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State Water Resources Control Board

**D R A F T**  
**Underground Storage Tank Case Closure Summary**  
**Vallemar Beacon**  
**Mr. Keet Nerhan (Petitioner)**  
**2095 Cabrillo Highway, City of Pacifica (Site)**

**Summary:**

The release from the subject Site was discovered during underground storage tank (UST) removal activities during 1989. The San Mateo County Health System (County) staff asserts that the risk to human health has not been adequately assessed. The County staff stated that potential vapor intrusion pathways need to be investigated, and the Petitioner has not requested case closure from the County. Therefore, closing the case would set a dangerous precedent. The County maintains that it is unclear whether the rise in the water table above the well screen in groundwater monitoring well (GM well) MW-2 might be responsible for decreases in contaminants of concern and that the affected groundwater is not de-designated for beneficial use in the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The County asserted that residual petroleum constituents in soil may affect future Site redevelopment.

Land use at the Site is commercial bordered by commercial. Cabrillo Highway and Reina Del Mar Boulevard border the western and southern Site boundaries. The Site is developed as the Alliance Beacon Service Station, a permitted UST facility. Businesses and residents in the City of Pacifica (Pacifica) are provided water and sewer services by local utility districts. The Site is located within the lower reach of the Calera Creek watershed. The Calera Creek Water Recycling Plant (CCWRP) and polishing wetland is located within approximately 1,000 feet and downgradient of the Site. The CCWRP can treat 4 million gallons of sewage per day. Pacifica's wastewater flows by gravity to the CCWRP where it is processed. Clear and disinfected water is discharged into wetlands or used as utility water. No production wells are located within 1,000 feet of the Site.

Based on the facts in the record and the hydrologic and geologic conditions at the Site, the limited residual petroleum constituents that remain in soil and groundwater do not represent a significant threat to human health, safety, or the environment. For these reasons, case closure is appropriate.

**Background:**

This UST Case Closure Summary has been prepared in support of a petition to the State Water Resources Control Board (State Water Board) for closure of the UST case at 2095 Cabrillo Highway, Pacifica.

All record owners of fee title for this Site as well as the applicable Regional Water Quality Control Board and local agency, water districts, adjacent property owners, and other interested parties have been notified of the recommendation for closure and were given the opportunity to provide comments.

**Case Information:**

Site Name: Vallemar Beacon	Address: 2095 Cabrillo Highway, Pacifica, CA 94044
Global ID: T0608100601	Petition Date: January 1, 2010
Underground Storage Tank Cleanup Fund (USTCF) Claim No: 15684	USTCF Expenditures: \$0

**Agency Information:**

Agency Name: San Mateo County Health System	Address: 2000 Alameda De Las Pulgas, Suite 100, San Mateo, CA 94403
Agency Case No: 340010	Number of Years Case Has Been Open: 22 years

**Tank Information:**

Tank No.	Size	Contents	Status	Date
1	10,000	Gasoline	Removed	April 1989
2	6,000	Gasoline	Removed	April 1989
3	4,000	Gasoline	Removed	April 1989
4	4,000	Gasoline	Removed	April 1989
5	100	Waste Oil	Removed	April 1989
6	100	Hydraulic Lift Oil	Removed	August 1998
7	500	Waste Oil	Removed	September 1998

**Release Information:**

- Discovery Date: April 5, 1989
- Source: UST system
- Affected Media: Soil and groundwater
- Free Product: None reported

**Corrective Actions:**

- April 1989 – Removal of five USTs.
- January 1992 – Soil and groundwater assessment.
- August 1998 – Removal of hydraulic lifts.
- September 1998 – Removal of waste oil UST.
- April 2003 – Soil and groundwater assessment.
- September 2003 – Trench excavation soil assessment.
- June 2004 – Soil and groundwater assessment.
- September 2004 – Soil and groundwater assessment.
- October 2005 – Shallow soil assessment near dispenser islands.

**Site Description/Conditions:**

- Groundwater Basin: San Francisco Bay Regional Water Quality Control Board – San Mateo Coastal Basin (San Mateo Coastal Basin).
- Beneficial Uses for Groundwater: Municipal and domestic (MUN), industrial process (PROC), industrial service (IND), and agricultural (AGR).
- Land Use: Commercial with a paved parking lot.

