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California Independent UST Case Closure Study:

A Quantification of Cases Potentially Closable Under Low-Risk Criteria

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Acknowledgements

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1.0 PURPOSE

The purpose of this study is to provide a statewide estimate of the overall number of open Leaking Underground Fuel Tank (LUFT) environmental cases that could be closed with no additional investigative or remedial work[1] if a uniform threat-based approach to environmental case closure were to be applied across the State of California.

The uniform threat-based approach considers the low-risk criteria established under San Francisco Regional Water Quality Control Board's (SFRWQCB) *Supplemental Instructions to State Water Board December 8, 1995 Interim Guidance on Required Cleanup at Low Risk Fuel Sites* (January 5, 1996)[2], as well as the precedents established by the State Water Resources Control Board (SWRCB) in the 14 Water Quality Orders resulting in case closure from the closure petitions process established by 23 Cal. Admin. Code §2814.6 *et seq.* (the "Petition Process"). Additionally, this study incorporates results from studies regarding the fate and transport of petroleum hydrocarbons and fuel oxygenates such as Methyl-Tertiary Butyl Ether (MTBE).

The low-risk evaluation criteria established under the SFRWQCB's *Supplemental Instructions to State Water Board December 8, 1995 Interim Guidance on Required Cleanup at Low Risk Fuel Sites* are:

- The leak has been stopped and ongoing sources, including free product, removed or remediated;
- The site has been adequately characterized;
- The dissolved hydrocarbon plume is not migrating;
- No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted;
- The site presents no significant risk to human health;
- The site presents no significant risk to the environment.

The 14 Water Quality Orders resulting from closure petitions are:

- WQO 98-03 Kenneth and Jean Fortenberry
- WQO 98-04 Matthew Walker

[1] For the purposes of this study, "additional investigative or remedial work" does not include preparation of a request for No Further Action status and non-environmental site restoration activities such as proper destruction of wells and removal of remediation equipment.

[2] SFRWQCB *Supplemental Instructions to State Water Board December 8, 1995 Interim Guidance on Required Cleanup at Low Risk Fuel Sites* was prepared in response to the December 8, 1995 memo from Walter Pettit entitled *Lawrence Livermore National Laboratories (LLNL) Report on Leaking Underground Storage Tank (UST) Cleanup*.

- WQO 98-08 Texaco Refining and Marketing, Inc.
- WQO 98-10 Margo Hayes
- WQO 98-12 Unocal Corporation, Gilroy
- WQO 98-13 Landis Incorporated
- WQO 99-04 Fallbrook Public Utility District
- WQO 2003-0001 Michael O'Donoghue Trust
- WQO 2003-0011 Sui Lau and Yut Bing Leung Lau
- WQO 2004-0018 Ernest Panosian
- WQO 2005-0002 Lois Green and Patricia Kelly
- WQO 2005-0008 Dan Thomas
- WQO 2005-0011 Purves Family Trust
- WQO 2008-0003 Shell Oil Products US

The fate and transport studies used to evaluate migration of petroleum hydrocarbons and fuel oxygenates include:

- *California Leaking Underground Fuel Tank (LUFT) Historical Case Analyses*, Lawrence Livermore National Laboratories, 1995;
- *An Evaluation of MTBE Impacts to California Groundwater Resources*, Lawrence Livermore National Laboratories, 1998;
- *Evaluation of the Impact of Fuel Hydrocarbons and Oxygenates on Groundwater Resources*; Shih, T.; Rong, Y., Harmon, T., Suffet, M., 2004.

2.0 Methodology

The purpose of this study is to estimate the percentage of currently active Underground Storage Tank (UST) cases that could be granted No Further Action status if Low-Risk criteria were used in the evaluation of case closure. In order to estimate this percentage, the following assumptions were made:

1) 9,996 active LUFT cases statewide[3]
2) 4,094 active Letters of Commitment[4]
3) 1,344 cases reviewed by 5-Year Review concurring case should remain open[5]
4) 338 cases reviewed by 5-Year Review and recommended for closure[6];

For the purposes of this study, the authors assume that the cases reviewed under the authority of Cal. Health & Safety Code §25299.39.2 (the UST Cleanup Fund "5-Year Review") are representative of the overall environmental LUFT caseload in California.

The set of cases considered under this study is composed solely of cases that had been previously evaluated by the 5-Year Review program. The reason that the 5-Year Review cases were selected as the representative data set was purely practical; these cases were known to have complied with the Electronic Submittal of Information to the State's GeoTracker Database, and therefore environmental case information since 2005 is readily available online for review and consideration.

The authors recognize that the assumption that the 5-Year Review cases are representative of the statewide LUFT caseload is not well supported and may induce a bias in the study results. Known biases include:

1. Procedurally, the 5-Year Review evaluates only cases that upload data to the State's GeoTracker Database. Claimants that upload data to GeoTracker are more likely to be responsive and actively engaged in case management. *Net effect: study may over-represent the percentage of overall cases that could be closed.*
2. Claimants on the Priority List (i.e. claimants that are awaiting a Letter of Commitment and do not yet have access to the UST Cleanup Fund) are typically large corporations and major oil companies such as BP, Chevron, Shell, etc. These claimants tend to employ highly qualified professional environmental consulting firms and are highly engaged in the management of their cases. *Net*

[3] Source: Electronic communication, Joel Coffman, PG, Underground Storage Tanks Program, US Environmental Protection Agency
[4] Source: Monthly Underground Storage Tank (UST) Cleanup Fund Program Statistics, October 30, 2009
[5] Source: Electronic communication, Robert Trommer, CHG, Chief, 5-Year Review Unit, UST Cleanup Fund
[6] Source: Electronic communication, Robert Trommer, CHG, Chief, 5-Year Review Unit UST Cleanup Fund

effect: study may under-represent the percentage of overall cases that could be closed.

3. It is believed that a disproportionately large percentage of cases are granted No Further Action Status before the age of the Letter of Commitment reaches 5 years. In many of these cases, the corrective action at the site solely consists of investigation and monitoring of an insignificant release that is ultimately determined to pose no threat to human health or the environment, and the case is closed before becoming eligible for the 5-Year Review. *Net effect: study may under-represent the percentage of overall cases that could be closed.*

The overall effect and magnitude of the biases are unknown, and therefore neglected. It is noted that the cases selected for evaluation by the 5-Year Review are randomly selected[7], and therefore should not induce bias.

Using the latest information provided by the UST Cleanup Fund, the author obtained a current list of all open cases that had been reviewed by the 5-Year Review and sorted the caseload into the following two categories:

1) Cases where 5-Year Review concurred with current corrective action or recommended additional corrective action (1,344 cases, Attachment A)
2) Cases recommended for closure by 5-Year Review (338 cases, Attachment B)

To approximate the relative percentage of cases recommended as open vs. closed by the 5-Year Review (79.9% open vs. 20.1% closed), the authors randomly[8] selected 28 cases from the recommended open list, and 7 cases from the recommended closed list (80.0% open vs. 20.0% closed).

Once the randomly identified sites were selected, site environmental conditions were evaluated using the reports, data, and correspondence that had been uploaded to the State's GeoTracker Database by the claimant or their agent. In certain cases, the responsible party or their consultant was contacted to clarify issues relating to the environmental case.

Site environmental data were compared with the low-risk criteria established under the December 8, 1995 Walter Pettit letter and the 14 Water Quality Orders resulting from closure petitions, and an independent evaluation whether the subject case could be closed was made on a site-by-site basis.

Upon completion of the site-specific evaluations, the relative percentages of cases considered closable as low-risk were compared against those where environmental

[7] Source: Electronic communication, Robert Trommer, CHG, Chief, 5-Year Review Unit UST Cleanup Fund

[8] Random selection of cases was performed using a random number generator provided by RANDOM.ORG.

conditions did not warrant closure. This relative percentage was extrapolated to the number of open LUFT cases in California to estimate the total number of cases that could be closed if low risk criteria were used.

3.0 CRITERIA & GUIDELINES

When evaluating cases for potential low-risk closure, the authors predominantly used the criteria established under the SFRWQCB's *Supplemental Instructions to State Water Board December 8, 1995 Interim Guidance on Required Cleanup at Low Risk Fuel Sites* as well as the precedents set under the 14 Water Quality Orders resulting in case closure from SWRCB closure petitions. While the criteria necessarily require independent professional judgment and do not lend themselves well to codification, certain criteria and guidelines could be used to establish whether the case should qualify for low-risk closure. These criteria and guidelines are presented below.

3.1 Free Product Removal & Remediation

The leak has been stopped and ongoing sources, including free product, removed or remediated to the extent practicable.

23 CCR Division 3, Chapter 16 §2655 requires that the owner or operator remove free product to the maximum extent practicable, as determined by the local agency. This requirement does not imply that all traces of free product must be removed; it must only be done so to the extent practicable. Section 2655 also makes clear that the primary purpose of product removal is to abate migration. If the responsible party has removed free product to the extent that it is technically and economically feasible *with respect to abating further migration, impacts to human health and ecological receptors*, it should be considered to be removed to the extent practicable, thereby satisfying this requirement.

3.2 Groundwater Contaminant Concentration

In general, petroleum hydrocarbon releases should be considered low-risk if the maximum concentrations in groundwater are less than:

- *10,000 ug/L for TPHg and for TPHd*
- *1,000 ug/L for each individual petroleum hydrocarbon constituent*
- *500 ug/L for each individual fuel oxygenate*

TPHg and TPHd concentrations should be used as an indicator of gross contamination; the concentration of TPH in and of itself should not be used as a regulatory driver. LUFT cases that do not contain appreciable concentrations of benzene or MTBE should be considered 'low-risk' irrespective of TPH concentration.

Modern formulations of gasoline typically consist of several hundred individual chemicals, of which benzene is generally considered to be the most toxic constituent present in significant quantities. Gasoline releases prior 1990 typically do not contain an

appreciable fraction of MTBE[9], and the benzene concentrations of many of these releases is insignificant due to biodegradation and/or volatilization over time. In cases where the TPH concentration is high, but MTBE and benzene concentrations are low or not present above laboratory detection limits, the case should be considered to be low risk irrespective of the TPH concentration.

Note that this criterion does not imply that sites that exhibit contaminant concentrations in excess of the concentrations listed above cannot be closed, nor does it imply that cases that meet the concentration guidelines should necessarily be considered low-risk. The concentrations criterion should be considered to be guidelines for each constituent, and best professional judgment should be used to evaluate the potential risk to receptors and whether the case should be closed.

3.3 Plume Stability and Migration

A groundwater contaminant plume is considered to be stable when the source has been removed to the extent practicable and contaminant concentrations in the most highly impacted areas are stable or decreasing. Plume stability may be judged by visual interpretation of the concentration trend with respect to time, a Kendall Trend test, or a linear regression.

With respect to more degradable and less mobile constituents such as TPH and benzene, reduction in concentration in the source area is considered evidence that the overall extent of the groundwater plume is contracting with respect to time. If the over all extent of the plume is contracting, the case should be considered low risk. If the release is stable, adequately characterized, and consists of a pre-MTBE formulation of gasoline, the case should be considered to be low risk.

Because MTBE tends to be less degradable and more mobile than petroleum hydrocarbon contaminants, demonstrating MTBE plume stability is more challenging unless the MTBE impacts are restricted to largely fine grained sedimentary deposits such as clay and silt. In these cases, an MTBE plume is considered to be stable when the plume is localized and connected to the source area, and an adequately placed monitoring network demonstrates that the plume is not mobile with respect to time.

Under certain conditions, MTBE is known to form a ‘detached’ plume, characterized by a discrete, low mass release that has separated from the source area. While detached plumes cannot be considered stable, the environmental case could still be closed if reasonable professional judgment is used with respect to the distance to known receptors in the downgradient direction, probable future use of the groundwater, and the concentration and mass of the contaminants in the detached plume.

[9] Widespread use of MTBE in California occurred in the early 1990’s in response to the 1990 Federal Clean Air Act Amendments and the wintertime oxygenated fuels program implemented by the California Air Resources Board in 1992.

3.4 Adequate Characterization

A groundwater plume is considered adequately delineated when reasonable professional judgment can be used to estimate the extent of the overall plume with respect to distance to nearby receptors.

Many regulatory agencies require that groundwater plumes are delineated to below laboratory detection limits both vertically and laterally. Furthermore, regulatory agencies commonly require detailed characterization of the source area, even though the plume may be fully delineated and stable. Under these circumstances, detailed characterization of the source area serves no useful purpose since it has no bearing on the overall plume with respect to nearby receptors. These requirements are not supported by reasonable interpretation of Resolution 92-49 and cause unnecessary investigation and expenditure by the UST Cleanup Fund or responsible parties.

3.5 Potential Impacts to Existing Drinking Water Wells

Contaminants that have a reasonable potential to impact drinking water wells due to plume migration cannot be considered low risk. The distance considered to be adequately protective of drinking water wells vary with the mobility and persistence of the constituents of concern, and should be measured in the predominant groundwater flow direction.

Numerous studies of the fate and transport of petroleum hydrocarbons and fuel oxygenates have been performed, including the 1995 and 1998 Lawrence Livermore Reports[10,11] and the 2004 Los Angeles Area Petroleum Hydrocarbon and Fuel Oxygenate Study[12]. These studies indicate that unabated, petroleum hydrocarbon and MTBE groundwater plumes reach a maximum length before the processes of natural attenuation, diffusion, advection and dispersion reduce the concentration to water quality objectives or levels adequately protective of human health.

The 1995 and 1998 Lawrence Livermore Reports indicate that the lateral dimensions of most (non-MTBE) LUFT sites do not exceed more than a few hundred feet, and that in 90% of cases, the benzene concentration had decreased to below 1 ug/L within 400 feet of the source area. The 2004 Los Angeles Study indicated that the longest MTBE plume length observed (5 ug/L) was approximately 1,040 feet, and that 90% of MTBE cases resulted in a plume length of 540 feet or less.

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[10] Lawrence Livermore National Laboratories; *California Leaking Underground Fuel Tank (LUFT) Historical Case Analyses*, 1995

[11] Lawrence Livermore National Laboratories; *An Evaluation of MTBE Impacts to California Groundwater Resources*, 1998

[12] Shih, T; et. al.; *Evaluation of the Impact of Fuel Hydrocarbons and Oxygenates on Groundwater Resources*; Environ. Sci. Technol. 2004.

Unless the site is situated in an area with unusual geologic conditions such as fractured bedrock, a distance of 1,000 feet should be considered to be adequately protective of downgradient receptors for MTBE. In cases where MTBE and other fuel oxygenates are not present, a distance of 500 feet should be considered adequately protective of downgradient receptors. Cases where the distances to the closest downgradient receptor exceed these distance criteria should be considered low risk.

If the contaminant consists of a pre-MTBE formulation of gasoline, the receptor should be considered adequately protected irrespective of distance if sentry wells between the source area and the receptor consistently show that water quality objectives have been met prior to reaching the receptor.

In cases where MTBE has formed a detached plume, best professional judgment should be employed to evaluate whether the contaminant has a reasonable likelihood of impacting an existing downgradient receptor before the processes of advection, dispersion and diffusion reduce the concentrations to below Water Quality Objectives.

3.6 Achievement of Water Quality Objectives Before Resource Used

Unless the water within the contaminant plume itself has an actual or probable beneficial use, it is inappropriate to require that Water Quality Objectives be met at the time of case closure. Closure should be granted if Water Quality Objectives would be reached in a "reasonable timeframe", based on actual or probable beneficial use.

It is recognized that with the growth in California's population, private domestic wells are being installed with lesser frequency, and that a greater percentage of water needs are being met by municipal sources. Typically, municipal wells are installed at greater depth, with a more robust sanitary seal, and are subjected to frequent water quality evaluations to ensure that contaminant impacts are recognized and appropriate action taken to protect public safety. Releases from petroleum USTs, which typically only impact the shallowest water bearing zones, should not be prevented from case closure unless it can be shown that the water within the contaminant plume will impact a current or probable beneficial use.

In the 14 Water Quality Orders resulting in case closure from SWRCB closure petitions, SWRCB clearly indicates that case closure should be granted if Water Quality Objectives will be achieved in a reasonable timeframe, based on the actual or probable beneficial use of the water. The determination of what constitutes a "reasonable timeframe" requires professional judgment, and should not be based on an arbitrary local or statewide policy number such as "20-Years" or "hundreds of years". The judgment must be made considering the stability and size of the plume. For example, if the subject site is a gasoline service station and the contaminant is highly localized and defined, the probability that a drinking water well will be installed in that contaminant plume is exceedingly low, and therefore a reasonable timeframe could be considered to be several hundred years. Likewise, if the plume extent covers several different parcels, a reasonable timeframe to achieve Water Quality Objectives could be significantly less.

3.7 Non-Residential Land Use in Probable Extent of Plume

If contaminant migration is beneath solely commercial or industrial land uses, exposure and risk to human health is significantly diminished.

Human health risk is significantly diminished if the current and probable extent of the groundwater plume extends beneath only non-residential land uses due to decreased exposure to contaminant vapors and a decreased probability that a drinking water well will be installed in the future. The evaluation of which properties are considered to be within the probable extent of the groundwater plume requires an understanding of the mobility of the various constituents of concern, lithology, and professional judgment. For example, if the plume is localized, composed of only TPH, and concentrations are reducing, the probable future extent of the plume may just be the property itself. If the plume is composed of high mobility constituents such as MTBE and the soils are predominantly sand, the probable future extent of the groundwater plume may extend 1,000 feet in the downgradient direction.

It is important to note that this criterion is not intended to imply that contaminant migration beneath residential properties necessarily constitutes a human health risk. In fact, contaminant migration beneath residential properties very rarely constitutes a threat to human health unless very high concentrations of contaminants (i.e. an order of magnitude or more above low-risk concentration guidelines presented in Section 3.2) are present, or a well in located within the plume. This criterion is only intended to suggest that the land use within the probable extent of the groundwater plume should be considered in a closure risk evaluation, and that if the land use is solely commercial or industrial, the migration of contaminants beneath nearby properties should not, in and of itself, be considered an impediment to closure.

3.8 Potential Impacts to Human Health

Cases that pose an insignificant risk to human health should be considered for low risk closure. The primary means of impacting human health are considered to be ingestion of impacted drinking water and inhalation of soil vapor.

A human health risk assessment is not necessarily required to evaluate potential impacts to human health if reasonable professional judgment is used. The primary means of impacting human health include inhalation of soil vapor and ingestion of contaminants through drinking water sources. Ingestion of contaminants adsorbed to soil particles is not considered to be a significant means of exposure in a non-residential setting, and it does not appear to be reasonable public policy to keep UST cases open solely on the basis that future construction workers could potentially be dermally exposed to contaminants.

Potential impacts to indoor air quality is currently evaluated using a phased investigative approach, including 1) evaluating whether soil and groundwater contaminant levels warrant investigation of soil vapor, 2) performance of subsurface soil vapor sampling

outside the building structure, 3) performance of sub-slab soil vapor sampling within the building structure, and 4) collection of indoor air quality within the building structure. Due to the conservative assumptions within the vapor evaluation model, it is believed that actual indoor air quality impacts are improbable unless the building structure is situated on free product. As such, the failure of a Human Health Risk Assessment based on subsurface soil vapor samples collected outside of the building structure do not necessarily indicate that an actual risk to occupants exist. Remediation and abatement of soil vapors purely based on subsurface vapors outside the building structure is inappropriate.

Potential impacts to human health through ingestion of impacted drinking water are primarily evaluated by considering the distance to the nearest domestic or municipal well. In cases where a sensitive receptor survey has not been performed and the nearest well is not known, the potential impact to human health cannot be overlooked unless the plume consists of low mobility constituents, the extent of the plume is known, and the plume is stable and/or reducing.

3.9 Potential Impacts to Environmental Receptors

Cases that pose an insignificant risk to environmental receptors should be considered for low risk closure. Unacceptable risk to environmental receptors should be evaluated within the receiving water and with respect to acute and chronic effects.

While environmental cases situated nearby or adjacent to surface water bodies have the potential of discharging contaminants to that water body, the actual impacts to environmental receptors may be insignificant if the concentrations and toxicity to aquatic life of the contaminants are low. The presence of contaminants in groundwater immediately adjacent to a water body should not necessarily be considered a threat to the water body unless it can be demonstrated that those contaminants pose an unacceptable risk to aquatic life within that receiving water body. It is noted that anti-degradation policy with respect to point source discharges into surface water bodies allow for a ‘zone of mixing’, and that the regulatory point of compliance is at the end of the zone.

The determination of unacceptable risk must be made with respect to acute and chronic effects to aquatic species within the receiving water body. Remediation and mitigation of contaminants in groundwater for the sole purpose of preventing contaminant contribution to water body is unwarranted unless the actual impact is understood with respect to aquatic life.

4.0 RESULTS

Of the 35 environmental cases reviewed, 12 cases were found to meet low-risk criteria and should be considered for No Further Action status (closure). This indicates that approximately 34%[13] of the overall caseload qualifies for low-risk closure if the criteria described in the previous section were to be adopted. Five of the 7 cases recommended for closure by the UST Cleanup Fund's 5-Year Review were found to meet low-risk criteria, and 7 of the 28 cases recommended for additional corrective action by the 5-Year Review also qualified for low-risk closure. The closure review summaries are presented in Table 1 and Table 2, respectively. The individual Independent UST Case Closure Reviews for each site are presented in Attachment C.

If the results of this study are representative of the overall UST caseload in California, approximately 3,430 cases could be considered to be low-risk and closed with no further corrective action other than site restoration activities such as the destruction of wells. With respect to the UST Cleanup Fund, it is estimated 1,400 cases with active Letters of Commitment could be closed if the results of this study are representative.

Of the cases that were not considered closable under this study, this study observes the following:

- 65% of cases (15 of 23) were not recommended for closure due to contaminant concentrations in excess of low-risk criteria guidelines;

- 17% of cases (4 of 23) reported the presence of free phase product. None of these cases had demonstrated that free product had been removed to the extent practicable. An additional 9% (2 of 22) cases reported concentrations of hydrocarbons consistent with the presence of free product;

- 65% of cases (15 of 23) were not adequately characterized, indicating that either the extent of the plume was unknown, or the behavior of the plume was not well understood;

- 39% of cases (9 of 23) were found to have plumes that were migrating or not stable. An additional 17% (4 of 23) cases were suspected of plume migration or instability, but could not be confirmed typically due to inadequate characterization;

- 43% of cases (10 of 23) were found to have plumes that extended, or would likely extend beneath residential properties. In an additional 13% of cases (3 of 23), it

[13] The margin of error of this study is approximately 13% using a 90% confidence level, therefore the percentage of cases considered to be eligible for low-risk closure should be considered to be 34% +/- 13%.

was unknown whether the plume would extend beneath residential properties either due to inadequate characterization or the nature of the contaminants. Note that this criterion does not imply that migration of contaminants beneath residential properties necessarily constitute a human health risk, but merely that it is likely occurring;

- 43% of cases (10 of 23) were found to have the potential to impact water wells. In many of these cases, the reason that the plumes were considered to have a potential to impact wells was merely because a sensitive receptor survey identifying the location of wells had not been performed. Note that a sensitive receptor survey is not necessarily needed to evaluate potential impacts to nearby wells of the contaminants consist of low mobility constituents and the extent of the plume is known.

- 48% of cases (11 of 22) were found to have contaminants that may not reach water quality objectives before the resource is used. Cases that fall within this category tend to either contain high concentrations of constituents that tend to persist in the environment, or a sensitive receptor survey had not been performed to assist in the evaluation of current water usage in the vicinity of the site.

- In one case (C1- Triple S Tires), contaminants were considered to impact surface water adjacent to the site, however it is noted that the contaminant is tetrachloroethylene (PCE), and there is a strong possibility that this contaminant is not related to the release from the site. In one additional case (O19 – S.F. Oakland Truck Stop), there is potential for contaminants to reach an adjacent surface water body, however due to inadequate characterization, it cannot be determined if such impacts exist. Note that it is outside the scope of this study to evaluate whether the contaminants entering into the receiving water body pose an unacceptable threat to aquatic life.

- 13% of cases (3 of 23) were considered to pose a potential threat to human health. In each of these cases, the reason that the potential threat is considered to exist is because subsurface soil vapor concentrations indicated that cancer risk may exceed the residential or commercial exposure limit of 1E-06. It is noted that the exceedance of the exposure limit in subsurface soil samples outside the perimeter of the building structure does not necessarily indicate that indoor air quality is impacted to an unacceptable degree – only that further investigation is warranted. It is further noted that multiple studies indicate that the likelihood of actual indoor air quality impact is extremely unlikely unless the building structure is situated on free product. In 57% of cases (13 of 23), the potential risk to human health was considered to be unknown. Typically, the potential risk was considered to be unknown because a sensitive receptor survey was not available on GeoTracker, and the location of drinking water wells could not be evaluated.

- In two cases, the potential for contaminants to impact environmental receptors were considered to be unknown. These cases are the same cases identified as potentially impacting surface water bodies.

5.0 CONCLUSIONS

UST Cases in California are currently not regulated using a uniform risk based decision-making process. Each agency independently establishes its own criteria for closure, typically based their interpretation of Resolution 68-16, Resolution 88-63, and Resolution 92-49. In many cases, this results in significant over-regulation of environmental cases, as the closure standards are interpreted by the agency to be equivalent to drinking water standards or lower, irrespective of the distance to the receptor or whether the water will ever have a reasonable likelihood of being used.

The current regulation of UST cases does not appear to bear a strong relationship to actual risk to human health or proximity to drinking water wells. This is evidenced by the fact that in 54% of the cases reviewed (19 of 35), the distance to the nearest drinking water well was not even identified in documents available in GeoTracker. In cases that were recommended for closure by the 5-Year Review, 71% (5 of 7) provided information about the nearest receptor on GeoTracker. Of cases that were not recommended for closure by the 5-Year Review, only 39% (11 of 28) provided information about the nearest receptor on GeoTracker. If it is assumed that cases recommended for closure by the 5-Year Review are closer to completion of corrective action than those not recommended for closure (i.e. further investigation and/or remediation required), this implies that Sensitive Receptor Surveys tend to be performed later in the corrective action process, and used as an impediment to closure rather than a driver of the environmental corrective action.

Surprisingly, this approach is not unreasonable if virtually all groundwater is considered drinking water. If the agency interprets all groundwater to be drinking water in accordance with Resolution 88-63, the location at which the water is actually being withdrawn and used is immaterial, and therefore a Sensitive Receptor Survey is unnecessary. On the other hand, if the agencies develop closure policy in accordance with Resolution 92-49 and interpret that Water Quality Objectives be met at some time in the future, so long as those Water Quality Objectives are met before the resource is used, the performance of a Sensitive Receptor Survey becomes of paramount importance. It is believed that if the latter approach is employed statewide, a significant number of cases could be closed without incurring additional risk to human health and the environment.

This study concludes that if the UST Cleanup Fund's 5-Year Reviews are representative of the overall UST caseload in California, approximately 34% of cases qualify as low-risk cases could be closed with no further corrective action other than site restoration activities. If these cases were to be closed, it is believed that the impact to human health and the environment would be negligible, but the cost savings to the UST Cleanup Fund, self funded responsible parties, and the people of the State of California would be enormous.

Table 1

INDEPENDENT UST CASE CLOSURE REVIEW

UST Cleanup Fund 5-Year Review
Recommended Closed

Study No.	Claim No.	Site Name	Site Address	Site City	Agency	Excessive GW Concentrations	Free Product Present	Plume Not Stable / Migrating	Inadequate Characterization	Wells Potentially Impacted	WQO's Not Reached Before Used	Nearby Land Use Residential	Discharges to Surface Water	Potential Human Health Risk	Potential Environmental Risk	Recommendation
C1	412	Triple S Tires	164 Calistoga Rd	Santa Rosa	Sonoma LOP			UNK		UNK	UNK			UNK	UNK	Not Ready For Closure
C2	986	Valley Convenience Store #5	1108 Main St	St. Helena	Napa LOP											**Ready For Closure**
C3	1884	Bar-Ale	17 Copeland St	Petaluma	Region 2											**Ready For Closure**
C4	2757	Redwood Cardlock	401 Healdsburg Ave	Healdsburg	Region 1											**Ready For Closure**
C5	7909	Circle K# 5423	7796 Sunrise Blvd	Citrus Heights	Sacramento LOP											**Ready For Closure**
C6	13084	John's Chevron Station	3595 Sagunto St	Santa Ynez	Santa Barbara LOP											**Ready For Closure**
C7	15090	Ramos Oil	210 G St	Lincoln	Region 5S						UNK			UNK		Not Ready For Closure

Table 2

INDEPENDENT UST CASE CLOSURE REVIEW

UST Cleanup Fund 5-Year Review
Recommended Closed

Study No.	Claim No.	Site Name	Site Address	Site City	Agency	Excessive GW Concentrations	Free Product Present	Plume Not Stable / Migrating	Inadequate Characterization	Wells Potentially Impacted	WQO's Not Reached Before Used	Nearby Land Use Residential	Discharges to Surface Water	Potential Human Health Risk	Potential Environmental Risk	Recommendation
O1	502	Colfax ARCO Mini-Market	504 Auburn Street	Colfax	Region 5S									■		Not Ready For Closure
O2	9204	Ken's Auto Repair	13155 Lincoln Way	Auburn	Region 5S	■								■		Not Ready For Closure
O3	10278	Alright Parking Lot	4180 Wilshire Blvd	Los Angeles	Region 4	■	■		■	UNK	UNK			UNK		Not Ready For Closure
O4	10596	Merced Co. Corporation Yard	440 6th Ave	Gustine	Merced LOP	■		UNK	■		UNK	UNK				Not Ready For Closure
O5	12768	Hollandia Dairy	622 E Mission Rd	San Marcos	San Diego LOP	■		UNK	■	UNK	UNK			UNK		Not Ready For Closure
O6	12791	Sierra Superstop #10	890 Oro Dam Rd	Oroville	Region 5S											**Ready For Closure**
O7	13747	Siebert's Oil Co., Inc.	2837 Parkway Dr N	Fresno	Region 5F											**Ready For Closure**
O8	14238	Alta Sierra Gas	10032 Alta Sierra Dr	Grass Valley	Nevada LOP									■		Not Ready For Closure
O9	15483	Los Olivos Garage	2900 Grand Ave	Los Olivos	Santa Barbara LOP											**Ready For Closure**
O10	16616	Lost Nugget Market	16448 Hwy 49	Camptonville	Region 5S											**Ready For Closure**
O11	1146	John's Auto Repair	3454 Santa Rosa Ave	Santa Rosa	Sonoma LOP		UNK			UNK		UNK		UNK		Not Ready For Closure
O12	1668	Sacramento Exec. Airport	6151 Freeport Blvd	Sacramento	Sacramento LOP											**Ready For Closure**
O13	2118	Thrifty Oil #123	434 5th Ave W	Escondido	San Diego LOP	■		■	■	UNK	UNK			UNK		Not Ready For Closure
O14	5435	Exxon #7-9134	1102 Hollister St	San Diego	San Diego LOP	■	UNK			UNK	UNK			UNK		Not Ready For Closure
O15	5510	Mobil #11-KLC	402 Mission St W	Santa Barbara	Santa Barbara LOP	■						■				Not Ready For Closure
O16	5749	Mobil #04-GPE	229 E St	Marysville	Region 5S	■		■								Not Ready For Closure
O17	7795	Rapid Gas #51	909 Pacific Coast Hwy W	Harbor City	Region 4	■		■	■			■		UNK		Not Ready For Closure
O18	9979	D & D Wholesale Tires	409 Hwy 12 W	Rio Vista	Solano LOP	■		■	■			■		UNK		Not Ready For Closure
O19	12240	S.F. Oakland Truck Stop	8255 San Leandro St	Oakland	Alameda LOP	■	■	UNK	■			UNK	UNK		UNK	Not Ready For Closure
O20	12477	United Oil #14	2500 Magnolia St	Burbank	Region 4	■	■	■	■	UNK	UNK	■		UNK		Not Ready For Closure
O21	12622	Mammoth Mo-Mart	3275 Main St	Mammoth Lakes	Region 6T											**Ready For Closure**
O22	13117	Rapid Gas #35	4558 Imperial Hwy W	Hawthorne	Region 4	■	■	■	■	UNK	UNK	■		UNK		Not Ready For Closure
O23	13909	Baljian Service Center	7490 La Palma Ave	Buena Park	Region 8	■										Not Ready For Closure
O24	14066	Alvidres 76 Service Station	100 West Front St	Buttonwillow	Kern LOP				■			■				Not Ready For Closure
O25	14280	Gas 4 Less	924 10th St	Antioch	Region 5S				■			■				Not Ready For Closure
O26	15232	Santa Cruz Texaco	1024 Water St	Santa Cruz	Region 3			■	■	UNK	UNK			UNK		Not Ready For Closure
O27	15652	Buy-N-Save Market	225 7th St	Los Banos	Merced LOP	■		■	■	UNK	UNK	■		UNK		Not Ready For Closure
O28	16420	Downtown Tire & Auto Repair	550 Main St	Red Bluff	Region 5R											**Ready For Closure**

C1

Independent UST Case Closure Review

Site Name	Triple S Tires – Former Dave's Pit Stop
Site Address	164 Calistoga Road Santa Rosa, CA
Lead Agency	North Coast RWQCB (R1)
USTCF Claim No.	412 ($368,428)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHd	--	--	--
TPHg	900	MW-1	Decreasing (v)
Benzene	ND <0.5	--	--
MTBE	8.3	MW-1	Decreasing (v)
PCE	19	MW-2R	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor?	775 ft

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	UNK
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	Yes
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	UNK

Regulatory Status & Directives

- Reports were rejected in GeoTracker due to PCE data being omitted.
- Waiting for one more sampling event to evaluate if additional corrective action is necessary.

