Executive Summary

The proposed Municipal Setting Designation (MSD) property (also referred to as the "designated property") is an irregular shaped 54.0464-acre tract located in Channelview, Texas and is comprised of four properties: the Rescar Channelview property, the Clarion Inn property, a portion of the Kindred Hospital East Houston property, and the Sam Bertron-Channelview property (utility right-of-way). The designated property is surrounded by a portion of the Union Pacific Railroad on the north, Interstate Highway 10 on the south, and residential, commercial, and industrial properties.

The former and present use of the land is commercial/industrial. Future land use is not anticipated to change. Surrounding property use is primarily commercial with some residential areas located to the north of the designated property. The largest part of the designated property is the Rescar Channelview railcar repair facility owned by Rescar Incorporated. The rest of the properties are the Clarion Inn property owned by Harrods Eastbelt Ltd, the Kindred Hospital property owned by Japage Partnership, and the utility right-of-way owned by CenterPoint Energy Houston Electric, LLC.

Semi-annual and annual groundwater monitoring events have taken place at the Rescar facility since 2002. The groundwater data collected during these past monitoring events have identified volatile organic compounds (VOCs) and metals in the groundwater at the designated property at concentrations exceeding the Residential Assessment Levels (RALs) as designated by the Texas Commission of Environmental Quality (TCEQ) under the Texas Risk Reduction Program (TRRP). The main VOCs affecting the groundwater are 1,1-dichloroethane, 1,2-dichloroethane, tetrachloroethene and its biodegradation products (trichloroethene, cis-1,2-dichloroethene, and vinyl chloride). The environmental conditions at the designated property are a result of historical activities conducted by prior owners at the Rescar facility associated with railcar maintenance activities that included steam cleaning, rinsing, and slag blasting of railcars along with treating the cleaning-process wastewaters on-site.

Two areas of affected groundwater have been delineated on the designated property. These areas are identified as: the Cleaning Track area and the Former Ponds area. The Cleaning Track area is on the northwest side of the Rescar property. The Former Ponds area is partly on the south-central part of the Rescar property and extends southward under the CenterPoint Right-of-Way, Kindred Hospital, and Clarion Inn properties.

The affected groundwater at the Cleaning Track area is limited to the second groundwater bearing unit (GWBU). The affected groundwater at the Former Ponds area has been delineated in the uppermost GWBU. These GWBUs are not connected nor do they overlay. The second GWBU at the Cleaning Track Area is found at a depth of between 35 to 70 feet below ground surface (bgs). The uppermost GWBU at the Former Ponds area is semi-confined and lies approximately 20 feet bgs. The affected groundwater flow of the second GWBU beneath the Cleaning Track area is to the southwest and the groundwater flow of the uppermost GWBU at the Former Ponds area is to the south-southeast. Groundwater flow in deeper GWBUs (greater than 200 feet bgs) is south towards the Gulf of Mexico.

There are 23 state-registered water wells located within one-half mile of the property. Five of the 23 water wells are listed as public supply wells and the rest are listed as domestic, irrigation, or industrial supply wells. The depths of all the wells exceed 200 feet bgs with the exception of one domestic well with a reported well depth of 10 feet bgs. The well log is not available for this well.

There are ten retail or municipal utilities within five miles of the designated property and there are no other municipalities within one-half mile of the designated property. Channelview is a census-designated community located in eastern Harris County and is within the City of Houston's extraterritorial jurisdiction.

The TRRP Tier 1 groundwater ingestion protective concentration levels (PCLs) for residential property, as the most protective, were selected as the RALs. Investigation activities identified chemicals of concern (COCs) in groundwater at the designated property in concentrations exceeding the RALs. These COCs were several VOCs and two metals. These ingestion-level exceedance areas have been delineated by sampling activities conducted from 2003 to 2013. The areas of affected groundwater (plume) are stable and remain within the boundaries of the designated property.

Implementation of an MSD for the designated property would eliminate the groundwater ingestion pathway. With the groundwater ingestion pathway eliminated, the critical PCL would then be the vapor inhalation pathway to outdoor air for a 0.5-acre source area. There currently are no COC concentrations in groundwater exceeding the non-ingestion pathway.

The applicant intends to implement a MSD for the designated property to prevent the use of shallow groundwater for potable supply purposes. Properties within 0.5 miles of the affected groundwater are connected to municipal water supplies. There are no current users of shallow groundwater in the area that are threatened by the identified affected groundwater. The applicant plans to obtain site closure from the TCEQ following MSD approval from the City of Houston and the TCEQ.