- Ambient Air: Likely to contain elevated concentrations of petroleum constituents from the operating permitted UST facility.
- Distance to Nearest Water Supply Well: The City of San Bruno Commodore Drive Well #15 is located approximately 3.5 miles east.
- Groundwater Depth: Approximate depth is between 3 and 7 feet below grade surface (bgs).
- Groundwater Flow Direction: West.
- Geology: Artificial fill and colluvium primarily composed of sandy clay and gravel. The artificial fill and colluvium are underlain by Franciscan Greenstone bedrock.
- Hydrology: Unconfined or slightly confined to approximately 23 feet bgs, the total depth explored; recharge methods are natural inflows from the Calera Creek watershed, infiltration of rainfall and irrigation water within the vicinity of the Site and discharge is subsurface outflow and evapotranspiration.
- Estimate of Remaining Mass: Small – low levels of petroleum constituents likely remain in the soil beneath and downgradient of UST and trench excavations.
- Estimated time to meet Water Quality Objectives (WQOs) for all constituents: Decades to hundreds of years.

#### **Site History:**

During 1989, four gasoline USTs and one waste oil UST were removed from two excavations. During 1998, one waste oil UST was removed and hydraulic lifts were removed from beneath the service station building (station building). Analytical results for soil and groundwater samples indicated petroleum constituent impacts to soil and groundwater. During 2003, an exploratory trench was sampled. Over the course of several corrective actions; approximately 15 UST excavation samples were collected; approximately 15 soil borings were drilled and sampled; six soil borings were completed as GM wells; and exploratory trench samples were collected downgradient of the gasoline UST excavation.

#### **Residual Petroleum Constituents:**

Soil sample data collected from the exploratory trench during 2003 indicated that free product was not present and that the primary constituents in soil were total petroleum hydrocarbons as diesel (TPHd), and lower concentrations of total petroleum hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene and xylenes (BTEX). Methyl tertiary butyl ether (MTBE) was not present in soil samples.

Soil and grab groundwater data collected during 2004 from boring locations GB-1 and VB-1 indicated that the residual mass of petroleum constituents was delineated south-southwest of the Site. Low to non-detectable concentrations of TPHg, BTEX and MTBE were reported in soil and groundwater at both locations.

Residual petroleum constituents including MTBE have been reported in samples from GM wells MW-1 through MW-5. Since installation, upgradient GM well MW-6 has reported non-detectable concentrations of TPHg, BTEX and low to non-detectable concentrations of MTBE. GM well MW-1 was paved over during 2002 and cannot be located for sampling.

Data from GM wells MW-2 through MW-6 demonstrate a stable plume, decreasing concentrations for all contaminants, and provide lateral delineation of the plume. Concentrations of petroleum constituents in GM wells MW-2 through MW-6 during May 2011 are shown in Table 1. Groundwater contaminant trends for GM well MW-2, located approximately 20 feet downgradient of the gasoline UST tank excavation are shown in Graph 1 below.

Concentrations of all contaminants in groundwater have decreased over time confirming the remaining residual mass of petroleum constituents is limited. The processes of adsorption, dispersion, dilution, volatilization, and biological degradation will continue and naturally attenuate the residual petroleum constituents.

