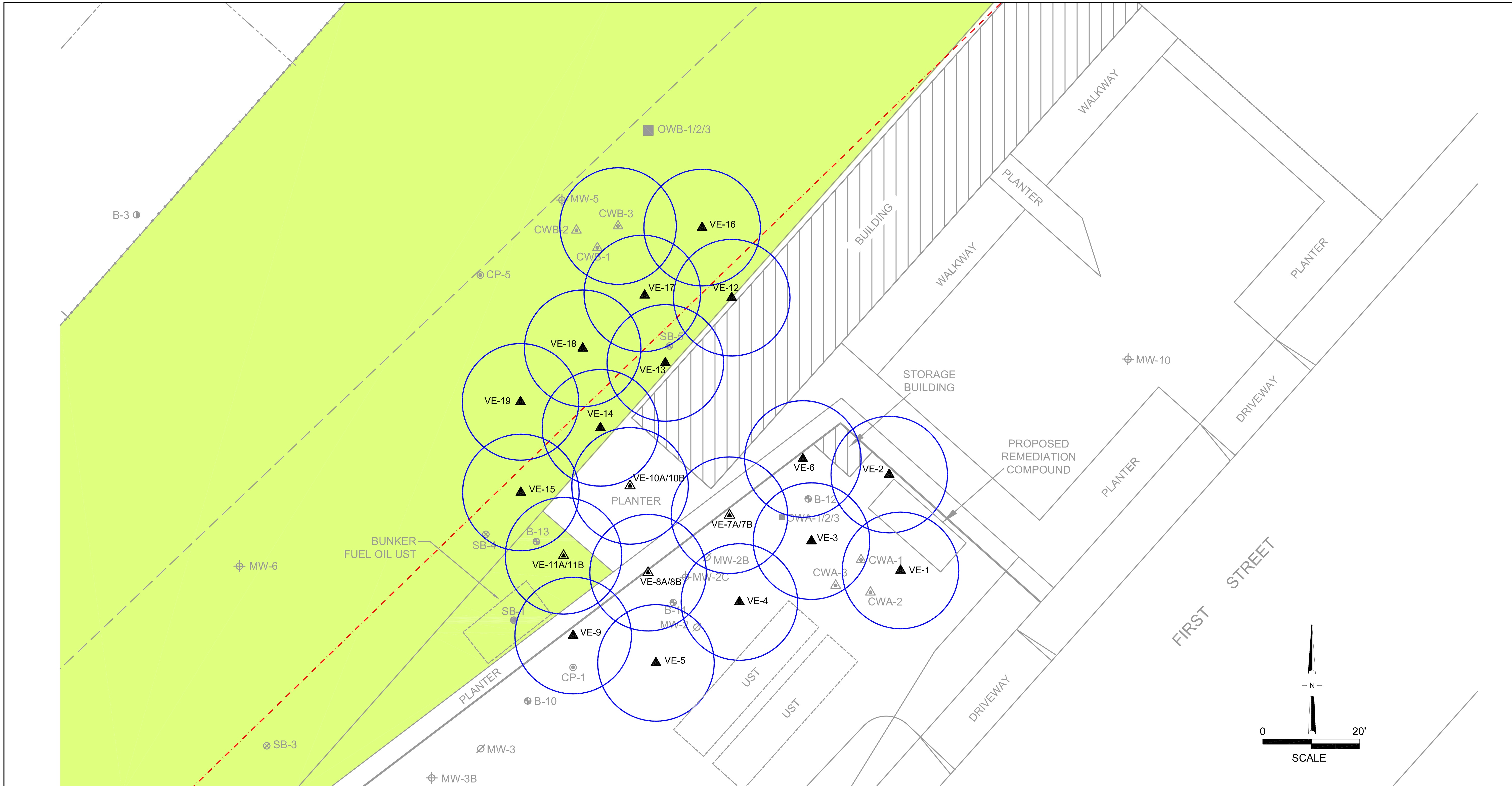
If you have any questions or need additional information, please contact me at (916) 558-7612.

Sincerely,

Bill Borgh

Bill Borgh
Site Manager – Risk Management and Remediation

Attachment



LEGEND

– · – · –	Approximate Property Line
–+–+–+–	Fence
red – · – · –	Approximate Location of Underground Petroleum Pipeline (KinderMorgan)
— — — —	Approximate location of Fiber Optic Utility Line
green box	Former Railroad Right-of-way
MW-12	Groundwater monitoring well Locaton
OWB-1/2/3	Observation Well Location (Delta, 2010)
CWA-1	Soil Vapor Extraction Well Location (Delta, 2010)
MW-2	Abandoned Well Location
VE-1	Proposed Soil Vapor Extraction Well Location with Radii
VE 7A/7B	Proposed Nested Soil Vapor Extraction Well Location with Radii
SB-1	Soil boring Location (Delta, June 2009)
CP-1	CPT boring Location (Delta, February 2008)
SB-1	Soil Boring Location (BSU, 2007)
B-8	Soil Boring Location (Gettler-Ryan, 1998-1999)
B-1	Soil Boring Location (ENGEO, 1997)

FIGURE 5
SOIL VAPOR EXTRACTION WELL
RADIUS OF INFLUENCE
76 SERVICE STATION #7376
4191 FIRST STREET
PLEASANTON, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
I42707376	LD/JM	KYM/JH
DATE	REVIEWED BY	FILE NAME
09/15/10	LD	7376-SM

DELTA

APPENDIX A

Summary of Site Assessment Activities

The following section summarizes findings of previous soil and groundwater investigations conducted at the site. Additional details are contained in Delta's *Site Conceptual Model* dated September 15, 2009.

