

EXECUTIVE SUMMARY

Pursuant to City of Houston Ordinance 2007-959, Union Pacific Railroad Company (“UPRR”) files this application seeking a Municipal Setting Designation (“MSD”) for the approximately 27-acre property located in Houston, Texas and described as follows: 10200 Westpark Drive, Lot No. 011-132-000-0086, 6.7900 Ac.; 10965 Westpark Drive, Lot No. 011-132-000-0065/011-132-000-0096, 5.2419 Ac.; Lot No. 123-753-001-0002, 3.8001 Ac.; Lot No. 011-129-000-0066, 11.3195 Ac., A 1.1078 Ac. Tract of land being a portion of Westpark Drive, a 100-foot right-of-way recorded under Harris County Clerk’s File Number F324484 in the Henry Woodruff Survey, Abstract 844.

From approximately 1968 to 1981, a portion of the property was operated by Crystal Chemical Company which produced herbicides at the site. As a result of those operations, the groundwater was impacted with arsenic. Records show that in 1981, Crystal Chemical Company filed for bankruptcy and abandoned the site. The Environmental Protection Agency (“EPA”) undertook certain cleanup measures, evaluated the site and approved a remedy for addressing the contamination. Although it did not cause the contamination, Southern Pacific Transportation Company, now UPRR, undertook responsibility for designing and implementing the remediation for impacted soil and groundwater, because it previously owned the land on which Crystal Chemical was located. The remediation was completed in 2003. In 2005, EPA completed a second five-year review for the site and found that the remedy for the site is protective of human health and the environment.

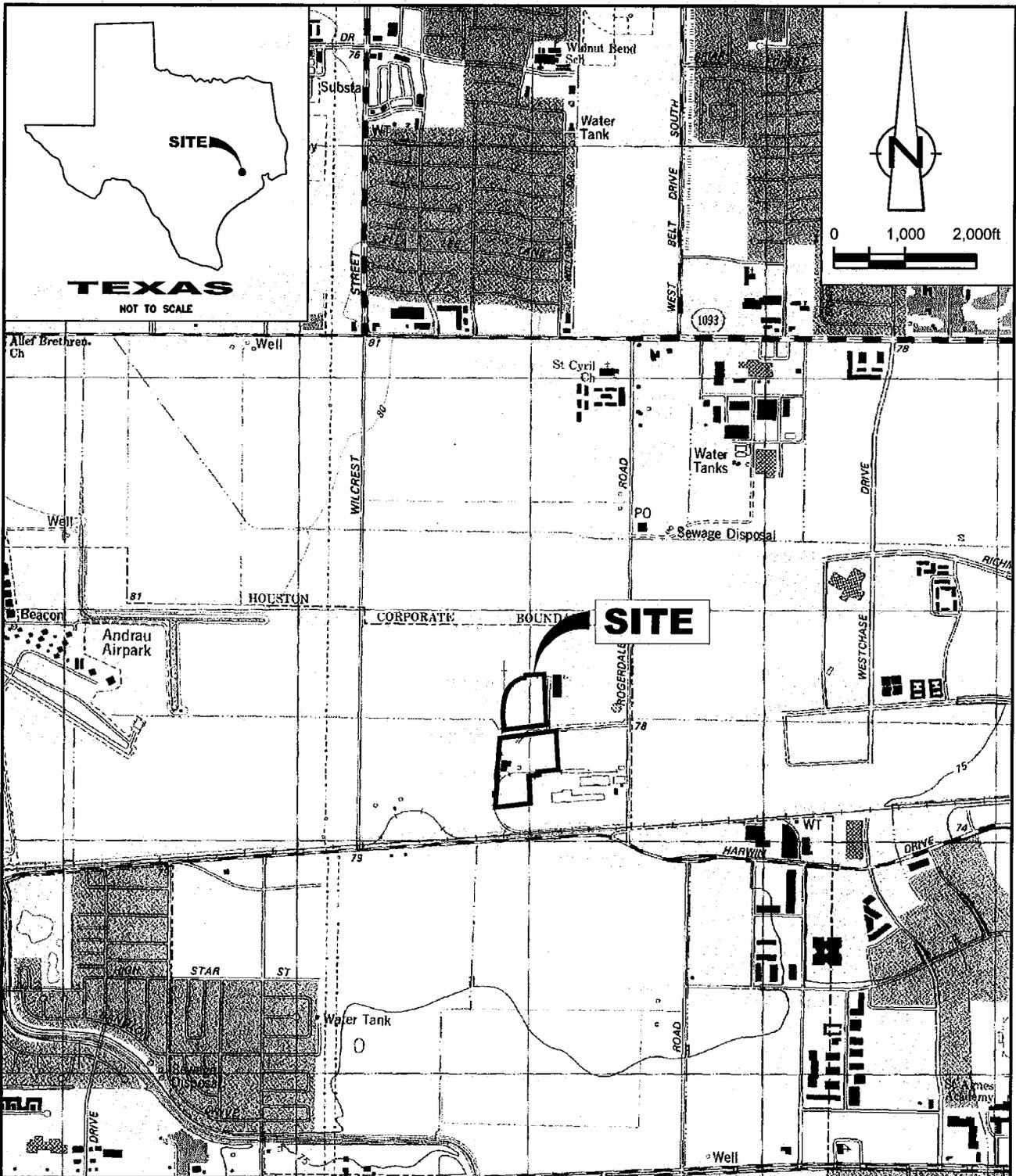
UPRR is seeking a Municipal Setting Designation (“MSD”) for this property to restrict access to groundwater to protect the public against exposure to contaminated groundwater. There is a public drinking water supply system that meets state requirements that supplies or is capable of supplying drinking water to the MSD property and all properties within one-half mile of the MSD property.

