

State Water Resources Control Board

UST CASE CLOSURE SUMMARY

Agency Information

Agency Name: County of Orange – Health Care Agency (County)	Address: 1241 E. Dyer Road, #120 Santa Ana, CA 92705-5611
Agency Caseworker: Denamarie Baker	Case No.: 99UT027

Case Information

USTCF Claim No.: None	Global ID: T0605930426
Site Name: Former Shell Service Station	Site Address: 7491 La Palma Avenue Buena Park, CA 90620 (Site)
Petitioner: Shell Oil Products US Attention: Andrea Wing	Address: 20945 South Wilmington Avenue, Carson, CA 90810
USTCF Expenditures to Date: \$0	Number of Years Case Open: 13

URL: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0605930426

Summary

The Low-Threat Underground Storage Tank Case Closure Policy (Policy) contains general and media-specific criteria, and cases that meet those criteria are appropriate for closure pursuant to the Policy. This Site meets all of the required criteria of the Policy. A summary evaluation of compliance with the Policy is shown in **Attachment 1: Compliance with State Water Board Policies and State Law**. The Conceptual Site Model upon which the evaluation of the case has been made is described in **Attachment 2: Summary of Basic Site Information**. Highlights of the Conceptual Site Model of the Site follow:

The release at this Site was discovered after an increase of methyl tert-butyl ether (MTBE) concentration in monitoring well (MW) MW-15 located next to the former Shell tank pit on the southeast part of the property in August 1999. The Site was formerly a World Oil and then a Shell service station. The Site is currently vacant. No underground storage tanks (USTs) are on-site.

World Oil Corporation operated a service station at this Site from 1971 to 1986. The release was remediated from 1987 to 2000. Three 10,000-gallon gasoline USTs were removed in 1987. Approximately 1,100 cubic yards (cy) of soil were excavated from the western portion of the Site. Groundwater pump and treat was performed from 1987 to 1997. Soil vapor extraction (SVE) system was operated from 1995 to 1997.

Shell operated a service station at this Site from 1987 to 2001. New USTs were installed in 1987. From 2001 to 2004, an SVE system was operated and removed approximately 4,754 pounds of vapor-phase petroleum constituents. The groundwater extraction system was operated from 2001 to 2009. As of November 2008, approximately 1.1 million gallons of groundwater were removed

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and 60.5 pounds of dissolved-phase petroleum constituents were recovered. Three 10,000-gallon USTs, one 550-gallon waste oil tank, and approximately 388 cy of impacted soil were removed in January 2002.

Based on the historical groundwater data, concentration trends for total petroleum hydrocarbons as gasoline (TPHg), benzene, MTBE, tertiary-butyl alcohol (TBA), and di-isopropyl ether (DIPE) have been either stable or decreasing in all wells.

Rationale for Closure under the Policy

- General Criteria – Site meets all eight general criteria under the Policy.
- Groundwater – Site meets the Policy Groundwater-Specific Class “2”.
- Petroleum Vapor Intrusion to Indoor Air – Site meets the Policy Class “b”. A site-specific risk assessment for the vapor intrusion pathway was conducted and demonstrates that human health is protected.
- Direct Contact and Outdoor Air Exposure – Site meets the Policy Class “b”. A site-specific risk assessment from exposure shows that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting the human health. The estimated naphthalene concentrations in soil meet the thresholds in Table 1 for direct contact by a factor of eight. It is highly unlikely that naphthalene concentrations in the soil, if any, exceed the threshold.

Objections to Closure

County staff objected to UST case closure because:

1. Vertical extent of benzene in soil and groundwater has not been defined.

Response: Based on information available in the record, elevated levels of residual benzene were identified on-site between 5 and 20 feet below ground surface (bgs). All soil samples from the off-site down-gradient wells installed in 1993 and 2009 and from the down-gradient borings advanced in 2008 between 5 to 20 feet bgs were non-detect.

Groundwater samples collected at depths of approximately 19 feet from the off-site down-gradient borings in 2008 were non-detect. Also, recent groundwater sampling conducted in December 2012 indicates that benzene was non-detect in the off-site down-gradient well. The screen interval for this well is from 5 to 20 feet bgs. Therefore, contamination migration has been investigated and adequately assessed. Vertical extent of benzene in soil and groundwater has been adequately defined.

2. High dissolved concentration of benzene remains at the Site.

Response: Elevated levels of dissolved benzene are limited to the west-southwest of the former Shell UST pit area measured in wells MW-25 and MW-26. Based on information available in the record, wells MW-25 and MW-26 are outside of the excavation areas from both World Oil Corporation and Shell. Groundwater concentration trend for benzene has been either stable or decreasing in all wells. Benzene was only detected twice in the down-gradient well MW-32 at

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0.75 µg/L and 0.86 µg/L. Therefore, the residual benzene that remains only poses a low threat to human health, safety, or the environment and will not adversely affect the beneficial use of the groundwater in the area.