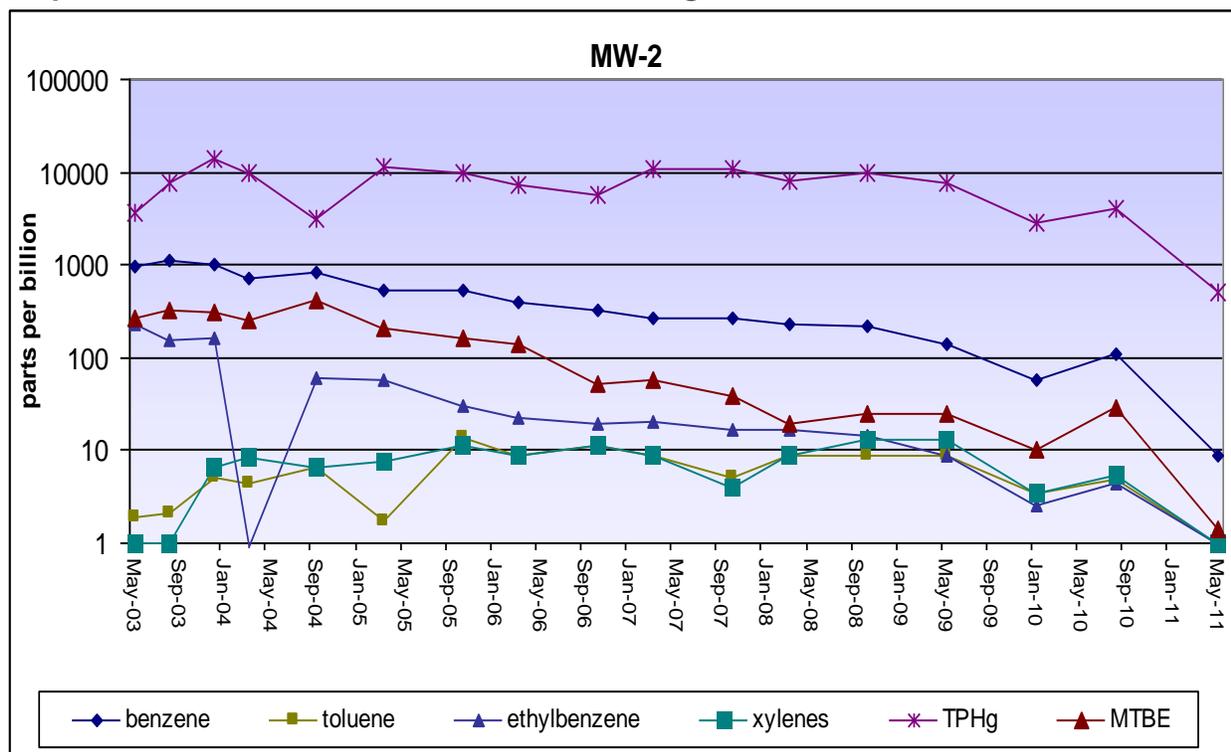
**Table 1: May 2011 Semi-Annual Groundwater Monitoring Event**

GM Well	TPHg (ppb)	benzene (ppb)	toluene (ppb)	ethylbenzene (ppb)	xylenes (ppb)	MTBE (ppb)
MW-2	496	8.7 <sup>1</sup>	<0.50	<0.30	<0.70	1.4
MW-3	81.7	<0.30	<0.50	<0.30	<0.70	76.1 <sup>1</sup>
MW-4	994	2.4 <sup>1</sup>	<1.0	<0.60	<1.4	72 <sup>1</sup>
MW-5	<25	<0.30	<0.50	<0.30	<0.70	4.9
MW-6	<25	<0.30	<0.50	<0.30	<0.70	<0.50
MCL	n/a	1.0	150	300	1,750	5.0

bgs-below grade surface  
GM Well-groundwater monitoring well  
MCL-maximum contaminant level  
MTBE-methyl tertiary butyl ether

n/a-not applicable  
ppb-parts per billion  
TPHg-total petroleum hydrocarbons as gasoline  
<sup>1</sup>-concentration above MCL

**Graph 1: Groundwater Contaminant trends Downgradient from Gasoline UST Excavation**



**Discussion:**

Source has been removed: UST system removal activities were completed during 1989 and 1998. Residual petroleum constituents in soil were excavated to the extent practicable during UST removal activities. The presence of underground utilities, a permitted UST system, and a station building restrict further excavation.

The plume is degraded: Initial concentrations of petroleum constituents reported in groundwater have been degraded by processes of adsorption, dispersion, dilution, volatilization, and biological degradation. Samples from GM wells MW-2, MW-3, and MW-5 provide over 7 years of groundwater analytical data which indicate that the residual petroleum plume is degrading.