June 30, 1987: Applied GeoSystems (AGS) oversaw the advancement of three soil borings (B-1, B-2 and B-3). The soil borings were advanced to 46.5 feet bgs and 55 feet bgs in the vicinity of the USTs and northern dispenser island. Total volatile hydrocarbons (TVH) were reported in all three borings, ranging from 7.72 milligrams per kilogram (mg/kg) in B-3 at a depth of 30 feet bgs, to 281.9 mg/kg in B-1 at a depth of 20 feet bgs. Total extractable hydrocarbons (TEH) were reported in B-1 at a depth of 35 feet bgs with a concentration of 1325 mg/kg. On August 21, 1987, an additional boring, B-4 was advanced to a depth of 66.5 feet bgs, directly north of B-1. TVH and TEH were reported at 100.5 mg/kg and 1,835 mg/kg, respectively at a depth of 35 feet bgs. Benzene was reported in all borings, with a maximum concentration of 17.1 mg/kg in B-1, located directly west of the fuel USTs, at a depth of 20 feet bgs, (AGS 1987).

December 2 through 7, 1987: Three soil borings (B-4, B-5 and B-6) were advanced at the site and completed in to monitoring wells MW-1, MW-2 and MW-3. The wells were installed to the southeast, north, and southwest of the site's fuel USTs as shown in **Figure 2**. TVH was detected in borings for wells MW-2 and MW-3 with a maximum concentration of 390 mg/kg at a depth of 55 feet bgs in MW-3. Benzene was detected in MW-2 and MW-3 with a maximum concentration of 14 mg/kg in MW-3 at a depth of 55 feet bgs. TEH was reported in MW-2 and MW-3 with a maximum concentration of 6,300 mg/kg in MW-2 at a depth of 35 feet bgs (AGS 1994).

September 9 through 24, 1994: Kaprellian Engineering Inc. (KEI) collected soil samples P1 through P13 from a depth of 3 feet and samples P2(9) and P5(9) from a depth of nine feet during product piping replacement activities. Total petroleum hydrocarbons as gasoline (TPH-G) and benzene were reported at a maximum concentrations of 8,900 mg/kg and 65 mg/kg, respectively, in sample P5 located at the southern end of the No. 2 fuel dispenser (KEI 1994).

February 6 and 7 1995: KEI oversaw the installation of monitoring well MW-2B and soil boring EB-1 in the vicinity of the fuel USTs and southern fuel dispenser, respectively (**Figure 2**). Well MW-2 was destroyed at this time due to introduction of asphalt to the well during repaving activities. TPH-G, total petroleum hydrocarbons as diesel (TPH-D) and benzene were reported in both borings with maximum concentrations of 15,000 mg/kg, 3,600 mg/kg and 340 mg/kg, respectively, in EB-1 at a depth of five feet. Detections of TPH-G, TPH-D and benzene were reported to depths of approximately 60 feet bgs in each boring (KEI 1995).

July 23 and 24, 1996: KEI oversaw the advancement of three additional soil monitoring wells (MW-4 through MW-6), to total depths of 73.5 to 93 feet bgs. Well MW-4 was installed onsite and wells MW-5 and MW-6 were installed offsite on the former Southern Pacific Railroad right-of-way as shown in **Figure 2**. Soil samples collected from the well borings were analyzed for TPH-G, benzene, toluene, ethylbenzene and xylenes (BTEX compounds), and fuel fingerprinting. Soil samples from boring MW-4 contained low concentrations of petroleum hydrocarbons ranging up to 47 parts per million (ppm) of TPH-G, up to 0.27 ppm of benzene, and up to 15 ppm of TPH-D. Soil samples collected in the upper 50 feet of well boring MW-5 contained benzene up to 0.038 ppm. Samples collected between 55 and 65 feet bgs in MW-5 contained up to 560 ppm of TPH-G, up to 3.9 ppm of benzene, and up to 450 ppm of TPH-D. Samples collected from MW-6 contained up to 5.0 ppm of TPH-G, up to 1.2 ppm of benzene and 200 ppm TPH-D detected at 55 feet bgs. Petroleum hydrocarbon concentrations in the range of kerosene, motor oil, and unidentified extractable hydrocarbons were also identified in the samples collected from the well borings (KEI, 1996).

June 27, 1997: Free product was encountered in well MW-5 during quarterly monitoring activities. In December 1997, Entrix, Inc. (Entrix) performed a forensic geochemical analysis of the free product extracted from well MW-5. The Entrix study determined that the free product was likely composed of a mixture of over 50% refined gasoline and 50% heavier hydrocarbons. The gasoline constituents appeared to be relatively fresh according to Entrix. The heavier hydrocarbon mixture had a carbon distribution ranging from C-13 to

C-33. The distribution was similar in nature to a very weathered crude oil or Bunker C fuel, and petroleum products such as diesel #2, motor oil, lube oil, etc., or mixtures of any of the above heavier hydrocarbons (Entrix, 1997).

November 1997: Engeo advanced six soil borings (B-1 through B-5) on the northwest extent of the vacant right-of-way to the northwest of the site. The borings were advanced to determine whether soils in the right-of-way had been impacted as a result of fuel releases at the site. Borings B-1 through B-5 were advanced to depths of 40 to 80 feet bgs. No analytes were reported above reporting limits in any soil samples. TPH-G, benzene and MTBE were reported in groundwater samples at concentrations of 0.630 ppm, 0.023 ppm, and 0.498 ppm, respectively in groundwater sample W-4.

June and August 1998 : Five additional onsite soil borings (B-8 through B-12) were advanced and two offsite down gradient groundwater monitoring wells (MW-7, MW-8) were installed by Gettler-Ryan (GR). TPH-G, benzene, TPH-D and MTBE reached maximum concentrations in boring B-12 at depths between 28.5 bgs and 37.5 bgs of 1,700 ppm, 21 ppm , 14,000 ppm and 2.6 ppm, respectively. Total petroleum hydrocarbons as hydraulic oil (TPH-ho) was detected in B-11 at 10.5 feet bgs at a maximum concentration of 5,200 ppm. No analytes were reported in samples collected from B-8 and MW-7. Two soil samples containing visible free product were collected from boring B-11 (near the former UST excavation) at 10.5 and 61 feet bgs and submitted to Global Geochemistry Corp. for hydrocarbon fingerprinting chemical analysis. The results of these analyses determined that the free product from both samples was composed of approximately 90% highly to severely weathered crude oil and 10% of slightly weathered gasoline (GR, 1999).

