



EXECUTIVE SUMMARY

Project Overview

ARCADIS U.S., Inc. (ARCADIS) was retained by Rheem Manufacturing Company (Rheem) to conduct environmental site assessments for the property located at 1025 Lockwood Dr in Houston, Texas. This property is approximately 12.4 acres located in a mixed light industrial and commercial area just east of downtown Houston. ARCADIS, as a representative for Rheem, which is the former property owner, is submitting this application on behalf of the current owner, Annie D. Adams Family Partnership, Ltd. The groundwater at the site is affected by chlorinated volatile organic compounds (VOCs) in the upper and, to a lesser extent, second water-bearing zones. In particular, tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE) and vinyl chloride (VC) have been detected in concentrations that exceed the Texas Commission on Environmental Quality's (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Residential ^{GW}GW_{Ing} Protective Concentration Levels (PCL) or the Ingestion Protective Concentration Levels (IPCL).

Site History

The property was formerly owned by Rheem and cold steel container or drum manufacturing operations were conducted from the 1930s until the property was sold in 1986. Groundwater monitoring has occurred at the site since 1990. Directly to the north of the former Rheem site is a property formerly owned by Cooper Energy Services (now Cameron International Corporation [Cameron]). For the purposes of this transmittal the property to the north of the former Rheem property is referred to as the former Cameron property. There is a groundwater plume of chlorinated VOCs associated with the former Cameron property in both the upper and second water-bearing zones. The plume associated with the former Cameron property has IPCL exceedances of the same chlorinated VOCs. It appears that the affected groundwater from the two properties has comeled near the property boundary.

An 8-foot concrete storm sewer line, located several feet below ground surface, is under the former Cameron property a short distance to the north of the boundary between the two properties. This sewer line is connected to and receives flow from a subsurface storm sewer line below Lockwood Drive to the east of the former Cameron property. Cameron has indicated in its submissions to TCEQ that the subsurface storm sewers act as a barrier to most, if not all, transport of constituents of concern, from one side of the sewer to the other (not verified by ARCADIS).

Both Rheem and Cameron have historically worked closely with regulators from the TCEQ and have submitted numerous site assessments, monitoring reports and other pertinent reports as requested by the TCEQ. In a letter from the TCEQ dated July 30, 2008, Eleanor Wehner approved Rheem's recommendation to apply for a Municipal Settings Designation for the site. Affected groundwater beneath the former Cameron property is being addressed by Cameron, as part of their remedial action plan.



EXECUTIVE SUMMARY

Cameron has committed to submitting its own closure plan to the TCEQ for the former Cameron facility. Cameron has informed Rheem that it has contractual rights to restrict groundwater use and to implement other necessary institutional controls to achieve closure at the former Cameron facility.

Current Site Status

The former Rheem property (site) is currently occupied by Houston Container and Trailer Marrying Company, a.k.a. Con Tra Mar. It is used as a warehouse for temporary storage and shipment of products. The properties immediately surrounding the site are used as mixed commercial and light industrial facilities. Residential areas exist to the west of the former Cameron property.

Historical data and data collected during the most recent sampling event (conducted in October 2008) indicate an IPCL Exceedance Zone (IPCLEZ) that extends from the central portion of the former Cameron property to the central portion of the former Rheem property. None of the groundwater samples collected to date has returned detected concentrations constituents above the non-ingestion protective concentration levels.

Based on historical constituent concentration trends it is believed that the groundwater plume in the upper water-bearing zone is shrinking in both size and concentration. It is believed that the plume in the second water-bearing zone is stable. There is no indication of any significant remaining source materials at the site that would contribute to groundwater concentrations. Based on the long-term historical trends and the absence of any on-going source, groundwater concentrations are expected to decline over time and remain far below the non-ingestion protective concentration levels.

Appendix B

Figures and Site Maps

Item 2: A site map showing:**a. The location of the designated property.**

The property location is shown in **Figure B-1**.

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 floodwater, as those terms are defined in Chapter 19 of the Code.

The topography of the designated property is shown in **Figure B-2**. The designated property is not located in a floodplain or floodway as shown in **Figure B-3**. The property is located in the Buffalo Bayou watershed as shown in **Figure B-4**.

c. The detected area of groundwater contamination.

Figure B-5 depicts the area of groundwater contamination for all contaminants of concern (COCs) in the upper water-bearing zone. **Figures B-13, B-14** and **B-15** show the estimated area of groundwater contamination in the second water-bearing zone.

d. The location of all the soil sampling locations and all groundwater monitoring wells.

The locations of the soil sampling location and all groundwater wells screened in either the upper or lower water-bearing zones are shown in **Figure B-6**.

e. Groundwater gradients, to the extent known, and direction of groundwater flow.

Figure B-7 shows the groundwater gradient in the upper water-bearing zone and indicates groundwater flow is generally radial into an area north of the northeast corner of the property. **Figure B-8** shows the groundwater gradient in the second water-bearing zone and indicates flow is to the west.

f. The ingestion protective concentration level exceedance zone for each contaminant of concern, to the extent known.

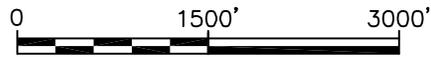
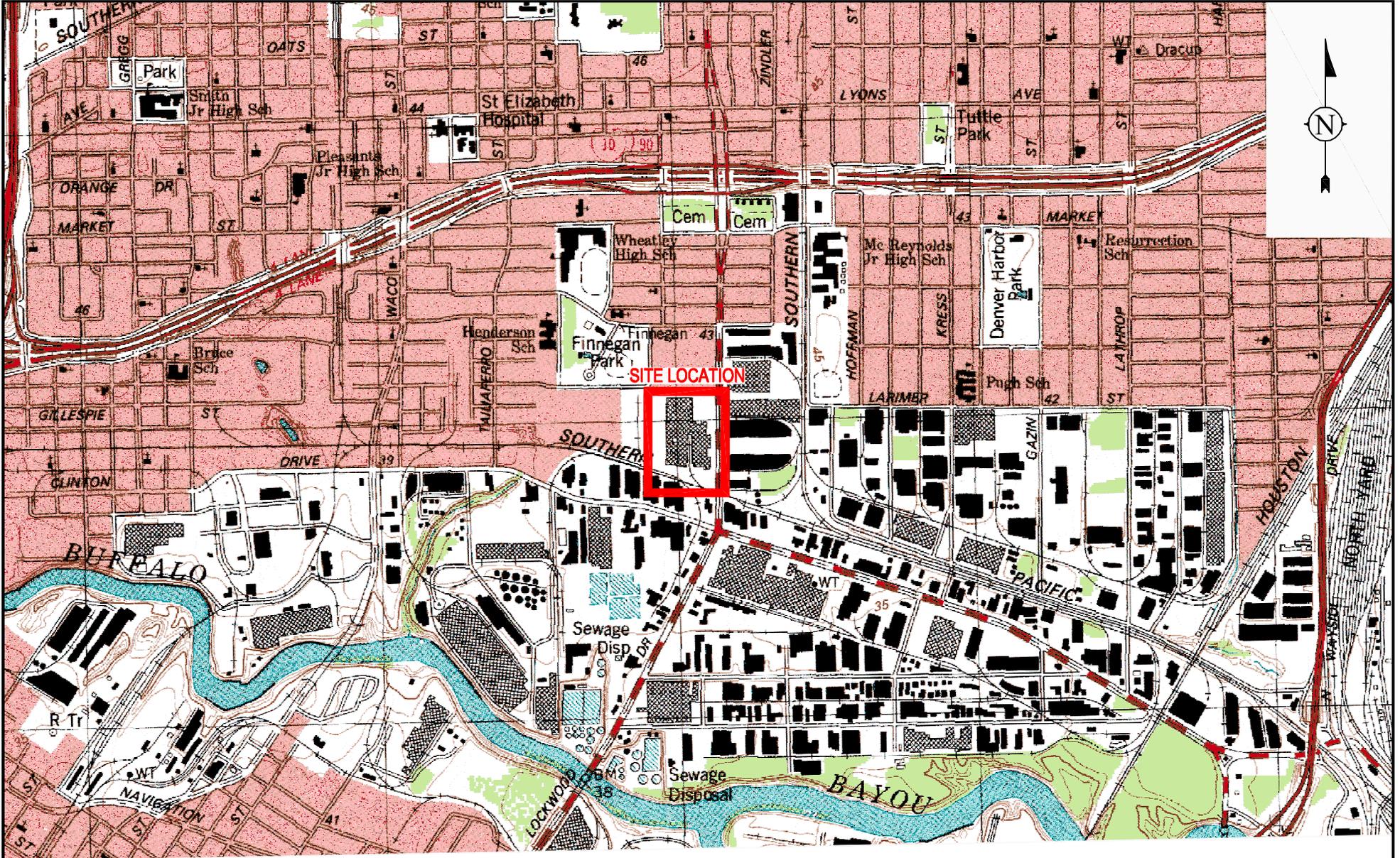
Figures B-9, B-10, B-11 and **B-12** show the ingestion protective concentration level exceedance zones (IPCLEZ) in the upper water-bearing zone for the four COCs – Tetrachlorethene (PCE), Trichloroethene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE) and Vinyl Chloride (VC), respectively – at the site. **Figures B-13, B-14** and **B-15** show the IPCLEZs for the three COCs detected in the second water-bearing zone including: PCE, TCE and VC.



copyright © 2007



PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
SHEET TITLE MSD APPLICATION - FORMER RHEEM MANUFACTURING FACILITY HOUSTON, TEXAS PROPERTY LOCATION MAP		TASK/PHASE NUMBER .00001	DRAWN BY A. FOX
		PROJECT NUMBER AT002030.0005	DRAWING NUMBER B-1



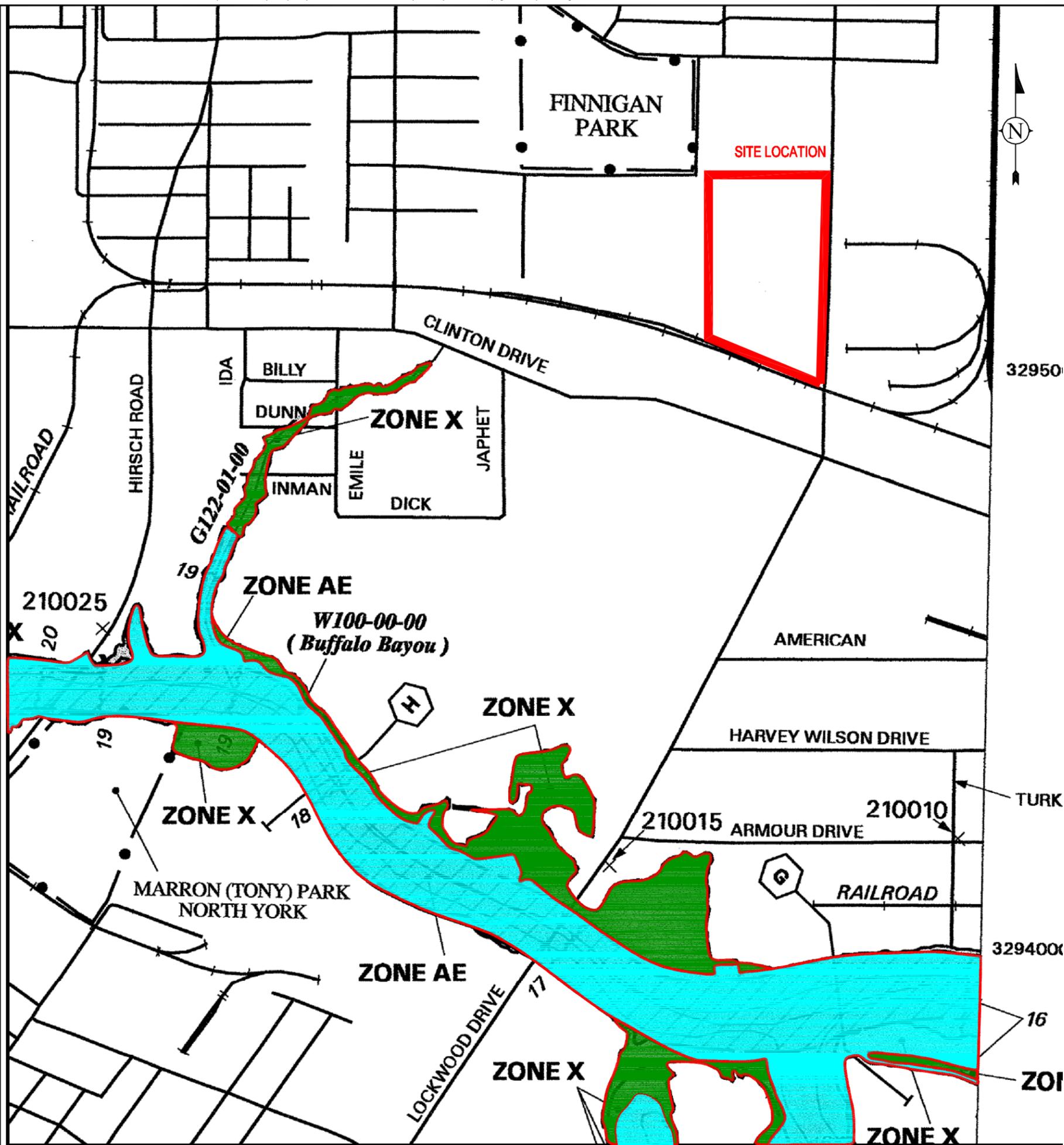
GRAPHIC SCALE

REFERENCE: USGS, 1982, SETTEGAST
 QUADRANGLE, TEXAS, 7.5 MINUTE SERIES
 (TOPOGRAPHIC)

copyright © 2007

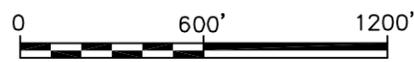


PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
SHEET TITLE MSD APPLICATION - FORMER RHEEM MANUFACTURING FACILITY HOUSTON, TEXAS TOPOGRAPHIC MAP		TASK/PHASE NUMBER .00001	DRAWN BY A. FOX
		PROJECT NUMBER AT002030.0005	DRAWING NUMBER B-2



LEGEND:

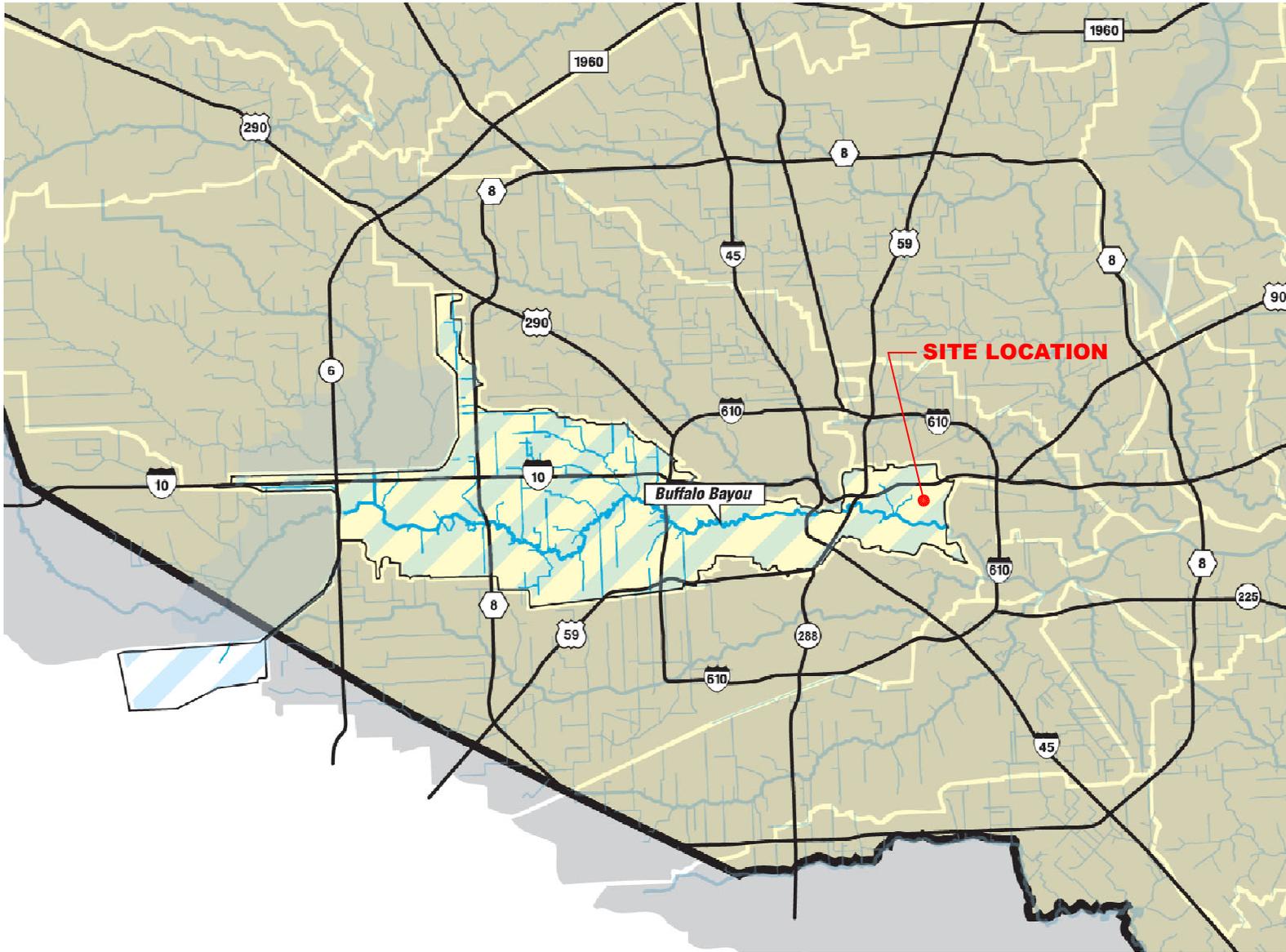
- FLOODWAY AREAS IN ZONE AE MUST BE KEPT CLEAR FOR 100 YEAR FLOOD
- OTHER FLOOD AREAS (ZONE X) IN THE 500 YEAR FLOOD AREA



GRAPHIC SCALE

REFERENCE: FLOOD INSURANCE MAP; FEMA; JUNE 18, 2007; MAP NUMBER 48201C0690L

copyright © 2007 www.arcadis-us.com	SEAL		PROJECT TITLE	PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY	
			MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	L. RODRIGUEZ	L. RODRIGUEZ	J. PITTS	L. RODRIGUEZ	
				SHEET TITLE			TASK/PHASE NUMBER	DRAWN BY
				FLOODPLAIN MAP			.00001	J. PITTS
						PROJECT NUMBER	FIGURE NUMBER	
						AT002030.0005	B-3	



NOT TO SCALE

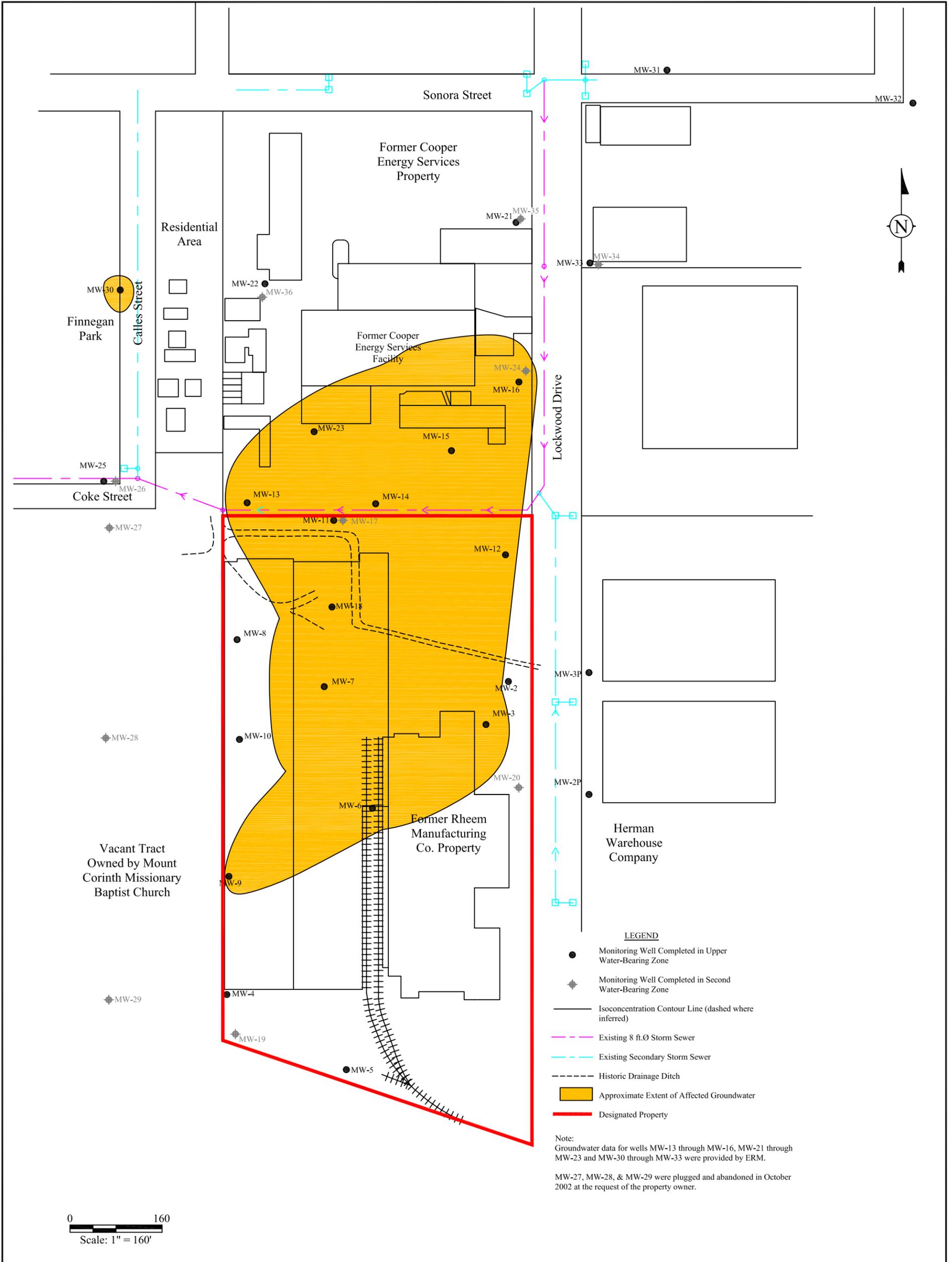
REFERENCE: HARRIS COUNTY FLOOD CONTROL DISTRICT (WATERSHEDS AND CHANNELS REFERENCE GUIDE 12-10-2007)

copyright © 2007

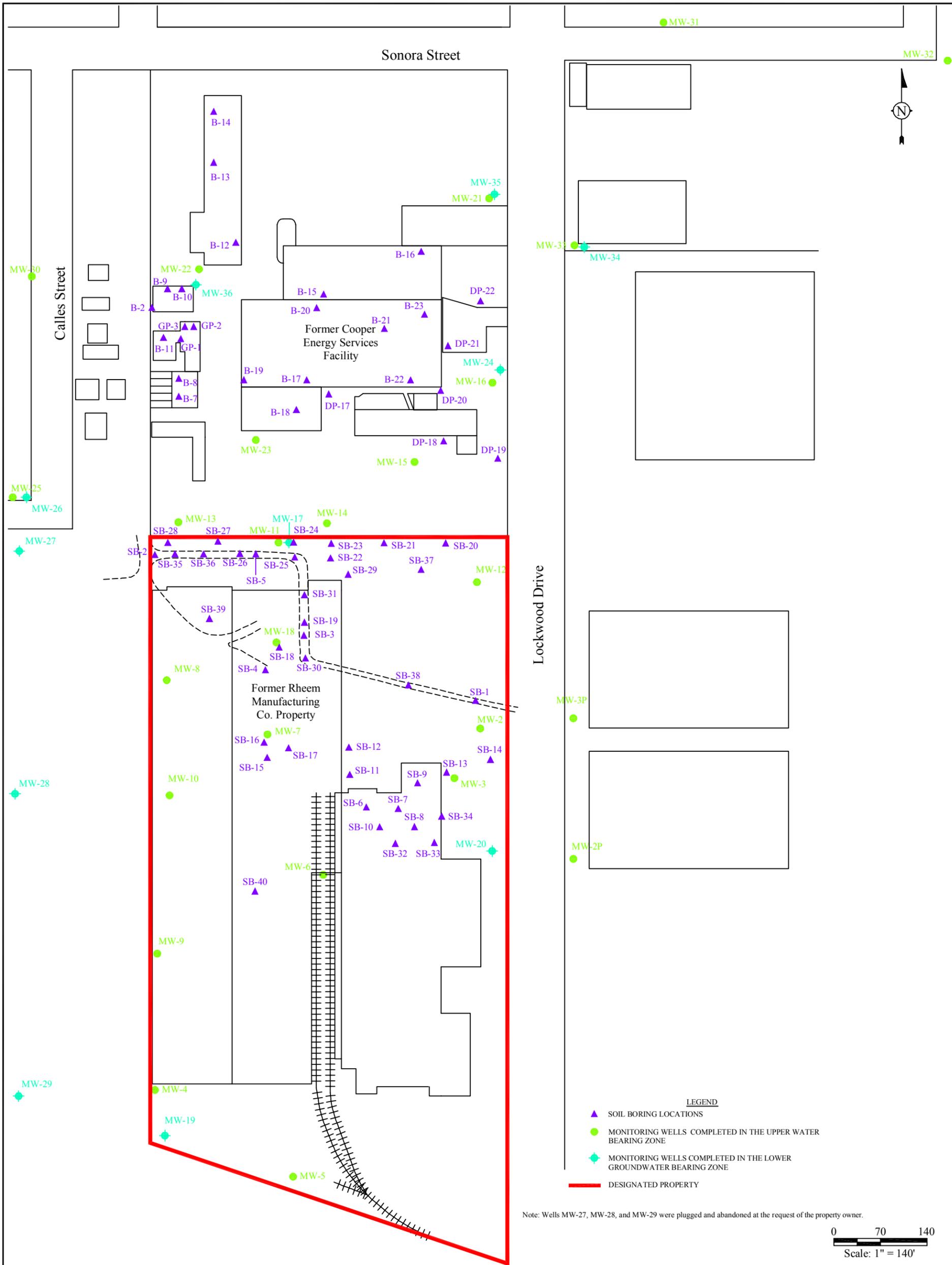


www.arcadis-us.com

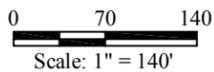
PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
SHEET TITLE MSD APPLICATION - FORMER RHEEM MANUFACTURING FACILITY HOUSTON, TEXAS WATERSHED MAP		TASK/PHASE NUMBER .00001	DRAWN BY A. FOX
		PROJECT NUMBER AT002030.0005	DRAWING NUMBER B-4