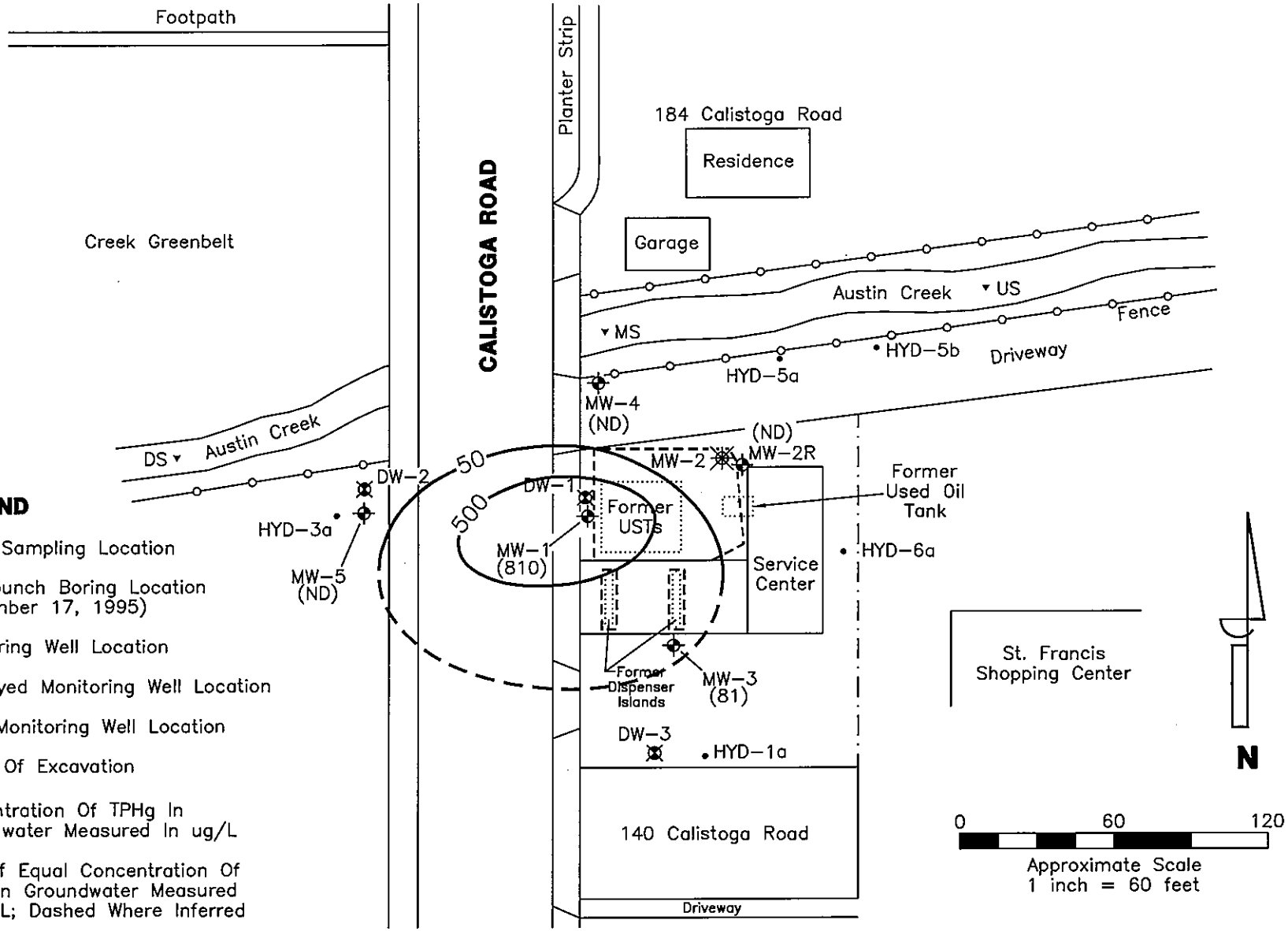
Closure Evaluation

- PCE is present in site wells, but it is believed to have migrated on to the site from an off-site source. This, however, has not been fully substantiated to the regulatory agency.
- The presence of PCE at the site has not been adequately evaluated.
- Petroleum hydrocarbons at the site have significantly reduced since remedial excavation activities.
- Petroleum hydrocarbons and MTBE are present at concentrations unlikely to present a significant risk to human health or the environment
- Groundwater is at ~ 5' bgs
- The nearby creek represents a potential environmental receptor.
- Domestic well sampling indicates that it has not been impacted by site contaminants
- If PCE can be demonstrated to be from an off-site source, case should be closed.

Recommendation

Closure not appropriate at this time. Warrants further regulation.

Reason: PCE present in site wells – source unknown. If source is not related to site activities, case should be closed.



LEGEND

- Creek Sampling Location
- Hydropunch Boring Location (November 17, 1995)
- Monitoring Well Location
- Destroyed Monitoring Well Location
- Deep Monitoring Well Location
- Limits Of Excavation
- (810) Concentration Of TPHg In Groundwater Measured In ug/L
- 500 Line Of Equal Concentration Of TPHg In Groundwater Measured In ug/L; Dashed Where Inferred
- (ND) Not Detected

APEX ENVIROTECH, INC.

DRAWN BY: D. Alston
DATE: 7/7/09
REVISIONS

SHALLOW-ZONE TPHg IN GROUNDWATER ISOCONCENTRATION MAP, JUNE 18, 2009

Former Dave's Pit Stop No. 1
164 Calistoga Road
Santa Rosa, California

FIGURE
5

PROJECT NUMBER:
ERA02.028

C2

Independent UST Case Closure Review

Site Name	Valley Convenience Store #5
Site Address	1108 Main Street St. Helena, California
Lead Agency	Napa County
USTCF Claim No.	986 ($918,191)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	1600	EW-4	Stable (v)
Benzene	ND<0.5	MW-10	Decreasing(v)
MTBE	16	MW-5	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

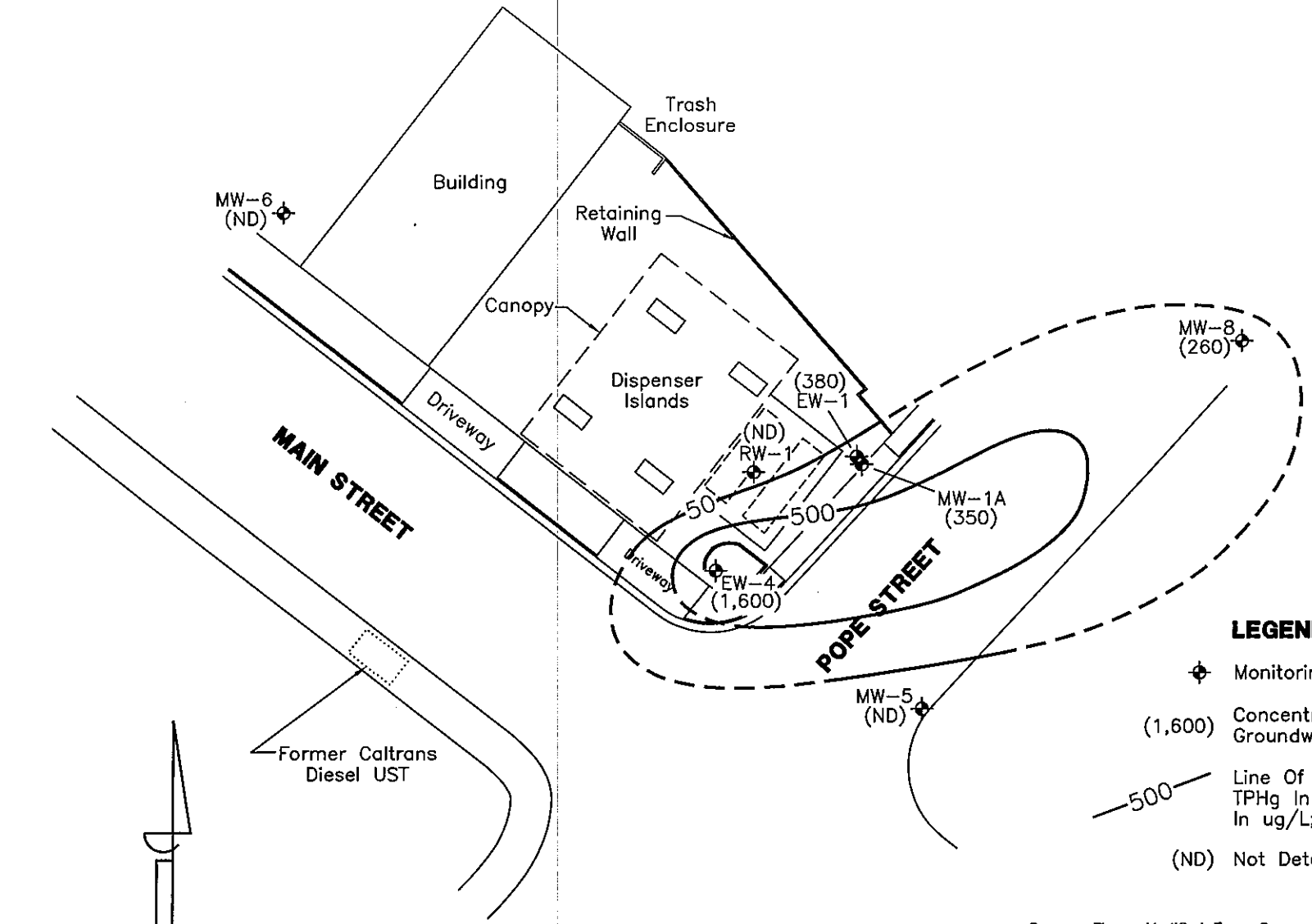
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes (nearby Site)
Distance to Nearest Receptor	300' (crossgradient)

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring

Closure Evaluation
• Groundwater at ~4 to 5' bgs • Trend analysis demonstrates that constituents of concern across the site are decreasing with respect to time with exception to TPHg in well EW-4. With exception to EW-4, all wells should reach WQO's within 5 years. • EW-4 is located on-site and does contain benzene, indicating that the contaminants are old. TPHg has limited mobility when the volatile fraction has been removed. • MTBE concentrations are low and cannot reasonably be considered a threat to human health and the environment • Further Active Remediation does not appear to be warranted at the current contaminant concentrations.

Recommendation
Should be granted No Further Action status; does not warrant further regulation. Reason: TPH concentrations are decreasing and plume is stable; MTBE concentrations are low and unlikely to impact human health or environment.



LEGEND

- Monitoring Well Location
- (1,600) Concentration Of TPHg In Groundwater Measured In ug/L
- 500 Line Of Equal Concentration Of TPHg In Groundwater Measured In ug/L; Dashed Where Inferred
- (ND) Not Detected

Source: Figure Modified From Survey Provided By Morrow Surveying.

APEX ENVIROTECH, INC.

DRAWN BY:	D. Alston
DATE:	10/1/09
REVISIONS	

TPHg IN GROUNDWATER ISOCONCENTRATION MAP: SEPTEMBER 15, 2009

Vintage Beacon/Valley Convenience Store No. 5
1108 Main Street
St. Helena, California

FIGURE **4**

PROJECT NUMBER: VCS52.002

C3

Independent UST Case Closure Review

Site Name	BAR-ALE
Site Address	17 Copeland Street Petaluma, CA
Lead Agency	San Francisco Bay RWQCB (R2)
USTCF Claim No.	1884 ($349,619)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHd	ND<50	--	--
TPHg	ND<50	--	--
Benzene	ND<0.5	--	--
MTBE	ND<0.5	--	--
DIPE	8.7	MW-5	Decreasing (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

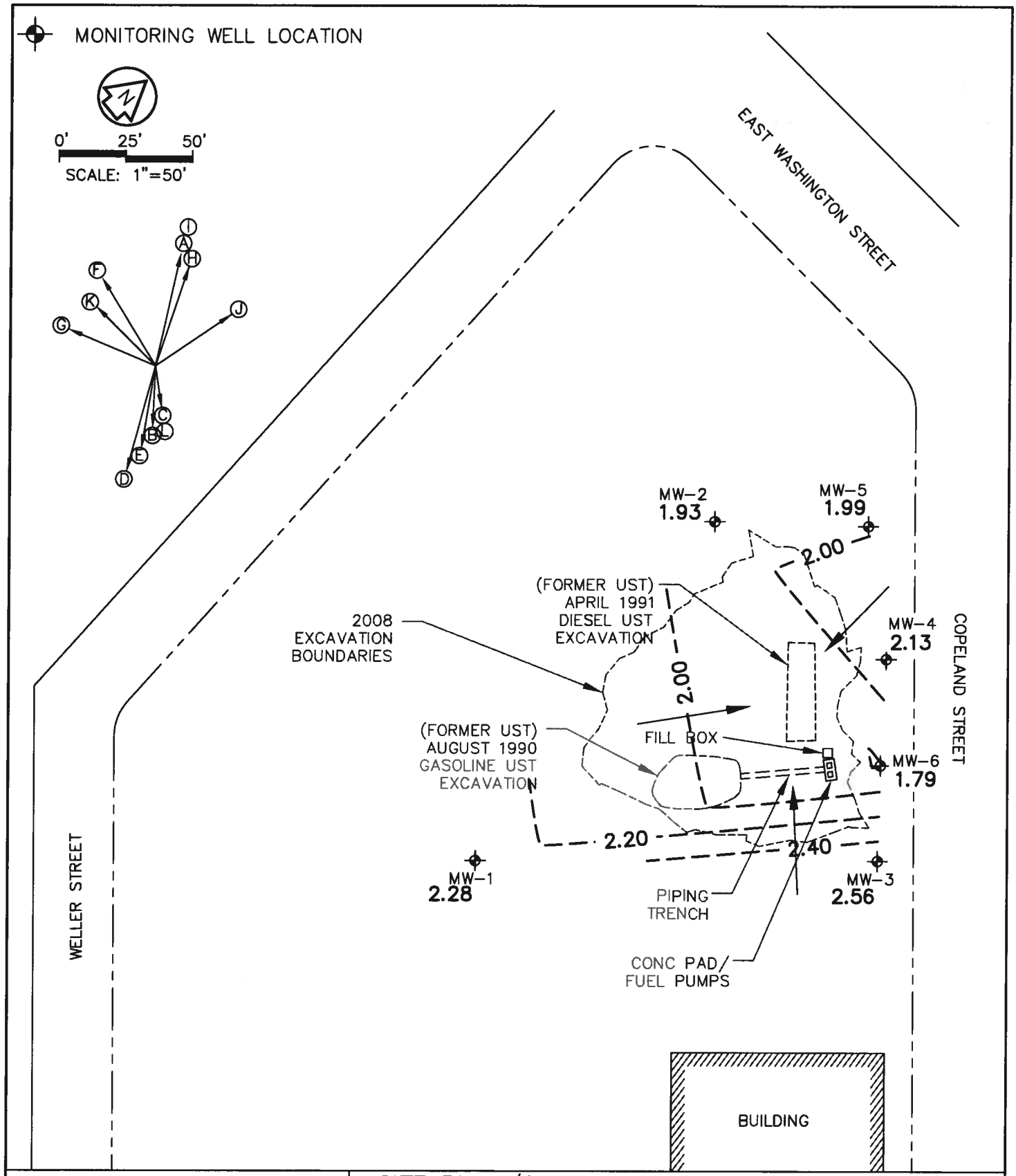
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor?	1,000 ft

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• No Regulatory correspondence since December 2007.

Closure Evaluation
• Groundwater is at ~6 to 7' bgs • Extensive excavation activities removed impacted soil to below residential risk screening levels. A total of 3,373 tons of impacted soil and 12,000-gallons of groundwater was removed during excavation activities. • Site has not been sampled since September 2008 at which time TPHg, TPHd, BTEX and fuel oxygenates were all ND with the exception of DIPE at a concentration of 8.7 ug/L. • Closure requested in November 2008 excavation summary report.

Recommendation
Should be granted No Further Action status; does not warrant further regulation. Reason: Concentrations of all petroleum hydrocarbons below laboratory detection limits. DIPE present at 8.7 ug/L and decreasing.



TRANS TECH CONSULTANTS
930 SHILOH RD., BLDG 44, SUITE J
WINDSOR, CA 95492
PHONE: 707-575-8622 FAX: 707-837-7334

SITE PLAN/GROUNDWATER ELEVATION CONTOUR MAP FOR 9/15/08

BAR ALE
17 COPELAND STREET
PETALUMA, CALIFORNIA

PLATE: 2

DRAWN BY:	DWG NAME:	APPR. BY:	JOB NUMBER:	W.O. NUMBER:	REVISIONS:	DATE:
JLP	1790.01 BASE	BRH	1790.01	B-218		11/18/08

C4

Independent UST Case Closure Review

Site Name	Redwood Card Lock
Site Address	401 Healdsburg Ave Healdsburg, CA
Lead Agency	North Coast RWQCB (R1)
USTCF Claim No.	2757 ($711,111)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHd	ND <50	--	--
TPHg	100	MW-5	Decreasing (v)
Benzene	ND <0.5	--	--
MTBE	21	MW-5	Decreasing (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor?	>1000'

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Annual monitoring recommended in July 2009.

Closure Evaluation
• Groundwater is at ~8' bgs • Impacted soil was excavated and impacted groundwater was pumped from the open excavation. • Regional Board documented that the site would be ready for NFA if vertical definition was achieved and if a sensitive receptor survey was completed. • Sensitive receptor survey indicates no domestic wells within a 500' radius of the site (door to door survey), and no municipal wells within ½ mile. Sensitive Receptor Update (2007) indicates no wells within a 1000' radius. • Foss Creek is located approximately 200' from the site, however there is reportedly no hydraulic connection between groundwater beneath the site and the creek. • Additional assessment was completed and reported in May 2007, no response from Regional Board is posted on GeoTracker. • Groundwater sampling continues to support closure of site.

Recommendation
Should be granted No Further Action status; does not warrant further regulation. Reason: Concentrations of petroleum hydrocarbons at or below WQO's; MTBE concentration low and unlikely to impact receptors

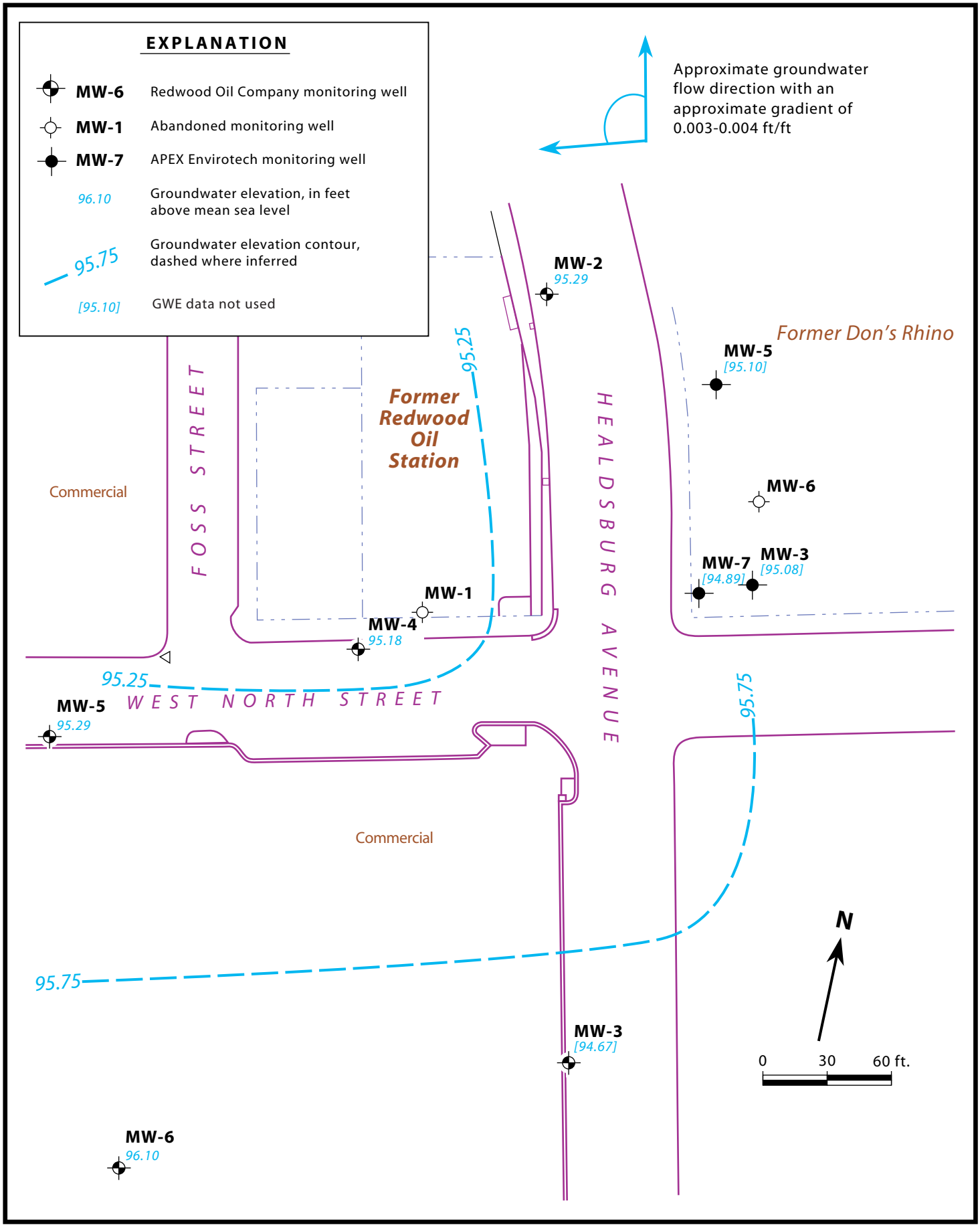


Figure 2. Monitoring Well Location and Groundwater Elevation Contour Map - February 6, 2009 - Former Redwood Oil Service Station #107, 401 Healdsburg Avenue, Healdsburg, California

98-523-14 [GW 2-09] 2/26/09

C5

Independent UST Case Closure Review

Site Name	Circle K #5423
Site Address	7796 Sunrise Blvd Citrus Heights, CA
Lead Agency	Sacramento County
USTCF Claim No.	7909 ($86,586)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	53	MW-7	Decreasing(v)
Benzene	ND<0.5	--	--
MTBE	56	MW-7	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Performance of two more quarters of groundwater monitoring to verify a reducing trend in MW-7, then closure.

Closure Evaluation

- Groundwater is at ~18' bgs
- Contamination on site has been reduced to below laboratory detection limits for all constituents except MTBE, which is present at 14 ug/L
- MTBE contamination is identified in off-site well MW-7 at a concentration of 56 ug/L. The MTBE concentration in this well exhibits a decreasing trend, which could be indicative of a detached plume.
- A recent off-site assessment performed in the vicinity of, and downgradient of MW-7 indicates that MTBE impacts are limited. This indicates that even if the MTBE found in MW-7 represents a detached plume, the total mass and maximum concentration is likely insignificant, and does not represent a threat to human health and ecological receptors.
- Two more quarters of groundwater monitoring is required by the agency to verify that a reducing trend is occurring in MW-7. This is based on a Sacramento County requirement that the Kendall Trend Analysis demonstrates a 95% certainty that a declining trend exists, and that a minimum of 12 sampling events occur to provide an adequate data set for accurate evaluation.
- As part of this study, Closure Solutions performed an independent Kendall Trend Analysis on the MTBE on well MW-7 from September 2005 to present. The results indicate that the MTBE concentrations are declining, with a 99.8% confidence. Based on Sacramento County guidance, it appears that this site already qualifies for closure with the existing data set.

Recommendation

Should be granted No Further Action status; does not warrant further regulation.

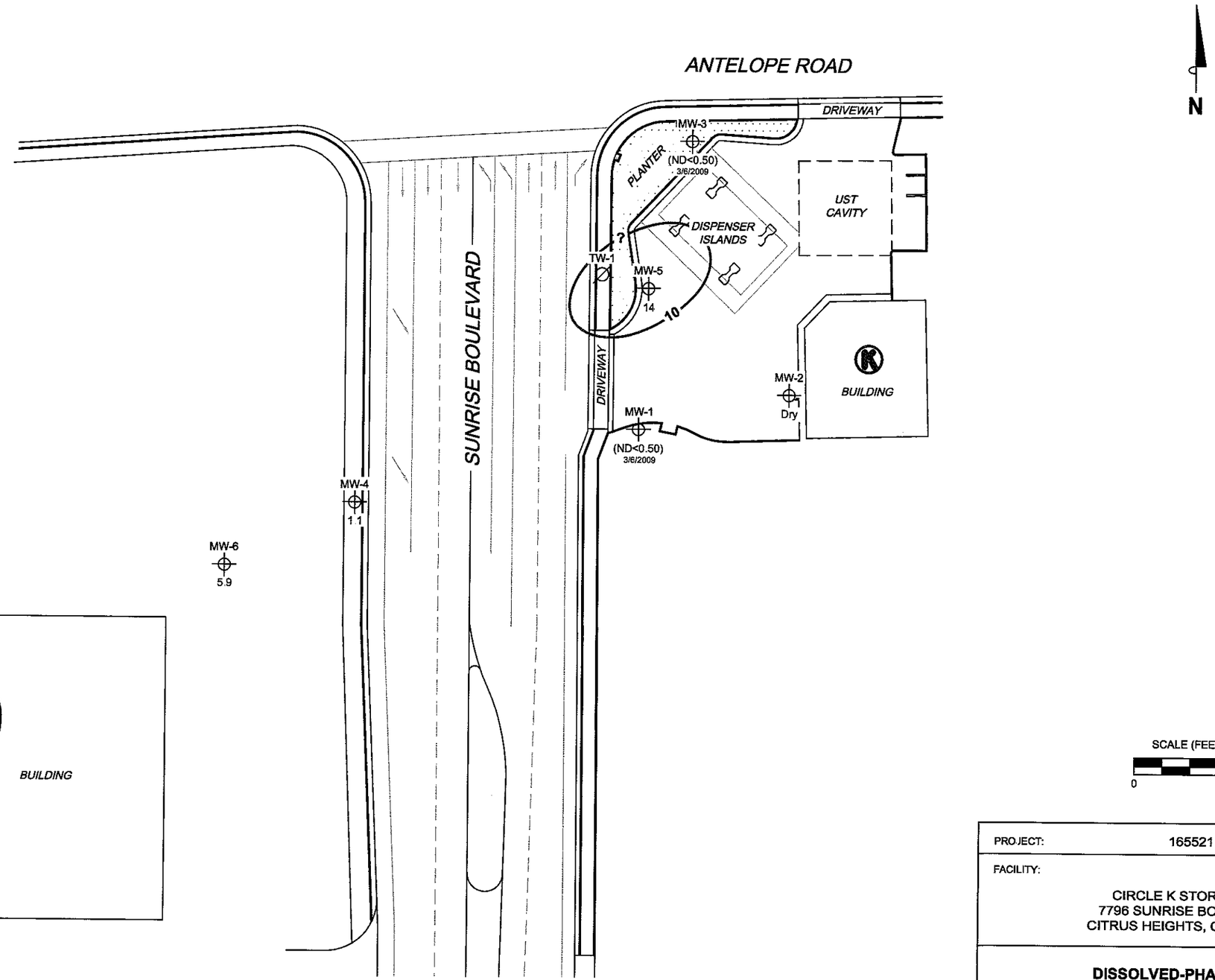
Reason: TPH and benzene concentrations are low to below detection limits. MTBE plume likely detached, however represents low concentration and mass; MTBE unlikely to impact receptors.

LEGEND

MW-7 Monitoring Well with Dissolved-Phase MTBE Concentration (µg/l)

TW-1 Abandoned Well

10 Dissolved-Phase MTBE Contour (µg/l)



SCALE (FEET)

0 50

NOTES:

Contour lines are interpretive and based on laboratory analysis results of groundwater samples. MTBE = methyl tertiary butyl ether. µg/l = micrograms per liter. ND = not detected at limit indicated on official laboratory report. ( ) = representative historical value. UST = underground storage tank. Results obtained using EPA Method 8260B.