October and November 2000: GR advanced one soil boring located northwest of the fuel USTs (B-13) and installed two offsite groundwater monitoring wells to the north of the site (MW-9 and MW-10) as shown in **Figure 2**. TPH-G and benzene were reported at maximum concentrations of 14,000 mg/kg and 100 mg/kg, respectively in B-13 at a depth of 28 feet bgs. Benzene and TPH-G were detected in B-13 to a depth of approximately 73 feet bgs. MTBE was reported at a maximum concentration of 2 mg/kg in B-13 at a depth of 46 feet bgs. No analytes were reported in MW-9. TPH-G, benzene and MTBE were reported in MW-

10 at maximum concentrations of 240 mg/kg, 0.71 mg/kg, and 1.2 mg/kg, respectively, at a depth of 56 feet bgs (GR, 2000).

September 17 through 19, 2001 :Two offsite soil borings were installed by GR and completed as groundwater monitoring wells MW-11 and MW-12 (**Figure 2**). The wells were installed to total depths of approximately 86 and 88 feet bgs, respectively. No analytes were detected above LRLs for all soil samples. No analytes were reported above the reporting limits in groundwater sample MW-12-Grab, collected from a perched groundwater zone at 40 feet bgs in well boring MW-12 (GR 2002).

November 5, 2007: BSK conducted an investigation in the right-of-way northwest of the site and surrounding parcels. The investigation was conducted for the City of Pleasanton to determine the extent of herbicides and heavy metals in the corridor as a result of the property's prior use as a railway. In addition, the investigation took place to determine the impact on soils from fuel releases at the site, and from the Shell service station across First Street.

Surface soil samples were collected at locations shown in Appendix B, and seven soil borings (SB-1 through SB-7) were advanced between the Kinder Morgan Pipeline location and the site. Borings were advanced to depths of 37.5 feet bgs to 61 feet bgs. Arsenic was reported at a maximum concentration of 68 mg/kg in sample RR-3, which is above the California Human Health Screening Levels (CHHSL) for residential and commercial soils of 0.07 mg/kg and 0.24 mg/kg, respectively. Lead was reported above the residential CHHSL of 150 mg/kg in two surface samples with a maximum concentration of 190 mg/kg in sample BG-1 (BSK 2008).

Samples from soil borings were analyzed for TPH-G, TPH-D, BTEX compounds, TPH-jet fuel, TPH-aviation fuel, oil and grease, MTBE and TBA. No analytes were reported above LRLs in SB-1 and SB-3. TPH-G and TPH-D, TPH-aviation fuel, TPH-jet fuel, benzene, oil and grease and MTBE were reported in maximum concentrations of 8,100 mg/kg, 860 mg/kg, 9,600 mg/kg, 37 mg/kg, 11,000 mg/kg and 260 mg/kg, respectively, in SB-5 at a depth of 30 feet bgs. TPH-G was reported at a maximum concentration of 380 mg/kg in SB-6 at a depth of

30 feet bgs. All soil sample locations and data are presented in Appendix B. The original lab report was amended as the indication of the petroleum hydrocarbons as jet fuel appeared to be questionable. A note on the soil analytical summary table stated "TPHg – total petroleum hydrocarbons – Jet Fuel** (Hydrocarbons reported within diesel range)" (BSK 2008).

February 18 through 26, 2008: Delta oversaw the advancement of seven cone penetrometer test (CPT) borings (CP-1 through CP-7). CP-1 and CP-2 were located onsite near the fuel USTs, and at the southeast portion of the site, respectively and CP-3 through CP-7 were located in the right of way directly to the west of the site as shown in **Figure 2**. TPH-G and benzene were reported only in CP-1 with maximum concentrations of 640 mg/kg and 25 feet bgs and 14 mg/kg at 30 feet bgs, respectively. TPH-G was reported in soil in CP-1 to the maximum depth explored of 701 feet bgs. MTBE was reported in borings CP-1, CP-5, CP-6 and CP-7, with a maximum concentration of 1.3 mg/kg in CP-1 at a depth of 30 feet bgs. TPH-G was reported in groundwater from borings CP-1, CP-4, CP-6 and CP-7 ranging from 99 micrograms per liter (μg/l) in CP-4 to a maximum of 1,500 μg/l in CP-1. Benzene was reported in CP-1, CP-2 and CP-6 ranging from 0.67μg/L in CP-2 to a maximum of 250 μg/l in CP-1. MTBE was reported in CP-1, CP-2, CP-4, CP-6 and CP-7 ranging from 1.4 μg/l in CP-2 to a maximum of 530 μg/l in CP-1. No groundwater samples were collected from CP-5 (Delta 2008).

June 8 through 25, 2009: Delta oversaw the destruction of wells MW-1, MW-2B and MW-3, and the installation of replacement wells MW-1B, MW-2C and MW-3B. In addition, one soil boring (SB-1) was advanced in the northwestern portion of the site in the footprint of an old bunker oil tank. Soil samples were collected from SB-1 and MW-2C. Gasoline range organics (GRO) was reported in soil boring SB-1 above the Environmental Screening Level (ESL) of 81 mg/kg from depths of 20 feet to 45 feet bgs. Fuel oil #6 was reported above the ESL of 2,500 mg/kg at depths of 30 feet bgs, 40 feet bgs and 45 feet bgs with a maximum concentration of 1,400 mg/kg at a depth of 20 feet bgs. Benzene was reported below 20 feet bgs in SB-1 to the maximum depth of 45 feet bgs, with a maximum concentration of 3.6 mg/kg at a depth of 30 feet bgs. MTBE was detected only at 10 feet bgs with a concentration of 0.05 mg/kg (Delta 2009).