Contaminants pose a low threat to the station building from the vapor intrusion pathway: Conditions show that potential vapor intrusion pathway threats from contaminants in soil and groundwater beneath the station building would be negligible in comparison to contaminants in ambient air at the operating permitted UST facility.

During 1989, elevated concentrations of TPHg and benzene were reported in soil and groundwater located approximately 25 feet downgradient from the station building and within the gasoline UST excavation. Soil and groundwater data indicate that TPHg and benzene do not pose a vapor intrusion pathway threat to the station building. Additionally, TPHg and benzene concentrations over the past 20 years have degraded and are unlikely to have migrated 25 feet in an upgradient direction impacting soil and groundwater within the immediate area of the station building.

During 1998, concentrations of TPHg were reported in soil and groundwater directly beneath the station building and within the hydraulic lift excavation. Soil and groundwater data indicate that TPHg is unlikely to pose a vapor intrusion pathway threat to the station building. Additionally, TPHg concentrations over the past 10 years have degraded.

#### **Objections to Case Closure and Response:**

**Objection 1:** *The risk to human health has not been adequately assessed because the potential vapor intrusion pathways have not been investigated.*

**Response:** Potential vapor intrusion pathway threats from contaminants beneath the station building would be negligible in comparison to contaminants in ambient air at the operating permitted UST facility. The human health threat to the station building related to the potential vapor intrusion pathway has been investigated and adequately assessed. Soil and groundwater data indicate that TPHg is unlikely to pose a vapor intrusion pathway threat to the station building. Additionally, TPHg concentrations over the past 10 years have degraded.

**Objection 2:** *Petitioner has not requested case closure from the County. Therefore, closing the case would set a dangerous precedent.*

**Response:** On October 29, 2009, the County directed the Petitioner to perform additional work. On January 1, 2010, Petitioner requested that the State Water Board close the Site. The Petitioner did not submit a closure denial letter from the County. On March 30, 2010, the County commented on the petition submitted to the State Water Board and stated, "we will treat this petition as if we had denied a request for closure..." Because the County does not object to the contention that closure has been denied by the County, the State Water Board considers the petition to be in substantial compliance with California Code of Regulations title 23, section 2814.6.

**Objection 3:** *It is unclear whether the rise in the water table above the well screen for GM well MW-2 might be responsible for decreases in contaminants of concern.*

**Response:** It is unlikely that the rise in the water table above the well screen for GM well MW-2 would be responsible for decreases in contaminants of concern. GM wells are purged prior to sampling to provide representative groundwater samples of formation waters. Additionally, the remaining Site GM wells show similar declines in concentrations of constituents of concern.

**Objection 4:** *The affected groundwater is not de-designated for beneficial uses in the Basin Plan.*

**Response:** Groundwater in the San Mateo Coastal Basin is designated for MUN, PROC, IND, and AGR. Locally, the Site is situated within the lower reaches of the Calera Creek watershed. It is not anticipated that affected groundwater will be utilized during the period of impairment.

**Objection 5:** *The consultant has been vague in describing the Site conditions.*

**Response:** Existing soil and groundwater data supports a conceptual site model which indicates that residual petroleum constituents at the Site present a low threat to human health, safety and the environment.

**Objection 6:** *Residual petroleum constituents in soil may affect future Site redevelopment.*

**Response:** The Site is currently an operating service station and there are no proposed plans to redevelop the Site. It is possible that residual petroleum constituents in soil may affect future Site redevelopment. If another use is proposed for the Site, the case may be re-evaluated to determine if a threat to human health or safety exists.

**Closure:**

**Does corrective action performed ensure the protection of human health, safety, and the environment?** Yes

**Are corrective actions and UST case closure consistent with State Water Board Resolution 92-49?** Yes

**Is achieving background water quality feasible?** No

To remove all traces of residual petroleum constituents at the Site would require significant effort and cost. Additional soil excavation near the operating UST system and exploratory trench would be greatly limited by the existing station building, piping, and underground utilities.

If complete removal of detectable traces of petroleum constituents becomes the standard for UST corrective actions, however, the statewide technical and economic implications will be enormous. For example, disposal of soils from comparable areas of over-excavation throughout the state would greatly impact already limited landfill space. In light of the precedent that would be set by requiring additional excavation at this Site and the fact that beneficial uses are not threatened, attaining background water quality at this Site is not feasible.

