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ENVIRONMENT

Recommendation for Case Closure
Former Atlantic Richfield Company Station #6041
7249 Village Parkway
Dublin, California
ACEH Case #RO0000452

"I declare that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct."

Date:
February 24, 2011

Submitted by:

ARCADIS U.S., Inc

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GP09BPNA.C039

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Atlantic Richfield Company

Recommendation for Case Closure

Atlantic Richfield Company Service Station No. 6041
7249 Village Parkway
Dublin, California 94568
ACEH Case # RO0000452

February 24, 2011

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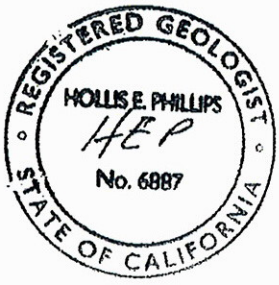

Recommendation for Case Closure

Atlantic Richfield Company
Service Station No. 6041

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Acronyms

1,2-DCA	1,2-Dichloroethane
ACEH	Alameda County of Environmental Health
ARCO	Atlantic Richfield Company
AS	Air sparge well
AST	Air sparge test
ASVET	Air sparge and vapor extraction test
BAI	Broadbent Associates, Inc
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and total xylenes
btoc	below top of casing
Cambria	Cambria Environmental Technology, Inc.
COC	contaminant of concern
CPT	cone penetrometer test
CRWQCB	California Regional Water Quality Control Board
DIPE	Di-isopropyl ether
DTSC	Department of Toxic Substances Control
DTW	depth to water
DVE	dual-phase vacuum extraction
ft	feet

EDB	1,2-Dibromoethane
EPA	Environmental Protection Agency
ESL	Environmental Screening Level
ETBE	Ethyl tert-butyl ether
Ft/ft	feet per foot
HVOC	halogenated volatile organic compound
MCL	maximum contaminant level
mg/kg	milligram per kilogram
mg/L	milligram per liter
MTBE	methyl tertiary butyl ether
MW	Monitoring Well
Ppb	parts per billion
Ppm	parts per million
PVC	polyvinyl chloride
Report	Recommendation for Case Closure
RESNA	RESNA Industries, Inc.
RWQCB	Regional Water Quality Control Board, San Francisco Bay
Site	Atlantic Richfield Company Station No. 6041, located at 7249 Village Parkway in Dublin, California
SPH	separate phase hydrocarbon

TAME	Tert-amyl Methyl Ether
TBA	Tert-butyl alcohol
TOG	total oil and grease
TPHd	total petroleum hydrocarbons as diesel
TPHg	total petroleum hydrocarbons as gasoline
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VET	vapor extraction test
VW	Vapor extraction Well
µg/L	microgram per liter

1. Introduction

ARCADIS has prepared this *Recommendation for Case Closure* (Report) for the Atlantic Richfield Company (ARCO) Service Station No. 6041 (Site) located at 7249 Village Parkway in Dublin, California (**Figure 1**).. Case closure is warranted for the Site based on the following information:

- Petroleum hydrocarbon sources, including other potential secondary sources, have been removed as evidenced by current Site conditions.
- Free product has never been observed in any of the monitoring wells on-Site.
- Current groundwater concentrations are orders of magnitude below historical maximums, are continuing to decrease with time, or are not detected above the detection limit, indicating that natural attenuation processes are occurring at the Site.
- The Site has been adequately characterized.
- The low-level plume is decreasing in size.
- No sensitive receptors are likely to be impacted, including surface-water bodies, municipal wells and drinking water sources.
- The Site presents no current or potential risk to human health or the environment.

The report is organized into the following sections:

- Section 1 provides the Site background and history.
- Section 2 provides the Previous Site Investigations.
- Section 3 presents the Extent of Soil and Groundwater Impacts.
- Section 4 provides the Beneficial Uses.
- Section 5 presents Remedial Effectiveness.

- Section 6 presents Conclusions with Recommendations for Case Closure.

- Section 7 presents References

1.1 Site Background

The Site is an active ARCO-branded gasoline station. Currently, there are two underground storage tanks (USTs) believed to be installed in 2001. Site features include eight dispenser islands and a station building (Cambria Environmental Technology, Inc. [Cambria], 2001). The majority of the Site surface is paved with concrete and asphalt. A Site Map showing historical sampling locations is provided as **Figure 2**.

The Site is bound by Village Parkway to the west-southwest and Amador Valley Boulevard to the east-southeast. Three other former or currently active retail service stations are located south, southwest, and west of the Site across Village Parkway and Amador Valley Boulevard.

1.2 Site Geology and Hydrogeology

The Site is located in the northwestern end of the Livermore Valley, within the Coast Ranges Geomorphic Province of Northern California. The Livermore Valley is approximately 13 miles long oriented in an east-west direction, approximately 4 miles wide, and is surrounded by hills of the Diablo Range. In the vicinity of the Site, the valley floor slopes gently to the south-southeast. Soil in the vicinity of the subject Site is mapped as Holocene alluvium that consists of unconsolidated, moderately to poorly sorted silt and clay rich in organic material interfingered with and graded into coarser grained stream deposits towards higher elevations. (EJ Helly, KR Lajoie, W.E Spange and M.L. Blair, 1979) Holocene alluvium (10 to 50 feet thick) overlies Pleistocene alluvium consisting of weekly consolidated poorly sorter, irregular interbedded clay, silt, sand and gravel, and older sedimentary deposits. The Calaveras Fault is approximately ½-mile west of the Site. (RESNA Industries, Inc. [RESNA], 1992)

The Livermore Valley groundwater basin is divided into sub-basins on the basis of fault traces or other hydrogeologic discontinuities (California Department of Water Resources, 1974). The groundwater system in Livermore Valley is a multi-layered system with an unconfined aquifer overlying a sequence of leaky or semi-confined aquifers. The subject Site is located within the Dublin groundwater sub-basin. The groundwater in the subbasin has been reported to be at depths ranging from 10 to 60 ft

bgs. (Alameda County Flood Control and Water Conservation District, Zone 7 [ACFCWCD], 1991) The groundwater gradient is generally toward the south-southeast (ACFCWCD, Zone 7. 1991). The principal streams in the vicinity of the Site are Alamo Canal which flows 0.6 miles southeast of the Site, and Dublin Creek which connects with Alamo Canal 0.6 miles south of the Site. (RESNA, 1992)

Based on geologic cross sections and soil boring logs from previous consultants, the Site consists primarily of sandy to silty clay interbedded with clayey to silty sand. (bgs) Below this sandy clay, a layer of dry silty to medium grained sand is present to depths of approximately 6.5 to 9.5 feet below ground surface (ft bgs). This silty to medium grained sand is underlain by silty clay, which extends to depths of approximately 9.5 to 12.5 ft bgs. Groundwater is usually encountered at depths of approximately 10 to 18 ft bgs in the clayey sand layer beneath the silty to medium grained sand. Groundwater encountered in this clayey sand stratum appears to be present in a relatively thin (2 to 5.5 feet thick) layer and confined by the overlying silty clay layer, as evidenced by water levels stabilizing at approximately 9.5 to 11.5 ft (bgs. A stratum of sandy clay with some gravel, which may be a perching or confining layer, is located beneath the water-bearing clayey sand between depths of approximately 18.5 to 20 ft bgs. (RESNA, 1992; RESNA, 1993a; RESNA, 1993b; RESNA, 1994)

Groundwater flow direction at the Site has been observed in the east-northeast direction and in the south-southwest direction with a hydraulic gradient which has ranged from 0.001 feet per foot (ft/ft) to 0.024 ft/ft. Predominant groundwater flow direction in the most recent monitoring event was in the northeast direction (Broadbent Associates, Inc. [BAI], 2010).

2. Previous Site Investigations

On June 6 and 7, 1990, one 550-gallon waste-oil tank of single wall steel construction was excavated and removed from its location adjacent to the northern wall of the station building at the Site. The location of the former station building is shown in **Figure 2**. Applied Geosystems observed no signs of leakage on the tank at the time of excavation. Approximately 15 to 20 cubic yards of soil was removed offsite from the tank pit. On July 6, 1990 the tank pit was backfilled with 25 tons of ¾ inch aggregate base, and the area was repaved. (Applied Geosystems, 1990).

On September 25, 1990, an unauthorized fuel spill reportedly occurred near the southeastern service island. On September 12 and 13, 1991, RESNA observed the

advancement of three soil borings (B-1 through B-3). These three borings were converted into monitoring wells:

- Monitoring well (MW) MW-1 was installed to a depth of 17.5 ft bgs and screened from 14 to 17.5 ft bgs;
- MW-2 was installed to a depth of 14 ft bgs and screened from 10.5 to 14 ft bgs;
- MW-3 was installed to a depth of 15 ft bgs and screened from 12 to 15 ft bgs.

The wells were completed with four-inch-diameter schedule 40 polyvinyl chloride (PVC) casing. The screened casings for the monitoring wells consisted of 4-inch-diameter, 0.020 machine-slotted PVC. Blank PVC casing was set from the top of the screened casing to within a few inches below the ground surface. (RESNA, 1992)

On October 26 and 27, 1992, RESNA performed an additional subsurface investigation to further delineate the extent of gasoline hydrocarbon impacts in the soil and groundwater at the Site. Additionally, the work was completed to prepare for a vapor extraction test (VET) to be performed on November 10, 1992. RESNA observed the advancement of seven soil borings (B-4 through B-10). All seven borings were converted into the following wells:

- MW-4, installed to a depth of 15 ft bgs and screened from 8.5 ft bgs to total depth;
- MW-5, installed to a depth of 18 ft bgs and screened from 11 ft bgs to total depth;
- MW-6, installed to a depth of 16 ft bgs and screened from 10 ft bgs to total depth;
- Vapor extraction well (VW) VW-1 through VW-4, installed to a depth of 9.5 ft bgs and screened from 4 ft bgs to total depth;

Both the monitoring wells and vapor extraction wells were completed with 4-inch diameter, Schedule 40, PVC casing. The screened casings for the groundwater monitoring wells (MW-4 through MW-6) consisted of 4-inch diameter, 0.020 inch-wide machine-slotted PVC. The screened casings for the vapor extraction wells (VW-1

through VW-4) consist of 4-inch diameter 0.10 inch-wide machine-slotted PVC set from the total depths of the wells to approximately 4 ft bgs. (RESNA, 1993a)

On August 11, 1993, six soil borings (B-11 through B-16) were cored at the Site to depths between 16 and 22 feet to evaluate potential on Site sources of gasoline hydrocarbons to aid in the design of an air sparge pilot test and an interim air sparge and vapor extraction remediation system. B-11, B-12, B-14, and B-15 were installed to a depth of 19 ft bgs. B-13 was installed to a depth of 22 ft bgs and B-15 was installed to a depth of 16 ft bgs. (RESNA, 1993b)

On October 12, 1993, RESNA installed three additional soil borings (B-17 through B-19), two air sparge wells (AS-1 and AS-2) and one vapor extraction well (VW-5) in preparation for the air sparge pilot test (AST) and combination air sparge/vapor extraction test (AS/VET). Air sparge wells AS-1 and AS-2 were constructed in the bottom of the borings using 2-inch-diameter, Schedule 40 PVC pipe, with 2 feet of 2-inch-diameter, 0.020-inch machine slots at the bottom of the borings. Vapor extraction well VW-5 was constructed using 4-inch diameter, Schedule 40 PVC with 0.10-inch machine slots, and was screened from 5 to 15 feet (RESNA, 1994).

On July 24, 2001, two hydraulic hoists were encountered and removed during the demolition of the station building. The hydraulic hoists were located underneath the former station building. Approximately 10 gallons of hydraulic fluid was released during the removal. The area where the former hydraulic hoists were located was overexcavated. The location of the former steel piping that was associated with the former waste-oil tank was also overexcavated at this time to a depth of 5.5 ft bgs. Approximately 100 cubic yards of impacted soil was removed during these activities. (Cambria, 2001)

On July 27, 2001, three 10,000 gallon, single-walled fiberglass USTs were removed from the Site and replaced with two, double-walled fiberglass USTs. Associated product piping was removed during this event. During the excavation of the piping, previous generation steel piping was encountered. The older steel piping was removed and no leaks were identified in any of the piping as observed by Cambria. Additional overexcavation activities included: the former UST cavity which was overexcavated to approximately 16 ft bgs, the new UST cavity which was overexcavated to approximately 17 ft bgs, the new dispenser pad and canopy footings which was overexcavated to approximately 5 ft bgs., and the entire site which was overexcavated to approximately 2.5 ft bgs. A total of 4,150 tons (approximately 3,190 cubic yards) of soil was removed during the over-excavation activities (including the hydraulic hoist

and former waste-oil piping over excavation activities) and approximately 25,600 gallons of impacted groundwater were removed from the Site. (Cambria, 2001) **Figure 2** shows the limits of excavation for these activities.

During the UST activities, five permitted wells, VW-1, VW-2, VW-5, AS-1 and MW-1 and two non-permitted tank backfill wells, TP-1 and TP-2 were decommissioned. All wells were excavated to their total depth and backfilled with engineered fill. (Cambria, 2001)

On November 22-23, 2010, three cone penetrometer tests (CPTs), CPT-1 through CPT-3 were conducted along the northeast portion of the Site in between MW-4 and MW-5. Three additional soil borings, SB-1 through SB-3 were advanced to 8 ft bgs in the vicinity of the former UST cavity. (ARCADIS, 2011)

Historical soil analytical data is presented in **Table 1**. Historical groundwater analytical data is presented in **Table 2**. The historical lateral extent of total petroleum hydrocarbons as gasoline (TPHg) and benzene soil impacts is provided on **Figures 3** and **4**, respectively. The vertical extent of TPHg and benzene soil impacts is provided in cross sections on **Figure 5** and **6**, respectively.

3. Extent of Soil and Groundwater Impacts

3.1 Soil Conditions

Analysis of soil samples collected from the waste-oil tank pit reported concentrations of halogenated volatile organic compounds (HVOCs), total oil and grease (TOG), TPHg, total petroleum hydrocarbons as diesel (TPHd), and benzene, toluene, ethylbenzene, and xylenes (BTEX) were not detected above the method detection limits. Results of laboratory analysis of the composite sample collected from the stockpiled soil indicated TOG at 110 parts per million (ppm), TPHd at 180 ppm, TPHg at 10 ppm, total xylenes at 0.25 ppm, and non-detectable concentrations of organic lead, benzene, toluene, and ethylbenzene. Based on the results of these samples, Applied Geosystems concluded no further excavation around the tank pit was necessary. (Applied Geosystems, 1990) The exact location of the waste-oil tank pit soil sample locations are not available, thus not shown on the site map.

During the installation of B-1 through B-3 (MW-1 through MW-3) in 1991, gasoline hydrocarbon concentrations over 100 ppm were not reported in soil samples collected from the borings with the exception of one sample from a depth of 9.5 ft bgs in B-1

(150 ppm TPHg) located near the northwestern service islands. TPHg was also detected above the detection limit at 4.5 and 9.5 ft bgs in B-2 and 9.5 feet in B-3 at concentrations of 2.5, 6.3, and 52 ppm, respectively. The soil in the vicinity of the southeastern service islands, where the fuel spill reportedly occurred, appears to be impacted by low levels of TPHg (less than 10 ppm) as evidenced by analytical results from soil samples collected from boring B-2. Boring B-3 was located downgradient of the four underground storage tanks at that time as the gradient has significantly fluctuated over the site's history. RESNA concluded that the fuel spill which occurred on September 25, 1990, did not appear to be the sole source of gasoline hydrocarbons detected beneath the Site. (RESNA, 1992)

After the installation of B-4 through B-10 in 1992, RESNA concluded the presence of gasoline-impacted soil appeared to be limited to the southern portion of the Site, particularly in the southeastern vicinity of the existing underground storage tanks, and in the southern vicinity of the northwestern service islands, directly above the water table within the capillary fringe (approximately 7 to 12 ft bgs). The soil at shallower depths (approximately 3 to 7 ft bgs) appeared to contain low levels of gasoline hydrocarbons (1.6 milligrams per kilogram [mg/kg] to 16 mg/kg). (RESNA, 1993a)

Subsequently following the installation of VW-1 through VW-4 in 1992, a VET was performed at the Site. Using results from the vapor extraction test performed on the Site, RESNA indicated vapor extraction could be a viable soil remediation alternative for the Site. As a result of the investigation, RESNA concluded that the lateral extent of the TPHg impacts in the soil at the Site had been delineated to non-detectable levels (less than 1 ppm), with the exception of the southeastern portion of the Site. The vertical extent of TPHg impacts in the soil at the Site had also been delineated to non-detectable levels at depths of approximately 10 to 19.5 ft bgs. Additionally, RESNA concluded that the lateral extent of TPHg in groundwater had been delineated to less than 50 parts per billion (ppb) with the exception of the southern and southwestern portions of the Site. (RESNA, 1993a)

Soil samples were obtained from the sidewalls of the former UST cavity during the 2001 UST removal. Maximum detected concentrations of TPHg and benzene were reported at 8,300 mg/kg and 64 mg/kg in SW-6 at 8 ft bgs, respectively. At that time the retail station at the Site was relocated and rebuilt. Two USTs and eight dispenser islands replaced the existing three USTs and four dispenser islands at the Site. In the fourth quarter of 2001, groundwater monitoring wells MW-7 and MW-8 were constructed. It is unknown if soil samples were collected from these two monitoring well

locations. Vapor Well VW-2 was abandoned prior to December 21, 2001. (Cambria, 2001)

During the 2010 investigation, TPHg was detected in two of the three soil boring locations. SB-2-8 had a reported a concentration of 0.240 mg/kg and SB-3-8 had a reported concentration of 40 mg/kg. Benzene was detected in one sample (SB-3-8) at a concentration of 0.170 mg/kg. Ethylbenzene was detected at SB-3-8 at a concentration of 0.270 mg/kg. Total xylenes were detected in SB-3-8 at a concentration of 0.048 mg/kg. tert-butyl alcohol (TBA) was detected at two of the three locations; SB-2-8 reported concentration of 0.190 mg/kg and SB-3-8 reported a concentration of 3.4 mg/kg. Methyl tertiary butyl ether (MTBE) was detected in SB-3-8 at a concentration of 0.093 mg/kg. Toluene, and the fuel oxygenates di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), 1,2-Dichloroethane (1,2-DCA), 1,2-Dibromoethane (EDB), and Ethanol were not detected above the laboratory detection limit in any of the soil samples. (ARCADIS, 2011)

Historical soil data is provided in **Table 1**. The lateral extent of TPHg and benzene soil impacts is provided on **Figures 3** and **4**, respectively. The vertical extent of TPHg and benzene soil impacts is provided on **Figure 5** and **6**.

3.2 Groundwater

Quarterly groundwater monitoring at the Site was initiated during the first quarter 1994 by RESNA, and is currently performed by BAI. Field procedures for groundwater sampling are provided in **Appendix A**.

On June 13, 2000, ARCO was notified by the Alameda County of Environmental Health (ACEH) that groundwater sampled in March 2000 contained higher concentrations of MTBE than in any other previous sampling even since August 1995, when analysis for MTBE was initiated. These results indicated a more recent fuel release may have occurred. ARCO was required to evaluate all monitoring records to determine if the UST system was tight. Monthly statistical analyses of the manual inventory records provided by the station owner/operator showed the UST system was tight. In addition, ACEH also required a workplan be developed for off-Site groundwater monitoring installation to fully delineate the contaminant plume. (Alameda County, 2000a)

On August 25, 2000, Cambria proposed incorporating monitoring wells MW-6 and MW-7 from the former Shell service station located on the opposite corner from the Site,

into the groundwater monitoring program. In addition, Cambria also proposed implementing dual-phase vacuum extraction (DVE) from source area wells to remove dissolved phase hydrocarbons. Alameda County approved these proposed monitoring and remedial actions on September 13, 2000. (Alameda County, 2000b)

Monitoring wells MW-4 through MW-6 are sampled on an annual basis in the third quarter and do not contain concentrations of contaminants of concerns (COCs) above the method detection limits with the exception of MTBE in monitoring wells MW-4 and MW-5. Monitoring wells MW-2, MW-3, and MW-8 are sampled on a semi-annual basis in the first and third quarters. Monitoring well MW-7 is gauged only due to the well being dry. Currently the highest reported concentrations of COCs are from MW-5 with concentrations of TPHg at 2,300 micrograms per Liter (µg/L), toluene at 0.55 µg/L, ethylbenzene at 1.7 µg/L, and TBA at 18 µg/L. These concentrations are indicating decreasing trends (**Appendix B**). **Table 2** presents historical groundwater analytical data.

On November 23, 2010, a total of 3 grab groundwater samples were collected from CPT-1 through CPT-3. Analytical results show that there were no reported COCs detected above the method detection limit in the samples that were collected with the exception of MTBE at CPT-1. MTBE was detected at a concentration of 0.91 µg/L at CPT-1.

3.2.1 TPHg

Historically TPHg has been reported at concentrations greater than laboratory reporting limits in all Site-related wells with the exception of MW-4, MW-5, MW-6, MW-7 and VW-2. The highest concentration was reported in MW-3 (29,700 µg/L; December 2000) which is located southeast of the former USTs. During the most recent groundwater monitoring and sampling event, third quarter 2010, TPHg was not detected in MW-3 above the laboratory reporting limit.

Concentrations of TPHg in MW-2 have not been reported since the second quarter 2004. Concentrations of TPHg in MW-4 through MW-6 have not been reported since the installation of the monitoring wells in 1995.

The third quarter 2010 groundwater monitoring report reported a concentration of TPHg of 78 µg/L at MW-8 which is two orders of magnitude lower than historical concentrations.

Monitoring well MW-1 was abandoned in 2001, with TPHg reporting below the laboratory reporting limit. MW-7 did not have reported concentrations of TPHg above the laboratory reporting limit during fourth quarter 2002 when the well was last sampled. Since then, the well has been dry or had insufficient water in the well for sampling.

TPHg was not detected in any of the grab groundwater samples collected during the November 2010 site investigation activities.

3.2.2 Benzene

Historically benzene has been reported at concentrations greater than laboratory detection limits in all Site related monitoring wells with the exception of MW-2, MW-6, and VW-3. The highest concentration was reported in MW-3 (2,590 µg/L; February 2001) which is located southeast of the former USTs. During the most recent groundwater monitoring and sampling event, third quarter 2010, benzene was not detected in MW-3 above the laboratory reporting limit.

Monitoring well MW-1 was abandoned in 2001, with benzene reporting below the laboratory reporting limit. Concentrations of benzene have not been detected in MW-2 since the first quarter 2002. Benzene has not been detected in MW-4 through MW-6 since the installation of the monitoring wells in 1995.

MW-7 did not have reported concentrations of benzene above the laboratory reporting limit during fourth quarter 2002 when the well was last sampled. Since then, the well has been dry or had insufficient water in the well for sampling.

During the third quarter 2010 groundwater monitoring and sampling event, benzene was detected at a concentration of 8.6 µg/L at MW-8. Prior to the most recent sampling event, benzene was not detected above the laboratory method detection limit for two sampling events. Concentrations of benzene at MW-8 have decreased by two orders of magnitude from its historical high.

Benzene was not detected in any of the grab groundwater samples collected during the November 2010 site investigation activities.

3.2.3 MTBE

Concentrations of MTBE have consistently been detected above the laboratory reporting limits in groundwater samples collected from all wells with the exception of MW-6 and MW-7. The highest concentrations were reported in MW-3 (85,000 µg/L; February 2001). Concentrations of MTBE in MW-3 have decreased four orders of magnitude from its historical high with a concentration of 5.1 µg/L during the most recent sampling event (July 2010). MW-1 was abandoned in 2001 and reported a concentration of MTBE at 42,000 µg/L at that time.

Concentrations of MTBE in MW-2 were 3.7 µg/L during the most recent groundwater monitoring and sampling event (July 2010) and have been below the Environmental Screening Level (ESLs) of 5.0 µg/L since first quarter 2008. Although MW-4 has had reported concentrations above the laboratory reporting limit, concentrations have generally been below the ESL of 5.0 µg/L. Current concentrations of MTBE at MW-5 were reported at 5.3 µg/L from the most recent sampling event (July 2010). MW-6 did not have a reported concentration of MTBE above the laboratory reporting limit during the most recent sampling event (July 2010). Concentrations of MTBE at MW-8 are three orders of magnitude below historical highs with current concentrations reported at 1.4 µg/L during the most recent sampling event.

Concentrations of MTBE at MW-7 were reported at 4.7 µg/L during fourth quarter 2002 when the well was last sampled. Since then, the well has been dry or had insufficient water in the well for sampling.

MTBE was detected at low concentrations in the grab groundwater sample collected from CPT-1 with a concentration of 0.91 µg/L. Grab groundwater samples from CPT-2 and CPT-3 did not have detected concentrations of MTBE above the laboratory detection limit.

3.3 Separate-Phase Hydrocarbon Status

Separate-phase hydrocarbons (SPH) have not been reported at the Site in either soil or groundwater with the exception of groundwater observed in the tank cavity during the 2001 UST removal. Approximately one inch of dark, viscous, weathered SPH was observed on the groundwater. Approximately 25,600 gallons of groundwater was removed from the UST cavity using a vacuum truck. Sheen has not been reported at the Site in any groundwater sample.

3.4 Hydraulic Gradient Trends

Groundwater is typically encountered during drilling events from 10 ft bgs (B-4/MW-4; June 1994) to 16 ft bgs (B-14; August 1993). The depth to water (DTW) in monitoring wells has ranged from 3.15 feet below top of casing (btoc) (MW-6; February 1998) to 11.80 feet btoc (MW-1; October 1992). Historically the groundwater gradient has ranged from 0.001 ft/ft to 0.024 ft/ft. The groundwater flow direction has been predominantly fluctuating from northeast to west-southwest.

Historical groundwater analytical results from monitoring events are presented in **Table 2** and concentrations of TPHg, MTBE and benzene from the most recent groundwater monitoring event are illustrated on **Figures 7** through **9**. Additionally, concentration trends for TPHg, MTBE and benzene in wells MW-2 through MW-6, MW-8, and VW-2 are provided in Charts 1 through 7 included in **Appendix B**.

Historical groundwater flow directions and gradients are provided in **Table 3** and shown on **Figure10**. A potentiometric surface map of groundwater elevations in July 2010 is provided on **Figure 11**.

4. Beneficial Uses

4.1 East and South Bay RWQCB Basin Plan

The Livermore Valley groundwater basin is divided into subbasins on the basis of fault traces or other hydrogeologic discontinuities (California Department of Water Resources, 1974). The groundwater system in Livermore Valley is a multi-layered system with an unconfined aquifer overlying a sequence of leaky or semiconfined aquifers. The subject Site is located within the Dublin groundwater subbasin. The groundwater in the subbasin has been reported to be at depths ranging from 10 to 60 ft bgs. (ACFCWCD, 1991) The regional groundwater gradient is generally toward the south-southeast (ACFCWCD, Zone 7. 1991). The principal streams in the vicinity of the Site are Alamo Canal which flows 0.6 miles southeast of the Site, and Dublin Creek which connects with Alamo Canal 0.6 miles south of the Site. (RESNA, 1992)

4.2 Potential Sensitive Receptors

The nearest natural drainage is Alamo Canal, located approximately 0.6 miles southeast of the Site, and Dublin Creek which connects with Alamo Canal 0.6 miles

south of the Site. Using visual reconnaissance, there is no body of surface water within one mile of the Site.

There are no water supply wells located within one quarter mile of the Site. **Appendix C** presents the location of monitoring wells, abandoned wells and water supply wells within one quarter mile of the Site.