Soil samples collected from MW-2C were subject to analysis for volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260, semi-volatile organic compounds by EPA Method 8270C, and purgeable aromatic and total petroleum hydrocarbons (TPH) by EPA 8015 (leaking underground fuel tank/ fuel finger printing) (LUFT/FFP). With the exception of sample depth 25 bgs Benzene was detected at all sampled depths at concentrations ranging from 28 (ppm) at 30 bgs, to 0.05 mg/kg at 45 bgs generally decreasing in concentration with depth. With the exception of sample depth 25 bgs MTBE was detected at all sampled depths in concentrations ranging from 8.7 mg/kg at 30 bgs to 0.075 mg/kg at 45 bgs generally decreasing in concentration with depth. TPH-G was not detected at or above LRLs from sampled depths. TPH as Kerosene was detected at two sampled depths at concentrations ranging from 93 mg/kg at 20 bgs to 1,800 mg/kg at 25 bgs. TPH-D was detected at all sampled depths at concentrations ranging from 26 mg/kg at 20 bgs 15,000 mg/kg at 35 bgs.

<u>March-April 2010</u>; Concentrations of MTBE have been rising in offsite well MW-8. In order to define the downgradient extend to MTBE offsite, Delta installed MW-13 located northeast of MW-8. The groundwater sample from well MW-13 contained MTBE at 68 ug/L. TPPH was reported at 67 ug/L but the laboratory noted that "TPPH does not exhibit a 'gasoline pattern. TPPH is entirely due to MTBE." TPH-fuel oil #6 was detected in the sample at 170 ug/L.

APPENDIX B

Soil Boring Logs and Well Construction Diagrams

Delta Consultants

Project No: c107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/5/10-4/6/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	55
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	55
Gravel Pack:	2/12 Sand	Casing Stickup:	

Well/ Boring ID: CWA-1

Location Map: Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
				Air knife to 5 feet bgs	0-5			
		moist	41.5	5 4 5	8.5-10		GC CL	**Clayey Gravel**, brown, 20% clay **Lean Clay with Gravel**, brown, 25% gravel, angular, stiff
		moist	30.2	3 5 9 10	15-17			As above, very stiff
		moist	22.5	8 8 12	17-18.5		CL	**Gravelly Lean Clay**, yellowish tan with red, quartz and chert clasts, very stiff
		moist	7.4	6 8 14	18.5-20		GW	**Sandy Gravel**, greenish gray, trace fines medium dense
		moist	41.2	7 9 12 12	20-22		CL	**Gravelly Lean Clay**, yellowish tan, rounded 1/2-inch quartz gravel, very stiff
				3	22-			As above

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HYDROGEOLOGIST
STATE OF CALIFORNIA

Delta Consultants

Project No: c107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/5/10-4/6/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	55
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	55
Gravel Pack:	2/12 Sand	Casing Stickup:	
Elevation		Northing	Easting

Location Map
Please See Site Map

Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Soil Type	LITHOLOGY / DESCRIPTION
	21.2	6	23		**Gravelly Lean Clay Continued**
		7		CL	yellowish tan, rounded 1/2-inch quartz gravel, stiff
damp		2			
	49.5	6	24		As above, gray-tan mottled, less gravel, silty
		7			stiff
moist		8	25		**Clayey Gravel**, greenish tan, clasts up to 1/2-inch
	29.3	12		GC	quartz, subangular to subrounded, 30% clay
		13	26		medium dense
		15			
moist		4	27		As above
	17.9	12		SP-	**Well Graded Gravelly Sand**, 35% gravel
		13	28	SW	medium dense
		5		ML	**Silt with Gravel**, orange-tan, 20% gravel,
	393	5	29		stiff
		9		ML	**Silt**, light gray-tan mottled, <5% gravel, stiff
moist		4	30		
	369	6			As above, gray-green, no gravel, very stiff
		8	31		
		10			
		2	32		sheen on surface - sph, medium stiff
	649	3			
		5	33		
		10			saturated with SPH- large gravel clasts >1/4-inch
very moist	766	16	34		very stiff to hard
		14			
		14	35		As above
	598	16		GC	**Clayey Gravel,** greenish dark-gray, SPH on gravel
moist		26	36		surfaces, very dense
		30			
		10	37	GW	**Well Graded Sandy Gravel with Clay**, dark gray,
	688	13			25% sand, 10% clay, SPH - vertical fractures
		16	38		medium dense
		9			
	328	11	39		
		12			**Lean Clay**, orange-tan, no gravel, no SPH
		4	40	CL	very stiff
	49.4	10			
damp		10	41		(as above) (increasing silt)
		14			
		7	42	ML	**Silt**, orange-tan, 20% fine sand
damp	35	10			very stiff
		7	43		
		4			As above
damp	15.5	10	44		

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Project No:c107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/5/10-4/6/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	55
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	55
Gravel Pack:	2/12 Sand	Casing Stickup:	

Well/ Boring ID: CWA-1

Location Map

Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
				11	45			**Silt**, orange-tan, 20% fine sand, very stiff continued.
		damp	5.5	6, 9, 13, 15	46		CL	**Lean Clay**, orange-tan, 15% fine sand, trace fine gravel- chert, quartz, very stiff
		damp	7.8	5, 6, 7	47–48			(as above, black spots of mineralization) stiff
		damp	3.5	4, 6, 10	49–50			as above, very stiff
		damp	2.9	6, 6, 9, 14	51–52			as above
		damp	3.5	5, 8, 10	53			as above
		damp	1.5	6, 10, 10	54–55		GC	**Clayey Gravel with Sand**, 20% clay, 20% medium sand, medium dense
					55			Bottom of Boring at 55 Feet bgs
					56			
					57			
					58			
					59			
					60			
					61			
					62			
					63			
					64			
					65			
					66			