**If achieving background water quality is not feasible, then will alternate cleanup level:**

- **Be consistent with the maximum benefit to the people of the State?**  
Yes. It is impossible to determine the precise level of water quality that will be attained given the limited residual petroleum constituents that remain at the Site, but in light of all the factors discussed above, and the fact that the residual petroleum constituents will not unreasonably affect present and anticipated beneficial uses of groundwater beyond the immediate vicinity of the Site, a level of water quality will be attained that is consistent with the maximum benefit to the people of the state and between the background level and the applicable water quality objective.
- **Unreasonably affect present and anticipated beneficial uses of water?**  
No. Impacted groundwater is not used as a source of drinking water or for any other beneficial use currently and for the above-mentioned reasons it is highly unlikely that the impacted groundwater will be used as a source of drinking water or for other beneficial use in the foreseeable future.
- **Exceed water quality prescribed in applicable Basin Plan?**  
No. The final step in determining whether cleanup to a level of water quality less stringent than background is appropriate for this Site requires a determination that the alternative level of water quality will not result in water quality less than that prescribed in the relevant Basin Plan. Pursuant to State Water Board Resolution 92-49, a Site may be closed if the Basin Plan requirements will be met within a reasonable time frame. Based on the above-mentioned discussion and analysis, the State Water Board finds that decades to hundreds of years is a reasonable time frame to meet WQOs.

**Have factors contained in Title 23 of the California Code of Regulations, Section 2550.4 been considered? Yes.**

As discussed earlier, the adverse effect on groundwater will be minimal and localized, and there will be no adverse effect on the groundwater contained in deeper aquifers, given the physical and chemical characteristics of petroleum constituents, the hydrogeological characteristics of the Site and surrounding land, and the quantity of the groundwater and direction of the groundwater flow.

In addition, the potential for adverse effects on beneficial uses of groundwater is low. Locally the Site is situated within the lower reaches of the Calera Creek watershed. The local hydrology beneath the Site indicates that groundwater recharge methods in the watershed are natural inflows from the Calera Creek watershed, infiltration of rainfall and CCWRP irrigation water within the vicinity of the Site. Finally, a level of water quality less stringent than background is unlikely to have any impact on surface water quality, in light of the volume and physical and chemical characteristics of petroleum constituents; the hydrogeological characteristics of the Site and surrounding land; the quantity and quality of groundwater and direction of groundwater flow, the patterns of precipitation in the region, and the proximity of residual petroleum constituents to surface waters.

**Has the requisite level of water quality been met? No**

**If no, the approximate period in which the requisite level of water quality will be met:**

The approximate period in which the requisite level of water quality will be met for dissolved petroleum constituents is decades to hundreds of years. In this case, this is a reasonable period in which to meet the requisite level of water quality because the affected groundwater is not currently being used as a source of drinking water and it is highly unlikely that the affected groundwater will be used as a source of drinking water in the future.

Other designated beneficial uses of water are not adversely impacted. The record indicates that sources were removed in 1989 and 1998; unauthorized releases resulted in a small petroleum constituent plume that is attenuating; none of the petroleum constituents have impacted existing water supply wells; and all petroleum constituents will meet WQOs within decades to hundreds of years.

**MTBE Testing:**

Site soil and groundwater has been tested for MTBE pursuant to reporting requirements of Health and Safety Code section 25296.15.

**Summary and Conclusions:**

Groundwater affected by the release from the former USTs exceeds the San Francisco Bay Regional Water Quality Control Board, WQOs for groundwater that is a potential source of drinking water. WQOs however, will be achieved in a reasonable period of time. Affected groundwater is not currently being used as a source of drinking water or for any other designated beneficial use and it is highly unlikely that the affected groundwater will be used as a source of drinking water or for another beneficial use in the foreseeable future. Closure is appropriate.