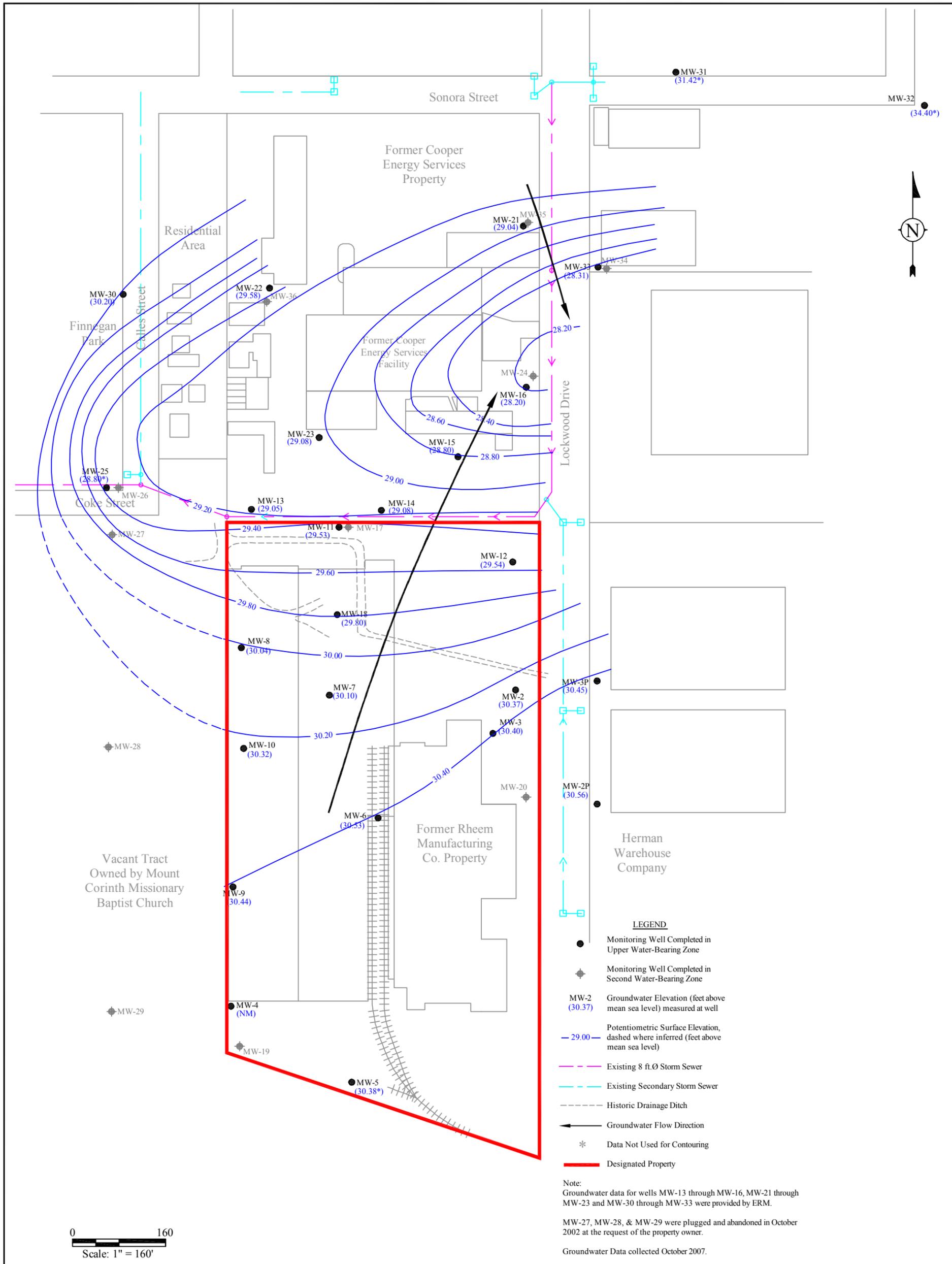
 www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
	SHEET TITLE AFFECTED GROUNDWATER IN THE UPPER WATER-BEARING ZONE			TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS	
	PROJECT NUMBER AT002030.0005			FIGURE NUMBER B-5		



Note: Wells MW-27, MW-28, and MW-29 were plugged and abandoned at the request of the property owner.



copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ	
	SHEET TITLE SOIL SAMPLE AND GROUNDWATER WELL LOCATIONS			TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS		
				PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-6		

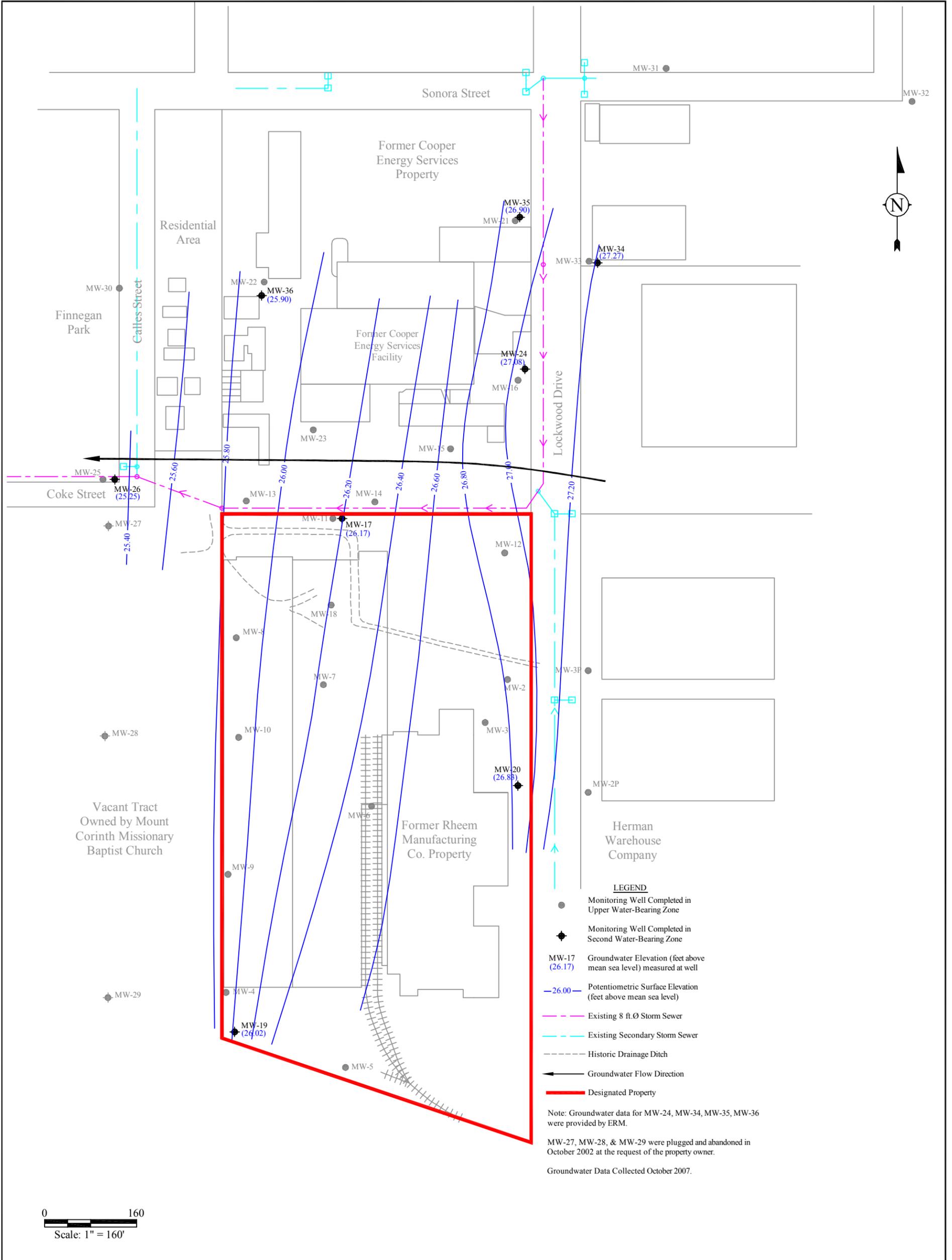


- LEGEND**
- Monitoring Well Completed in Upper Water-Bearing Zone
 - ◆ Monitoring Well Completed in Second Water-Bearing Zone
 - MW-2 (30.37) Groundwater Elevation (feet above mean sea level) measured at well
 - 29.00 - Potentiometric Surface Elevation, dashed where inferred (feet above mean sea level)
 - Existing 8 ft.Ø Storm Sewer
 - Existing Secondary Storm Sewer
 - Historic Drainage Ditch
 - Groundwater Flow Direction
 - * Data Not Used for Contouring
 - ▭ Designated Property

Note:
 Groundwater data for wells MW-13 through MW-16, MW-21 through MW-23 and MW-30 through MW-33 were provided by ERM.
 MW-27, MW-28, & MW-29 were plugged and abandoned in October 2002 at the request of the property owner.
 Groundwater Data collected October 2007.

0 160
 Scale: 1" = 160'

copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION -- FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ	
	SHEET TITLE POTENTIOMETRIC SURFACE MAP FOR UPPER WATER-BEARING ZONE			TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS		
				PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-7		



LEGEND

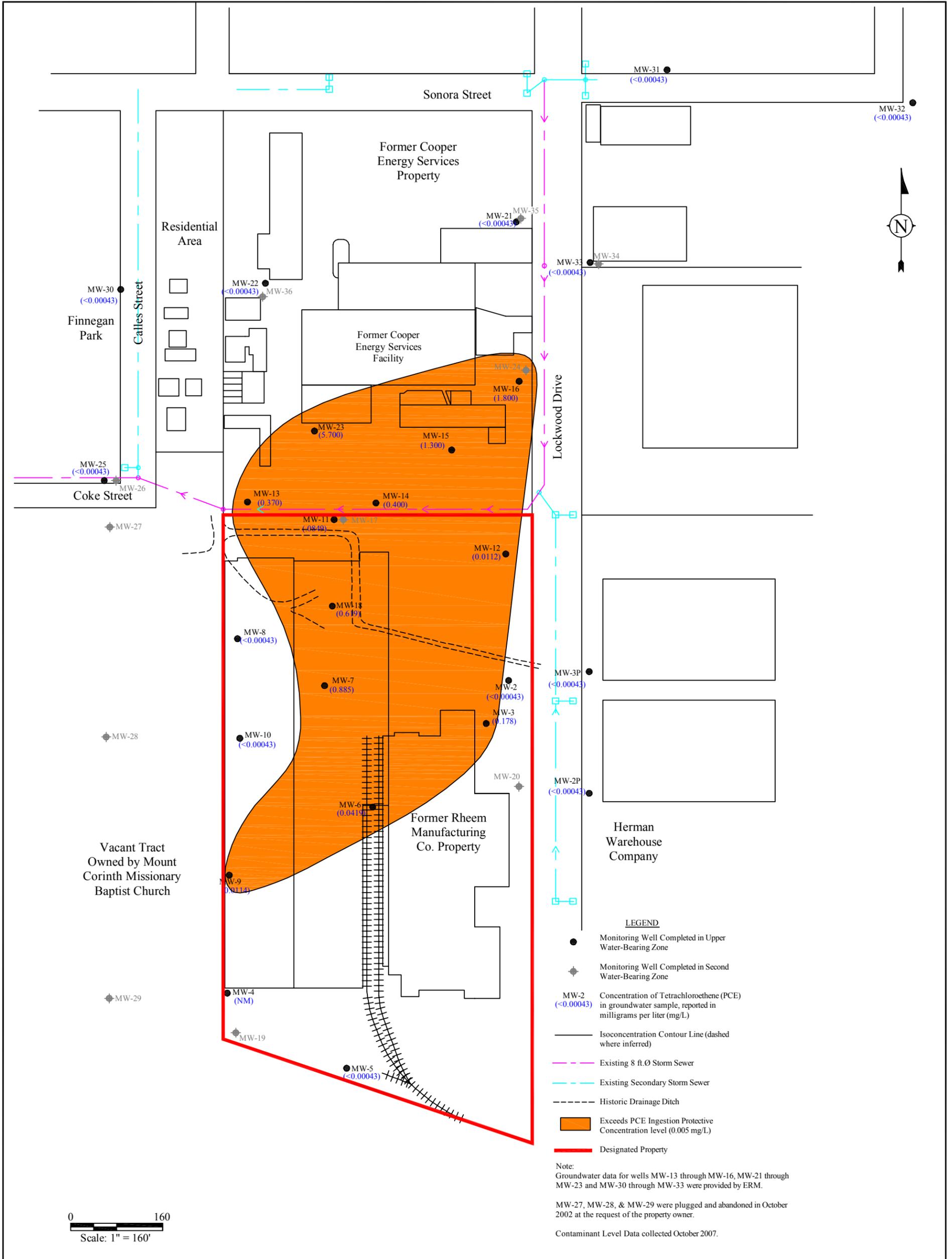
- Monitoring Well Completed in Upper Water-Bearing Zone
- ◆ Monitoring Well Completed in Second Water-Bearing Zone
- MW-17 (26.17) Groundwater Elevation (feet above mean sea level) measured at well
- 26.00- Potentiometric Surface Elevation (feet above mean sea level)
- - - Existing 8 ft.Ø Storm Sewer
- - - Existing Secondary Storm Sewer
- - - Historic Drainage Ditch
- ← Groundwater Flow Direction
- ▭ Designated Property

Note: Groundwater data for MW-24, MW-34, MW-35, MW-36 were provided by ERM.

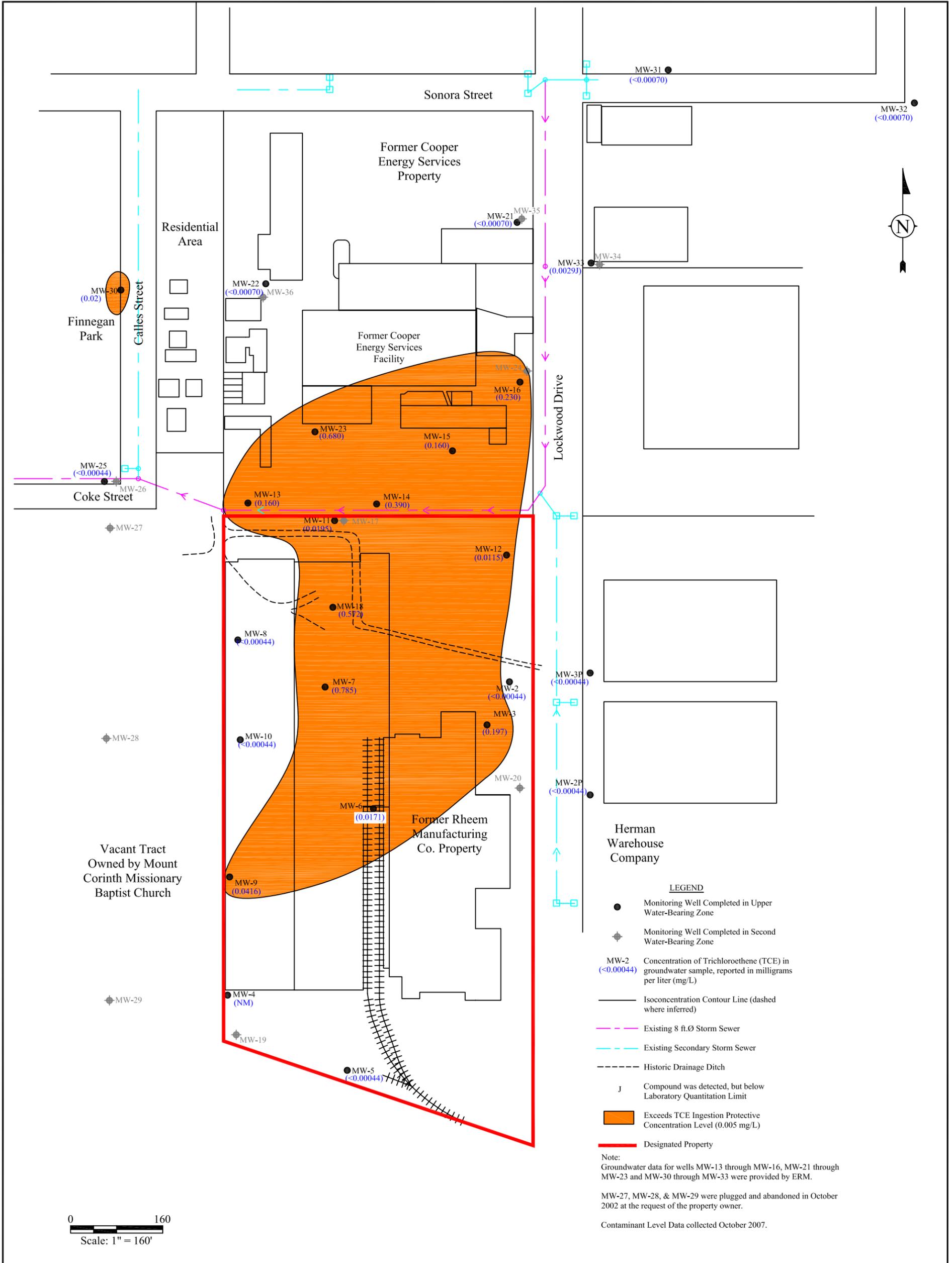
MW-27, MW-28, & MW-29 were plugged and abandoned in October 2002 at the request of the property owner.

Groundwater Data Collected October 2007.

copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ	
			SHEET TITLE POTENTIOMETRIC SURFACE MAP FOR SECOND WATER-BEARING ZONE			TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS
						PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-8

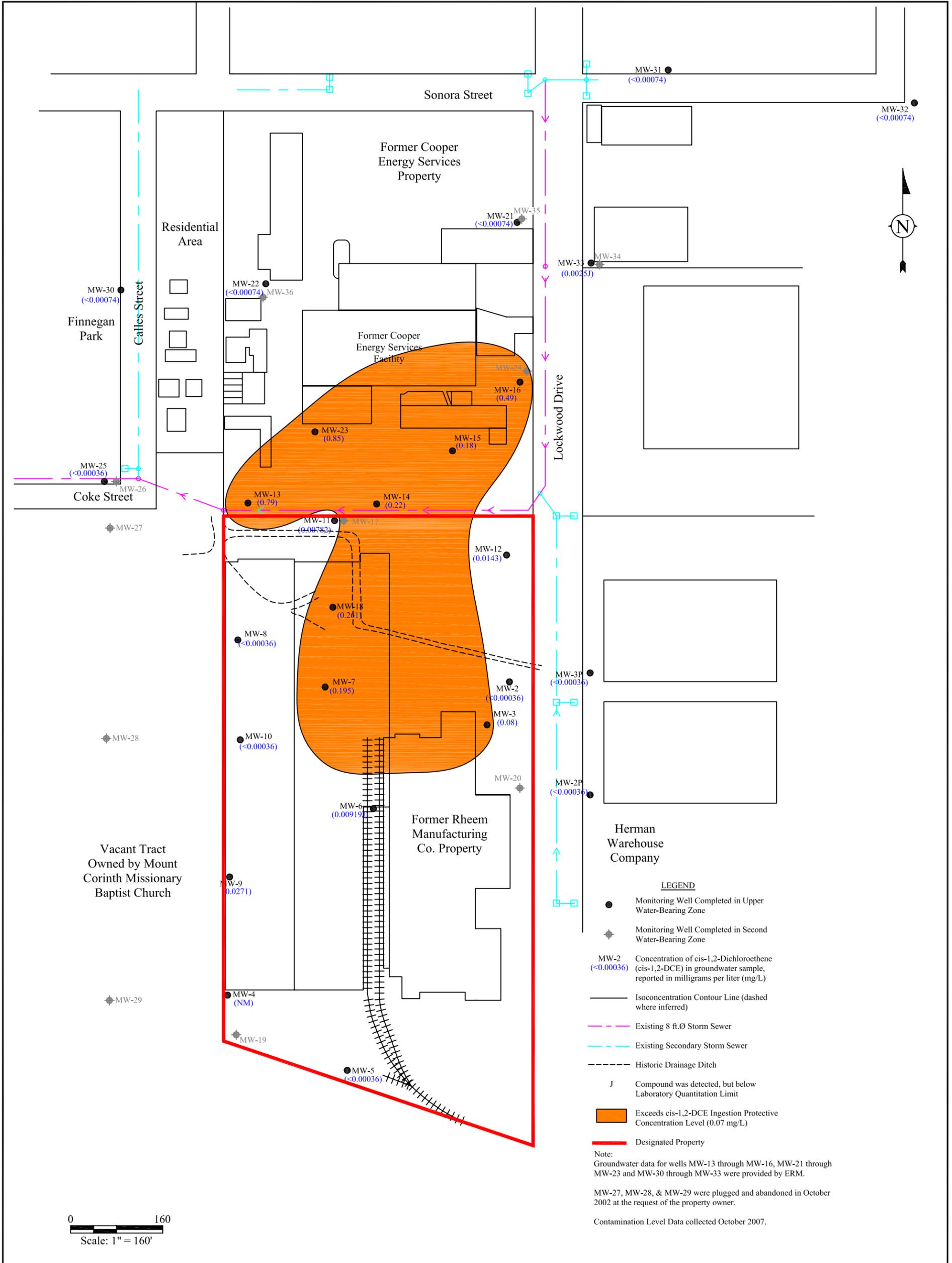


copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
			SHEET TITLE PCE INGESTION PROTECTIVE CONCENTRATION LEVEL EXCEEDANCE ZONE IN THE UPPER WATER-BEARING ZONE	TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS	
			PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-9		



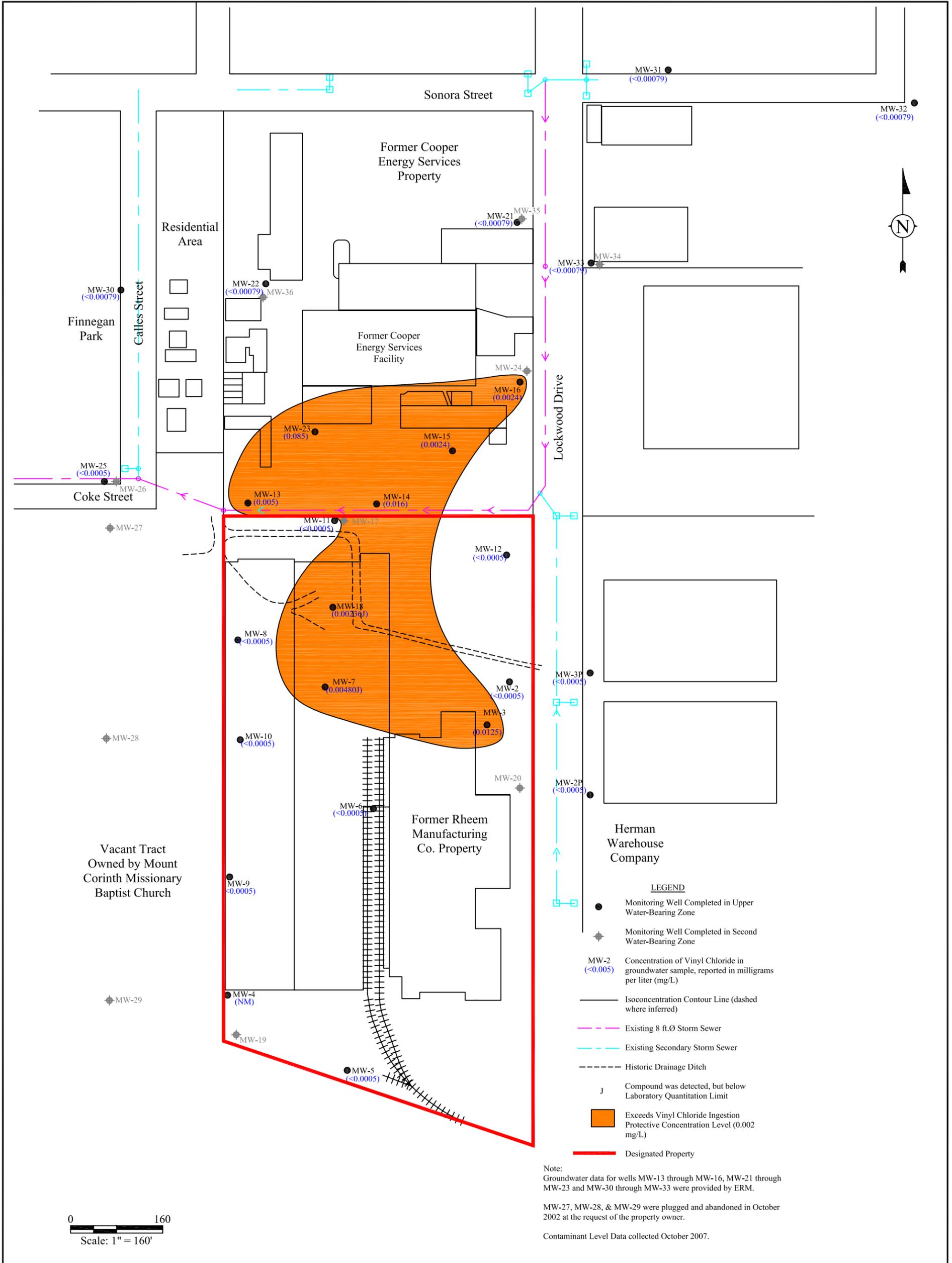
0 160
 Scale: 1" = 160'

copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ	
			SHEET TITLE TCE INGESTION PROTECTIVE CONCENTRATION LEVEL EXCEEDANCE ZONE IN THE UPPER WATER-BEARING ZONE	TASK/PHASE NUMBER .00001	PROJECT NUMBER AT002030.0005	DRAWN BY J. PITTS	FIGURE NUMBER B-10