3. Vertical and lateral extent of DIPE has not been defined to the southwest of the Site and remedial efforts did not successfully address DIPE.

Response: Although there are no non-detect wells on the west-southwest of the Site, the plume is adequately defined. To the southwest of the Site, groundwater samples were collected at depth of approximately 19 feet from several down-gradient borings in 2008 and were non-detect.

4. A Corrective Action Plan is needed if the findings of the pending assessment and quarterly groundwater monitoring suggest that it is still necessary.

Response: The requested assessment is not necessary because monitoring data in wells and borings have shown that remedial actions undertaken by the petitioner have reduced the residual petroleum constituents mass to low or non-detect level. The remaining mass of residual petroleum constituents is limited to the vicinity of the former dispenser islands and the former USTs. Based on the historical groundwater data, concentration trends for TPHg, benzene, MTBE, TBA, and DIPE have been either stable or decreasing in all wells.

Recommendation for Closure

The corrective action performed at this Site ensures the protection of human health, safety, the environment and is consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations, applicable state policies for water quality control and the applicable water quality control plan, and case closure is recommended.

Prepared By: Trinh Pham
Trinh Pham
Water Resource Control Engineer

4/5/2013
Date

Reviewed By: George Lockwood
George Lockwood, PE#59556
Senior Water Resource Control Engineer

4/9/2013
Date



ATTACHMENT 1: COMPLIANCE WITH STATE WATER BOARD POLICIES AND STATE LAW

The site complies with the State Water Resources Control Board policies and state law. Section 25296.10 of the Health and Safety Code requires that sites be cleaned up to protect human health, safety, and the environment. Based on available information, any residual petroleum constituents at the site do not pose significant risk to human health, safety, or the environment.

The site complies with the requirements of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.¹

<p>Is corrective action consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations? The corrective action provisions contained in Chapter 6.7 of the Health and Safety Code and the implementing regulations govern the entire corrective action process at leaking UST sites. If it is determined, at any stage in the corrective action process, that UST case closure is appropriate, further compliance with corrective action requirements is not necessary. Corrective action at this site has been consistent with Chapter 6.7 of the Health and Safety Code and implementing regulations and, since this case meets applicable case-closure requirements, further corrective action is not necessary, unless the activity is necessary for case closure.</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>Have waste discharge requirements or any other orders issued pursuant to Division 7 of the Water Code been issued at this site?</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>If so, was the corrective action performed consistent with any order?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>
<p><u>General Criteria</u> General criteria that must be satisfied by all candidate sites:</p> <p>Is the unauthorized release located within the service area of a public water system?</p> <p>Does the unauthorized release consist only of petroleum?</p> <p>Has the unauthorized (“primary”) release from the UST system been stopped?</p> <p>Has free product been removed to the maximum extent practicable?</p> <p>Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>

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

<p>Has secondary source been removed to the extent practicable?</p> <p>Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15?</p> <p>Nuisance as defined by Water Code section 13050 does not exist at the site?</p> <p>Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p><u>Media-Specific Criteria</u> Candidate sites must satisfy all three of these media-specific criteria:</p> <p>1. Groundwater: To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives (WQOs) must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites:</p> <p>Is the contaminant plume that exceeds WQOs stable or decreasing in areal extent?</p> <p>Does the contaminant plume that exceeds WQOs meet all of the additional characteristics of one of the five classes of sites?</p> <p>If YES, check applicable class: <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5</p> <p>For sites with releases that have not affected groundwater, do mobile constituents (leachate, vapors, or light non-aqueous phase liquids) contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>
<p>2. Petroleum Vapor Intrusion to Indoor Air: The site is considered low-threat for vapor intrusion to indoor air if site-specific conditions satisfy all of the characteristics of one of the three classes of sites (a through c) or if the exception for active commercial fueling facilities applies.</p> <p>Is the site an active commercial petroleum fueling facility? Exception: Satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk.</p> <p>a. Do site-specific conditions at the release site satisfy all of the applicable characteristics and criteria of scenarios 1 through 3 or all of the applicable characteristics and criteria of scenario 4? If YES, check applicable scenarios: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA</p>

<p>b. Has a site-specific risk assessment for the vapor intrusion pathway been conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency?</p> <p>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>
<p>3. Direct Contact and Outdoor Air Exposure: The site is considered low-threat for direct contact and outdoor air exposure if site-specific conditions satisfy one of the three classes of sites (a through c).</p> <p>a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth bgs?</p> <p>b. Are maximum concentrations of petroleum constituents in soil less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health?</p> <p>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA</p>

ATTACHMENT 2: SUMMARY OF BASIC INFORMATION (Conceptual Site Model)

Site Location/History

- The Site is located on the northwest corner of the intersection of La Palma Avenue and Western Avenue in Buena Park. The Site is currently vacant.
- The property immediately west of the Site is a retail shopping plaza. A vacant lot is located to the east of the Site, across Western Avenue. A mini-mart, video store, dry cleaner, and fire station are located south of the Site, across La Palma Avenue. Knott's Berry Farm is located southeast of the Site. A public park and public school are located southwest of the Site across La Palma Avenue.
- Nature of Contaminants of Concern: Petroleum hydrocarbons only.
- Primary Source of Release: UST system.
- Discovery Date: August 1999.
- Release Type: Petroleum².
- 17 monitoring wells and 3 piezometer wells have been installed.
- Free Product: None reported.