Prepared By:  January 26, 2012  
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Reviewed By:  January 26, 2012  
George Lockwood, PE#59556 Date  
Senior Water Resource Control Engineer

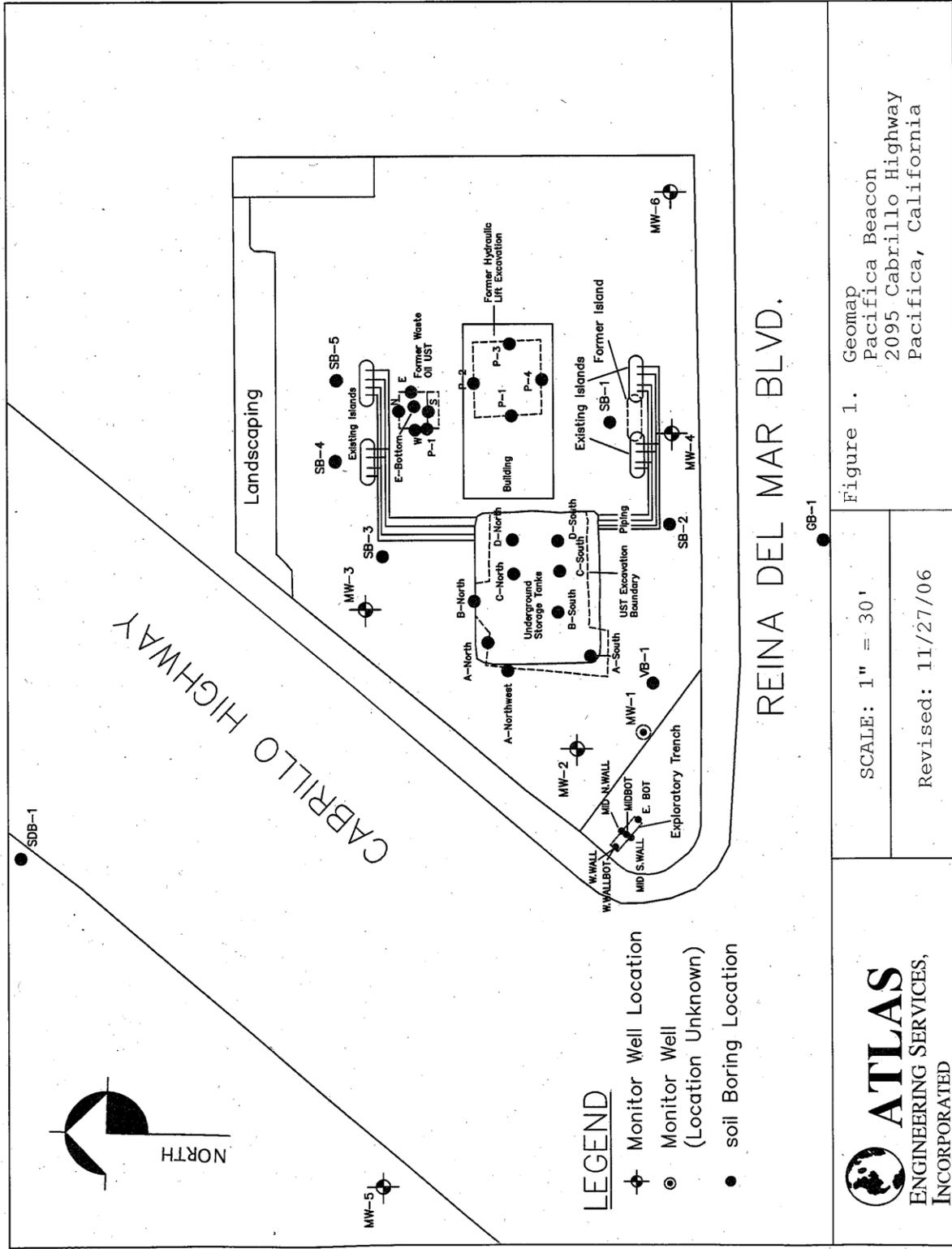


Figure 1. Geomap  
Pacifica Beacon  
2095 Cabrillo Highway  
Pacifica, California

SCALE: 1" = 30'  
Revised: 11/27/06

**ATLAS**  
ENGINEERING SERVICES,  
INCORPORATED