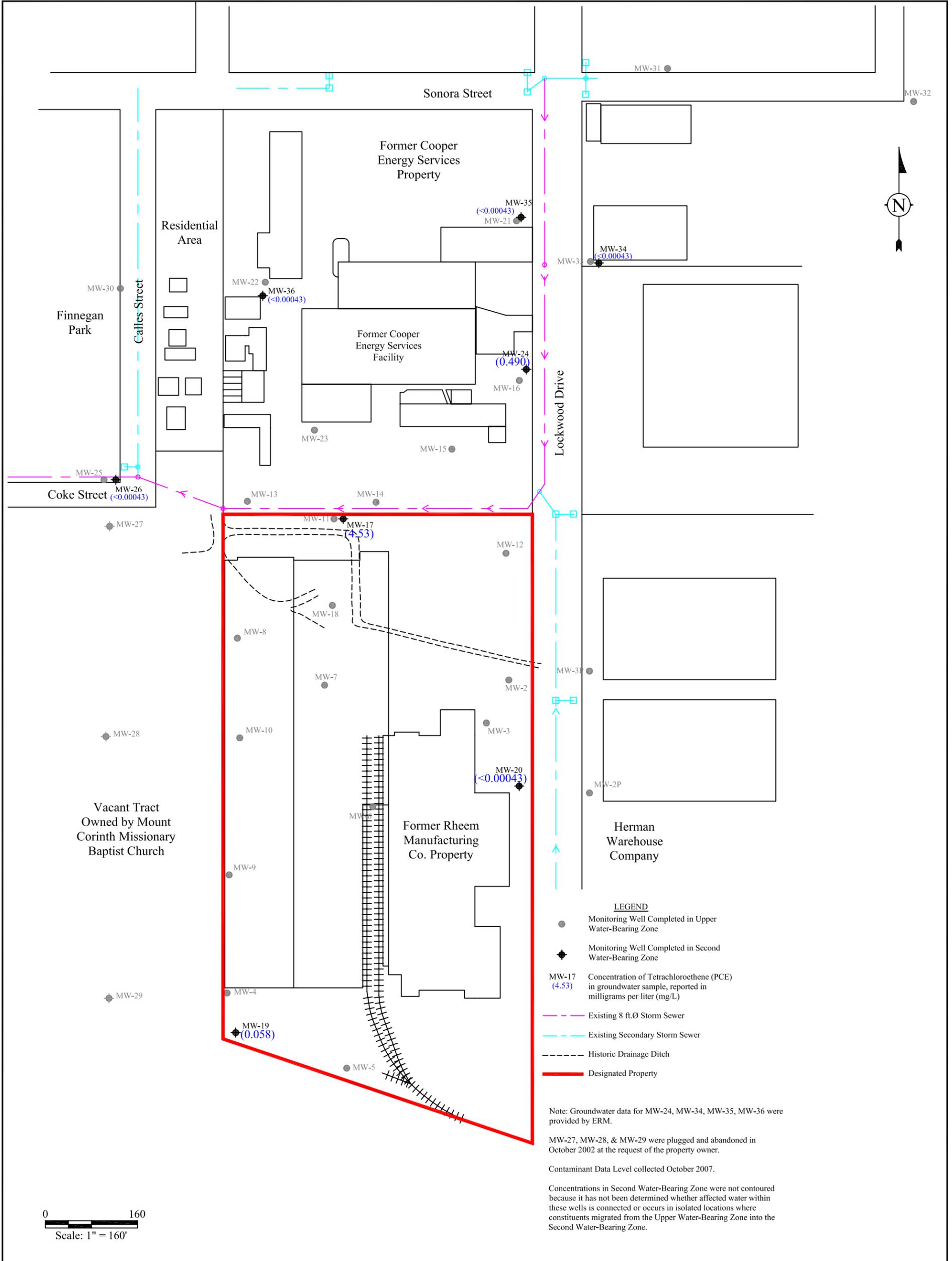


0 160
 Scale: 1" = 160'

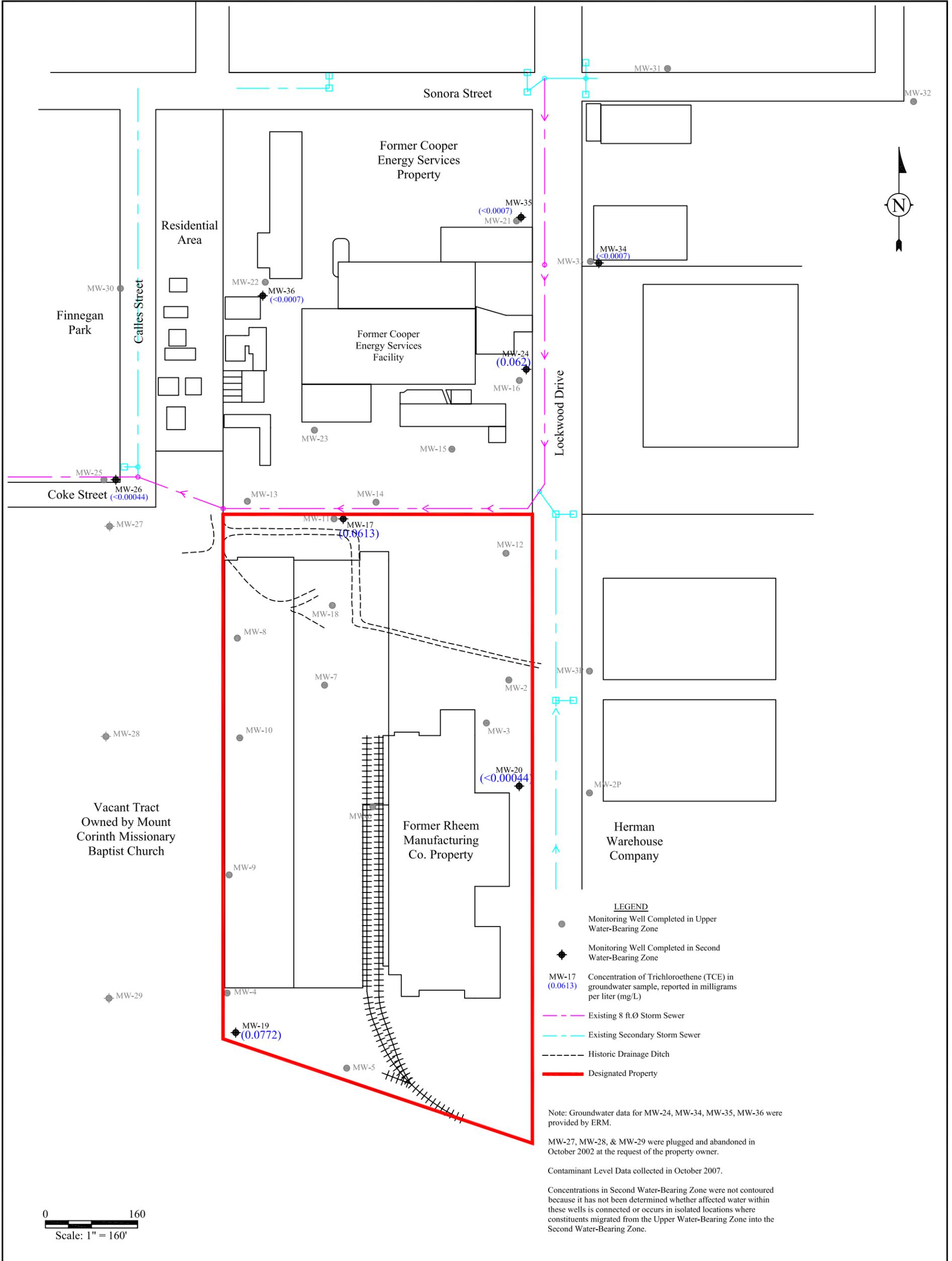
copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ	
			SHEET TITLE cis-1,2-DCE INGESTION PROTECTIVE CONCENTRATION LEVEL EXCEEDANCE ZONE IN THE UPPER WATER-BEARING ZONE			TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS
						PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-11



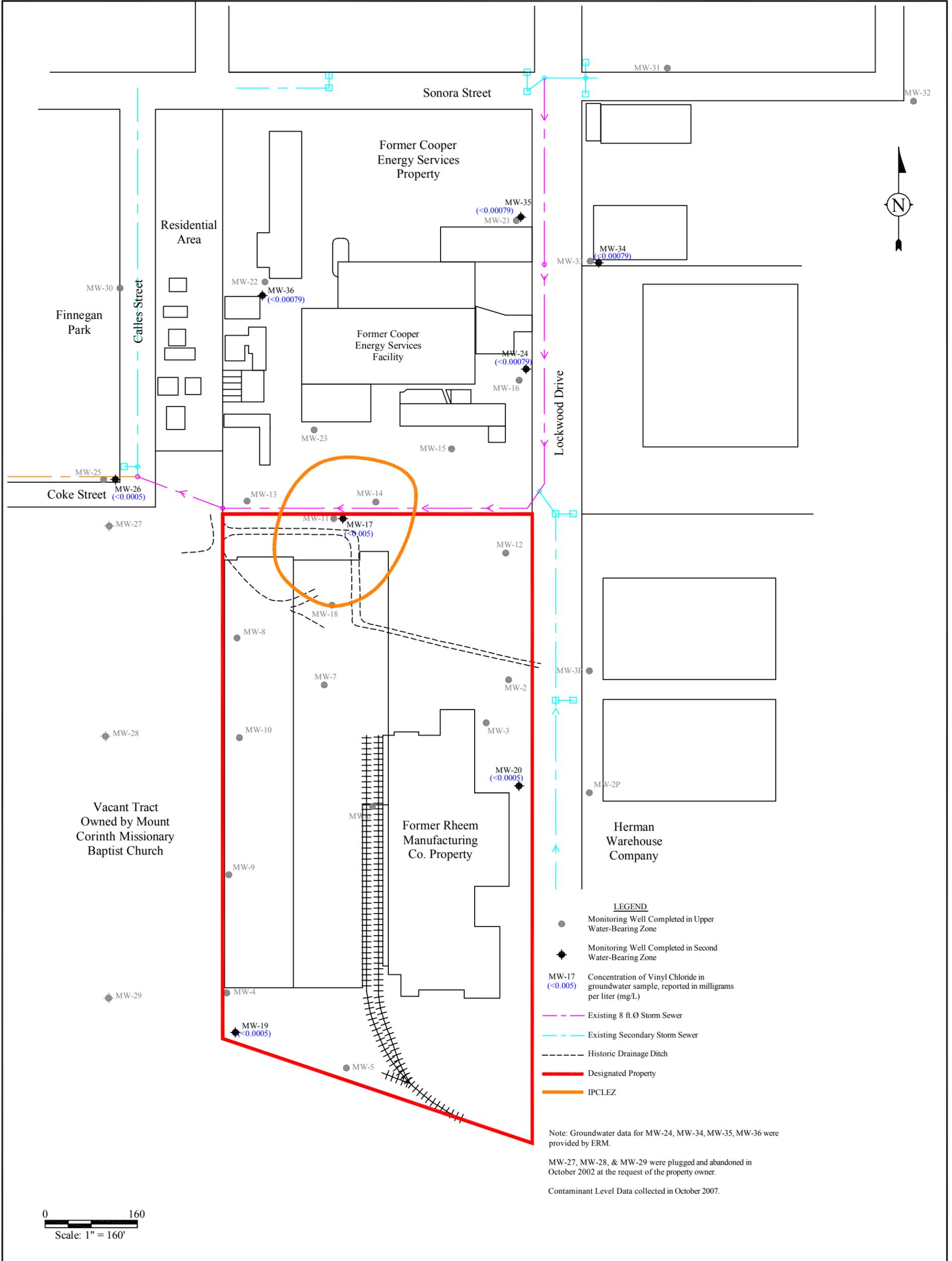
<p>ARCADIS www.arcadis-us.com</p>	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ	
	SHEET TITLE VINYL CHLORIDE INGESTION PROTECTIVE CONCENTRATION LEVEL EXCEEDANCE ZONE IN THE UPPER WATER-BEARING ZONE			TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS		
	PROJECT NUMBER AT002030.0005			FIGURE NUMBER B-12			



copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
			SHEET TITLE PCE INGESTION CONCENTRATION LEVEL EXCEEDANCES IN THE SECOND WATER-BEARING ZONE	TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS	
			PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-13		



copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
			SHEET TITLE TCE INGESTION CONCENTRATION LEVEL EXCEEDANCES IN THE SECOND WATER-BEARING ZONE	TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS	
			PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-14		



0 160
 Scale: 1" = 160'

copyright © 2007  www.arcadis-us.com	SEAL	PROJECT TITLE MSD APPLICATION – FORMER RHEEM MANUFACTURING FACILITY 1025 LOCKWOOD DRIVE HOUSTON, TEXAS	PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ	
			SHEET TITLE VINYL CHLORIDE INGESTION PROTECTIVE CONCENTRATION LEVEL EXCEEDANCE ZONE IN THE SECOND WATER-BEARING ZONE			TASK/PHASE NUMBER .00001	DRAWN BY J. PITTS
						PROJECT NUMBER AT002030.0005	FIGURE NUMBER B-15

Appendix C

Current and Future Property Use

Item 3: 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 former Rheem property (site) is currently owned by Annie D. Adams Family Partnership, Ltd. and occupied by Houston Container & Trailer Marring Company (Con-Tra-Mar), which operates a warehouse for temporary storage and shipping of imported products, including industrial and agricultural materials. The area has been used by industry for many years and it is likely that the property will continue to be used for industrial and/or commercial purposes for the foreseeable future.

Current land use in the vicinity of the property is primarily commercial and light industrial. Many of the surrounding properties are utilized as storage and manufacturing facilities. There is a vacant tract of land owned by Mount Corinth Missionary Baptist Church, located to the west of the property. A public roadway, Lockwood Drive, runs along the eastern property boundary. The commercial/industrial property to the north of the property is operated by Westbrook LLC and was formerly operated by Cameron International Corporation (Cameron). A small residential area and Finnegan Park are located directly west of the former Cameron property and are located within 500 feet of the northwest boundary of the former Rheem property. Railroad tracks border the site to the south.

Appendix D

Ingestion Protective Concentration Level Exceedence Zone Discussion

Item 4: For each contaminant of concern within the ingestions protective concentration level exceedence zone, to the extent known, provide the following:

- a. A description of the ingestion protective concentration level exceedence zone (IPCLEZ) and the non-ingestion protective concentration level exceedence zone (non-IPCLEZ), including a specification of the horizontal area and the minimum and maximum depth below ground surface.**
- b. The level of contamination, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed as mg/L units.**
- c. Its basic geochemical properties (e.g., whether the contaminant of concern migrates with groundwater, floats or is soluble in water).**

a) The IPCLEZ is present on both the designated property and on the former Cameron property directly to the north. Constituents in the affected groundwater plume are dissolved chlorinated volatile organic compounds (VOCs) including parent compounds tetrachloroethene (PCE), trichloroethene (TCE), and degradation products cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride. These constituents are present in the upper and second water bearing zones. The upper water-bearing zone begins at approximately 13 to 15 ft below ground surface (bgs) and extends to a confining clay layer approximately 24 to 28 ft bgs. The second water-bearing zone is variable across the site and begins at about 40 to 45 ft bgs and extends to about 50 to 60 ft bgs.

- i. The IPCLEZ for dissolved PCE in the upper water-bearing zone encompasses an area that extends roughly from the southern half of the former Cameron property to the north-central portion of the former Rheem property. The wells in the IPCLEZ and the concentrations in those wells are given in **Table D-1** and a map of the plume is shown in **Figure B-9**.

PCE is present in the second water-bearing zone in areas near Wells MW-17 and MW-19 (on the former Rheem property) and MW-24 (on the former Cameron property). These data have not been contoured because it is not clear whether the concentrations in these wells are connected and represent one continuous plume or smaller isolated areas where constituents have reached the second water-bearing zone. The wells in the IPCLEZ in the second water-bearing zone and the concentrations in those wells are given in **Table D-1** and a map of these locations is shown in **Figure B-13**.

- ii. The IPCLEZ for TCE in the upper water-bearing zone extends from the southern half of the former Cameron property to the north-central portion of the former Rheem property. In addition, ingestion protective concentration levels for TCE have been exceeded at

MW-30 which is located to the west of the former Cameron property. The wells in the IPCLEZ and the concentrations in those wells are given in **Table D-1** and a map of the plume is shown in **Figure B-10**.

TCE is present in the second water-bearing zone in areas near Wells MW-17 and MW-19 (on the former Rheem property) and MW-24 (on the former Cameron property). These data have not been contoured because it is not clear whether the concentrations in these wells are connected and represent one continuous plume or smaller isolated areas where constituents have reached the second water-bearing zone. The wells in the IPCLEZ in the second water-bearing zone and the concentrations in those wells are given in **Table D-1** and a map of these locations is shown in **Figure-14**.

- iii. The IPCLEZ for cis-1,2-DCE in the upper water-bearing zone encompasses an area that extends roughly from the southern half of the former Cameron property to the north-central portion of the former Rheem property. The wells in the IPCLEZ and the concentrations in those wells are given in **Table D-1** and a map of the affected groundwater is provided as **Figure B-11**.

There have not been any exceedences of the ingestion protective concentration level for cis-1,2-DCE in the second water-bearing unit.

- iv. The IPCLEZ for vinyl chloride in the upper water-bearing zone is present from the south central portion of the former Cameron property and extends to the north-central portion of the former Rheem property. The wells in the IPCLEZ and the concentrations in those wells are given in **Table D-1** and a map of the affected groundwater is provided as **Figure B-12**.

The only ingestion concentration level exceedence for vinyl chloride in the second water-bearing zone is at MW-17 which is located on the northern border of the former Rheem property. The concentration in well MW-17 is given in **Table D-1** and a map showing the location of the vinyl chloride occurrence in the second water-bearing zone is provided as **Figure B-15**.

- b) The contamination levels of the COCs in all the wells within the groundwater plume are given in **Table D-1**. The table includes the wells in the upper and second water-bearing zones. The ingestion protective concentration levels, which are also known as the Tier 1 Residential $^{GW}GW_{Ing}$ Protective Concentration Limit (PCL) under the Texas Commission on Environmental Quality's (TCEQ) Texas Risk Reduction Program (TRRP) are given for each COC in mg/L and the contamination level in each well is compared to that value. Exceedences of the ingestion protective concentration level are highlighted in yellow. The non-ingestion protective concentration levels, is the Tier 1 Residential $^{Air}GW_{Inh-V}$ PCL under the TRRP, are also given for each COC in the table in mg/L. There are no exceedences of the non-ingestion protective concentration levels.

- c) The COCs in the IPCLEZ are chlorinated VOCs including PCE and TCE and their daughter products cis-1,2-DCE and vinyl chloride. Chlorinated VOCs can be present as a dense non-aqueous phase liquid (DNAPL) that is denser than water and would be found at the bottom of the water table. However, there is no indication that the COCs at the site are in the DNAPL form. These COCs are present in the dissolved phase and can migrate in the groundwater. The chlorinated VOCs do not migrate in the groundwater at the same speed as the general groundwater velocity due to retardation factors such as adsorption and absorption.

**Table D-1
IPCLEZ and Non-IPCLEZ in Groundwater**

	Tetrachloroethene (PCE)	Trichloroethene (TCE)	cis-1,2-Dichloroethene (cis-1,2-DCE)	Vinyl Chloride
Ingestion Protective Concentration Level (Tier 1 Residential ^{GSV} GW _{Ing} PCL)	0.005	0.005	0.07	0.002
Non-Ingestion Protective Concentration Level (Tier 1 Residential ^{Air} GW _{Inh-V} PCL)	42.23	21.00	2100.18	0.47
Upper Water Bearing Zone	mg/L	mg/L	mg/L	mg/L
MW-3 (Oct 2007)	0.178	0.197	0.08	0.0125
MW-6 (Oct 2007)	0.0419	0.0171	0.00919	<0.0005
MW-7 (Oct 2007)	0.885	0.785	0.195	0.00480J
MW-9 (Oct 2007)	0.0114	0.0416	0.0271	<0.0005
MW-11 (Oct 2007)	0.0849	0.0195	0.00782	<0.0005
MW-12 (Oct 2007)	0.0112	0.0115	0.0143	<0.0005
MW-13 (Oct 2007)	0.36	0.16	0.79	0.0069
MW-14 (Oct 2007)	0.4	0.39	0.22	0.016
MW-15 (Oct 2007)	1.3	0.16	0.18	0.0024
MW-16 (Oct 2007)	1.8	0.23	0.49	0.0024
MW-18 (Oct 2007)	0.598	0.572	0.261	0.00264J
MW-23 (Oct 2007)	5.7	0.68	0.85	0.085
MW-30 (Oct 2007)	<0.00043	0.02	<0.00074	<0.00079
Lower Water Bearing Zone	mg/L	mg/L	mg/L	mg/L
MW-17 (Oct 2007)	4.53	0.0613	0.0179	<0.005
MW-19 (Oct 2007)	0.058	0.0772	0.0492	<0.0005
MW-24 (Oct 2007)	0.49	0.062	0.063	<0.00079

IPCLEZ- Ingestion Protective Concentration Level Exceedence Zone

Indicates constituent exceeds Ingestion Protective Concentration Level

Indicates constituent exceeds Non-Ingestion Protective Concentration Level

J - Compound was present but below the laboratory quantification limit.

Wells MW-3 through MW-12 and MW-17 through MW-21 are operated by Rheem. Wells MW-13 through 16, MW-23, MW-24 and MW-30 are operated by Cameron.

Appendix E

Designated Groundwater Discussion

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

- a. A description of the ingestion protective concentration level exceedance zone (IPCLEZ) and the non-ingestion protective concentration level exceedance zone (non-IPCLEZ), including a specification of the horizontal area and the minimum and maximum depth below ground surface.**
- b. The level of contamination, the ingestion protective concentration level, and the non-ingestion protective concentration level, all expressed as mg/L units.**
- c. Its basic geochemical properties (e.g., whether the contaminant of concern migrates with groundwater, floats or is soluble in water).**

- a) As previously mentioned the IPCLEZ is present on both the designated property and on the former Cameron property directly to the north. This MSD application applies to only the groundwater below the former Rheem property. Cameron has committed to submitting its own closure plan to the TCEQ for the former Cameron property. Cameron has informed Rheem that it has contractual rights to restrict groundwater use and to implement other necessary institutional controls to achieve closure at the former Cameron property.

The contaminants of concern (COCs) for the affected groundwater plume are dissolved chlorinated volatile organic compounds (VOCs) including parent compounds (Tetrachloroethene or PCE and Trichloroethene or TCE) and degradation (daughter) products (cis-1,2-Dichloroethene or cis-1,2-DCE and vinyl chloride). The COCs have impacted the upper and second water bearing zones. The upper water-bearing zone begins at approximately 13 to 15 ft below ground surface (bgs) and extends to a confining clay layer approximately 24 to 28 ft bgs. The second water-bearing zone is variable across the former Rheem property and begins between 40 and 45 ft bgs and extends to between 50 and 60 ft bgs.

- i. The IPCLEZ for the designated property for dissolved PCE in the upper water-bearing zone extends from the northern border of the former Rheem facility to the central portion of the former Rheem property. The wells in the designated property in the IPCLEZ and the concentrations in those wells are given in **Table E-1**. **Figure B-9** shows the entire IPCLEZ area but defines the groundwater area to which this MSD application applies. The plume covers a horizontal area of approximately 224,000 square ft.

PCE is present in the second water-bearing zone in areas near Wells MW-17 and MW-19 on the designated property. These data have not been contoured because it is not clear whether the concentrations in these wells are connected and represent one continuous plume or smaller isolated areas where constituents have reached the second water-

bearing zone. The wells in the IPCLEZ in the second water-bearing zone and the concentrations in those wells are given in **Table D-1** and a map of these locations is shown in **Figure B-13**.

- ii. The IPCLEZ for TCE in the upper water-bearing zone extends from the northern boundary of the former Rheem property to the north-central portion of the former Rheem property. The wells in the designated property in the IPCLEZ and the concentrations in those wells are given in **Table E-1**. **Figure B-10** shows the entire IPCLEZ area but defines the groundwater area to which this MSD application applies. The plume covers a horizontal area of approximately 195,000 square ft.

TCE is present in the second water-bearing zone in areas near Wells MW-17 and MW-19 on the designated property. These data have not been contoured because it is not clear whether the concentrations in these wells are connected and represent one continuous plume or smaller isolated areas where constituents have reached the second water-bearing zone. The wells in the IPCLEZ in the second water-bearing zone and the concentrations in those wells are given in **Table D-1** and a map of these locations is shown in **Figure B-14**.

- iii. The IPCLEZ for cis-1,2-DCE in the upper water-bearing zone encompasses an area that extends from the northern boundary of the former Rheem property to the north-central portion of the former Rheem property. The wells in the designated property in the IPCLEZ and the concentrations in those wells are given in **Table E-1**. **Figure B-11** shows the entire IPCLEZ area but defines the groundwater area to which this MSD application applies. The plume covers a horizontal area of approximately 132,000 square ft.

There have not been any exceedances of the ingestion protective concentration level for cis-1,2-DCE in the second water-bearing unit.