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Project No:c107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/5/10-4/6/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	40
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	40
Gravel Pack:	2/12 Sand	Casing Stickup:	

Well/ Boring ID: CWA-2

Page 1 of 1

Location Map: Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill, Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample Recovery	Sample Interval	Soil Type	LITHOLOGY / DESCRIPTION
					2				See CWA-1 for lithology
					4				
					6				
					8				
					10				
					12				
					14				
					16				
					18				
					20				
					22				
					24				
					26				
					28				
					30				
					32				
					34				
					36				
					38				
					40				Bottom of Boring at 40 feet bgs
					42				
					44				

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Project No:c107376		Client:	ConocoPhillips
Logged By: Nadine Periat		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/5/10-4/6/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	35
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	35
Gravel Pack:	2/12 Sand	Casing Stickup:	

Well/ Boring ID: CWA-3

Page 1 of 1

Location Map
Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill, Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample: Recovery	Sample: Interval	Soil Type	LITHOLOGY / DESCRIPTION
					2				See CWA-1 for lithology
					4				
					6				
					8				
					10				
					12				
					14				
					16				
					18				
					20				
					22				
					24				
					26				
					28				
					30				
					32				
					34				
					36				Bottom of Boring at 35 feet bgs
					38				
					40				
					42				
					44				

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Project No: C107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	3/29/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	65
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	65
Gravel Pack:	2/12 Sand	Casing Stickup:	NA

Well/ Boring ID: CWB-1

Page 1 of 3

Location Map: Please See Site Map

▽ = First Encountered Groundwater Depth

Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
				Air knife to 5 feet bgs	0–2	Interval 0–5	CL	**Lean Clay**, brown, silty, <10% fine sand, very stiff, lithified with fracture planes
					2–5		GM	**Silty Gravel**, brown, 20-25% silt, gravel is well graded, medium sized to 6" diameter cobbles, chunks of asphalt, brick and concrete mixed with silty gravel Artificial fill
					5–8.5		SM	**Silty Sand with Gravel,** 25% gravel, 50% fine sand 30% silt, black organic material
		Damp	0.3	5 7 10	8.5–10	8.5–10		As above, medium dense
		Wet	0.5	4 5 5 7	15–17	15–17		As above, gravel up to 1/2 inch diameter, subrounded
							GW-GM	**Well Graded Gravel with Silt**, gray, 10% silt, medium dense
		Damp	0.5	3 7 10	17–18.5	17–18.5	SM	**Silty Sand with Gravel**, orange-tan mottled, 15% gravel, 15-25% silt, medium dense
					18		CL	**Lean Clay with Sand**, mottled, 20% sand wood/organic fragments (brown) moderate plasticity, very stiff
		Damp	0.9	7 12 16	18.5–20	18.5–20		
			0.8	8 10 13 16	20–22	20–22	CL	**Sandy Lean Clay**, orange tan, 10% fine gravel, 20-30% medium sand, very stiff
				10	22	22–		

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Project No: C107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	3/29/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	65
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	65
Gravel Pack:	2/12 Sand	Casing Stickup:	NA
Elevation		Northing	Easting

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Well/ Boring ID: CWB-1

Location Map
Please See Site Map

▽ = First Encountered Groundwater Depth

Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Soil Type	LITHOLOGY / DESCRIPTION
			10		CL	**Sandy Lean Clay continued**, grey
		0.4	17	23		
			7			
			13	24		As above, brown-grey, less sand, 5-10% sand, hard.
		1.1	18			
			6	25	GM	**Silty Gravel**, 1/8"-1/4" quartz gravel, sub angular, dense
			13		CL	**Gravelly Clay with Sand**, 20% fine gravel, 20% quartz
		1.1	18	26		sand, 60% clay, grey root holes, white veining, hard
			19			
			4	27		
	Damp	1.3	13			
			17	28		
			5			
		6.3	6	29		As above, 1/2 frequency of quartz and red chert
			11			very stiff
			5	30	SM	**Silty Sand**, trace gravel, 25% silt, dense
		7.5	6			
	Moist		15	31		
			16			
			4	32	ML	**Sandy Silt**, grey, 35% very fine sand, low plasticity
		34.3	4	33		stiff
	Wet		8			
				34		
	Damp	27.7				
	Moist			35	SP	**Poorly Graded Sand,** grey, medium dense
			4			
		28.5	4	36		
	Damp		7			
			11	37	GC	**Clayey Gravel**, 1/4"-1/2" quartz, subangular gravel, 30%
			6		SP	clay, medium dense
	Moist		19	38		**Poorly Graded Sand,** grey, sand is fine to medium,
			22		GM	10% gravel, dense
			21	39		**Silty Gravel**, grey, 20% silt, gravel is coarse, angular
	Damp	425	35			quartzite, very dense
			16	40		Calcite (effervesces in HCL)
			4		CL	**Sandy Lean Clay**, orange-tan, medium plasticity,
	Damp	55	16	41		very stiff
			8			
			10	42		
			4		CL	**Lean Clay**, grey-orange tan mottled,
		110	10	43		little or no sand, stiff
			12			
			6	44		
		102	7			

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Project No: C107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	3/29/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	65
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	65
Gravel Pack:	2/12 Sand	Casing Stickup:	NA
Elevation		Northing	Easting