Appendix B

2. Provide a site map showing:

- a. The location of the designated property.
- b. The topography of the designated property as indicated on publicly available sources, which must note the watershed and whether the designated property is located in a floodplain or floodway, as those terms are defined in Chapter 19 of this Code.
- c. The detected area of groundwater contamination.
- d. The location of all soil sampling locations and all groundwater monitoring wells.
- e. Groundwater gradients, to the extent known, and direction of groundwater flow.
- f. The ingestion protective concentration level exceedence zone for each contaminant of concern, to the extent known.

Please see attached site maps.



RE: USGS 7.5 MINUTE TOPOGRAPHIC MAP, "ALIEF, TEXAS," DATED 1982.

NOTES: 1) SITE LOCATED IN BUFFALO BAYOU WATERSHED.

2) SITE IS NOT LOCATED IN A 100-YEAR OR 500-YEAR FLOOD PLAIN,
EXCEPT ALONG A LIMITED PORTION OF IT'S WESTERN BOUNDARY.

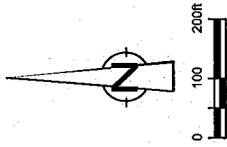
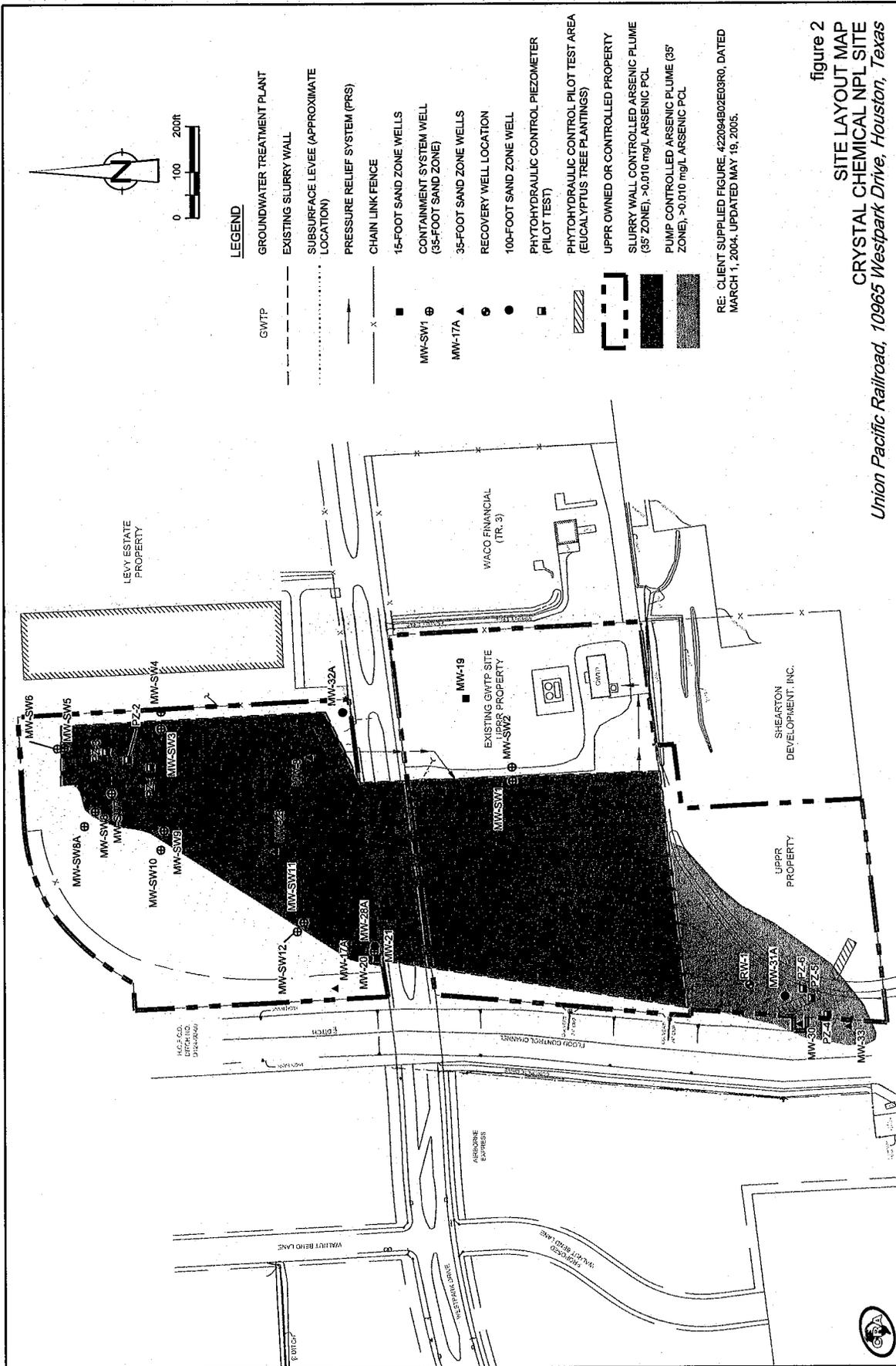
HARRIS COUNTY FLOOD CONTROL DISTRICT (HCFCD) DITCH
NO. D124-00-00.