No K-12 schools are known to be located within one quarter mile of the Site, although Resurrection Lutheran Preschool is located approximately 900 feet to the west-southwest of the Site across Highway 680. No hospitals are known to be located within a quarter mile of the Site.

ARCADIS used the Revised May 2008 *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (CRWQCB, 2008) to obtain current ESLs and assess potential human health risks associated with current Site conditions. The ESLs were developed using the United States Environmental Protection Agency (USEPA) and California's Department of Toxic Substances Control (DTSC) human health risk assessment methodologies. Under most circumstances, the presence of a chemical in soil or groundwater at concentrations below the corresponding ESL can be inferred to not pose a significant threat to human health or the environment.

To evaluate the potential long-term fate of COCs associated with the Site, the most recent and the maximum concentrations of contaminants detected in soil and groundwater have been compared to the appropriate ESLs. The use of commercial/industrial screening levels is based on the assumption that land use at the Site will remain unchanged.

Soil ESLs were obtained from *Table K-2 – Direct Contact to a Commercial/Industrial Receptor* (CRWQCB, 2008). The ESLs are presented in **Table 4**. The most recent soil data (2010) from the vadose zone (grade to 8 ft bgs) contained very low level of COCs. Soil boring SB-3-8 was the only location with detected COCs. However, the detected COCs do not exceed ESLs. In addition, a commercial worker would likely not have contact with soil located at 8 ft bgs or greater. Therefore, considering both the low detected current concentrations and the depth of the soil, contact with on-Site soil does not appear to pose as a health risk to a commercial worker.

Groundwater ESLs were obtained from *Table E-1 – Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns* (CRWQCB, 2008). The inhalation of vapors migrating from the subsurface to indoor air is the only identified complete

potential exposure pathway to groundwater under current conditions. However, though groundwater is not a drinking water source, for informational purposes, the potential ingestion of groundwater was evaluated as a complete exposure pathway. Soil vapor samples have not been collected at the Site. Accordingly, the groundwater data were used to evaluate the vapor intrusion potential. A station building is currently present at the Site and the entire Site is paved, with no exposed soil present at the ground surface. Current concentrations show that all COCs are below their applicable ESLs for the protection of the vapor intrusion pathway (**Table 4**). Therefore the exposure potential from groundwater through inhalation of volatile organics in indoor air and particulate emissions through outdoor ambient air is considered an insignificant pathway. In addition, based on the most recent sampling results, each detected COC, which the exception of benzene, was below its maximum contaminant level. Benzene was detected at 8.6 µg/l and the maximum contaminant level (MCL) is 1 µg/l. However, the maximum detected benzene concentration in 2001 was 2,590 µg/l. The most recent maximum benzene concentration is more than 300 times lower than the historical maximum detected concentration. This demonstrates a trend of significant reductions. **Figure12** illustrates the potential sources of exposure and the status of the corresponding pathways.

An ESL for TPHg in groundwater, considering the vapor intrusion pathway, is currently not available. The DTSC rescinded its total petroleum hydrocarbon risk assessment guidance document in April 2010. TPHg was reported at a low concentration at MW-8 (73 µg/L) during the latest sampling event and should not be a vapor intrusion concern because the sample was collected approximately 100 feet from the nearest structure in the downgradient direction. Additionally, per current DTSC policy health risk associated with TPHg vapor intrusion can be evaluated using BTEX. BTEX represent the more toxic constituents associated with TPHg. BTEX compounds are not present above their respective ESLs for the groundwater to indoor air pathway (*Table E-1)*. The current BTEX data indicate groundwater to indoor air is an insignificant pathway.

4.3 Summary Factors Affecting Long-Term Fate of Contaminants

The potential source of hydrocarbons includes the former waste-oil tank cavity and associated piping, the former UST complex in the south-southeastern portion of the Site, former fuel spill in the eastern portion of the Site, the former hydraulic hoist cavity and hydraulic fluid release and associated product piping from the former USTs. The exact volume released from the UST complex and product piping is unknown.

The waste-oil tank and associated piping was removed from the site in 1990. During the removal there were no signs of leakage, holes or pittings from the waste-oil tank. The associated piping was also removed during this time. Approximately 15 to 20 cubic yards of soil was excavated from the waste-oil tank. Observations of the stockpiled soil showed no signs if discoloration or odor. The area was further over excavated in 2001 during the removal of the hydraulic hoists and former UST complex.

The removal of the original UST complex and associated piping in 2001 was conducted as a release intervention. During removal of the original UST complex, Cambria reported that there were no obvious leaks from the USTs. In addition, approximately 1,110 cubic yards of contaminated soil was excavated and removed at the time of the UST complex removal, as well as 25,600 gallons of hydrocarbon-impacted ground water (Cambria, 2001).

In order to accommodate the new USTs, the new UST cavity was over excavated to approximately 17 ft bgs. Approximately 1,300 cubic yards of contaminated soil was removed in the new UST cavity area. In order to accommodate the new dispenser pad and canopy footing, the area directly east of the existing UST cavity was over excavated to approximately 5 ft bgs. Approximately 1,150 cubic yards of contaminated soil was removed from the proposed dispenser pad and canopy footing area. The entire Site was excavated to approximately 2.5 ft bgs for geotechnical reasons. Approximately 3,192 cubic yards of soil total was removed during the UST removal and installation event including the soil removed from the hydraulic hoist removal.

Numerous soil borings and monitoring wells have been installed to delineate and monitor the lateral and vertical extent of petroleum hydrocarbon impacts. Remediation through Site upgrades, equipment removal and associated over-excavations, and natural attenuation have proven to be effective for substantially removing on-Site contamination sources. It has been demonstrated by declining petroleum hydrocarbon concentration trends in Site monitoring wells that natural attenuation is occurring and should continue to occur at the Site

5. Remedial Effectiveness

Based upon the previous remedial activities detailed above, the impacts to soil and groundwater have been addressed and are evident by the low levels of soil impacts and decreasing concentration trends in groundwater. Downgradient groundwater samples from monitoring wells MW-3, MW-5, and MW-8 (these wells are listed as downgradient based on the fluctuating groundwater flow direction) have either been

below laboratory detection limits or decreased two magnitudes of order from its historical high. The lack of concentrations seen in the downgradient wells indicates that any residual groundwater impacts are not migrating off Site. The very low level of soil contamination remaining on Site does not appear to be impacting the groundwater.
Conclusions

The Site meets all published criteria and qualifies as low risk, as described in the *Supplemental Instructions to State Water Board December 18, 1995 Interim Guidance of Required Cleanup at Low-Risk Fuel Sites* (CRWQCB, 1996). Therefore, ARCADIS requests approval for case closure and no further action at this Site based on the following:

- Sources of petroleum hydrocarbons at the Site have been removed. The absence of high concentrations observed in soil samples suggests that secondary sources (residual hydrocarbons in soil) were identified and removed.

- During the last sampling event (July 2010) only one well, MW-8, contained TPHg (73 µg/L) above the detection limit. TPHg has a decreasing trend in MW-8 (**Appendix B**).

- All the wells that contain MTBE concentrations in groundwater (the current maximum concentration is 5.3 µg/L) indicate a decreasing trend (**Appendix B**).

- Soil samples collected during the 2010 soil investigation indicted very low levels of TPHg, benzene, ethylbenzene, totally xylenes, and MTBE. The concentrations that were detected do not exceed their respective ESLs.

- Groundwater samples collected during the CPT investigation in November 2010 indicated a very low level of MTBE (0.91 µg/L) at CPT-1. There were no detected concentrations of any other COCs in any of the other groundwater samples. This concentration is below ESLs for both drinking water and groundwater to indoor air. It.

- Current Site conditions suggest that TPHg is limited to the southeastern Site boundary in the vicinity of MW-8 (**Figure 7**).

- Current Site conditions suggest that MTBE is limited to the southeastern boundary of the Site between MW-3 and MW-4. The plume does not appear to be migrating,

as evidenced by consistent results from monitoring wells MW-2 through MW-5, and MW-8.

- The Site has been adequately characterized.
- No sensitive receptors are likely to be impacted, including surface-water bodies, municipal wells and drinking water sources.
- The Site presents no current or potential risk to human health or the environment.

ARCADIS recommends that case closure be granted and that all groundwater monitoring wells associated with the Site be destroyed. A Case Closure Summary is included in **Appendix D**.

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ARCADIS

Tables

Table 1: Historical Soil Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case #RO452

Location	Sample Depth (ft bgs)	Sample Date	TPHg	TPHd	B	T	E	X	MTBE	Total O & G	TBA	Ethanol	DIPE	ETBE	TAME	1,2-DCA	EDB	HVOC	Cadmium	Chromium	Lead	Nickel	Zinc
Commercial ESLs (mg/Kg)[1]			**450**	**450**	**0.27**	**210**	**5.0**	**100**	**65**	**--**	**320,000**	**--**	**--**	**--**	**--**	**0.48**	**--**	**--**					
S-N9-WOA[2]	9	6/7/1990	--	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	<0.005	--	--	--	--	--
S-S9-WOA[2]	9	6/7/1990	--	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	<0.005	--	--	--	--	--
S-E9-WOA[2]	9	6/7/1990	--	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	<0.005	--	--	--	--	--
S-W9-WOA[2]	9	6/7/1990	--	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	<0.005	--	--	--	--	--
S-C10-WOA[2]	10	6/7/1990	--	--	--	--	--	--	--	<50	--	--	--	--	--	--	--	<0.005	--	--	--	--	--
S-N9-WOB	9	6/7/1990	<2.0	<10	<0.050	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-S9-WOB	9	6/7/1990	<2.0	<10	<0.050	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-E9-WOB	9	6/7/1990	<2.0	<10	<0.050	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-W9-WOB	9	6/7/1990	<2.0	<10	<0.050	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-C10-WOB	10	6/7/1990	<2.0	<10	<0.050	<0.050	<0.050	<0.050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-9.5-B1	9.5	9/12/1991	150	--	0.90	4.2	2.4	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-14.5-B1	14.5	9/12/1991	<1.0	--	0.0060	0.019	0.0090	0.060	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-21.5-B1	21.5	9/12/1991	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-4.5-B2	4.5	9/13/1991	2.5	--	0.071	<0.0050	0.093	0.017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-9.5-B2	9.5	9/13/1991	6.3	--	0.30	0.011	0.30	0.060	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-15.5-B2	15.5	9/13/1991	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-9.5-B3	9.5	9/12/1991	52	--	1.2	2.5	1.4	8.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-19.5-B3	19.5	9/12/1991	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B4	5.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-9.5-B4	9.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-15.5-B4	15.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B5	5.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10-B5	10	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-19.5-B5	19.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B6	5.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10.5-B6	10.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-18.5-B6	18.5	10/26/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B7	5.5	10/27/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050															
S-10-B7	10	10/27/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B8	5.5	10/27/1992	1.6	--	0.091	<0.0050	0.060	0.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10-B8	10	10/27/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B9	5.5	10/27/1992	4.1	--	0.21	0.018	0.11	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10-B9	10	10/27/1992	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B10	5.5	10/27/1992	16	--	0.26	0.69	0.30	2.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10.5-B10	10	10/27/1992	3,200	--	12	74	59	390	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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7249 Village Parkway, Dublin, California
Local Case #RO452

Location	Sample Depth (ft bgs)	Sample Date	TPHg	TPHd	B	T	E	X	MTBE	Total O & G	TBA	Ethanol	DIPE	ETBE	TAME	1,2-DCA	EDB	HVOC	Cadmium	Chromium	Lead	Nickel	Zinc
Commercial ESLs (mg/Kg)[1]			**450**	**450**	**0.27**	**210**	**5.0**	**100**	**65**	**--**	**320,000**	**--**	**--**	**--**	**--**	**0.48**	**--**	**--**					
S-6-B11	6	8/11/1993	<1.0	--	0.10	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-11.5-B11	11.5	8/11/1993	5,300	--	9.0	<0.0050	8.3	210	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-18.5-B11	18.5	8/11/1993	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-6-B12	6	8/11/1993	<1.0	--	0.16	0.017	0.016	0.050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-12.5-B12	12.5	8/11/1993	580	--	4.0	2.0	13	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-18.5-B12	18.5	8/11/1993	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5-B13	5	8/11/1993	7.5	--	0.054	<0.0050	0.20	0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-11-B13	11	8/11/1993	280	--	1.5	<0.0050	8.8	7.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-20-B13	20	8/11/1993	2.3	--	0.020	<0.0050	0.058	0.051	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-6.5-B14	6.5	8/11/1993	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050															
S-9.5-B14	9.5	8/11/1993	1.4	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5-B15	5	8/11/1993	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-9.5-B15	9.5	8/11/1993	<1.0	--	0.038	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-6.5-B16	6.5	8/11/1993	<1.0	--	0.019	<0.0050	0.018	0.031	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-9.5-B16	9.5	8/11/1993	410	--	1.9	1.9	9.4	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-18.5-B16	18.5	8/11/1993	<1.0	--	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-6-B17	6	10/12/1993	19	--	0.80	0.043	1.1	0.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10.5-B17	10.5	10/12/1993	5,100	--	30	40	72	410	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-5.5-B18	5.5	10/12/1993	29	--	1.5	0.56	2.4	0.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10.5-B18	10.5	10/12/1993	4,400	--	20	77	69	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-25-B18	25	10/12/1993	<1.0	--	<0.0050	0.0070	0.0060	0.053	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-6-B19	6	10/12/1993	20	--	0.22	0.39	0.24	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-10-B19	10	10/12/1993	2,900	--	13	55	41	290	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-20.5-B19	20.5	10/12/1993	<1.0	--	<0.0050	<0.0050	<0.0050	0.014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OV-1[2]	6	7/26/2001	<0.050	<9.9	<0.00200	<0.00200	<0.00200	<0.00200	<0.00500	<49.5	--	--	--	--	--	--	--	--	0.182	12.3	2.96	15.4	15.8
OV-2[2]	6	7/26/2001	<0.050	<9.9	<0.00200	<0.00200	<0.00200	<0.00200	<0.00500	<49.1	--	--	--	--	--	--	--	--	0.132	10.6	2.79	14.5	14.5
SW-1[2]	8	7/27/2001	220	--	1.70	<0.500	<0.500	0.500	<0.500	--	--	--	--	--	--	--	--	--	--	--	<4.85	--	--
SW-2[2]	8	7/27/2001	4,500	--	12.0	<10.0	63.0	300	<10.0	--	--	--	--	--	--	--	--	--	--	--	<4.85	--	--
SW-3[2]	8	7/27/2001	1,300	--	<2.50	<2.50	22.0	130	4.40	--	--	--	--	--	--	--	--	--	--	--	<4.85	--	--
SW-4[2]	8	7/27/2001	4,700	--	11.0	<10.0	43.0	320	<10.0	--	--	--	--	--	--	--	--	--	--	--	5.16	--	--
SW-5[2]	8	7/27/2001	13	--	0.093	<0.0250	1.00	0.180	1.90	--	--	--	--	--	--	--	--	--	--	--	<4.95	--	--
SW-6[2]	8	7/27/2001	8,300	--	64.0	<25.0	180	310	<25.0	--	--	--	--	--	--	--	--	--	--	--	<4.95	--	--
SW-7[2]	8	7/27/2001	1,500	--	8.00	<5.00	26.0	22.0	<5.00	--	--	--	--	--	--	--	--	--	--	--	<5.00	--	--
SW-8[2]	8	7/27/2001	2,400	--	7.40	<5.00	37.0	220	6.00	--	--	--	--	--	--	--	--	--	--	--	<5.00	--	--
UST-1[2]	13	7/27/2001	0.21	--	<0.00500	<0.00500	<0.00500	<0.00500	0.0550	--	--	--	--	--	--	--	--	--	--	--	13.3	--	--

Table 1: Historical Soil Results
ARCO Service Station No. 6041
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Local Case #RO452

Location	Sample Depth (ft bgs)	Sample Date	TPHg	TPHd	B	T	E	X	MTBE	Total O & G	TBA	Ethanol	DIPE	ETBE	TAME	1,2-DCA	EDB	HVOC	Cadmium	Chromium	Lead	Nickel	Zinc
Commercial ESLs (mg/Kg)[1]			**450**	**450**	**0.27**	**210**	**5.0**	**100**	**65**	**--**	**320,000**	**--**	**--**	**--**	**--**	**0.48**	**--**	**--**					
Disp-1[2]	5	7/27/2001	70	--	<0.120	<0.120	0.570	0.950	0.410	--	--	--	--	--	--	--	--	--	--	--	<4.85	--	--
Disp-2[2]	3	7/27/2001	1,200	--	3.20	9.30	18.0	87.0	<1.20	--	--	--	--	--	--	--	--	--	--	--	4.77	--	--
Disp-3[2]	3	7/27/2001	4.0	--	0.0250	<0.0250	0.0650	0.052	0.210	--	--	--	--	--	--	--	--	--	--	--	<4.81	--	--
Disp-4[2]	3	7/27/2001	7.8	--	0.0430	<0.0250	0.120	0.0340	0.0830	--	--	--	--	--	--	--	--	--	--	--	<4.85	--	--
Disp-5[2]	4	7/27/2001	55	--	<0.120	<0.120	0.580	0.820	0.360	--	--	--	--	--	--	--	--	--	--	--	<4.95	--	--
Disp-6[2]	4	7/27/2001	580	--	1.80	5.00	12.0	52.0	<1.20	--	--	--	--	--	--	--	--	--	--	--	<4.85	--	--
Pipe-1[2]	4	7/27/2001	4.2	--	0.0380	0.0320	0.150	0.0590	0.360	--	--	--	--	--	--	--	--	--	--	--	<4.81	--	--
Pipe-2[2]	4	7/27/2001	1.4	--	0.0120	0.00730	0.0700	0.00800	0.0490	--	--	--	--	--	--	--	--	--	--	--	<4.81	--	--
SB-1-8[2]	8	11/22/2010	<.250	--	<.005	<.005	<.005	<.01	<.005	--	<.01	<.5	<.005	<.005	<.005	<.005	<.005	--	--	--	--	--	--
SB-2-8[2]	8	11/22/2010	0.24	--	<.0048	<.0048	<.0048	<9.6	<.0048	--	0.190	<.480	<.0048	<.0048	<.0048	<.0048	<.0048	--	--	--	--	--	--
SB-3-8[2]	8	11/22/2010	40	--	0.170	<.024	0.270	0.048	0.093	--	3.4	<2.4	<.024	<.024	<.024	<.024	<.024	--	--	--	--	--	--

Table 1: Historical Soil Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case #RO452

Location	Sample Depth (ft bgs)	Sample Date	TPHg	TPHd	B	T	E	X	MTBE	Total O & G	TBA	Ethanol	DIPE	ETBE	TAME	1,2-DCA	EDB	HVOC	Cadmium	Chromium	Lead	Nickel	Zinc
Commercial ESLs (mg/Kg)[1]			**450**	**450**	**0.27**	**210**	**5.0**	**100**	**65**	**--**	**320,000**	**--**	**--**	**--**	**--**	**0.48**	**--**	**--**					

Notes:
Results are in parts per million unless otherwise noted
ft bgs = feet below ground surface
TPHg = Total Petroleum Hydrocarbons as Gasoline
TPHd = Total Petroleum Hydrocarbons as Diesel
B = Benzene
T = Toluene
E = Ethylbenzene
X = Total Xylenes
MTBE = Methyl tert-butyl ether
Total O & G = Total Oil and Gas
TBA = Tert-butyl Alcohol
DIPE = Di-isopropyl Ether
ETBE = Ethyl tert-butyl Ether
TAME = Tert-amyl Methyl Ether
1,2-DCA = 1,2-Dichloroethane
EDB = 1,2-Dibromoethane
HVOC = Halogenated Volatile Organic Compounds
VOCs = Volatile Organic Compounds
mg/kg = milligrams per kilogram
< = analyte not detected above laboratory detection limit
- = not analyzed

[1] = Soil ESLs values are listed from Table K-2
[2] = Analytical results were reported in mg/kg

TPHg, BTEX analyzed by EPA Method 5030/8015/8020 between 1990 and 1993
TPHd analyzed by EPA Method 3550/8015 between 1990 and 1993
Total O & G anaylzed by Standard Method 503D/E between 1990 and 1993
Metals analyzed by EPA Method 6010
TPHd and TPHg analyzed by EPA Method 8015M between 2001 and 2010
Total O & G analyzed by EPA Method 9071 between 2001 and 2010
BTEX and MTBE analyzed by EPA Method 8260 between 2001 and 2010