- iv. The IPCLEZ for vinyl chloride in the upper water-bearing zone is present from the northern boundary of the former Rheem property and extends to the north-central portion of the former Rheem property. The wells in the designated property in the IPCLEZ and the concentrations in those wells are given in **Table E-1**. **Figure B-12** shows the entire IPCLEZ area but defines the groundwater area to which this MSD application applies. The plume covers a horizontal area of approximately 104,000 square ft.

The only ingestion concentration level exceedance for vinyl chloride in the second water-bearing zone is at well MW-17 which is located on the northern boundary of the former Rheem property. The concentration in well MW-17 is given in **Table E-1**. **Figure B-14** shows the location of this well.

An 8 foot concrete storm sewer line, located several feet below ground surface, is under the former Cameron property a short distance to the north of the boundary between the two properties. This sewer line is connected to and receives flow from a subsurface storm sewer line below Lockwood Drive to the east of the former Cameron property. Cameron has indicated in its submissions to TCEQ that the subsurface storm sewers act as a barrier to most, if not all, transport of constituents of concern, from one side of the sewer to the other (not verified by ARCADIS).

- b) The contamination levels of the COCs in all the wells in the designated groundwater area are given in **Table E-1**. The table includes the wells in the upper and second water-bearing zones. The ingestion protective concentration levels, which are also known as the Tier 1 Residential $^{GW}_{Ing}$ Protective Concentration Limit (PCL) under the Texas Risk Reduction Program (TRRP) from the Texas Commission on Environmental Quality (TCEQ), are given for each COC in mg/L and the contamination level in each well is compared to that value. Exceedances of the ingestion protective concentration level are highlighted in yellow. The non-ingestion protective concentration levels, which are also known as the Tier 1 Residential $^{Air}_{Inh-V}$ PCL under TRRP, are also given for each COC in the table in mg/L. There are no exceedances of these levels.
- c) The COCs in the IPCLEZ within the designated groundwater are chlorinated VOCs including PCE and TCE and their daughter products cis-1,2-DCE and vinyl chloride. Chlorinated VOCs can be present as a dense non-aqueous phase liquid (DNAPL) that is denser than water and would be found at the bottom of the water table. However, there is no indication that the COCs at the former Rheem property are in the DNAPL form. These COCs are present in the dissolved phase and can migrate in the groundwater. The chlorinated VOCs do not migrate in the groundwater at the same speed as the general groundwater velocity due to retardation factors such as adsorption and absorption.

**Table E-1
IPCLEZ and Non-IPCLEZ in Designated Groundwater**

	Tetrachloroethene (PCE)	Trichloroethene (TCE)	cis-1,2-Dichloroethene (cis-1,2-DCE)	Vinyl Chloride
Ingestion Protective Concentration Level (Tier 1 Residential ^{GW} GW _{Ing} PCL)	0.005	0.005	0.07	0.002
Non-Ingestion Protective Concentration Level (Tier 1 Residential ^{Air} GW _{Inh-V} PCL)	42.23	21.00	2100.18	0.47
Upper Water Bearing Zone	mg/L	mg/L	mg/L	mg/L
MW-3 (Oct 2007)	0.178	0.197	0.08	0.0125
MW-6 (Oct 2007)	0.0419	0.0171	0.00919	<0.0005
MW-7 (Oct 2007)	0.885	0.785	0.195	0.00480J
MW-9 (Oct 2007)	0.0114	0.0416	0.0271	<0.0005
MW-11 (Oct 2007)	0.0849	0.0195	0.00782	<0.0005
MW-12 (Oct 2007)	0.0112	0.0115	0.0143	<0.0005
MW-18 (Oct 2007)	0.598	0.572	0.261	0.00264J
Lower Water Bearing Zone	mg/L	mg/L	mg/L	mg/L
MW-17 (Oct 2007)	4.53	0.0613	0.0179	<0.005
MW-19 (Oct 2007)	0.058	0.0772	0.0492	<0.0005

IPCLEZ- Ingestion Protective Concentration Level Exceedence Zone

Indicates constituent exceeds Ingestion Protective Concentration Level

Indicates constituent exceeds Non-Ingestion Protective Concentration Level

J - Compound was present but below the laboratory quantification limit.

Appendix F

Maximum Contaminants of Concern Concentrations

Item 6: A table displaying the following information for each contaminant of concern, 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 as mg/L units.**
 - b. The critical protective concentration level without the municipal setting designation, highlighting any exceedances.**
- a) **Table F-1** shows the maximum concentrations of PCE, TCE and 1,2-DCE detected in soil sampled across the designated property. The table includes the sample locations, the depth interval from which the samples were collected and the sample collection dates. The maximum detected concentrations of PCE, TCE and cis-1,2-DCE were 6.06, 0.9 and 0.33 mg/kg, respectively. Vinyl chloride was not detected in any soil sample collected from the site but the maximum sample detection limit was 1.4 mg/kg in sample SB-5(b).

The ingestion protective concentration level (IPCL) in soil for cis-1,2-DCE was determined from the Tier 1 Residential ^{GW}Soil_{ing} protective concentration limit (PCL) as set by the TCEQ. The IPCL in soil for PCE, TCE and vinyl chloride were determined from the 2002 Baseline Risk Assessment submitted by ARCADIS and approved by the TCEQ. These values are the calculated Tier 2 PCLs for soil constituents leaching to groundwater. As shown on Table F-1, the historical maximum concentration for 1,2-DCE in soils exceeded the IPCL (i.e. the critical PCL without an MSD). Vinyl chloride was not detected, but its detection limit in soil exceeded the IPCL.

The non-IPCLs in soil for all four contaminants of concern were determined from the Residential Tier 1 ^{Tot}Soil_{comb} PCLs as set by the TCEQ. An exceedance of these PCLs indicates that a risk to human health exists via exposure to the soil through the inhalation, ingestion, dermal contact and vegetable consumption pathways. As shown on Table F-1.2, none of the historical maximum concentrations in soils exceeded any of the non-IPCLs (i.e. the critical PCL with an MSD).

Tables F-2.1 and **F-2.2** indicate the maximum concentrations of the four COCs in groundwater. The tables indicate the maximum concentrations detected in groundwater samples from wells on the designated property during the October 2007 sampling event, as well as the maximum detected concentrations from sampling events conducted since 2000.

The IPCLs for all four contaminants in groundwater were determined from the Tier 1 ^{GW}GW_{ing} PCLs as set by the TCEQ. An exceedance of these PCLs indicates that a risk to human health exists should the groundwater be ingested. As shown on Table F-2.1, the historical maximum concentration for PCE, TCE, 1,2-DCE and vinyl chloride in groundwater exceeded the IPCL (i.e. the critical PCL without an MSD).

MSD Application
Former Rheem
Manufacturing Company
Property

The non-IPCLs for all four contaminants in groundwater were determined from the Tier 1 $^{Air}GW_{Inh-V}$ PCLs as set by the TCEQ. An exceedance of these PCLs indicates a risk to human health exists should a person inhale vapors emanating from the groundwater. As shown on Table F-2, none of the historical maximum concentrations in groundwater exceeded any of the non-IPCLs (i.e. the critical PCL with an MSD).

Table F-1
Maximum Constituent Concentrations in Soils

Table F-1.1 - Maximum Constituent Concentrations in Soils Compared to IPCL (i.e. Critical PCL without MSD)

Constituent	IPCL ^{GW} SOIL _{Ing} (mg/kg)	non-IPCL ^{Tot} Soil _{Comb} (mg/kg)	Critical PCL (no MSD) (mg/kg)	Historical Max on Designated Property (mg/kg)	Sample Location	Sample Depth (ft bgs)	Sample Date
Tetrachloroethene (PCE)	1.00E+02	8.54E+01	1.00E+02	6.06E+00	SB-26	2-4	4/22/1998
Trichloroethene (TCE)	1.40E+01	9.06E+01	1.40E+01	9.00E-01	SB-5	1	1/26/1994
cis-1,2-Dichloroethene	1.24E-01	7.24E+02	1.24E-01	3.30E-01	SB-39	2-4	4/23/1998
Vinyl Chloride	4.10E-02	3.39E+00	4.10E-02	<1.40E+00	SB-5(b)	1	1/26/1994

Indicates sample exceeds the Critical PCL without a MSD

IPCL: Ingestion Protective Concentration Level is the critical PCL without a Municipal Settings Designation (MSD)

Non-IPCL: Non-Ingestion Protective Concentration Level is the critical PCL with a Municipal Settings Designation (MSD)

^{Tot}Soil_{Comb}: Tier 1 PCL for total soil combined (human exposure through inhalation, ingestion and dermal contact)

^{GW}SOIL_{Ing}: PCL for constituents in soil leaching to groundwater

Table F-1.2 - Maximum Constituent Concentrations in Soils Compared to Non-IPCL (i.e. Critical PCL with MSD)

Contaminant of Concern	IPCL (mg/kg)	non-IPCL ^{Tot} Soil _{Comb} (mg/kg)	Critical PCL (with MSD) (mg/kg)	Historical Max on Designated Property (mg/kg)	Sample Location	Sample Depth (ft bgs)	Sample Date
Tetrachloroethene (PCE)	1.00E+02	8.54E+01	8.54E+01	6.06E+00	SB-26	2-4	4/22/1998
Trichloroethene (TCE)	1.40E+01	9.06E+01	9.06E+01	9.00E-01	SB-5	1	1/26/1994
cis-1,2-Dichloroethene	1.24E-01	7.24E+02	7.24E+02	3.30E-01	SB-39	2-4	4/23/1998
Vinyl Chloride	4.10E-02	3.39E+00	3.39E+00	<1.40E+00	SB-5(b)	1	1/26/1994

Indicates sample exceeds the Critical PCL with MSD

IPCL: Ingestion Protective Concentration Level is the critical PCL without a Municipal Settings Designation (MSD)

Non-IPCL: Non-Ingestion Protective Concentration Level is the critical PCL with a Municipal Settings Designation (MSD)

^{Tot}Soil_{Comb}: Tier 1 PCL for total soil combined (human exposure through inhalation, ingestion and dermal contact)

^{GW}SOIL_{Ing}: PCL for constituents in soil leaching to groundwater

Table F-2
Maximum Constituent Concentrations in Groundwater

Table F-2.1: Maximum Constituent Concentrations in Groundwater Compared to IPCL

Contaminant of Concern	IPCL ^{GW} GW _{Ing} (mg/L)	non-IPCL ^{Air} GW _{Inh-V} (mg/L)	Critical PCL (no MSD) (mg/L)	Max Concentration October 2007 Event (mg/L)	Well ID	Historical Max Concentration (mg/L)	Well ID	Date Sampled
Tetrachloroethene (PCE)	5.00E-03	4.22E+01	5.00E-03	4.53E+00	MW-17	7.52E+00	MW-17	6/23/2000
Trichloroethene (TCE)	5.00E-03	2.10E+01	5.00E-03	7.85E-01	MW-7	1.38E+00	MW-7	10/1/2003
cis-1,2-Dichloroethene	7.00E-02	2.10E+03	7.00E-02	2.61E-01	MW-18	8.38E-01	MW-11	4/6/2004
Vinyl Chloride	2.00E-03	4.70E-01	2.00E-03	5.00E-03	MW-17	2.21E-01	MW-3	6/21/2000

Indicates sample exceeds the Critical PCL without a Municipal Settings Designation (MSD)

IPCL: Ingestion Protective Concentration Level is the critical PCL without a Municipal Settings Designation (MSD)

Non-IPCL: Non-Ingestion Protective Concentration Level is the critical PCL with a Municipal Settings Designation (MSD)

^{GW}GW_{Ing}. Tier 1 PCL for ingestion of groundwater

^{Air}GW_{Inh-V}. Tier 1 PCL for human inhalation of vapors emanating from groundwater

Table F-2.2: Maximum Constituent Concentrations in Groundwater Compared to Non-IPCL

Contaminant of Concern	IPCL ^{GW} GW _{Ing} (mg/L)	non-IPCL ^{Air} GW _{Inh-V} (mg/L)	Critical PCL (with MSD) (mg/L)	Max Concentration October 2007 Event (mg/L)	Well ID	Historical Max Concentration (mg/L)	Well ID	Date Sampled
Tetrachloroethene (PCE)	5.00E-03	4.22E+01	4.22E+01	4.53E+00	MW-17	7.52E+00	MW-17	6/23/2000
Trichloroethene (TCE)	5.00E-03	2.10E+01	2.10E+01	7.85E-01	MW-7	1.38E+00	MW-7	10/1/2003
cis-1,2-Dichloroethene	7.00E-02	2.10E+03	2.10E+03	2.61E-01	MW-18	8.38E-01	MW-11	4/6/2004
Vinyl Chloride	2.00E-03	4.70E-01	4.70E-01	5.00E-03	MW-17	2.21E-01	MW-3	6/21/2000

Indicates sample exceeds the Critical PCL with a Municipal Settings Designation (MSD)

IPCL: Ingestion Protective Concentration Level is the critical PCL without a Municipal Settings Designation (MSD)

Non-IPCL: Non-Ingestion Protective Concentration Level is the critical PCL with a Municipal Settings Designation (MSD)

^{GW}GW_{Ing}. Tier 1 PCL for ingestion of groundwater

^{Air}GW_{Inh-V}. Tier 1 PCL for human inhalation of vapors emanating from groundwater

Appendix G

Plume Stability Analysis

Item 7: A statement as to whether the plume of contamination is stable, expanding, or contracting, with the basis for that statement.

The affected groundwater extends into the upper and second water-bearing zones. Groundwater in the upper water-bearing zone has been monitored since 1990 while groundwater in the second water-bearing zone has been monitored since 2000. A discussion of the plume stability in each zone is discussed below.

Upper Water-Bearing Zone

Figures G-1 to G-4 are time-series maps that show the plume stability in the upper water-bearing zone and illustrate that the general concentrations have declined. These time-series maps show that since 2000, the footprints of the affected groundwater in the upper water-bearing zone have generally remained stable or shrunk, as a result of natural attenuation processes.

Figure G-1 shows that, in general, the footprint of the PCE plume beneath the former Rheem property has remained stable. The time-series maps show that the overall strength of the PCE plume has generally declined, especially in the area near well MW-7, which has historically shown the highest concentrations beneath the former Rheem property. PCE concentrations over the last six years in well MW-7 have declined from 1.36 mg/L to 0.885 mg/L.

The time-sequence maps for TCE, provided in **Figure G-2**, show that the footprint of the TCE plume has remained stable. The TCE plume maps show a significant reduction in constituent concentration in the central portion of the former Rheem property. A comparison between the 2002 and 2007 contour maps show that the area beneath the former Rheem property that historically contained TCE concentrations greater than 1.00 mg/L has disappeared.

The time-sequence maps for cis-1,2-DCE, provided in **Figure G-3**, show that the footprint of the cis-1,2-DCE plume beneath the former Rheem property has shrunk and the concentration of the plume has declined. The cis-1,2-DCE maps show a significant reduction in constituent concentration in the central portion of the former Rheem property near well MW-7, which has historically contained the highest constituent concentrations. A comparison between the 2002 and 2007 contour maps show that the cis-1,2-DCE concentrations in well MW-7 decreased from 0.381 mg/L in 2002 to 0.195 mg/L in 2007. During that same timeframe, cis-1,2-DCE concentrations in wells MW-11 and MW-12 dropped below the IPCL (0.070 mg/L).

The time-sequence maps for vinyl chloride (**Figure G-4**) show that concentrations in the area on the Rheem property that has historically shown the highest concentrations of vinyl chloride (the area extending between MW-3 and MW-7) have declined sharply. Between 2002 and 2007 vinyl chloride concentrations in wells MW-3 and MW-7 declined from 0.0882 mg/L to 0.0125 mg/L and 0.00797 mg/L to 0.0048 mg/L, respectively. Only three wells on the former Rheem property contained vinyl chloride concentrations detected in exceedance of the Ingestion Protective Concentration Level (IPCL) during the most recent sampling event in October 2007 (Wells MW-3, MW-7 and MW-18).

The general decline in constituent concentrations is further demonstrated by the graphs provided in **Appendix G**. Long-term data trends show overall decreasing groundwater concentrations across the former Rheem property. Graphs for Wells MW-2, MW-6, MW-7, MW-8, MW-10, MW-11, MW-12, MW-13, MW-14, MW-15, and MW-16 (**Figures G-5, G-7, G-8, G-9** and **G-11 to G-17**, respectively) show decreasing concentration trends, while graphs from wells MW-3 and MW-23 (**Figures G-6** and **G-19**) show stable trends. These stable and decreasing trends indicate a lack of ongoing residual source material and the affect of natural attenuation, resulting in plume stability and local contaminant reduction. While the overall trends in Well MW-9 have increased since 2000, constituent concentrations appear to have reached a peak in 2004, and have declined or remained stable since that time. Trends have also shown slightly increased concentrations in Well MW-18. However, because of its central location within the affected groundwater plume, along with the overall declining footprint of the plume, these trends do not indicate plume instability, but a general fluctuation of concentrations in the interior of the plume.

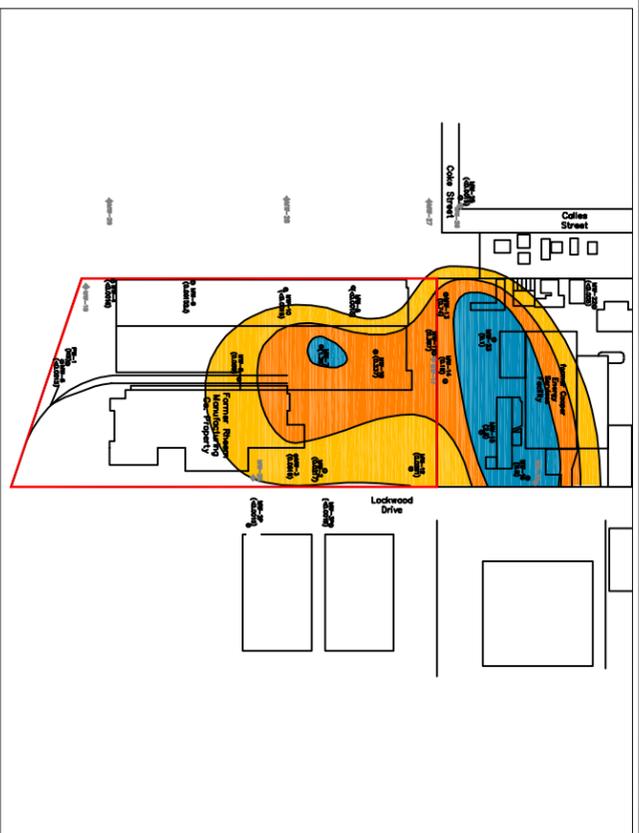
Constituents present in the upper water-bearing zone beneath the former Cameron property are being addressed by Cameron as part of an approved remedial action plan.

An 8 foot concrete storm sewer line, located several feet below ground surface, is under the former Cameron property a short distance to the north of the boundary between the two properties. This sewer line is connected to and receives flow from a subsurface storm sewer line below Lockwood Drive to the east of the former Cameron property. Cameron has indicated in its submissions to TCEQ that the subsurface storm sewers act as a barrier to most, if not all, transport of constituents of concern, from one side of the sewer to the other (not verified by ARCADIS).

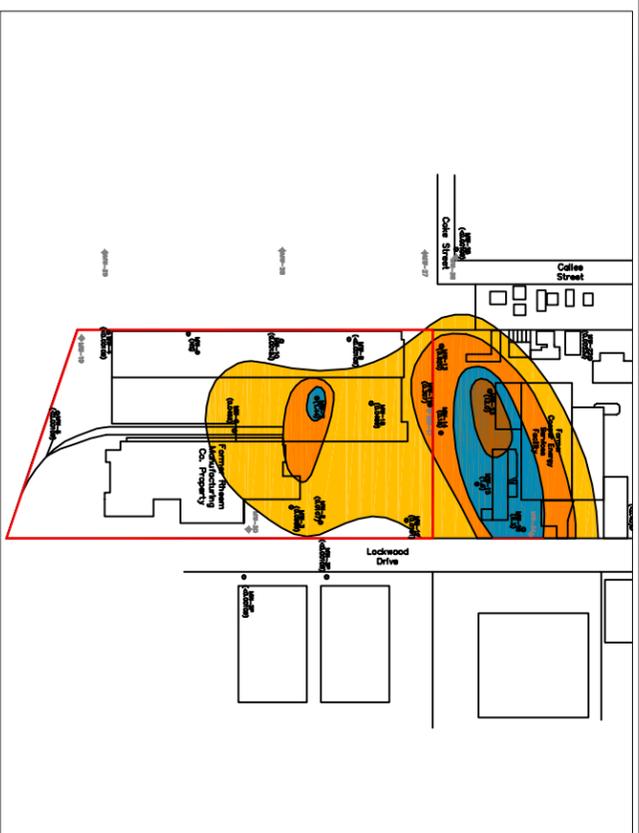
Second Water-Bearing Zone

Of the eleven monitoring wells completed in the second water-bearing zone across the two properties (Wells MW-17, MW-19, MW-20, MW-24, MW-26, MW-27, MW-28, MW-29, MW-34, MW-35 and MW-36), only samples from wells MW-17, MW-19 and MW-24 have contained chlorinated solvent constituents. Of the constituents of concern, only PCE and TCE have been regularly detected above the IPCL in samples from the second water-bearing zone. Graphs showing the concentrations over time for wells MW-17, MW-19 and MW-24 are provided in **Appendix G** as **Figures G-20 to G-22**, respectively. As shown in the graphs, well MW-17 has shown stable constituent concentrations since 2000, while concentration trends in wells MW-19 and MW-24 have increased slightly over time. Wells MW-27, MW-28 and MW-29, formerly located west (down-gradient) of the former Rheem property and have since been plugged at the request of the property owner, historically showed no detectable concentrations of any constituents associated with the former Rheem property. Based on these findings, there is no evidence that affected groundwater in the second water-bearing zone has migrated off-site.

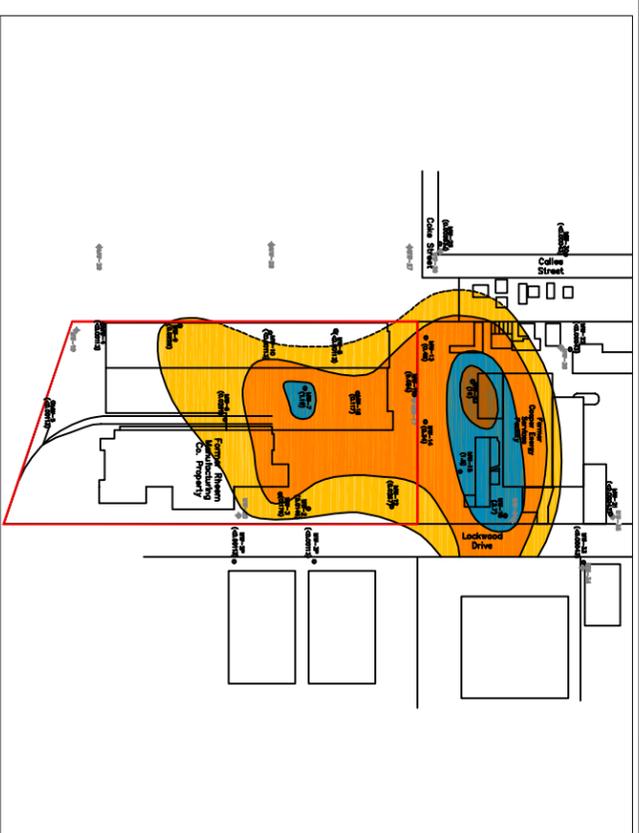
Constituents present in the second water-bearing zone beneath the former Cameron property are being addressed by Cameron as part of an approved remedial action plan.



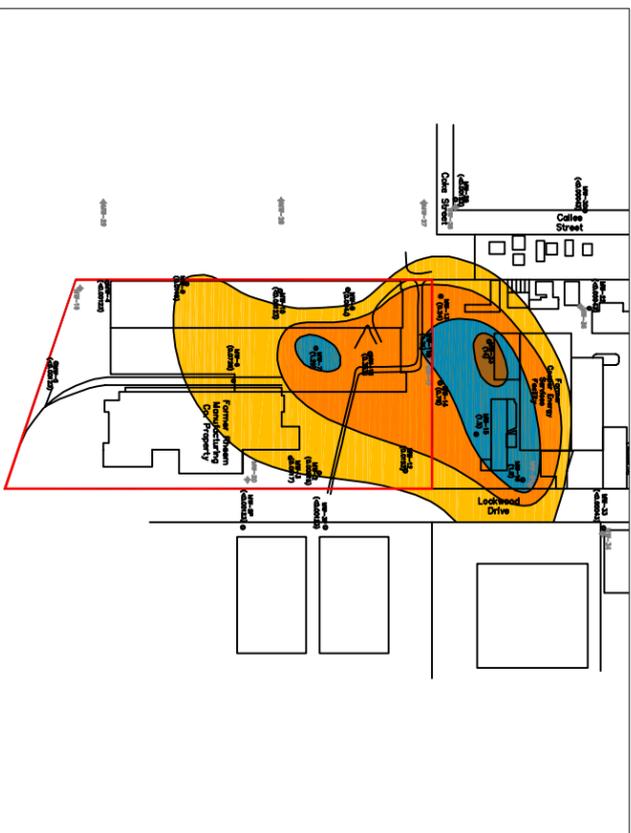
Tetrachloroethene—October 2002



Tetrachloroethene—October 2003



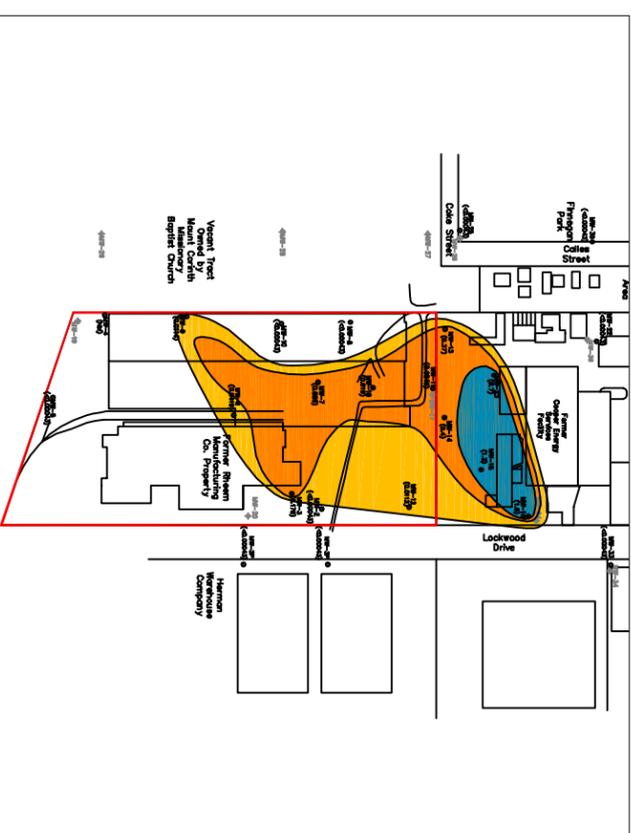
Tetrachloroethene—October 2004



Tetrachloroethene—October 2005



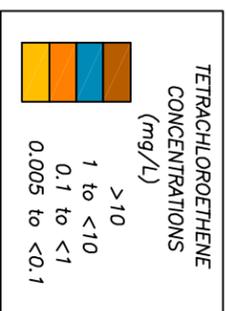
Tetrachloroethene—October 2006



Tetrachloroethene—October 2007

- LEGEND**
- Monitoring Well Completed in Upper Water-Bearing Zone
 - ◆ Monitoring Well Completed in Second Water-Bearing Zone
 - ▲ MW-2 Concentration of Tetrachloroethene (PCE) in <math>< 0.00214</math> groundwater sample, reported in milligrams per liter (mg/L)
 - Isocentration Contour Line (dashed where inferred)
 - Designated Property

Note: Wells MW-27, MW-28, and MW-29 were plugged and abandoned at the request of the property owner. Ingestion protective concentration level for PCE is 0.005 mg/L.