figure 1

**SITE LOCATION MAP
CRYSTAL CHEMICAL NPL SITE**

Union Pacific Railroad, 10965 Westpark Drive, Houston, Texas





LEGEND

- GROUNDWATER TREATMENT PLANT
- EXISTING SLURRY WALL
- SUBSURFACE LEVEE (APPROXIMATE LOCATION)
- PRESSURE RELIEF SYSTEM (PRS)
- CHAIN LINK FENCE
- 15-FOOT SAND ZONE WELLS
- CONTAINMENT SYSTEM WELL (35-FOOT SAND ZONE)
- 35-FOOT SAND ZONE WELLS
- RECOVERY WELL LOCATION
- 100-FOOT SAND ZONE WELL
- PHYTOHYDRAULIC CONTROL PIEZOMETER (PILOT TEST)
- PHYTOHYDRAULIC CONTROL PILOT TEST AREA (EUCALYPTUS TREE PLANTINGS)
- UPRR OWNED OR CONTROLLED PROPERTY
- SLURRY WALL CONTROLLED ARSENIC PLUME (35' ZONE), >0.010 mg/L ARSENIC PCL
- PUMP CONTROLLED ARSENIC PLUME (35' ZONE), >0.010 mg/L ARSENIC PCL

RE: CLIENT SUPPLIED FIGURE 422094B02E03R0, DATED MARCH 1, 2004, UPDATED MAY 19, 2005.

figure 2
SITE LAYOUT MAP
CRYSTAL CHEMICAL NPL SITE
Union Pacific Railroad, 10965 Westpark Drive, Houston, Texas



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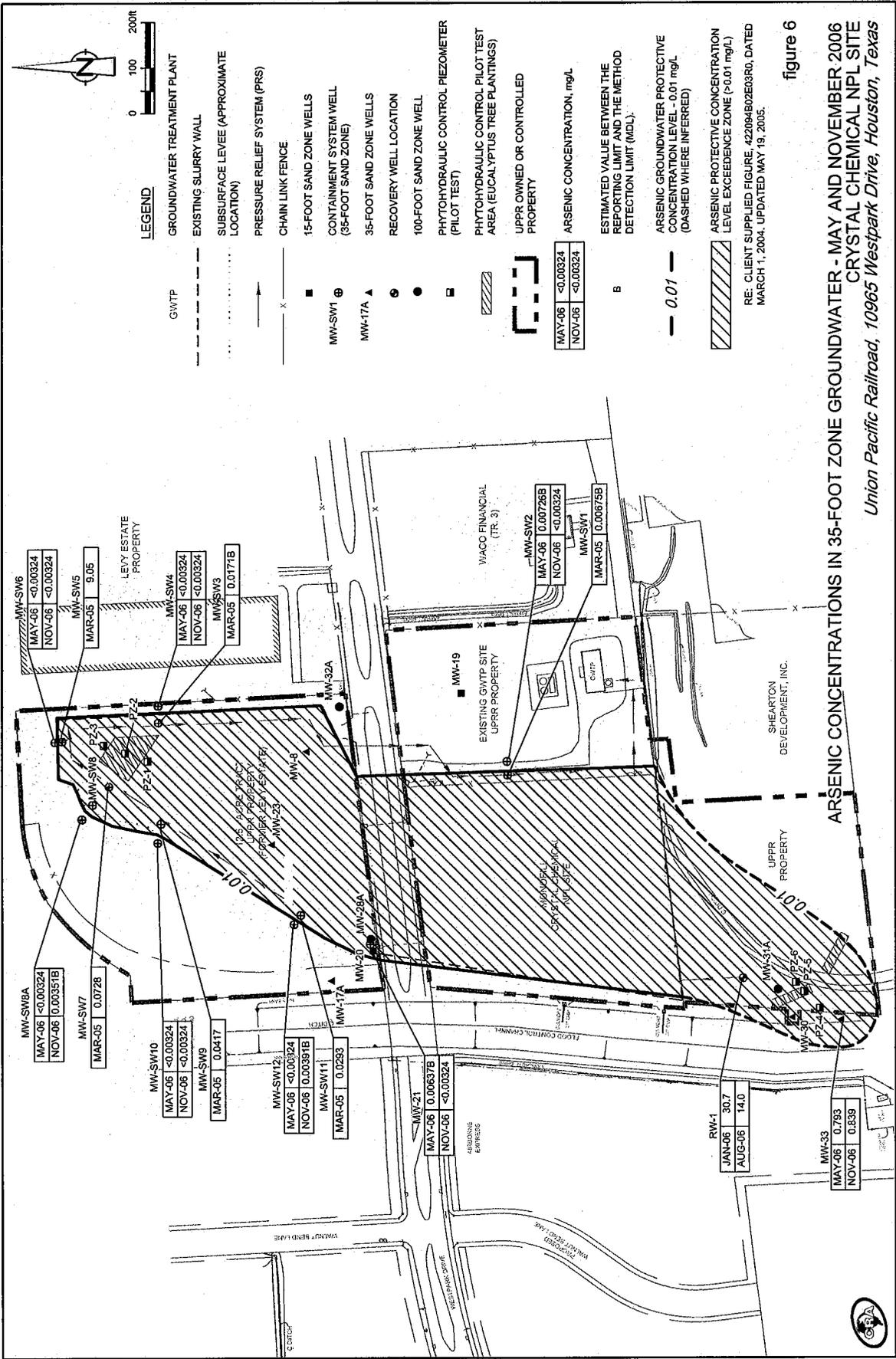


figure 6

ARSENIC CONCENTRATIONS IN 35-FOOT ZONE GROUNDWATER - MAY AND NOVEMBER 2006
CRYSTAL CHEMICAL NPL SITE
Union Pacific Railroad, 10965 Westpark Drive, Houston, Texas