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-1	09/20/1991	--	336.56	11.20	--	325.36	410	28	36	4.3	89	--	--
MW-1	10/22/1991	--	336.56	11.48	--	325.08	--	--	--	--	--	--	--
MW-1	11/27/1991	--	336.56	11.27	--	325.29	--	--	--	--	--	--	--
MW-1	12/16/1991	--	336.56	11.55	--	325.01	840	50	50	3.9	12	--	--
MW-1	01/18/1992	--	336.56	11.37	--	325.19	--	--	--	--	--	--	--
MW-1	02/21/1992	--	336.56	9.13	--	327.43	--	--	--	--	--	--	--
MW-1	03/16/1992	--	336.56	9.70	--	326.86	780	22	12	45	22	--	--
MW-1	04/24/1992	--	336.56	10.20	--	326.36	--	--	--	--	--	--	--
MW-1	05/15/1992	--	336.56	10.46	--	326.10	--	--	--	--	--	--	--
MW-1	06/09/1992	--	336.56	10.73	--	325.83	700	8.8	15	16	18	--	--
MW-1	07/28/1992	--	336.56	11.04	--	325.52	--	--	--	--	--	--	--
MW-1	08/24/1992	--	336.56	11.32	--	325.24	--	--	--	--	--	--	--
MW-1	09/09/1992	--	336.56	11.54	--	325.02	400	5.4	8.4	4.6	6.7	--	--
MW-1	10/26/1992	--	336.56	11.80	--	324.76	--	--	--	--	--	--	--
MW-1	11/10/1992	--	336.56	11.74	--	324.82	2,800	93	56	190	390	--	--
MW-1	12/14/1992	--	336.56	10.77	--	325.79	--	--	--	--	--	--	--
MW-1	01/15/1993	--	336.56	8.88	--	327.68	--	--	--	--	--	--	--
MW-1	02/10/1993	--	336.56	9.66	--	326.90	9,700	180	100	450	740	--	--
MW-1	03/29/1993	--	336.56	8.31	--	328.25	--	--	--	--	--	--	--
MW-1	04/27/1993	--	336.56	9.03	--	327.53	--	--	--	--	--	--	--
MW-1	05/10/1993	--	336.56	9.50	--	327.06	6,400	120	12	410	300	--	--
MW-1	06/18/1993	--	336.56	10.16	--	326.40	--	--	--	--	--	--	--
MW-1	07/28/1993	--	336.56	10.68	--	325.88	--	--	--	--	--	--	--
MW-1	08/30/1993	--	336.56	10.59	--	325.97	2,000	2.5	<2.5	110	61	--	--
MW-1	09/28/1993	--	336.56	10.82	--	325.74	--	--	--	--	--	--	--
MW-1	10/31/1993	--	336.56	10.94	--	325.62	--	--	--	--	--	--	--
MW-1	11/11/1993	--	336.56	10.70	--	325.86	2,100	<2.5	<2.5	66	20	--	--
MW-1	12/15/1993	--	336.56	10.56	--	326.00	--	--	--	--	--	--	--
MW-1	02/11/1994	--	336.56	10.35	--	326.21	2,000	<2.5	<2.5	25	5.7	--	--
MW-1	03/13/1994	--	336.56	9.99	--	326.57	--	--	--	--	--	--	--
MW-1	02/15/1995	--	336.56	8.53	--	328.03	820	15	<1	5.2	1.4	--	--
MW-1	05/24/1995	--	336.56	9.00	--	327.56	640	12	<1	7.3	<1	--	--
MW-1	08/25/1995	--	336.56	10.30	--	326.26	780	2	<1	2	2	2,500	--
MW-1	11/28/1995	--	336.56	11.01	--	325.55	570	2.2	<0.5	1.4	0.9	--	--
MW-1	02/26/1996	--	336.56	7.35	--	329.21	1,100	28	<7	13	7	3,400	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-1	05/23/1996	--	336.56	8.73	--	327.83	560	8.5	<1	1.1	<1	3,900	--
MW-1	08/23/1996	--	336.56	10.25	--	326.31	860	<1	<1	<4	2	5,600	--
MW-1	03/21/1997	--	336.56	9.35	--	327.21	520	12	<0.5	2.7	1.5	6,200	--
MW-1	08/20/1997	--	336.56	10.75	--	325.81	<5,000	<50	<50	<50	<50	7,400	--
MW-1	11/21/1997	--	336.56	11.10	--	325.46	<5,000	<50	<50	<50	<50	8,500	--
MW-1	02/12/1998	P	336.56	7.05	--	329.51	210	<0.5	<0.5	<0.5	<0.5	8,900	--
MW-1	07/31/1998	P	336.56	10.04	--	326.52	<20,000	<200	<200	<200	<200	18,000	--
MW-1	02/17/1999	--	336.56	8.50	--	328.06	<20,000	<200	<200	<200	<200	16,000	--
MW-1	08/24/1999	P	336.56	10.40	--	326.16	190	<0.5	4.4	<0.5	1.1	15,000	--
MW-1	03/01/2000	P	336.56	8.85	--	327.71	310	20	0.5	7.6	4.0	80,000	--
MW-1	08/18/2000	P	336.56	9.35	--	327.21	<10,000	<100	<100	<100	<100	48,400/63,70	--
MW-1	12/27/2000	P	336.56	10.81	--	325.75	<10,000	309	<100	<100	289	44,400	--
MW-1	02/09/2001	--	336.56	--	--	--	3,490	432	9.56	146	235	31,800	--
MW-1	02/09/2001	P	336.56	10.65	--	325.91	2,820	368	<25.0	116	176	23,300	--
MW-1	04/17/2001	--	336.56	--	--	--	2,600	70.1	<20.0	32.7	30.6	45,400	--
MW-1	04/17/2001	P	336.56	11.09	--	325.47	2,900	66.0	<10.0	33.2	25.1	46,500	--
MW-1	07/17/2001	P	336.56	11.07	--	325.49	<10,000	<100	<100	130	520	42,000	--
MW-2	09/20/1991	--	334.80	9.22	--	325.58	130	6.6	0.96	1.4	1.5	--	--
MW-2	10/22/1991	--	334.80	9.66	--	325.14	--	--	--	--	--	--	--
MW-2	11/27/1991	--	334.80	9.48	--	325.32	--	--	--	--	--	--	--
MW-2	12/16/1991	--	334.80	9.76	--	325.04	83	0.96	<0.30	<0.30	<0.30	--	--
MW-2	01/18/1992	--	334.80	9.47	--	325.33	--	--	--	--	--	--	--
MW-2	02/21/1992	--	334.80	7.62	--	327.18	--	--	--	--	--	--	--
MW-2	03/16/1992	--	334.80	7.84	--	326.96	430	130	<2.5	37	5.0	--	--
MW-2	04/24/1992	--	334.80	8.34	--	326.46	--	--	--	--	--	--	--
MW-2	05/15/1992	--	334.80	8.62	--	326.18	--	--	--	--	--	--	--
MW-2	06/09/1992	--	334.80	8.88	--	325.92	120	3.7	<0.5	5.7	<0.5	--	--
MW-2	07/28/1992	--	334.80	9.38	--	325.42	--	--	--	--	--	--	--
MW-2	08/24/1992	--	334.80	9.81	--	324.99	--	--	--	--	--	--	--
MW-2	09/09/1992	--	334.80	9.92	--	324.88	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-2	10/26/1992	--	334.80	10.13	--	324.67	--	--	--	--	--	--	--
MW-2	11/10/1992	--	334.80	10.12	--	324.68	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-2	12/14/1992	--	334.80	8.99	--	325.81	--	--	--	--	--	--	--
MW-2	01/15/1993	--	334.80	7.20	--	327.60	--	--	--	--	--	--	--
MW-2	02/10/1993	--	334.80	7.30	--	327.50	740	110	<5	35	<5	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-2	03/29/1993	--	334.80	6.60	--	328.20	--	--	--	--	--	--	--
MW-2	04/27/1993	--	334.80	7.10	--	327.70	--	--	--	--	--	--	--
MW-2	05/10/1993	--	334.80	7.40	--	327.40	2,000	650	14	86	28	--	--
MW-2	06/18/1993	--	334.80	8.02	--	326.78	--	--	--	--	--	--	--
MW-2	07/28/1993	--	334.80	8.47	--	326.33	--	--	--	--	--	--	--
MW-2	08/30/1993	--	334.80	8.80	--	326.00	170	1.4	7.9	1.6	15	--	--
MW-2	09/28/1993	--	334.80	9.19	--	325.61	--	--	--	--	--	--	--
MW-2	10/31/1993	--	334.80	9.12	--	325.68	--	--	--	--	--	--	--
MW-2	11/11/1993	--	334.80	9.02	--	325.78	78	<0.5	2.8	0.7	5.9	--	--
MW-2	12/15/1993	--	334.80	8.82	--	325.98	--	--	--	--	--	--	--
MW-2	02/11/1994	--	334.80	8.59	--	326.21	<50	2.4	0.7	<0.5	<0.5	--	--
MW-2	03/13/1994	--	334.80	8.09	--	326.71	--	--	--	--	--	--	--
MW-2	02/15/1995	--	334.80	6.75	--	328.05	730	110	1.7	25	66	--	--
MW-2	05/24/1995	--	334.80	6.88	--	327.92	370	110	<1	17	1.9	--	--
MW-2	08/25/1995	--	334.80	7.91	--	326.89	150	6	<1	<1	<1	2,700	--
MW-2	11/28/1995	--	334.80	9.06	--	325.74	<50	<0.5	<0.5	<0.5	0.8	--	--
MW-2	02/26/1996	--	334.80	6.65	--	328.15	350	66	<0.5	11	1.7	<3	--
MW-2	05/23/1996	--	334.80	6.90	--	327.90	540	140	<2.5	13	<2.5	4,600	--
MW-2	08/23/1996	--	334.80	8.45	--	326.35	180	0.8	2	0.7	2.6	4,000	--
MW-2	03/21/1997	--	334.80	7.28	--	327.52	410	90	<1	14	4	3,800	--
MW-2	08/20/1997	--	334.80	8.87	--	325.93	<5,000	<50	<50	<50	<50	3,100	--
MW-2	11/21/1997	--	334.80	9.28	--	325.52	<2,000	<20	<20	<20	<20	2,600	--
MW-2	02/12/1998	P	334.80	5.90	--	328.90	310	54	<0.5	6.2	1.1	3,800	--
MW-2	07/31/1998	P	334.80	8.12	--	326.68	6,100	52	220	110	1,100	7,700	--
MW-2	02/17/1999	P	334.80	7.18	--	327.62	<5,000	<50	<50	<50	<50	4,200	--
MW-2	08/24/1999	P	334.80	8.68	--	326.12	200	1.8	16	3.0	32	3,100	--
MW-2	03/01/2000	P	334.80	7.02	--	327.78	760	24	12	13	59	6,300	--
MW-2	08/18/2000	P	334.80	7.75	--	327.05	<500	<5.00	<5.00	<5.00	<5.00	1,610/1,980	--
MW-2	12/27/2000	--	334.80	8.85	--	325.95	--	--	--	--	--	--	--
MW-2	02/09/2001	P	334.80	8.50	--	326.30	<50.0	<0.500	<0.500	<0.500	<0.500	9.11	--
MW-2	04/17/2001	--	334.80	9.12	--	325.68	--	--	--	--	--	--	--
MW-2	07/17/2001	--	334.80	--	--	--	3,500	<10	<10	<10	<10	3,500	--
MW-2	07/17/2001	P	334.80	8.99	--	325.81	1,200	<10	<10	<10	<10	4,200	--
MW-2	12/21/2001	NP	334.80	8.65	--	326.15	65	<0.50	1.2	0.61	6.7	11/6.5	--
MW-2	03/06/2002	NP	334.80	8.61	--	326.19	<50	<0.50	<0.50	<0.50	1.8	31	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-2	04/26/2002	NP	334.80	8.20	--	326.60	92	<0.5	<0.50	<0.50	0.64	98/180	--
MW-2	09/23/2002	P	334.80	8.50	--	326.30	250	<1.2	<1.2	<1.2	<1.2	1,500	--
MW-2	12/27/2002	P	334.80	7.15	--	327.65	440	<2.5	<2.5	<2.5	<2.5	790	<10,000
MW-2	03/12/2003	P	334.80	7.33	--	327.47	<50	1.6	<0.50	<0.50	1.2	11	540
MW-2	06/28/2003	P	337.29	7.49	--	329.80	<50	<0.50	<0.50	<0.50	<0.50	1.2	<20
MW-2	09/30/2003	P	337.29	8.20	--	329.09	<50	<0.50	<0.50	<0.50	<0.50	5.2	290
MW-2	12/05/2003	NP	337.29	7.73	--	329.56	<50	<0.50	<0.50	<0.50	<0.50	2.6	730
MW-2	03/10/2004	P	337.29	6.70	--	330.59	<500	<5.0	<5.0	<5.0	<5.0	5.6	13,000
MW-2	06/21/2004	P	337.29	7.71	--	329.58	160	<1.0	<1.0	<1.0	<1.0	1.5	2,900
MW-2	09/17/2004	P	337.29	7.45	--	329.84	<100	<1.0	<1.0	<1.0	<1.0	1.0	2,100
MW-2	12/13/2004	P	337.29	7.04	--	330.25	<50	<0.50	<0.50	<0.50	<0.50	0.54	860
MW-2	03/03/2005	P	337.29	6.18	--	331.11	<500	<5.0	<5.0	<5.0	<5.0	<5.0	5,000
MW-2	06/23/2005	P	337.29	6.51	--	330.78	<50	<0.50	<0.50	<0.50	<0.50	4.3	1,900
MW-2	09/16/2005	P	337.29	7.65	--	329.64	<100	<1.0	<1.0	<1.0	<1.0	2.0	3,600
MW-2	12/27/2005	P	337.29	7.29	--	330.00	<250	<2.5	<2.5	<2.5	<2.5	<2.5	3,800
MW-2	03/02/2006	P	337.29	6.51	--	330.78	<250	<2.5	<2.5	<2.5	<2.5	5.8	3,300
MW-2	6/23/2006	P	337.29	6.75	--	330.54	<250	<2.5	<2.5	<2.5	<2.5	4.2	650
MW-2	9/19/2006	P	337.29	7.30	--	329.99	<50	<0.50	<0.50	<0.50	<0.50	4.0	340
MW-2	12/19/2006	P	337.29	6.93	--	330.36	<50	<0.50	<0.50	<0.50	<0.50	0.70	1,300
MW-2	3/29/2007	P	337.29	6.61	--	330.68	<50	<0.50	<0.50	<0.50	<0.50	1.3	1,300
MW-2	6/5/2007	P	337.29	7.12	--	330.17	<50	<0.50	<0.50	<0.50	<0.50	0.94	1,400
MW-2	9/25/2007	P	337.29	7.77	--	329.52	<50	<0.50	<0.50	<0.50	<0.50	0.56	930
MW-2	12/26/2007	P	337.29	7.40	--	329.89	<50	<0.50	<0.50	<0.50	<0.50	0.64	380
MW-2	3/25/2008	P	337.29	6.45	--	330.84	<50	<0.50	<0.50	<0.50	<0.50	7.1	2,100
MW-2	6/10/2008	P	337.29	7.22	--	330.07	<50	<0.50	<0.50	<0.50	<0.50	3.2	430
MW-2	9/9/2008	P	337.29	7.69	--	329.60	<50	<0.50	<0.50	<0.50	<0.50	1.5	57
MW-2	12/4/2008	P	337.29	7.74	--	329.55	<50	<0.50	<0.50	<0.50	<0.50	0.53	300
MW-2	3/5/2009	P	337.29	6.16	--	331.13	<50	<1.0	<1.0	<1.0	<1.0	2.7	1,200
MW-2	6/2/2009	P	337.29	7.11	--	330.18	<50	<1.0	<1.0	<1.0	<1.0	1.3	350
MW-2	10/26/2009	P	337.29	7.37	--	329.92	<50	<0.50	<0.50	<0.50	<1.0	0.90	6.6
MW-2	3/16/2010	P	337.29	6.05	--	331.24	<50	<0.50	<0.50	<0.50	<1.0	3.5	420
MW-2	7/30/2010	NP	337.29	7.10	--	330.19	<50	<0.50	<0.50	<0.50	<1.0	3.7	<4.0
MW-3	09/20/1991	--	335.53	10.16	--	325.37	990	50	100	11	200	--	--
MW-3	10/22/1991	--	335.53	10.48	--	325.05	--	--	--	--	--	--	--
MW-3	11/27/1991	--	335.53	10.17	--	325.36	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-3	12/16/1991	--	335.53	10.25	--	325.28	1,000	180	5.1	23	4.3	--	--
MW-3	01/18/1992	--	335.53	10.71	--	324.82	--	--	--	--	--	--	--
MW-3	02/21/1992	--	335.53	8.68	--	326.85	--	--	--	--	--	--	--
MW-3	03/16/1992	--	335.53	8.91	--	326.62	430	86	<1.0	22	3.4	--	--
MW-3	04/24/1992	--	335.53	9.14	--	326.39	--	--	--	--	--	--	--
MW-3	05/15/1992	--	335.53	9.54	--	325.99	--	--	--	--	--	--	--
MW-3	06/09/1992	--	335.53	9.72	--	325.81	1,800	290	2.4	49	17	--	--
MW-3	07/28/1992	--	335.53	10.15	--	325.38	--	--	--	--	--	--	--
MW-3	08/24/1992	--	335.53	10.42	--	325.11	--	--	--	--	--	--	--
MW-3	09/09/1992	--	335.53	10.53	--	325.00	2,600	550	<5	120	12	--	--
MW-3	10/26/1992	--	335.53	10.92	--	324.61	--	--	--	--	--	--	--
MW-3	11/10/1992	--	335.53	10.72	--	324.81	1,100	280	<5	100	<5	--	--
MW-3	12/14/1992	--	335.53	9.78	--	325.75	--	--	--	--	--	--	--
MW-3	01/15/1993	--	335.53	7.66	--	327.87	--	--	--	--	--	--	--
MW-3	02/10/1993	--	335.53	7.87	--	327.66	980	190	<5	52	<5	--	--
MW-3	03/29/1993	--	335.53	7.35	--	328.18	--	--	--	--	--	--	--
MW-3	04/27/1993	--	335.53	7.70	--	327.83	--	--	--	--	--	--	--
MW-3	05/10/1993	--	335.53	8.46	--	327.07	1,100	280	<2.5	70	<2.5	--	--
MW-3	06/18/1993	--	335.53	9.13	--	326.40	--	--	--	--	--	--	--
MW-3	07/28/1993	--	335.53	9.49	--	326.04	--	--	--	--	--	--	--
MW-3	08/30/1993	--	335.53	9.62	--	325.91	470	120	<1	22	<1	--	--
MW-3	09/28/1993	--	335.53	9.80	--	325.73	--	--	--	--	--	--	--
MW-3	10/31/1993	--	335.53	9.84	--	325.69	--	--	--	--	--	--	--
MW-3	11/11/1993	--	335.53	9.81	--	325.72	830	96	<2.5	25	<2.5	--	--
MW-3	12/15/1993	--	335.53	10.23	--	325.30	--	--	--	--	--	--	--
MW-3	02/11/1994	--	335.53	9.60	--	325.93	220	42	<1.0	84	<1.0	--	--
MW-3	03/13/1994	--	335.53	9.03	--	326.50	--	--	--	--	--	--	--
MW-3	02/15/1995	--	335.53	8.55	--	326.98	100	14	<0.5	6.3	<0.5	--	--
MW-3	05/24/1995	--	335.53	8.17	--	327.36	110	8	<0.5	2.7	<0.5	--	--
MW-3	08/25/1995	--	335.53	9.27	--	326.26	210	3.6	<0.5	2.9	0.6	20,000	--
MW-3	11/28/1995	--	335.53	9.91	--	325.62	81	1.5	<0.5	1.4	<0.5	15,000	--
MW-3	02/26/1996	--	335.53	8.42	--	327.11	16,000	1,600	1,200	300	2,000	9,500	--
MW-3	05/23/1996	--	335.53	7.70	--	327.83	6,500	690	<10	120	14	8,600	--
MW-3	08/23/1996	--	335.53	9.25	--	326.28	1,700	85	2.1	61	5.3	11,000	--
MW-3	03/21/1997	--	335.53	8.72	--	326.81	100	2	<1	1	<1	6,600	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-3	08/20/1997	--	335.53	9.73	--	325.80	<5,000	<50	<50	<50	<50	7,700	--
MW-3	11/21/1997	--	335.53	10.10	--	325.43	<5,000	<50	<50	<50	<50	9,700	--
MW-3	02/12/1998	P	335.53	6.68	--	328.85	110	11	<0.5	<0.5	1.9	10,000	--
MW-3	07/31/1998	P	335.53	7.98	--	327.55	<10,000	<100	<100	<100	<100	13,000	--
MW-3	02/17/1999	P	335.53	8.40	--	327.13	<20,000	<200	<200	<200	<200	23,000	--
MW-3	08/24/1999	P	335.53	9.45	--	326.08	200	0.6	5.6	0.6	1.7	22,000	--
MW-3	03/01/2000	P	335.53	8.32	--	327.21	320	32	1	6.1	4	58,000	--
MW-3	08/18/2000	P	335.53	8.35	--	327.18	<10,000	<100	<100	<100	<100	46200/55600	--
MW-3	12/27/2000	P	335.53	9.75	--	325.78	29,700	1,620	1,730	<250	6,230	62,600	--
MW-3	02/09/2001	P	335.53	9.61	--	325.92	29,300	2,590	3,530	440	7,080	85,500	--
MW-3	04/17/2001	P	335.53	9.94	--	325.59	16,400	1,680	<25.0	310	2,290	48,700	--
MW-3	07/17/2001	P	335.53	9.93	--	325.60	21,000	1,500	<100	1,100	690	82,000	--
MW-3	12/21/2001	P	335.53	9.40	--	326.13	<5,000	<50	<50	<50	<50	4,300/3,800	--
MW-3	03/06/2002	P	335.53	9.33	--	326.20	<50	1.2	<0.50	1.1	13	880	--
MW-3	04/26/2002	P	335.53	9.19	--	326.34	260	3.7	<1.0	1.1	1.8	460/940	--
MW-3	09/23/2002	P	335.53	9.30	--	326.23	1,500	41	2.4	9.8	14	980	--
MW-3	12/27/2002	P	335.53	7.30	--	328.23	1,500	300	100	21	66	1,100	<20,000
MW-3	03/12/2003	P	335.53	8.06	--	327.47	<1,000	<10	<10	<10	<10	45	6,100
MW-3	06/28/2003	P	338.18	8.60	--	329.58	1,500	20	27	12	45	140	29,000
MW-3	09/30/2003	P	338.18	9.04	--	329.14	<2,500	<25	<25	<25	<25	650	39,000
MW-3	12/05/2003	P	338.18	8.57	--	329.61	<2,500	<25	<25	<25	<25	480	39,000
MW-3	03/10/2004	P	338.18	7.58	--	330.60	180	7.4	<1.0	<1.0	<1.0	75	590
MW-3	06/21/2004	P	338.18	8.51	--	329.67	<2,500	<25	<25	<25	<25	370	34,000
MW-3	09/17/2004	P	338.18	8.38	--	329.80	<5,000	<50	<50	<50	<50	280	53,000
MW-3	12/13/2004	P	338.18	8.04	--	330.14	520	89	4.6	3.9	5.8	460	5,300
MW-3	03/03/2005	P	338.18	6.89	--	331.29	300	23	<2.5	<2.5	<2.5	130	940
MW-3	06/23/2005	P	338.18	8.27	--	329.91	260	6.1	1.1	0.65	2.8	40	9,400
MW-3	09/16/2005	P	338.18	8.47	--	329.71	850	52	<5.0	<5.0	<5.0	270	20,000
MW-3	12/27/2005	P	338.18	7.77	--	330.41	300	56	<2.5	<2.5	3.6	230	1,700
MW-3	03/02/2006	P	338.18	7.33	--	330.85	<250	4.0	<2.5	<2.5	<2.5	24	400
MW-3	6/23/2006	P	338.18	7.64	--	330.54	340	1.5	<0.50	<0.50	<0.50	47	13,000
MW-3	9/19/2006	P	338.18	8.17	--	330.01	<50	<0.50	<0.50	<0.50	<0.50	14	1,500
MW-3	12/19/2006	P	338.18	7.85	--	330.33	530	120	<5.0	<5.0	5.5	270	4,900
MW-3	3/29/2007	P	338.18	7.15	--	331.03	750	180	<5.0	9.2	7.1	420	6,000
MW-3	6/5/2007	P	338.18	8.10	--	330.08	1,200	330	<5.0	12	12	610	8,800