Table A: USTs

Tank	Size in Gallons	Contents	Status	Date
3 USTs	10,000	Gasoline	Removed	January 2002
1 UST	550	Waste Oil	Removed	January 2002

Receptors

- Groundwater Basin: Coastal Plain of Orange County.
- Groundwater Beneficial Uses: Municipal and domestic water supply (MUN), industrial service water supply (IND), industrial process water supply (PRO), and agricultural water supply (AGR).
- Designated Land Use: Commercial and residential.
- Public Water System: Metropolitan Water District of Southern California.
- Distance to Nearest Supply Wells: Greater than 1,000 feet.
- Distance to Nearest Surface Waters: Greater than 1,000 feet.

Geology/Hydrogeology

- Average Groundwater Depth: ~ 10 feet bgs.
- Maximum Groundwater Depth: ~ 11 feet bgs.
- Groundwater Flow Direction: South - Southwest.
- Geology: Silty sand and sand to a depth of approximate 16 feet; silt, clayey silt, and clay from 16 to 24 feet; and silty sand and sand from 24 to 38 feet.
- Hydrology: Upper most groundwater within the release area is typically semi-perched at depths of less than 50 feet. Shallow sediments at the Site form an aquitard overlying the Orange County equivalent of the Artesia aquifer.

² "Petroleum" means crude oil, or any fraction thereof, which is liquid at standard conditions of temperature and pressure, which means at 60 degrees Fahrenheit and 14.7 pounds per square inch absolute. (Health & Saf. Code, § 25299.2.)

Corrective Actions

- SVE system was operated from 2001 to 2004. Approximately 4,754 pounds of vapor-phase petroleum constituents were removed.
- Groundwater extraction system was operated from 2001 to 2009. As of November 2008, approximately 1.1 million gallons of groundwater were removed and 60.5 pounds of dissolved-phase petroleum constituents were recovered.
- Four USTs and approximately 388 cy of impacted soil were removed in January 2002.

Table B: Concentrations of Petroleum Constituents in Soil

Constituent	Maximum 0-5 feet bgs (mg/kg)	Maximum 5-10 feet bgs (mg/kg)	San Francisco Bay Regional Water Quality Control Board ¹ 's Construction/Trench Worker Direct Exposure Screening Levels (mg/kg)
Benzene	2.1	8.6	12
Ethylbenzene	64	130	210
Naphthalene	NA	NA	130
PAHs ²	NA	NA	