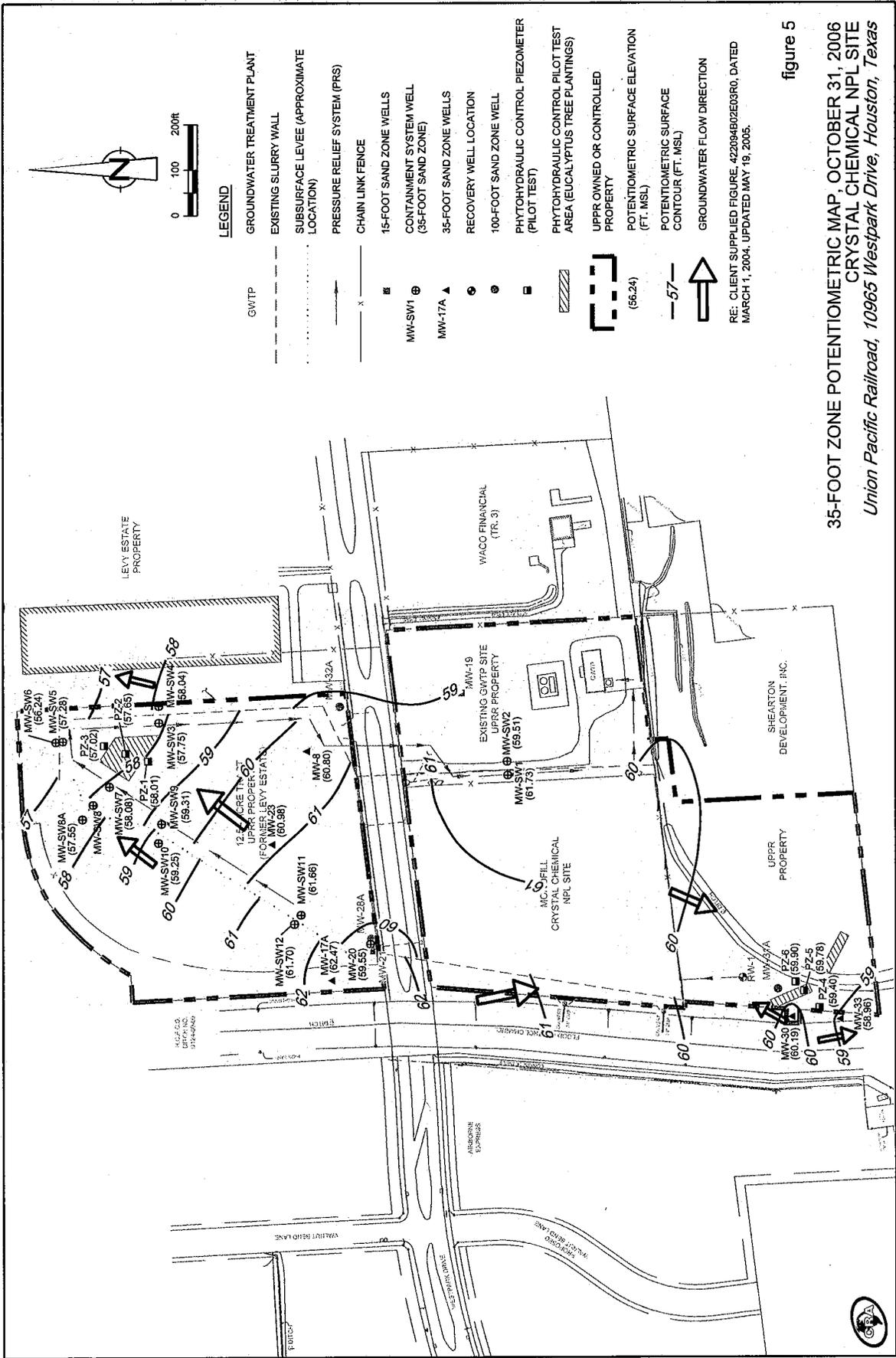


figure 5

35-FOOT ZONE POTENTIOMETRIC MAP, OCTOBER 31, 2006
CRYSTAL CHEMICAL NPL SITE
Union Pacific Railroad, 10965 Westpark Drive, Houston, Texas