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-3	9/25/2007	P	338.18	8.73	--	329.45	230	<5.0	<5.0	<5.0	<5.0	54	7,600
MW-3	12/26/2007	P	338.18	8.50	--	329.68	190	21	<0.50	0.69	<0.50	71	1,800
MW-3	3/25/2008	P	338.18	7.23	--	330.95	170	41	<10	<10	<10	77	4,900
MW-3	6/10/2008	P	338.18	8.15	--	330.03	110	<25	<25	<25	<25	<25	6,000
MW-3	9/9/2008	P	338.18	8.57	--	329.61	73	<20	<20	<20	<20	<20	6,400
MW-3	12/4/2008	P	338.18	8.67	--	329.51	91	<20	<20	<20	<20	<20	5,700
MW-3	3/5/2009	P	338.18	6.75	--	331.43	64	11	<0.50	<0.50	<0.50	19	150
MW-3	6/2/2009	P	338.18	7.99	--	330.19	<50	<1.0	<1.0	<1.0	<1.0	4.0	340
MW-3	10/26/2009	P	338.18	8.18	--	330.00	330	11	3.5	<2.5	<5.0	38	1,600
MW-3	3/16/2010	P	338.18	6.83	--	331.35	340	180	<2.5	20	6.4	240	5,400
MW-3	7/30/2010	P	338.18	8.02	--	330.16	<250	<2.5	<2.5	<2.5	<5.0	5.1	2,700
MW-4	11/10/1992	--	334.22	9.58	--	324.64	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	12/14/1992	--	334.22	8.72	--	325.50	--	--	--	--	--	--	--
MW-4	01/15/1993	--	334.22	7.27	--	326.95	--	--	--	--	--	--	--
MW-4	02/10/1993	--	334.22	6.80	--	327.42	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	03/29/1993	--	334.22	6.29	--	327.93	--	--	--	--	--	--	--
MW-4	04/27/1993	--	334.22	6.33	--	327.89	--	--	--	--	--	--	--
MW-4	05/10/1993	--	334.22	6.68	--	327.54	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	06/18/1993	--	334.22	7.05	--	327.17	--	--	--	--	--	--	--
MW-4	07/28/1993	--	334.22	7.77	--	326.45	--	--	--	--	--	--	--
MW-4	08/30/1993	--	334.22	8.09	--	326.13	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	09/28/1993	--	334.22	8.40	--	325.82	--	--	--	--	--	--	--
MW-4	10/31/1993	--	334.22	8.56	--	325.66	--	--	--	--	--	--	--
MW-4	11/11/1993	--	334.22	8.48	--	325.74	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	12/15/1993	--	334.22	8.38	--	325.84	--	--	--	--	--	--	--
MW-4	02/11/1994	--	334.22	8.15	--	326.07	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	03/13/1994	--	334.22	7.57	--	326.65	--	--	--	--	--	--	--
MW-4	02/15/1995	--	334.22	7.85	--	326.37	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	05/24/1995	--	334.22	6.68	--	327.54	--	--	--	--	--	--	--
MW-4	08/25/1995	--	334.22	6.93	--	327.29	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	11/28/1995	--	334.22	8.21	--	326.01	--	--	--	--	--	--	--
MW-4	02/26/1996	--	334.22	6.65	--	327.57	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	05/23/1996	--	334.22	6.47	--	327.75	--	--	--	--	--	--	--
MW-4	08/23/1996	--	334.22	7.66	--	326.56	--	--	--	--	--	--	--
MW-4	03/21/1997	--	334.22	6.84	--	327.38	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-4	08/20/1997	--	334.22	8.32	--	325.90	--	--	--	--	--	--	--
MW-4	11/21/1997	--	334.22	8.65	--	325.57	--	--	--	--	--	--	--
MW-4	02/12/1998	--	334.22	6.35	--	327.87	--	--	--	--	--	--	--
MW-4	07/31/1998	--	334.22	6.84	--	327.38	--	--	--	--	--	--	--
MW-4	02/17/1999	--	334.22	7.50	--	326.72	--	--	--	--	--	--	--
MW-4	08/24/1999	--	334.22	9.50	--	324.72	--	--	--	--	--	--	--
MW-4	03/01/2000	--	334.22	6.93	--	327.29	--	--	--	--	--	--	--
MW-4	08/18/2000	--	334.22	7.03	--	327.19	--	--	--	--	--	--	--
MW-4	12/27/2000	--	334.22	8.10	--	326.12	--	--	--	--	--	--	--
MW-4	02/09/2001	--	334.22	7.97	--	326.25	--	--	--	--	--	--	--
MW-4	04/17/2001	--	334.22	8.90	--	325.32	--	--	--	--	--	--	--
MW-4	07/17/2001	--	334.22	8.59	--	325.63	--	--	--	--	--	--	--
MW-4	12/21/2001	NP	334.22	8.31	--	325.91	<50	<0.50	<0.50	<0.50	<0.50	4.1/2.0	--
MW-4	03/06/2002	P	334.22	8.27	--	325.95	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--
MW-4	04/26/2002	P	334.22	8.05	--	326.17	<50	<0.50	<0.50	<0.50	<0.50	3.6	--
MW-4	09/23/2002	P	334.22	7.94	--	326.28	<50	<0.50	<0.50	<0.50	<0.50	2.9	--
MW-4	12/27/2002	--	334.22	7.56	--	326.66	<50	<0.50	<0.50	<0.50	<0.50	2.6	<20
MW-4	03/12/2003	P	334.22	7.67	--	326.55	<50	<0.50	<0.50	<0.50	<0.50	1.6	<20
MW-4	06/28/2003	P	336.87	7.60	--	329.27	<50	<0.50	<0.50	<0.50	<0.50	2.1	<20
MW-4	09/30/2003	--	336.87	7.66	--	329.21	<50	<0.50	<0.50	<0.50	<0.50	1.4	<20
MW-4	12/05/2003	P	336.87	5.61	--	331.26	<50	<0.50	<0.50	<0.50	<0.50	2.3	<20
MW-4	03/10/2004	P	336.87	6.84	--	330.03	<50	<0.50	<0.50	<0.50	<0.50	2.1	<20
MW-4	06/21/2004	P	336.87	7.35	--	329.52	<50	<0.50	<0.50	<0.50	<0.50	2.0	<20
MW-4	09/17/2004	P	336.87	7.30	--	329.57	<50	<0.50	<0.50	<0.50	<0.50	3.5	<20
MW-4	12/13/2004	P	336.87	7.08	--	329.79	<50	<0.50	<0.50	<0.50	<0.50	5.4	85
MW-4	03/03/2005	P	336.87	8.11	--	328.76	<50	<0.50	<0.50	<0.50	<0.50	6.3	<20
MW-4	06/23/2005	P	336.87	6.70	--	330.17	--	--	--	--	--	--	--
MW-4	09/16/2005	P	336.87	7.28	--	329.59	<50	<0.50	<0.50	<0.50	<0.50	4.2	79
MW-4	12/27/2005	--	336.87	7.03	--	329.84	--	--	--	--	--	--	--
MW-4	03/02/2006	--	336.87	6.45	--	330.42	--	--	--	--	--	--	--
MW-4	6/23/2006	--	336.87	6.42	--	330.45	--	--	--	--	--	--	--
MW-4	9/19/2006	P	336.87	7.01	--	329.86	<50	<0.50	<0.50	<0.50	<0.50	5.8	<20
MW-4	12/19/2006	--	336.87	6.85	--	330.02	--	--	--	--	--	--	--
MW-4	3/29/2007	--	336.87	6.23	--	330.64	--	--	--	--	--	--	--
MW-4	6/5/2007	--	336.87	6.72	--	330.15	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
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Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-4	9/25/2007	P	336.87	7.53	--	329.34	<50	<0.50	<0.50	<0.50	<0.50	3.0	<20
MW-4	12/26/2007	--	336.87	7.25	--	329.62	--	--	--	--	--	--	--
MW-4	3/25/2008	--	336.87	6.18	--	330.69	--	--	--	--	--	--	--
MW-4	6/10/2008	--	336.87	6.90	--	329.97	--	--	--	--	--	--	--
MW-4	9/9/2008	P	336.87	7.38	--	329.49	<50	<0.50	<0.50	<0.50	<0.50	5.3	<10
MW-4	12/4/2008	--	336.87	7.47	--	329.40	--	--	--	--	--	--	--
MW-4	3/5/2009	--	336.87	6.35	--	330.52	--	--	--	--	--	--	--
MW-4	6/2/2009	--	336.87	6.62	--	330.25	--	--	--	--	--	--	--
MW-4	10/26/2009	P	336.87	7.12	--	329.75	<50	<0.50	0.57	<0.50	<1.0	4.4	<5.0
MW-4	3/16/2010	--	336.87	5.85	--	331.02	--	--	--	--	--	--	--
MW-4	7/30/2010	P	336.87	6.70	--	330.17	<50	<0.50	<0.50	<0.50	<1.0	4.2	<4.0
MW-5	11/10/1992	--	335.87	11.02	--	324.85	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-5	12/14/1992	--	335.87	10.17	--	325.70	--	--	--	--	--	--	--
MW-5	01/15/1993	--	335.87	8.14	--	327.73	--	--	--	--	--	--	--
MW-5	02/10/1993	--	335.87	8.00	--	327.87	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-5	03/29/1993	--	335.87	7.52	--	328.35	--	--	--	--	--	--	--
MW-5	04/27/1993	--	335.87	8.26	--	327.61	--	--	--	--	--	--	--
MW-5	05/10/1993	--	335.87	8.64	--	327.23	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-5	06/18/1993	--	335.87	9.26	--	326.61	--	--	--	--	--	--	--
MW-5	07/28/1993	--	335.87	9.65	--	326.22	--	--	--	--	--	--	--
MW-5	08/30/1993	--	335.87	9.81	--	326.06	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-5	09/28/1993	--	335.87	9.99	--	325.88	--	--	--	--	--	--	--
MW-5	10/31/1993	--	335.87	10.02	--	325.85	--	--	--	--	--	--	--
MW-5	11/11/1993	--	335.87	10.09	--	325.78	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-5	12/15/1993	--	335.87	10.08	--	325.79	--	--	--	--	--	--	--
MW-5	02/11/1994	--	335.87	9.63	--	326.24	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-5	03/13/1994	--	335.87	9.26	--	326.61	--	--	--	--	--	--	--
MW-5	02/15/1995	--	335.87	7.80	--	328.07	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-5	05/24/1995	--	335.87	8.10	--	327.77	--	--	--	--	--	--	--
MW-5	08/25/1995	--	335.87	9.43	--	326.44	--	--	--	--	--	--	--
MW-5	11/28/1995	--	335.87	10.12	--	325.75	--	--	--	--	--	--	--
MW-5	02/26/1996	--	335.87	6.73	--	329.14	--	<0.5	<0.5	<0.5	<0.5	<3	--
MW-5	05/23/1996	--	335.87	7.87	--	328.00	--	--	--	--	--	--	--
MW-5	08/23/1996	--	335.87	9.46	--	326.41	--	--	--	--	--	--	--
MW-5	03/21/1997	--	335.87	8.23	--	327.64	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-5	08/20/1997	--	335.87	9.92	--	325.95	--	--	--	--	--	--	--
MW-5	11/21/1997	--	335.87	10.18	--	325.69	--	--	--	--	--	--	--
MW-5	02/12/1998	--	335.87	6.45	--	329.42	--	--	--	--	--	--	--
MW-5	07/31/1998	--	335.87	8.98	--	326.89	--	--	--	--	--	--	--
MW-5	02/17/1999	--	335.87	7.65	--	328.22	--	--	--	--	--	--	--
MW-5	08/24/1999	--	335.87	8.10	--	327.77	--	--	--	--	--	--	--
MW-5	03/01/2000	--	335.87	7.31	--	328.56	--	--	--	--	--	--	--
MW-5	08/18/2000	--	335.87	8.65	--	327.22	--	--	--	--	--	--	--
MW-5	12/27/2000	--	335.87	9.80	--	326.07	--	--	--	--	--	--	--
MW-5	02/09/2001	--	335.87	9.65	--	326.22	--	--	--	--	--	--	--
MW-5	04/17/2001	--	335.87	9.92	--	325.95	--	--	--	--	--	--	--
MW-5	07/17/2001	--	335.87	9.95	--	325.92	--	--	--	--	--	--	--
MW-5	12/21/2001	--	335.87	--	--	--	--	--	--	--	--	--	--
MW-5	03/06/2002	--	335.87	--	--	--	--	--	--	--	--	--	--
MW-5	04/26/2002	--	335.87	--	--	--	--	--	--	--	--	--	--
MW-5	09/23/2002	--	335.87	7.94	--	327.93	--	--	--	--	--	--	--
MW-5	12/27/2002	--	335.87	7.57	--	328.30	<50	<0.50	<0.50	<0.50	0.76	15	<20
MW-5	03/12/2003	--	335.87	8.32	--	327.55	--	--	--	--	--	--	--
MW-5	06/28/2003	--	338.59	8.58	--	330.01	--	--	--	--	--	--	--
MW-5	09/30/2003	--	338.59	9.28	--	329.31	--	--	--	--	--	--	--
MW-5	12/05/2003	P	338.59	9.11	--	329.48	<50	<0.50	<0.50	<0.50	<0.50	22	<20
MW-5	03/10/2004	--	338.59	7.57	--	331.02	--	--	--	--	--	--	--
MW-5	06/21/2004	--	338.59	8.68	--	329.91	--	--	--	--	--	--	--
MW-5	09/17/2004	--	338.59	--	--	--	--	--	--	--	--	--	--
MW-5	09/24/2004	P	338.59	8.53	--	330.06	<50	<0.50	<0.50	<0.50	<0.50	17	<20
MW-5	12/13/2004	--	338.59	8.28	--	330.31	--	--	--	--	--	--	--
MW-5	03/03/2005	--	338.59	6.78	--	331.81	--	--	--	--	--	--	--
MW-5	06/23/2005	--	338.59	8.27	--	330.32	--	--	--	--	--	--	--
MW-5	09/16/2005	P	338.59	9.57	--	329.02	<50	<0.50	<0.50	<0.50	<0.50	69	<20
MW-5	12/27/2005	--	338.59	8.72	--	329.87	--	--	--	--	--	--	--
MW-5	03/02/2006	--	338.59	8.11	--	330.48	--	--	--	--	--	--	--
MW-5	6/23/2006	--	338.59	8.54	--	330.05	--	--	--	--	--	--	--
MW-5	9/19/2006	P	338.59	9.21	--	329.38	52	<0.50	<0.50	<0.50	<0.50	82	<20
MW-5	12/19/2006	--	338.59	9.00	--	329.59	--	--	--	--	--	--	--
MW-5	3/29/2007	--	338.59	8.53	--	330.06	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-5	6/5/2007	--	338.59	8.42	--	330.17	--	--	--	--	--	--	--
MW-5	9/25/2007	P	338.59	9.80	--	328.79	<50	<0.50	<0.50	<0.50	<0.50	18	<20
MW-5	12/26/2007	--	338.59	9.28	--	329.31	--	--	--	--	--	--	--
MW-5	3/25/2008	--	338.59	8.31	--	330.28	--	--	--	--	--	--	--
MW-5	6/10/2008	--	338.59	9.19	--	329.40	--	--	--	--	--	--	--
MW-5	9/9/2008	P	338.59	9.69	--	328.90	<50	<0.50	<0.50	<0.50	<0.50	27	<10
MW-5	12/4/2008	--	338.59	9.79	--	328.80	--	--	--	--	--	--	--
MW-5	3/5/2009	--	338.59	7.68	--	330.91	--	--	--	--	--	--	--
MW-5	6/2/2009	--	338.59	8.87	--	329.72	--	--	--	--	--	--	--
MW-5	10/26/2009	P	338.59	9.36	--	329.23	<50	<0.50	<0.50	<0.50	<1.0	8.6	<5.0
MW-5	3/16/2010	--	338.59	7.73	--	330.86	--	--	--	--	--	--	--
MW-5	7/30/2010	P	338.59	9.10	--	329.49	<50	<0.50	<0.50	<0.50	<1.0	5.3	<4.0
MW-6	11/10/1992	--	335.84	11.03	--	324.81	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	12/14/1992	--	335.84	10.03	--	325.81	--	--	--	--	--	--	--
MW-6	01/15/1993	--	335.84	7.64	--	328.20	--	--	--	--	--	--	--
MW-6	02/10/1993	--	335.84	8.22	--	327.62	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	03/29/1993	--	335.84	7.59	--	328.25	--	--	--	--	--	--	--
MW-6	04/27/1993	--	335.84	8.20	--	327.64	--	--	--	--	--	--	--
MW-6	05/10/1993	--	335.84	8.85	--	326.99	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	06/18/1993	--	335.84	9.26	--	326.58	--	--	--	--	--	--	--
MW-6	07/28/1993	--	335.84	9.83	--	326.01	--	--	--	--	--	--	--
MW-6	08/30/1993	--	335.84	10.15	--	325.69	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	09/28/1993	--	335.84	9.95	--	325.89	--	--	--	--	--	--	--
MW-6	10/31/1993	--	335.84	10.16	--	325.68	--	--	--	--	--	--	--
MW-6	11/11/1993	--	335.84	10.02	--	325.82	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	12/15/1993	--	335.84	10.28	--	325.56	--	--	--	--	--	--	--
MW-6	02/11/1994	--	335.84	9.66	--	326.18	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	03/13/1994	--	335.84	9.28	--	326.56	--	--	--	--	--	--	--
MW-6	02/15/1995	--	335.84	7.81	--	328.03	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-6	05/24/1995	--	335.84	8.35	--	327.49	--	--	--	--	--	--	--
MW-6	08/25/1995	--	335.84	9.71	--	326.13	--	--	--	--	--	--	--
MW-6	11/28/1995	--	335.84	10.28	--	325.56	--	--	--	--	--	--	--
MW-6	02/26/1996	--	335.84	6.60	--	329.24	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-6	05/23/1996	--	335.84	8.05	--	327.79	--	--	--	--	--	--	--
MW-6	08/23/1996	--	335.84	9.58	--	326.26	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-6	03/21/1997	--	335.84	8.39	--	327.45	--	--	--	--	--	--	--
MW-6	08/20/1997	--	335.84	9.98	--	325.86	--	--	--	--	--	--	--
MW-6	11/21/1997	--	335.84	10.31	--	325.53	--	--	--	--	--	--	--
MW-6	02/12/1998	--	335.84	3.15	--	332.69	--	--	--	--	--	--	--
MW-6	07/31/1998	--	335.84	9.29	--	326.55	--	--	--	--	--	--	--
MW-6	02/17/1999	--	335.84	7.72	--	328.12	--	--	--	--	--	--	--
MW-6	08/24/1999	--	335.84	9.65	--	326.19	--	--	--	--	--	--	--
MW-6	03/01/2000	--	335.84	7.35	--	328.49	--	--	--	--	--	--	--
MW-6	08/18/2000	--	335.84	8.65	--	327.19	--	--	--	--	--	--	--
MW-6	12/27/2000	--	335.84	9.83	--	326.01	--	--	--	--	--	--	--
MW-6	02/09/2001	--	335.84	9.62	--	326.22	--	--	--	--	--	--	--
MW-6	04/17/2001	--	335.84	10.03	--	325.81	--	--	--	--	--	--	--
MW-6	07/17/2001	--	335.84	9.95	--	325.89	--	--	--	--	--	--	--
MW-6	12/21/2001	NP	335.84	9.47	--	326.37	<50	<0.50	<0.50	<0.50	0.57	<2.5	--
MW-6	03/06/2002	P	335.84	9.31	--	326.53	<50	<0.50	<0.50	<0.50	<0.50	<5.0	--
MW-6	04/26/2002	P	335.84	9.09	--	326.75	<50	<0.50	<0.50	<0.50	0.7	<2.5	--
MW-6	09/23/2002	P	335.84	9.14	--	326.70	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--
MW-6	12/27/2002	--	335.84	7.26	--	328.58	<50	<0.50	<0.50	<0.50	0.63	0.91	<20
MW-6	03/12/2003	P	335.84	8.41	--	327.43	<50	<0.50	<0.50	<0.50	<0.50	0.64	<20
MW-6	06/28/2003	P	338.37	8.56	--	329.81	<50	<0.50	<0.50	<0.50	<0.50	0.62	<20
MW-6	09/30/2003	--	338.37	9.32	--	329.05	<250	<2.5	<2.5	<2.5	<2.5	3.9	<100
MW-6	12/05/2003	--	338.37	8.96	--	329.41	--	--	--	--	--	--	--
MW-6	03/10/2004	--	338.37	7.65	--	330.72	--	--	--	--	--	--	--
MW-6	06/21/2004	--	338.37	8.58	--	329.79	--	--	--	--	--	--	--
MW-6	09/17/2004	P	338.37	8.47	--	329.90	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20
MW-6	12/13/2004	--	338.37	8.04	--	330.33	--	--	--	--	--	--	--
MW-6	03/03/2005	--	338.37	6.60	--	331.77	--	--	--	--	--	--	--
MW-6	06/23/2005	--	338.37	8.14	--	330.23	--	--	--	--	--	--	--
MW-6	09/16/2005	P	338.37	8.66	--	329.71	<50	<0.50	<0.50	<0.50	<0.50	<0.50	42
MW-6	12/27/2005	--	338.37	7.79	--	330.58	--	--	--	--	--	--	--
MW-6	03/02/2006	--	338.37	7.15	--	331.22	--	--	--	--	--	--	--
MW-6	6/23/2006	--	338.37	7.70	--	330.67	--	--	--	--	--	--	
MW-6	9/19/2006	P	338.37	8.30	--	330.07	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20
MW-6	12/19/2006	--	338.37	7.90	--	330.47	--	--	--	--	--	--	--
MW-6	3/29/2007	--	338.37	7.72	--	330.65	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-6	6/5/2007	--	338.37	8.18	--	330.19	--	--	--	--	--	--	--
MW-6	9/25/2007	NP	338.37	8.86	--	329.51	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20
MW-6	12/26/2007	--	338.37	8.25	--	330.12	--	--	--	--	--	--	--
MW-6	3/25/2008	--	338.37	7.35	--	331.02	--	--	--	--	--	--	--
MW-6	6/10/2008	--	338.37	8.23	--	330.14	--	--	--	--	--	--	--
MW-6	9/9/2008	P	338.37	8.65	--	329.72	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
MW-6	12/4/2008	--	338.37	8.80	--	329.57	--	--	--	--	--	--	--
MW-6	3/5/2009	--	338.37	6.34	--	332.03	--	--	--	--	--	--	--
MW-6	6/2/2009	--	338.37	7.96	--	330.41	--	--	--	--	--	--	--
MW-6	10/26/2009	P	338.37	8.26	--	330.11	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0
MW-6	3/16/2010	--	338.37	6.59	--	331.78	--	--	--	--	--	--	--
MW-6	7/30/2010	NP	338.37	8.75	--	329.62	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0
MW-7	12/21/2001	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	03/06/2002	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	04/26/2002	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	09/23/2002	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	12/27/2002	--	--	7.74	--	--	<50	<0.50	<0.50	<0.50	<0.50	4.7	<20
MW-7	03/12/2003	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	06/28/2003	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	09/30/2003	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	12/05/2003	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	03/10/2004	--	338.62	7.78	--	330.84	--	--	--	--	--	--	--
MW-7	06/21/2004	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	09/17/2004	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	12/13/2004	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	03/03/2005	--	338.62	6.81	--	331.81	--	--	--	--	--	--	--
MW-7	06/23/2005	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	09/16/2005	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	12/27/2005	--	338.62	7.90	--	330.72	--	--	--	--	--	--	--
MW-7	03/02/2006	--	338.62	7.39	--	331.23	--	--	--	--	--	--	--
MW-7	6/23/2006	--	338.62	7.90	--	330.72	--	--	--	--	--	--	--
MW-7	9/19/2006	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	12/19/2006	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	3/29/2007	--	338.62	7.95	--	330.67	--	--	--	--	--	--	--
MW-7	6/5/2007	--	338.62	--	--	--	--	--	--	--	--	--	--

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ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-7	9/25/2007	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	12/26/2007	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	3/25/2008	--	338.62	7.51	--	331.11	--	--	--	--	--	--	--
MW-7	6/10/2008	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	9/9/2008	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	12/4/2008	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	3/5/2009	--	338.62	6.70	--	331.92	--	--	--	--	--	--	--
MW-7	6/2/2009	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	10/26/2009	--	338.62	--	--	--	--	--	--	--	--	--	--
MW-7	3/16/2010	--	338.62	6.90	--	331.72	--	--	--	--	--		--
MW-7	7/30/2010	--	338.62	--	--	--	--	--	--	--	--		--
MW-8	12/21/2001	NP	--	8.70	--	--	<5,000	67	<50	<50	<50	2,400/1,300	--
MW-8	03/06/2002	--	--	--	--	--	170	37	0.67	0.7	1.9	740	--
MW-8	03/06/2002	P	--	8.63	--	--	210	41	0.64	0.79	2.0	940	--
MW-8	04/26/2002	--	--	--	--	--	480	74	3.5	11	<1.0	640	--
MW-8	04/26/2002	P	--	8.15	--	--	680	95	<1.0	14	2.5	490	--
MW-8	09/30/2002	P	--	9.37	--	--	1,100	120	<5.0	57	8.7	1,100	--
MW-8	12/27/2002	P	--	7.55	--	--	350	13	<0.50	2.4	2.2	73	260
MW-8	03/12/2003	P	--	8.25	--	--	<2,500	89	<25	<25	<25	740	2,200
MW-8	06/28/2003	P	338.27	8.38	--	329.89	7,000	680	<25	110	180	2,900	12,000
MW-8	09/30/2003	P	338.27	9.09	--	329.18	1,500	240	18	45	150	180	28,000
MW-8	12/05/2003	P	338.27	8.37	--	329.90	590	60	<2.5	15	4.2	150	500
MW-8	03/10/2004	P	338.27	7.41	--	330.86	690	50	<5.0	7.4	6.8	370	420
MW-8	06/21/2004	P	338.27	8.41	--	329.86	1,300	200	<5.0	65	82	400	9,200
MW-8	09/17/2004	P	338.27	8.25	--	330.02	580	17	<0.50	1.9	5.8	22	83
MW-8	12/13/2004	P	338.27	7.78	--	330.49	380	24	<0.50	18	4.9	6.6	540
MW-8	03/03/2005	P	338.27	6.48	--	331.79	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20
MW-8	06/23/2005	P	338.27	7.91	--	330.36	160	10	<0.50	3.8	5.4	26	440
MW-8	09/16/2005	P	338.27	8.38	--	329.89	1,700	340	5.0	100	95	49	5,000
MW-8	12/27/2005	--	338.27	7.60	--	330.67	--	--	--	--	--	--	--
MW-8	03/02/2006	P	338.27	6.93	--	331.34	<250	10	<2.5	4.4	2.6	14	200
MW-8	6/23/2006	--	338.27	7.55	--	330.72	--	--	--	--	--	--	--
MW-8	9/19/2006	P	338.27	8.21	--	330.06	600	70	<2.5	24	3.2	89	5,200
MW-8	12/19/2006	--	338.27	7.89	--	330.38	--	--	--	--	--	--	--
MW-8	3/29/2007	P	338.27	7.55	--	330.72	95	3.1	<0.50	0.58	<0.50	5.1	400

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						
MW-8	6/5/2007	--	338.27	8.10	--	330.17	--	--	--	--	--	--	--
MW-8	9/25/2007	P	338.27	8.82	--	329.45	400	2.2	<0.50	<0.50	<0.50	3.5	3,800
MW-8	12/26/2007	--	338.27	8.23	--	330.04	--	--	--	--	--	--	--
MW-8	3/25/2008	P	338.27	6.43	--	331.84	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10
MW-8	6/10/2008	--	338.27	8.15	--	330.12	--	--	--	--	--	--	--
MW-8	9/9/2008	P	338.27	8.62	--	329.65	920	130	1.5	24	8.1	16	3,200
MW-8	12/4/2008	--	338.27	8.74	--	329.53	--	--	--	--	--	--	--
MW-8	3/5/2009	P	338.27	6.49	--	331.78	180	0.72	<0.50	<0.50	<0.50	0.89	27
MW-8	6/2/2009	--	338.27	6.80	--	331.47	--	--	--	--	--	--	--
MW-8	10/26/2009	P	338.27	8.12	--	330.15	420	<2.5	<2.5	<2.5	<5.0	3.6	1,300
MW-8	3/16/2010	P	338.27	6.65	--	331.62	120	<0.50	<0.50	<0.50	<1.0	0.91	160
MW-8	7/30/2010	P	338.27	8.02	--	330.25	73	8.6	<0.50	<0.50	<1.0	1.4	1,900
VW-2	03/21/1997	--	--	8.22	--	--	150	8.9	<0.5	<0.5	0.6	270	--
VW-2	08/20/1997	--	--	9.16	--	--	--	--	--	--	--	--	--
VW-2	11/21/1997	--	--	8.27	--	--	<200	3	<2	<2	<2	180	--
VW-2	02/12/1998	--	--	6.65	--	--	200	19	<0.5	0.6	<0.5	2,200	--
VW-2	07/31/1998	--	--	7.01	--	--	--	--	--	--	--	--	--
VW-2	02/17/1999	--	--	8.47	--	--	--	--	--	--	--	--	--
VW-2	08/24/1999	--	--	8.20	--	--	--	--	--	--	--	--	--
VW-2	03/01/2000	--	--	8.72	--	--	--	--	--	--	--	--	--
VW-2	08/18/2000	NP	--	8.40	--	--	<250	<2.50	<2.50	<2.50	<2.50	537	--
VW-2	12/27/2000	--	--	8.95	--	--	--	--	--	--	--	--	--
VW-2	02/09/2001	--	--	8.87	--	--	--	--	--	--	--	--	--
VW-2	04/17/2001	--	--	9.00	--	--	--	--	--	--	--	--	--
VW-2	07/17/2001	--	--	8.97	--	--	--	--	--	--	--	--	--
VW-2	12/21/2001	--	--	--	--	--	--	--	--	--	--	--	--

Table 2: Historical Groundwater Results
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case # RO452

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA
							µg/L						

Notes:
TOC = Top of Casing
DTW = Depth to Water
ft = feet
btoc = below top of casing
TPHg = Total Petroleum Hydrocarbons as Gasoline
MTBE = Methyl tert-butyl ether
TBA = tert-Butyl alcohol
µg/L = micrograms per liter
P = well purged prior to sampling
NP = well not purged prior to sampling
- = not analyzed
< = analyte not detected above laboratory detection limit
ppb = parts per billion

Analytical results collected between September 2, 1991 to February 11, 1994 were reported in ppb. TPHg and BTEX analyzed by EPA Method 5030/8020/DHS LUFT Meth

BTEX, MTBE and oxygenates analytical results after February 11, 1994 were analyzed by EPA Method 8260B.

Beginning fourth quarter 2003, the laboratory modified the reported analyte list. TPHg was changed to GRO.

Beginning second quarter 2004, the carbon range for GRO was changed from C6-C10 to C4-C12.

From April 2006 through February 4, 2008, GRO analysis was completed by EPA method 8260B. From February 5, 2008 through September 30, 2009, GRO analysis was completed by EPA Method 8015B. From October 1, 2009 to present, GRO analysis was completed by EPA Method 8260B.

Table 3: Historical Groundwater Flow Directions and Gradients
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case #RO452

Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient (ft/ft)
10/22/1991	Southwest	NR
11/27/1991	North	NR
12/16/1991	North-Northeast	NR
1/18/1992	South-Southwest	NR
2/21/1992	South	NR
3/16/1992	South-Southwest	NR
4/24/1992	West-Southwest	NR
5/15/1992	Southwest	NR
6/9/1992	Southwest	NR
7/28/1992	South-Southeast	NR
8/24/1992	East-Southeast	NR
9/9/1992	Northeast	NR
10/26/1992	South-Southeast	NR
11/10/1992	East-Southeast	NR
12/14/1992	East-Northeast	NR
1/15/1993	East-Southeast	NR
2/10/1993	Northwest	NR
3/29/1993	South-Southeast	NR
4/27/1993	Northeast	NR
5/10/1993	West-Southwest	NR
6/18/1993	West-Southwest	NR
7/28/1993	Southwest	NR
8/30/1993	West-Northwest	NR
9/28/1993	South-Southwest	NR
10/31/1993	South-Southwest	NR
2/11/1994	South-Southwest	NR
3/13/1994	West	NR
2/15/1995	NR	NR
5/24/1995	East-Southeast	0.002
8/25/1995	Northwest	0.006
11/28/1995	North	0.006
2/26/1996	East	0.012
5/23/1996	Flat Gradient	Flat Gradient
8/23/1996	Flat Gradient	Flat Gradient
3/21/1997	South-Southeast	0.005
8/20/1997	South-Southwest	0.001
11/21/1997	South-Southwest	0.002
2/12/1998	East	0.024
7/31/1998	Northwest	0.01
2/17/1999	Southeast	0.007
8/24/1999	South-Southwest	0.013
3/1/2000	South-Southeast	0.005
9/26/2000	South-Southeast	0.002
12/27/2000	West-Southwest	0.003
2/9/2001	West-Southwest	0.003
4/17/2001	South-Southwest	0.015

Table 3: Historical Groundwater Flow Directions and Gradients
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case #RO452

Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient (ft/ft)
7/17/2001	South-Southwest	0.003
12/21/2001	East	0.002
3/6/2002	East	0.003
4/26/2002	Southeast	0.003
9/27/2002	South	0.013
12/27/2002	Southeast	0.011
3/12/2003	South-Southeast	0.008
6/28/2003	South	0.001
9/30/2003	Southwest	0.002
12/5/2003	West	0.009
3/10/2004	South-Southeast	0.003
6/21/2004	Southeast	0.004
9/17/2004	Variable	0.001-0.007
12/13/2004	East	0.002
3/3/2005	East	0.02
6/23/2005	Variable	0.02-0.005
9/16/2005	Northeast	0.005
12/27/2005	East-Northeast	0.007
3/2/2006	Northeast	0.005
6/23/2006	Northeast	0.004
9/19/2006	North-Northeast	0.004
12/19/2006	North-Northeast	0.006
3/29/2007	North-Northeast	0.004
6/5/2007	South-Southeast	0.002
9/25/2007	North-Northeast	0.005
12/26/2007	Northeast	0.005
3/25/2008	Northeast	0.005
6/10/2008	Northeast	0.005
9/9/2008	North-Northeast	0.005
12/4/2008	North-Northeast	0.005
3/5/2009	East-Northeast	0.008
6/2/2009	Northeast	0.005
10/26/2009	Northeast	0.006
3/16/2010	Northeast	0.006
7/30/2010	Northwest	0.004

Notes:
ft/ft = feet per foot
NR = not recorded

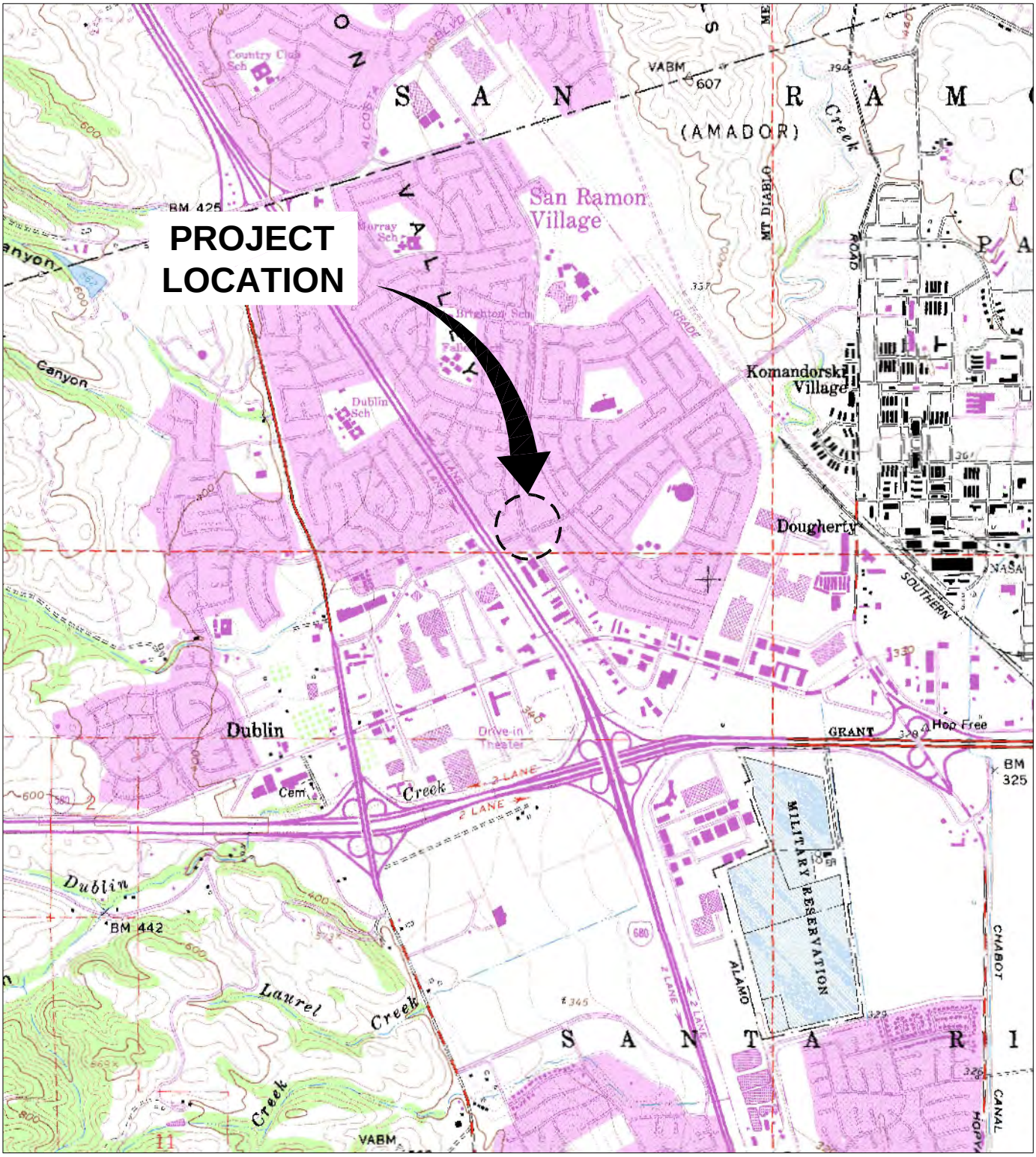
Table 4: Most Recent and Maximum Concentration of Contaminants Detected in Soil and Groundwater
ARCO Service Station No. 6041
7249 Village Parkway, Dublin, California
Local Case #RO452