¹ San Francisco Bay Regional Water Board

² Poly-aromatic hydrocarbons as benzo(a)pyrene toxicity equivalent

NA = Not available

Table C: Concentrations of Petroleum Constituents in Groundwater

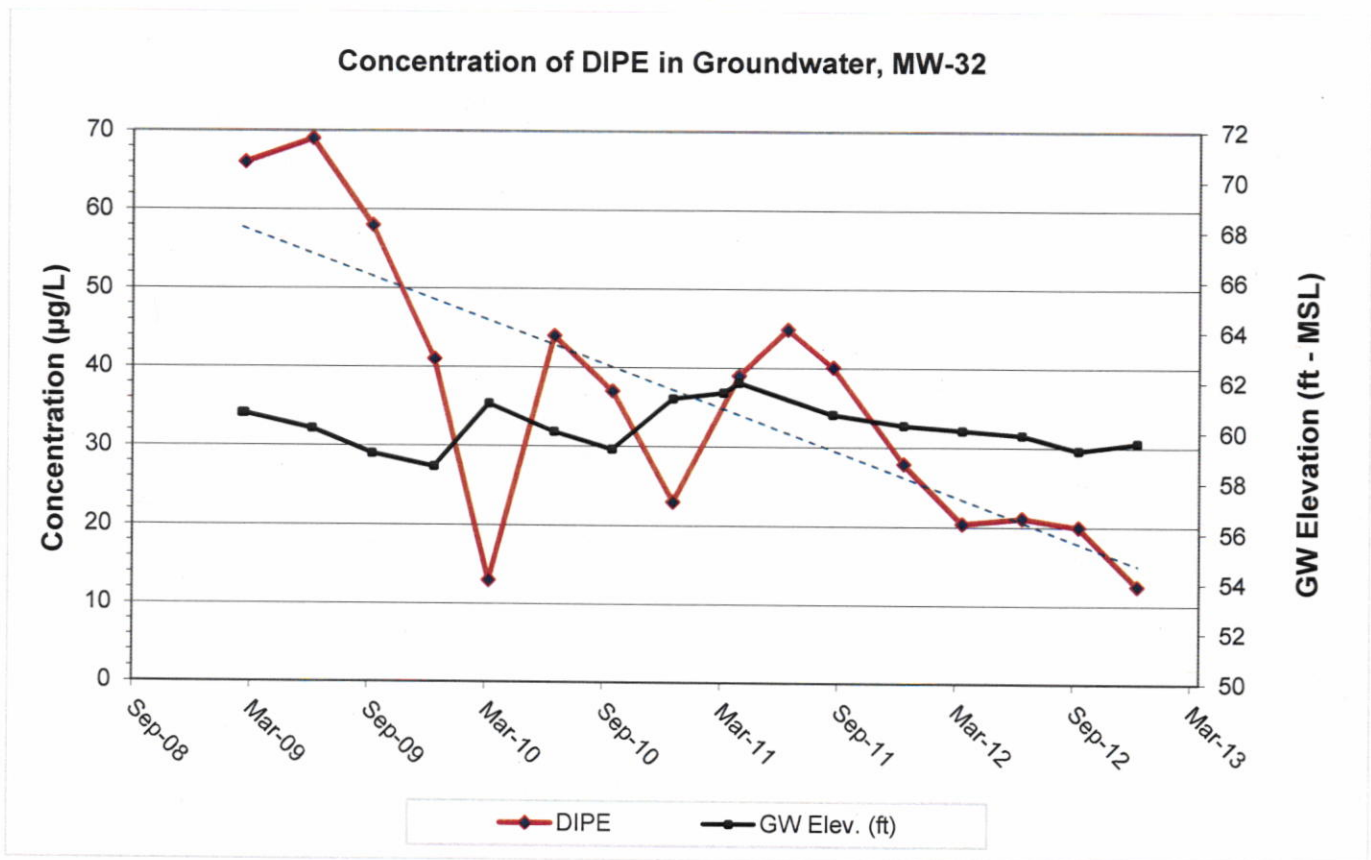
Well No.	Sample Date	TPHg (µg/L)	Benzene (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)
MW-16	12/17/2012	<50	<1	0.4 ¹	<10	<2
MW-17	12/17/2012	<50	<1	0.3 ¹	<10	<2
MW-18	12/17/2012	<50	<1	4.4	<10	<2
MW-19	12/17/2012	<50	<1	0.24 ¹	<10	<2
MW-20	12/17/2012	<50	<1	0.58 ¹	<10	<2
MW-21	12/17/2012	<50	<1	0.49 ¹	<10	0.25 ¹
MW-22	12/17/2012	<50	<1	0.39 ¹	<10	<2
MW-23	12/17/2012	105	0.2 ¹	1.5	<10	6.8
MW-24	12/17/2012	<50	<1	0.78 ¹	<10	<2
MW-25	12/17/2012	16,800	1,900	19.4 ¹	<200	91
MW-26	12/17/2012	8,320	205	10.4	<100	319
MW-27	12/17/2012	<50	<1	2.3	<10	4.3
MW-28	12/17/2012	<50	<1	0.71 ¹	<10	<2
MW-29	12/17/2012	963	8.6	4.4	<40	316
MW-30	12/17/2012	721	95.5	2.9	7.5 ¹	115
MW-31	12/17/2012	58.2	<1	0.27 ¹	<10	<2
MW-32	12/17/2012	26.5 ¹	<1	<1	<10	12.5
P-1 ²	12/17/2012	32.2 ¹	<1	0.34 ¹	<10	<2
P-2 ²	12/17/2012	<50	<1	0.4 ¹	<10	<2
P-3 ²	12/17/2012	146	<1	0.76 ¹	<10	<2

Table C: Concentrations of Petroleum Constituents in Groundwater (Cont.)

ND	Non-detect
1	Estimated value
2	Piezometer well
3	Taste and odor threshold (McKee and Wolf)
4	California Primary Maximum Contaminant Level (MCL)
5	California Secondary MCL
6	California Department of Public Health Notification Level for Toxicity in Humans for Drinking Water
7	Taste and Odor Threshold (Amoore and Hautala)

Groundwater Trends

Reported DIPE concentrations in groundwater have demonstrated stable or decreasing trends over time in all wells.