PROJECT:	165521
FACILITY:	CIRCLE K STORE 05423 7796 SUNRISE BOULEVARD CITRUS HEIGHTS, CALIFORNIA
DISSOLVED-PHASE MTBE CONCENTRATION MAP May 8, 2009	
TRC	**FIGURE 5**

MS=1:1 05423-003 L:\Graphics\QMS NORTH-SOUTH\x-0000\05423-1\05423QMS(NEW).dwg May 28, 2009 - 9:26am aakers

C6

Independent UST Case Closure Review

Site Name	John's Chevron Station
Site Address	3595 Sagunto Street Santa Ynez, CA
Lead Agency	Santa Barbara County LOP
USTCF Claim No.	13084 ($230,701)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	18	MW-3	Decreasing (v)
Benzene	ND<0.5	--	--
MTBE	ND<0.5	--	--

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK
Depth to Groundwater	58 ft bgs

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Groundwater sampled in 1Q09.
- 10/2007 directive letter to implement RAP which includes installing 2 nested remediation wells and implementation of air-sparging and HVDPE.
-

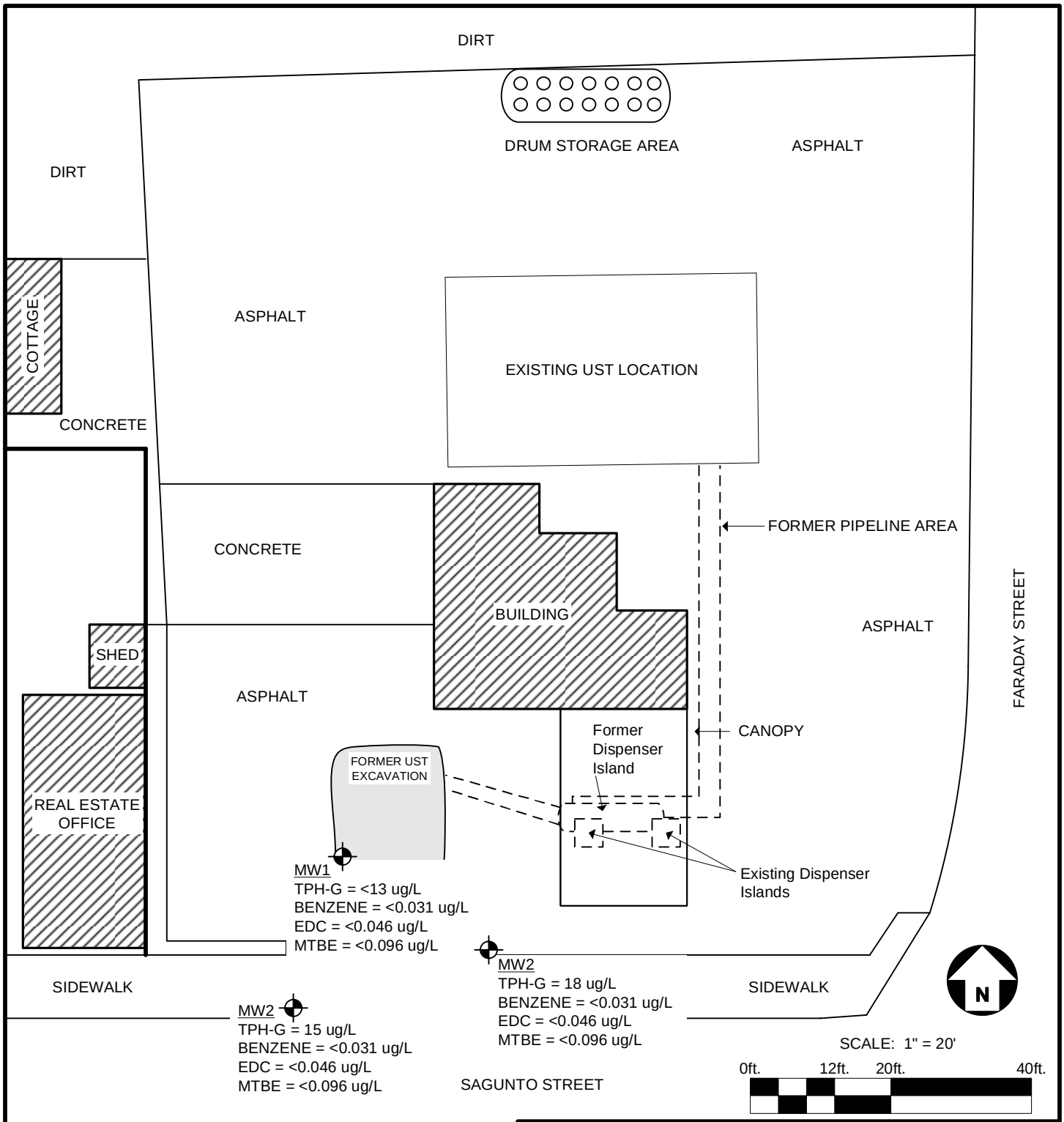
Closure Evaluation

- Groundwater is at ~58' bgs
- All constituents are ND in all wells except for TPHg at a concentration of 13 and 18 *micrograms* per liter. These concentrations are laboratory "j" flagged since the reporting limit is 50 ug/L.
- Site assessment in 2005 identified one location of relatively significant impact – boring B12. A grab-groundwater sample collected at this location contained 70,000 ug/L TPHg, 2,900 ug/L benzene, 56 ug/L MTBE. All other borings showed very little impact. Note that B12 is located approximately 5' from MW-1, indicating that the impact is very limited in spatial extent.
- Groundwater samples collected from borings delineate groundwater around former UST excavation.
- Groundwater gradient changes seasonally 180 degrees from northeast to southwest.
- Additional groundwater monitoring will not provide any useful information.

Recommendation

Should be granted No Further Action status; does not warrant further regulation.

Reason: Concentrations of constituents of concern are below WQO's.



KEY

MW1 TPH-G = 1000 ug/L* BENZENE = 1.0 ug/L* EDC = 0.5 ug/L* MTBE = 5.0 ug/L*	MONITORING WELL LOCATION WITH IDENTIFICATION AND CONTAMINANT CONCENTRATION REPORTED IN MICORGRAMS PER LITER (ug/L) *NOTE: CONCENTRATIONS LISTED ARE MAXIMUM CONTAMINANT LEVELS (MCLs) PER LUFT/RWQCB
UST	UNDERGROUND STORAGE TANK, REMOVED SEPTEMBER 1997

CONTAMINANT CONCENTRATION MAP
JUNE 3, 2009

JOHN'S CHEVRON STATION
3595 SAGUNTO STREET
SANTA YNEZ, CALIFORNIA

DMI-EMK Environmental Services, Inc.

FIGURE 4

DATE: 7/28/09

C7

Independent UST Case Closure Review

Site Name	Ramos Oil
Site Address	210 G Street Lincoln, CA
Lead Agency	Central Valley RWQCB (5S)
USTCF Claim No.	15090 ($446,612)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHd	1200	MW-10	Inc./Stable (v)
TPHg	180	MW-10	Inc./Stable (v)
Benzene	ND<0.5	--	--
MTBE	450	MW-9	Decreasing (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

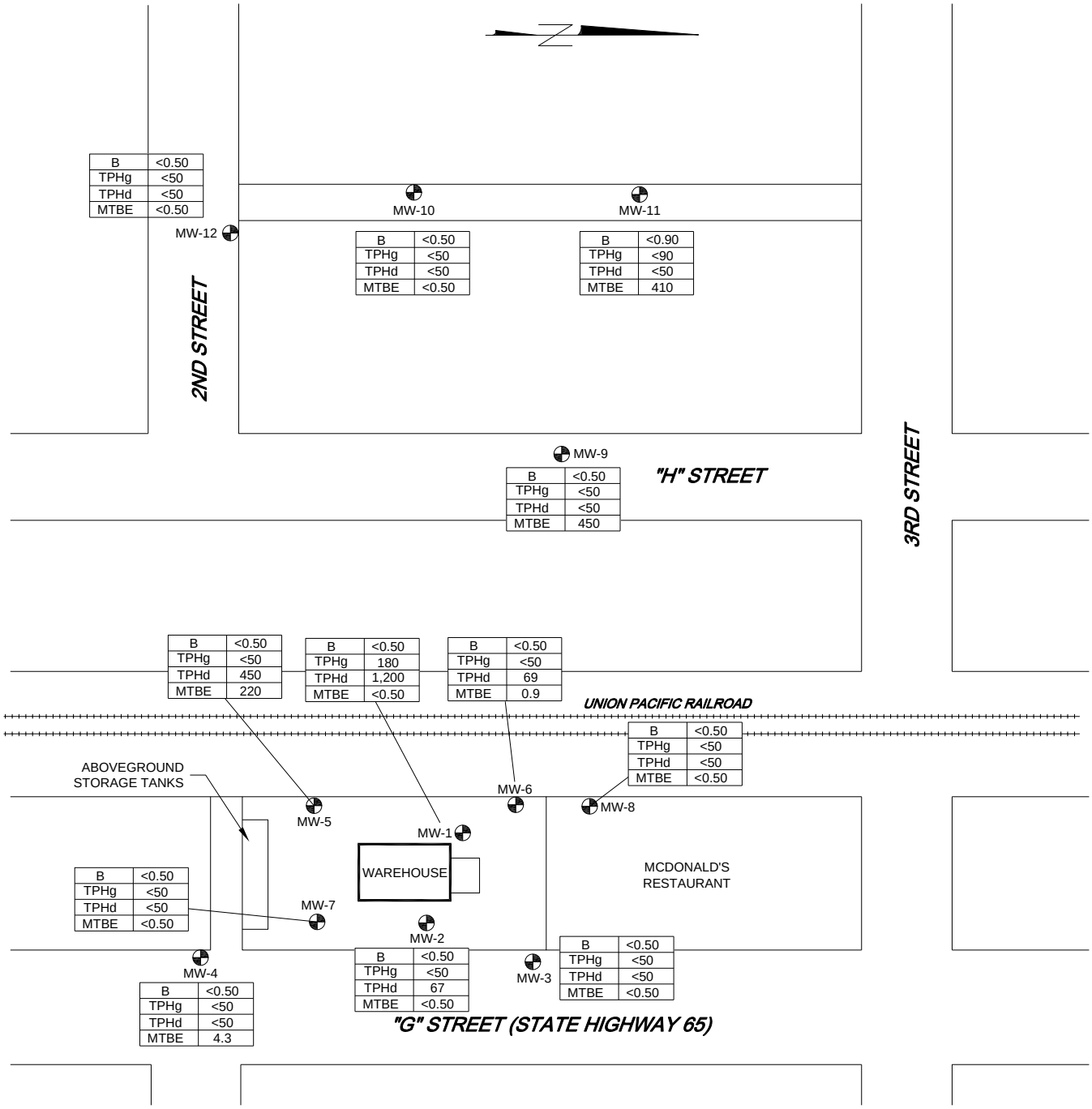
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor	1000' upgradient

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring

Closure Evaluation
• Groundwater varies seasonally from ~7-8' bgs in 1Q to ~9-10' bgs in 3Q • A soil vapor survey was conducted in 2009. Results of the survey indicate that soil vapor does not pose a significant threat to human health and welfare • A sensitive receptor survey performed at the site indicates that the closest known drinking water well to the site is located approximately 1000' upgradient of the property. The closest known downgradient/crossgradient well is believed to be 1700' from the site. • Diesel contamination was found in the source area during a recent remedial excavation – the extent and magnitude of the diesel impacts identified were greater than initially expected, and because of the location of existing utilities, the impacts could not be fully removed; • Diesel is a highly immobile constituent of concern that cannot be reasonably considered a threat to existing uses of water at the concentrations found unless a well is installed within the source area • MTBE in furthest off-site well MW-11 (410 ug/L) appears to exhibit an increasing trend, which could indicate a migrating, detached plume. The source of the MTBE is debatable – Ramos' consultant contends that the MTBE is more likely from a nearby gasoline service station with a known release, however there is insufficient data to fully support this hypothesis at this time • The concentration in MW-11 is increasing, and if the concentration trend is similar to that found in MW-9, the concentration could ultimately reach up to 1,000 ug/L. • MTBE is highly mobile, however given that it has been removed from the fuel supply, the MTBE discharge has clearly been stopped. • It is extremely unlikely that the detached MTBE plume will impact the existing downgradient receptor, however due to the MTBE concentration and uncertainty with respect to plume location in the future, Water Quality Objectives may not be achieved before the resource is used. • It may not be acceptable public policy to allow detached MTBE plumes up to 1,000 ug/L to move unchecked through the subsurface in a residential setting irrespective of the distance to the receptor.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Though exiting drinking water wells are not likely to be impacted, the concentration of MTBE may too high to degrade through the processes of advection, dispersion and natural attenuation to ensure that the contaminants will reach WOQs before the resources is used.



0 100 FT

SCALE

LEGEND:

MW-1 MONITORING WELL LOCATION

B	<0.50
TPHg	180
TPHd	1,200
MTBE	<0.50

- B: BENZENE CONCENTRATION IN MICROGRAMS PER LITER (ug/L)
- TPHg: TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN ug/L
- TPHd: TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN ug/L
- MTBE: METHYL TERTIARY BUTYL ETHER IN ug/L

FIGURE 4

GROUNDWATER ANALYTICAL SUMMARY
9/16/09

RAMOS OIL CARDLOCK BULK PLANT
210 "G" STREET
LINCOLN, CA.

PROJECT NO. Ram-Lin	DRAWN BY M.L. 10/16/09
FILE NO. Ram-Lin Site	PREPARED BY CWB
REVISION NO. 1	REVIEWED BY

North State Environmental

O1

Independent UST Case Closure Review

Site Name	Colfax Arco Mini Market
Site Address	504 Auburn Street South Colfax, CA
Lead Agency	Central Valley RWQCB (5S)
USTCF Claim No.	502, 8533 ($475,593)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	7,400	MW-1	Stable (v)
Benzene	4.0	MW-1	Stable (v)
MTBE	3.5	MW-2	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

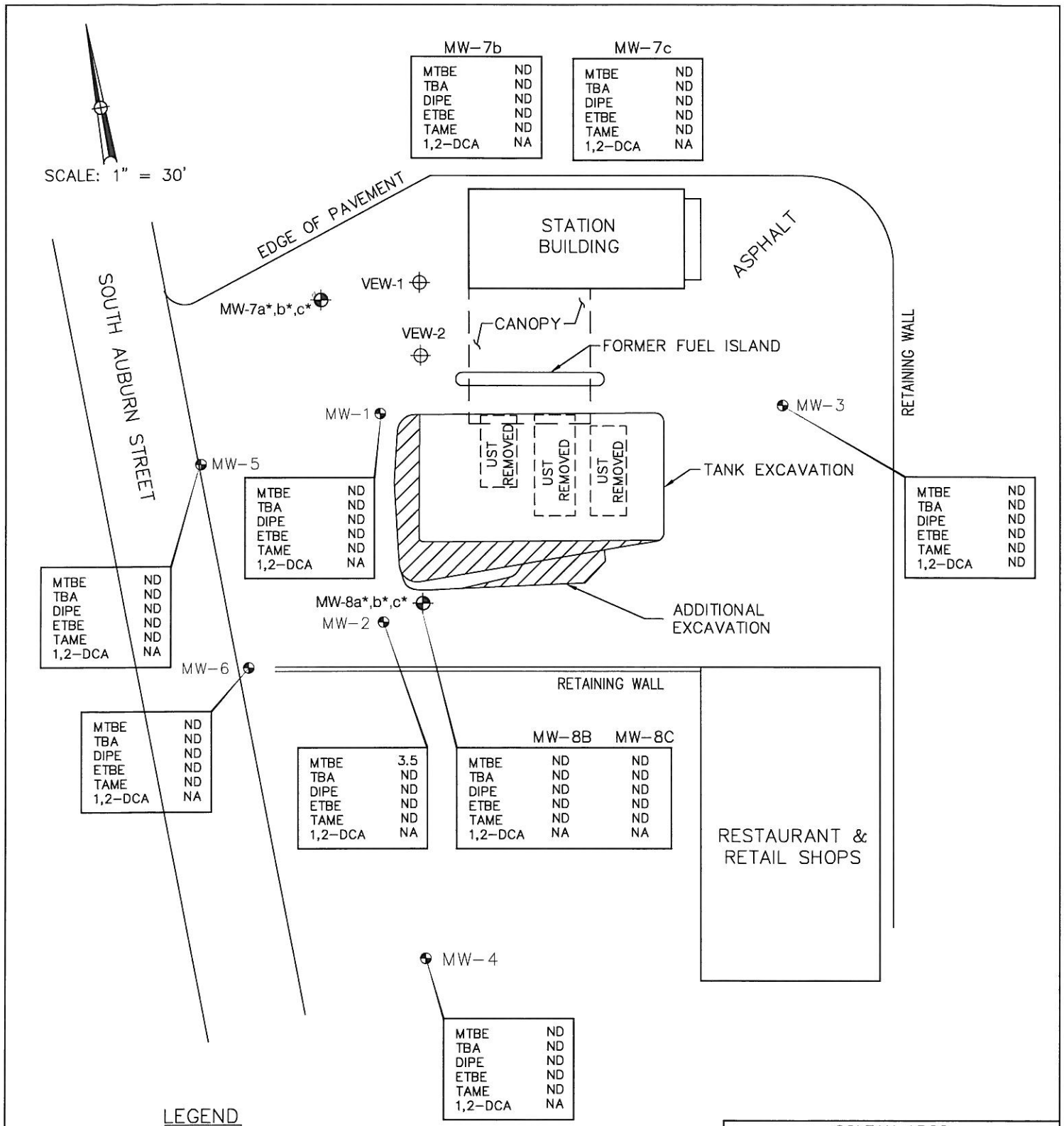
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor	1200’

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	No
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • Implementation of SVE at site to remediate shallow impacted soil that continues to provide seasonal source to impacted groundwater.

Closure Evaluation
• Groundwater is at ~13' bgs • Surrounding land use is commercial or undeveloped – no residential in immediate vicinity • Additional excavation was conducted during UST removal. Multiple pilot tests conducted at site. Most recent SVE conducted for 16 hrs (4 scfm(?)) and significant TPHg concentrations as high as 29,000 mg/m3. • The contaminant plume appears to be highly localized at this time – the only significantly impacted well is MW-1. The plume appears to be laterally defined in the downgradient direction. • The site is located on a hill with the downgradient well (MW-4) at a significantly lower elevation than onsite wells. • Two wells are located approximately 1200' from the site. Hydrologic barriers and topography protect against migration of contaminants to these receptors. • Concentrations of residual constituents of concern are present well above WQO's but do not appear to threaten current or probable beneficial uses. It is likely that the contaminants will degrade to WQO's before the resource is used. • A HHRA was conducted in 2006 and the concentrations in soil and groundwater did not indicate a risk above target threshold levels for commercial property use. The July 14 2006 Risk Based Corrective Action (RBCA) Reassessment (GHH, Inc.) concludes that "*Results of the RBCA assessment indicate that target risk levels are not met. Based on this assessment, it is GHH;s opinion that the concentration of impacted soil and groundwater are at acceptable levels for site closure*." • The Additional Site Assessment and Soil Vapor Survey Report (June 2008) revises the HHRA and indicates that cancer risk (8.30E-3) is above the target level of 1E-6.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Failed HHRA – Soil Vapor. Note that failure of an HHRA based on subsurface vapor concentrations does not necessarily indicate that indoor quality is unacceptable, but further investigation is warranted



LEGEND

- MONITORING WELL LOCATION
- VAPOR EXTRACTION WELLS
- MULTIPLE COMPLETION MONITORING WELLS

SAMPLED: APRIL 09, 2009

MTBE	METHY-TERT-BUTYL-ETHER
TBA	TERTIARY BUTYL ALCOHOL
DIPE	DI-ISOPROPYL ETHER
ETBE	ETHYL TERTIARY BUTYL ETHER
TAME	TERTIARY AMYL MATHYL ETHER
1,2-DCA	1,2-DICHLOROETHANE

COLFAX ARCO
520 SOUTH AUBURN STREET
COLFAX, CALIFORNIA
OXYGENATES & 1,2-DCA
IMPACTED GROUNDWATER DATA

GHH ENGINEERING, INC.
11960 Heritage Oak Place
Auburn, CA 95603
(530) 886-3100

INITIAL JLG
DATE 5/15/2009
JOB # 4198
FIG. # 5

May 15,2009-4:51pm X:\DRAWINGS\4198 Colfax Arco\SMR\1st 2009\FIG5.DWG

O2

Independent UST Case Closure Review

Site Name	Ken's Service Station
Site Address	13155 Lincoln Way Auburn, CA
Lead Agency	Central Valley RWQCB (5S)
USTCF Claim No.	9204 ($540,256)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	9,100	VW-1	Decreasing (v)
Benzene	1,500	MW-5	Decreasing (v)
MTBE	120	VW-1	Decreasing (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	No
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Quarterly Groundwater Monitoring • No remediation completed at site to date.

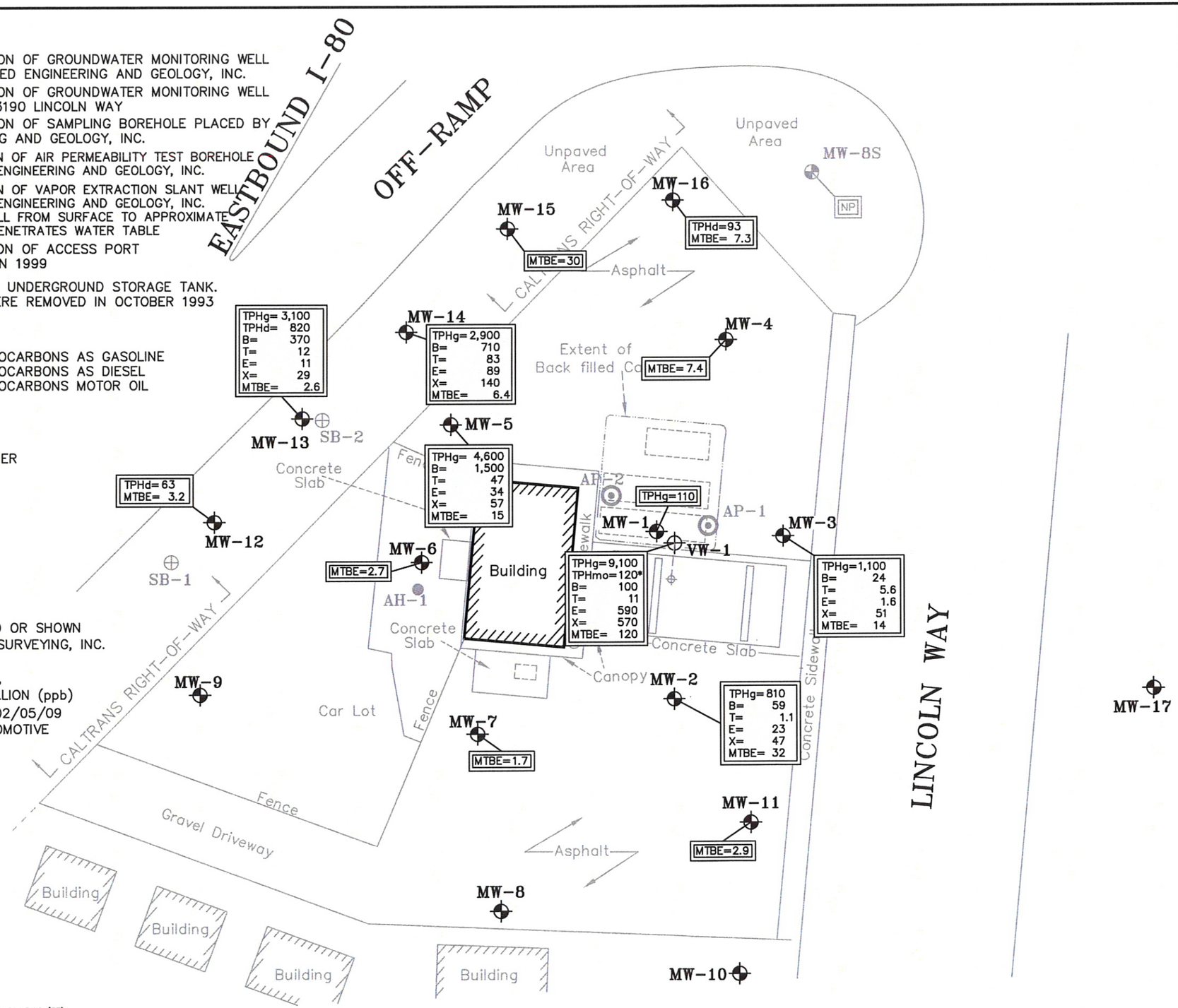
Closure Evaluation
• Groundwater is at ~10-12' bgs • Feasibility testing conducted indicated that SVE, GWE and Oxygen enhancement not feasible remedial options for site. Microbial tests indicate natural degradation as shown analytical testing and decreasing concentrations at site. • HHRA done for site and indicated that carcinogenic risk for adult and child residential receptor unacceptable. Levels for workers also exceeded. • Highest concentrations are in VW-1 located in under dispensers and cross gradient wells MW-5, MW-13 and MW-14. • Plume undefined cross gradient into I80 off ramp, though lateral definition is probably unwarranted and infeasible. MTBE plume defined to site.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Failed HHRA – Soil Vapor. Note that failure of an HHRA based on subsurface vapor concentrations does not necessarily indicate that indoor quality is unacceptable, but further investigation is warranted

LEGEND:

- APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELL INSTALLED BY APPLIED ENGINEERING AND GEOLOGY, INC.
- APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELL ASSOCIATED WITH 13190 LINCOLN WAY
- APPROXIMATE LOCATION OF SAMPLING BOREHOLE PLACED BY APPLIED ENGINEERING AND GEOLOGY, INC.
- APPROXIMATE LOCATION OF AIR PERMEABILITY TEST BOREHOLE PLACED BY APPLIED ENGINEERING AND GEOLOGY, INC.
- APPROXIMATE LOCATION OF VAPOR EXTRACTION SLANT WELL PLACED BY APPLIED ENGINEERING AND GEOLOGY, INC. SHOWS TREND OF WELL FROM SURFACE TO APPROXIMATE POINT WHERE WELL PENETRATES WATER TABLE
- APPROXIMATE LOCATION OF ACCESS PORT INSTALLED BY AEG IN 1999
- LOCATION OF FORMER UNDERGROUND STORAGE TANK. ALL FOUR TANKS WERE REMOVED IN OCTOBER 1993

TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
TPHd	TOTAL PETROLEUM HYDROCARBONS AS DIESEL
TPHmo	TOTAL PETROLEUM HYDROCARBONS MOTOR OIL
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	TOTAL XYLENES
MTBE	METHYL TERT BUTYL ETHER
NP	NOT PROVIDED
*	ATYPICAL



NOTE:

1) NOT ALL UTILITIES ARE LOCATED OR SHOWN
2) WELLS SURVEYED BY CALVADA SURVEYING, INC. AND AEG
3) ONLY POSITIVE RESULTS SHOWN, ALL RESULTS IN PARTS PER BILLION (ppb)
4) ONLY SAMPLES COLLECTED ON 02/05/09 FROM THE FORMER KEN'S AUTOMOTIVE REPAIR SITE ARE REPORTED

15' 0 15' 30'

1" = 30' +/-

JANUARY 11, 1995

REVISED MARCH 18, 2009

S:\AEG DOCUMENTS\KENS AUTO\KENS 2009\KENS AUTO 09A.DWG (57)

POSITIVE GROUNDWATER ANALYTICAL RESULTS 1Q09

FORMER KEN'S AUTOMOTIVE REPAIR

13155 LINCOLN WAY

AUBURN, PLACER COUNTY, CALIFORNIA

APPROVAL	DATE
	03/18/09
DS	4/20/09

FIGURE 4

APPLIED ENGINEERING AND GEOLOGY, INC.

P.O. BOX 247, LINCOLN, CA 95648

(916) 645-6014 (916) 645-6098 FAX

O3

Independent UST Case Closure Review

Site Name	Alright Parking Lot (Chevron Heritage #21-1315)
Site Address	4180 Wilshire Blvd Los Angeles, CA
Lead Agency	Los Angeles RWQCB
USTCF Claim No.	10278 ($465,798)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	14,000	MW-8	No Trend (v)
Benzene	110	MW-9	Decreasing (v)
MTBE	ND<0.5	--	--
TBA	31	MW-18	No Trend (v)
DIPE	33	MW-18	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

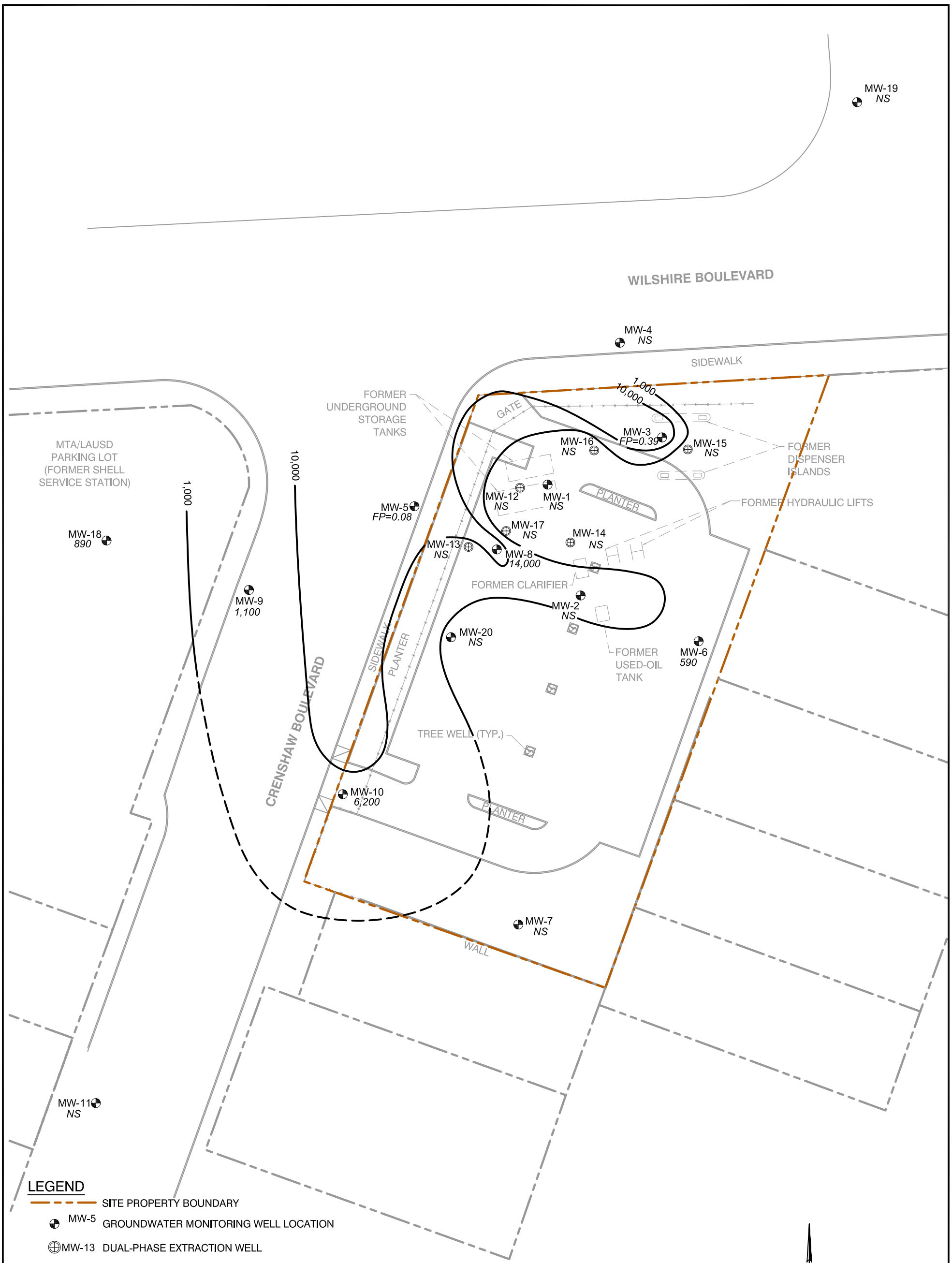
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	Yes
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Quarterly and Semi-Annual Groundwater Monitoring • Site is being redeveloped and some wells will be destroyed and replaced following site construction. • SPH skimmers in two wells at site • Remedial Action Plan will be implemented at site

Closure Evaluation
• Groundwater is at ~34' bgs • SPH present in two wells at site (MW-3: 0.39', MW-5: 0.08') • Residential properties crossgradient and upgradient. • Additional off-site investigation warranted • Additional remedial action proposed and appropriate.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: SPH present and not yet removed to extent practicable, site not adequately characterized



LEGEND

	SITE PROPERTY BOUNDARY
MW-5	GROUNDWATER MONITORING WELL LOCATION
MW-13	DUAL-PHASE EXTRACTION WELL
	TPH-G CONCENTRATION CONTOUR
790	TPH-G CONCENTRATION IN μg/L
ND<50	ANALYTE NOT DETECTED AT OR ABOVE THE LABORATORY METHOD REPORTING LIMIT
J	ESTIMATED VALUE
TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
µg/L	MICROGRAMS PER LITER
NS	NOT SAMPLED
FP=0.08	NAPL THICKNESS IN FEET-NOT SAMPLED

No warranty is made by Stantec as to the accuracy, reliability, or completeness of these data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed electronically, and may be updated without notification. Any reproduction may result in a loss of scale and or information.