REV.	ISSUED DATE	DESCRIPTION



KENTPLAN

SCALE

PROJECT TITLE
MSD APPLICATION
FORMER RHEEM MANUFACTURING
FACILITY
HOUSTON, TEXAS

PROJECT MANAGER L. RODRIGUEZ	DEPARTMENT MANAGER L. RODRIGUEZ	LEAD DESIGN PROF. J. PITTS	CHECKED BY L. RODRIGUEZ
SHEET TITLE TIME-SEQUENCE PLUME MAPS FOR TETRACHLOROETHENE	TASK/PHASE NUMBER .00001	PROJECT NUMBER AT002030.0005	DRAWN BY J. PITTS
			FIGURE NUMBER G-1



www.arcadis-us.com

REV. ISSUED DATE DESCRIPTION

KEY PLAN



SCALE

PROJECT TITLE

MSD APPLICATION
FORMER RHEEM MANUFACTURING
FACILITY
HOUSTON, TEXAS

PROJECT MANAGER

L. RODRIGUEZ

DEPARTMENT MANAGER

L. RODRIGUEZ

LEAD DESIGN PROF.

J. PITTS

CHECKED BY

L. RODRIGUEZ

SHEET TITLE

TIME-SEQUENCE PLUME MAPS
FOR TRICHLOROETHENE

TASK/PHASE NUMBER

.00001

DRAWN BY

J. PITTS

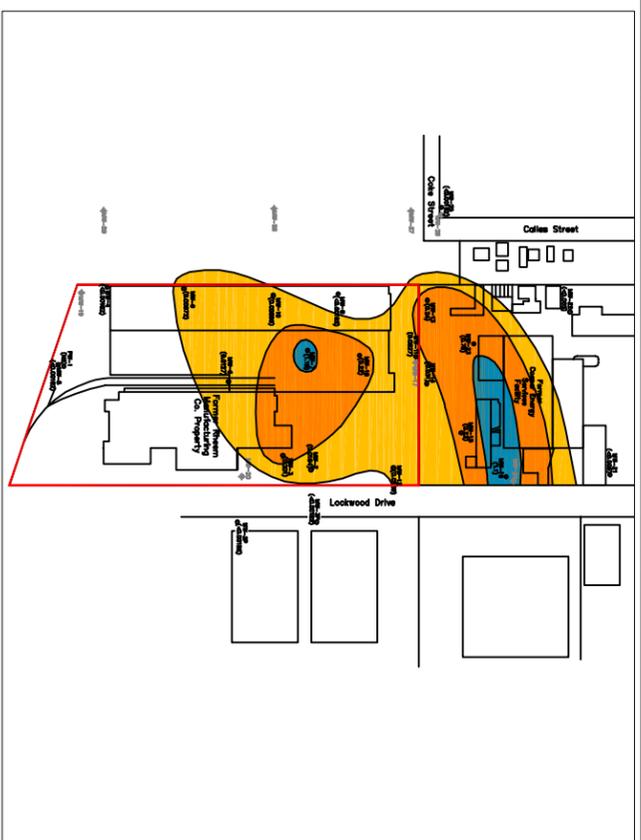
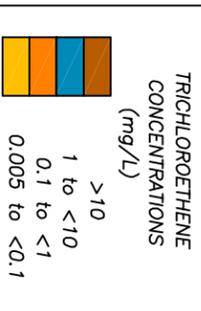
PROJECT NUMBER

A1002030.0005

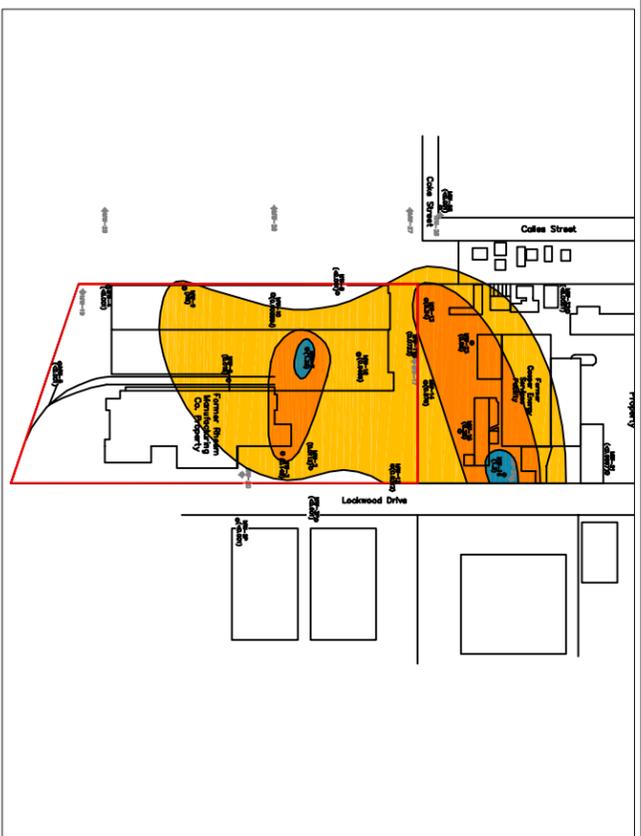
FIGURE NUMBER

G-2

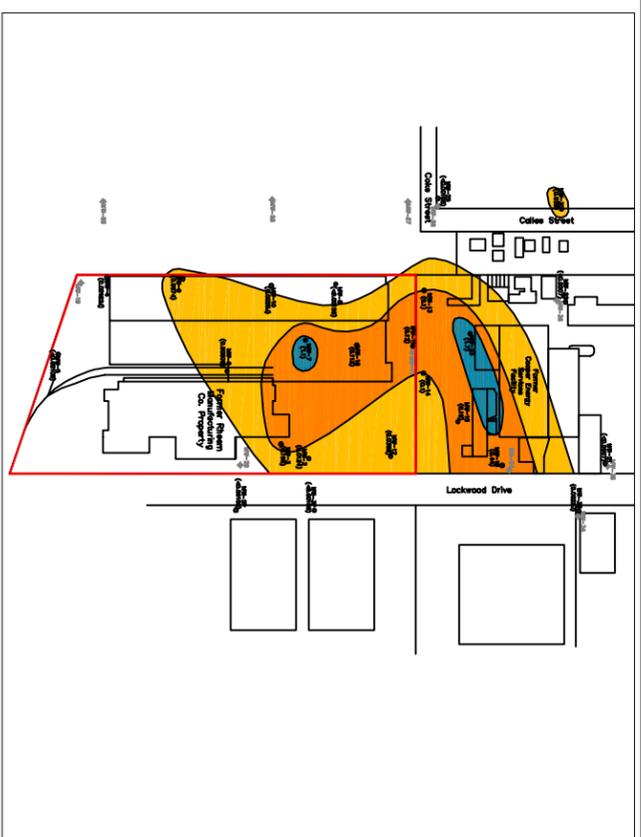
- LEGEND**
- Monitoring Well Completed in Upper Water-Bearing Zone
 - Monitoring Well Completed in Second Water-Bearing Zone
 - ◆ MW-2 Concentration of Trichloroethene (TCE) in (<math><0.00214</math>) milligrams per liter (mg/L)
 - Isoconcentration Contour Line (dashed where interrupted)
 - Designated Property
- Note: Wells MW-27, MW-28, and MW-29 were plugged and abandoned at the request of the property owner. Ingestion protective concentrations level for TCE is 0.005 mg/L.



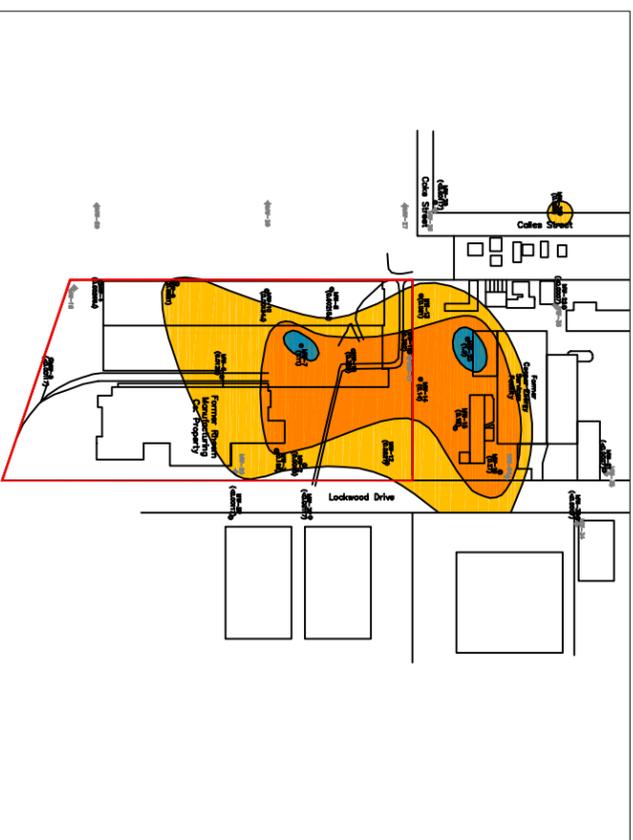
Trichloroethene—October 2002



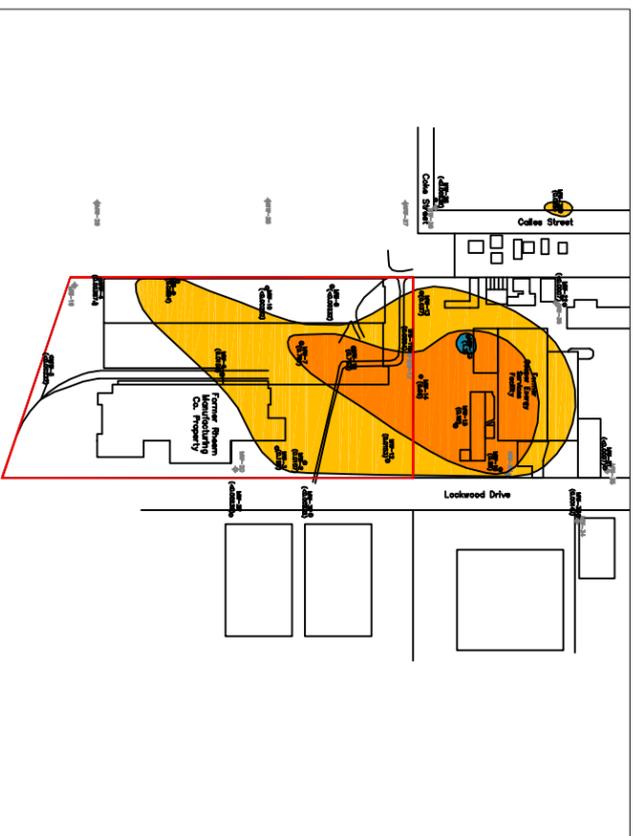
Trichloroethene—October 2003



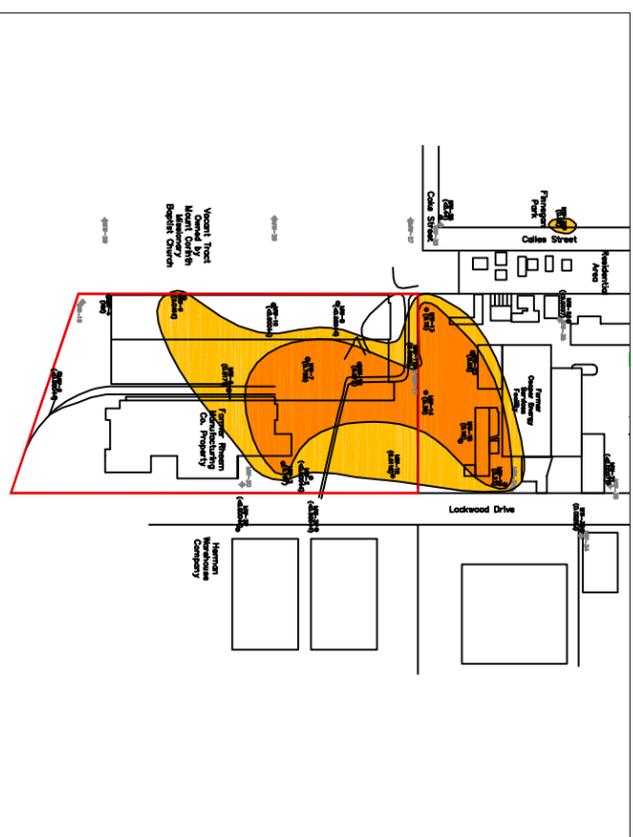
Trichloroethene—October 2004



Trichloroethene—October 2005



Trichloroethene—October 2006



Trichloroethene—October 2007



KEY PLAN



SCALE

PROJECT TITLE

MSD APPLICATION
FORMER RHEEM MANUFACTURING
FACILITY
HOUSTON, TEXAS

PROJECT MANAGER

L. RODRIGUEZ

DEPARTMENT MANAGER

L. RODRIGUEZ

LEAD DESIGN PROF.

J. PITTS

CHECKED BY

L. RODRIGUEZ

SHEET TITLE

TIME-SEQUENCE PLUME MAPS
FOR CIS-1,2-DICHLOROETHENE

TASK/PHASE NUMBER

.00001

DRAWN BY

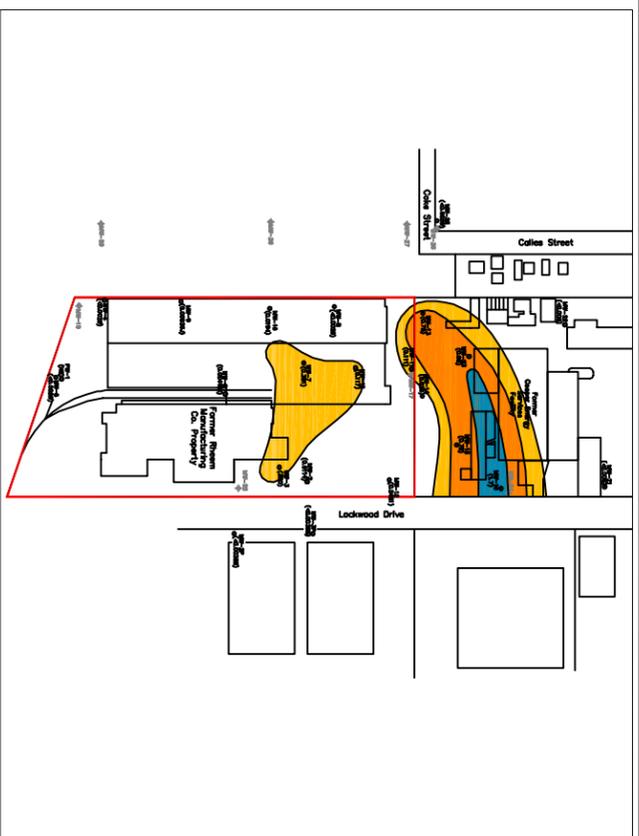
J. PITTS

PROJECT NUMBER

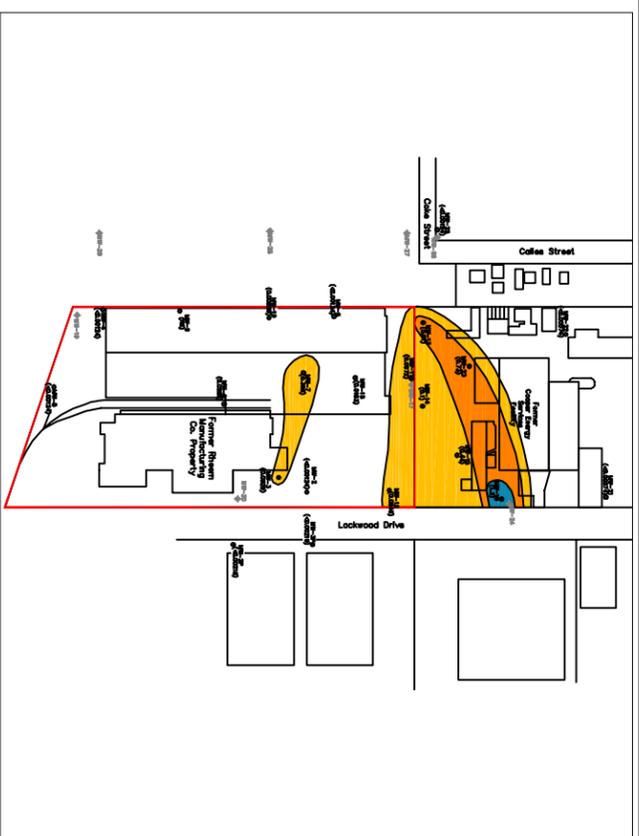
AT002030.0005

FIGURE NUMBER

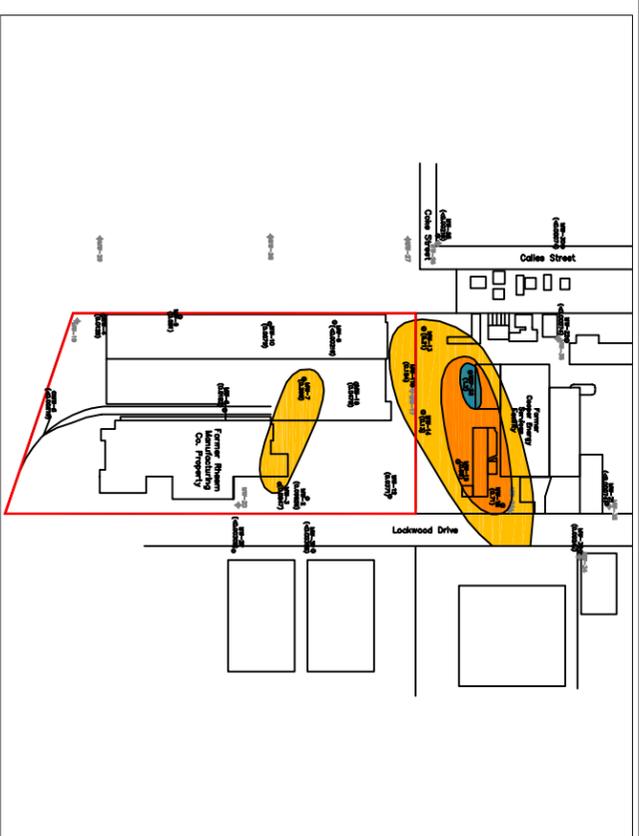
G-3



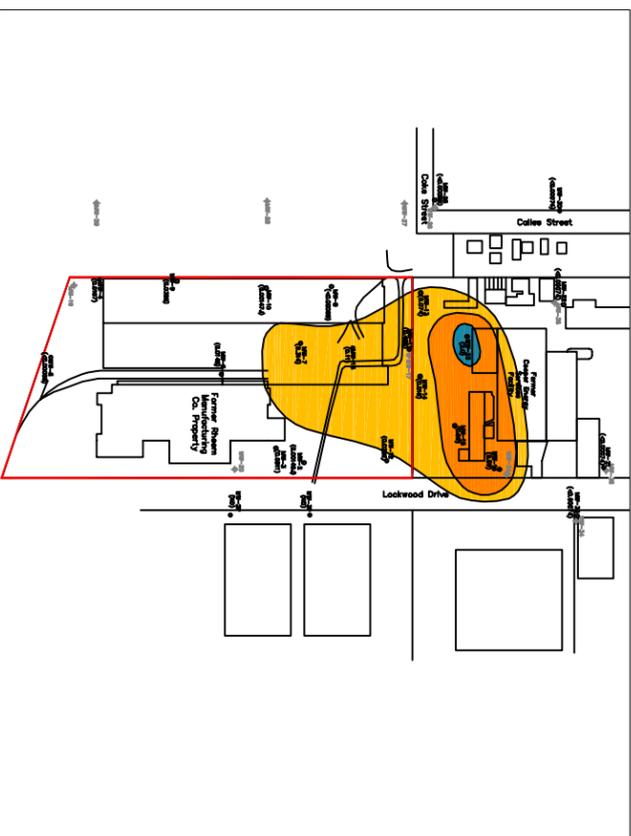
Cis-1,2-Dichloroethene—October 2002



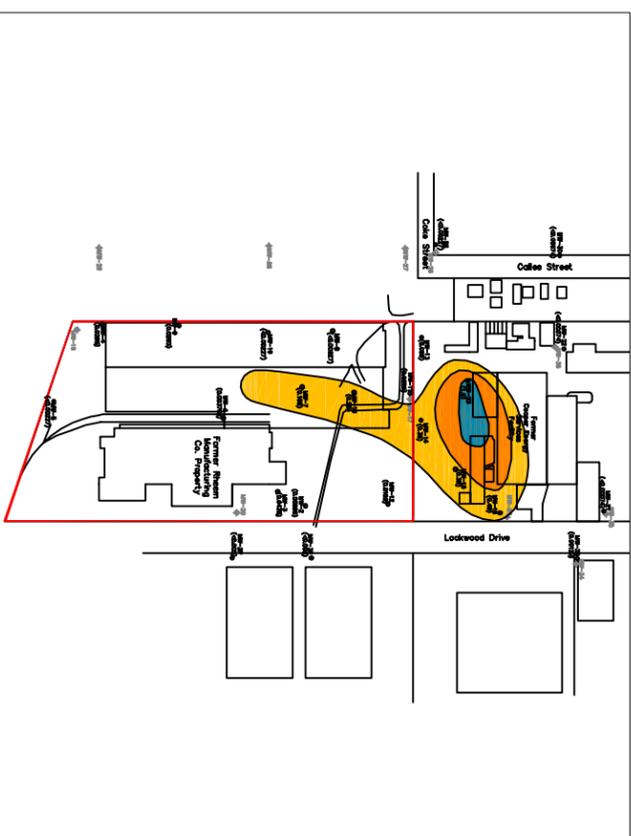
Cis-1,2-Dichloroethene—October 2003



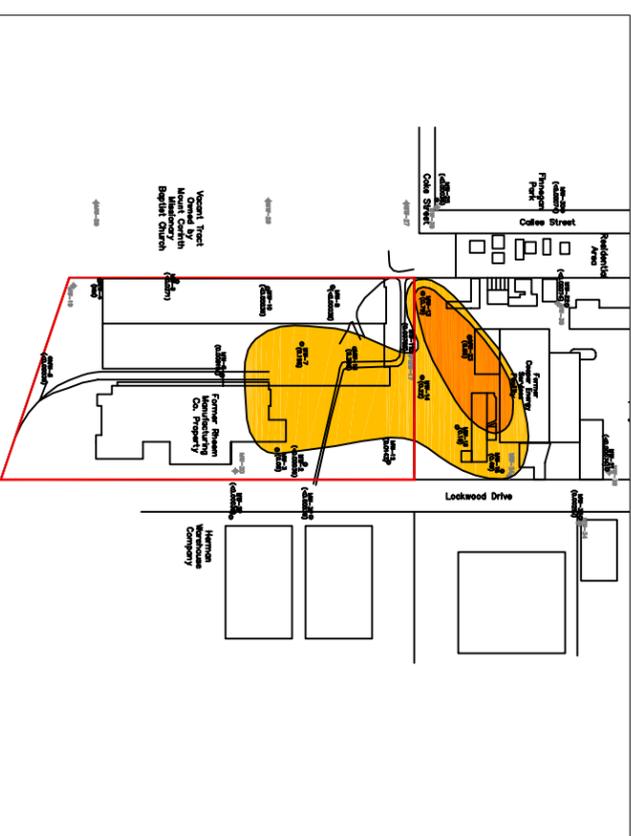
Cis-1,2-Dichloroethene—October 2004



Cis-1,2-Dichloroethene—October 2005



Cis-1,2-Dichloroethene—October 2006

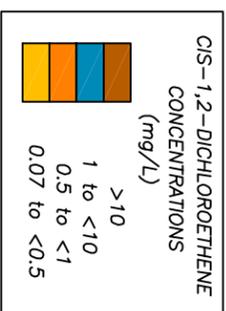


Cis-1,2-Dichloroethene—October 2007

LEGEND

- Monitoring Well Completed in Upper Water-Bearing Zone
- ◆ Monitoring Well Completed in Second Water-Bearing Zone
- Concentration of Cis-1,2-Dichloroethene (<0.00214) (Cis-1,2-DCE) in groundwater sample, where inferred
- - - Isopleth Concentration Contour Line (dashed where inferred)
- Designated Property

Note: Wells MW-27, MW-28, and MW-29 were plugged and abandoned at the request of the property owner. Ingestion protective concentration level for Cis-1,2-DCE is 0.07mg/L.





www.arcadis-us.com

REV. ISSUED DATE DESCRIPTION

KEY PLAN



SCALE

PROJECT TITLE

MSD APPLICATION
FORMER RHEEM MANUFACTURING
FACILITY
HOUSTON, TEXAS

PROJECT MANAGER

L. RODRIGUEZ

DEPARTMENT MANAGER

L. RODRIGUEZ

LEAD DESIGN PROF.