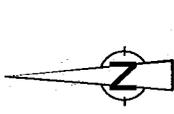
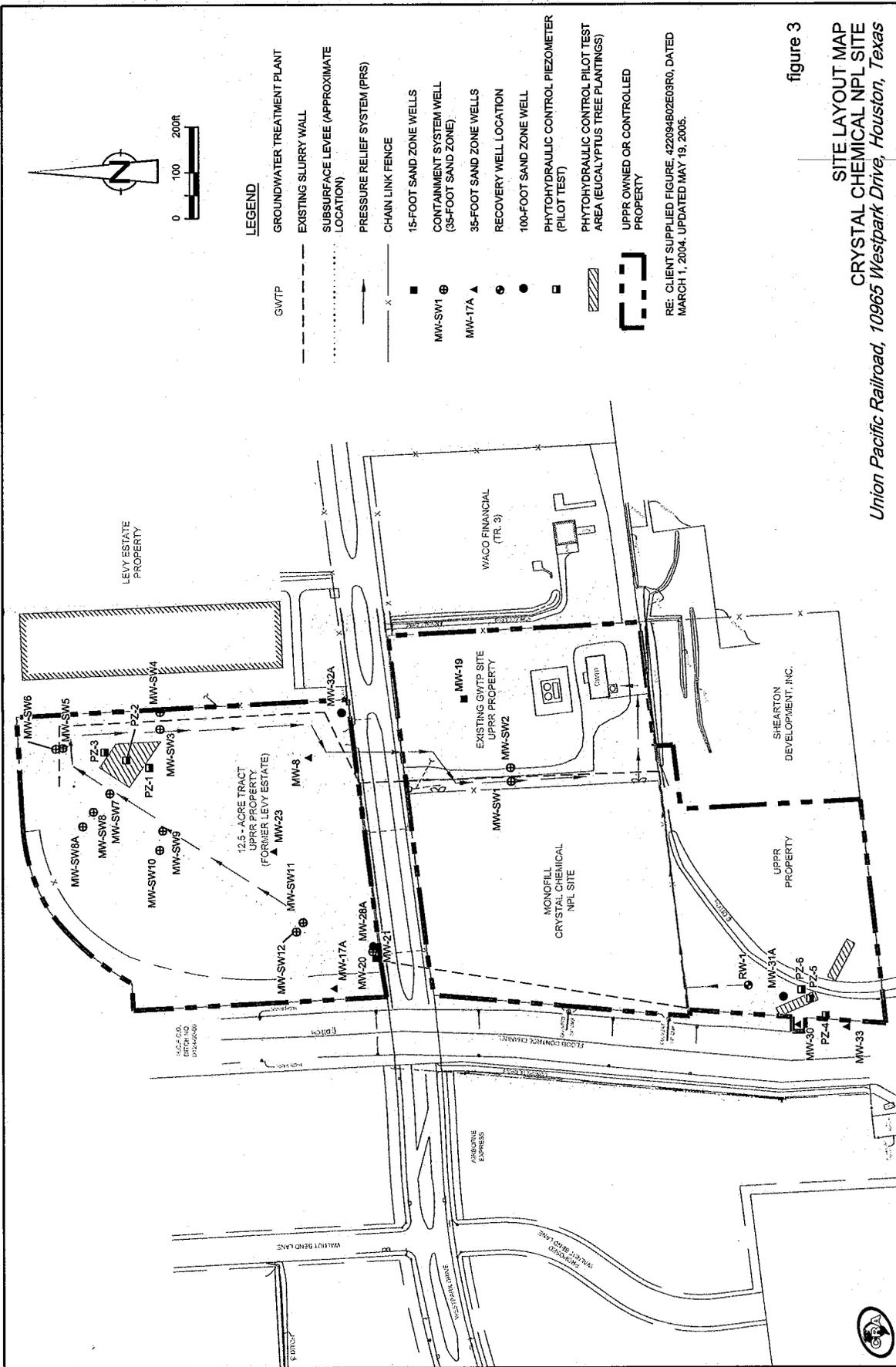
RE: CLIENT SUPPLIED FIGURE, 422094802E09R0, DATED MARCH 1, 2004, UPDATED MAY 19, 2005.

LEGEND

- GROUNDWATER TREATMENT PLANT
- EXISTING SLURRY WALL
- SUBSURFACE LEVEE (APPROXIMATE LOCATION)
- PRESSURE RELIEF SYSTEM (PRS)
- CHAIN LINK FENCE
- 15-FOOT SAND ZONE WELLS
- CONTAINMENT SYSTEM WELL (35-FOOT SAND ZONE)
- 35-FOOT SAND ZONE WELLS
- RECOVERY WELL LOCATION
- 100-FOOT SAND ZONE WELL
- PHYTOHYDRAULIC CONTROL, PIEZOMETER (PILOT TEST)
- PHYTOHYDRAULIC CONTROL, PILOT TEST AREA (EUCALYPTUS TREE PLANTINGS)
- UPPER OWNED OR CONTROLLED PROPERTY
- POTENTIOMETRIC SURFACE ELEVATION (FT. MSL)
- POTENTIOMETRIC SURFACE CONTOUR (FT. MSL)
- GROUNDWATER FLOW DIRECTION