Stantec
3017 KILGORE ROAD, SUITE 100
RANCHO CORDOVA, CALIFORNIA
PHONE: (916) 861-0400/861-0430 (FAX)

FOR:
FORMER TIDEWATER SERVICE STATION
CHEVRON SITE NO. 21-1315
4180 WILSHIRE BOULEVARD
LOS ANGELES, CALIFORNIA

DISSOLVED PHASE TPH-G CONCENTRATIONS IN GROUNDWATER
JUNE 4, 2009

FIGURE: 4

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211901030	ARA	MZ	DR	6/30/09

FILEPATH:K:\CADD files\Other offices work\REDLANDS\Tidewater-Wilshire Blvd, LA\CP-21131-GW-2Q09.dwg|aandrews|Jul 07, 2009 at 12:12|Layout: TPH

O4

Independent UST Case Closure Review

Site Name	Merced County Corporation Yard
Site Address	440 6th Avenue Gustine, CA
Lead Agency	Merced County LOP
USTCF Claim No.	10596 ($284,122)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	79,000	MW-18	Decreasing (v)
Benzene	6,600	MW-22	Decreasing (v)
MTBE	ND<0.5	--	--

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

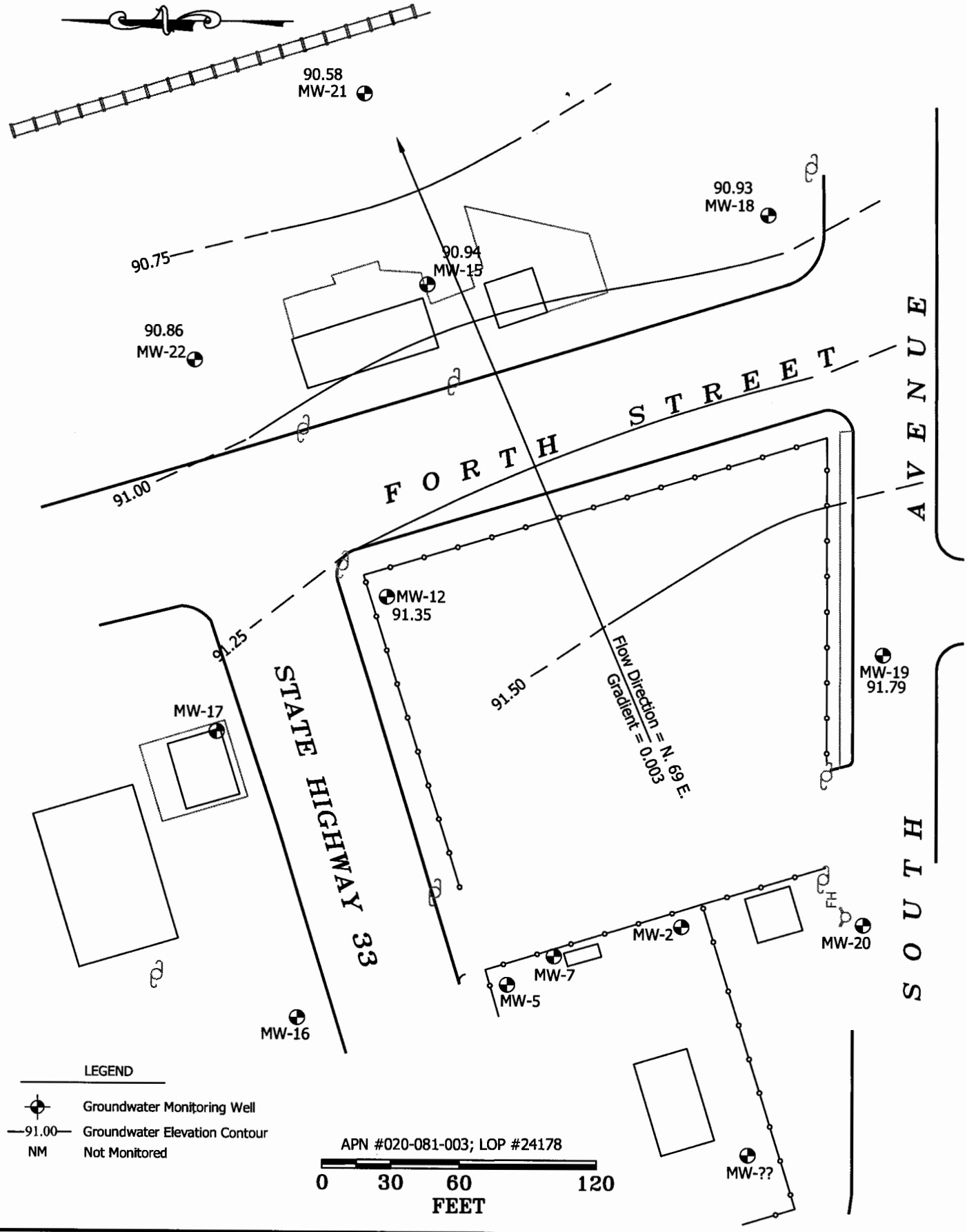
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor	1,000 ft

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	UNK
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	UNK
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • 4Q06 is most current groundwater sampling data available. • Consultant proposing 98 air sparge wells(?)

Closure Evaluation
• Most recent groundwater data reports depth to water of ~7-9' bgs • Municipal supply well located 50' from site, however this well is not used due to high nitrate concentration • Current groundwater data has not been uploaded to GeoTracker. Remediation and natural processes could have changed the existing concentrations significantly in the past 3 years. Effective closure review is not possible without missing data. • Vapor survey and HHRA do not indicate significant threat to human health. • Very large, extensive plume with 50,000 ug/L benzene detected in groundwater from offsite soil boring. • Subject site is not residential, however residential properties are nearby

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Full site characterization unavailable in GeoTracker; contaminant concentrations above low risk thresholds; unable to fully evaluate plume stability.



HerSchy Environmental, Inc.
Environmental Consulting and Remediation

P. O. Box 229
Bass Lake, California 93604-0229
Tel. (559) 641-7320, Fax (559) 641-7340

GROUNDWATER ELEVATION CONTOUR MAP
December 2006

Merced Co. Public Works Dept., Corporation Yard

440 Sixth Street, Gustine, California

DATE:	JANUARY 2007
FILE NO.:	A23-01
DRAWN BY:	KAH

FIGURE 2

O5

Independent UST Case Closure Review

Site Name	Hollandia Dairy
Site Address	622 E Mission Road San Marcos, CA
Lead Agency	San Diego County LOP
USTCF Claim No.	12768, 13056 ($153,914)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	1,700	MW-4	Decreasing (v)
Benzene	980	MW-4	Stable (v)
MTBE	4,600	MW-5	Decreasing (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	UNK
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring

Closure Evaluation
• Groundwater is at ~4-6' bgs • MTBE plume not defined to west (cross-gradient) • Groundwater plume does not appear consistent with groundwater flow direction • Groundwater sampling and corrective action is sporadic • Sensitive receptor or well survey not available on GeoTracker. Unknown if performed. • 2008 report indicates that CAP preparation is recommended.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Site is not adequately characterized; concentrations exceed low risk criteria

LEGEND

B8/MW8 Boring/Monitoring Well Location Completed by EOC on April 21, 2006

SG1 Soil Gas Collection Point Completed by EOC & H&P Mobile Geochemistry on May 5, 2006

B1/MW1 Boring Monitoring Well Location Completed by EOC on June 23 & 24, 2003

Note that this revised site plan is based on January 19, 2005 and May 7, 2007 surveys of the site performed by W.A. Craig & Associates, a California licensed surveyor.

GROUNDWATER MONITORING REPORT
OCTOBER 20, 2008

HOLLANDIA DAIRY RETAIL FACILITY

MW3

	7/17/03	7/27/04	10/22/04	1/19/05	5/20/05	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500	<500	<500	<500	<500	<500
TPHg	1,400	3,300	<500	700	<500	880	2,100	<500	<500
MTBE	14	<100	<100	<100	<10	<10	<10	<1.0	<5.0
Benzene	1,500	1,100	990	120	140	77	200	26	54

MW8

	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500
TPHg	<500	<500	<500	<500
MTBE	<1.0	<1.0	<1.0	<1.0
Benzene	<0.5	<0.5	<0.5	<0.5

MW4

	7/17/03	7/27/04	10/22/04	1/19/05	5/20/05	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500	<500	<500	<500	<500	<500
TPHg	4,400	4,000	3,000	5,300	5,400	6,200	24,000	1,600	1,700
MTBE	13	<100	<100	<100	<100	<100	<20	<10	<25
Benzene	1,500	940	980	980	1,600	1,500	1,400	780	980

MW5

	7/17/03	7/27/04	10/22/04	1/19/05	5/20/05	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500	<500	<500	<500	<500	<500
TPHg	2,600	5,500	2,000	2,500	1,500	2,100	1,100	600	<500
MTBE	19,000	16,000	14,000	14,000	11,000	12,000	4,500	7,900	4,600
Benzene	1,600	240	<100	120	<100	130	110	69	<12

MW9

	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500
TPHg	1,000	<500	<500	<500
MTBE	<20	<1.0	<1.0	<1.0
Benzene	40	9.8	16	11

MW2

	7/17/03	7/27/04	10/22/04	1/19/05	5/20/05	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500	<500	<500	<500	<500	<500
TPHg	<500	<500	<500	<500	<500	<500	<500	<500	<500
MTBE	59	62	50	19	7.4	9.4	30	17	21
Benzene	160	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5

MW1

	7/17/03	7/27/04	10/22/04	1/19/05	5/20/05	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500	<500	<500	<500	<500	<500
TPHg	<500	<500	<500	<500	<500	<500	<500	<500	<500
MTBE	130	32	21	19	13	11	4.7	5.5	2.8
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

MW10

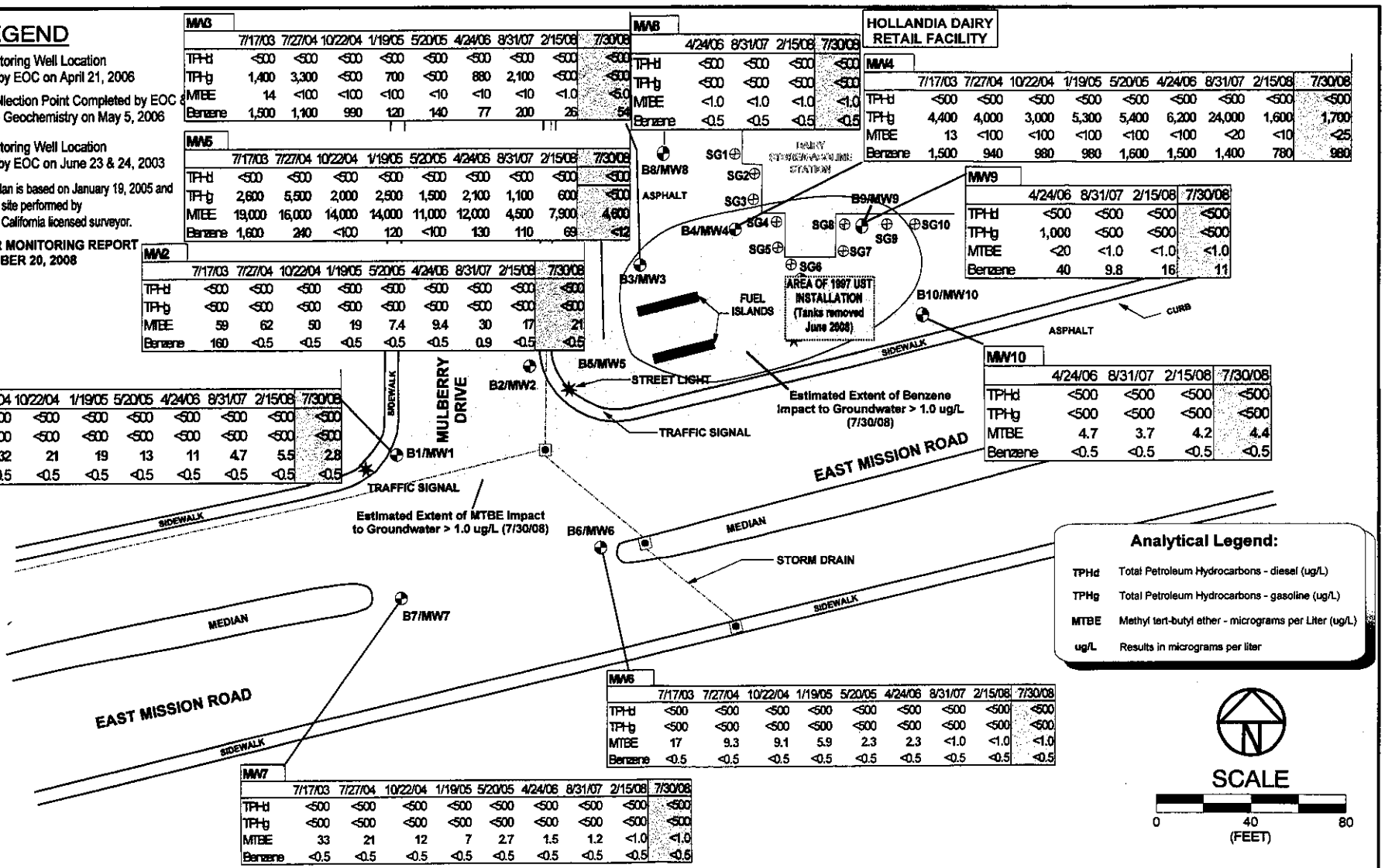
	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500
TPHg	<500	<500	<500	<500
MTBE	4.7	3.7	4.2	4.4
Benzene	<0.5	<0.5	<0.5	<0.5

MW6

	7/17/03	7/27/04	10/22/04	1/19/05	5/20/05	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500	<500	<500	<500	<500	<500
TPHg	<500	<500	<500	<500	<500	<500	<500	<500	<500
MTBE	17	9.3	9.1	5.9	2.3	2.3	<1.0	<1.0	<1.0
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

MW7

	7/17/03	7/27/04	10/22/04	1/19/05	5/20/05	4/24/06	8/31/07	2/15/08	7/30/08
TPHd	<500	<500	<500	<500	<500	<500	<500	<500	<500
TPHg	<500	<500	<500	<500	<500	<500	<500	<500	<500
MTBE	33	21	12	7	2.7	1.5	1.2	<1.0	<1.0
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5



Analytical Legend:

TPHd	Total Petroleum Hydrocarbons - diesel (ug/L)
TPHg	Total Petroleum Hydrocarbons - gasoline (ug/L)
MTBE	Methyl tert-butyl ether - micrograms per Liter (ug/L)
ug/L	Results in micrograms per liter

N

SCALE

0 40 80
(FEET)

EnvirOmega Consultants, Inc.

Groundwater Analytical Results and Contaminant Extent
Figure 3
PROJECT NO. EOC - 97 - 043A

Hollandia Dairy Retail Facility
622 E. Mission Road
San Marcos, CA

O6

Independent UST Case Closure Review

Site Name	Tom's Sierra Station #10
Site Address	890 Oro Dam Road Oroville, CA
Lead Agency	Central Valley RWQCB (5R)
USTCF Claim No.	12791 ($182,364)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	3100	MW-10	Decreasing(v)
Benzene	64.7	MW-10	Decreasing(v)
MTBE	ND<0.5	--	Decreasing(v)
TBA	33.5	MW-10	Single Occurrence
TAME	2.28	MW-10	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

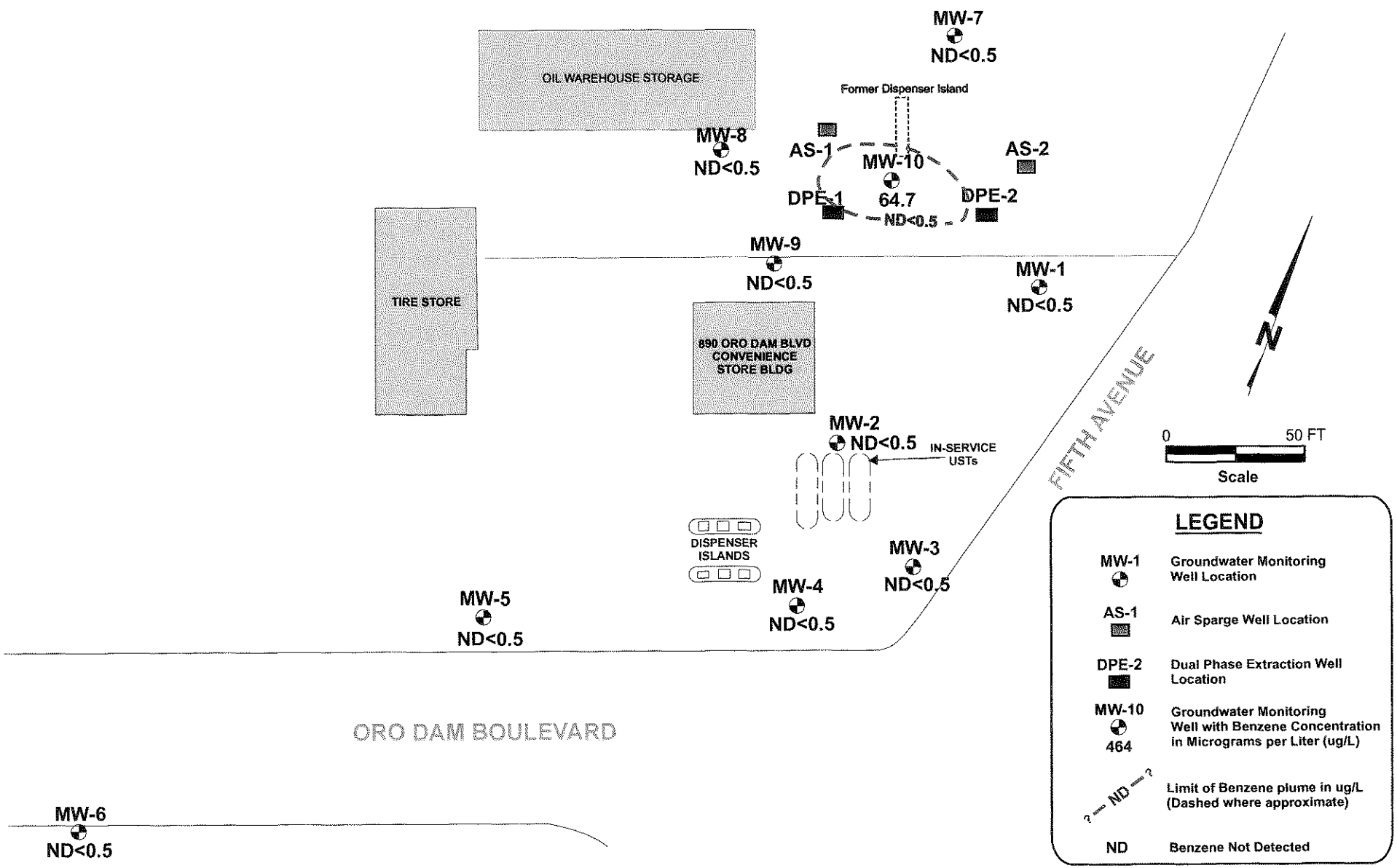
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • Monthly Dual Phase Extraction Remediation Events

Closure Evaluation
• Groundwater is at ~10-12' bgs • The contaminant plume appears to be highly localized – the only significantly impacted well is MW-10. • The plume appears to be laterally defined in the downgradient direction. Contaminant detections in downgradient wells appear sporadically, and are not of a level that represent a significant threat to public safety or ecological receptors; • Concentrations of residual constituents of concern are present above WQO's but do not appear to threaten current or probable beneficial uses. It is likely that the contaminants will degrade to WQO's before the resource will be used. • High Vacuum Dual Phase Extraction events initiated in 2007 and continues to this day. Appears to be a mobile unit brought to the site, typically on a bi-weekly basis. • High Vacuum Dual Phase Extraction has reportedly removed an estimated of 178 lbs of hydrocarbons to date. • Further Active Remediation does not appear to be warranted at the current contaminant concentrations. • It is unknown if Sensitive Receptor Survey has been performed, and as such, the distance to the nearest receptor is not known. Based on a review of GeoTracker, the consultant has not recommended the performance of an SRS, and the Agency has not directed an SRS to be performed. Because of this, it is assumed that the parties do not feel that one is warranted, and that it is not an impediment to closure.

Recommendation
Should be granted No Further Action status; does not warrant further regulation. Reason: Concentrations of constituents of concern are low; Plume is decreasing and composed of low mobility constituents; Plume is highly localized; Continued monthly HVDPE is unwarranted – has removed only 178 lbs of hydrocarbon to date since 2007



E_2C Remediation
5300 Woodmere Dr., Suite 105
Bakersfield, CA 93313
Phone: (661) 831-6906
Fax: (661) 831-6234

FORMER TOMS SIERRA STATION #10
890 ORO DAM BOULEVARD
OROVILLE, CALIFORNIA

SECOND QUARTER 2009
GW BENZENE
DISTRIBUTION PLOT
MAY 27, 2009

FIGURE
4

O7

Independent UST Case Closure Review

Site Name	Seibert's Oil Co., Inc.
Site Address	2837 Parkway Drive N Fresno, CA
Lead Agency	Central Valley RWQCB (5F)
USTCF Claim No.	13747 ($127,814)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	ND <50	--	--
TPHd	ND <50	--	--
Benzene	ND <1.0	--	--
MTBE	ND <1.0	--	--

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	>0.5 mi

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Semi-Annual Groundwater Monitoring
- CAP prepared – recommended Soil Vapor Extraction
- CAP approved. Installation of SVE system by January 2010

Closure Evaluation

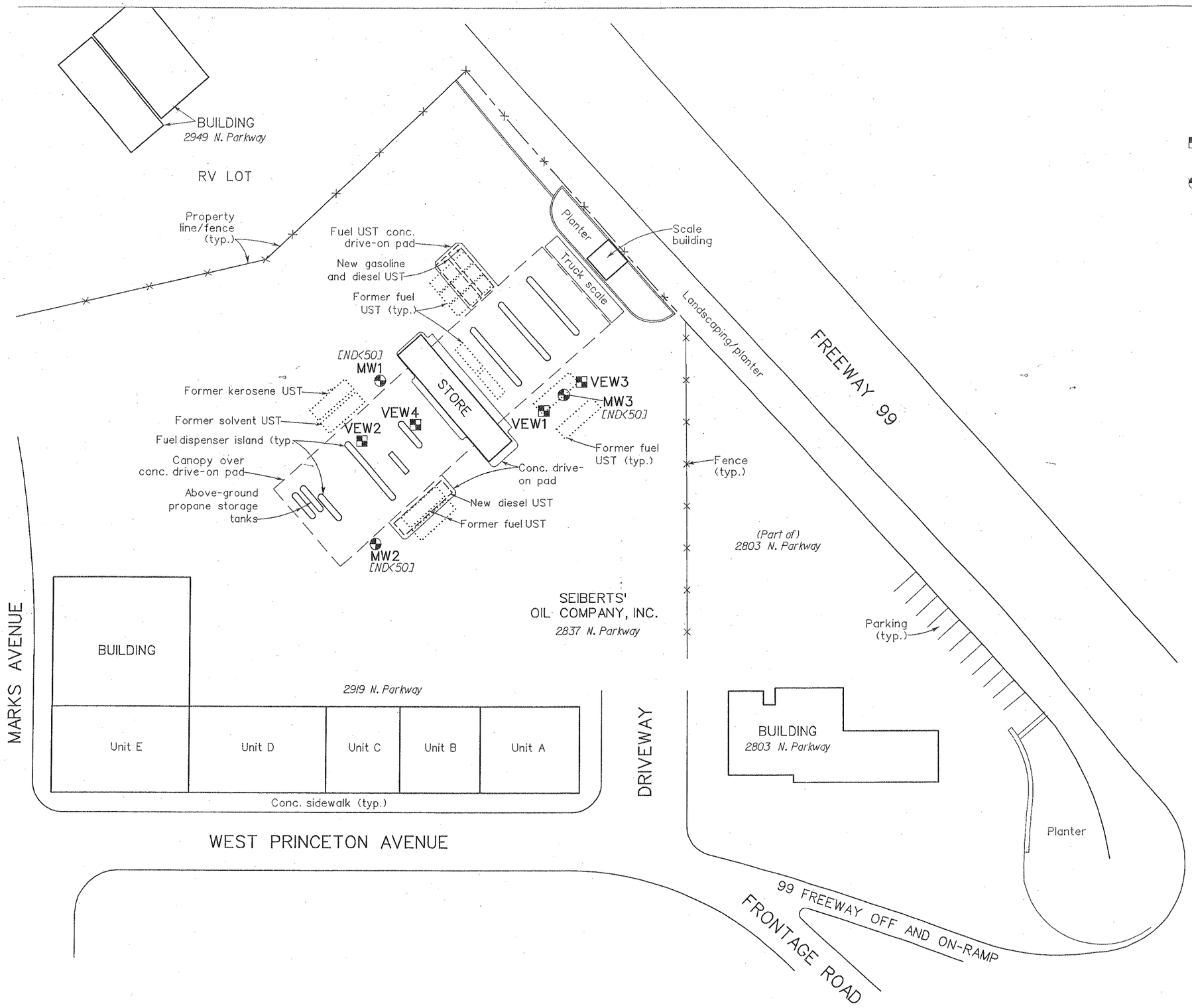
- Soil Only Case
- Groundwater is at ~103' bgs
- Releases appear to be associated with the tanks removed in 1998 and dispensers.
- SVE pilot test indicated ROI of 27 to 260 feet with flow rate of 35 to 140 scfm (vacuum of 12.5 to 25 ft H2O) with hydrocarbon removal rate of 0.02 and 0.83 lbs/hr. Max MTBE vapor concentration = 11 ppmv during pilot test.
- Maximum benzene concentration from vapor testing was 2.3 ppmv.
- Soils predominantly impacted by TPHd (Max 24,000 mg/kg). TPHg soil impact found (Max 3000 mg/kg). Minimal benzene (max 22 mg/kg). MTBE detected at a maximum of 300 mg/kg.
- A concentration of TPHd in soil decrease with depth with soil impact is predominantly in the 5 to 25 foot range.
- An estimated 4,812 gallons of diesel is reportedly present between 5 and 20 feet bgs.
- Active drinking water wells are not known to exist within the well search radius (0.5 mi.)
- The environmental record available on GeoTracker does not appear to indicate that a soil vapor study to evaluate potential impacts to indoor air quality has been performed. Since the regulator has not requested, and the consultant has not proposed to evaluate potential vapor impacts to indoor air quality, it is assumed that this is not a regulatory driver for this case.

Recommendation

Should be granted No Further Action status; does not warrant further regulation.

Reason: Soils Only case; Impacts to groundwater possible, however nearest receptors are greater than ½ mile from the subject site.

Comment: A deed restriction may be placed on the property to protect against exposure to construction workers performing future subsurface activities.



EXPLANATION

VEW1 VAPOR EXTRACTION WELL LOCATION

MW1 GROUNDWATER MONITORING WELL LOCATION

[ND<50] With TPH-G concentration in groundwater (in µg/l, on January 22, 2009; ND=not detected above laboratory detection limit)

NOTES:

1) All locations and dimensions are approximate.
2) Property and building outlines from drawing supplied by Seibert's Oil Company, Inc., and aerial photograph from Google Earth.
3) Groundwater monitoring, vapor extraction well locations, and site were surveyed by Robert Goodner Surveying, Inc. on April 5, 2007 and February 21, 2008.

NORTH

0 60 120

APPROXIMATE SCALE IN FEET

SEIBERT'S OIL COMPANY, INC.
2837 N. PARKWAY DRIVE
FRESNO, CALIFORNIA

Client: SEIBERTS' OIL COMPANY, INC. Project No.: 576-01

FREY ENVIRONMENTAL, INC.