J. PRTS

CHECKED BY

L. RODRIGUEZ

SHEET TITLE

TIME-SEQUENCE PLUME MAPS
FOR VINYL CHLORIDE

TASK/PHASE NUMBER

000001

DRAWN BY

J. PRTS

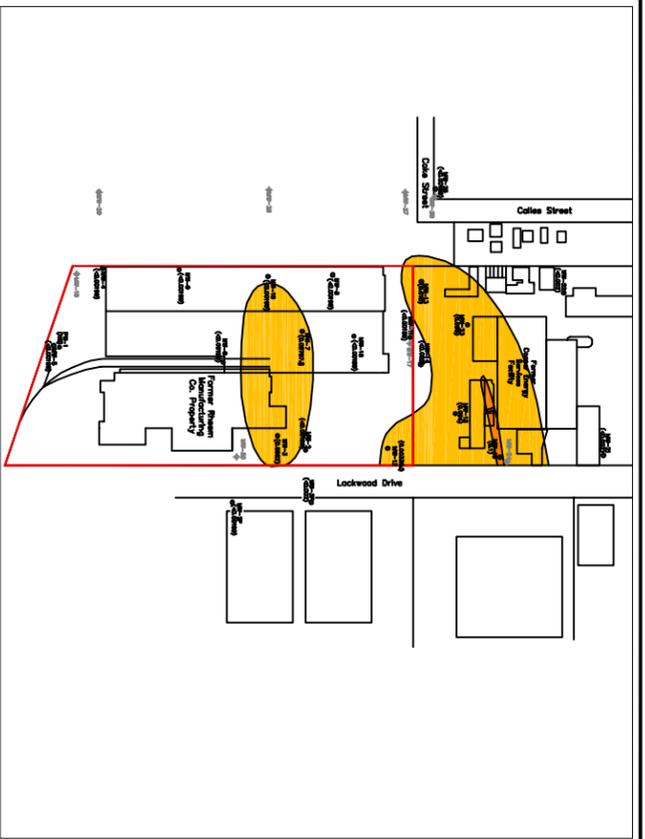
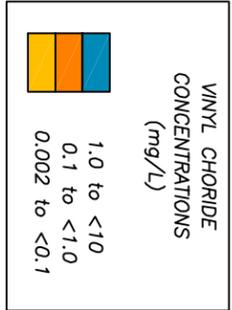
PROJECT NUMBER

AT002030.0005

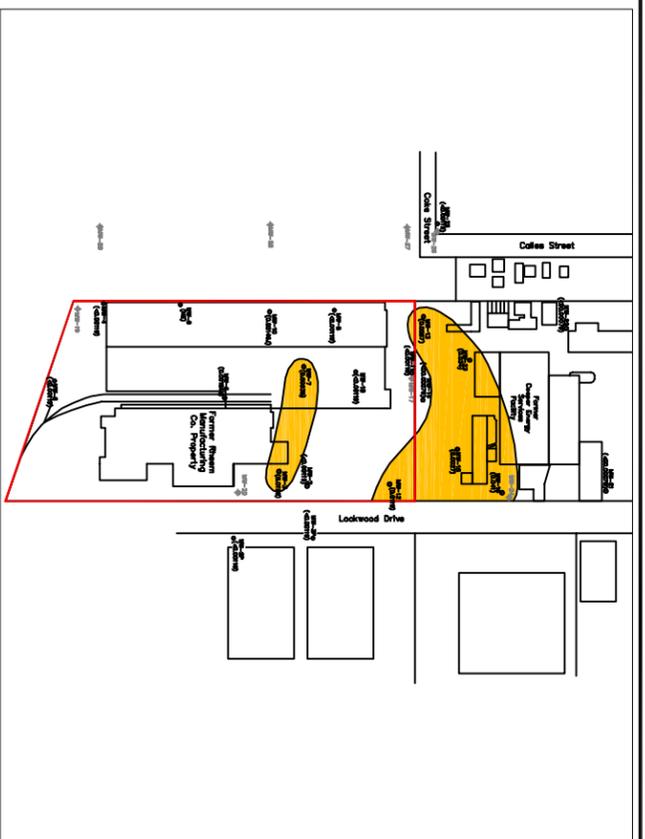
FIGURE NUMBER

G-4

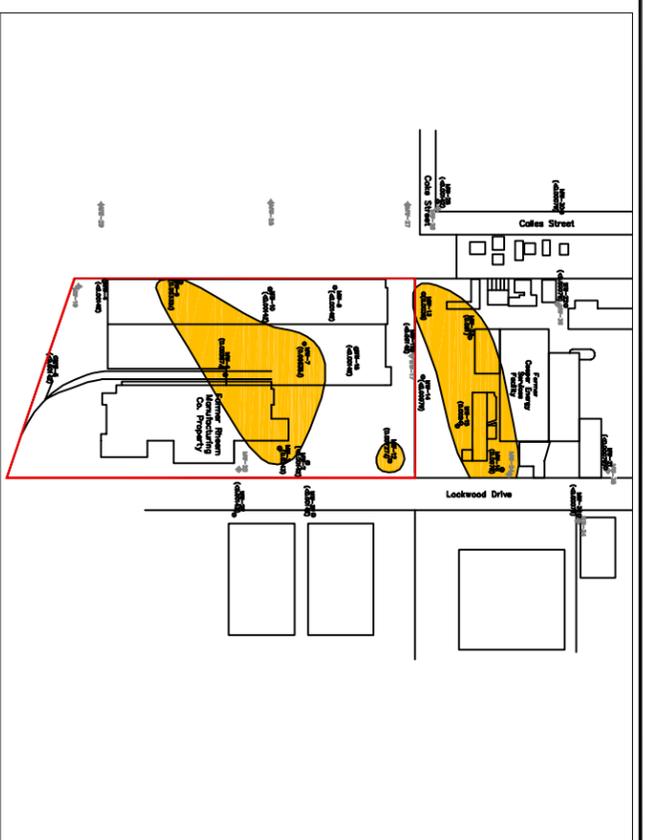
- LEGEND**
- Monitoring Well Completed in Upper Water-Bearing Zone
 - ◆ Monitoring Well Completed in Second Water-Bearing Zone
 - Concentration of Vinyl Chloride in MW-2 groundwater sample, reported in (<0.00214) milligrams per liter (mg/L)
 - Isoconcentration Contour Line (dashed where inferred)
 - Designated Property
- Note: Wells MW-27, MW-28, and MW-29 were plugged and abandoned at the request of the property owner. Ingestion protective concentration level for Vinyl Chloride is 0.002 mg/L.