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LEGEND

- GROUNDWATER TREATMENT PLANT
- EXISTING SLURRY WALL
- SUBSURFACE LEVEE (APPROXIMATE LOCATION)
- PRESSURE RELIEF SYSTEM (PRS)
- CHAIN LINK FENCE
- 15-FOOT SAND ZONE WELLS
- CONTAINMENT SYSTEM WELL (35-FOOT SAND ZONE)
- 35-FOOT SAND ZONE WELLS
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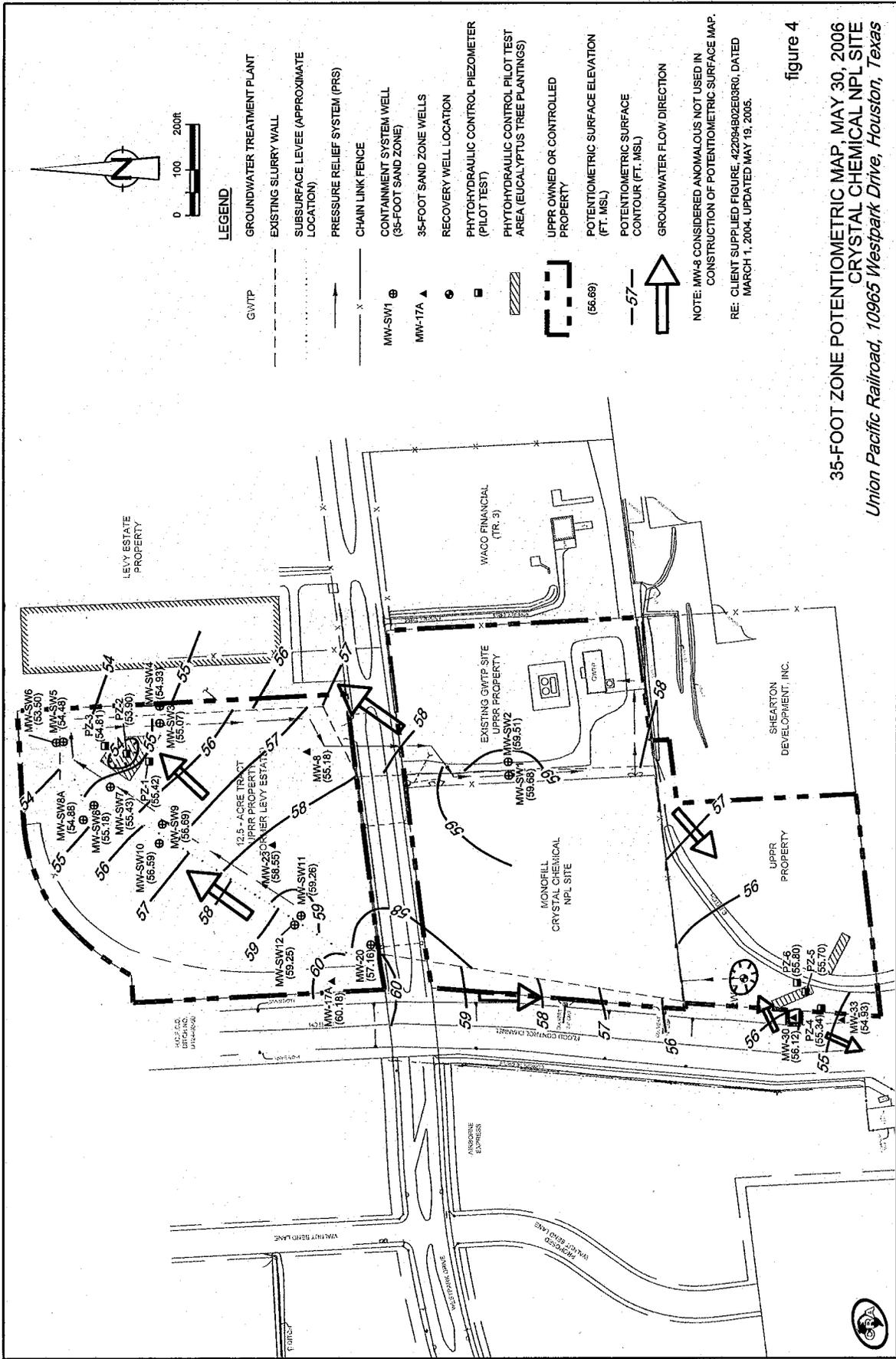
figure 3

SITE LAYOUT MAP
CRYSTAL CHEMICAL NPL SITE
Union Pacific Railroad, 10965 Westpark Drive, Houston, Texas

RE: CLIENT SUPPLIED FIGURE 422094B02E03R0, DATED MARCH 1, 2004. UPDATED MAY 19, 2005.



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Appendix C

- 3. Provide a description of the current use, and, to the extent known, the anticipated uses, of the designated property and properties within 500 feet of the boundary of the designated property.**

The current and anticipated uses, to the extent known, of properties within 500 feet of the Applicant's Property for Municipal Setting Designation ("APMSD") boundary is described as follows:

- The designated property is vacant, and vacant property exists to the northwest, south, southwest and southeast of the APMSD, and to the east of the APMSD south of Westpark Blvd.
- Commercial/industrial property exists to the west of the APMSD (package delivery, hydrocarbon recovery, concrete recycling, office/warehouse) and to the north and northeast (warehouse).
- A Harris County Flood Control District Ditch runs along the west boundary of the APMSD.
- Residential property exists approximately 400 feet to the northeast of the APMSD boundary, with one apartment building approximately 480 feet to the northeast.

Appendix D

4. **For each contaminant of concern within the ingestion protective concentration level exceedence zone, to the extent known, provide the following:**
- a. **A description of the ingestion protective concentration level exceedence zone and the non-ingestion protective concentration level exceedence zone, including a specification of the horizontal area and the minimum and maximum depth below ground surface.**

The protective concentration level ("PCL") for groundwater ingestion for arsenic is 0.01 milligrams per liter (mg/L) as currently set by the Texas Commission on Environmental Quality ("TCEQ"); no non-ingestion PCLs for arsenic are currently set by the TCEQ. The horizontal area of the PCL exceedence zone is approximately 1,900 feet long (NNE to SSW) and approximately 500 feet wide (WNW to ESE). The affected groundwater exists within this area from a minimum depth of approximately 10 feet below ground surface (bgs) to approximately 50 feet bgs.