SITE SKETCH
SHOWING TPH-G CONCENTRATIONS
IN GROUNDWATER ON JANUARY 22, 2009

Date: MARCH 2009 Figure 3

576-01/57601-2.dgn

O8

Independent UST Case Closure Review

Site Name	Alta Sierra Gas
Site Address	10032 Alta Sierra Drive Grass Valley, CA
Lead Agency	Nevada County LOP
USTCF Claim No.	14238 ($321,078)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	ND < 50	MW-1	No Trend (v)
Benzene	ND < 0.5	--	--
MTBE	143	MW-1	No Trend (v)
TBA	21.4	MW-1	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

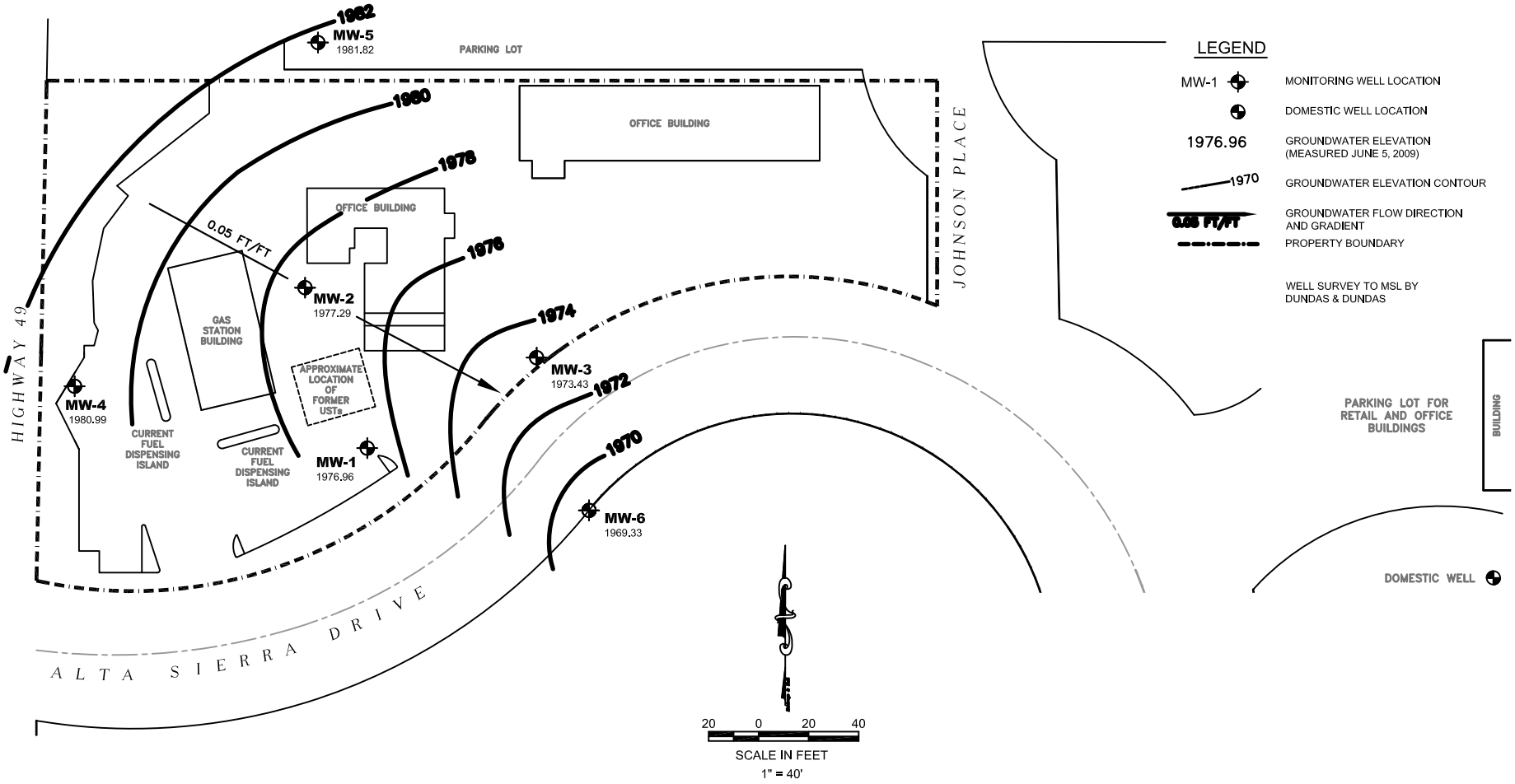
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor	450 ft downgradient

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	No
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring

Closure Evaluation
• Groundwater is at ~41' bgs • Elevated MTBE and TBA onsite in MW-1. Concentrations in downgradient wells below MCL and decreasing trend observed. • The contaminant plume appears to be highly localized at this time – the only significantly impacted well is MW-1. The plume appears to be laterally defined in the downgradient direction. Contaminant detections in downgradient wells are not of a level that represent a significant threat to public safety or ecological receptors; • Domestic well is identified downgradient less than 500 feet from site. Wells in downgradient direction have been below MCLs for 5 years. Impact to domestic well is improbable. • Soil Vapor survey indicated that benzene was present in soil vapor that exceeded health risk of 1.0E-6 under residential and commercial standards. • Soil Vapor remediation would be necessary to decrease benzene risk prior to closure.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Failed HHRA – Soil Vapor. Note that failure of an HHRA based on subsurface vapor concentrations does not necessarily indicate that indoor quality is unacceptable, but further investigation is warranted



887–09–GWQ209

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
792 SEARLS AVENUE
NEVADA CITY, CA 95959
(530) 478–1305 FAX 478–1019

GROUNDWATER ELEVATION CONTOURS – JUNE 5, 2009

ALTA SIERRA SERVICE STATION

NEVADA COUNTY, CALIFORNIA

DRAWN BY: DFD	CHECKED BY: TJH
PROJECT NO.: 887–09	
DATE: JULY 2009	
FIGURE NO.: 2	

O9

Independent UST Case Closure Review

Site Name	Los Olivos Garage
Site Address	2900 Grand Avenue Los Olivos, CA
Lead Agency	Santa Barbara County LOP
USTCF Claim No.	15483 ($236,970)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	ND <50	--	--
Benzene	0.64	MW-5	Decreasing(v)
MTBE	ND<0.5	--	--

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

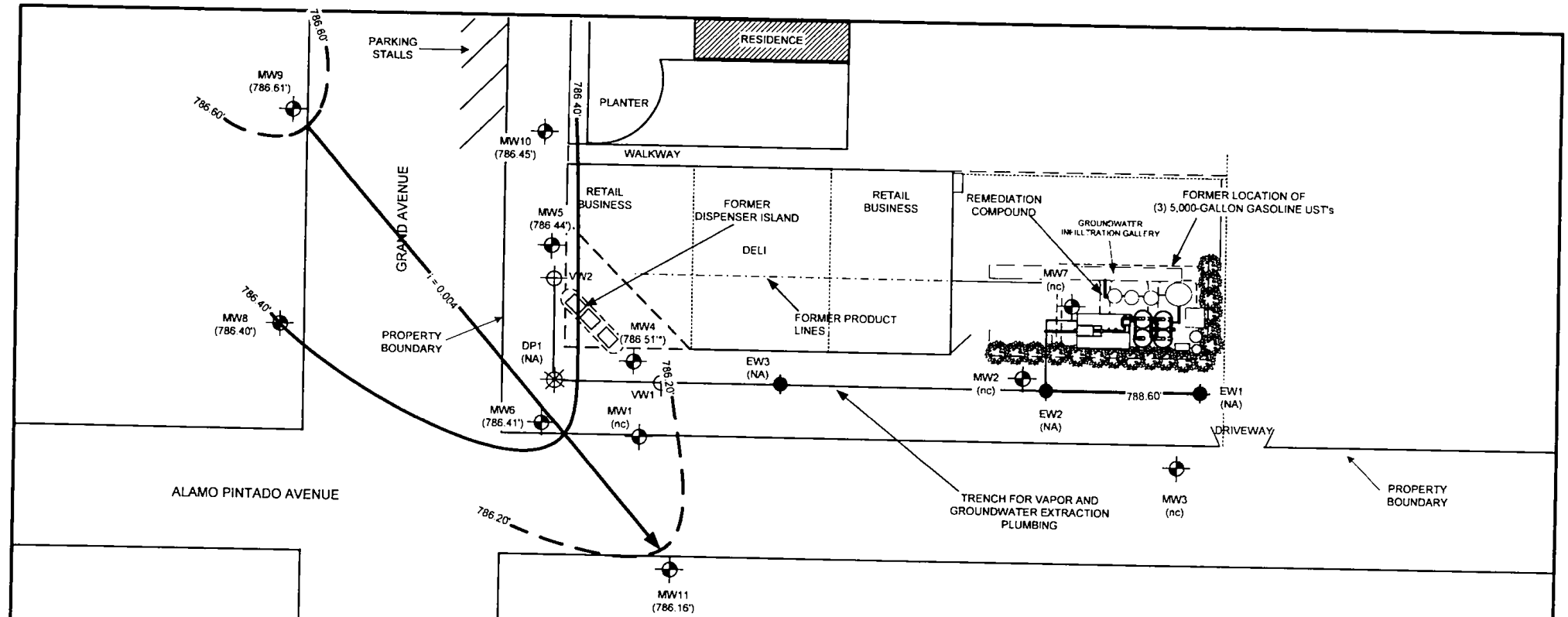
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • High Vacuum DPE system shut down • Verification investigation approved.

Closure Evaluation
• Groundwater is at ~27' bgs • High Vacuum Dual Phase Extraction has occurred from December 2008 to March 2009. Since that time, contaminant concentrations have decreased significantly. • Groundwater is not impacted above MCLs. Approximately 550 pounds of petroleum hydrocarbons removed. • It is unknown if Sensitive Receptor Survey has been performed, and as such, the distance to the nearest receptor is not known. Based on a review of GeoTracker, the consultant has not recommended the performance of an SRS, and the Agency has not directed an SRS to be performed. Because of this, it is assumed that the parties do not feel that one is warranted, and that it is not an impediment to closure. • Further Active Remediation does not appear to be warranted at the current contaminant concentrations.

Recommendation
Should be granted No Further Action status; does not warrant further regulation. Reason: Water Quality Objectives appear to be met.



KEY

MW11 (786.16')	MONITORING WELL LOCATION AND NUMBER WITH GROUNDWATER ELEVATION (FT AMSL)
EW1 (NA)	GROUNDWATER EXTRACTION WELL LOCATION AND NUMBER
VW2	VAPOR EXTRACTION WELL LOCATION AND NUMBER
DP1 (NA)	DUAL-PHASE EXTRACTION WELL LOCATION AND NUMBER
(NA)	GROUNDWATER ELEVATION NOT AVAILABLE
786.60'	GROUNDWATER ELEVATION CONTOUR LINE IN FEET AMSL. DASHED WHERE INFERRED.
i = 0.004	GROUNDWATER GRADIENT AND DIRECTION.
•	GROUNDWATER ELEVATION NOT USED IN GRADIENT

GROUNDWATER GRADIENT MAP
6/18/09
LOS OLIVOS GARAGE
2900 GRAND AVENUE
LOS OLIVOS, CALIFORNIA

PENVIRONMENTAL
230 DOVE COURT • SANTA PAULA, CALIFORNIA • 93060

FIGURE 2

UPDATED: 6/18/09

O10

Independent UST Case Closure Review

Site Name	Lost Nugget Market
Site Address	16448 Highway 49 Camptonville, CA
Lead Agency	Central Valley RWQCB (5S)
USTCF Claim No.	16616 ($385,943)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	4500	MW-5	Stable (v)
Benzene	3.9	MW-5	Stable (v)
MTBE	18	MW-5	Stable (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	340' upgradient

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring

Closure Evaluation
• Groundwater is at ~23' bgs • Subsurface is fractured rock. Two groundwater gradients identified shallow and deep due to fractures. Both plumes defined. • Community well located approximately 340 feet upgradient of site. Well is reportedly shallow: 95' total depth. • Constituents of concern have not been detected in community well. • Sampling of the community well was discontinued in June 2008 at the direction of Regional Board. • The contaminant plume appears to be highly localized at this time – the only significantly impacted well is MW-5. The plume appears to be laterally defined in the downgradient direction. • Concentrations of residual constituents of concern are present above WQO's but do not appear to threaten the existing domestic well. It is likely that the contaminants will degrade to WQO's before the resource will be used. • Further Active Remediation does not appear to be warranted at the current contaminant concentrations.

Recommendation
Should be granted No Further Action status; does not warrant further regulation. Reason: Plume is highly localized; Contaminant concentrations are low; Community well is upgradient and not threatened

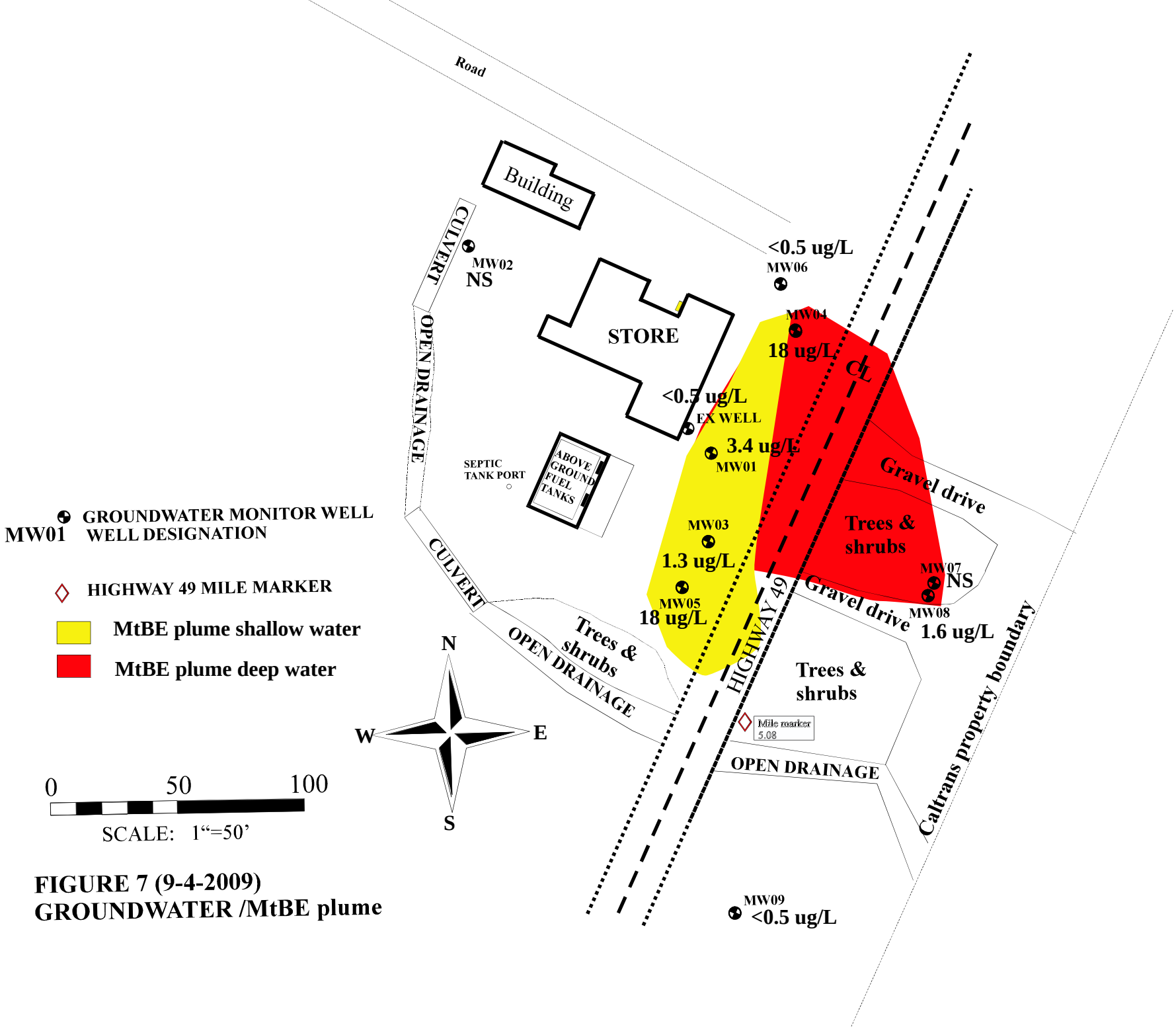


FIGURE 7 (9-4-2009)
GROUNDWATER /MtBE plume

O11

Independent UST Case Closure Review

Site Name	John's Auto Repair
Site Address	3454 Santa Rosa Avenue Santa Rosa, CA
Lead Agency	Sonoma County LOP
USTCF Claim No.	1146 ($845,410)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	18,000	MW-10	Decreasing (v)
TPHd	5,700	MW-10	Decreasing (v)
Benzene	2.5	MW-5	Decreasing (v)
TBA	22	MW-5	No Trend (v)
MTBE	ND <0.5	--	--

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	250' crossgradient 350' downgradient

Low Risk Evaluation Criteria	
Free Product Present at Site?	UNK
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	UNK
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Quarterly Groundwater Monitoring
- Ozone sparging since June 2005

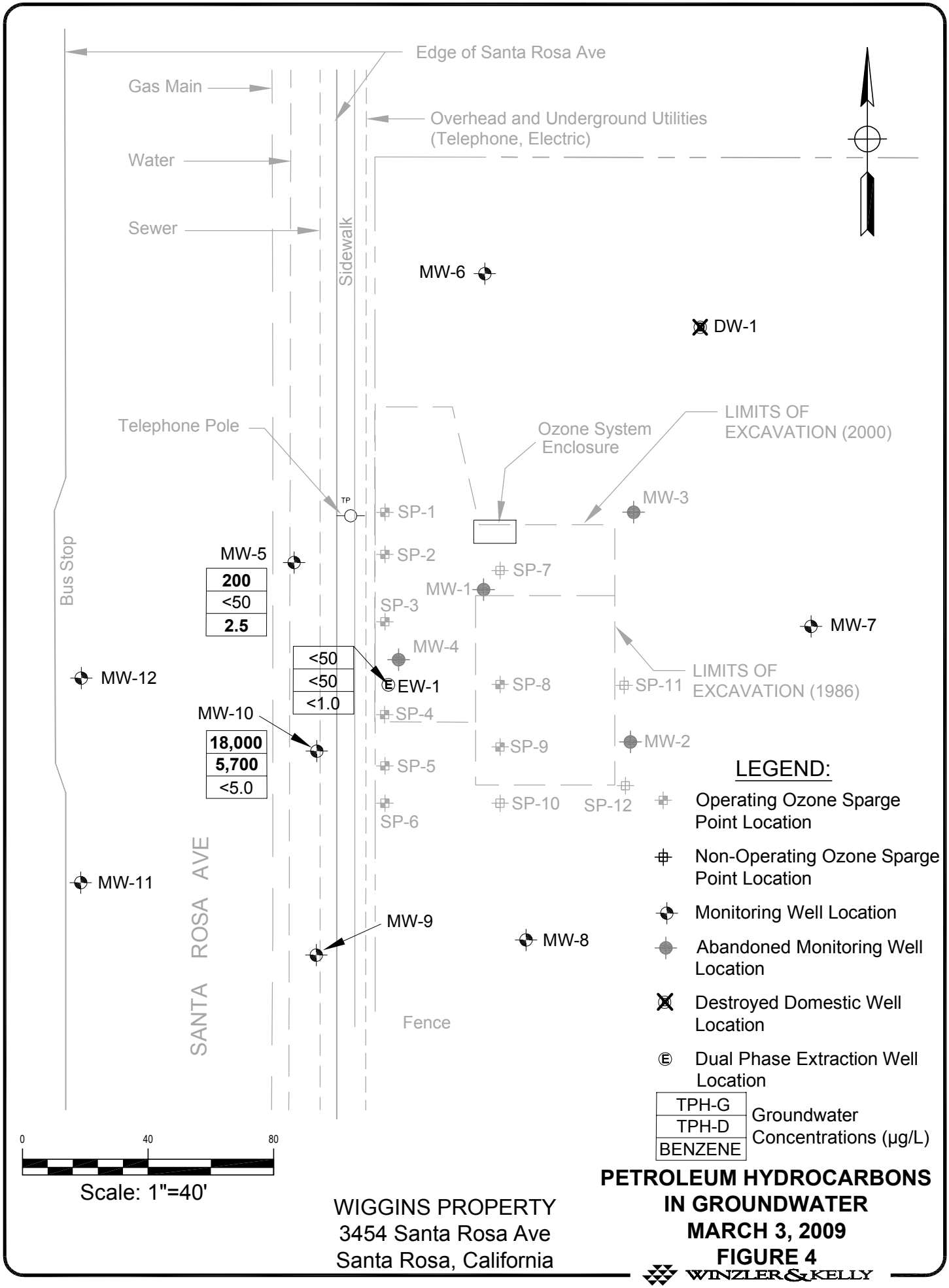
Closure Evaluation

- Groundwater is at ~4' bgs
- Ozone sparging has occurred since June 2005. Since that time, contaminant concentrations have decreased significantly;
- Remaining constituents of concern are TPHg and TPHd in wells under road, downgradient of treatment system.
- Concentrations of TPHg and TPHd increase with groundwater elevation indicating soil impact remaining, however concentrations continue to decrease, either because of ozone sparging or natural attenuation
- TPH concentrations are high, though benzene, TBA and MTBE concentrations are very low.
- The contaminant plume appears to be highly localized at this time – the only significantly impacted well is MW-10. The plume appears to be laterally defined in the downgradient direction.
- Note that while TPHd was reported at 5,700 ug/L in 1Q09, during 4Q08, the TPHd concentration was 190,000 ug/L. This concentration may be indicative of the presence of free product.
- Domestic wells are located approximately 250' cross/up-gradient, and 350' downgradient of the most impacted well (MW-10).
- Wells MW-11 and MW-12 act as sentry wells to the downgradient domestic well. These wells have not shown any meaningful detection of contaminants since installed in 2002.

Recommendation

Closure not appropriate at this time. Warrants further regulation.

Reason: Though plume appears to be highly localized and composed of lower toxicity constituents, the probable presence of free product approximately 350' upgradient of a domestic well represents a potential threat to human health, even though there is no evidence that the plume is mobile. Contaminant concentrations must be reduced under the roadway or the downgradient well destroyed.



WIGGINS PROPERTY
3454 Santa Rosa Ave
Santa Rosa, California

PETROLEUM HYDROCARBONS IN GROUNDWATER
MARCH 3, 2009
FIGURE 4

WINZLER & KELLY

J:\02598 – Wiggins Electric\02598-08-001 3454 Santa Rosa Ave\CAD\GW-Box.dwg May 07, 2009 – 9:36am

O12

Independent UST Case Closure Review

Site Name	Sacramento Executive Airport
Site Address	6151 Freeport Boulevard Sacramento, CA
Lead Agency	Central Valley RWQCB (5R)
USTCF Claim No.	1668, 1670 ($652,808)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	12,000	MW-2	Decreasing (v)
Benzene	70	MW-2	Decreasing (v)
MTBE	ND<0.5	--	--

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Semi-Annual Groundwater Monitoring
- No site documents submitted for this site
- Air sparge/Vapor extraction conducted at site
- Closure requested in August & October 2005
- Additional assessment was conducted to confirm site conditions

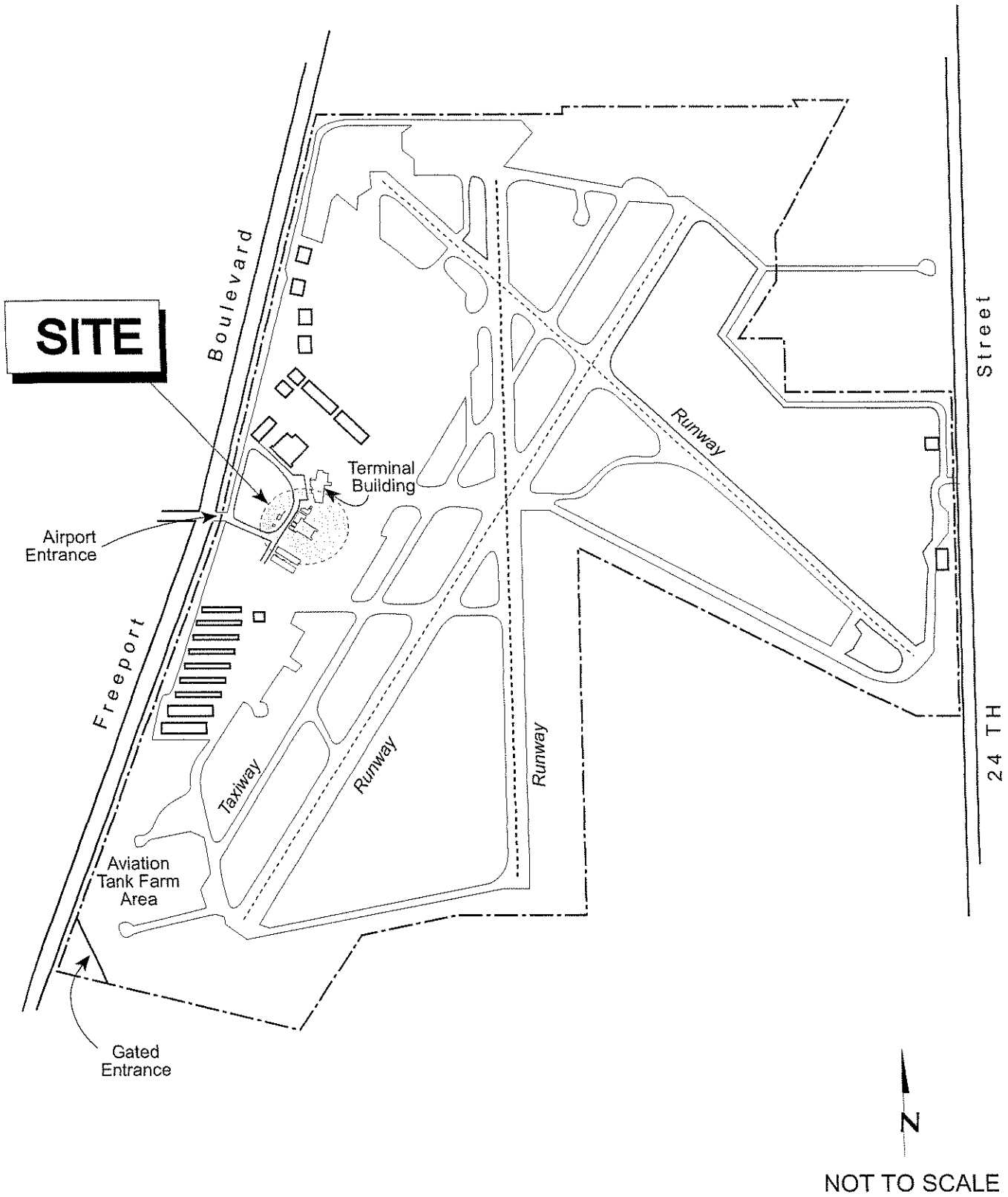
Closure Evaluation

- Groundwater is at ~20' bgs
- Most recent groundwater data available is from November 2007.
- The contaminant plume appears to be highly localized at this time – the only significantly impacted well is MW-2. The plume appears to be laterally defined in the downgradient direction. Contaminant detections in downgradient wells appear sporadically, and are not of a level that represent a significant threat to public safety or ecological receptors;
- Plume migration and groundwater flow is toward airstrip and downgradient wells are non-detect for constituents of concern.
- It is unknown if Sensitive Receptor Survey has been performed, and as such, the distance to the nearest receptor is not known. Based on a review of GeoTracker, the consultant has not recommended the performance of an SRS, and the Agency has not directed an SRS to be performed. Because of this, it is assumed that the parties do not feel that one is warranted, and that it is not an impediment to closure.
- Concentrations of residual constituents of concern are present above WQO's but do not appear to threaten current or probable beneficial uses. It is likely that the contaminants will degrade to WQO's before the resource will be used.

Recommendation

Should be granted No Further Action status; does not warrant further regulation.

Reason: Concentrations are low, Groundwater flow direction is toward airstrip.



Reference: County of Sacramento, Executive Airport

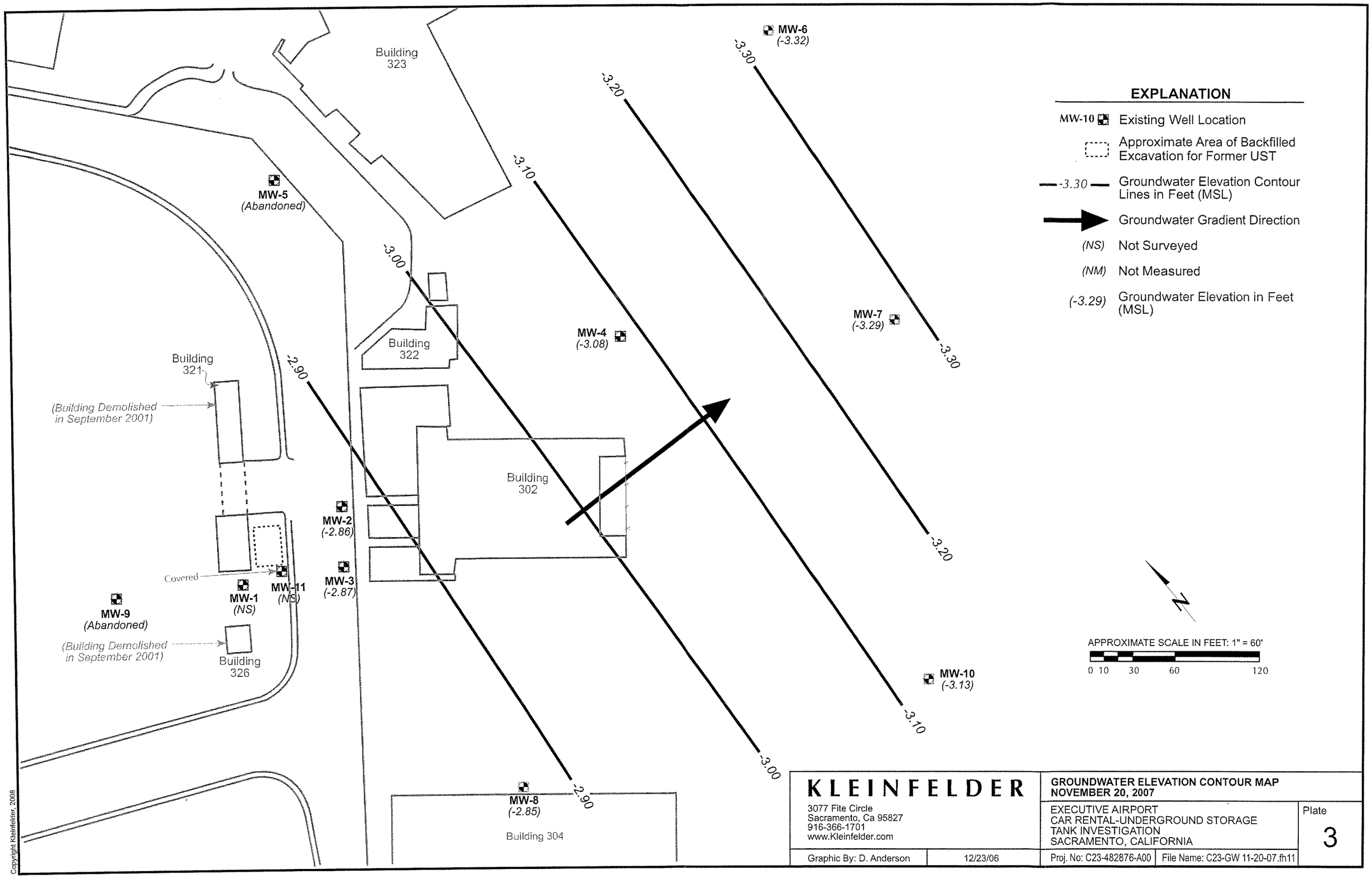
KLEINFELDER

Drawn By: M. Bussanich
Project No. 23-482876-A00

Date: 5-20-2004
Filename: 3039b.fh10

AREA MAP
EXECUTIVE AIRPORT
CAR RENTAL-UNDERGROUND STORAGE TANK INVESTIGATION
SACRAMENTO, CALIFORNIA

PLATE
2



KLEINFELDER
3077 Fite Circle
Sacramento, Ca 95827
916-366-1701
www.Kleinfelder.com

GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 20, 2007

EXECUTIVE AIRPORT
CAR RENTAL-UNDERGROUND STORAGE
TANK INVESTIGATION
SACRAMENTO, CALIFORNIA

Plate 3

Graphic By: D. Anderson | 12/23/06 | Proj. No: C23-482876-A00 | File Name: C23-GW 11-20-07.fh11

Copyright Kleinfelder, 2008

O13

Independent UST Case Closure Review

Site Name	Thrifty Oil #123
Site Address	434 5th Avenue Escondido, CA
Lead Agency	San Diego County LOP
USTCF Claim No.	2118 ($418,115)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	13,300	MW-8	Increasing (v)
Benzene	26	MW-3	Decreasing (v)
MTBE	21,200	MW-8	Increasing (v)
DIPE	116	MW-3	Increasing (v)
TBA	569	MW-8	Increasing (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Semi-Annual Groundwater Monitoring
- SVE & GWT since November 2008

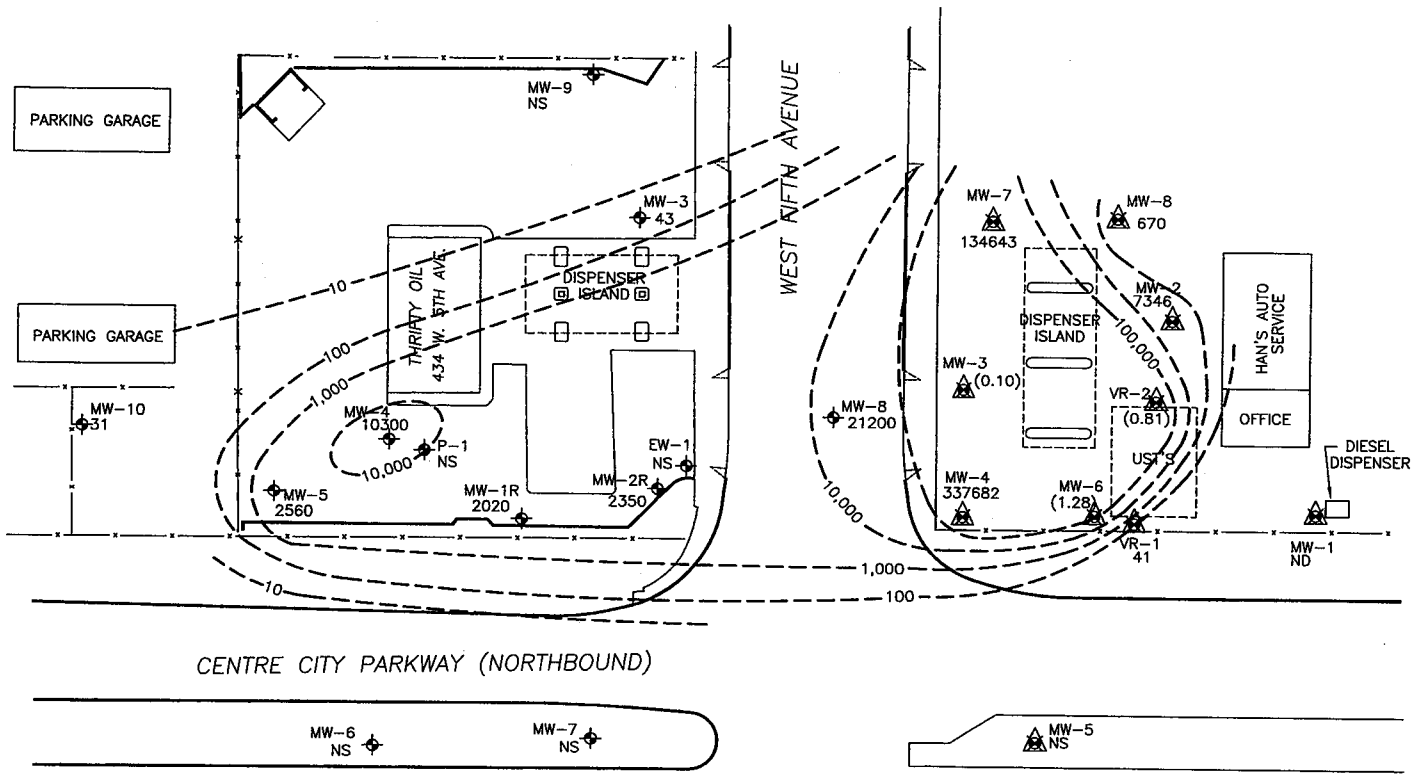
Closure Evaluation

- Groundwater is at ~5-7' bgs
- SVE & GWT implemented at site.
- Contaminant plume currently defined, however increasing concentrations in MW-8 may indicate that plume is not stable and has migration potential.
- Contaminants from neighboring property has impacted subject site. Site has been recommended to the commingled plume account.