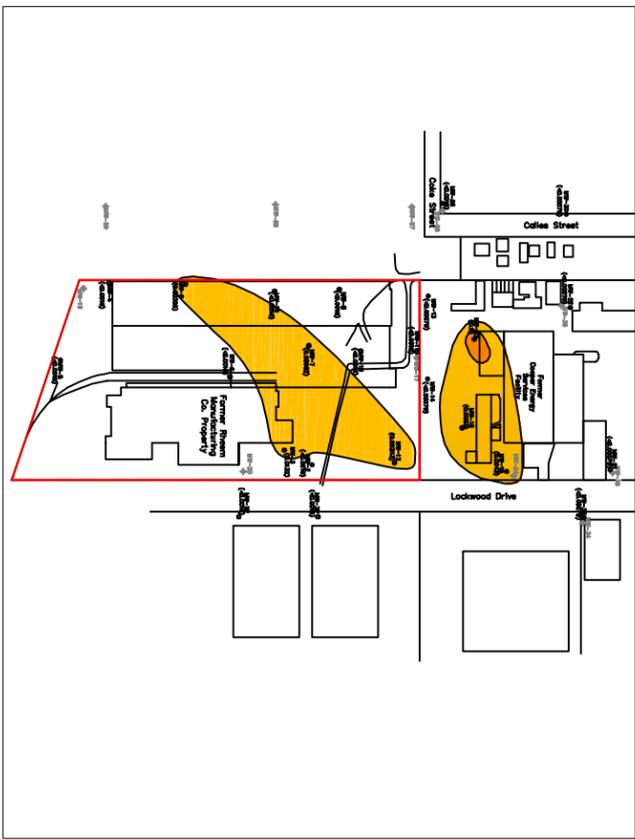
Vinyl Chloride—October 2002



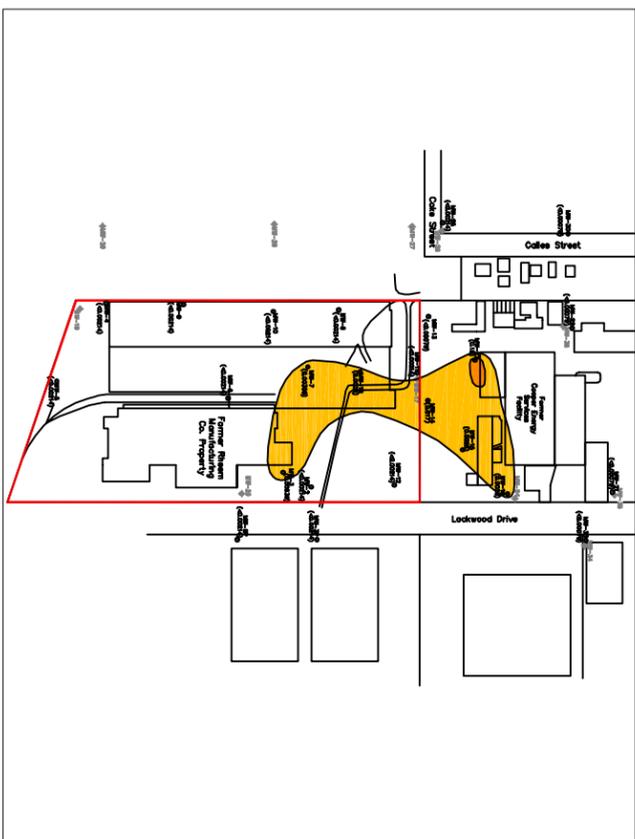
Vinyl Chloride—October 2003



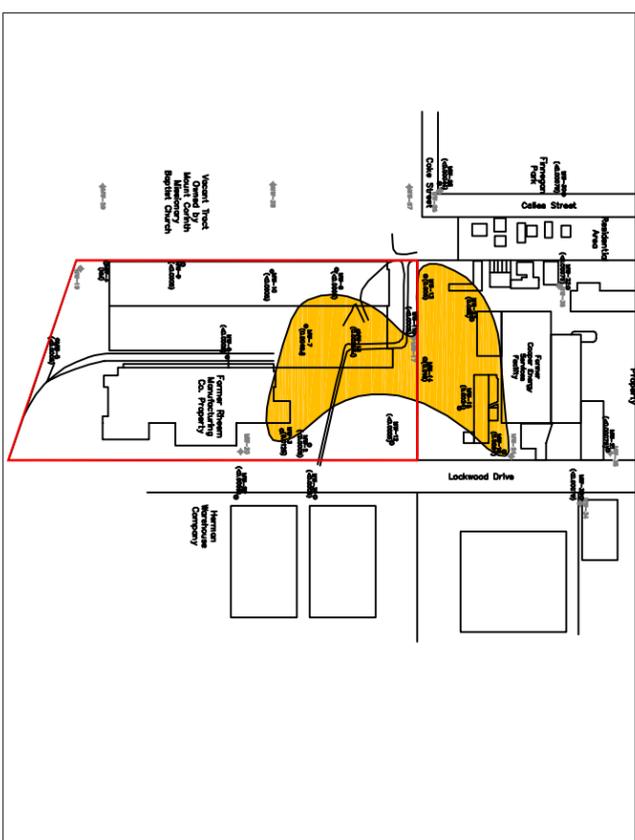
Vinyl Chloride—October 2004



Vinyl Chloride—October 2005



Vinyl Chloride—October 2006



Vinyl Chloride—October 2007

Figure G-5
VOC trends in MW-2 (semilog)
on Former Rheem Property

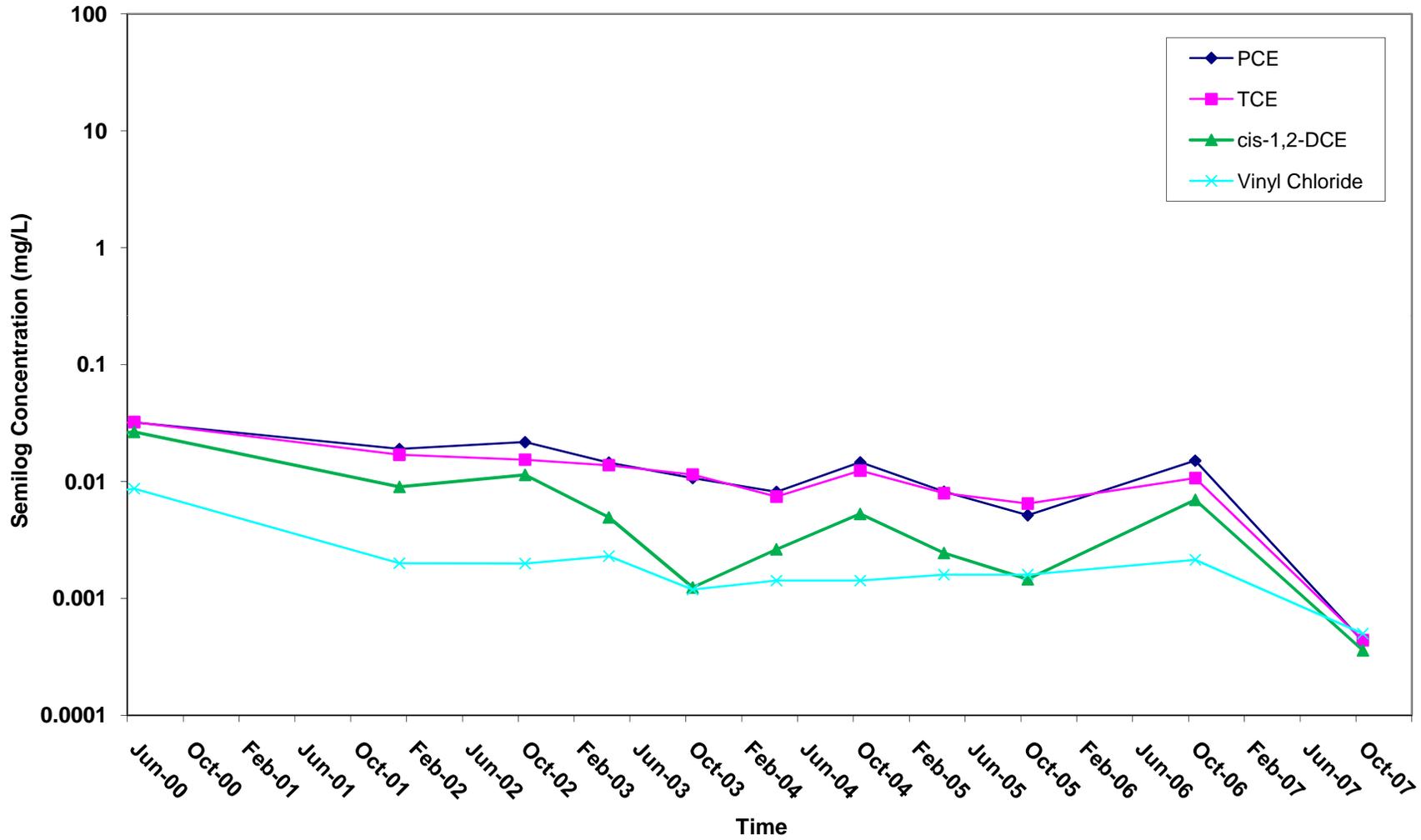


Figure G-6
VOC trends in MW-3 (semilog)
on Former Rheem Property

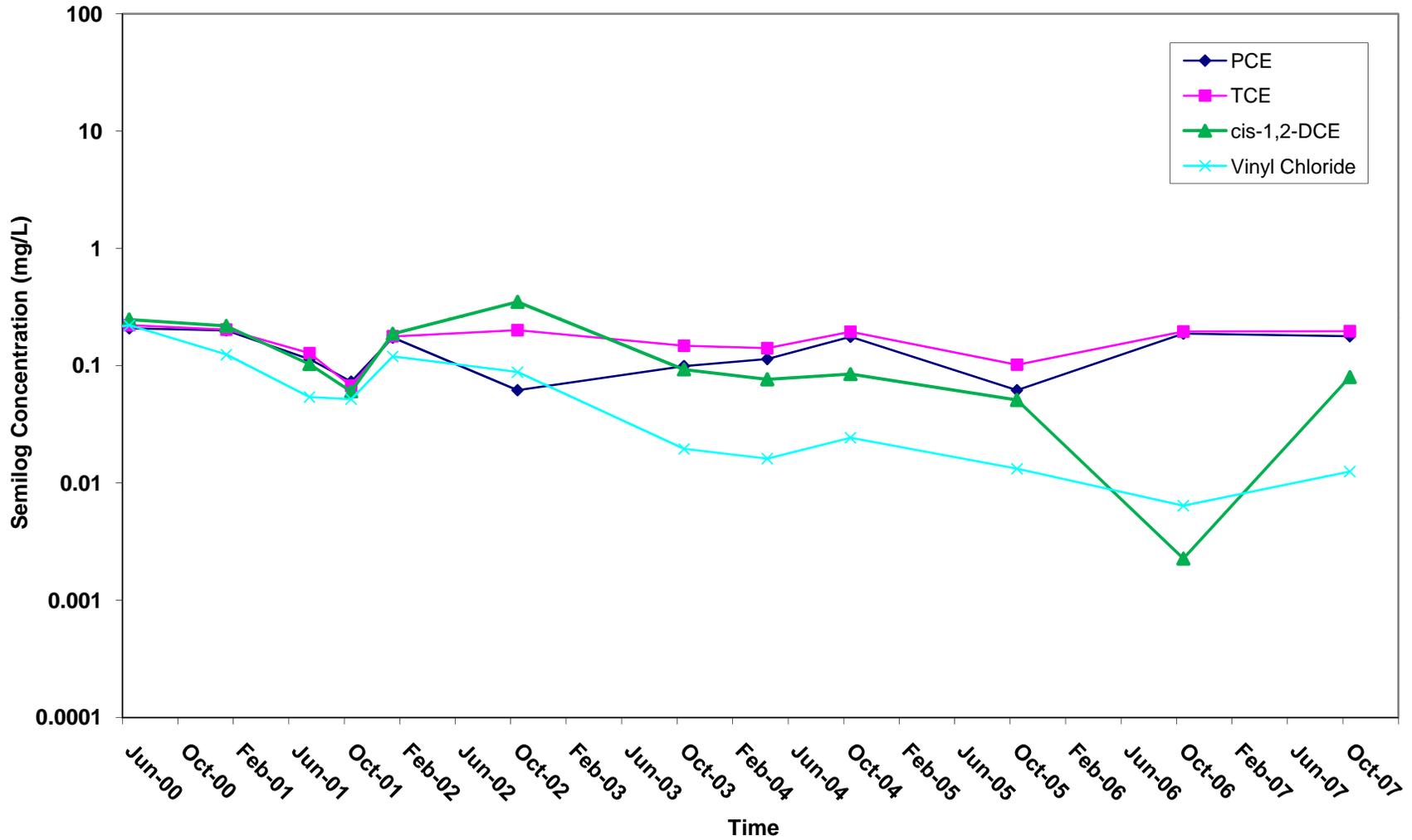


Figure G-7
 VOC trends in MW-6 (semilog)
 on Former Rheem Property

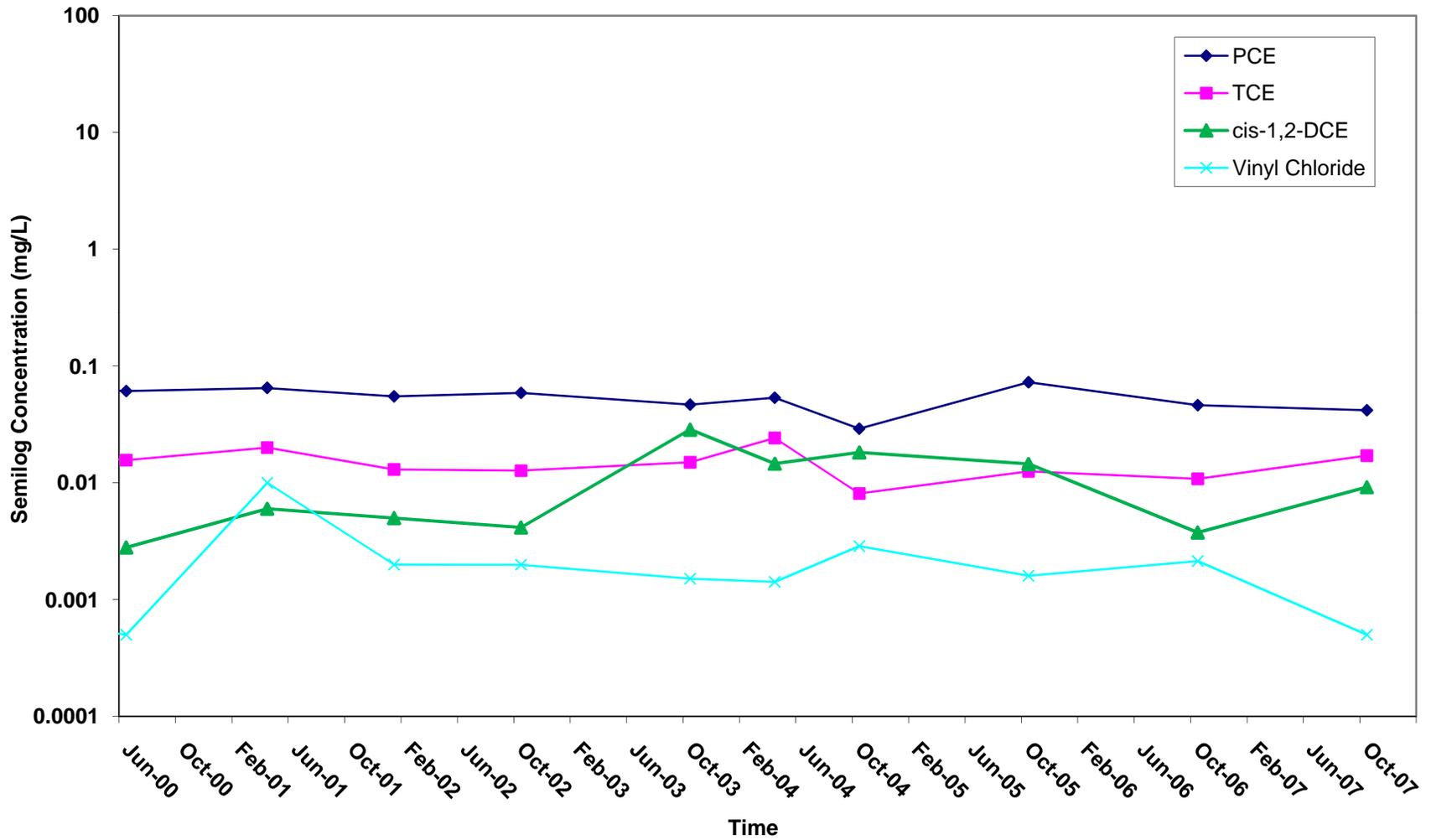


Figure G-8
VOC trends in MW-7 (semilog)
on Former Rheem Property

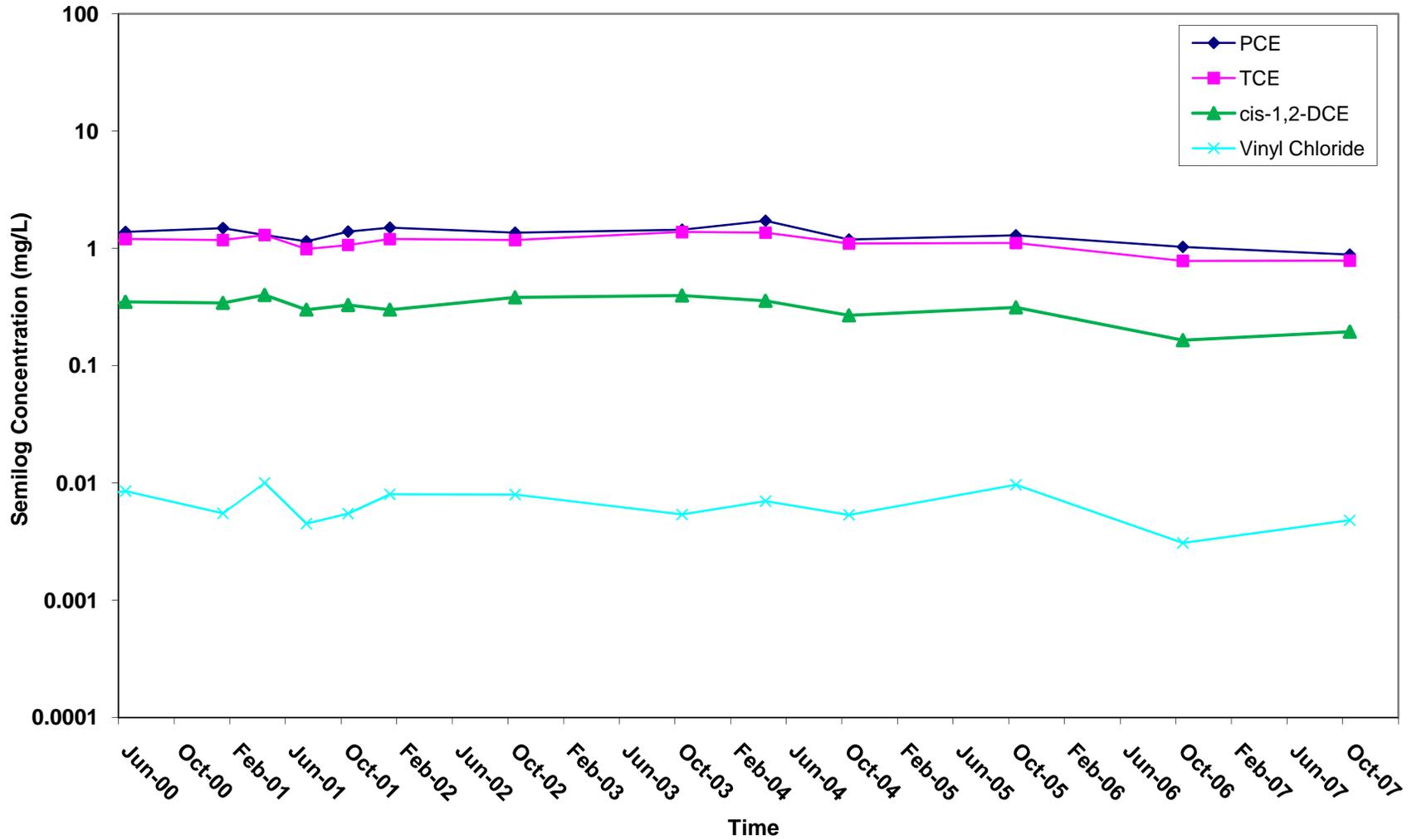


Figure G-9
VOC trends in MW-8 (semilog)
on Former Rheem Property

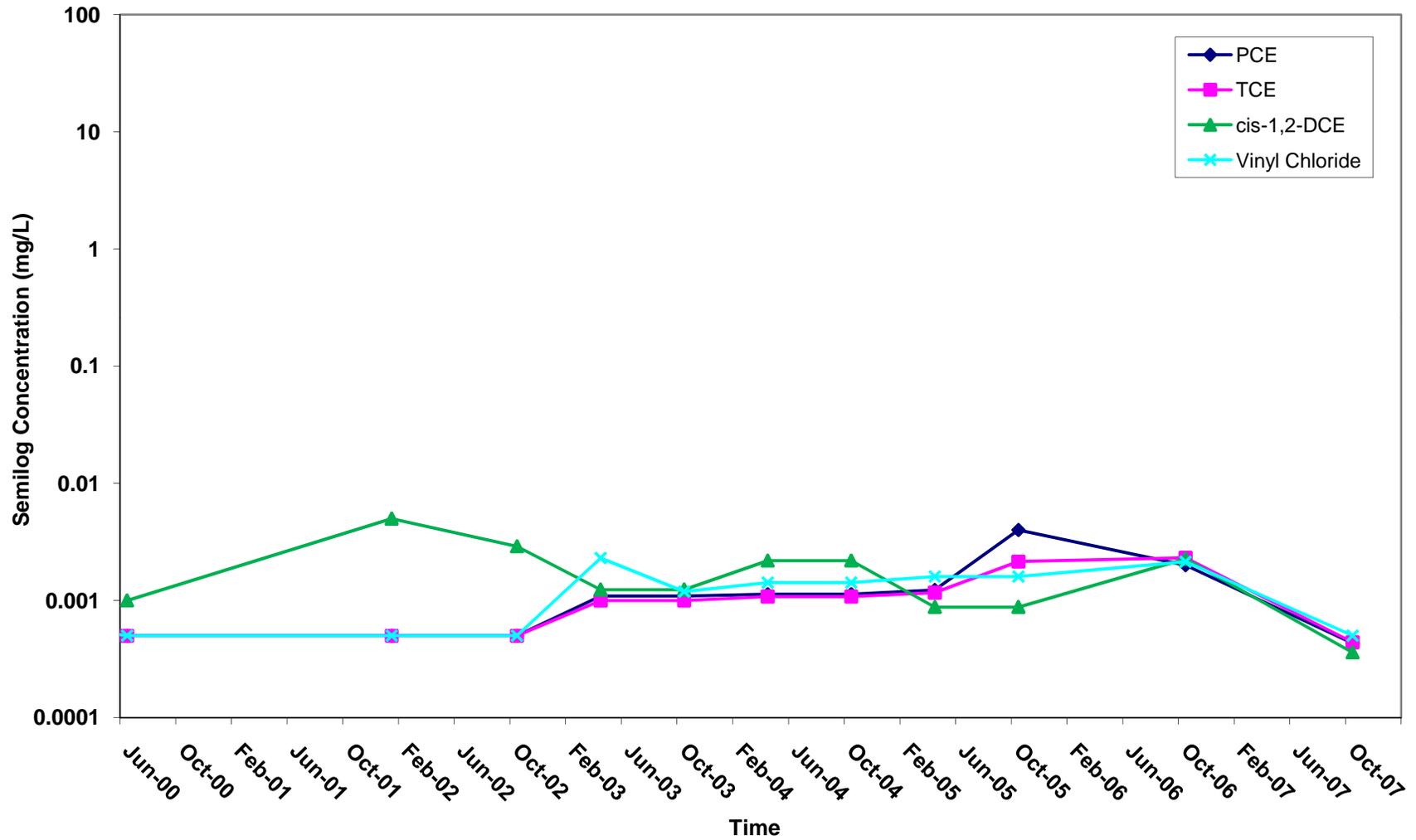


Figure G-10
VOC trends in MW-9 (semilog)
on Former Rheem Property

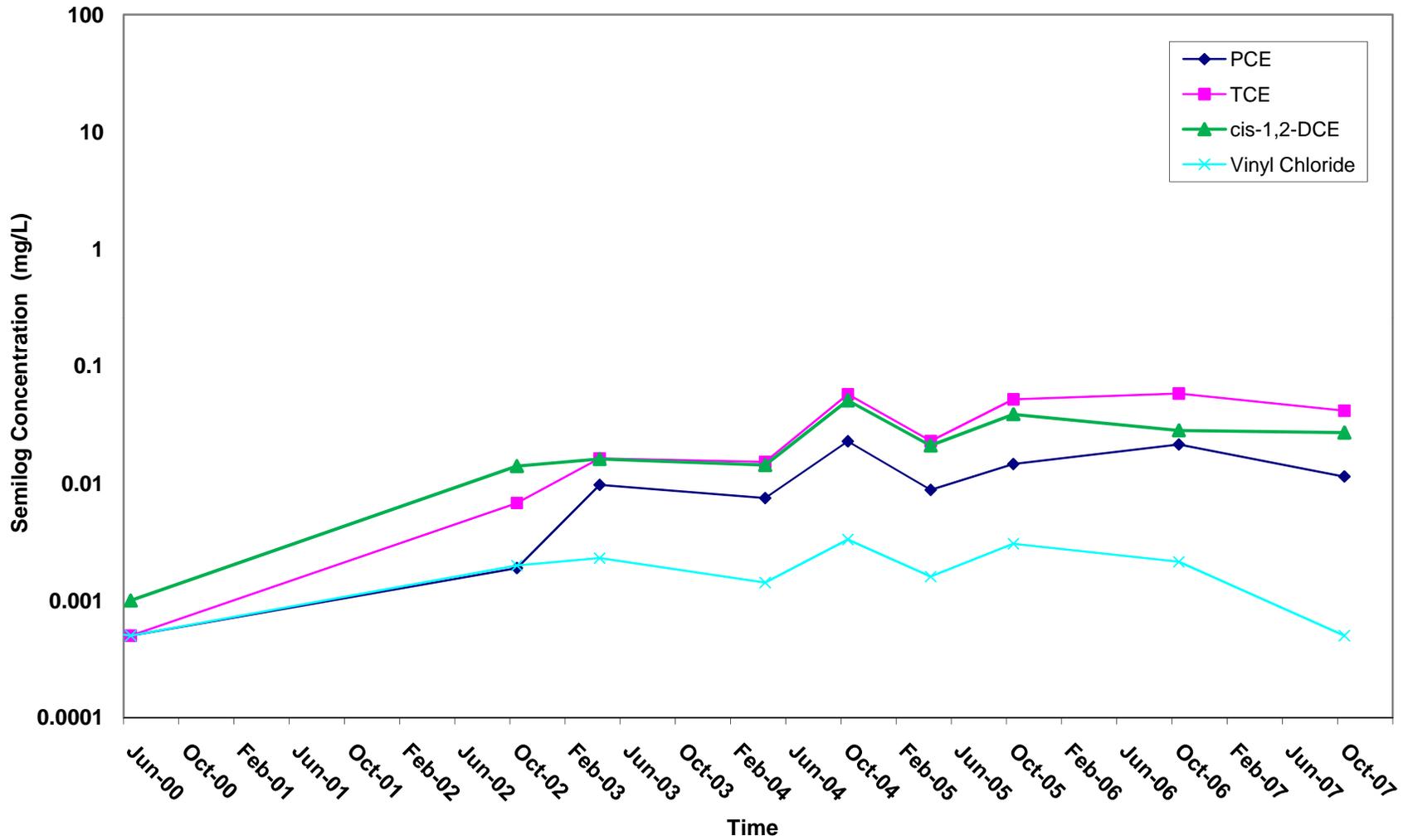


Figure G-11
VOC trends in MW-10 (semilog)
on Former Rheem property

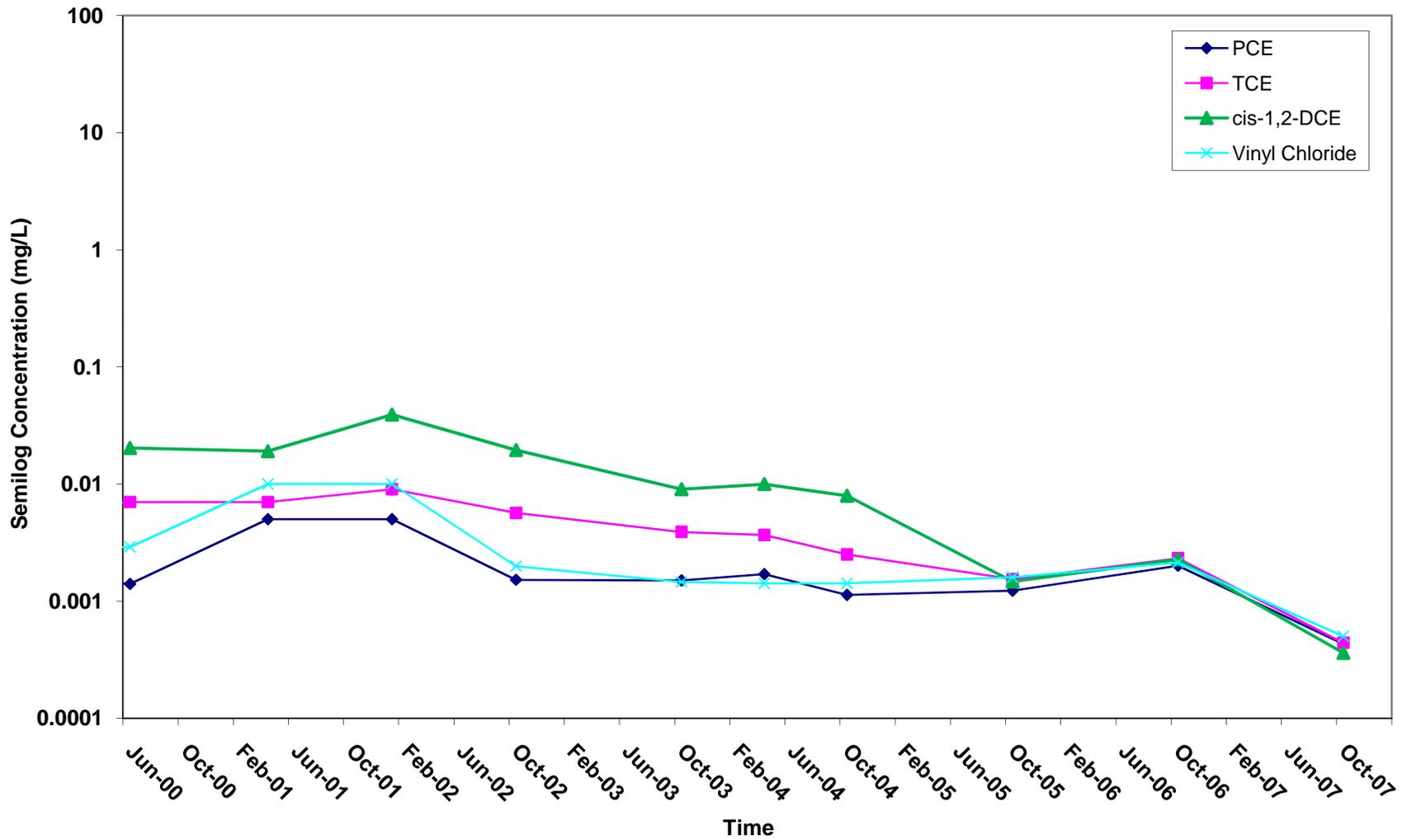


Figure G-12
VOC trends in MW-11 (semilog) near boundary
between Former Rheem and CES Property

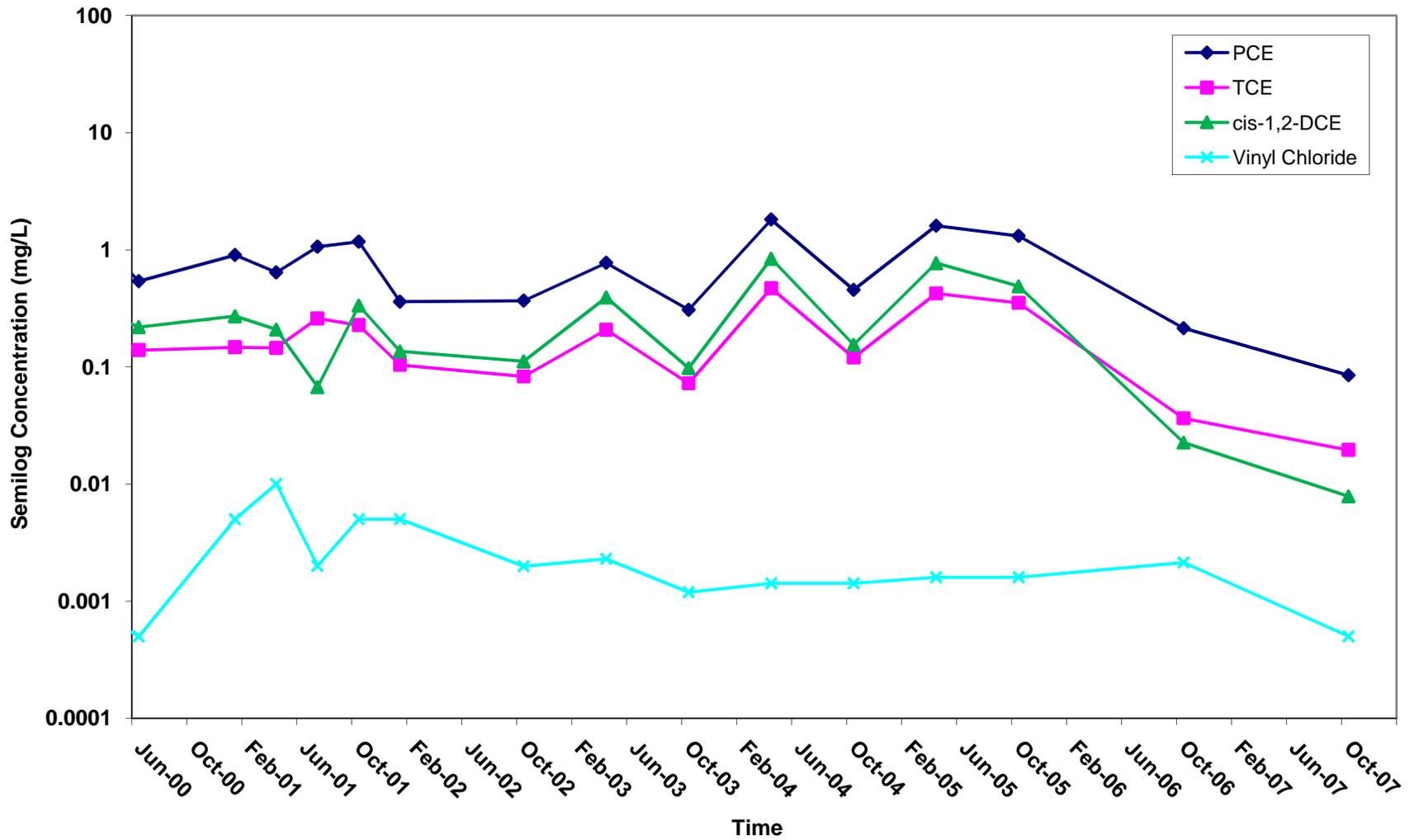


Figure G-13
VOC trends in MW-12 (semilog)
on Former Rheem Property

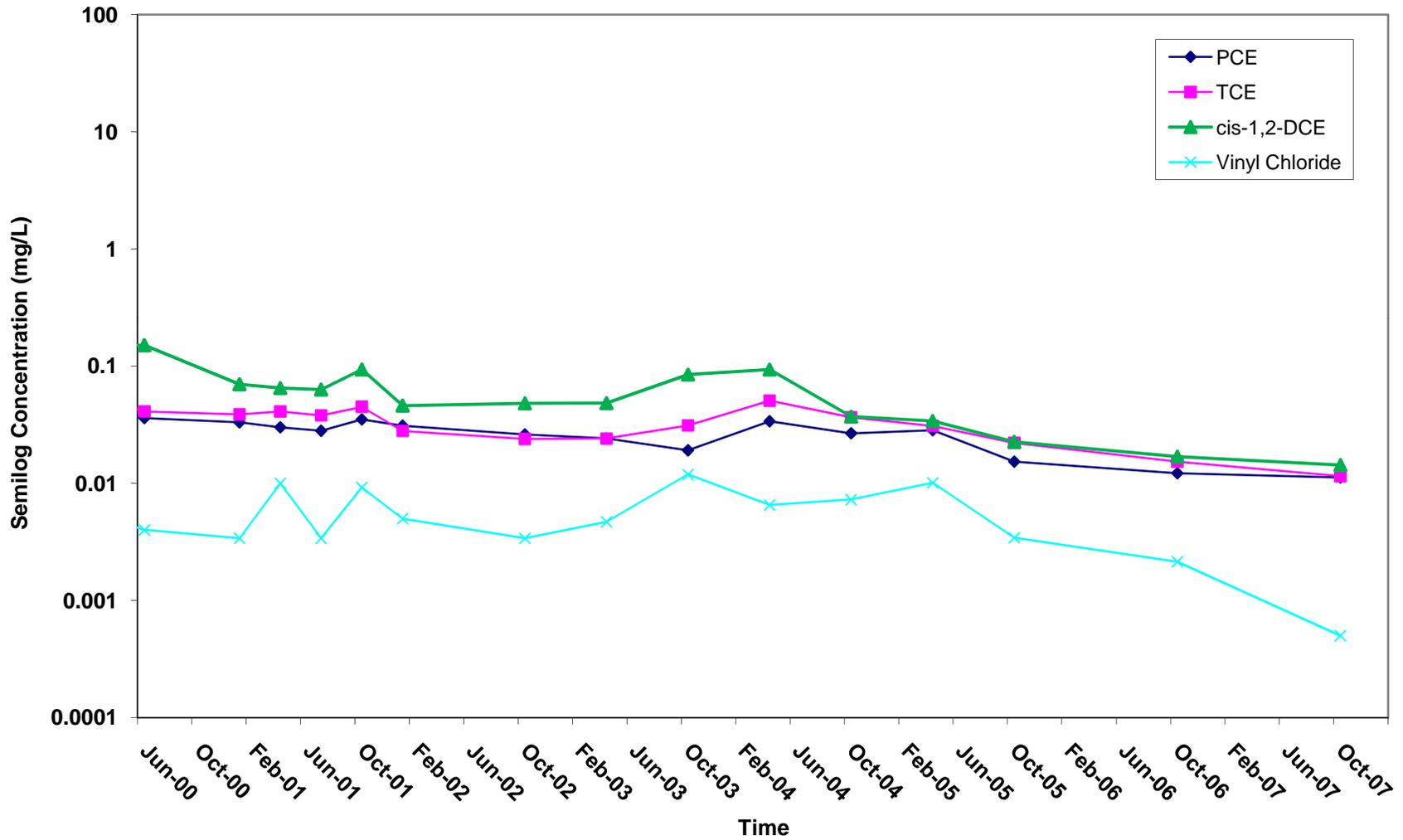


Figure G-14
VOC trends in MW-13 (semilog) near boundary
between Former Rheem and CES Properties

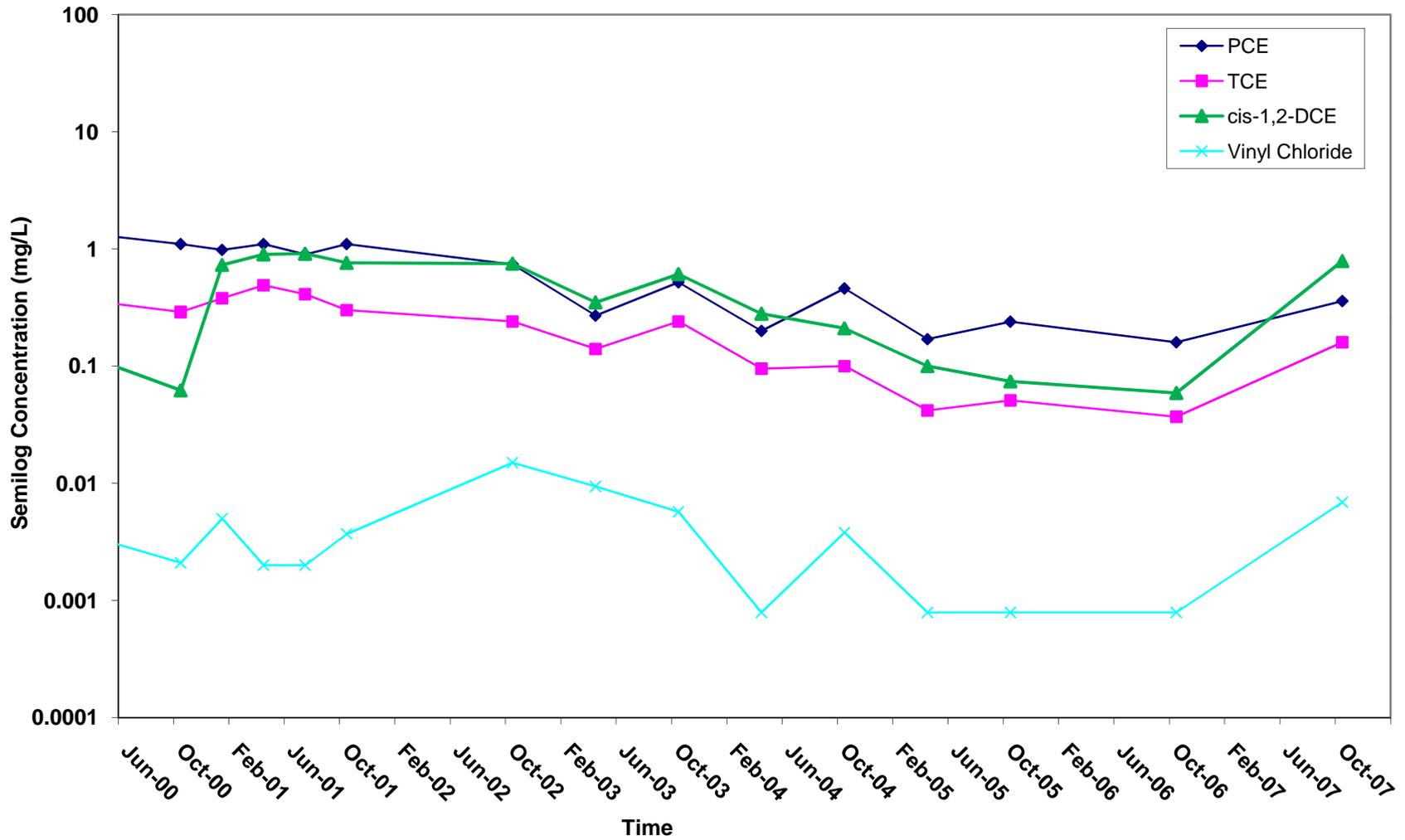


Figure G-15
VOC trends in MW-14 (semilog) near boundary
between Former Rheem and CES Properties