Location Map
Please See Site Map

▽ = First Encountered Groundwater Depth

Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Soil Type	LITHOLOGY / DESCRIPTION
			9			**Lean Clay continued**
			4	45	ML	**Silt**, orange-tan, 5-10% sand, very stiff
		102	7			
			9	46		
			13			
			3	47	CL	**Lean Clay**, orange-tan with black spots, silty, moderate
	Damp	711	5			plasticity, stiff
			7	48		
			7			
	Damp	101	10	49		As above, trace fine angular gravel,
			13			very stiff
			4	50		
	Damp	381	7			
			8	51		As above
			13			
			14	52		
		157	10			
			10	53		
			5			
	Damp	354	8	54		sub rounded red chert clasts
			12			
			4	55		scattered medium gravel
		1274	15			
			14	56		As above, hard
			18			
			6	57	GM	**Silty Gravel**, grey-orange-tan mottled, medium dense
	Damp	44.6	9			
			10	58	ML	**Silt with Gravel**, grey-brown, very stiff
			4			
	Damp	1406	7	59		
			9		SM	**Silty Sand with Gravel**, grey, 25% gravel, 25% silt
▽			6	60		
		1620	12		SW	**Gravelly Sand**, grey, 30% gravel, medium rounded,
	Wet		19	61		dense
			22			
			6	62		SPH-black, as above
		1312	10			
			15	63		
			17			
		1268	19	64		very dense
			40			
				65		Bottom of boring = 65 feet below grade
				66		

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Project No: C107376		Client:	ConocoPhillips	Well/ Boring ID: CWB-2
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA	Page 1 of 1
Driller: Gregg Drilling and Testing		Date Drilled:	3/29-3/30/10	Location Map
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"	Please See Site Map
Sampling Method:	Split Spoon	Hole Depth:	57	
Casing Type:	Sch 40 PVC	Well Diameter:	4	▽ = First Encountered Groundwater Depth
Slot Size:	0.02 - inch	Well Depth:	57	
Gravel Pack:	2/12 Sand	Casing Stickup:	NA	
Elevation		Northing	Easting	

Well Completion (Backfill, Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery, Interval)	Soil Type	LITHOLOGY / DESCRIPTION
					4			See CWB-1 for lithology
					8			
					12			
					16			
					20			
					24			
					28			
					32			
					36			
					40			
					44			
					48			
					52			
					56			
					60			Bottom of Boring at 57 feet bgs
					64			
					68			
					72			
					76			
					80			
					84			
					88			

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Project No: C107376		Client:	ConocoPhillips
Logged By: Lee Dooley		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	3/29-3/30/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	10"
Sampling Method:	Split Spoon	Hole Depth:	40
Casing Type:	Sch 40 PVC	Well Diameter:	4
Slot Size:	0.02 - inch	Well Depth:	40
Gravel Pack:	2/12 Sand	Casing Stickup:	NA
Elevation		Northing	Easting

Well/ Boring ID: CWB-3

Location Map

Please See Site Map

▽ = First Encountered Groundwater Depth

Well Completion (Backfill, Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery, Interval)	Soil Type	LITHOLOGY / DESCRIPTION
					2			See CWB-1 for lithology
					4			
					6			
					8			
					10			
					12			
					14			
					16			
					18			
					20			
					22			
					24			
					26			
					28			
					30			
					32			
					34			
					36			
					38			
					40			Bottom of Boring at 40 feet bgs
					42			
					44			

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Project No: c107376		Client:	ConocoPhillips
Logged By: Nadine Periat		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/1-4/2/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"
Sampling Method:	Split Spoon	Hole Depth:	80
Casing Type:	Sch 40 PVC	Well Diameter:	2
Slot Size:	0.02 - inch	Well Depth:	77
Gravel Pack:	2/12 Sand	Casing Stickup:	
Elevation		Northing	Easting

Well/ Boring ID: MW-13

Location Map

Please See Site Map

▽ First Encountered Water

▼ Static Water Level

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
				Air knife to 5 feet bgs	0–8		ML	**Silt,** brown, < 10% fine sand, trace cobbles, slight plasticity, clayey, artificial fill
		Damp	0.3	4 4 5	9	8.5–10	ML	**Sandy Silt**, brown, 35-45% very fine sand, sand is poorly graded, unconsolidated, stiff
		Damp	1.1	5 4 5	14	13.5–15		As above, better consolidation, small root holes stiff
		Damp	0.2	8 10 12	19	18.5–20		As above, trace medium gravel, subrounded, 1" in diameter, very stiff

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Delta Consultants	Project No: c107376		Client:	ConocoPhillips	Well/ Boring ID: MW-13
	Logged By: Nadine Periat		Location:	4191 First Street, Pleasanton, CA	Page 2 of 4
	Driller: Gregg Drilling and Testing		Date Drilled:	4/1-4/2/10	Location Map
	Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"	Please See Site Map
	Sampling Method:	Split Spoon	Hole Depth:	80	
	Casing Type:	Sch 40 PVC	Well Diameter:	2	▽ First Encountered Water
	Slot Size:	0.02 - inch	Well Depth:	77	▼ Static Water Level
	Gravel Pack:	2/12 Sand	Casing Stickup:		
	Elevation		Northing	Easting	

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
					23			
		Damp	0.5	8 11 12	24		CL	**Lean Clay with Sand**, brown-tan, 15-20% coarse sand, trace fine gravel, low plasticity, silty, very stiff.
					25			
					26			
					27			
					28			
		Moist	0.7	4 7 9	29			As above
					30			
					31			
					32			
					33			
		Very Moist	0.6	5 8 9	34		CL	**Lean Clay**, tan/gray mottled, 5-15% fine sand, medium plasticity, root holes, very stiff
					35			
					36			
					37			
					38			
		Moist	0.5	3 50/3	39		GW	**Sandy Gravel**, gray, gravel is <1-inch to >2-inches in diameter, fractured, 25-30% well graded sand, 10% clay, poor recovery, cobble stuck in sampler very dense
					40			
					41			
					42			
					43			As above
		Moist	0.5	24 20	44		CL	**Lean Clay**, tan-orange mottled, trace gravel, 10-15% fine to medium sand, medium plasticity, hard

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Project No: c107376		Client:	ConocoPhillips
Logged By: Nadine Periat		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/1-4/2/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"
Sampling Method:	Split Spoon	Hole Depth:	80
Casing Type:	Sch 40 PVC	Well Diameter:	2
Slot Size:	0.02 - inch	Well Depth:	77
Gravel Pack:	2/12 Sand	Casing Stickup:	