- b. **The level of contamination, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed as mg/L units.**

Arsenic groundwater contamination within the PCL zone is currently observed at concentrations from not detected (<0.001 mg/L) to 30.7 mg/L (RW-1, 1/6/06). The PCL for groundwater ingestion for arsenic is 0.01 mg/L as currently set by TCEQ; a non-ingestion PCL for arsenic is not currently set by TCEQ.

- c. **Its basic geochemical properties (e.g., whether the contaminant of concern migrates with groundwater, floats, or is soluble in water).**

Arsenic is relatively insoluble in water and will migrate with groundwater to some extent if a pathway exists. Arsenic's mobility depends on the existence of a completed migration pathway, the geological matrix type (sand, silt, clay, etc.) of a saturated zone, and relevant geochemical conditions (pH, ionic potential, etc.).

Appendix E

5. For each contaminant of concern within the designated groundwater, to the extent known, provide:

- a. A description of the ingestion protective concentration level exceedence zone and the non-ingestion protective concentration level exceedence zone, including a specification of the horizontal area and the minimum and maximum depth below ground surface.

The protective concentration level (“PCL”) for groundwater ingestion for arsenic is 0.01 milligrams per liter (mg/L) as currently set by the TCEQ; no non-ingestion PCLs for arsenic are currently set by the TCEQ. The horizontal area of the PCL exceedence zone is approximately 1,900 feet long (NNE to SSW) and approximately 500 feet wide (WNW to ESE). The affected groundwater exists within this area from a minimum depth of approximately 10 feet below ground surface (bgs) to approximately 50 feet bgs.

- b. The level of contamination, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed as mg/L units.

Arsenic groundwater contamination within the PCL zone is currently observed at concentrations from not detected (<0.001 mg/L) to 30.7 mg/L (RW-1, 1/6/06). The PCL for groundwater ingestion for arsenic is 0.01 mg/L as currently set by TCEQ; a non-ingestion PCL for arsenic is not currently set by TCEQ.

- c. Its basic geochemical properties (e.g., whether the contaminant of concern migrates with groundwater, floats, or is soluble in water).

Arsenic is relatively insoluble in water and will migrate with groundwater to some extent if a pathway exists. Arsenic’s mobility depends on the existence of a completed migration pathway, the geological matrix type (sand, silt, clay, etc.) of a saturated zone, and relevant geochemical conditions (pH, ionic potential, etc.).

Appendix F

6. Provide a table displaying the following information for each COC, to the extent known:
- a. the maximum concentration level for soil and groundwater, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed in mg/L units.

All soils have been remediated from the affected areas of the site and are currently stored in the Monofill Cap Area at the site. Arsenic-affected soils with concentrations above those set in the Environmental Protection Agency (“EPA”)-approved Record of Decision (ROD) for arsenic (30 milligrams per kilogram) are not located outside of the Monofill Cap Area. See attached tables.

- b. the critical protective concentration level without the municipal setting designation, highlighting any exceedences.

See attached tables.

TABLE 6

Summary of December 2003-2006 Analytical Results
 35 Foot Zone Ground Water Monitor Wells
 Crystal Chemical NPL Site
 Union Pacific Railroad
 Alief (Houston), Texas

Well ID	Date Sampled	Total Arsenic (mg/L)	
Tier 1 Residential ^{GW} GW _{ing}		0.01	
MW-SW1	3/11/2005	0.00675	B
MW-SW2	12/10/2003	0.0069	B
	3/9/2004	0.0108	
	6/9/2004	<0.0034	
	6/9/2004*	<0.0034	
	9/8/2004	0.0059	B
	9/8/2004*	0.0036	B
	12/2/2004	<0.0034	
	12/2/2004*	<0.0034	
	3/9/2005	<0.0034	
	5/24/2005	0.0030	
	11/15/2005	0.0070	B
	5/31/2006	0.00726	B
	11/1/2006	<0.00324	
	4/4/2007	<0.0031	
MW-SW-3	3/11/2005	0.0171	B
MW-SW4	12/10/2003	<0.0028	
	3/9/2004	<0.0034	
	6/9/2004	<0.0034	
	9/7/2004	<0.0034	
	12/1/2004	<0.0034	
	3/9/2005	<0.0034	
	5/23/2005	<0.0020	
	11/14/2005	<0.0020	
	5/31/2006	<0.00324	
	10/31/2006	<0.00324	
	4/4/2007	<0.0031	
MW-SW5	3/11/2005	9.05	
MW-SW6	12/10/2003	<0.0028	
	3/9/2004	<0.0034	
	6/9/2004	<0.0034	
	9/7/2004	<0.0034	
	12/1/2004	<0.0034	
	3/10/2005	0.00394	B
	5/23/2005	<0.0020	
	11/14/2005	0.0041	B
	5/31/2006	<0.00324	
	10/31/2006	<0.00324	
	4/5/2007	<0.0031	
MW-SW7	3/10/2005	0.0728	

TABLE 6

Summary of December 2003-2006 Analytical Results
 35 Foot Zone Ground Water Monitor Wells
 Crystal Chemical NPL Site
 Union Pacific Railroad
 Alief (Houston), Texas