Analyte	Soil [1]								Groundwater						
	Most Recent Concentration Observed (mg/kg)	Sample Depth (feet bgs)	Sample Date	Maximum Concentration Observed (mg/kg)	Sample Depth (feet bgs)	Sample Date	Commercial ESL[2] (mg/kg)	RWQCB Region 2 ESL for Shallow Soils (<3m bgs)[3] (µg/L)	Most Recent Concentration Observed (µg/L)	Sample Date	Maximum Concentration Observed (µg/L)	Sample Date	Commerical ESL for the Protection of the Vapor Intrusion Pathway[4] (µg/L)	State of California Maximum Contaminant Level (µg/L)	RWQCB Region 2 ESL for Shallow Soils (<3m bgs)[3] (µg/L)
TPHg	40 (SB-3-8)	8	11/22/2010	**8,300 (SW-6)**	8	7/27/2001	450	83	73 (MW-8)	7/30/2010	**29,700 (MW-3)**	12/27/2000	NA	NA	100
Benzene	0.170 (SB-3-8)	8	11/22/2010	**64 (SW-6)**	8	7/27/2001	0.27	0.044	8.6 (MW-8)	7/30/2010	**2,590 (MW-3)**	2/9/2001	1,800	1	1.0
Toluene	<.024 (SB-3-8)	8	11/22/2010	9.30 (DISP-2)	3	7/27/2001	210	2.9	<2.5 (MW-3)	7/30/2010	3,530 (MW-3)	2/9/2001	530,000	150	40
Ethylbenzene	0.270 (SB-3-8)	8	11/22/2010	**180 (SW-6)**	8	7/27/2001	5	3.3	<2.5 (MW-3)	7/30/2010	1,100 (MW-3)	7/17/2001	175,000	300	30
Xylenes	0.048 (SB-3-8)	8	11/22/2010	**320 (SW-4)**	8	7/27/2001	100	2.3	<5 (MW-3)	7/30/2010	7,080 (MW-3)	2/9/2001	160,000	1750	20
MTBE	0.093 (SB-3-8)	8	11/22/2010	6 (SW-8)	8	7/27/2001	65	0.023	5.3 (MW-5)	7/30/2010	**85,500 (MW-3)**	2/9/2001	80,000	13	5.0
TPHd	-	-	-	<9.9 (OV-1)	6	7/26/2001	450	83	-	-	-	-	-	NA	NA

[1] Soil results are reported from the vadose zone, which does not exceed 8 feet bgs
[2] ESL for Direct Contact to a Commercia/Industrial Receptor (Table K-2)
[3] ESL for Shallow Soils (<3 meters) where groundwater is a current or potential source of drinking water-commerical/industrial land use (Table A)
[4] ESL for Groundwater for the Evaluation of Potential Vapor Intrusion Concerns (Table E-1)
Bold = exceedances of commercial ESL
ESL = Environmental Screening Levels
RWQCB = Regional Water Quality Control Board
MCL = Maximum Contaminant Level
TPHg = Total Petroleum Hydrocarbons as Gasoline
MTBE = methyl tert-butyl ether
TPHd = Total Petroleum Hydrocarbons as Diesel
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
bgs = below ground surface
< = not detected above laboratory detection limits
NA = not applicable
GRO Commerical ESL values are listed as TPH (gasolines) in Table A of *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*
DRO Commercial ESL values are listed as TPH (middle distillates) in Table A of Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater

ARCADIS

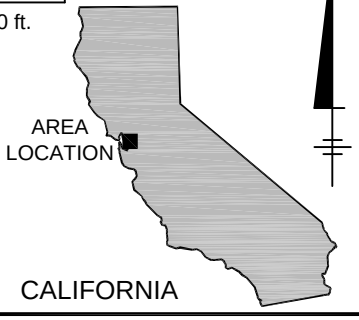
Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., DUBLIN, CALIFORNIA, 1961, PHOTOREVISED 1980.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA

BP 6041 CLOSURE REPORT

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(Opt)ON=*;OFF=*REF*
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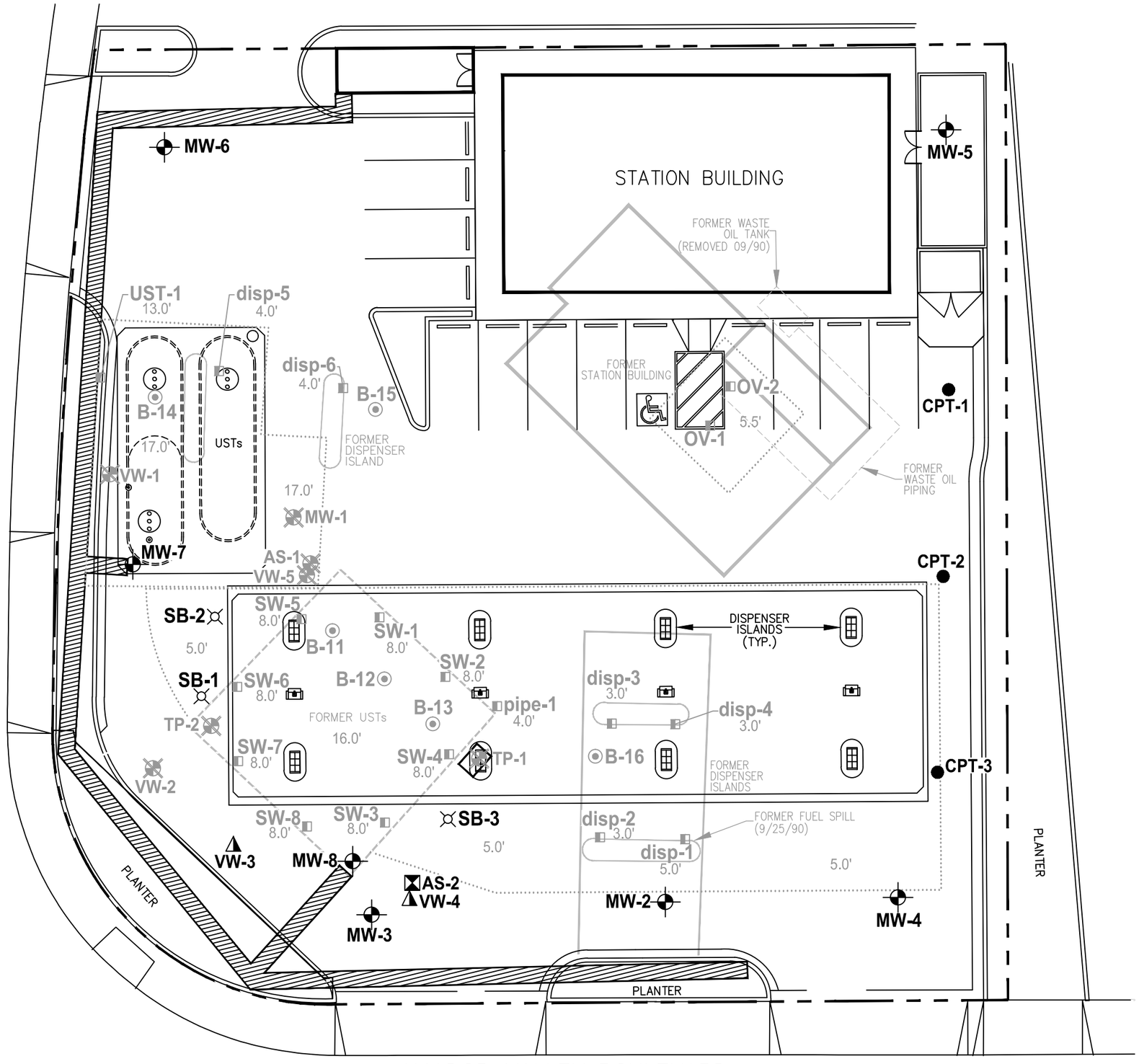

LEGEND

- MW-4 MONITORING WELL
- VW-4 VAPOR EXTRACTION WELL
- AS-2 AIR SPARGE WELL
- MW-1 ABANDONED WELL
- SW-6 8.0' HISTORICAL SOIL SAMPLE AND DEPTH (FT BGS) [CAMBRIA, 2001]
- B-11 HISTORICAL SOIL BORING (RESNA, AUGUST 1993)
- CPT-1 CPT BORING (ARCADIS, 2010)
- SB-2 SOIL BORING (ARCADIS, 2010)
- 5.0' EXCAVATION AND DEPTH (FT BGS)
- REMEDIATION PIPING TRENCH
- CPT CONE PENETROMETER TEST
- FT BGS FEET BELOW GROUND SURFACE

NOTES:

1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.
2. PIPE-2 SAMPLE LOCATION IS UNKNOWN AND NOT SHOWN ON MAP.
3. ENTIRE SITE WAS EXCAVATED TO 2.5 FT BGS DUE TO GEOTECHNICAL REASONS DURING THE UST REMOVAL ACTIVITIES IN 2001.

0 20' 40'

GRAPHIC SCALE

STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA
BP 6041 CLOSURE REPORT

SITE PLAN WITH HISTORICAL EXCAVATION LIMITS AND SOIL SAMPLE LOCATIONS

ARCADIS

FIGURE 2

CITY: PETALUMA, CA DIV/GROUP: H. PHILLIPS DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(Opt)ON=*;OFF=*REF*
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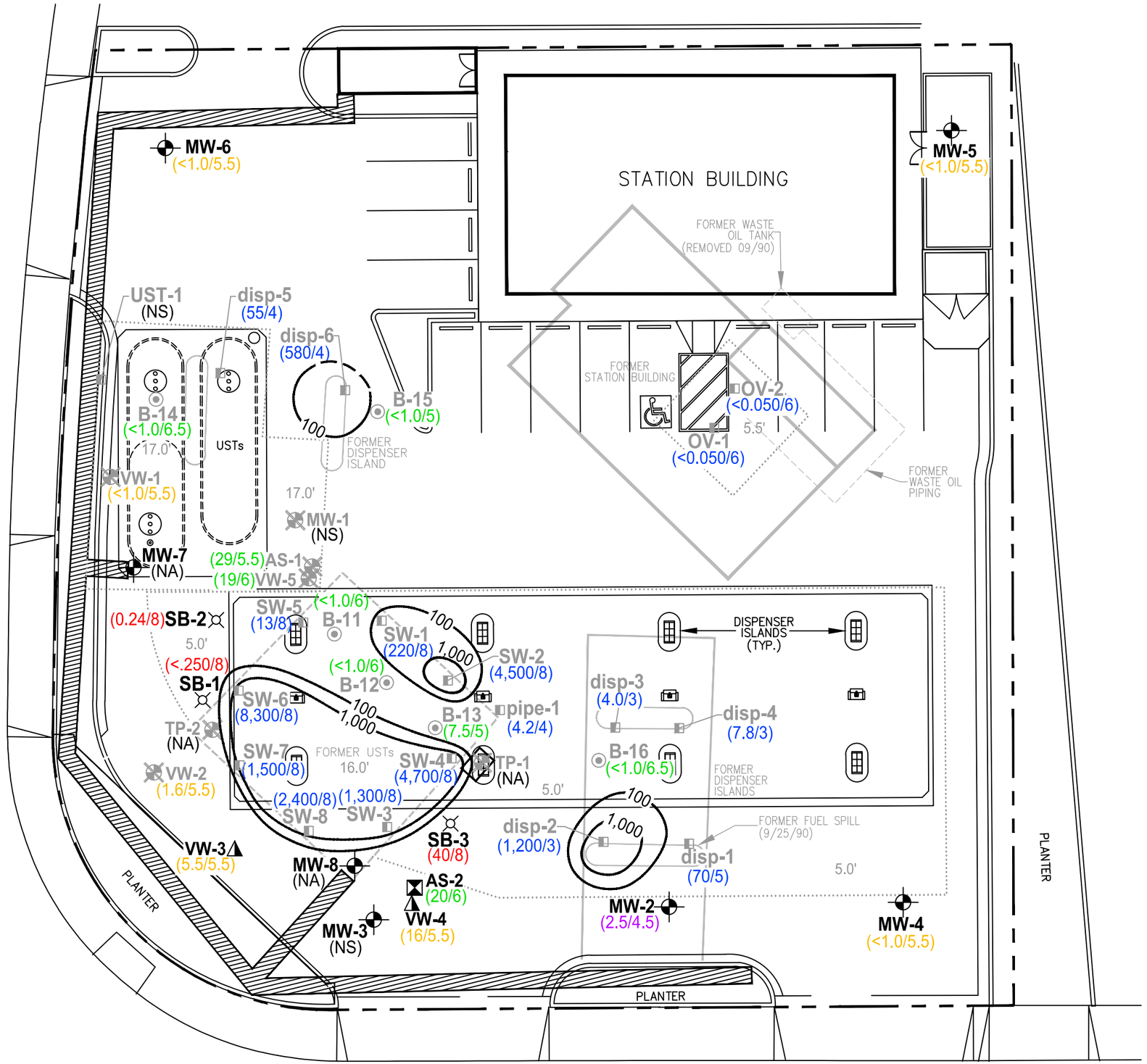

LEGEND

MW-4	MONITORING WELL
VW-4	VAPOR EXTRACTION WELL
AS-2	AIR SPARGE WELL
MW-1	ABANDONED WELL
SW-6	HISTORICAL SOIL SAMPLE (CAMBRIA, 2001)
B-11	HISTORICAL SOIL BORING (RESNA, AUGUST 1993)
SB-2	SOIL BORING (ARCADIS, 2010)
5.0'	EXCAVATION AND DEPTH (FT BGS)
	REMEDIATION PIPING TRENCH
FT BGS	FEET BELOW GROUND SURFACE
(<1.0/5.5)	(TPHg CONCENTRATION/SAMPLE DEPTH IN FT BGS)
100	TPHg CONCENTRATION CONTOUR IN mg/kg (DASHED WHERE INFERRED)
(2.5)	TPHg CONCENTRATION IN mg/kg IN 1991
(<1.0)	TPHg CONCENTRATION IN mg/kg IN 1992
(<1.0)	TPHg CONCENTRATION IN mg/kg IN 1993
(7.8)	TPHg CONCENTRATION IN mg/kg IN 2001
(<.250)	TPHg CONCENTRATION IN mg/kg IN 2010
(NS)	NOT SAMPLED AT THE SPECIFIED INTERVAL
(NA)	NO AVAILABLE DATA
<	BELOW LABORATORY REPORTING LIMIT
TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
mg/kg	MILLIGRAMS PER KILOGRAM

NOTES:

1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.
2. ALL CONCENTRATIONS ARE REPORTED FROM THE VADOSE ZONE, WHICH DOES NOT EXCEED 8 FT BGS.
3. CONCENTRATIONS ARE BASED UPON THE HIGHEST DETECTION FROM THE BORING IN THE VADOSE ZONE.
4. PIPE-2 SAMPLE LOCATION IS UNKNOWN AND NOT SHOWN ON MAP.
5. ENTIRE SITE WAS EXCAVATED TO 2.5 FT BGS DUE TO GEOTECHNICAL REASONS DURING THE UST REMOVAL ACTIVITIES IN 2001.

0 20' 40'

GRAPHIC SCALE

STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA
BP 6041 CLOSURE REPORT

HISTORICAL LATERAL EXTENT OF TPHg SOIL IMPACTS

ARCADIS

FIGURE 3

CITY: PETALUMA, CA DIV/GROUP: H. PHILLIPS DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(Opt)ON=*;OFF=*REF*
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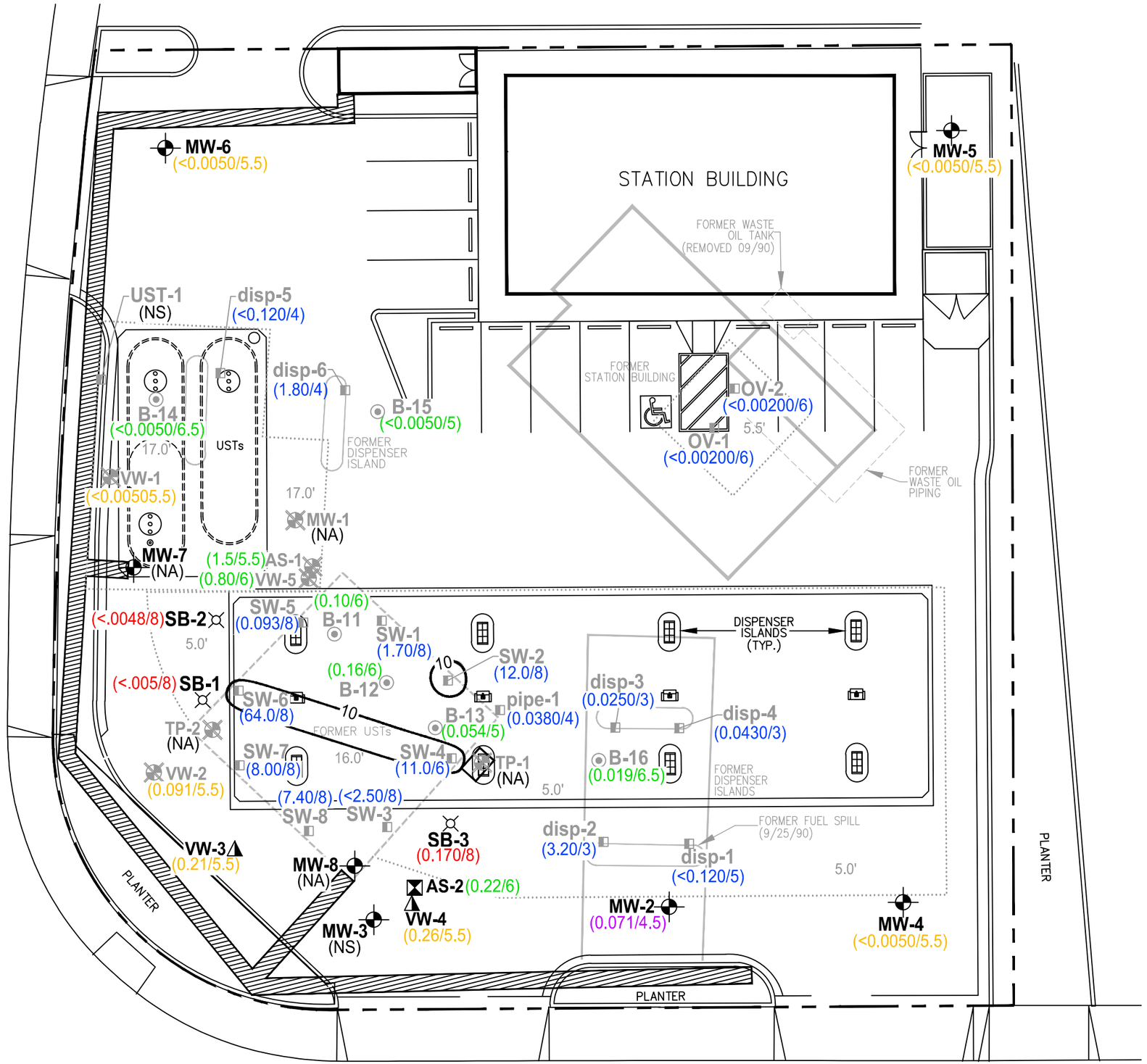

LEGEND

MW-4	MONITORING WELL
VW-4	VAPOR EXTRACTION WELL
AS-2	AIR SPARGE WELL
MW-1	ABANDONED WELL
SW-6	HISTORICAL SOIL SAMPLE (CAMBRIA, 2001)
B-11	HISTORICAL SOIL BORING (RESNA, AUGUST 1993)
SB-2	SOIL BORING (ARCADIS, 2010)
5.0'	EXCAVATION AND DEPTH (FT BGS)
	REMEDIATION PIPING TRENCH
FT BGS	FEET BELOW GROUND SURFACE
(<0.0050/5.5)	(BENZENE CONCENTRATION IN mg/kg/SAMPLE DEPTH IN FT BGS)
10	BENZENE CONCENTRATION CONTOUR IN mg/kg (DASHED WHERE INFERRED)
(0.071)	BENZENE CONCENTRATION IN mg/kg IN 1991
(<0.0050)	BENZENE CONCENTRATION IN mg/kg IN 1992
(0.019)	BENZENE CONCENTRATION IN mg/kg IN 1993
(<0.00200)	BENZENE CONCENTRATION IN mg/kg IN 2001
(0.170)	BENZENE CONCENTRATION IN mg/kg IN 2010
(NS)	NOT SAMPLED AT THE SPECIFIED INTERVAL
(NA)	NO AVAILABLE DATA
<	BELOW LABORATORY REPORTING LIMIT
mg/kg	MILLIGRAMS PER KILOGRAM

NOTES:

1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.
2. ALL CONCENTRATIONS ARE REPORTED FROM THE VADOSE ZONE, WHICH DOES NOT EXCEED 8 FT BGS.
3. CONCENTRATIONS ARE BASED UPON THE HIGHEST DETECTION FROM THE BORING IN THE VADOSE ZONE.
4. PIPE-2 SAMPLE LOCATION IS UNKNOWN AND NOT SHOWN ON MAP.
5. ENTIRE SITE WAS EXCAVATED TO 2.5 FT BGS DUE TO GEOTECHNICAL REASONS DURING THE UST REMOVAL ACTIVITIES IN 2001.

0 20' 40'

GRAPHIC SCALE

STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA
BP 6041 CLOSURE REPORT

HISTORICAL LATERAL EXTENT OF BENZENE SOIL IMPACTS

ARCADIS

FIGURE
4

CITY: PETALUMA, CA DIV/GROUP: H. PHILLIPS DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(Opt)ON=*;OFF=*REF*
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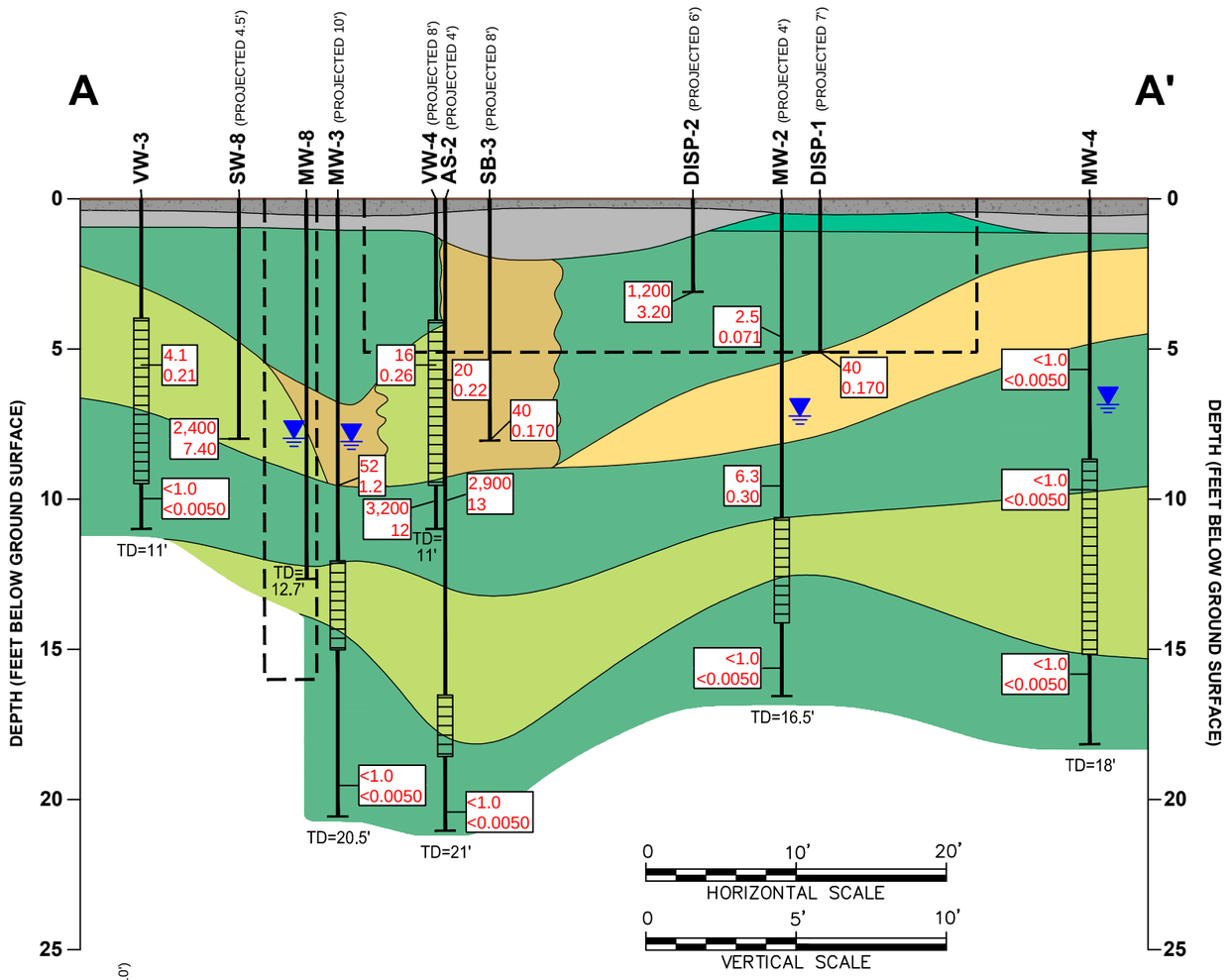

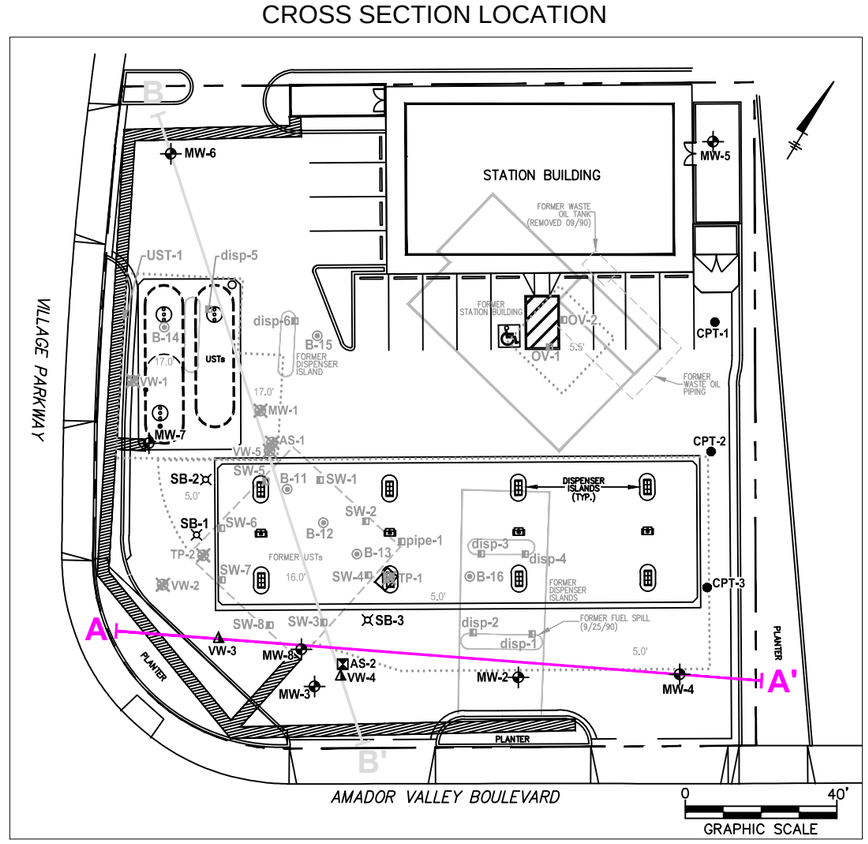

LEGEND

WELL / SOIL BORING ID
(PROJECTED DISTANCE IN FEET FROM CROSS SECTION LINE)

GEOLOGIC CONTACT

WATER LEVEL FROM 3Q10 GROUNDWATER MONITORING REPORT

LABORATORY ANALYZED SOIL SAMPLE RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)

WELL SCREEN

TOTAL DEPTH IN FEET

ASPHALT

FILL

CLAY (SANDY CLAY, SILTY CLAY) (CL)

FAT CLAY (CH)

SILTY SAND (SM)

WELL GRADED SAND (SW)

CLAYEY SAND (SC)

SILT (ML)

POORLY GRADED SAND (SP)

83 — TPHg ENVIRONMENTAL SCREENING LEVEL (mg/kg)

0.044 — BENZENE ENVIRONMENTAL SCREENING LEVEL (mg/kg)

EXCAVATED AREA

TPHg — TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

NOTE:

1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.

STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA
BP 6041 CLOSURE REPORT

VERTICAL EXTENT OF TPHg AND BENZENE SOIL IMPACTS; (GEOLOGIC CROSS SECTION A-A')

ARCADIS

FIGURE
5

CITY: PETALUMA, CA DIV/GROUP: H. PHILLIPS DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(Opt)ON=*:OFF=*REF*
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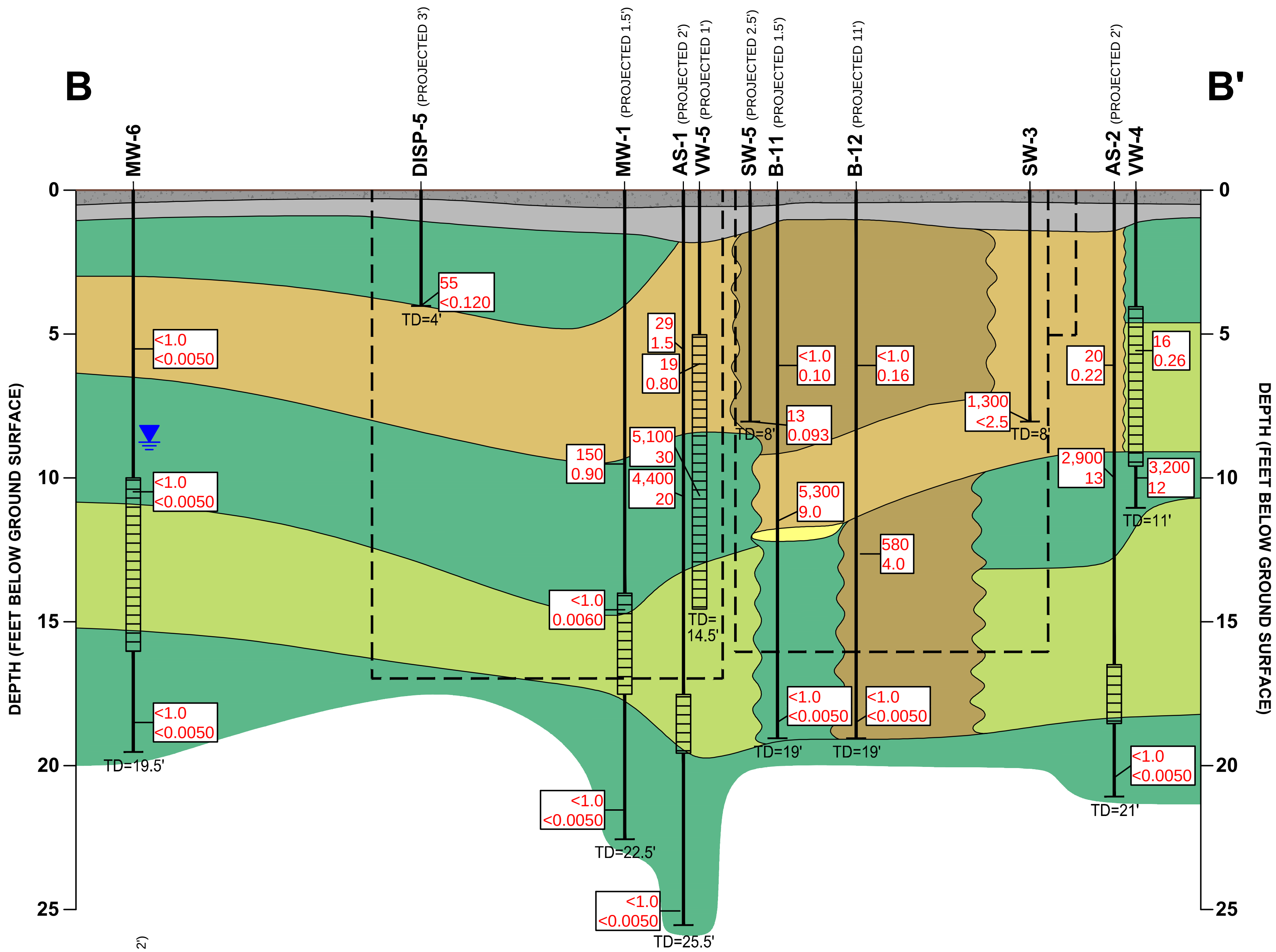
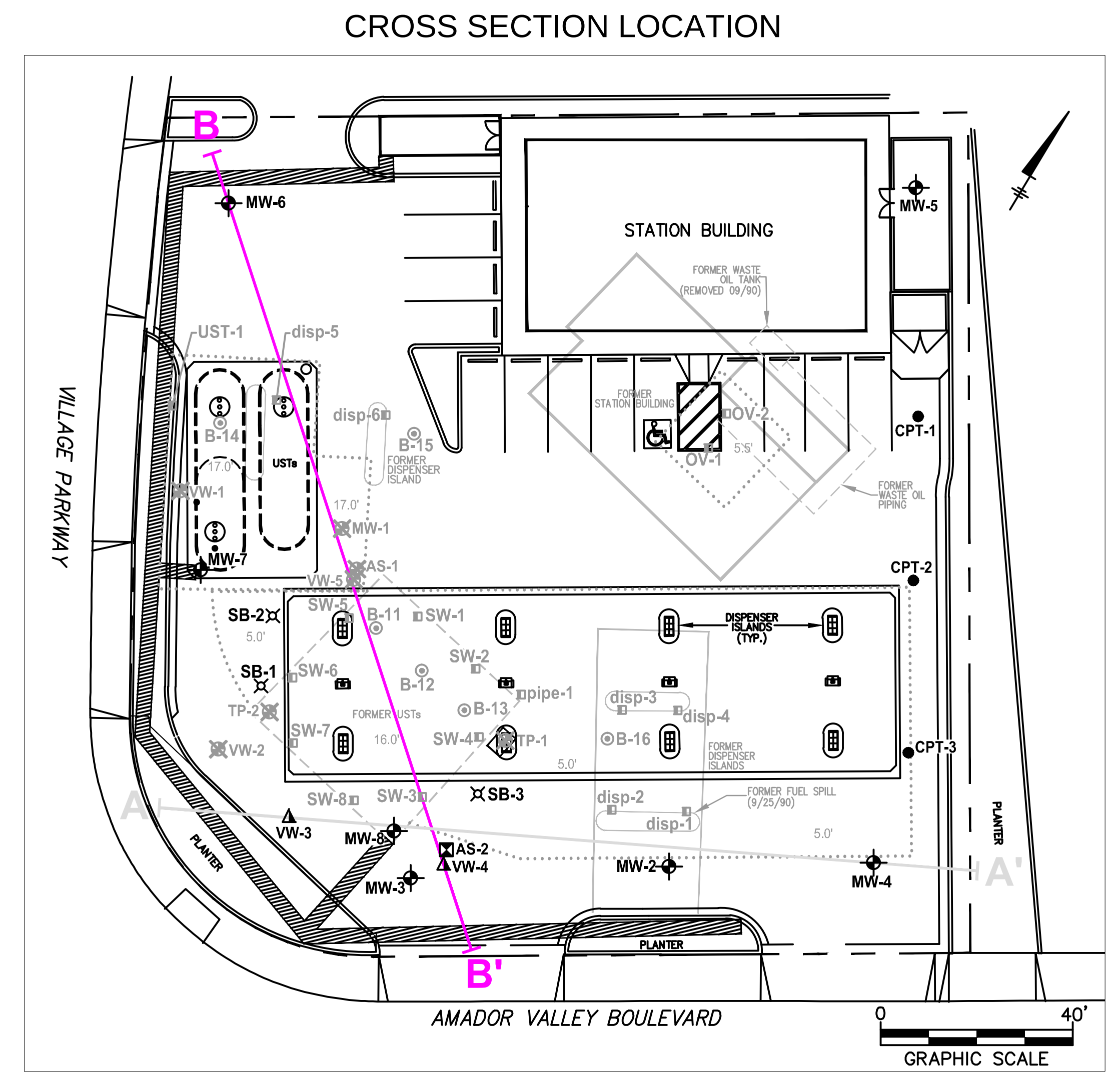




LEGEND

AS-1 (PROJECTED 2') — WELL / SOIL BORING ID (PROJECTED DISTANCE IN FEET FROM CROSS SECTION LINE)

GEOLOGIC CONTACT

WATER LEVEL FROM 3Q10 GROUNDWATER MONITORING REPORT

TPHg / Benzene — LABORATORY ANALYZED SOIL SAMPLE RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)

WELL SCREEN

TD=25.5' — TOTAL DEPTH IN FEET

ASPHALT

FILL

CLAY (SANDY CLAY, SILTY CLAY) (CL)

SILTY SAND (SM)

WELL GRADED SAND (SW)

CLAYEY SAND (SC)

SILT (ML)

POORLY GRADED SAND (SP)

83 — TPHg ENVIRONMENTAL SCREENING LEVEL (mg/kg)

0.044 — BENZENE ENVIRONMENTAL SCREENING LEVEL (mg/kg)

EXCAVATED AREA

TPHg — TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

NOTE:

1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.

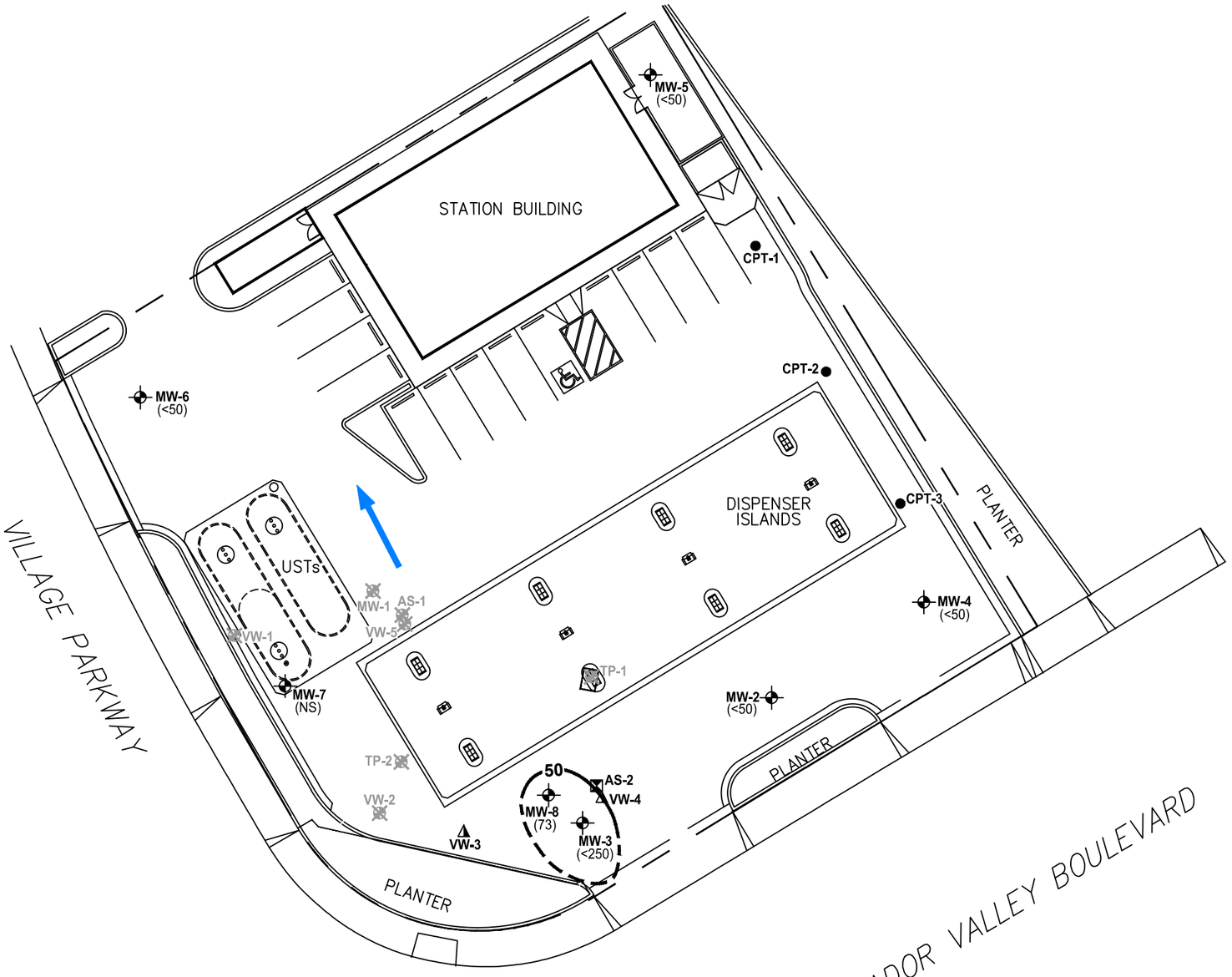
STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA

BP 6041 CLOSURE REPORT

VERTICAL EXTENT OF TPHg AND BENZENE SOIL IMPACTS; (GEOLOGIC CROSS SECTION B-B')

ARCADIS

FIGURE 6



LEGEND

- MW-4 ⊕ MONITORING WELL
- VW-4 ◭ VAPOR EXTRACTION WELL
- AS-2 ⊠ AIR SPARGE WELL
- MW-1 ⊗ ABANDONED WELL
- CPT-1 ● CPT BORING
- (<50) TPHg CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- 50 — — — TPHg CONCENTRATION CONTOUR IN µg/L (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- < BELOW LABORATORY REPORTING LIMIT
- CPT CONE PENETROMETER TEST
- NS NOT SAMPLED
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

NOTE:

BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.

0 30' 60'

GRAPHIC SCALE

STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA
BP 6041 CLOSURE REPORT

EXTENT OF TPHg GROUNDWATER IMPACTS JULY 2010

ARCADIS

FIGURE
7

CITY: PETALUMA, CA DIV/GROUP: H. PHILLIPS DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(OptION=*;OFF=*REF*
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JESSICA ACADVER: 18.0S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 2/3/2011 3:27 PM BY: HARRIS,
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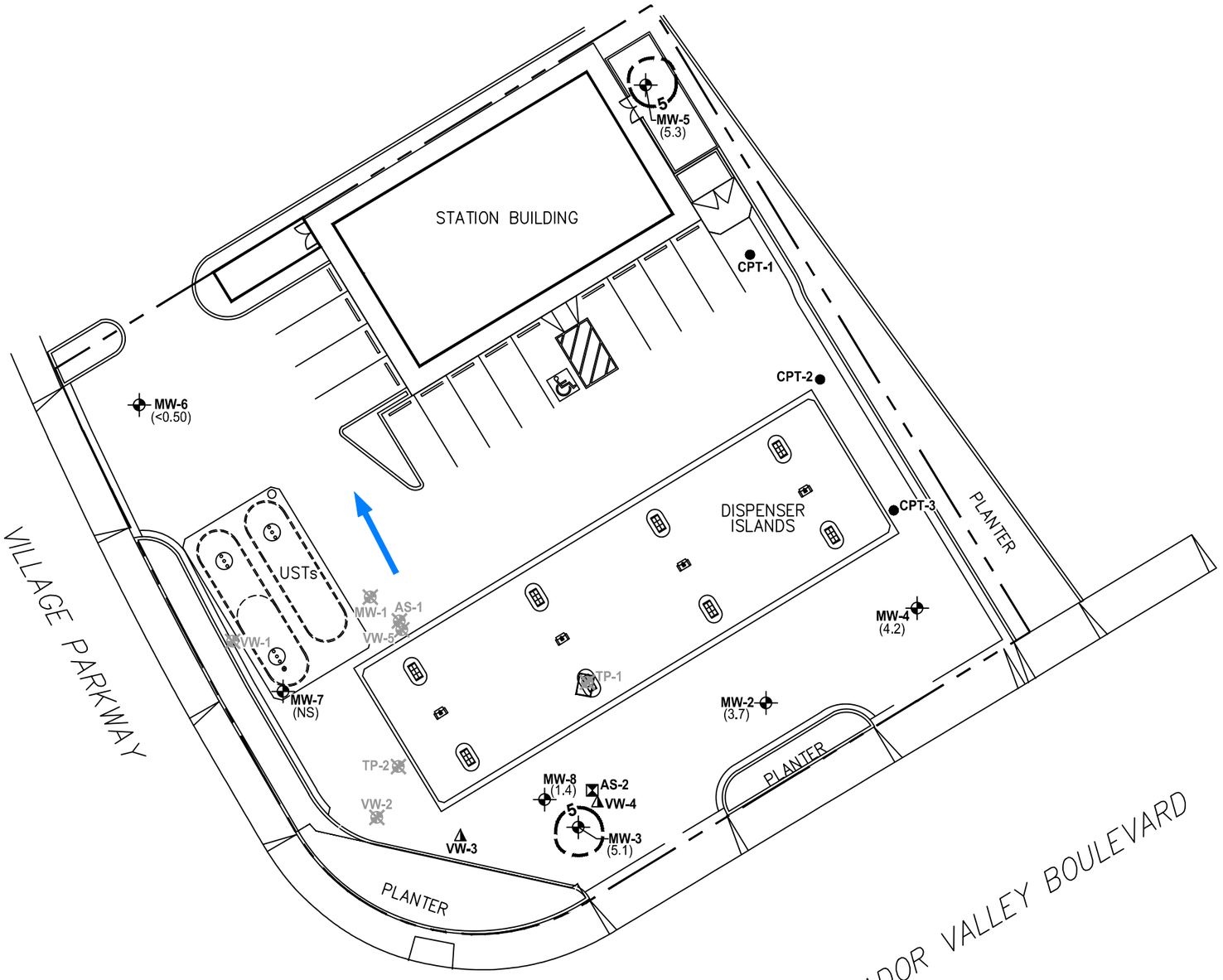

LEGEND

MW-4 ⊕	MONITORING WELL
VW-4 ◭	VAPOR EXTRACTION WELL
AS-2 ⊠	AIR SPARGE WELL
MW-1 ⊗	ABANDONED WELL
CPT-1 ●	CPT BORING
(<0.50)	MTBE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
5 – – –	MTBE CONCENTRATION CONTOUR IN µg/L (DASHED WHERE INFERRED)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
<	BELOW LABORATORY REPORTING LIMIT
CPT	CONE PENETROMETER TEST
NS	NOT SAMPLED
MTBE	METHYL TERTIARY BUTYL ETHER

NOTE:

BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.

0 30' 60'

GRAPHIC SCALE

STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA
BP 6041 CLOSURE REPORT

EXTENT OF MTBE GROUNDWATER IMPACTS JULY 2010

ARCADIS

FIGURE
8

CITY: PETALUMA, CA DIV/GROUP: H. PHILLIPS DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(OptON=*;OFF=*REF* C:\Documents and Settings\jharris\Desktop\ENVCAD\GP09BPNA.C039.Q0000\Closure Report\DWG\GP09BPNAC039-C02.dwg LAYOUT: 8 SAVED: 2/18/2011 3:59 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 2/24/2011 1:25 PM BY: HARRIS, JESSICA
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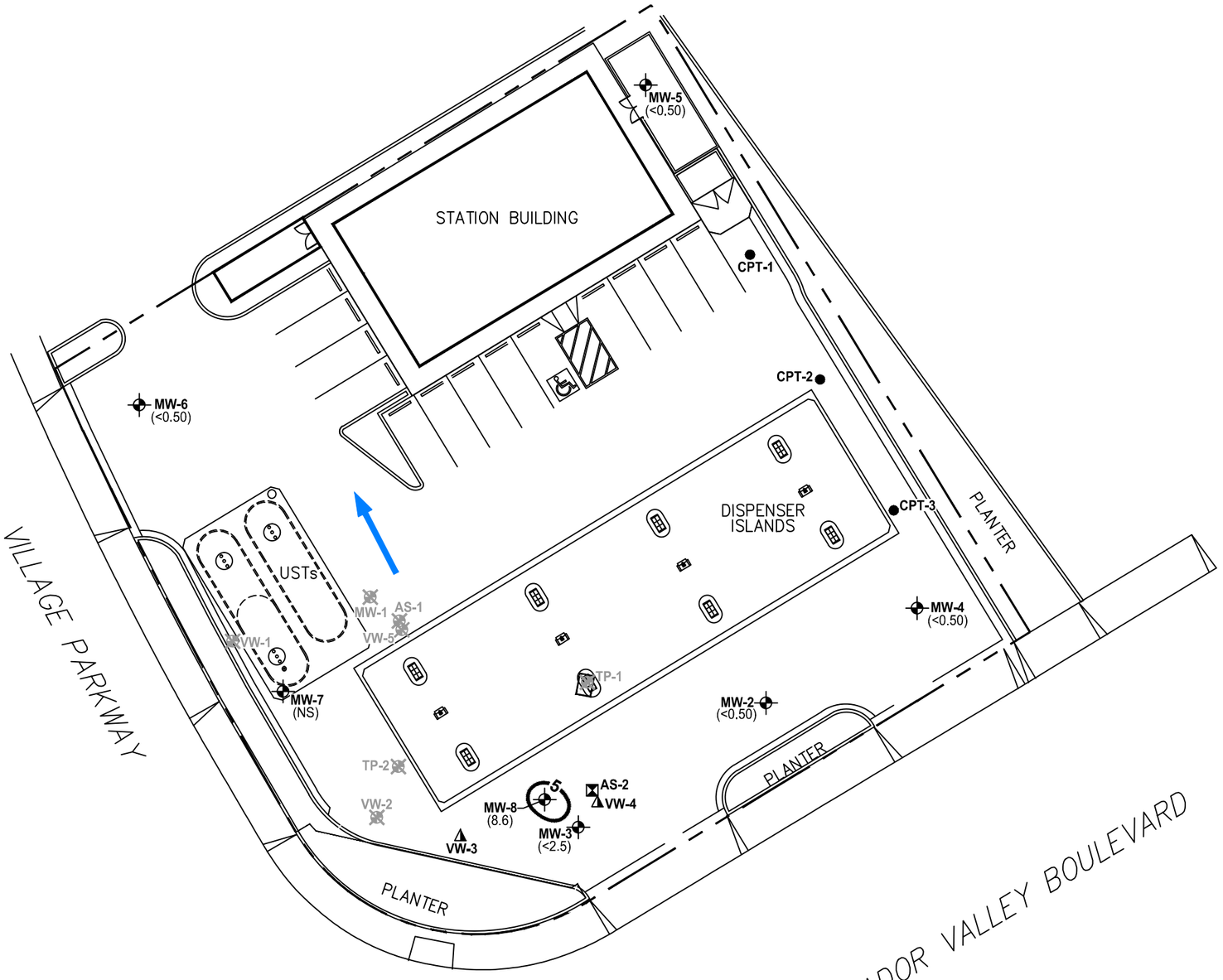

LEGEND

- MW-4 ⊕ MONITORING WELL
- VW-4 ◭ VAPOR EXTRACTION WELL
- AS-2 ⊠ AIR SPARGE WELL
- MW-1 ⊗ ABANDONED WELL
- CPT-1 ● CPT BORING
- (<0.50) BENZENE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- 5 — — — BENZENE CONCENTRATION CONTOUR IN µg/L (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- < BELOW LABORATORY REPORTING LIMIT
- CPT CONE PENETROMETER TEST
- NS NOT SAMPLED

NOTE:

BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 10/21/09, AT A SCALE OF 1"=40'. HISTORICAL SOIL SAMPLE AND EXCAVATION AREA DATA PROVIDED BY CAMBRIA, TITLED "SOIL SAMPLING, OVER EXCAVATION AND REMEDIATION PIPING SITE PLAN" AT A SCALE OF 1"=20'.

0 30' 60'

GRAPHIC SCALE

STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA
BP 6041 CLOSURE REPORT

EXTENT OF BENZENE GROUNDWATER IMPACTS JULY 2010

ARCADIS

FIGURE
9

CITY: PETALUMA, CA DIV/GROUP: H. PHILLIPS DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: L. NEARY LYR:(OptION=*;OFF=*REF*
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JESSICA ACADVER: 18.0S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 2/24/2011 1:27 PM BY: HARRIS,
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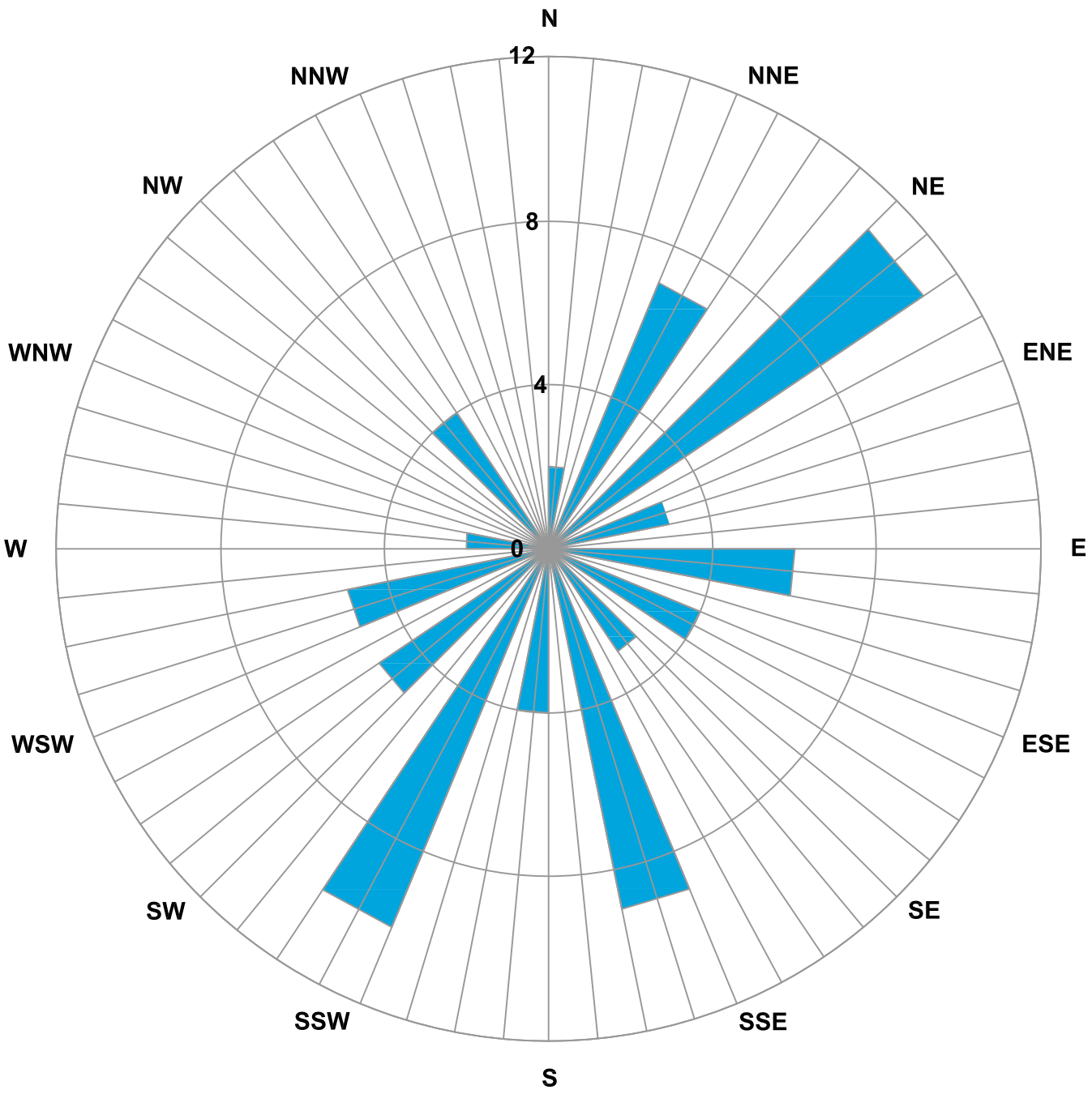


LEGEND

CONCENTRIC CIRCLES REPRESENT 54 MONITORING EVENTS CONDUCTED BETWEEN 10/91 THROUGH 7/10.