Evaluation of Risk Criteria

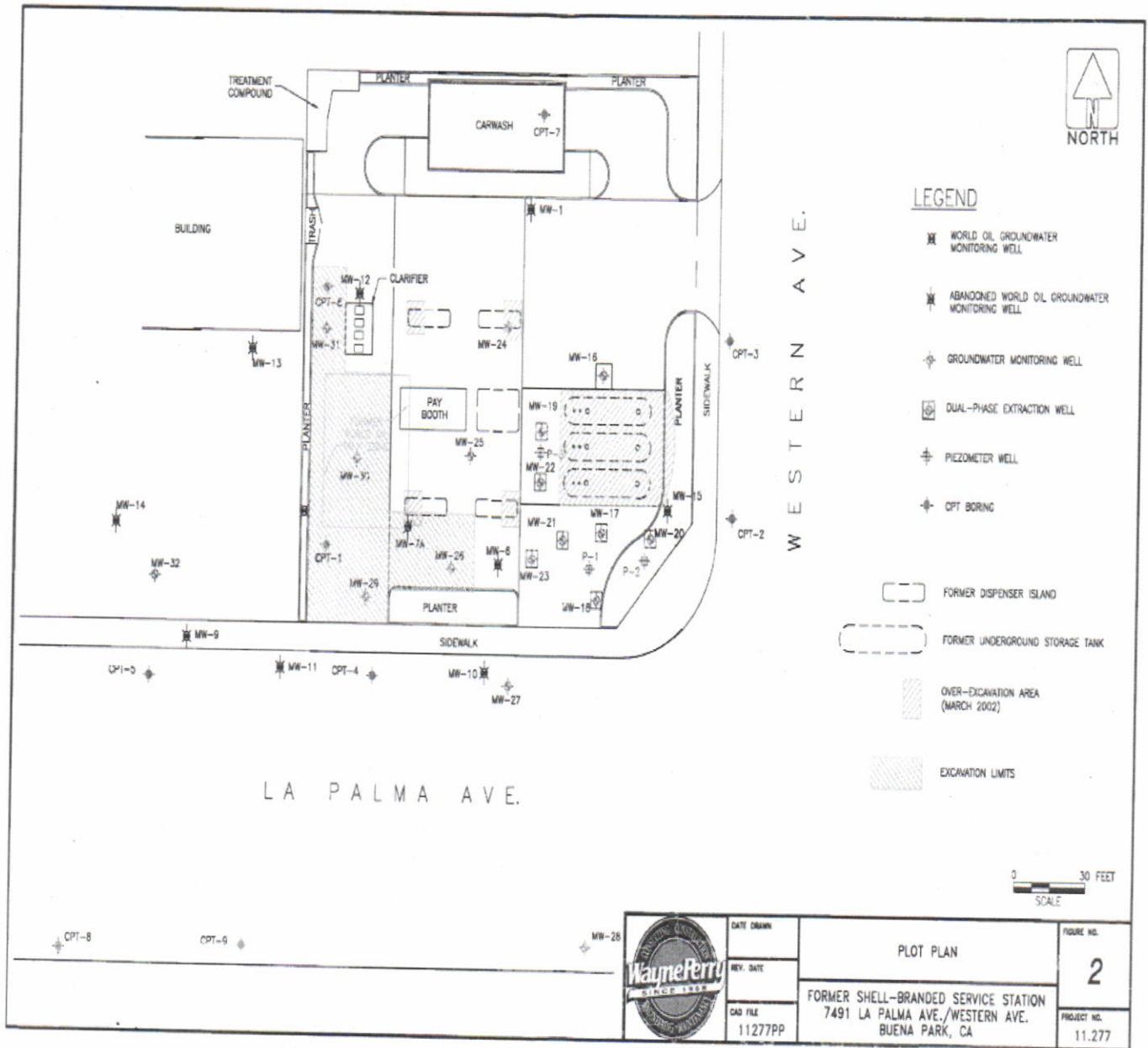
- Maximum Petroleum Constituent Plume Length above WQOs: TPHg plume is ~ 240 feet, benzene plume is ~ 130 feet, MTBE plume is ~ 150 feet, DIPE plume is ~ 240 feet.
- Petroleum Constituent Plume Determined Stable or Decreasing: Yes.
- Soil/Groundwater Sampled for MTBE: Yes, see Table C above.
- Residual Petroleum Constituents Pose Significant Risk to the Environment: No.
- Residual Petroleum Constituents Pose Significant Vapor Intrusion Risk to Human Health: No. The vapor intrusion risk is not a concern for this Site because:
 - Based on the latest soil data from 2007 to 2009, total petroleum hydrocarbons (TPHg and total petroleum hydrocarbons as diesel combined) were less than 100 mg/kg at 5 and 10 feet bgs.
 - Soil data in 2003 indicate that benzene was non-detect in a soil sample at 5 feet bgs from well MW-25 and in both of the soil samples at 5 and 10 feet bgs from well MW-26.
 - The groundwater concentration trend for benzene has been either stable or decreasing in all wells.
 - The residual petroleum constituents in soil and groundwater are acceptable because site conditions are protective of human health.
- Residual Petroleum Constituents Pose a Nuisance³ at the Site: No.
- Residual Petroleum Constituents in Soil Pose Significant Risk of Adversely Affecting Human Health: No.
- Residual Petroleum Constituents Pose Significant Direct Contact and Outdoor Air Exposure to Human Health: No. A site-specific risk assessment from exposure shows that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting the human health because:
 - Historical soil data indicate that only soil samples from well MW-24 are slightly above soil screening levels for benzene for the Residential scenario in Table 1 of the Policy. However, these soil samples were collected in 2003 and the concentrations for benzene from the latest soil samples from 2007 to 2009 were below soil screening levels in Table 1.
 - Maximum soil sampling concentrations from well MW-24 are below the thresholds for Commercial/Industrial and Utility Worker scenarios.
 - As stated in the *Technical Justification for Soil Screening Levels for Direct Contact and Outdoor Air Exposure Pathways*, which provides technical justifications for developing soil screening levels for the Direct Contact and Outdoor Air Exposure section of the Policy, soil screening levels in Table 1 were developed based on multiple conservative assumptions. For example, a residential receptor is assumed to come in contact with soil at concentrations equivalent to the screening level every day (350 days/year) for a total of 30 years. Another conservative assumption is that the chemical concentrations remain constant over time in soil. In reality, these worst case scenarios are not likely to occur. Therefore, actual risk is expected to be lower than the risk targets used to derive the screening levels.
 - Reported maximum concentration of benzene and ethylbenzene from the upper ten feet of soil from well MW-24 do not exceed the San Francisco Bay Regional Water Board's soil screening levels for Direct-Exposure Concerns.
 - Natural attenuation has occurred as evidenced by stable or decreasing concentration trends for all petroleum constituents in all wells.
 - There are no soil sample results in the case record for naphthalene. However, the relative concentration of naphthalene in soil can be conservatively estimated using the published