Well/ Boring ID: MW-13

Location Map
Please See Site Map

▽ First Encountered Water
▼ Static Water Level

Elevation	Northing	Easting

Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Soil Type	LITHOLOGY / DESCRIPTION
		20	45	CL	**Lean Clay Continued**
Moist	0.1	4 7 7	49		As above, stiff
Moist	0.5	5 7 9	54		As above, low plasticity, silty, very stiff
Damp	1.4	4 9 12	59		As above, chunks of black organic matter, very stiff
Moist	0.9	3 6 15	64	SC	**Clayey Sand**, brown, 15-20% clay, slight plasticity sand is fine and poorly graded, medium dense

Delta Consultants	Project No: c107376 Logged By: Nadine Periat Driller: Gregg Drilling and Testing Drilling Method: Hollow Stem Auger Sampling Method: Split Spoon Casing Type: Sch 40 PVC Slot Size: 0.02 - inch Gravel Pack: 2/12 Sand	Client: ConocoPhillips Location: 4191 First Street, Pleasanton, CA Date Drilled: 4/1-4/2/10 Hole Diameter: 8" Hole Depth: 80 Well Diameter: 2 Well Depth: 77 Casing Stickup:	Well/ Boring ID: MW-13 Page 4 of 4 Location Map Please See Site Map ▽ First Encountered Water ▼ Static Water Level

Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
	▼				67			**Clayey Sand**, continued
					68			
		Very Moist	0.2	17 32 38	69	↕	SC	**Clayey Sand with Gravel,** tan, 20-25% fine gravel, 20% clay, sand is well graded, gravel is angular. very dense
					70			
					71			
					72			
					73			
	▽	Wet	1	18 23 22	74	↕	SC	**Clayey Sand,** tan, 15-25% clay, sand is well graded, trace fine gravel, dense
					75			
					76			
					77			
	Cave-in				78			
		Wet	0.4	17 28 50	79	↕		As above, very dense.
					80			Bottom of Boring at 80' bgs
					81			
					82			
					83			
					84			
					85			
					86			
					87			
					88			

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Project No: c107376		Client:	ConocoPhillips
Logged By: Nadine Periat		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/7/2010
Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"
Sampling Method:	Split Spoon	Hole Depth:	50'
Casing Type:	Sch 40 PVC	Well Diameter:	1" (3 casings)
Slot Size:	0.02 - inch	Well Depth:	50', 40', 34'
Gravel Pack:	2/12 Sand	Casing Stickup:	

Well/ Boring ID: OWA-1,2,3

Location Map
Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
Grout				Air Knife to 5	0–1	Interval 0–5		Asphalt
								Base Rock- sand, gravel, silt mixture
					1–3		CL	**Lean Clay**, gray, silty, no sand
					3–5		CL	**Lean Clay with Sand**, orange-tan, 30% medium sand, 5-10% fine gravel
					5			(gray-tan)
				13, 16, 19	8.5–10	Interval 8.5–10	GP-GC	No Recovery - Driller speculates material is gravel Dense
		Damp	44.3	10, 23, 19	13.5–15	Interval 13.5–15	GC	**Gravel with Silt and Sand**, brown, 30% well graded sand, 15-20% silt, gravel is subrounded and well graded, large cobbles stuck in sampler (chert) Dense
		Moist	38.6	6, 8, 9	18.5–20	Interval 18.5–20		**Sandy Lean Clay**, brown-green, 35-45% fine to medium sand, trace fine gravel, silty, very stiff
					21–22			

PROFESSIONAL GEOLOGIST
R. LEE DOOLEY
NO. 0183
CERTIFIED HYDROGEOLOGIST
STATE OF CALIFORNIA

Delta Consultants

Project No: c107376		Client:	ConocoPhillips
Logged By: Nadine Periat		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	4/7/2010
Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"
Sampling Method:	Split Spoon	Hole Depth:	50'
Casing Type:	Sch 40 PVC	Well Diameter:	1" (3 casings)
Slot Size:	0.02 - inch	Well Depth:	50', 40', 34'
Gravel Pack:	2/12 Sand	Casing Stickup:	
Elevation		Northing	Easting

Well/ Boring ID: OWA-1,2,3

Location Map
Please See Site Map

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
Grout		Damp	47.5	5, 8, 7	23–25		SC	**Clayey Sand with Gravel**, brown-green, 15-20% gravel, 20% clay, sand is fine to medium, gravel is subrounded medium dense
Bentonite / Sand		Moist	1275	12, 14, 17	29		SM	**Silty Sand with Gravel**, brown, sand is 70% fine and 30% medium to coarse, gravel is fine to medium and subrounded, 15-20% silt, dense
Sand					30–32		CL	Shoe is: **Lean Clay with Sand**, brown-green, 5% gravel, 15-20% fine sand, medium plasticity
Sand / Bentonite		Moist	1052	7, 8, 22	33–36		GW-GM	**Well Graded Gravel with Silt and Sand**, brown-green, 10% fines, 35-40% well graded sand, 10% fines, gravel is fine to >2" (angular fragments). dense, brown separate phase hydrocarbon (SPH) Light blue-white soft crystaline precipitate observed. Sample effervesces when mixed with HCL
Sand		Damp	741	5, 8, 10	37–40		CL	**Lean Clay with Sand**, grey-tan mottled, 15-20% fine sand, sample contains large amount of SPH in root holes very stiff
Bentonite					41–43			
Sand			844	7, 12	44		CL	**Sandy Lean Clay**, brown-green mottled, 35-40% fine sand large amount of oil (SPH), red color at top of sample