GROUNDWATER FLOW DIRECTION

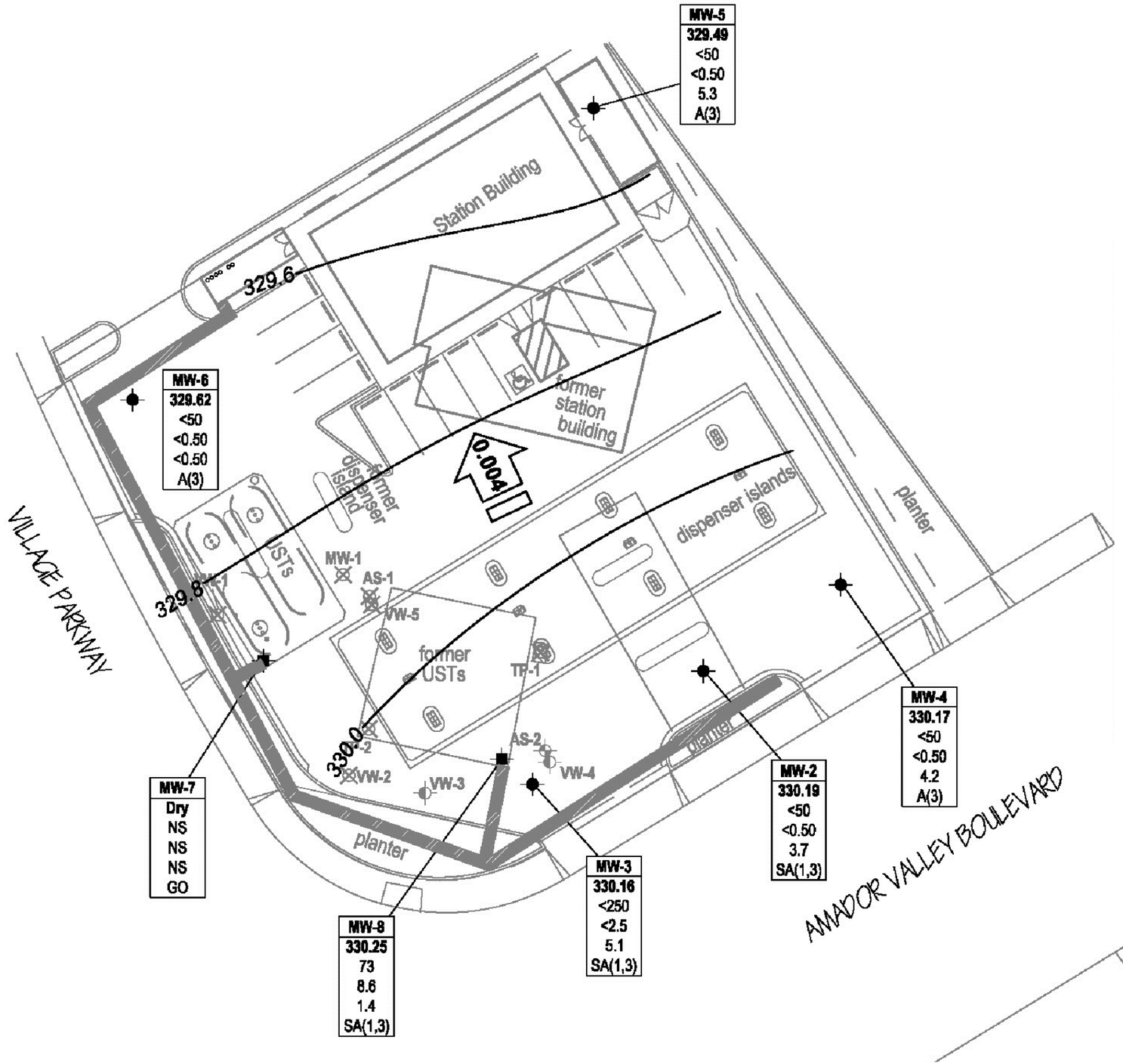
STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA

BP 6041 CLOSURE REPORT

HISTORIC GROUNDWATER FLOW DIRECTION ROSE DIAGRAM

ARCADIS

FIGURE
10



LEGEND

- Monitoring well
- Vapor extraction well
- Air sparge well
- Tank pit observation well
- Abandoned well
- 330.0 — Ground-water elevation contour, (feet above MSL)
- 0.004 — Approximate ground-water flow direction and gradient (ft/ft)
- Well ID — Well designation
- ELEV — Ground-water elevation in ft above MSL
- GRO / Benzene / MTBE — GRO, benzene & MTBE concentration in micrograms per liter (µg/L)
- Q/A — Sampling frequency
- < — Not detected at or above laboratory reporting limits
- NS — Not sampled
- SA(1,3) — Sampled semi-annually, 1st & 3rd quarters
- A(3) — Sampled annually, 3rd quarter
- GO — Gauged only
- Q — Sampled quarterly
- Remediation piping trench
- * — Not used to generate contour map

NOTE:

BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC., DATED 08/16/10, AT A SCALE OF 1"=40".

0 30' 60'

GRAPHIC SCALE

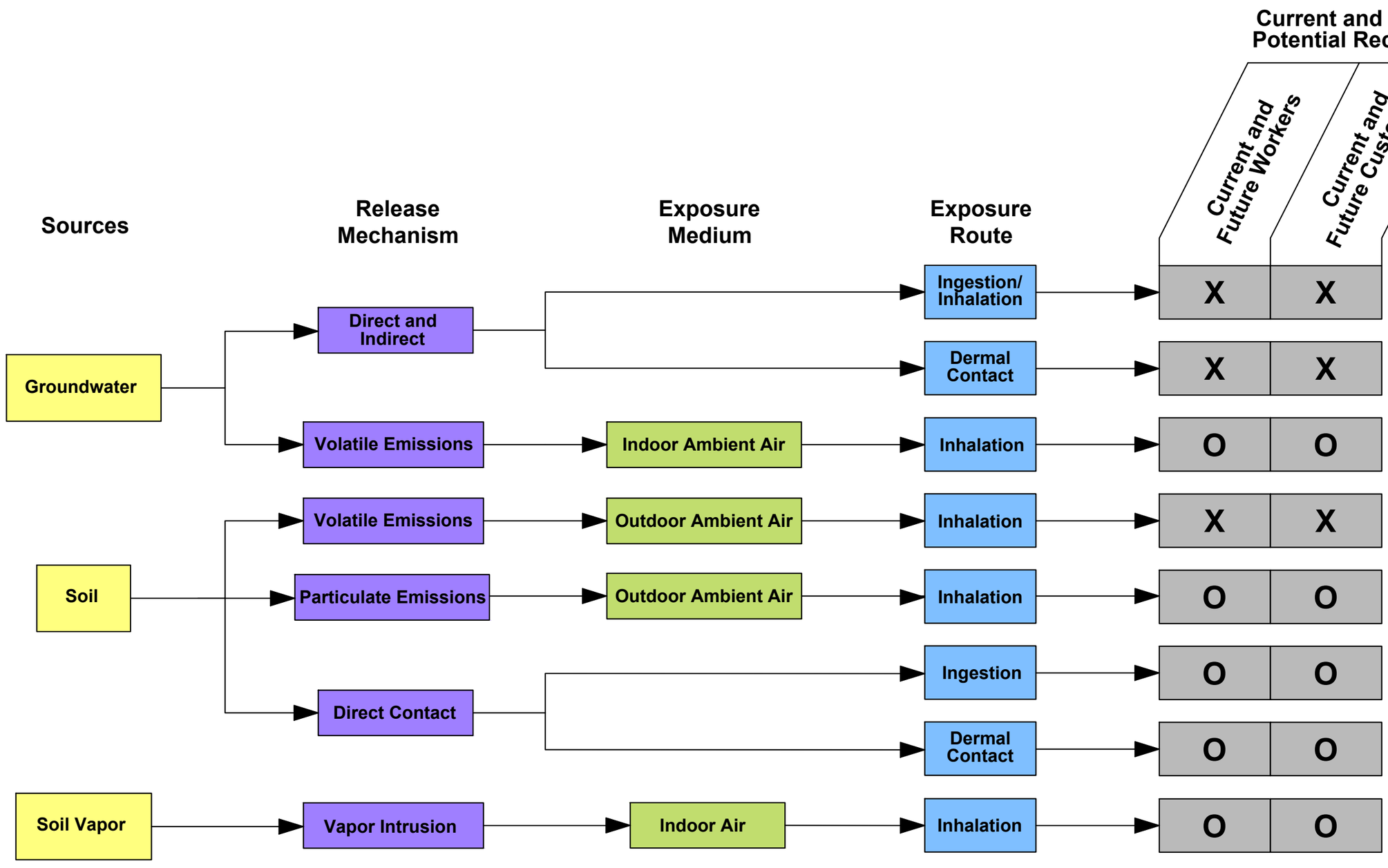
STATION #6041
7249 VILLAGE PARKWAY
DUBLIN, CALIFORNIA

BP 6041 CLOSURE REPORT

GROUNDWATER ELEVATION CONTOUR AND ANALYTICAL SUMMARY MAP JULY 30, 2010

ARCADIS

FIGURE 11



EXPLANATION

X INCOMPLETE PATHWAY

O COMPLETE PATHWAY

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7249 VILLAGE PARKWAY
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POTENTIAL EXPOSURE PATH FLOW CHART

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FIGURE
12

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Appendix A

Groundwater Sampling Protocols

FIELD PROCEDURES FOR GROUNDWATER SAMPLING

The sampling procedures for groundwater monitoring events are contained in this appendix.

Groundwater and Liquid-Phase Petroleum Hydrocarbon Depth Assessment

Prior to measuring the depth to liquid in the well, the well caps are removed and the liquid level is allowed to stabilize. A water/hydrocarbon interface probe is used to assess the liquid-phase petroleum hydrocarbon (LPH) thickness, if present, and a water level indicator is used to measure the groundwater depth in monitoring wells that do not contain LPH. Depth to groundwater or LPH is measured from a datum point at the top of each monitoring well casing. The datum point is typically a notch cut in the north side of the casing edge. If a water level indicator is used, the tip is subjectively analyzed for hydrocarbon sheen.

Subjective Analysis of Groundwater

Prior to purging, a water sample is collected from the monitoring well for subjective assessment. The sample is retrieved by gently lowering a clean, disposable bailer to approximately one-half the bailer length past the air/liquid interface. The bailer is then retrieved, and the sample contained within the bailer is examined for floating LPH and the appearance of a LPH sheen.

Monitoring Well Sampling

In many cases, determining whether to purge or not to purge wells prior to sample collection is made in the field and is often based on depth to water relative to the screen interval of the well. Site-specific field data sheets present details associated with the purge method and equipment used.

Monitoring wells, when purged, use a pump or bailer until pH, temperature, and conductivity of the purge water has stabilized and a minimum of three well volumes of water has been removed. Field measuring equipment is calibrated and maintained according to the manufacturers' instructions. If three well volumes cannot be removed in one half hour's time, the well is allowed to recharge to 80% of original level. After recharging, a groundwater sample is then collected from each of the wells using disposable bailers.

A Teflon bailer, electric submersible or bladder pump will be the only equipment used for well sampling. When samples for volatile organic analysis are being collected, the pump flow will be regulated at approximately 100 milliliters per minute to minimize pump effluent turbulence and aeration. Glass bottles of at least 40 milliliters volume and fitted with Teflon-lined septa will be used in sampling for volatile organics. These bottles will be filled completely to prevent air accumulation in the bottle. A positive meniscus forms with the bottle is completely full. A convex Teflon septum will be placed over the positive meniscus to eliminate air. After the bottle is capped, it is inverted and tapped to verify that it contains no air bubbles. The sample containers for other parameters will be filled, filtered as required,

and capped. Glass and plastic bottles used by Stratus to collect groundwater samples are supplied by the laboratory.

Groundwater Sample Labeling and Preservation

Samples are collected in appropriate containers supplied by the laboratory. All required chemical preservation is added to the bottles prior to delivery to Stratus. Sample label information includes a unique sample identification number, job identification number, date and time. After labeling, all groundwater samples are placed in a Ziploc® type bags and placed in an ice chest cooled to approximately 4^{o} Celsius. Upon arriving at Stratus' office the samples are transferred to a locked refrigerator cooled to approximately 4^{o} Celsius. Chemical preservation is controlled by the required analysis and is noted on the chain-of-custody form. Trip and temperature blanks supplied by the laboratory accompany the groundwater sample containers and groundwater samples.

Sample Identification and Chain-of-Custody Procedures

Sample identification and chain-of-custody procedures document sample possession from the time of collection to ultimate disposal. Each sample container submitted for analysis has a label affixed to identify the job number, sampler, date and time of sample collection, and a sample number unique to that sample. This information, in addition to a description of the sample, field measurements made, sampling methodology, names of on-site personnel, and any other pertinent field observations, is recorded in the field records. The samples are analyzed by a California-certified laboratory.

A chain-of-custody formed is used to record possession of the sample from time of collection to its arrival at the laboratory. When the samples are shipped, the person in custody of them relinquishes the samples by signing the chain-of-custody form and noting the time. The sample-control officer at the laboratory verifies sample integrity and confirms that the samples are collected in the proper containers, preserved correctly, and contain adequate volumes for analysis. These conditions are noted on a Laboratory Sample Receipt Checklist that becomes part of the laboratory report upon request.

If these conditions are met, each sample is assigned a unique log number for identification throughout analysis and reporting. The log number is recorded on the chain-of-custody form and in the legally-required log book maintained by the laboratory. The sample description, date received, client's name, and other relevant information is also recorded.

Equipment Cleaning

All reusable sample equipment is cleaned using phosphate-free detergents and rinsed with de-ionized water.