Recommendation

Closure not appropriate at this time. Warrants further regulation.

Reason: Contaminant concentrations in excess of low risk criteria; Contaminant concentrations are increasing, possibly indicating that plume is migrating.



LEGEND

THRIFTY GROUNDWATER MONITORING WELL SHOWING MTBE CONCENTRATION IN ug/L

HAN'S GROUNDWATER MONITORING WELL SHOWING MTBE CONCENTRATION IN ug/L

LINE OF EQUAL MTBE CONCENTRATION

NOTES:

ND – NOT DETECTED

NA – DATA NOT AVAILABLE

NS – NOT SAMPLED

0 40 FEET
SCALE

NORTH

Wayne Perry CONSULTING · CONSTRUCTION · ENGINEERING · MAINTENANCE SINCE 1968	DATE DRAWN	MTBE ISOCONCENTRATION MAP SEPTEMBER 29, 2009
	REV. DATE	FORMER THRIFTY SERVICE STATION #123 434 W. 5th AVE. ESCONDIDO, CA
	CAD FILE 07251MTB	

FIGURE NO. **5**

PROJECT NO. 07.251

O14

Independent UST Case Closure Review

Site Name	Exxon #7-9134 (Coronado Texaco)
Site Address	1102 Hollister Street San Diego, CA
Lead Agency	San Diego County LOP
USTCF Claim No.	12559, 5435 ($111,042)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	170,000	MW-10	No Trend (v)
Benzene	29,000	MW-10	No Trend (v)
MTBE	3,300	MW-10	No Trend (v)
TBA	ND <2500	--	--
TAME	ND <500	--	--

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

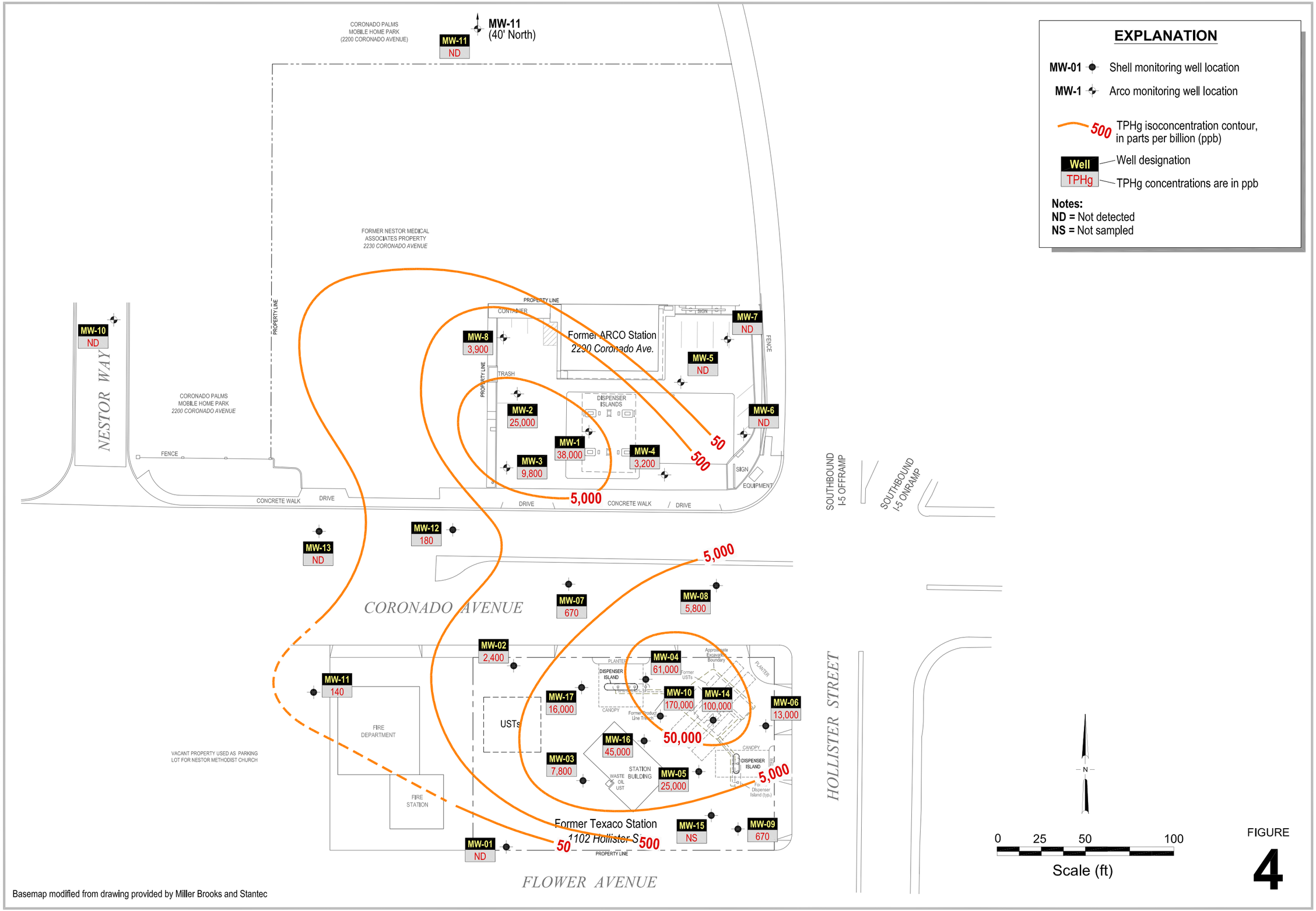
Low Risk Evaluation Criteria	
Free Product Present at Site?	UNK
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • Free product skimming at site.

Closure Evaluation
• Groundwater is at ~16' bgs • Though free product has not been observed since October 2007, TPHg concentrations are considered consistent with the presence of free product. • Human Health Risk Assessment and Sensitive Receptor Survey not available on GeoTracker – unknown if performed • Site part of large commingled plume. • Plume appears to be stable and extent is defined at this time • Mobile home park (residential) is located downgradient of site

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Concentrations in excess of low risk criteria; Free product likely present

07/24/09



EXPLANATION

MW-01 — Shell monitoring well location

MW-1 — Arco monitoring well location

500 — TPHg isoconcentration contour, in parts per billion (ppb)

Well / TPHg — Well designation; TPHg concentrations are in ppb

Notes:
ND = Not detected
NS = Not sampled

Basemap modified from drawing provided by Miller Brooks and Stantec

FIGURE
4

TPHg Isoconcentration Map

April 6-7, 2009

CONESTOGA-ROVERS & ASSOCIATES

Former Texaco-branded Service Station
1102 Hollister Street
San Diego, California

I:\6-chars\24----\2418--\241862\241862 - REPORTS\241862-RPT5-2Q09 QMR\241862 2QM09-TPHG.DWG

O15

Independent UST Case Closure Review

Site Name	Mobil Oil No 11-KLC
Site Address	402 Mission St W Santa Barbara, CA
Lead Agency	Santa Barbara County
USTCF Claim No.	5510 ($647,431)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	14,000	MW04R	Decreasing(v)
Benzene	1,600	MW04R	Decreasing(v)
MTBE	2,900	MW04R	Decreasing(v)
TBA	3,900	MW04R	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

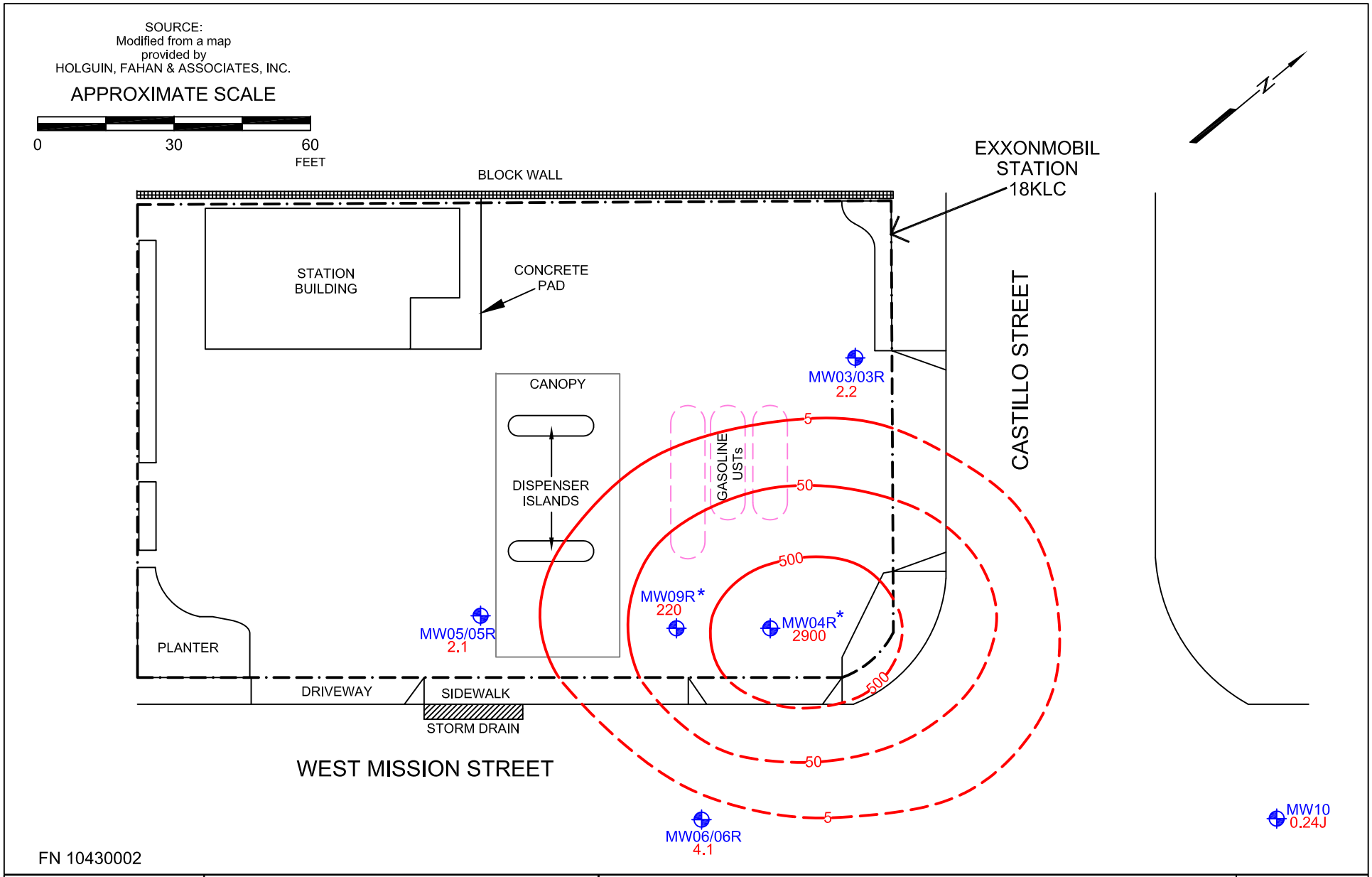
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	700’

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Quarterly Groundwater Monitoring • Oxygen diffusion since 2004

Closure Evaluation
• Groundwater is at ~23-26' bgs • Contaminants appear to be localized in vicinity of MW04R and MW09 • Concentrations of MTBE and TBA high – 2,900 ug/l and 3,900 ug/l, respectively • Site is located in a residential area • Current remedial approach (passive remediation through oxygen diffusion) may not be adequate for mitigation of MTBE and TBA

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Concentrations in excess of low risk criteria



FN 10430002

VALUE, QUALITY, RESPONSE

MTBE GROUNDWATER ISOPLETH CONCENTRATION MAP - 02/13/09

EXXONMOBIL STATION 18KLC
402 West Mission Street
Santa Barbara, California

EXPLANATION

MW10	Groundwater monitoring well
*	Emitter well
	MTBE concentration in micrograms per liter
J	Estimated value between method detection limit and practical quantitation limit
	Line of equal MTBE concentration (dashed where inferred)

PROJECT NO.
1043

PLATE
6

DATE: 06/08/09

O16

Independent UST Case Closure Review

Site Name	Mobil #04-GPE
Site Address	229 E St Marysville, CA
Lead Agency	Central Valley RWQCB (5S)
USTCF Claim No.	5749 ($1,366,661)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	35,000	MW-6	No Trend (v)
Benzene	2,000	PV7	Decreasing (v)
MTBE	72	EW2	Decreasing (v)
TBA	17	EW2	Decreasing (v)
1,2-DCA	7.9	AW7	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

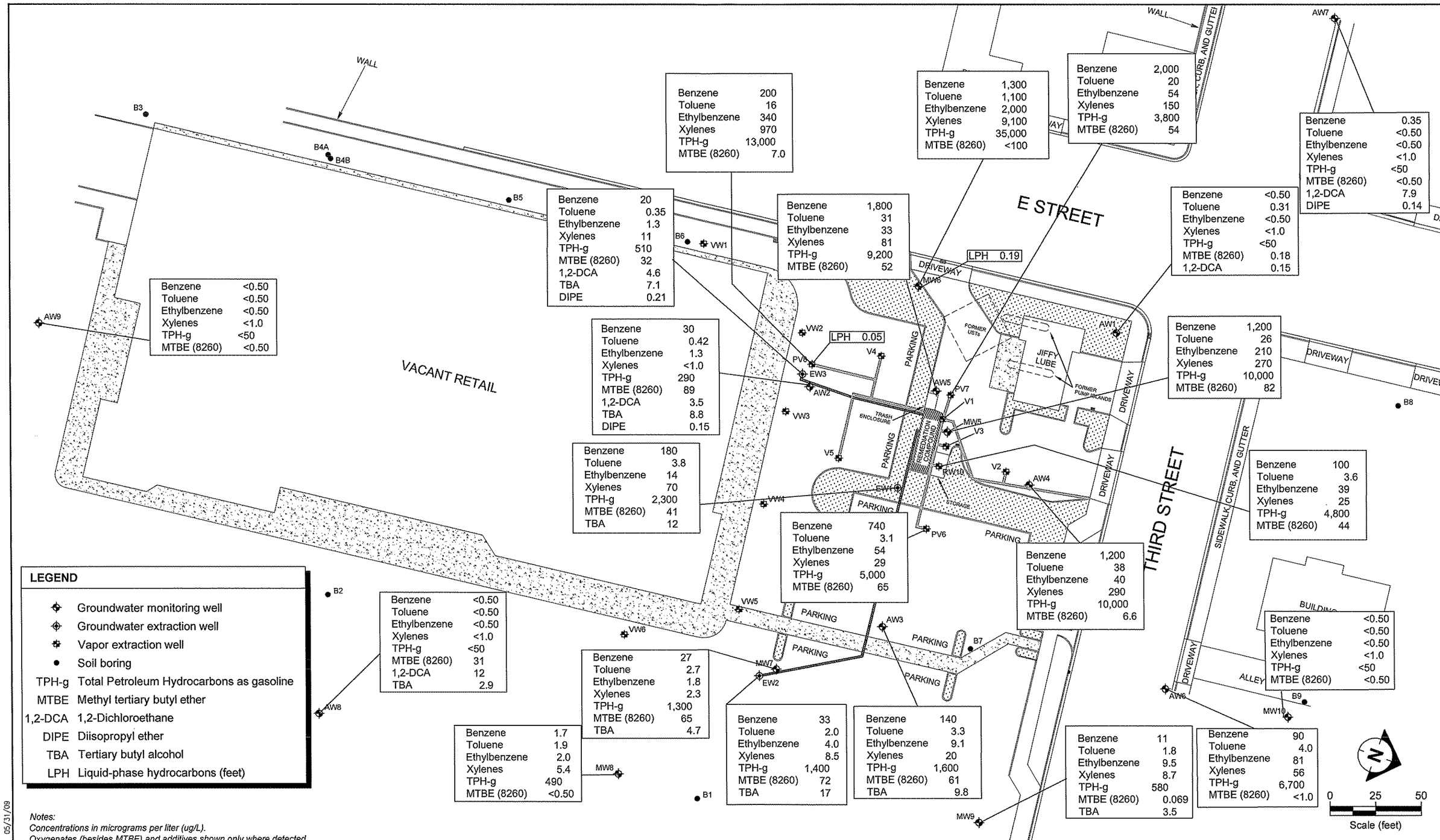
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	Yes
Distance to Nearest Receptor	>2000'

Low Risk Evaluation Criteria	
Free Product Present at Site?	Yes
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Quarterly Groundwater Monitoring • SVE ongoing • DPE Pilot Test performed • Recommended implementation of DPE or combined GWE/SVE

Closure Evaluation
• Groundwater is at ~23' bgs • SPH present up to 0.19' in two wells (MW-6 and PV8) • High concentrations, up to 2,000 ug/l, of Benzene present • Recent site assessment completes plume lateral delineation, though some wells are submerged (including SPH well MW-6) • Groundwater concentrations have been decreasing or stable since SVE operation. • Nearby properties are residential (downgradient)

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Free product present in site wells; concentrations in excess of low risk criteria



Notes:
Concentrations in micrograms per liter (ug/L).
Oxygenates (besides MTBE) and additives shown only where detected.

ETIC ENGINEERING

SITE MAP SHOWING GROUNDWATER ANALYTICAL RESULTS
FORMER MOBIL STATION 04GPE
229 E STREET, MARYSVILLE, CALIFORNIA
11 MAY 2009

FIGURE: **2**

FILENAME: 2q2009.dwg 05/31/09

O17

Independent UST Case Closure Review

Site Name	Rapid Gas #51
Site Address	909 Pacific Coast Hwy W Harbor City, CA
Lead Agency	Los Angeles RWQCB (4)
USTCF Claim No.	7795 ($508,346)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	5,200	MW-1	Decreasing(v)
Benzene	1,400	MW-3	Decreasing(v)
MTBE	1,100	MW-3	No Trend(v)
TBA	8,900	MW-1	No Trend(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	2,370 crossgradient

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • SVE/AS ongoing

Closure Evaluation
• Groundwater is at ~35-40' bgs • Concentrations of mobile compounds MTBE (1,100 ug/l) and TBA (8,900 ug/l) above low-risk criteria • Benzene, MTBE and TBA off-site under residential properties • TBA not defined downgradient. • Groundwater flow predominately to the west. • Municipal well located approximately 2,370 feet southwest of site. • Lake in proximity of site but not considered receptor due to lake depth at 7 feet bgs and groundwater impact at 35-40 feet bgs.

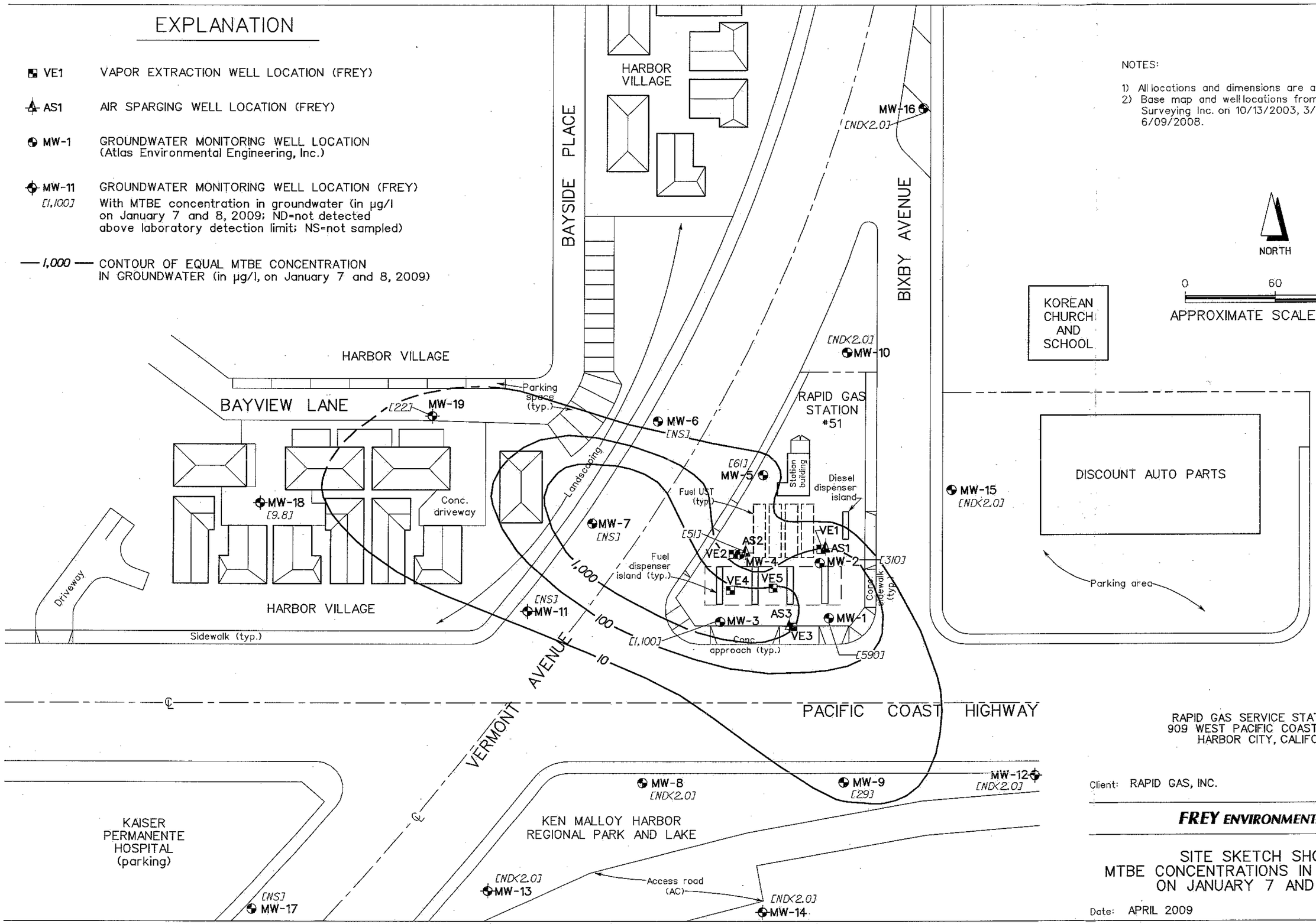
Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Plume underlies residential properties downgradient of site; Concentrations present in excess of low-risk criteria; Plume not fully defined

EXPLANATION

- VE1 — VAPOR EXTRACTION WELL LOCATION (FREY)
- AS1 — AIR SPARGING WELL LOCATION (FREY)
- MW-1 — GROUNDWATER MONITORING WELL LOCATION (Atlas Environmental Engineering, Inc.)
- MW-11 [1,100] — GROUNDWATER MONITORING WELL LOCATION (FREY) With MTBE concentration in groundwater (in µg/l on January 7 and 8, 2009; ND=not detected above laboratory detection limit; NS=not sampled)
- 1,000 — CONTOUR OF EQUAL MTBE CONCENTRATION IN GROUNDWATER (in µg/l, on January 7 and 8, 2009)

NOTES:

1) All locations and dimensions are approximate.
2) Base map and well locations from survey by RdM Surveying Inc. on 10/13/2003, 3/29/2006, and 6/09/2008.



RAPID GAS SERVICE STATION # 51
909 WEST PACIFIC COAST HIGHWAY
HARBOR CITY, CALIFORNIA

Client: RAPID GAS, INC. Project No.: 284-28

FREY ENVIRONMENTAL, INC.

SITE SKETCH SHOWING
MTBE CONCENTRATIONS IN GROUNDWATER
ON JANUARY 7 AND 8, 2009

Date: APRIL 2009 Figure 6

O18

Independent UST Case Closure Review

Site Name	D&D Wholesale Tires
Site Address	409 Hwy 12 W Rio Vista, CA 94571
Lead Agency	Solano County
USTCF Claim No.	9979 ($376,750)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	14,000	MW4	No Trend (v)
Benzene	2,300	MW4	No Trend (v)
Xylenes	350	MW4	No Trend (v)
MTBE	180	MW2	No Trend (v)
TBA	360	MW2	No Trend (v)
1,2-DCA	1.2	MW2	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

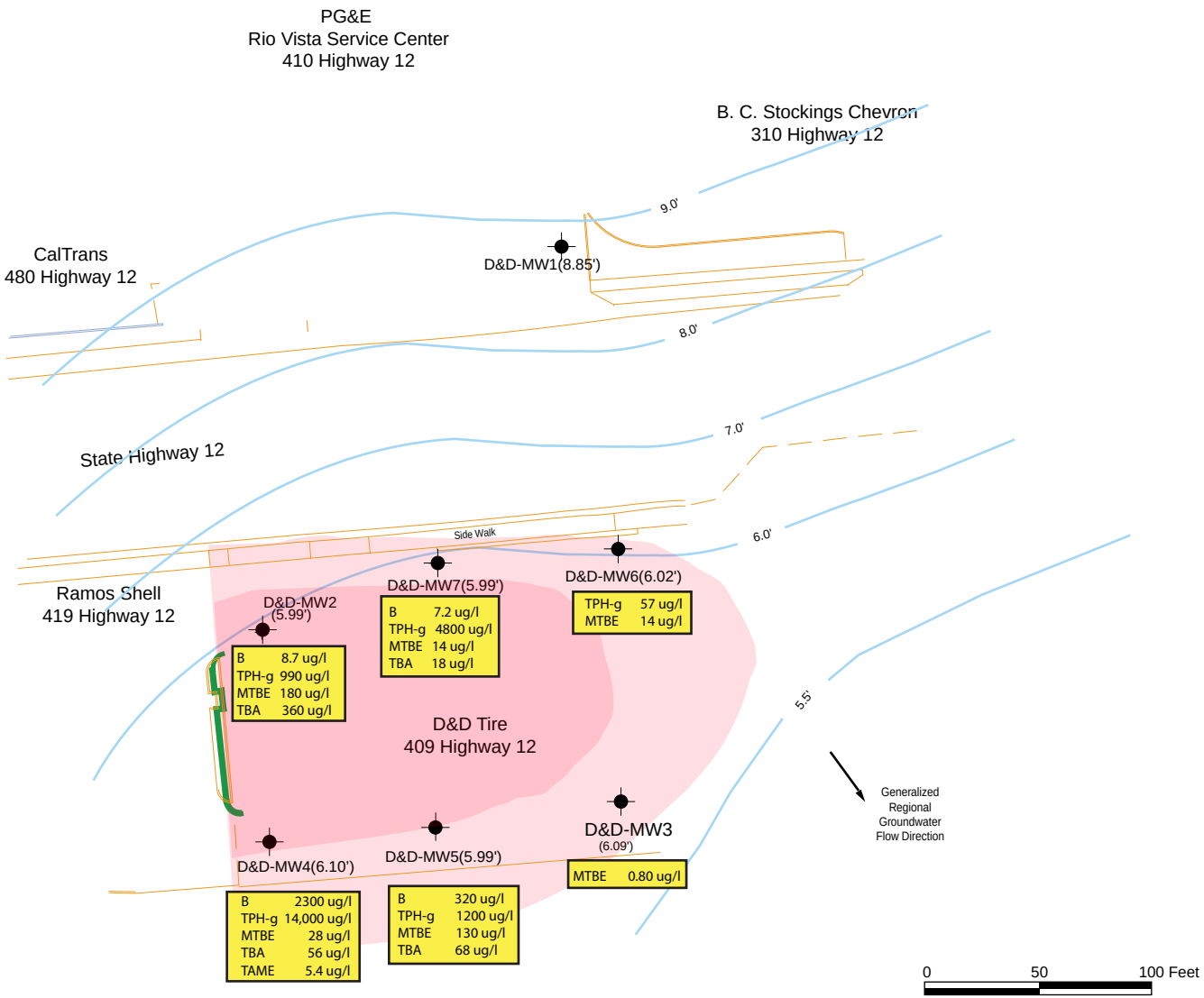
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	1,000'

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • Pilot Study Work Plan required by April 20, 2009 (late) • Active Remediation required by September 21, 2009 (late)

Closure Evaluation
• Groundwater is at ~14' bgs • Impact not defined in any direction • Contaminant concentrations do not exhibit a clear trend • Contribution from offsite sources very likely… not currently evaluated (as far as can be determined with available data) • Residential properties adjacent to site (downgradient) • Pilot Study and active remediation required by regulator

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reasons: Inadequate characterization; Contaminant concentrations in excess of low-risk criteria; Residential properties adjacent to site in downgradient direction; Plume likely off-site in downgradient direction.