Delta Consultants	Project No: c107376	Client: ConocoPhillips	Well/ Boring ID: OWA-1,2,3
	Logged By: Nadine Periat	Location: 4191 First Street, Pleasanton, CA	Page 3 of 3
	Driller: Gregg Drilling and Testing	Date Drilled: 4/7/2010	Location Map
	Drilling Method: Hollow Stem Auger	Hole Diameter: 8"	Please See Site Map
	Sampling Method: Split Spoon	Hole Depth: 50'	
	Casing Type: Sch 40 PVC	Well Diameter: 1" (3 casings)	
	Slot Size: 0.02 - inch	Well Depth: 50', 40', 34'	
	Gravel Pack: 2/12 Sand	Casing Stickup:	
	Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
Sand				17	45		CL	**Sandy Lean Clay continued**
								very stiff
					46			
					47			
					48			
				10	49			As above, orange, areas of well cemented green material
		Damp	252	10				some SPH
				17	50			
					51			Bottom of boring = 50'
					52			
					53			
					54			
					55			
					56			
					57			
					58			
					59			
					60			
					61			
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					65			
					66			

Delta Consultants

Project No: c107376		Client:	ConocoPhillips
Logged By: Nadine Periat		Location:	4191 First Street, Pleasanton, CA
Driller: Gregg Drilling and Testing		Date Drilled:	03/31/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"
Sampling Method:	Split Spoon	Hole Depth:	65
Casing Type:	Sch 40 PVC	Well Diameter:	1" (3 casings)
Slot Size:	0.02 - inch	Well Depth:	65', 53', 40'
Gravel Pack:	2/12 Sand	Casing Stickup:	NA

Well/ Boring ID: OWB-1,2,3

Location Map: Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
Grout		Damp		Air Knife to 5	0–5	Interval 0–5	GC	**Clayey Gravel**, brown, 20% clay, gravel is angular to pea gravel (artificial fill)
					1		ML	**Sandy Silt**, brown, 35% fine sand, slight plasticity trace 3"-6" cobbles, artificial fill from old rail road
					8		SM	**Silty Sand with Gravel**, brown, 20% fine-medium gravel, 30% silt, gravel is subrounded, sand is fine, medium stiff
		Damp	1.4	5 / 4 / 4	8.5–10	Recovered	ML	**Sandy Silt**, dark brown, 35-40% fine sand, <10% fine gravel no plasticity, medium stiff
		Damp	2.3	5 / 2 / 4	13.5–15	Recovered	ML	**Sandy Silt with Gravel**, brown, 15-20% gravel, gravel is well rounded, medium stiff
		Damp	1.5	7 / 23 / 16	18.5–20	Recovered	SM	**Silty Sand with Gravel**, tan, 15% fine to medium gravel, 50-60% fine sand, hard
					19.5		CL	**Lean Clay with Sand**, tan-orange, 15-25% fine sand, low plasticity, hard

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Driller: Gregg Drilling and Testing		Date Drilled:	03/31/10
Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"
Sampling Method:	Split Spoon	Hole Depth:	65
Casing Type:	Sch 40 PVC	Well Diameter:	1" (3 casings)
Slot Size:	0.02 - inch	Well Depth:	65', 53', 40'
Gravel Pack:	2/12 Sand	Casing Stickup:	NA

Well/ Boring ID: OWB-1,2,3

Page 2 of 3

Location Map: Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Soil Type	LITHOLOGY / DESCRIPTION
Grout					23		
Grout		Damp	3.9	5 14 15	24–25	CL	**Sandy Lean Clay**, tan-orange, 5% fine gravel, 25-35% well graded sand, low plasticity, very stiff, silty
Bentonite					26–28		
Sand		Damp	4.1	5 12 12	28.5–30	GM	**Silty Gravel with Sand**, brown-gray, 15-20% well graded sand, 20-30% silt, gravel is fine and sub angular
						CL	**Lean Clay with Sand**, green grey, 15-20% sand, low plasticity, trace gravel, silty, very stiff
Sand					31–33		
Sand		Damp	7.2	15 12 6	33.5–35	GP-GM	**Poorly Graded Gravel with Silt**, grey, 10-15% fine sand, 10% silt, gravel is fine
						SP	**Poorly Graded Sand**, green, trace fine gravel, <5% silt, sand is very fine toward 35', medium dense
Sand					36–38		
Sand		Damp	6.0	17 35 23	38.5–40	GM	**Silty Gravel with Sand and Silt**, grey, 30% well graded sand, 15-20% silt, gravel is fine to medium, angular to well rounded, the angular gravel is likely fractured cobbles very dense
Bentonite					41–43		
Bentonite			1230	7 10	43.5–44	CL	**Lean Clay**, tan-orange, trace gravel, 5-10% fine sand, low plasticity, orange mottling, very stiff

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Drilling Method:	Hollow Stem Auger	Hole Diameter:	8"
Sampling Method:	Split Spoon	Hole Depth:	65
Casing Type:	Sch 40 PVC	Well Diameter:	1" (3 casings)
Slot Size:	0.02 - inch	Well Depth:	65', 53', 40'
Gravel Pack:	2/12 Sand	Casing Stickup:	NA

Well/ Boring ID: OWB-1,2,3

Location Map: Please See Site Map

Elevation	Northing	Easting

Well Completion (Backfill / Casing)	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample (Recovery / Interval)	Soil Type	LITHOLOGY / DESCRIPTION
Bentonite				11	45	sample to 45	CL	**Lean Clay continued**
					46			
					47			
Sand (screen)					48			
		Damp	75	5 / 6 / 9	49–50	48.5–50		As above, black organic chunks, silty, stiff
					51			
					52			
					53			
Bentonite		Damp	5	7 / 8 / 14	54–55	53.5–55		As above, very stiff
Sand (screen)					56			
					57			
					58			
		Damp	2.2	8 / 8 / 12	59–60	58.5–60		As above, 5-10% fine gravel
					61			
					62			
					63			
			2.2	3 / 8 / 14	64–65	63.5–65	SM	**Silty Sand with Gravel,** orange brown mottled, 15-25% fine gravel, 30-35% silt, sand is fine becomes grey with 35% gravel and 15-20% silt
					66			Bottom of boring = 65'