³ Nuisance as defined in California Water Code, section 13050, subdivision (m).

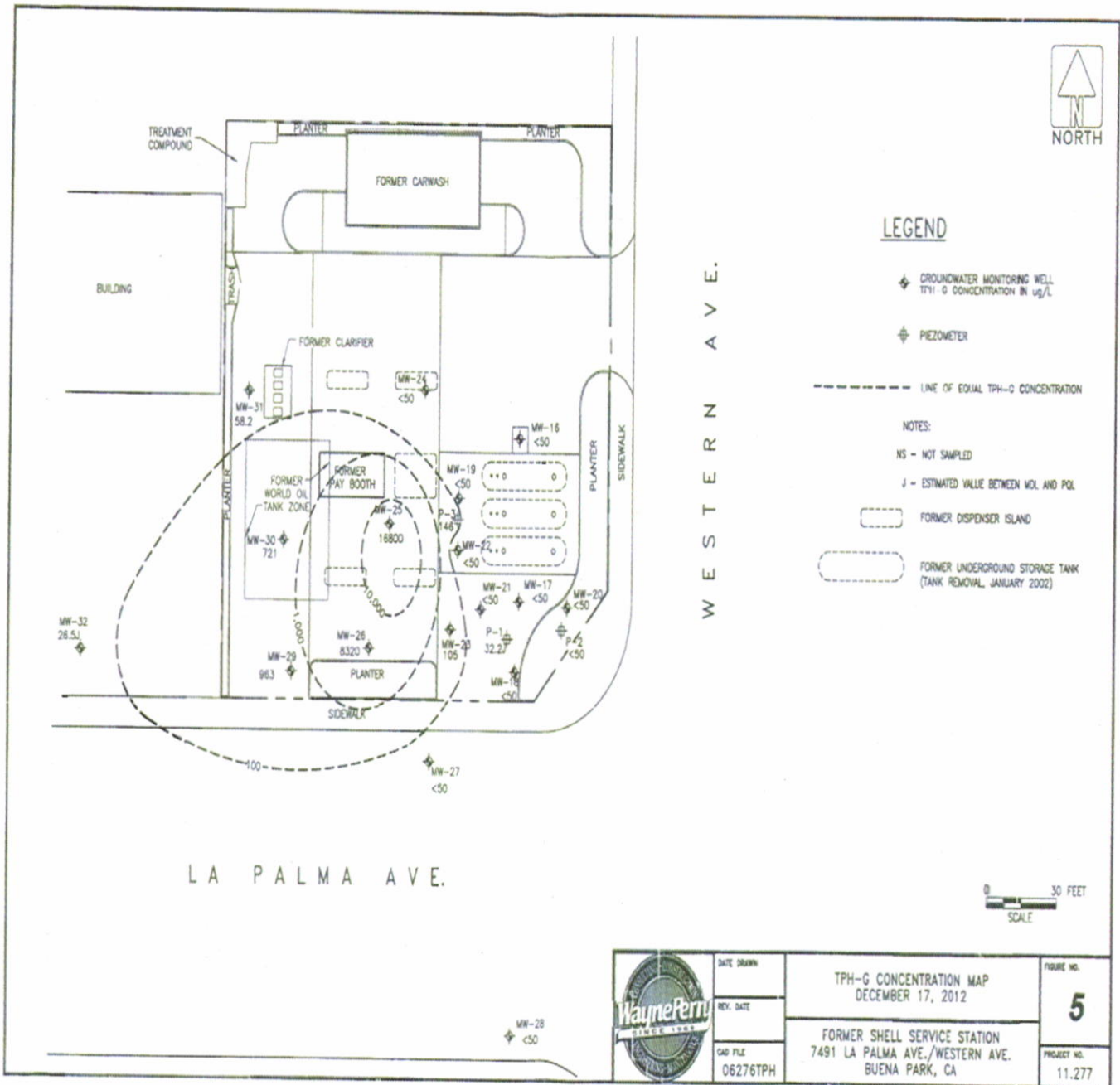
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relative concentrations of naphthalene and benzene in gasoline. Taken from Potter and Simmons (1998), gasoline mixtures contain approximately 2 percent benzene and 0.25 percent naphthalene. Therefore, benzene concentrations can be directly substituted for naphthalene concentrations with a safety factor of eight. Benzene concentrations from the Site are below the naphthalene thresholds in Table 1 of the Policy. Therefore, estimated naphthalene concentrations meet the thresholds in Table 1 for direct contact by a factor of eight. It is highly unlikely that naphthalene concentrations in the soil, if any, exceed the threshold.