LEGEND

MW-2 -5.87 GROUNDWATER MONITORING WELL LOCATION AND GROUNDWATER SURFACE ELEVATION

(US EPA Test Method 8015M,Test results reported in mg/L)
TPH-D TPH-DIESEL

(US EPA Test Method 8260B,Test results reported in ug/L)
B BENZENE
T TOLUENE
E ETHYLBENZENE
X XYLENE
TPH-G TPH-GASOLINE
MTBE METHYL TERTIARY BUTYL ETHER
DIPE DIISOPROPYL ETHER
ETBE ETHYL TERTIARY BUTYL ETHER
TAME TERTIARY AMYL METHYL ETHER
TBA TERTIARY BUTANOL
M METHANOL
ET ETHANOL
1,2-DCA 1,2 DICHLOROETHANE
1,2-EDB 1,2 DIBROMOETHANE

NA Not Analyzed
ND Concentration below Analytical Method of Detection

5' GROUNDWATER SURFACE CONTOUR (Feet Mean Sea Level)

Approximate Extent of Petro;leum Hydrocarbon Groundwater Contamination Plume

Note:
(1) Horizontal Control - California State Plane Coordinate System Zone 2, NAD27 datum.
(2) Vertical control provided with USGS benchmark V190, with elevation 27.87'MSL, NAVD88 datum
(3) Wellhead casings surveyed August, 2003 by Stephen G. Muir (CEG #1224, Expiration date 08/30/05)

WELLS SAMPLED ON
September 9, 2008

Stephen G. Muir
Consulting Geologist & Geophysicist

VIsta Del Rio- D&D Tire Site
409 Highway 12, Rio Vista, California

Quarterly Monitoring Report Basemap

Sept. 2008 | Figure 3

O19

Independent UST Case Closure Review

Site Name	S.F. Oakland Truck Stop
Site Address	8255 San Leandro St Oakland, CA
Lead Agency	Alameda County LOP
USTCF Claim No.	12240 ($779,511)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	1,500	MW-2	Decreasing(v)
TPHd	960	MW-2	Decreasing(v)
TPHmo	2,500	MW-2	Single Occurrence(v)
Benzene	1.5	MW-2	Decreasing(v)
MTBE	64	MW-2	Decreasing(v)
TBA	5,000	MW-5	Increasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

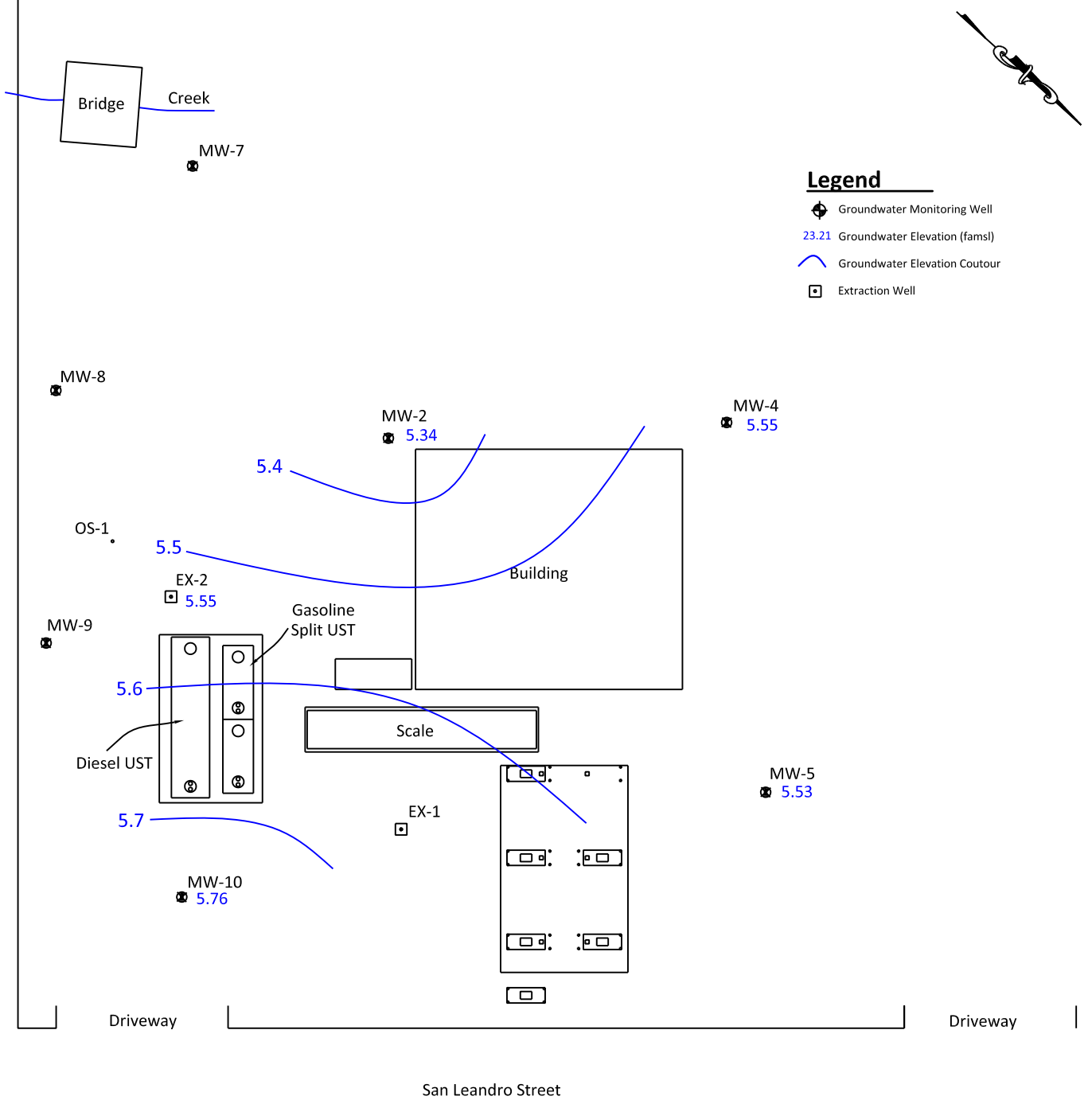
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	Adjacent to Site (Creek)

Low Risk Evaluation Criteria	
Free Product Present at Site?	Yes
Plume Stable and Not Migrating?	UNK
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	UNK
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	UNK

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring

Closure Evaluation
• Groundwater is at ~5' bgs • Plume defined to ND levels downgradient. • TBA increasing. • SPH reported in one well (MW-2) at a thickness of 0.005'. SPH had been previously reported in well MW-1 at 1.16' before abandonment in July 08. MW-1 had contained up to 6.13' in December 2005. • SPH removal is not currently occurring, and no attempt to remove product to extent practicable is known to have been made. • An unnamed creek is adjacent to the site in the downgradient direction. Well placement unable to adequately evaluate whether discharges to surface water is occurring. • One industrial and two irrigation wells are known to exist within a 2,000' radius of the site. No domestic or municipal supply wells are known to exist within a 2000' radius of the site.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reasons: Free product present at site and not yet removed to extent practicable; Site adjacent to unnamed creek; TBA concentrations increasing; Inadequate characterization to evaluate potential discharges to creek adjacent to site.



Site Groundwater Gradient
12/30/2008

Oakland Truck Stop
8255 San Leandro Street
Oakland, California

MATRIKS

321 Court Street
Woodland, California 95695
(530) 406-1760

Lic. No. 909563
Fax# (530) 406-1760

Project #: 6019	Figure: 4
Date: 02/15/2009	
Scale: 1" = 40'	

O20

Independent UST Case Closure Review

Site Name	United Oil #14
Site Address	2500 Magnolia St Burbank, CA
Lead Agency	Los Angeles RWQCB (4)
USTCF Claim No.	12477 ($254,464)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	5,900	MW-11	Stable (v)
TPHd	5,500	MW-7	No Trend (v)
Benzene	9.4	MW-6	Decreasing (v)
MTBE	25,000	MW-11	Increasing (v)
TBA	7,700	MW-7	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	Yes
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Semi-Annual Groundwater Monitoring
- Ongoing AS/SVE system
- Weekly SPH removal
- Offsite Assessment planned

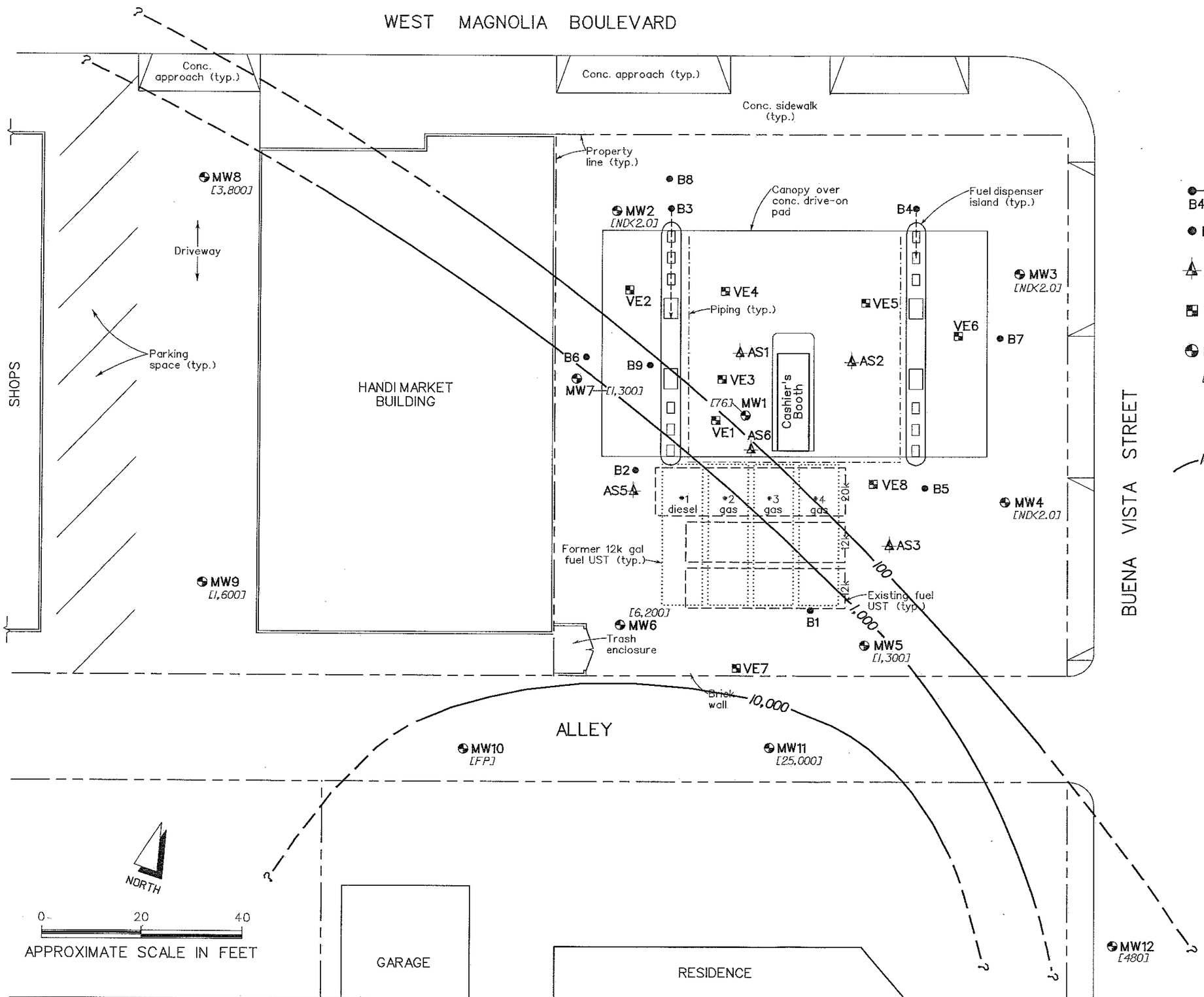
Closure Evaluation

- Groundwater is at ~110-115' bgs
- Ongoing AS/SVE system operation removing hydrocarbons at an average of more than one pound per hour
- Weekly SPH removal from passive skimmer in well MW-10. Measured levels of SPH ranged in 1Q from 0.12 feet to 1.2 feet.
- Plume apparently not defined offsite (assessment planned)
- Nearby properties are residential in all compass directions
- Free product is located in alley adjacent to residential land use

Recommendation

Closure not appropriate at this time. Warrants further regulation.

Reason: Free product present and not yet removed to extent practicable; Nearby properties are residential in all compass directions; Extent of plume not defined.



EXPLANATION

B4	SLANT BORING (Atlas)
B1	SOIL BORING LOCATION
AS1	AIR SPARGE WELL LOCATION
VE1	VAPOR EXTRACTION WELL LOCATION
MW1	GROUNDWATER MONITORING WELL LOCATION
[6,200]	With MTBE concentration in groundwater in µg/l, on December 10 and 11, 2008; ND=not detected above indicated laboratory detection limit; FP=free product in groundwater
10,000	CONTOUR OF EQUAL MTBE CONCENTRATION IN GROUNDWATER (in µg/l, on December 10 and 11, 2008)

NOTES:

1) All locations and dimensions are approximate.
2) Base map from Atlas Environmental Engineering, Inc. drawing no. U14-SIF2, report dated 8/28/1998.
3) Groundwater monitoring well locations MW1 through MW3 were surveyed by RdM Surveying Inc. on December 2, 2005 all other wells were surveyed by RdM on 06/06/2006.

UNITED SERVICE STATION # 14
2500 WEST MAGNOLIA BOULEVARD
BURBANK, CALIFORNIA

Client: UNITED EL SEGUNDO, INC. Project No.: 284-26

FREY ENVIRONMENTAL, INC.

SITE SKETCH SHOWING
MTBE CONCENTRATIONS IN GROUNDWATER
ON DECEMBER 10 AND 11, 2008

Date: FEBRUARY 2009 Figure 7

284-26/28426-20.dgn

O21

Independent UST Case Closure Review

Site Name	Mammoth Mo-Mart
Site Address	3275 Main St Mammoth Lakes, CA
Lead Agency	Lahontan RWQCB (6T)
USTCF Claim No.	12622 ($350,548)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	4,400	MW-4	Decreasing(v)
Benzene	ND	All wells	Decreasing(v)
MTBE	ND	All wells	Decreasing(v)
TBA	ND	All wells	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Semi-Annual Groundwater Monitoring
- Corrective Action Plan required due to contaminant concentrations "orders of magnitude above water quality objectives and the source of the contamination is unclear"... CAP required by 12/15/08. No record of a CAP being submitted.

Closure Evaluation

- Groundwater is at ~20' bgs
- Plume old - no MTBE or TBA, hydrocarbons degraded.
- Contaminants are highly localized in the vicinity of MW-4
- Concentrations are decreasing with respect to time.
- Corrective Action Plan required due to contaminant concentrations "orders of magnitude above water quality objectives and the source of the contamination is unclear"... CAP required by 12/15/08. No record of a CAP being submitted.
- Sensitive Receptors are unknown, however site is located in a predominantly commercial land use area. The nearest residence in the downgradient direction is approximately 800 feet from the site.
- Development of a robust site conceptual model is unwarranted because of low concentrations and the lack of highly mobile constituents of concern such as MTBE.
- TPH concentrations are present well above water quality objectives, but since all other constituents are below laboratory detection limits, the contaminants are unlikely to pose a threat to human health or the environment.

Recommendation

Should be granted No Further Action status; does not warrant further regulation.

Reason: Contaminants are highly localized and restricted to TPH; Concentrations are decreasing with respect to time; Plume is adequately delineated; Site is in a commercial area

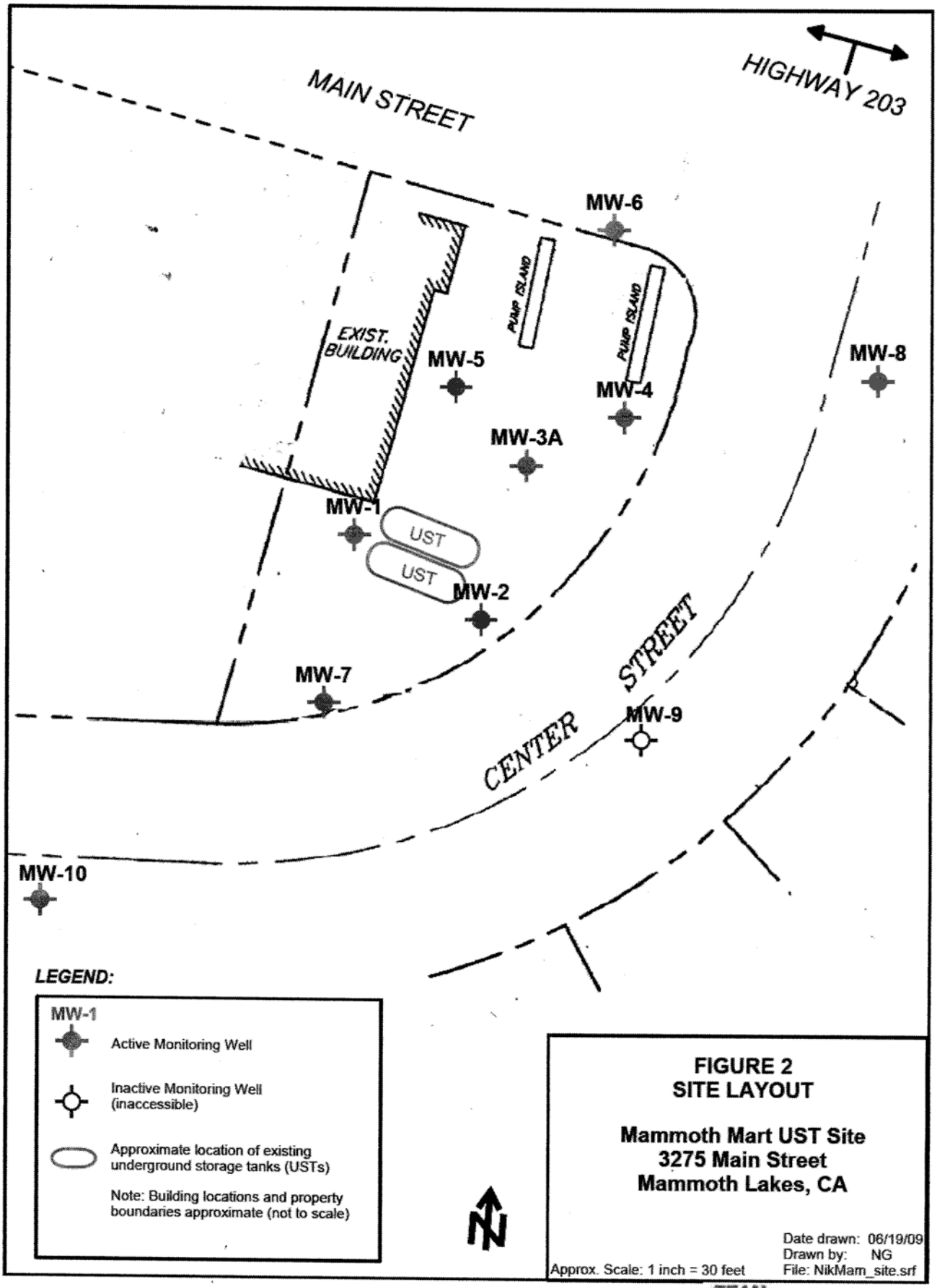


FIGURE 2
SITE LAYOUT

Mammoth Mart UST Site
3275 Main Street
Mammoth Lakes, CA

Date drawn: 06/19/09
Drawn by: NG
File: NikMam_site.srf

TEAM
ENGINEERING & MANAGEMENT, INC.
Bishop and Mammoth Lakes, California

O22

Independent UST Case Closure Review

Site Name	Rapid Gas #35
Site Address	4558 Imperial Hwy W Hawthorne, CA
Lead Agency	Los Angeles RWQCB (4)
USTCF Claim No.	13117 ($610,455)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	123,000	MW-4	No Trend(v)
Benzene	12,900	MW-2	Decreasing (v)
MTBE	227,000	MW-4	No Trend (v)
TBA	38,300	MW-4	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

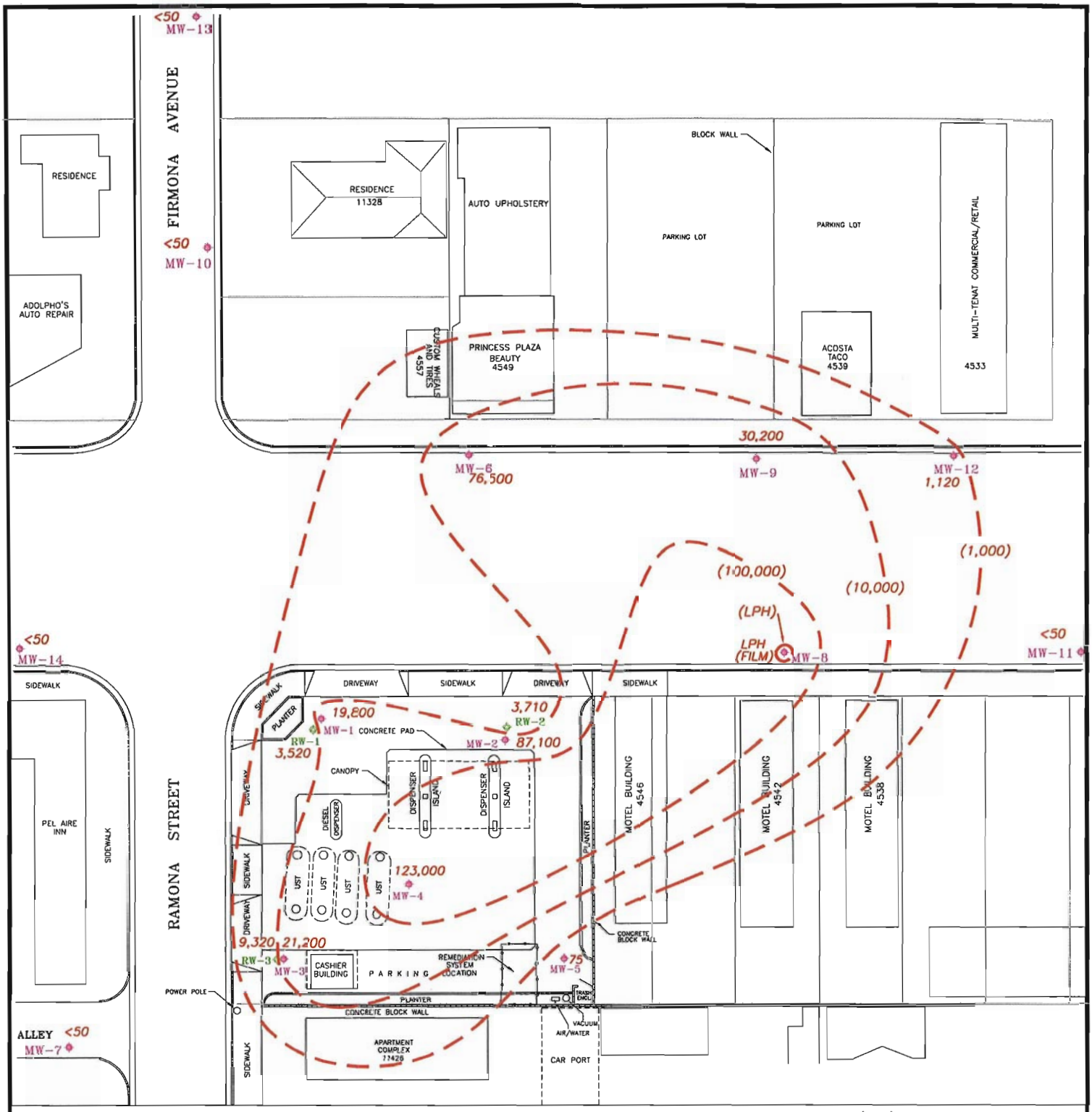
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	Yes
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • Interim SVE and GWE system operation ongoing • Offsite monitoring well work plan approved by regulator: required report by August 4, 2009 – Unknown if prepared • Remedial Action Plan (RAP) required by August 13, 2009 - Unknown if prepared

Closure Evaluation
• Groundwater is at ~34-39' bgs • SPH (film) observed in MW-8. Note that MW-8 is approximately 120 feet downgradient of the source area. • SPH has been observed in many site wells historically. MW-6 contained 0.15' of free product in February 2009; MW-2 contained 0.01' of free product in November 2008 • Concentrations of constituents very high (including MTBE at 123,000 ug/l) and increasing • Groundwater plume appears to underlie the motel immediately adjacent to the site in the downgradient direction • Residential properties are located immediately adjacent to the subject site toward the south (crossgradient)

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reasons: SPH appears to be widespread across the property and in the street; SPH has not yet been removed to extent practicable; Contaminant concentrations are well above low-risk concentration criteria; Residential properties are located immediately adjacent to site.



LEGEND:

MW-14	4"-DIA. MONITORING WELL	123,000	TPHg CONCENTRATIONS IN PARTS PER BILLION (ppb), 06/26/2009
RW-3	4"-DIA. RECOVERY WELL	? (100,000)	TPHg ISO-CONCENTRATION CONTOUR (DASHED WHERE INFERRED)
		LPH(FILM)	LIQUID-PHASE HYDROCARBONS (APPARENT THICKNESS IN FEET)

Design By: EFD	Drawn By: EFD	Date: 09/19/2004	Rev.: 07/10/2009

NORTH

SCALE 0 – 50'
DIMENSIONS IN FEET

Atlas Environmental Engineering, Inc.
- Environmental Products and Services
- Air/Water/Soil Permitting and Monitoring
- Site Assessment and Remediation
- Hazardous Waste Management

3185 AIRWAY AVENUE, SUITE D-1
COSTA MESA, CA 92626
PHONE: (714) 890-7129

RAPID GAS, INC. STATION #35

4558 W. IMPERIAL HIGHWAY
HAWTHORNE, CALIFORNIA

TPHg CONCENTRATIONS IN GROUNDWATER

DRAWING NUMBER: R3520927

FIGURE 4

O23

Independent UST Case Closure Review

Site Name	Baljian Service Center
Site Address	7490 La Palma Ave. Buena Park, CA
Lead Agency	Santa Ana RWQCB (R8)
USTCF Claim No.	11850, 13909 ($152,396)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	32,300	PVX-2	No Trend (v)
Benzene	10,900	PVX-2	Stable (v)
MTBE	124	W-1	Decreasing (v)
DIPE	42	MW-5	No Trend (v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

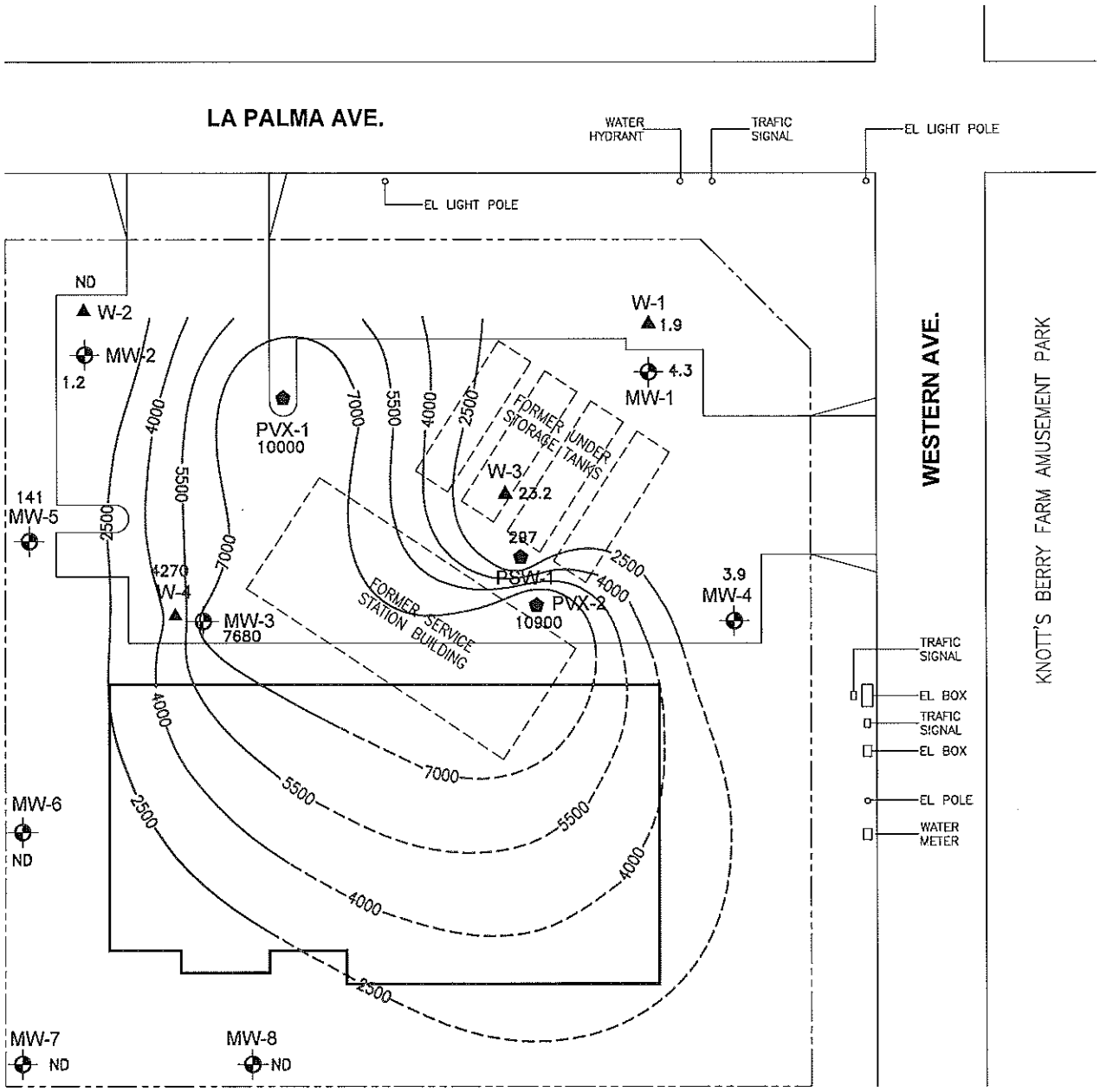
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor?	775 ft

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• No regulatory correspondence available on GeoTracker • CAP prepared – recommended Dual Phase Extraction

Closure Evaluation
• Property was used as an automotive repair facility until tanks were removed in 1987 • It is assumed that the MTBE is not associated with the site since the tanks were removed prior to widespread use of MTBE in California – MTBE appears to be from an off-site source • TPH plume appears to be stable • Contaminants likely extend beneath the grocery store directly south of the source area • Property is located adjacent to Knott's Berry Farm and a school. • Groundwater is at ~11-12' bgs

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Contaminant concentrations in excess of low-risk criteria.