Well ID	Date Sampled	Total Arsenic (mg/L)	
Tier 1 Residential ^{GW} GW _{ing}		0.01	
MW-SW8A	12/11/2003	0.0078	B
	3/9/2004	<0.0034	
	6/9/2004	<0.0034	
	9/7/2004	0.0043	B
	12/1/2004	<0.0034	
	3/9/2005	<0.0034	
	5/23/2005	0.0041	B
	11/14/2005	0.0053	B
	5/31/2006	<0.00324	
	11/1/2006	0.00351	B
	4/5/2007	<0.0031	
MW-SW9	3/10/2005	0.0417	
MW-SW10	12/11/2003	0.0033	B
	3/9/2004	0.0068	B
	6/9/2004	<0.0034	
	9/8/2004	<0.0034	
	12/1/2004	<0.0034	
	3/9/2005	<0.0034	
	5/23/2005	<0.0020	
	11/14/2005	0.0023	B
	5/31/2006	<0.00324	
	11/1/2006	<0.00324	
	4/5/2007	0.00380	B
MW-SW11	3/10/2005	0.0293	
MW-12	12/10/2003	0.0069	B
	3/9/2004*	0.0047	B
	3/9/2004	0.0046	B
	6/9/2004	<0.0034	
	9/8/2004	0.0054	B
	12/1/2004	0.0044	B
	3/9/2005	<0.0034	
	5/23/2005	<0.0020	
	11/14/2005	0.0050	B
	5/31/2006	<0.00324	
11/1/2006	0.00391	B	
	4/5/2007	<0.0031	

TABLE 6

Summary of December 2003-2006 Analytical Results
 35 Foot Zone Ground Water Monitor Wells
 Crystal Chemical NPL Site
 Union Pacific Railroad
 Alief (Houston), Texas

Well ID	Date Sampled	Total Arsenic (mg/L)
Tier 1 Residential ^{GW} / _{ing}		0.01
MW-33	12/15/2003	0.872
	3/9/2004	1.02
	6/9/2004	0.755
	9/8/2004	0.83
	12/1/2004	1.56
	3/10/2005	<0.0034
	5/24/2005	0.834
	11/15/2005	0.701
	5/31/2006	0.793
	11/1/2006	0.839
	4/5/2007	1.78

NOTE:

<0.001 = *Not Detected* at the Method Detection Limit (MDL)

B - Analyte is an estimated value between the Reporting Limit (RL) and the MDL

* = Duplicate Sample

TABLE 4

Summary of 2006-2007 Groundwater Analytical Data
 15-Foot Zone Monitor Wells
 Crystal Chemical NPL Site, Union Pacific Railroad
 Alief (Houston), Texas

Well ID	Date	Total Arsenic (mg/L)	
Tier 1 Residential ^{GW} GW _{ing}		0.01	
MW-19	5/30/2006	NS	
	10/31/2006	NS	
	4/4/2007	NS	
MW-21	5/30/2006	NS	
	5/31/2006	0.00637	B
	10/31/2006	NS	
	11/2/2006	<0.00324	
	4/5/2007	<0.0031	

NOTE:

<0.001 = Not Detected at the Method Detection Limit (MDL) indicated

B = estimated value between the reporting limit and the MDL

NS = Not Sampled

TABLE 2

2006 Summary of Arsenic Analytical Data
Groundwater Treatment Plant
Crystal Chemical NPL Site, Union Pacific Railroad
Alief (Houston), Texas

Date	Influent/Process (RW/TI)		Plant Effluent (a)(b)	
	Sample ID	Concentration (mg/L)	Sample ID	Concentration (mg/L)
	Tier 1 Residential ^{GW} GW _{ing}	0.01		
1/6/2006	RW-1	30.7	11-A	0.831
1/17/2006	---	---	11-B	1.04
2/6/2006	RW-1	27.6	11-A	1.07
2/15/2006	---	---	11-B	1.85
3/2/2006	RW-1	19.3	11-A	1.41
3/17/2006	---	---	11-B	1.45
4/4/2006	RW-1	28.4	11-A	1.42
4/24/2006	---	---	11-B	1.06
5/10/2006	RW-1	28.0	11-A	1.22
5/25/2006	---	---	11-B	1.16
6/6/2006	RW-1	23.2	11-A	1.23
6/16/2006	---	---	11-B	1.56
7/19/2006	RW-1	28.1	11-A	1.51
8/8/2006**	RW-1	14.0	11-A	1.31

NOTE:

Sample Identification:

11-A, 11-B, 11-C: Effluent Storage Tanks

RW-1: Recovery Well RW-1

(a) Plant effluent concentrations are the reported concentrations in the treated ground water prior to discharge.

(b) Grab Samples

* - Not Discharged

** - No GWTP discharge since 8/8/06.

Appendix G

- 7. Provide a statement as to whether the plume of contamination is stable, expanding, or contracting, with the basis for that statement. If this information is not known, a statement of why the information is not known should be attached.**

The arsenic groundwater plume is generally stable at the site, with the majority of the affected groundwater contained by an engineered slurry wall. The EPA-approved engineered slurry wall is a 3-foot thick barrier made relatively impermeable to the flow of groundwater ($< 1 \times 10^{-9}$ cm/s) through the addition of Bentonite to the native soils at the site. This slurry wall extends from the surface to approximately fifty (50) feet below ground surface.

The portion of the affected groundwater that is not contained by the slurry wall, in the southwest portion of the APMSD area, is also generally stable due to the naturally decreasing permeability of the saturated zone materials (silts, clays) to the west and south. These silts and clays at the site have been considered relatively impermeable and adequate for partial hydraulic control in the EPA's ROD. In addition, hydraulic control is performed by pumping well RW-1. RW-1 creates an inward hydraulic gradient sufficient to control the generally stable arsenic groundwater plume and limit off-site migration.