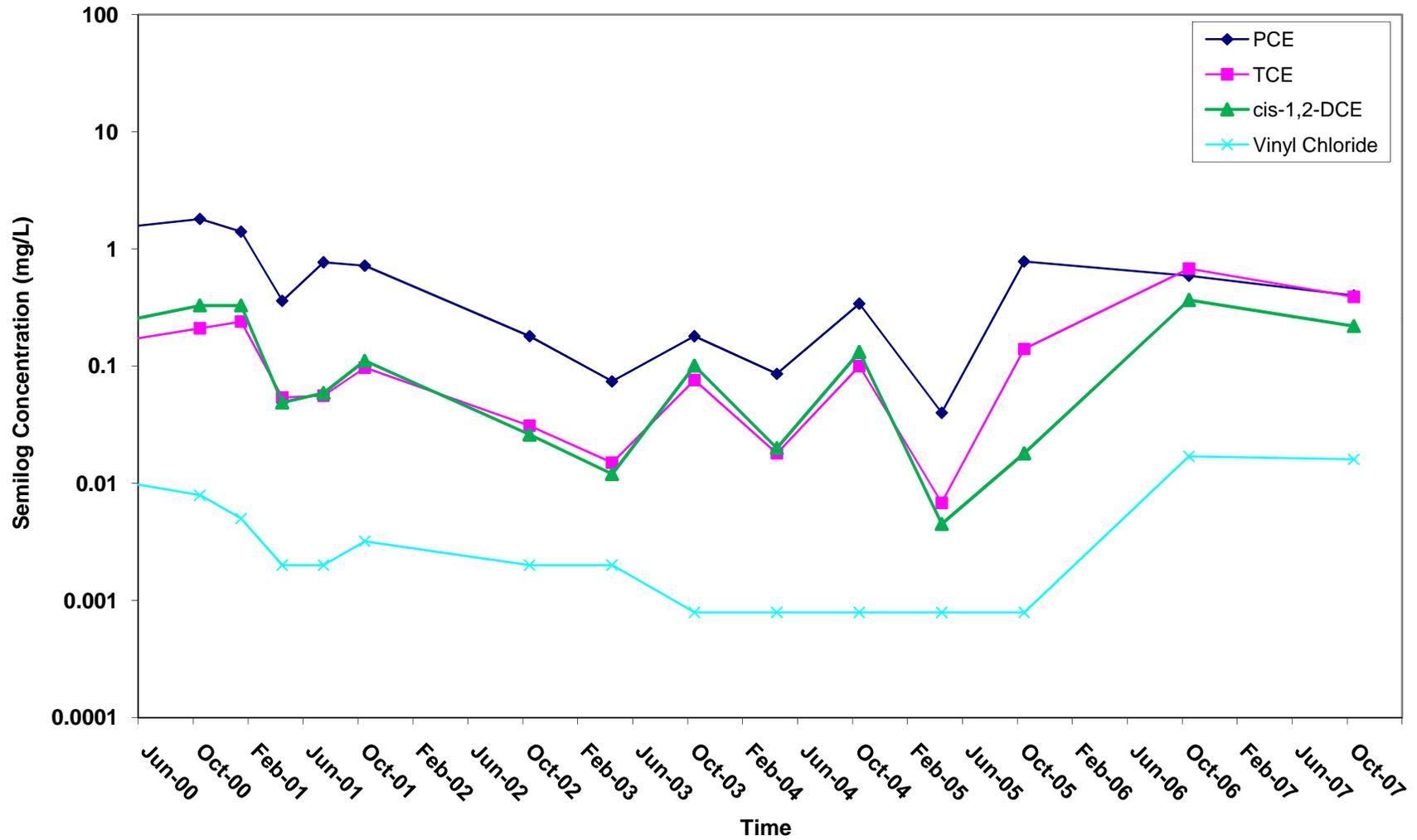


Figure G-16
VOC trends in MW-15 (semilog)
on Former CES Property

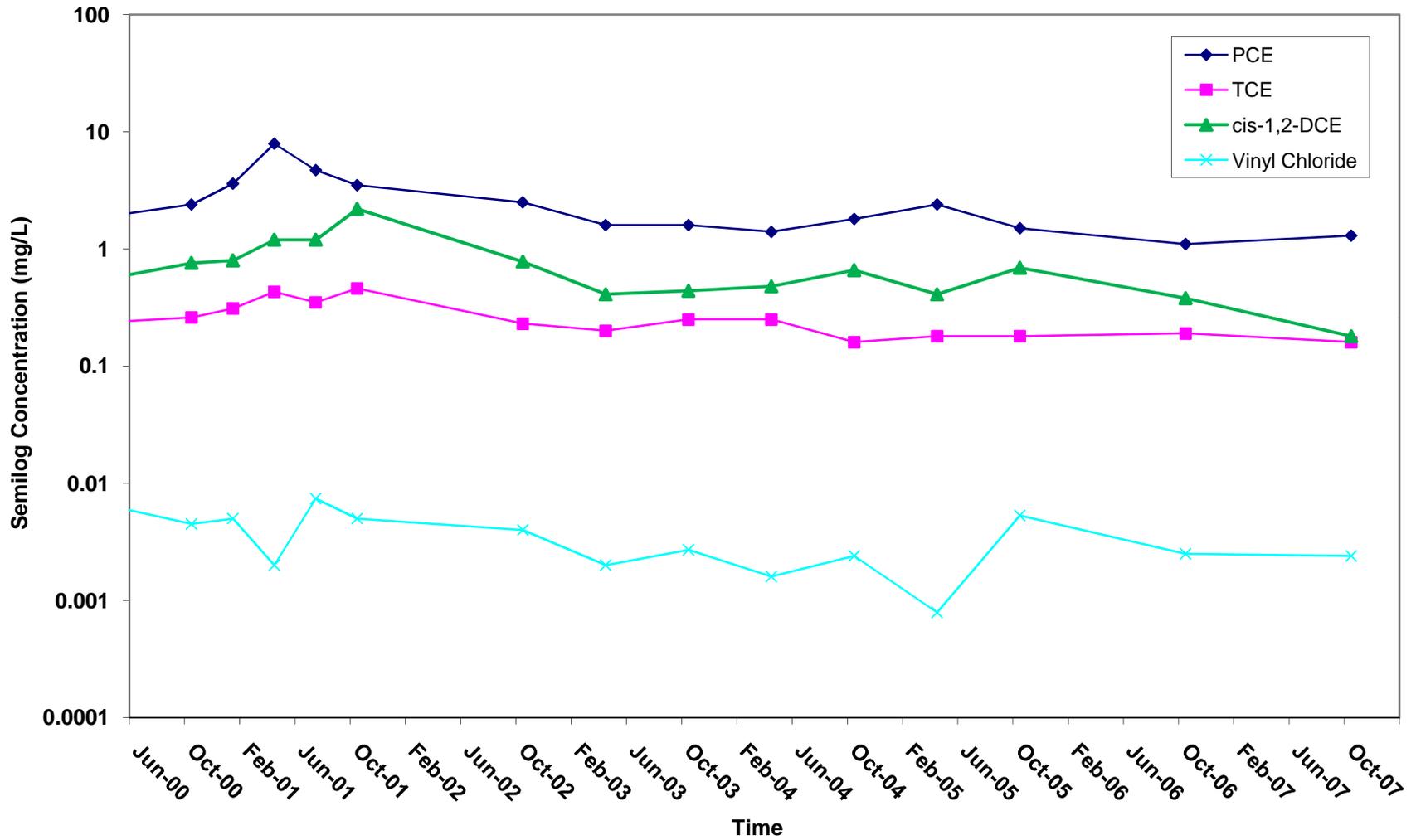


Figure G-17
VOC trends in MW-16 (semilog)
on Former CES Property

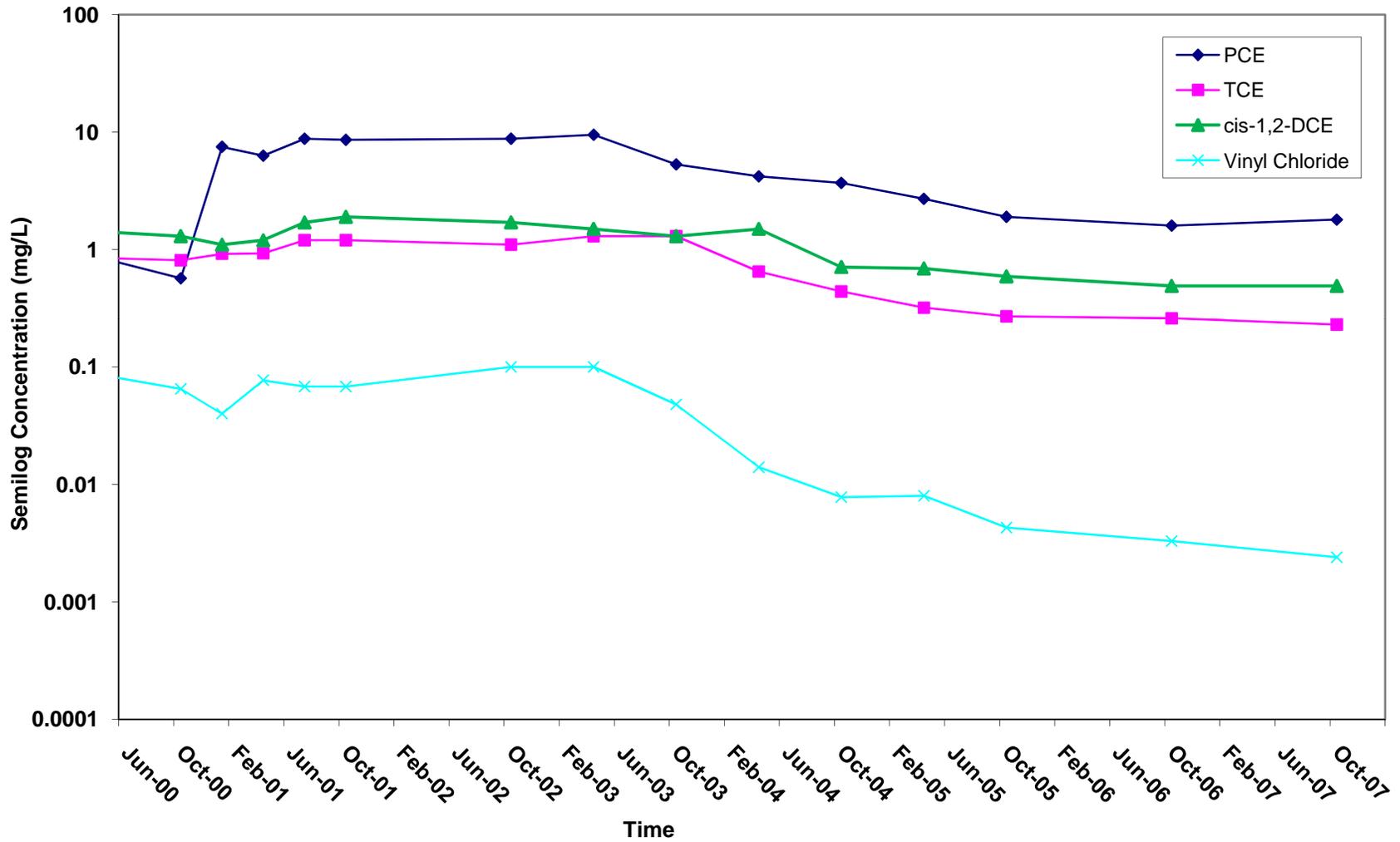


Figure G-18
VOC Trends in MW-18 (semilog)
on Former Rheem Property

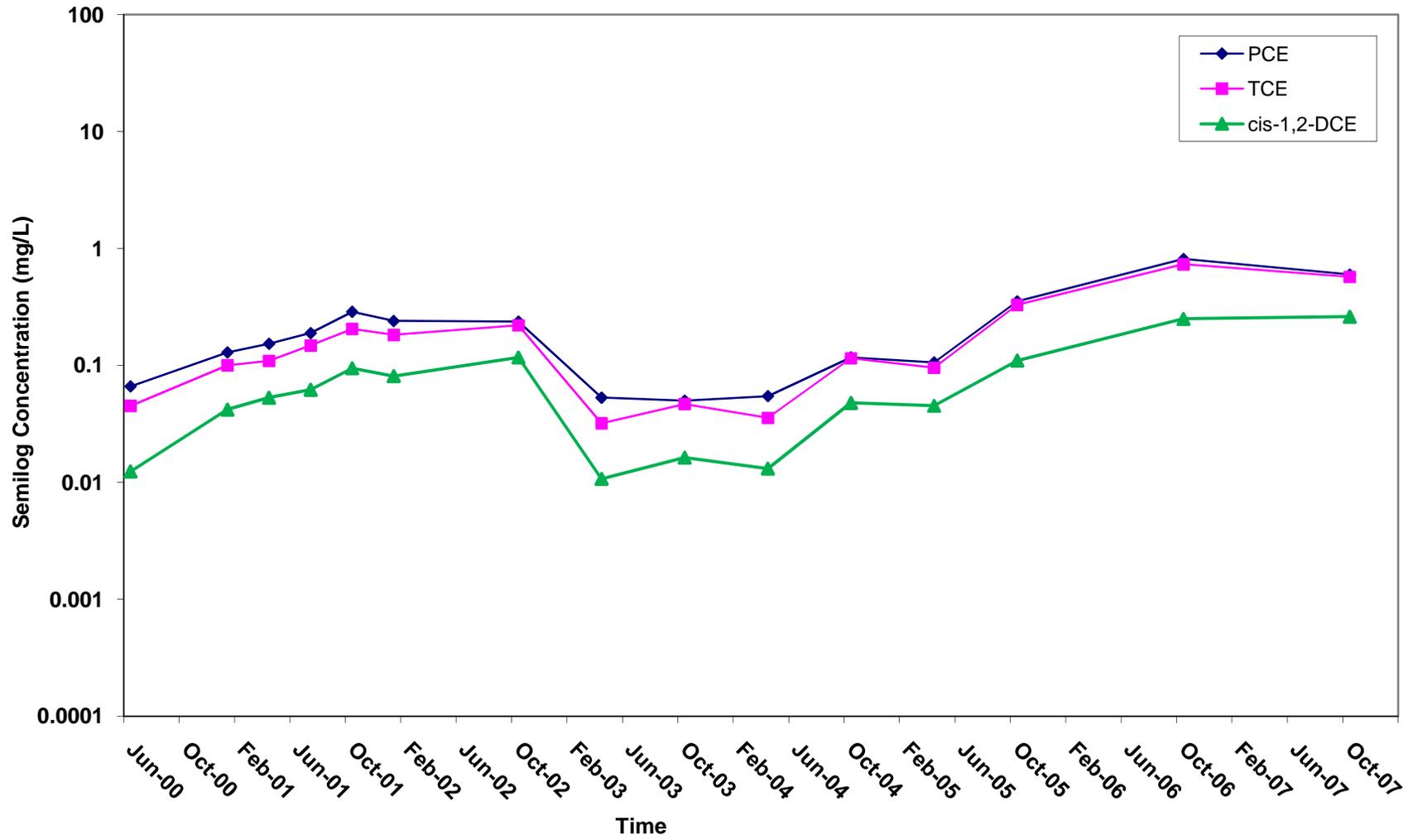


Figure G-19
VOC trends in MW-23 (semilog)
on Former CES Property

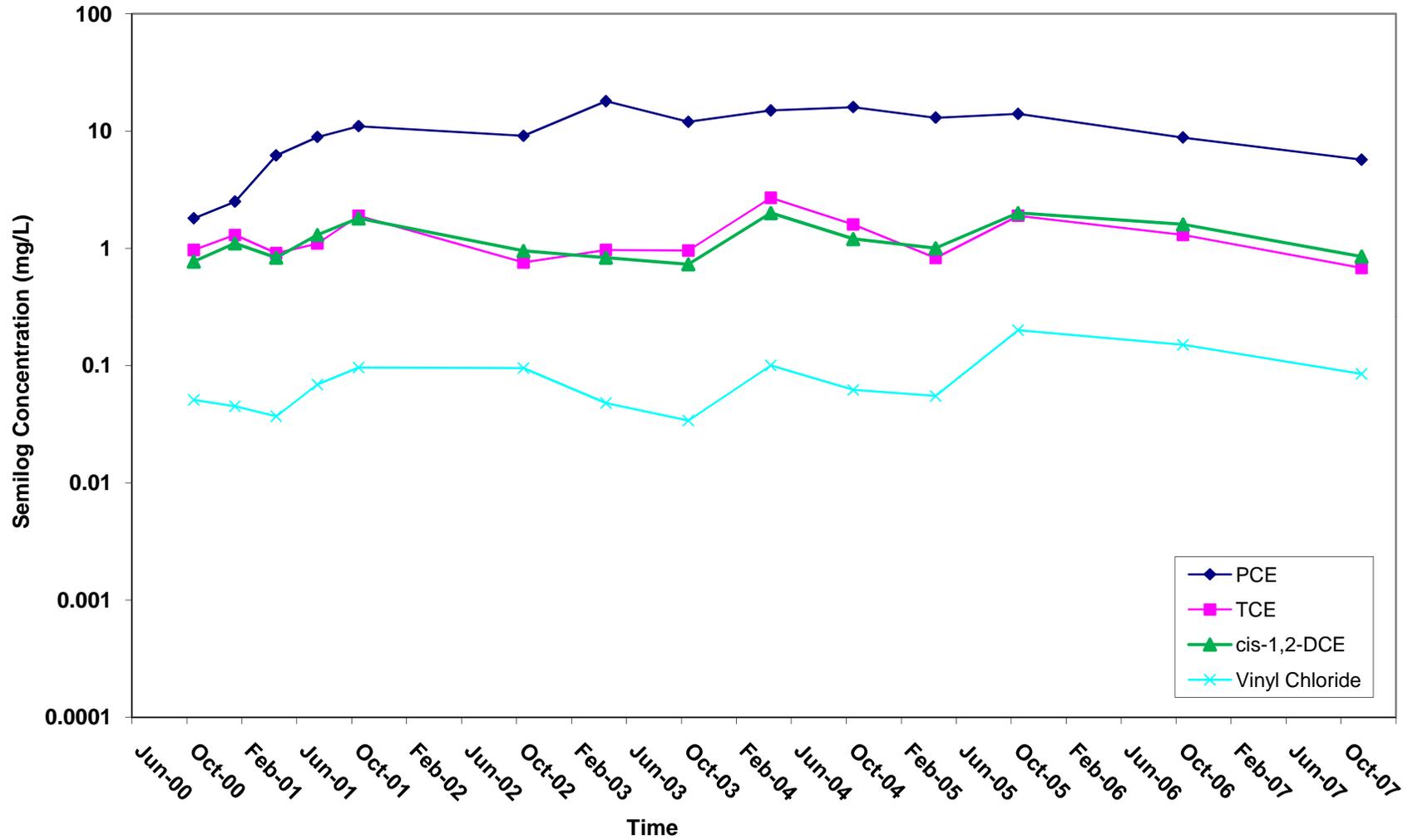


Figure G-20
VOC trends in MW-17 (semilog) near boundary
between Former Rheem and CES Properties

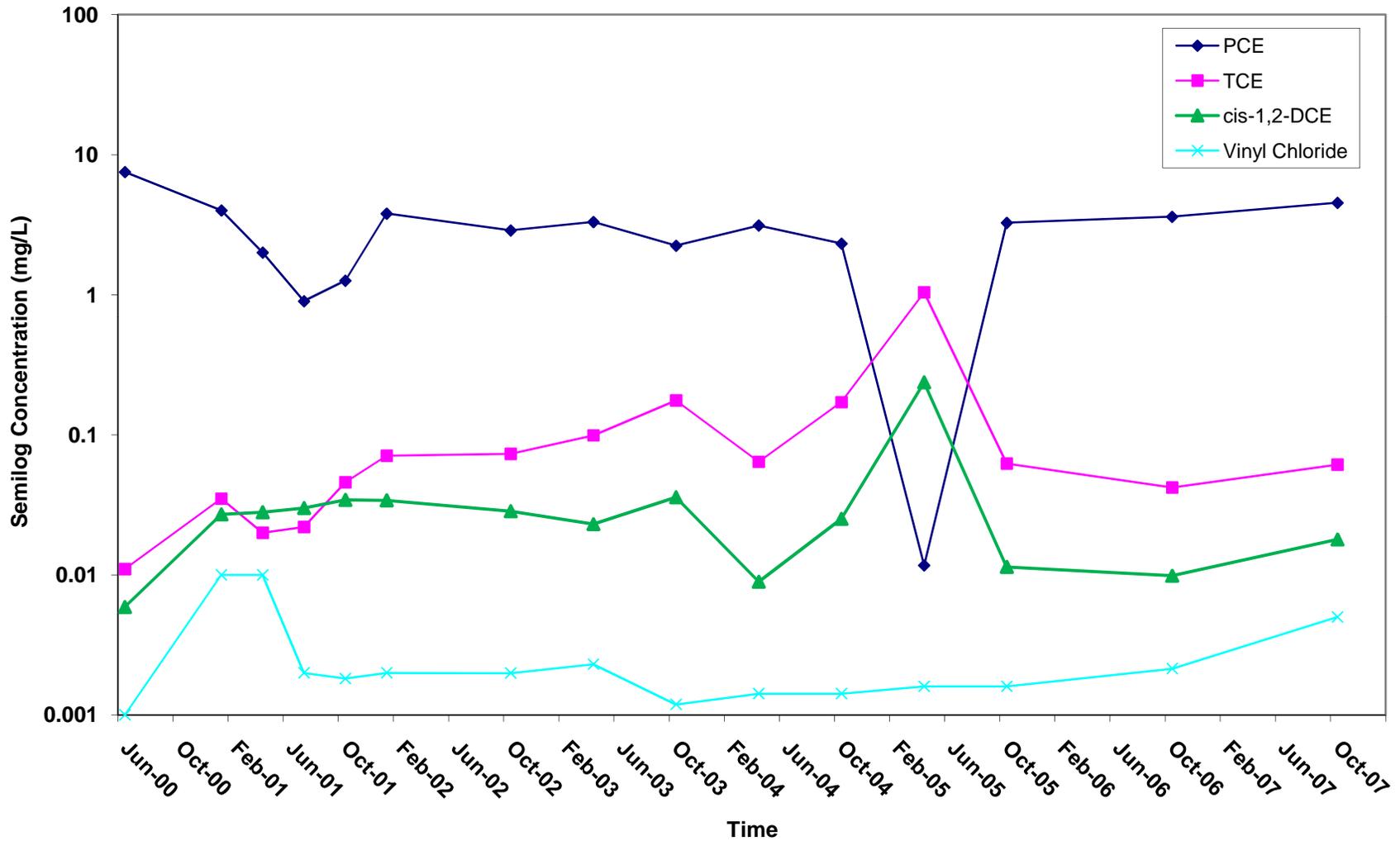


Figure G-21
 VOC trends in MW-19 (semilog)
 on Former Rheem Property

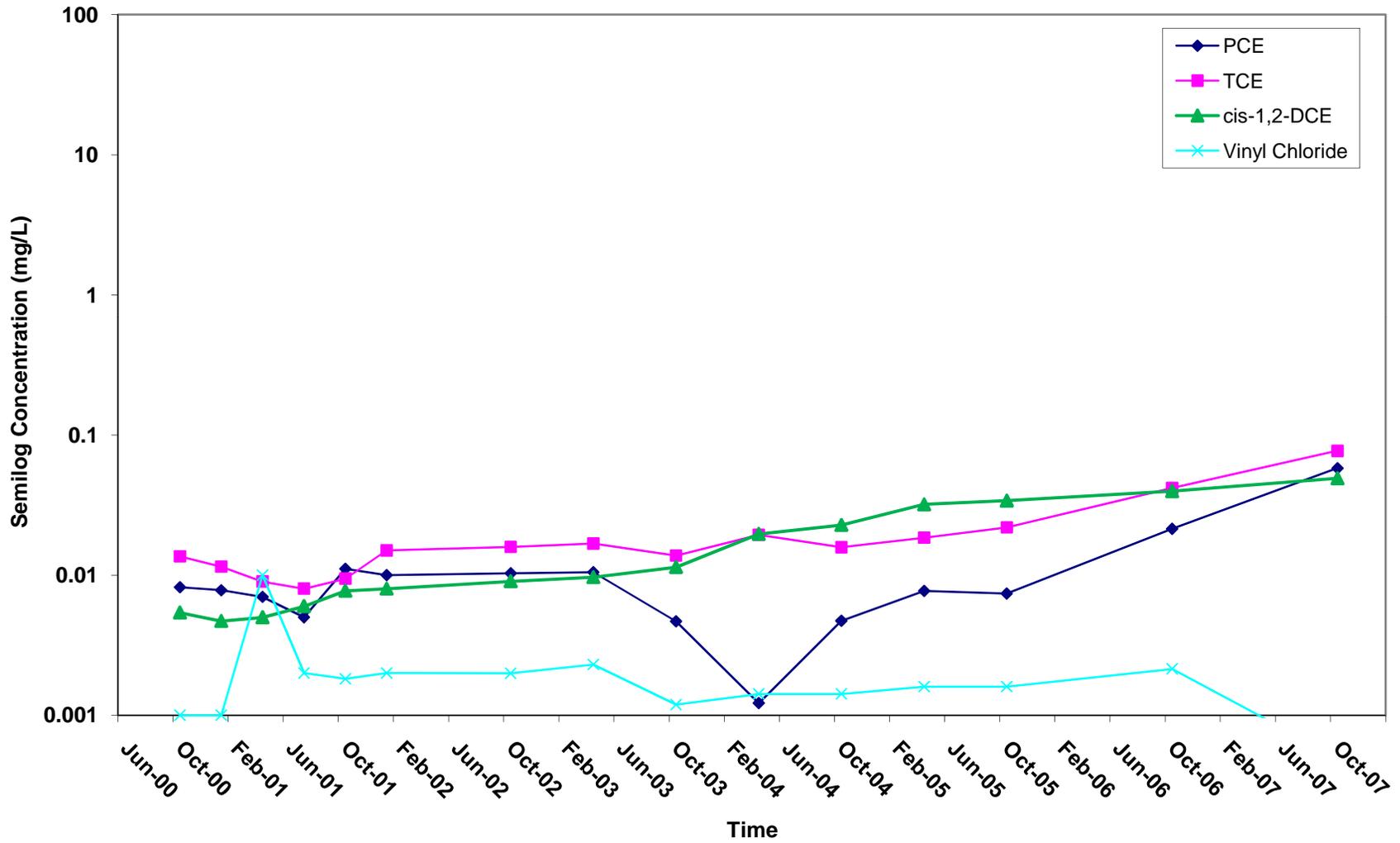


Figure G-22
 VOC trends in MW-24 (semilog)
 on Former CES Property