LEGEND

- Groundwater Monitoring Wells (BW Environmental)
- Groundwater Monitoring Wells (ENV America)
- Groundwater Monitoring Wells (AAKO)
- Vapor Extraction & Air Sparging System
- 2500 ISOPLETH CONTOURS FOR BENZENE
- 10000 CONCENTRATION, (µg/L)
- ND NOT DETECTED

N W E S

0 10' 20' 30'

A.C.C.E.S. INC.	TITLE: PLAN VIEW OF SITE ISOPLETH CONTOURS FOR BENZENE (µg/L)	DWN BY: GS	SCALE: AS SHOWN
ENVIRONMENTAL ENGINEERING	PROJECT: QUARTERLY GROUNDWATER MONITORING 2nd QUARTER 2009	CHK BY: HA	DATE: 05/27/09
2034 COTNER AVENUE, SUITE 408 LOS ANGELES, CA 90025 Tel 310-479-7183 . Fax 310-479-1286 www.accesengineering.com	SITE: PHILTON PROPERTIES 7490 LA PALMA AVE. BUENA PARK, CA 90620	PROJECT No. 20066	DWG NO: FIGURE 5

O24

Independent UST Case Closure Review

Site Name	Alvidres 76 Service Station (aka Alvidres Unocal)
Site Address	100 West Front Street Buttonwillow, CA
Lead Agency	Kern County
USTCF Claim No.	14066 ($106,840)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	3,300	DPW-1	Decreasing(v)
Benzene	160	DPW-1	Decreasing(v)
MTBE	180	DPW-1	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

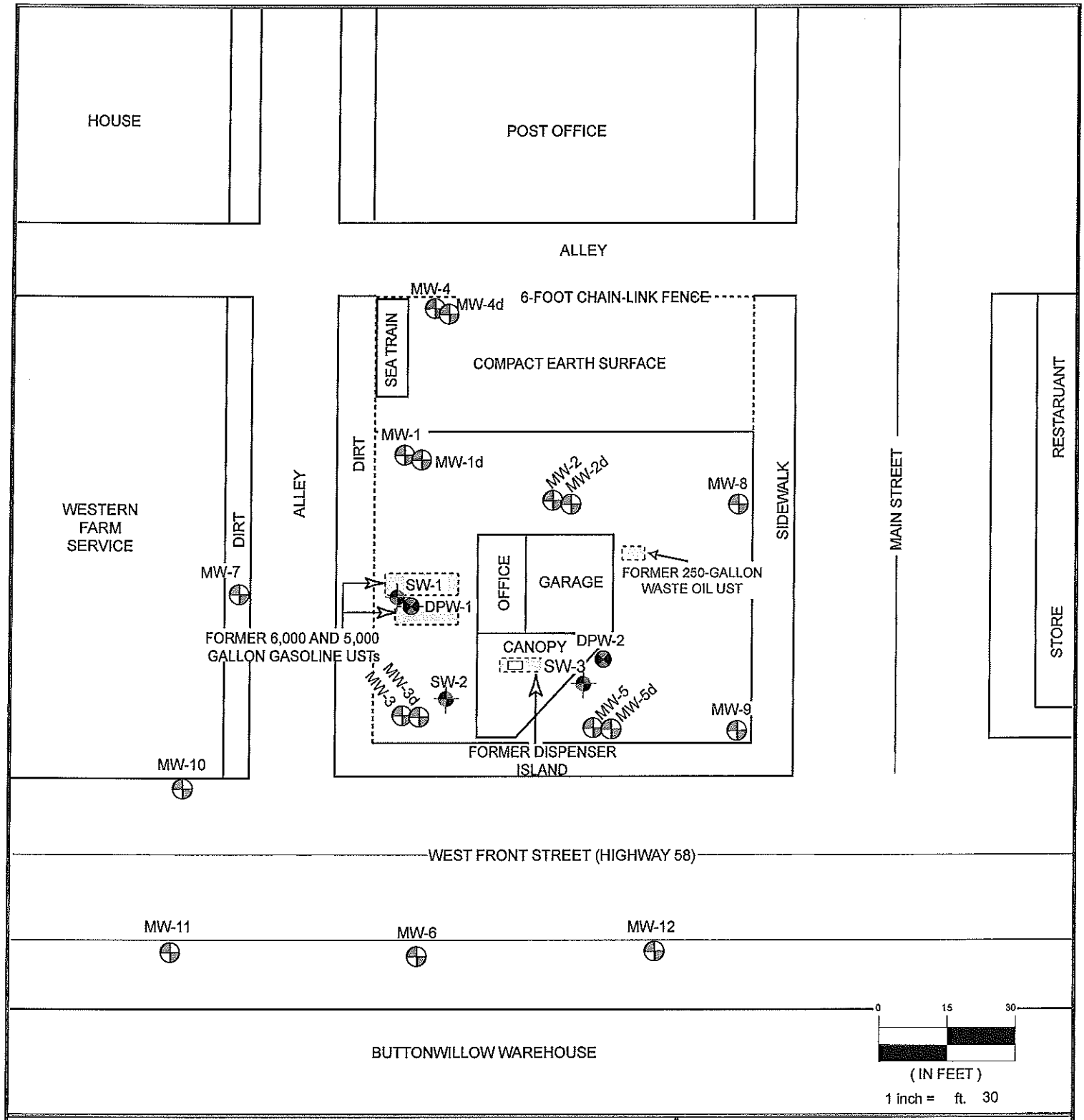
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Site in Active Groundwater Recharge Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • Consultant recommended (3/17/08) and regulator approved (9/10/08) SVE, DPE and AS pilot testing, feasibility study, conceptual site model, and corrective action plan

Closure Evaluation
• Groundwater is at ~35' bgs • Due to dropping groundwater level, several wells no longer intersect the groundwater table. Replacement wells have been installed in selected locations • Soil concentrations from recent well installation report modest concentrations in source area (former UST pit): up to 6,200 mg/kg TPHg, 16 mg/kg benzene, 5.4 mg/kg MTBE • Plume not adequately characterized. Groundwater plume undefined in most directions, though concentrations appear to be decreasing over time. • Residential property 150 feet from source area (NW of property) • Not known if there are water supply wells in vicinity of site.

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Site not adequately characterized; Distance to receptors unknown



LEGEND	MR. HENRY ALVIDRES
GROUNDWATER MONITORING WELL AIR SPARGE WELL LOCATION DUAL PHASE EXTRACTION WELL LOCATION	76 SEVICE STATION 100 WEST FRONT STREET BUTTONWILLOW, CALIFORNIA FIGURE 2 - PLOT PLAN
	VEIR Corp

REVISED: MARCH 13, 2009:jlt

O25

Independent UST Case Closure Review

Site Name	Gas 4 Less
Site Address	924 10th Street Antioch, CA
Lead Agency	Central Valley RWQCB (5S)
USTCF Claim No.	14280 ($548,811)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	2,000	MW-5	Decreasing(v)
Benzene	300	MW-5	Decreasing(v)
MTBE	220	MW-5	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	>2,000' upgradient

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Semi-Annual Groundwater Monitoring
- Site under Cleanup and Abatement Order (CAO) dated Nov. 8, 2005
- Dual Phase Extraction: Started June 2008. Terminated January 2009 due to suspension of claim

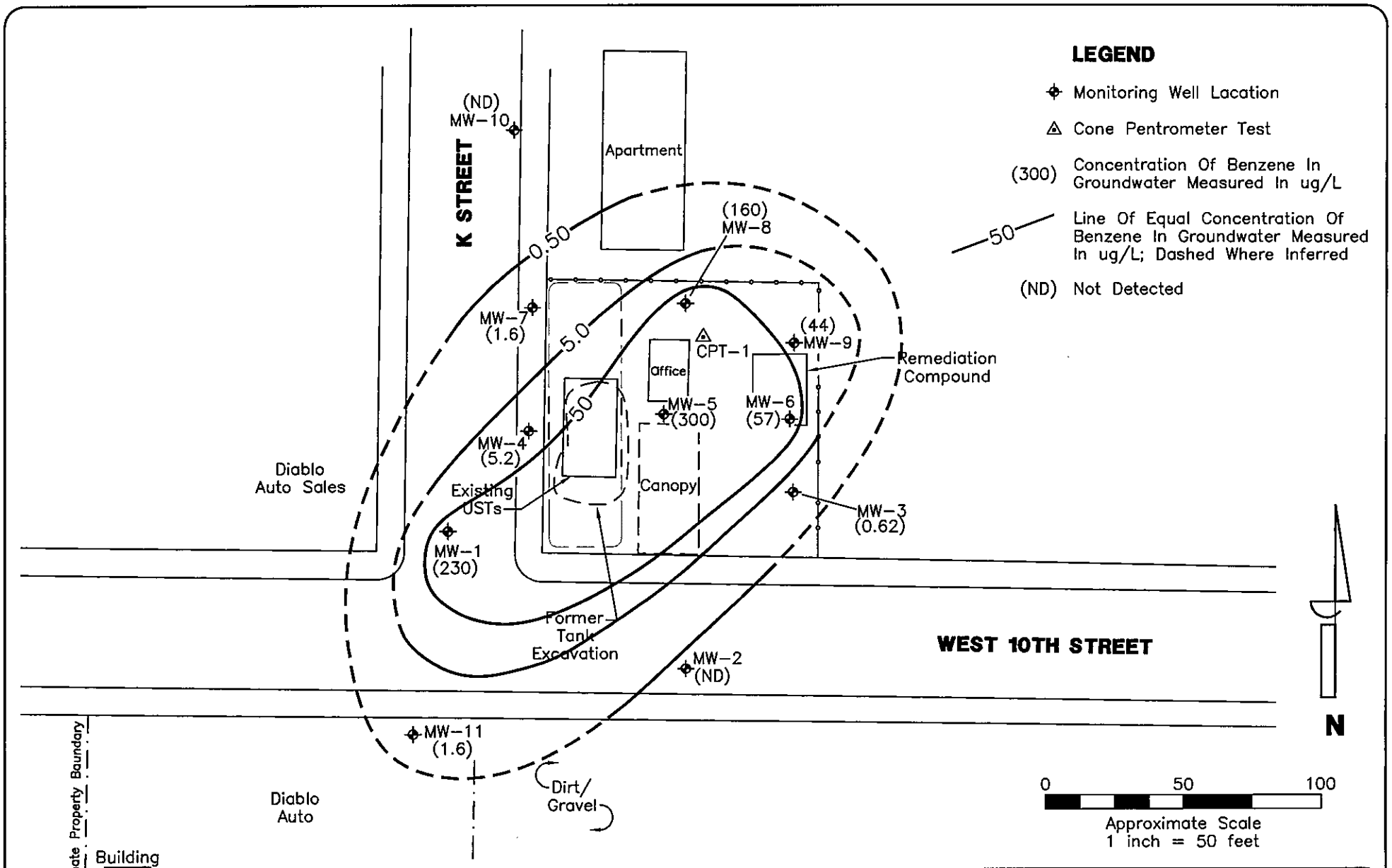
Closure Evaluation

- Groundwater is at ~8' bgs
- Residential properties adjacent to site in downgradient direction (North)
- Groundwater batch extraction performed from Dec. 2006 to April 2007
- Concentrations decreasing over time (as of the 4Q 2008 report)
- TCE reported in three wells - likely from former dry cleaning facility that was located upgradient of the site.
- No downgradient definition of TPHg, benzene or MTBE
- DPE system in operation since June 2008. DPE system removed approximately 3,050 pounds of TPHg, 74 pounds of benzene, and 4 pounds of MTBE in 2008. System not in operation since before January 1, 2009 due to financial hardship.
- While TPHg and benzene concentrations are relatively moderate at this time, this is likely due to the performance of Dual Phase Extraction at the site. Pre-remediation concentrations of benzene = 6500 ug/L (MW-5, 4/30/08).
- Continued operation of the system is reasonable, and case should not be closed until further mass is removed.

Recommendation

Closure not appropriate at this time. Warrants further regulation.

Reason: Site concentrations have declined to low-risk criteria while DPE system was in operation. Because all infrastructure is in place, the system should be restarted to complete remediation. Groundwater plume likely underlies residential properties to the north.



APEX ENVIROTECH, INC.

DRAWN BY:	D. Alston
DATE:	1/12/09
REVISIONS	

BENZENE IN GROUNDWATER ISOCONCENTRATION MAP: OCTOBER 16, 2008

Gas For Less
924 10th Street
Antioch, California

FIGURE **5**

PROJECT NUMBER: MSH52.001

O26

Independent UST Case Closure Review

Site Name	Santa Cruz Texaco (a.k.a. Former Exxon 7-0114)
Site Address	1024 Water Street Santa Cruz, CA
Lead Agency	Central Coast RWQCB (3)
USTCF Claim No.	15232 ($414,058)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	148	STMW-16	Increasing(v)
Benzene	ND	all wells	Decreasing(v)
MTBE	175	STMW-16	Increasing(v)
TBA	448	STMW-6	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	No
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Semi-Annual Groundwater Monitoring
- Work plan for soil vapor and soil sampling required by April 20, 2009 (unclear if performed)

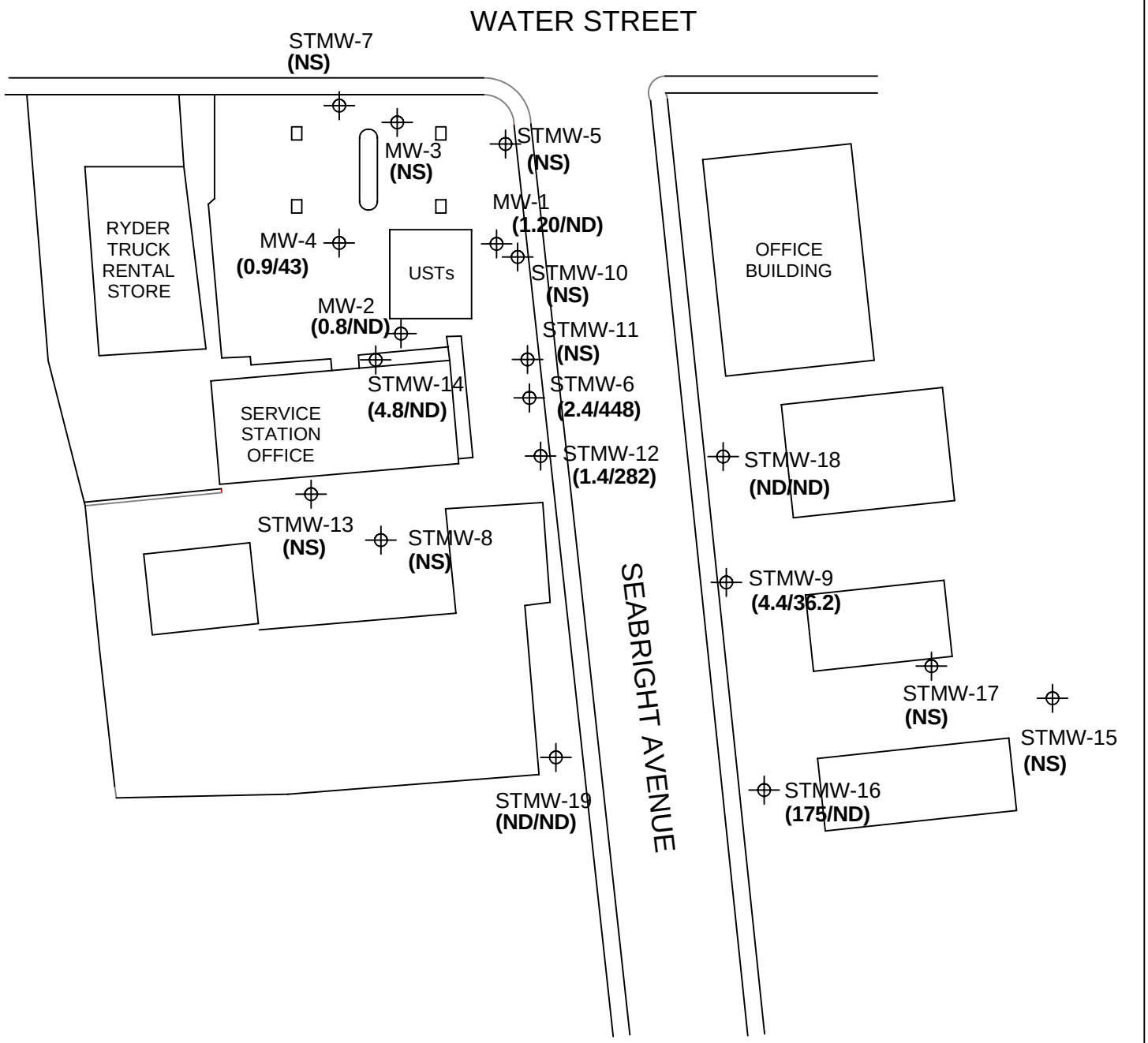
Closure Evaluation

- Groundwater varies seasonally from ~5-6' in 1Q to ~7-8' in 3Q
- Overexcavation conducted in 1996
- Soil concentrations range up to 1,200 mg/kg TPHg, 0.62 mg/kg benzene and 10 mg/kg MTBE. Soil impact is limited to on-site.
- Concentrations of petroleum hydrocarbons and fuel oxygenates negligible on-site; detections of MTBE and TBA are found in the furthest downgradient wells, indicating that the plume is likely detached from the original source area.
- Properties in the downgradient direction are commercial; the nearest residential property appears to be 1000' from the subject site. It is noted that the MTBE and TBA plume has migrated at least 200' from the subject site.
- It is unclear where the nearest sensitive receptor is with respect to the site. If the distance to the receptor is appreciable, then the concentrations of MTBE and TBA are unlikely to pose a threat to human health. Until a sensitive receptor survey is performed, the site cannot be considered low risk.

Recommendation

Closure not appropriate at this time. Warrants further regulation.

Reason: Plume is migrating; Site characterization is inadequate (undefined in downgradient direction); Location of nearest receptors unavailable in GeoTracker.



EXPLANATION

⊕	GROUNDWATER MONITORING WELL
(ND/ND)	MTBE / TBA CONCENTRATIONS, (micrograms per liter)
ND	NOT DETECTED BY LABORATORY METHOD
NS	NOT SAMPLED THIS QUARTER

N

0 40

RED HILLS ENVIRONMENTAL, INC.

MTBE, TBA Groundwater Concentration Map, 12-16-08

Prepared For:

Former Exxon 7-0144
1024 Water Street
Santa Cruz, CA

Prepared by: JC

REF: FIG 5_Conc Map

FIG: **5**

O27

Independent UST Case Closure Review

Site Name	Buy-N-Save Market
Site Address	225 7th St Los Banos, CA
Lead Agency	Merced County
USTCF Claim No.	15652 ($331,733)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	ND<5,000	all wells	No Trend(v)
Benzene	ND<50	all wells	No Trend(v)
MTBE	5,700	MW-2	No Trend(v)
TBA	ND<500	all wells	Decreasing(v)

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

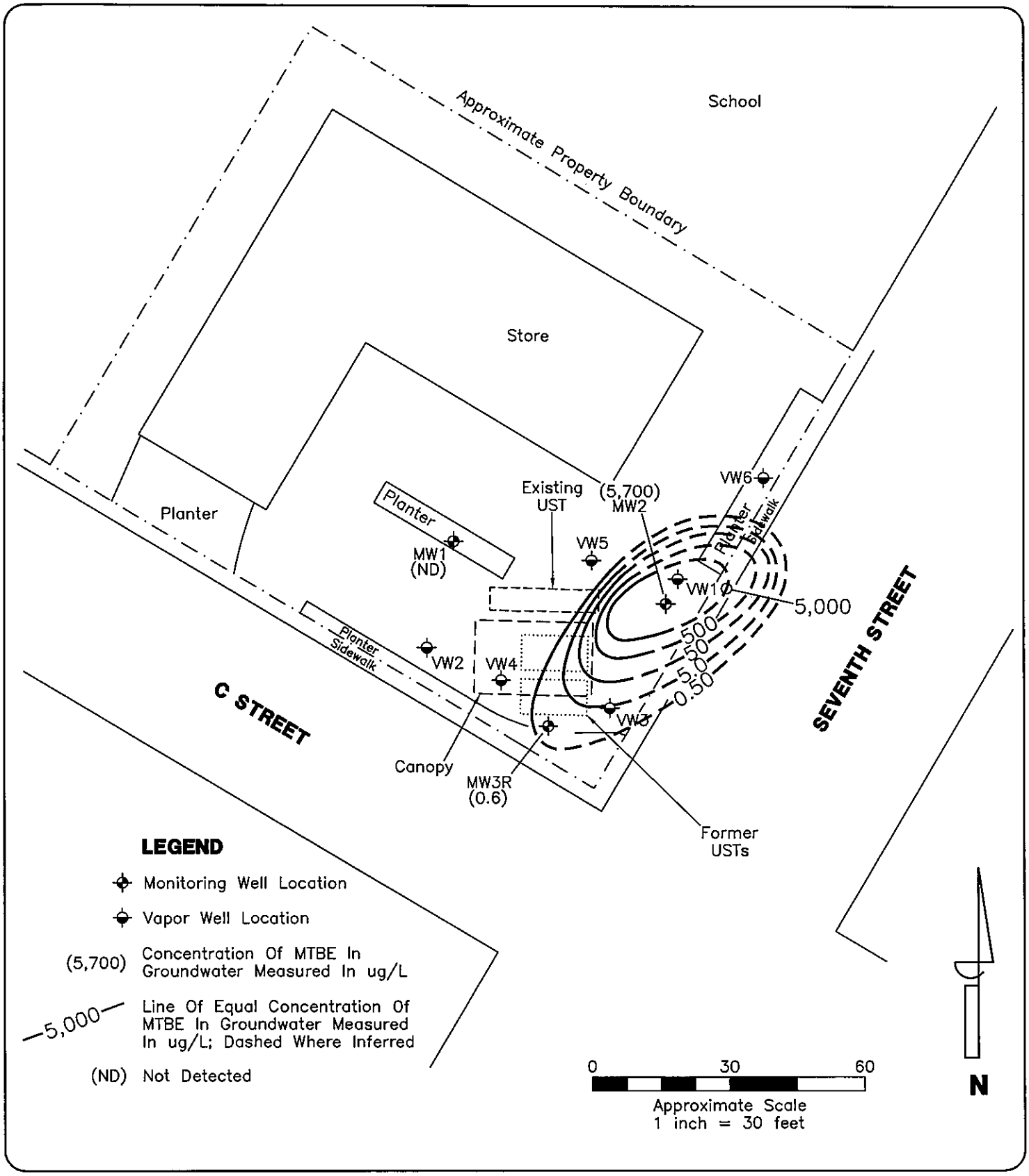
Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	UNK
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	No
Has Site been Adequately Characterized?	No
Drinking Water Wells Potentially Impacted?	UNK
Water Quality Objectives Likely Achieved Before Resource Used?	UNK
Land Use Residential Within Probable Plume Migration Area?	Yes
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	UNK
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives
• Semi-Annual Groundwater Monitoring • AS/SVE is planned - construction was planned for early 2009

Closure Evaluation
• Groundwater is at ~23-24' bgs • Appears to be predominantly an MTBE release; TPHg and benzene have historically been low to non-detect • Groundwater concentrations of MTBE undefined in the downgradient (NE) direction. The highest detections MTBE to be found in the most downgradient well, MW-2. • MTBE plume appears to be mobile – drifting downgradient from MW-3 toward MW-2 • Further plume delineation and remediation are warranted. • Residential properties are present approximately 500' downgradient of site • Performance of a sensitive receptor survey is warranted, if not already performed

Recommendation
Closure not appropriate at this time. Warrants further regulation. Reason: Plume is not defined; Plume does not appear to be stable; Location of nearby receptors not identified



APEX ENVIROTECH, INC.	DRAWN BY: D. Alston DATE: 5/27/09 REVISIONS	**MTBE IN GROUNDWATER ISOCONCENTRATION MAP, APRIL 15, 2009** Buy–N–Save Market 225 Seventh Street Los Banos, California	FIGURE **4** PROJECT NUMBER: R0C58.001

O28

Independent UST Case Closure Review

Site Name	Downtown Tire & Auto Repair
Site Address	550 Main St Red Bluff, CA
Lead Agency	Central Valley RWQCB (5R)
USTCF Claim No.	16420 ($129,534)

Constituent Of Concern	Current Max Concentration (ug/L)	Well	Trend
TPHg	4,800	MW-2	Stable (v)
Benzene	32	MW-3	Decreasing(v)
MTBE	ND	all wells	
TBA	ND	all wells	

Notes: (v) – Visual evaluation of trend
(k) – Kendall Trend test

Site Specific Risk Profile	
Human Health Risk Assessment Been Performed?	No
Distance to Nearest Receptor	UNK

Low Risk Evaluation Criteria	
Free Product Present at Site?	No
Plume Stable and Not Migrating?	Yes
Has Site been Adequately Characterized?	Yes
Drinking Water Wells Potentially Impacted?	No
Water Quality Objectives Likely Achieved Before Resource Used?	Yes
Land Use Residential Within Probable Plume Migration Area?	No
Impacted Groundwater Discharges to Surface Water Body?	No
Contaminants Likely Pose Insignificant Risk to Human Health?	Yes
Contaminants Likely Pose Insignificant Risk to Environment?	Yes

Regulatory Status & Directives

- Quarterly Groundwater Monitoring
- Regulatory agency issued a Cleanup and Abatement Order (CAO) on 6/25/07 requiring submittal of a "draft" Corrective Action Plan (CAP)
- Unknown if CAP has been prepared

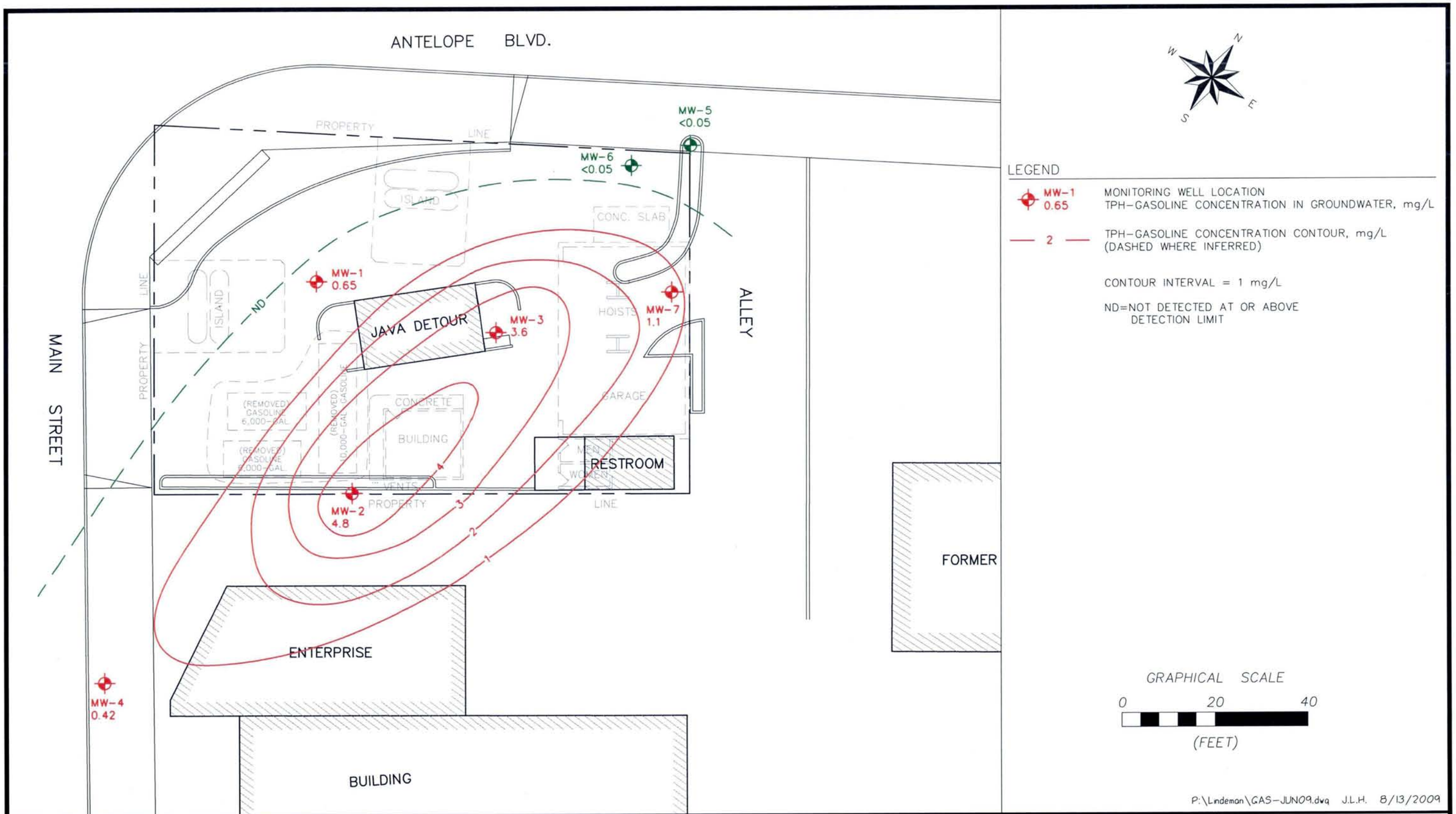
Closure Evaluation

- Groundwater is at ~16-19' bgs
- This case to be an old pre-MTBE release of gasoline. The benzene fraction appears to be highly degraded.
- Surrounding land use is well developed commercial; residential properties are not in the immediate vicinity of the site.
- January 2007 soil vapor survey reports hydrocarbons not detected in soil vapor.
- Consultant recommends continuing quarterly sampling to further evaluate groundwater trends and variations, so that an appropriate remediation plan can be implemented.
- Downgradient extent of TPHg not defined. Downgradient wells MW-1 (to the northwest) and MW-7 (to the northeast) reports concentrations of 650 ug/l and 1,100 ug/l of TPHg, respectively. Nevertheless, the plume is considered to be adequately characterized because TPH is relatively immobile and cannot be reasonably expected to migrate significantly beyond site boundary
- Unknown if a receptor survey has been performed.

Recommendation

Should be granted No Further Action status; does not warrant further regulation.

Reason: Contaminants are relatively immobile and below low-risk concentration criteria; Plume is adequately defined; Soil Vapor Survey results do not indicate unacceptable risk to indoor air quality; Surrounding properties are not residential.



TPH-GASOLINE CONCENTRATIONS IN GROUNDWATER
JUNE 3, 2009

LAWRENCE & ASSOCIATES
3590 IRON COURT
SHASTA LAKE, CA 96019
PHONE (530) 275-4800
FAX (530) 275-7970

SCALE:	1"=20'
DATE:	6/25/2009
JOB NO.:	003063.00

CLIENT:	PROJECT:	DRAWN BY:	CHECKED BY:	
MR. RICHARD LINDEMAN	GROUNDWATER MONITORING	J. HOLDEN	D. KIRK	FIGURE 3