ARCADIS

Appendix B

Concentration versus Time Graphs
for TPHg, Benzene and MTBE

CHART 1: MW-2 Concentration Trends

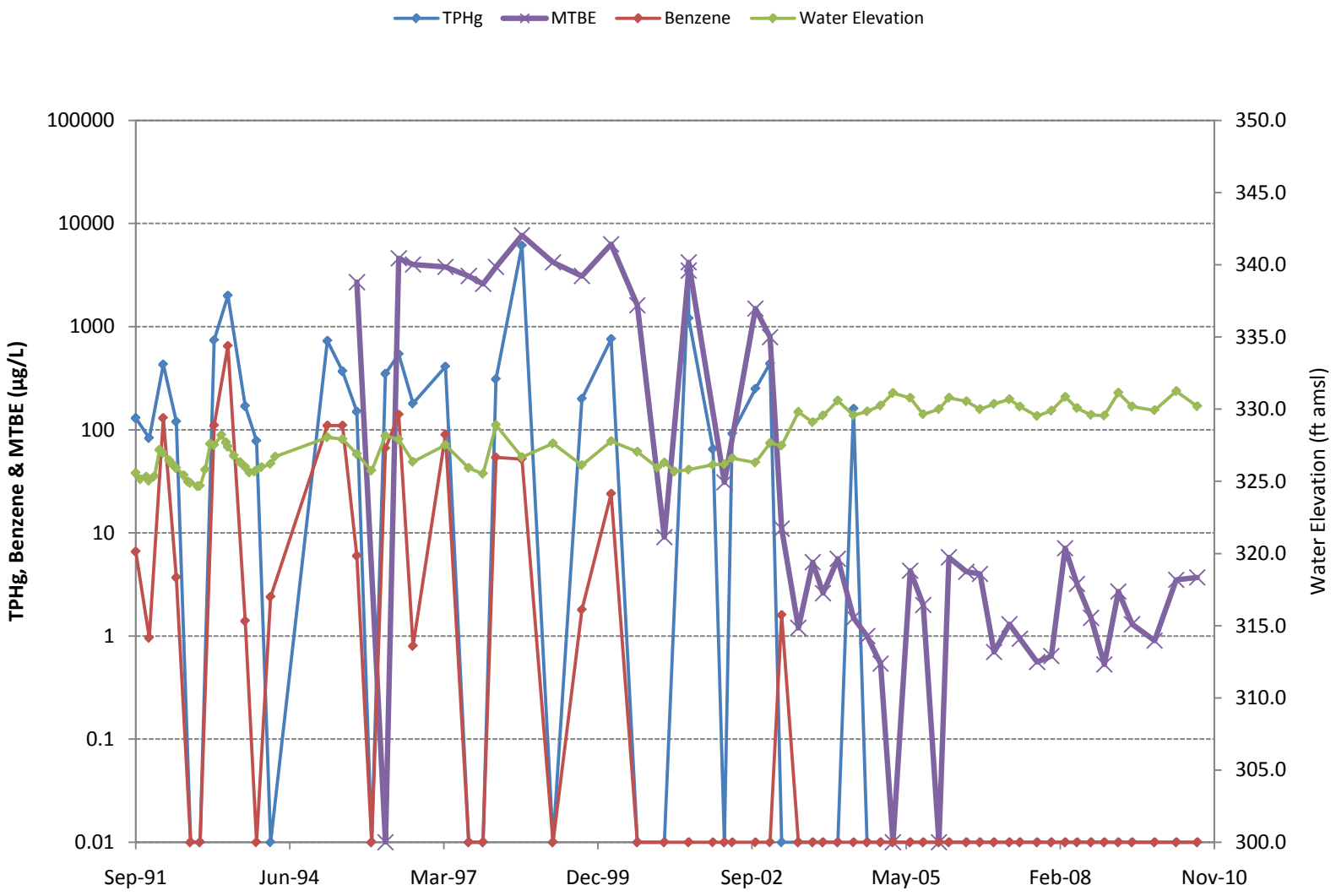


Chart 2: MW-3 Concentration Trends

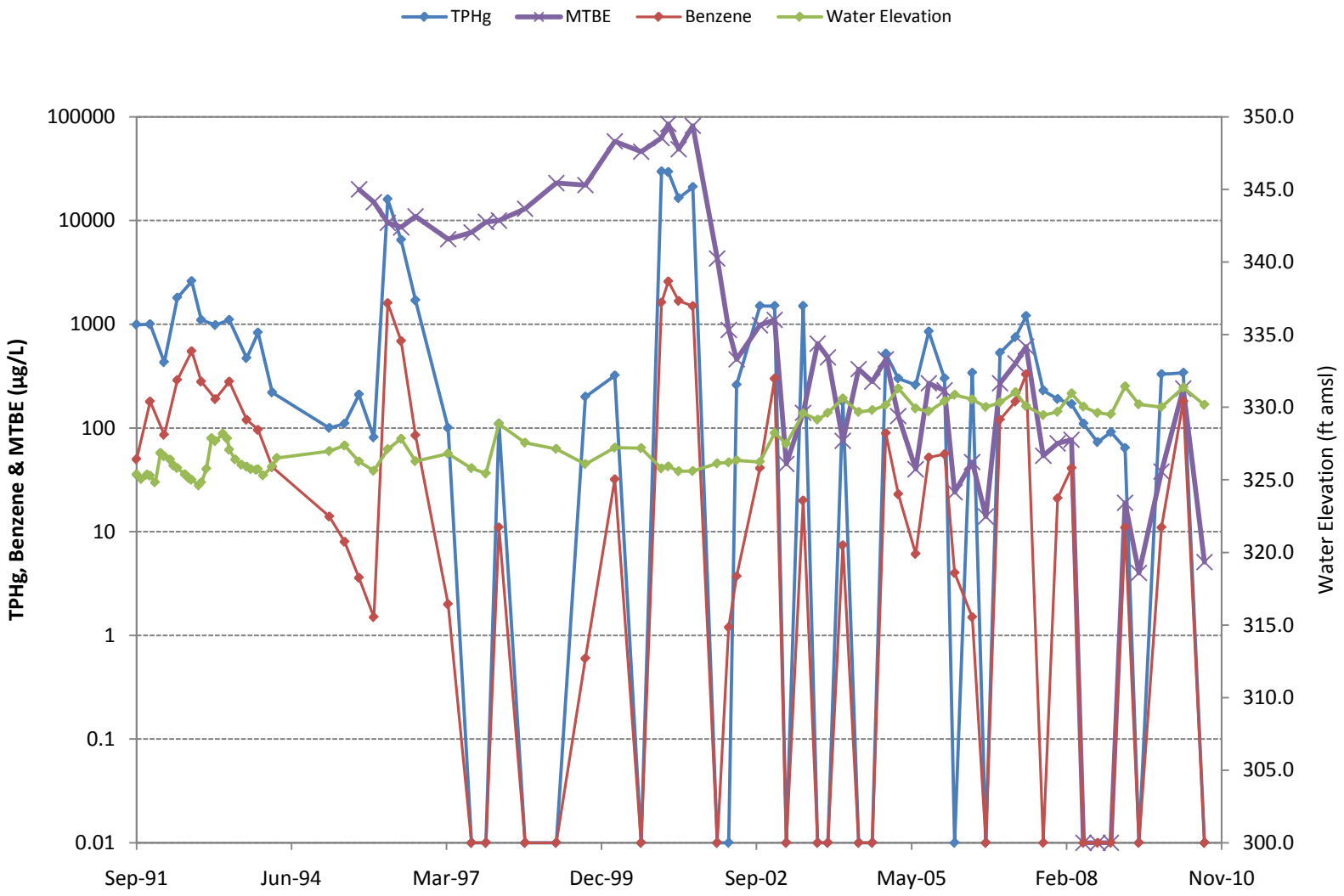


CHART 3: MW-4 Concentration Trends

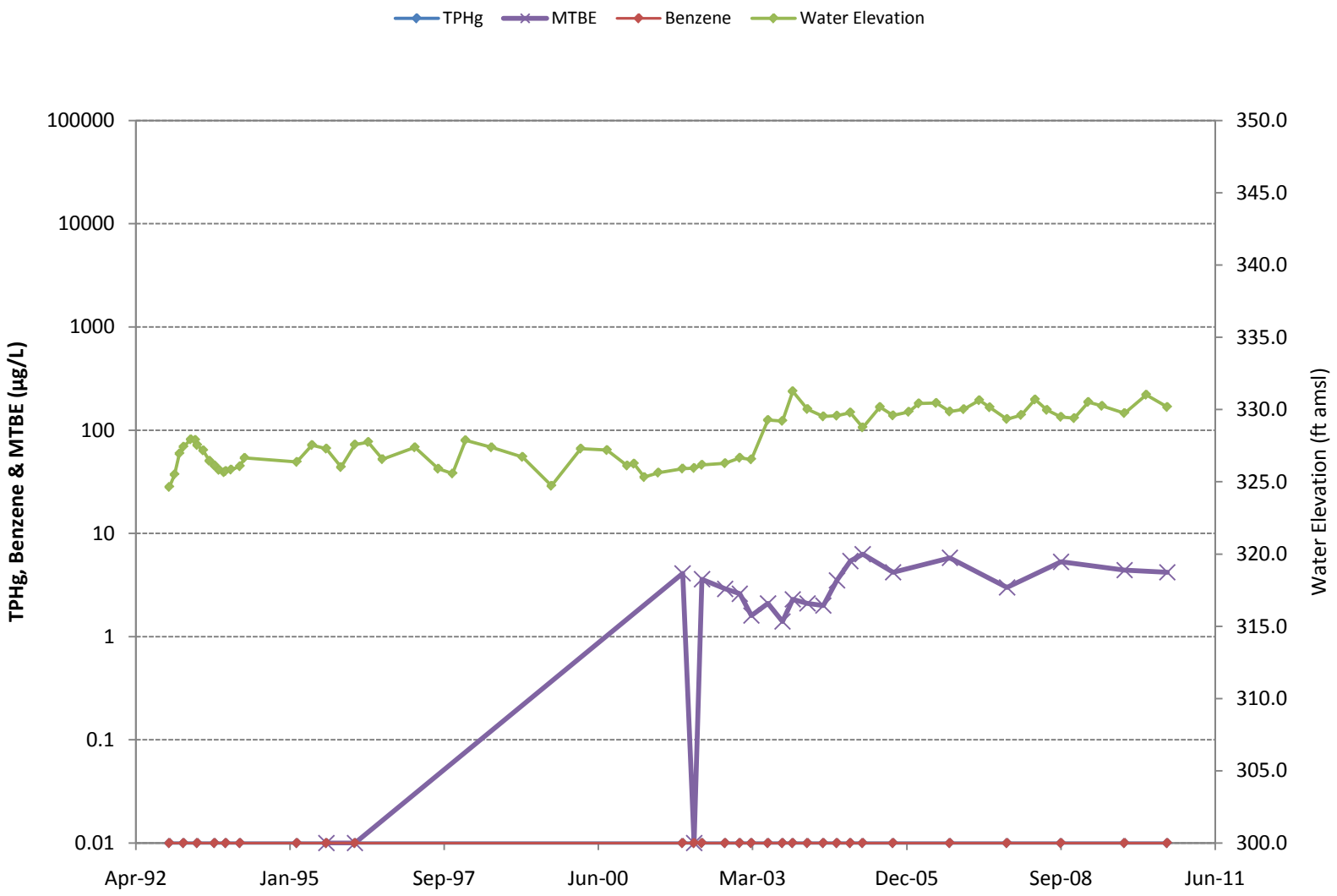


CHART 4: MW-5 Concentration Trends

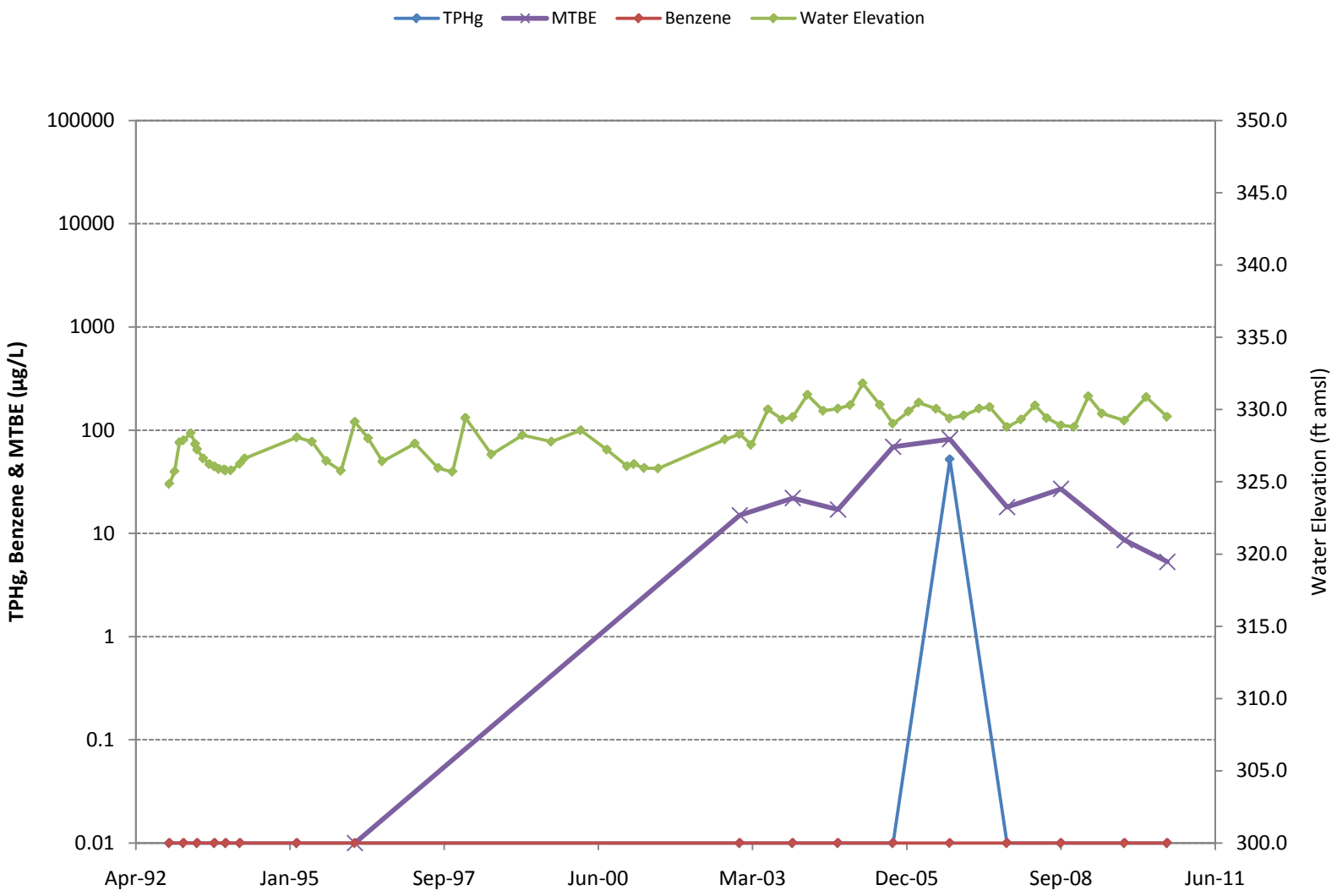


CHART 5: MW-6 Concentration Trends

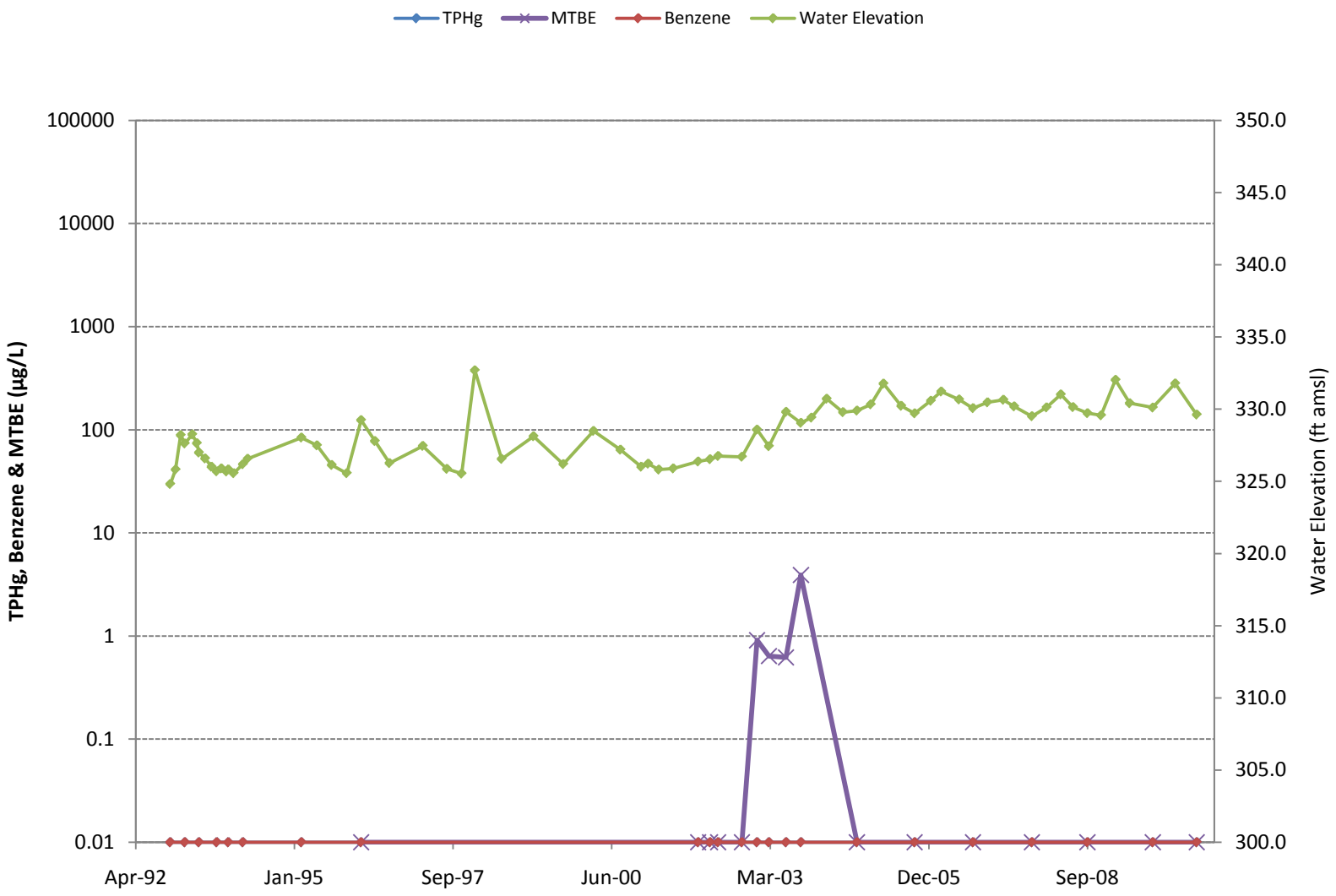


CHART 6: MW-8 Concentration Trends

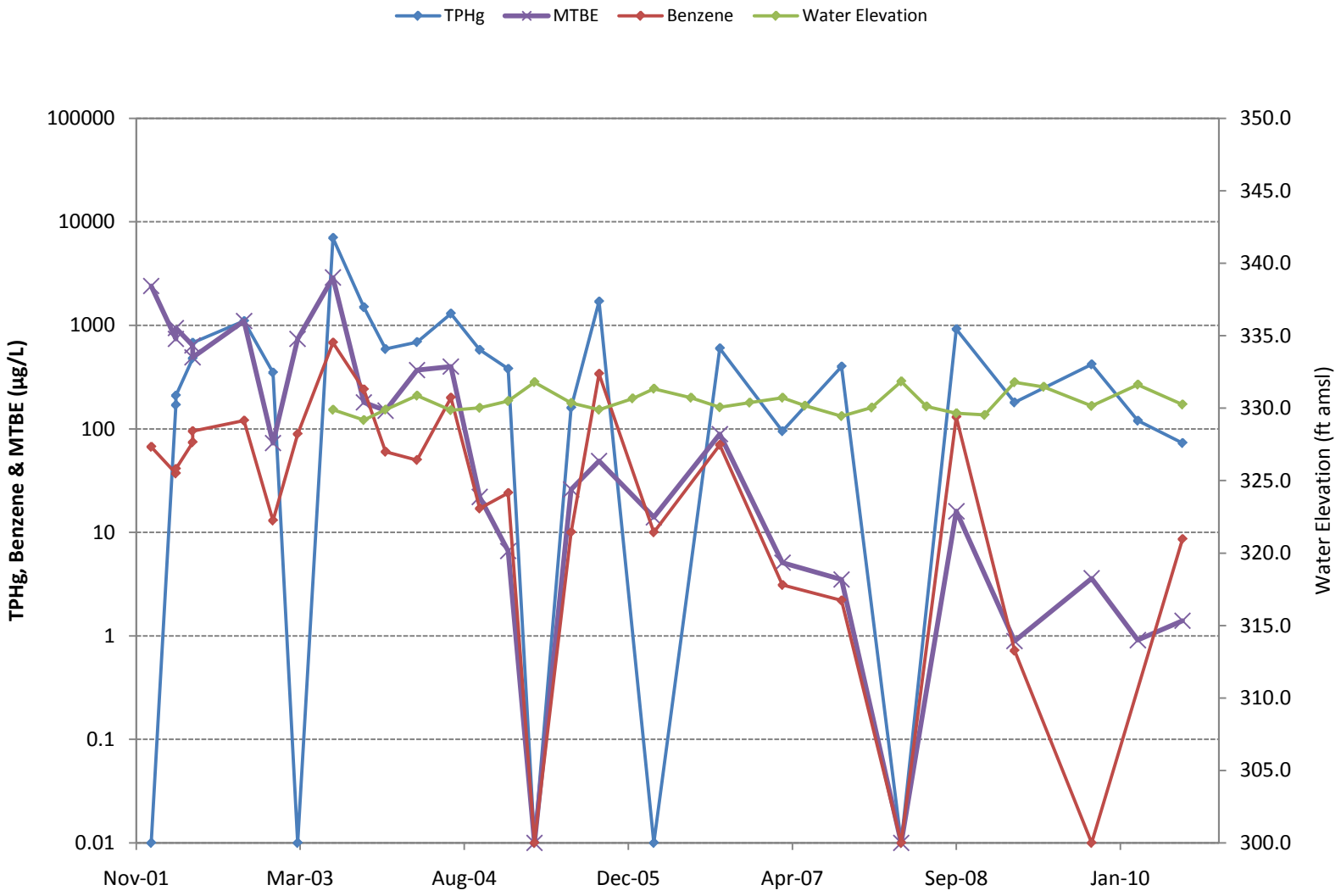
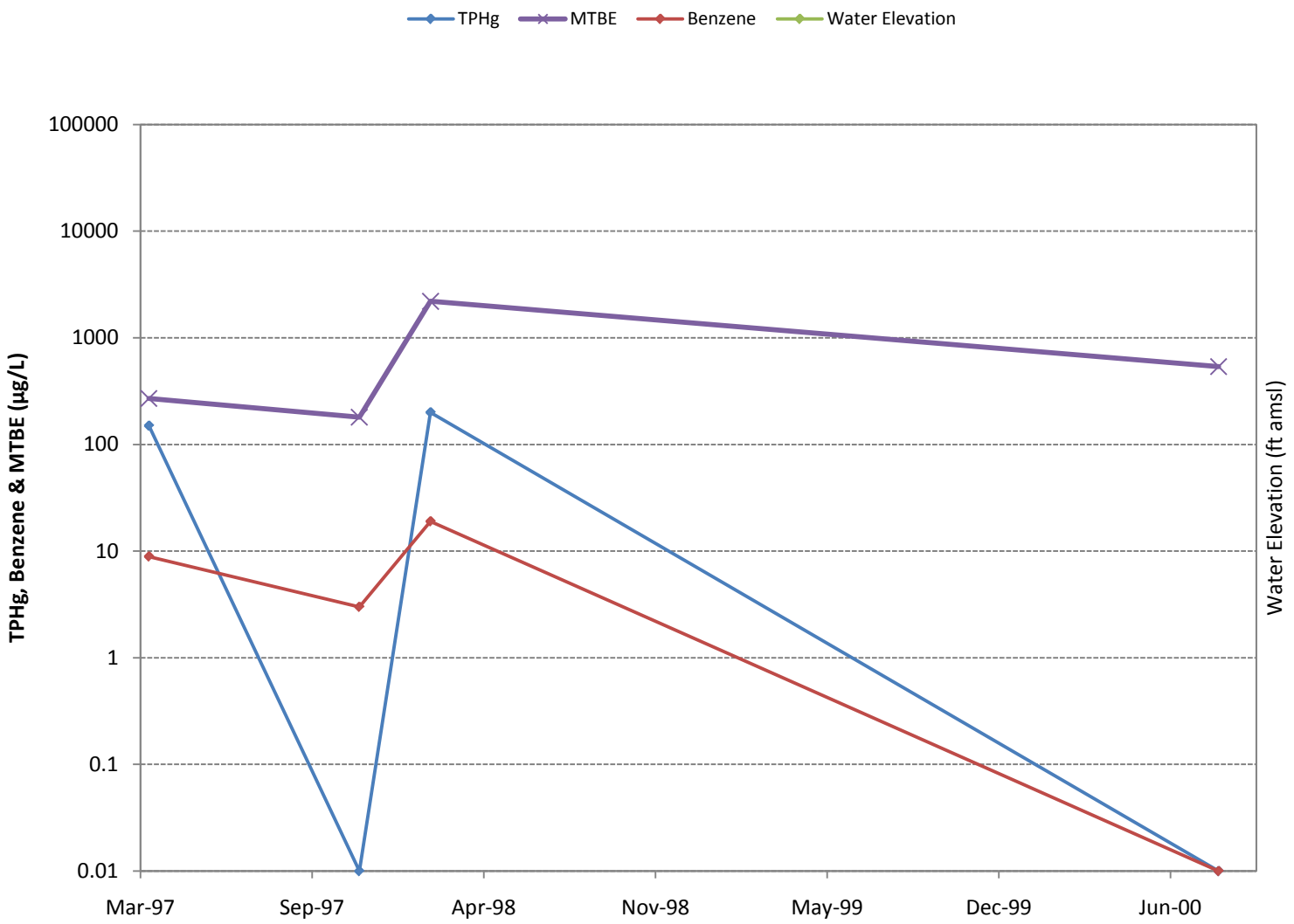


CHART 7: VW-2 Concentration Trends



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Appendix C

Zone 7 Agency Well Location Map

	ZONE 7 WATER AGENCY **100 NORTH CANYONS PARKWAY** **LIVERMORE, CA 94551**	**WELL LOCATION MAP**	**SCALE: 1"= 500 ft** **DATE: 2/24/11** **7249 Village Pkwy**

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Appendix D

Alameda County Environmental Health Case Closure Summary

CASE CLOSURE SUMMARY
LEAKING UNDERGROUND FUEL STORAGE TANK – LOCAL OVERSIGHT PROGRAM

I. AGENCY INFORMATION Date: February 24, 2011

Agency Name: Alameda County Environmental Health	Address: 1131 Harbor Bay Parkway
City/State/Zip: Alameda, CA 94502-6577	Phone: 510.668.4411
Responsible Staff Person: Paresh Khatri	Title: Groundwater Resources Engineer

II. CASE INFORMATION

Site Facility Name: ARCO Service Station No. 6041		
Site Facility Address: 7249 Village Parkway, Dublin, CA		
RB Case No.: 01-0117	Local Case No.: RO0000452	LOP Case No.: RO0000452
URF Filing Date:	Global ID No.: T0600100109	APN: 941-197-79-4

Responsible Parties	Addresses	Phone Numbers
Atlantic Richfield Company	P.O. Box 1257, San Ramon, CA 94583	(925) 275-3801

Tank I.D. No	Size in Gallons	Contents	Closed In Place/Removed?	Date
Unknown	Unknown	Gasoline	In Place	2001-Present
Unknown	Unknown	Gasoline	In Place	2001-Present
Unknown	10,000	Gasoline	Removed	July 2001
Unknown	10,000	Gasoline	Removed	July 2001
Unknown	10,000	Gasoline	Removed	July 2001
Unknown	550	Waste Oil	Removed	June 1990
Piping – associated with waste oil tank and gasoline USTs			Removed	June 1990 / July 2001

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and Type of Release: Exact release source is unknown; one unauthorized fuel spill occurred near the southeastern service island in September 1991; upon excavation in 2001 the USTs did not have any obvious holes or leaks.	
Site characterization complete? Yes	Date Approved By Oversight Agency: TBD

Monitoring wells installed? Yes	Number: 8	Proper screened interval? Although DTW has generally been above the S.I., there have been a few instances where DTW has been within the S.I.
Highest GW Depth Below Ground Surface: 11.80 feet (below top of casing)	Lowest Depth: 3.15 feet (below top of casing)	Flow Direction: predominately northeast
Most Sensitive Current Use: Alamo Canal approximately 0.6 miles southeast of the Site; Dublin Creek which connects with Alamo Canal approximately 0.6 miles south of the Site		

Summary of Production Wells in Vicinity: Production wells are not present in site vicinity (1,320 feet) (Appendix C of Case Closure Summary)	
Are drinking water wells affected? No	Aquifer Name: NA
Is surface water affected? No	Nearest SW Name: Alamo Canal (0.6 miles SE of Site)
Off-Site Beneficial Use Impacts (Addresses/Locations): None	
Reports on file? Yes with ACEH	Where are reports filed? ACEH & SFBRWQCB

TREATMENT AND DISPOSAL OF AFFECTED MATERIAL

Material	Amount (Include Units)	Action (Treatment or Disposal w/ Destination)	Date
Tank	One 550-gallon waste-oil tank; three 10,000-gallon UST	Waste-oil tank was removed in June 1990; all three USTs were removed in July 2001	June 1990 and July 2001
Piping	Unknown	Waste oil tank associated piping removed in June 1990; Product lines removed in July 2001; waste manifest included in removal report	Piping removed on March, 1996
Free Product	Unknown	Observed in the groundwater that recharged into the former UST cavity during UST removal activities; approx. 25,600 gallons of groundwater was pumped out of the UST cavity in July 2001; waste manifest included in removal report	July 2001
Soil	3,212 Cubic Yards	Soil removed during the waste-oil tank removal in June 1990 was transported to Kettleman City; Soil removed in July 2001 during UST removal, associated piping, hydraulic hoist removal, overexcavation of: former waste oil piping area, new UST cavity, dispenser pad and canopy footing area and entire site; waste manifest included in removal report	July 2001
Groundwater	25,600 Gallons	Groundwater pumped out of UST cavity during UST removal in July 2001; waste manifest included in removal report	July 2001

MAXIMUM DOCUMENTED CONTAMINANT CONCENTRATIONS BEFORE AND AFTER CLEANUP
(Please see appendices for additional information on contaminant locations and concentrations)

Contaminant	Soil (ppm)[1]		Water (ppb)	
	Before	After[2]	Before	After[2]
TPHg	8,300 mg/kg (SW-6@ 8', 7/27/2001)	40 mg/kg (SB-3-8 @ 8', 11/22/2010)	29,700 µg/L MW-3, 12/27/2000	73 µg/L MW-8, 7/30/2010
TPHd	<9.9 mg/kg (OV-1 @ 6', 7/26/2001)	Not sampled	Not sampled	Not sampled
Total Oil and Grease	Not sampled	Not sampled	Not sampled	Not sampled
Benzene	64 mg/kg (SW-6@ 8', 7/27/2001)	0.170 mg/kg (SB-3-8 @ 8', 11/22/2010)	2,590 µg/L MW-3, 2/9/2001	8.6 µg/L MW-8, 7/30/2010
Toluene	9.30 mg/kg (DISP-2 @ 3', 7/27/2001)	<.024 mg/kg (SB-3-8 @ 8', 11/22/2010)	3,530 µg/L MW-3, 2/9/2001	<2.5 µg/L MW-3, 7/30/2010
Ethylbenzene	180 mg/kg (SW-6@ 8', 7/27/2001)	0.270 mg/kg (SB-3-8 @ 8', 11/22/2010)	1,100 µg/L MW-3, 7/17/2001	<2.5 µg/L MW-3, 7/30/2010
Xylenes	320 mg/kg (SW-4@ 8', 7/27/2001)	0.048 mg/kg (SB-3-8 @ 8', 11/22/2010)	7,080 µg/L MW-3, 2/9/2001	<5 µg/L MW-3, 7/30/2010
MTBE	6 mg/kg (SW-8@ 8', 7/27/2001)	0.093 mg/kg (SB-3-8 @ 8', 11/22/2010)	85,500 µg/L[3] MW-3, 2/9/2001	5.3 µg/L MW-5, 7/30/2010
Lead	Not sampled	Not sampled	Not sampled	Not sampled

[1] Soil results are from samples collected at depths of 8 feet bgs or shallower.
[2] After results are represented by the maximum concentration on site.
[3] Other fuel oxygenates (groundwater [µg/L] before cleanup): TBA 53,000 µg/L, DIPE <500 µg/L, ETBE <500 µg/L, TAME <500 µg/L, 1.2-DCA <500 µg/L, EDB <500 µg/L, ethanol <40,000 µg/L from MW-3
[4] Other fuel oxygenates (groundwater [µg/L] after cleanup): TBA 2,700 µg/L, DIPE <2.5 µg/L, ETBE <2.5 µg/L, TAME <2.5 µg/L, 1.2-DCA <2.5 µg/L, EDB <2.5 µg/L, ethanol <500 µg/L from MW-3

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? **Yes**		
Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? **Yes**		
Does corrective action protect public health for current land use? It does not appear that the release would present a significant risk to human health based upon current land use and conditions.		
Site Management Requirements: **No.**		
Should corrective action be reviewed if land use changes? **No**		
Was a deed restriction or deed notification filed? **No**		Date Recorded: --
Monitoring Wells Decommissioned: **MW-1 in 2001; Remaining Wells - Upon Case Closure Approval**	Number Decommissioned: **All**	Number Retained: **None**
List Enforcement Actions Taken: **NA**		
List Enforcement Actions Rescinded: **NA**		

V. ADDITIONAL COMMENTS, DATA, ETC.

Considerations and/or Variances:

Very low levels of residual soil and groundwater contamination remain onsite (refer Tables 1 and 2 below); however, these concentrations do not pose a threat to human health of the environment because the concentrations are below their respective ESLs..

Conclusion:

ARCADIS requests approval for case closure and no further action at this site based on the following:

- Sources of petroleum hydrocarbons at the Site have been removed. The absence of high concentrations observed in soil samples suggests that secondary sources (residual hydrocarbons in soil) were identified and removed.

- During the last sampling event (July 2010) only one well, MW-8, contained TPHg (73 µg/L) above the detection limit.. TPHg has a decreasing trend in MW-8.

- All the wells that contain MTBE concentrations in groundwater (the current maximum concentration is 5.3 µg/L) indicate a decreasing trend.

- Soil samples collected during the 2010 soil and groundwater investigation indicated very low levels of TPHg, benzene, ethylbenzene, totally xylenes, and MTBE. The concentrations that were detected do not exceed their respective ESLs.

- Groundwater samples collected during the CPT investigation in November 2010 indicated a very low level of MTBE (0.91 µg/L) at CPT-1. There were no detected concentrations of any other COCs in any of the other groundwater samples. This concentration is below ESLs for both drinking water and groundwater to indoor air. It.

- Current Site conditions suggest that TPHg is limited to the southeastern Site boundary in the vicinity of MW-8

(**Figure 7**).

- Current Site conditions suggest that MTBE is limited to the southeastern boundary of the Site between MW-3 and MW-4 . The plume does not appear to be migrating, as evidenced by consistent results from monitoring wells MW-2 through MW-5, and MW-8.
- The Site has been adequately characterized.
- No sensitive receptors are likely to be impacted, including surface-water bodies, municipal wells and drinking water sources.
- The Site presents no current or potential risk to human health or the environment

VI. LOCAL AGENCY REPRESENTATIVE DATA

Prepared by: Paresh Khatri	Title: Hazardous Materials Specialist
Signature:	Date:
Approved by:	Title:
Signature:	Date:

This closure approval is based upon the available information and with the provision that the information provided to this agency was accurate and representative of site conditions.

VII. REGIONAL BOARD NOTIFICATION

Regional Board Staff Name: Cherie McCaulou	Title: Engineering Geologist
RB Response:	Date Submitted to RB:
Signature:	Date:

VIII. MONITORING WELL DECOMMISSIONING

Date Requested by ACEH: **TBD**	Date of Well Decommissioning Report: **TBD**	
All Monitoring Wells Decommissioned: **TBD**	Number Decommissioned: **TBD**	Number Retained: **TBD**
Reason Wells Retained: **TBD**		
Additional requirements for submittal of groundwater data from retained wells:		
ACEH Concurrence - Signature:		Date:

Attachments:
1. Tables 1 and 2 (comparison of maximum residual contamination to applicable ESLs or approved cleanup goals).
2. Site figures provided in Recommendation for Case Closure Report.

3. Analytical data tables for soil, groundwater, depth to groundwater, etc. are provided in Recommendation for Case Closure Report.
4. Zone 7 Agency Well Location Map is provided in Recommendation for Case Closure Report.

This document and the related CASE CLOSURE LETTER & REMEDIAL ACTION COMPLETION CERTIFICATE will be retained by the lead agency as part of the official site file.

Environmental Impacts in Groundwater
BP 6041
7249 Village Parkway, Dublin, California

Table 1. Comparison of Most Current Maximum Residual Soil Concentrations at the Site to Relevant Cleanup Standards (mg/kg)

	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TPH-DRO (mg/kg)
Current Maximum Residual Soil Concentrations at Site[1,3]	**40 mg/kg (SB-3-8 @ 8', 11/22/2010)**	**0.170 mg/kg (SB-3-8 @ 8', 11/22/2010)**	**<.024 mg/kg (SB-3-8 @ 8', 11/22/2010)**	**0.270 mg/kg (SB-3-8 @ 8', 11/22/2010)**	**0.048 mg/kg (SB-3-8 @ 8', 11/22/2010)**	**0.093 mg/kg (SB-3-8 @ 8', 11/22/2010)**	**--**
RWQCB, Region 2 ESLs[1]	**83[2]**	**0.044[2]**	**2.9[2]**	**3.3[2]**	**2.3[2]**	**0.023[2]**	**83[2]**

Notes:
[1] Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs) *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Water Board, May 2008.
[2] ESL value for Shallow Soils (≤ 3 meters bgs) where groundwater is a current or potential source of drinking water-commercial/industrial land use (Table A).
[3] Depth to water ranges between 3.15 feet and 11.80 feet below top of casing; therefore, all soil results are from sample depths of 8 feet or shallower.

Environmental Impacts in Groundwater
BP 6041
7249 Village Parkway, Dublin, California

Table 2. Comparison of Most Current Maximum Residual Groundwater Concentrations at the Site to Relevant Cleanup Standards (µg/L)

	TPH-GRO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L) (µg/L)	TPH-DRO (µg/L)
Maximum Residual Groundwater Concentrations at Site	**73 MW-8, 7/30/2010**	**8.6 MW-8 7/30/2010**	**<2.5 MW-3, 7/30/2010**	**<2.5 MW-3, 7/30/2010**	**<5 MW-3, 7/30/2010**	**5.3 MW-5, 7/30/2010**	**--**
RWQCB, Region 2 ESLs[1]	**100[2]**	**1.0[2]**	**40[2]**	**30[2]**	**20[2]**	**5.0[2]**	**100[2]**

Notes:
[1] Regional Water Quality Control Board, San Francisco Bay Region (Water Board) Environmental Screening Levels (ESLs) *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Water Board, May 2008.
[2] ESL value for Shallow Soils (≤ 3 meters bgs) where groundwater is a current or potential source of drinking water-commercial/industrial land use (Table A).