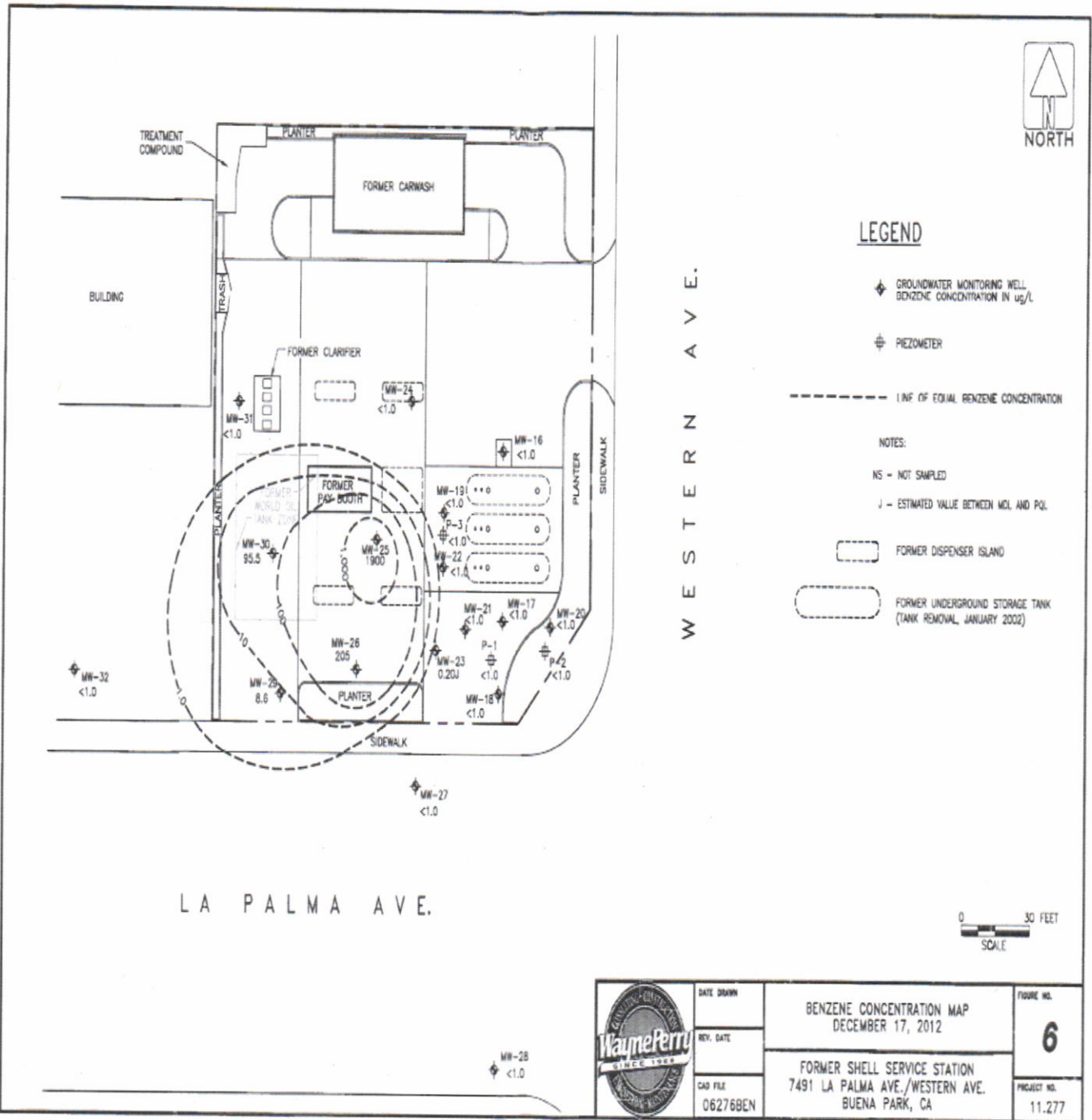
PLOT PLAN



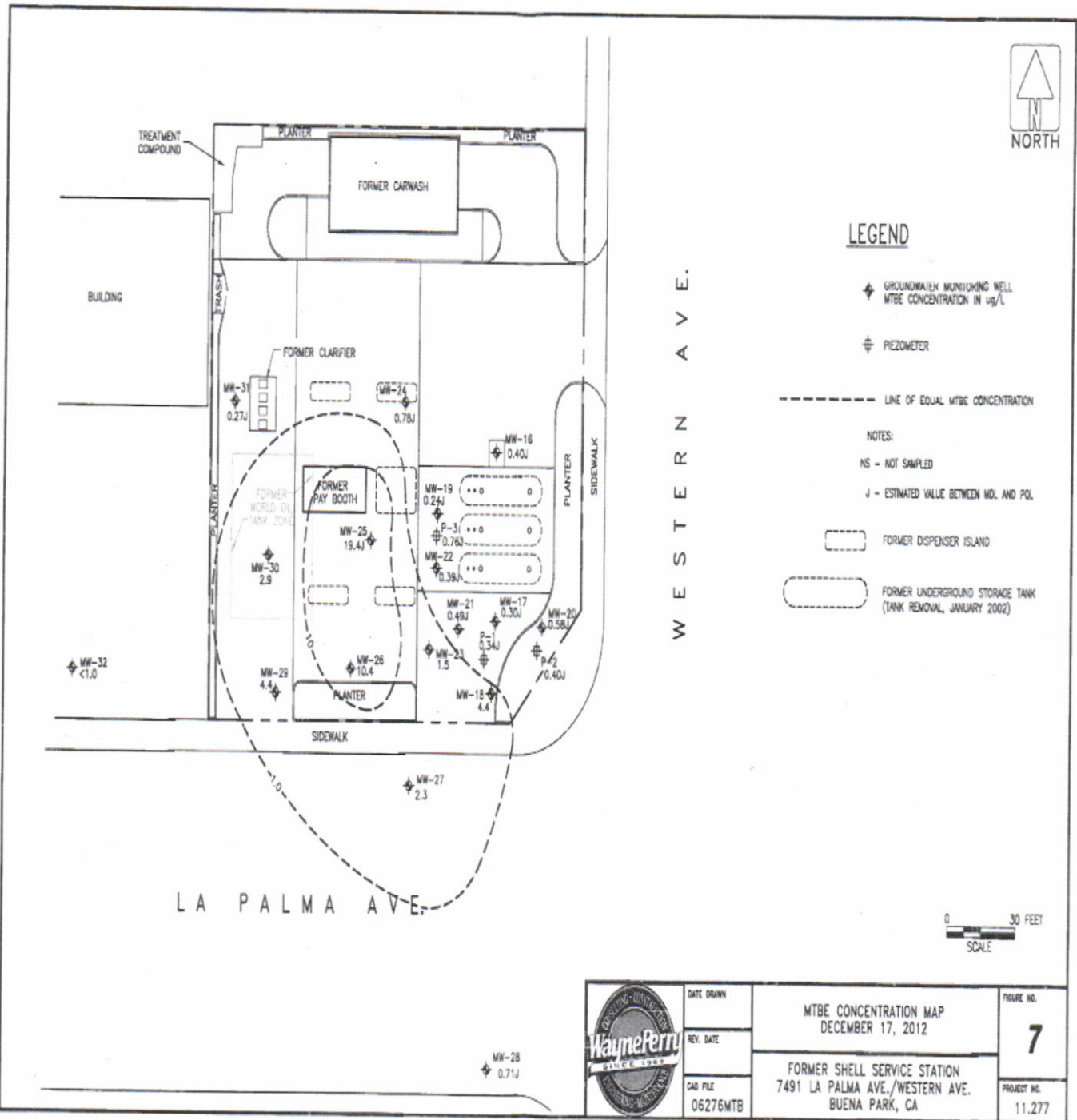
TPH_g IN GROUNDWATER – DECEMBER 2012



BENZENE IN GROUNDWATER- DECEMBER 2012



MTBE IN GROUNDWATER- DECEMBER 2012



DIPE IN GROUNDWATER- DECEMBER 2012