Appendix A

Provide a legal description of the boundaries of the designated property, including metes and bounds, and a copy of the deed for the property. A professional surveyor currently registered with the Texas Board of Professional Surveying must certify that all property descriptions with metes and bounds are accurate.

A legal description of the boundaries of the proposed MSD property, the metes and bounds of the adjacent public rights-of-way, and a copy of the deed are included under this appendix. The following properties are included in this application:

- The Rescar facility owned by Rescar Companies located at 407 West Brentwood, Channelview, Texas.
- A portion of Kindred Hospital East Houston property owned by Japage Partnership, located at 15101 East Freeway, Channelview, Texas.
- The Clarion Inn property owned by Harrods Eastbelt Ltd, located at 15157 East Freeway, Channelview, Texas.
- A portion of the Sam Bertron-Channelview utility right-of-way separating Rescar from Kindred Hospital East Houston and Clarion Inn (owned by CenterPoint Energy Houston Electric, LLC).

Also attached are the Harris County Appraisal District records for the parcels within the designated property.

LEGAL DESCRIPTION OF
54.0464-ACRE TRACT OF LAND

Being a 54.0464-acre (2,354,263 sq. ft.) tract of land out of the Peter J. Duncan Survey, Abstract 232, being all of a called 34.6387 acre tract as recorded in Harris County Clerk File No. (HCCF#) P025606 a Quitclaim Deed to Rescar of Channelview, Inc., also being all of a called 6.014 acre tract as recorded in HCCF# S977172 a General Warranty Deed to Rescar Industries, Inc., also being part of a called 153,767 SF (3.53 AC) Centerpoint Energy Houston 85' Wide Fee Strip per Harris County Appraisal District Real Property Account Information No. (HCADRPAI#) 0420930000159 (Tax Year:2012), also being all of called 0.65 acre tract as recorded in Volume 1236, Page 117 & 118 Harris County Deed Records (HCDR.) a Deed to Houston Lighting & Power Company (Centerpoint Energy Houston) a 50' Wide Fee Strip, also being a part of a called 152,939 SF (3.51 AC) Centerpoint Energy Houston 50' Wide Fee Strip per HCADRPAI# 0420930000026 & 218, also being all of a called 2.1495 acre Channelview Medical Center Condominiums a plat as recorded in Volume 148, Page 94 Harris County Condominium Records (HCCR) also being part of called 9.0330 acre Restricted Reserve "A" of Channelview Medical Center a plat as recorded in Volume 326, Page 28 Harris County Map Record (HCMR), also being all of a called 5.7264 acre tract as recorded in HCCF# T745129 a General Warranty Deed to Harrods Eastbelt, Ltd. and being more particularly described by metes and bounds as follows:

All bearings are based on the NAD83 Texas State Plane Coordinate System South Central Zone.

BEGINNING at the Northeast corner of Lot 5, Block 11 of Old River Terrace Fourth Section a subdivision as recorded in Volume 17, Page 50 HCMR being in the South line of the Houston North Shore R.R. Missouri-Pacific System (100' wide) and the West right-of-way line of South Brentwood Drive (60' wide) also being the Northeast corner of the said Rescar of Channelview, Inc called 34.6387. acre tract and the most Northeasterly corner of herein described tract of land;

THENCE S 21°05'01" E along the West line of said South Brentwood Drive, and the East line of said Lot 5 of Old River Terrace Section 4, a distance of 46.30 feet to point for corner from which a found mag nail with shiner bears S 54d41'51" E - 1.63' the most Northerly corner of the SWS Services Co., Inc. tract as recorded under HCCF# 20110278993 (Tr-1&2) and a corner of the herein described tract of land;

THENCE S 68°54'59" W along a common South line of said Rescar of Channelview, Inc. tract and the North line of said SWS Services Co., Inc. tract, a distance of 257.15 feet to a point for a corner of the herein described tract of land;

THENCE S 05°07'59" W along a common West line of said Rescar of Channelview, Inc. tract and the East line of said SWS Services Co., Inc. tract, a

distance of 87.20 feet to a point for corner from which a 5/8-inch iron rod found for a corner of the herein described tract of land;

THENCE S 25°55'01" E along a common line being the East line of said Rescar of Channelview, Inc. tract and a North line of said SWS Services Co., Inc. tract, a distance of 72.80 feet to a 5/8-inch iron rod found for corner of the herein described tract of land;

THENCE S 62°31'59" W along a common line being the South line of said Rescar of Channelview, Inc. tract and the West line of said SWS Services Co., Inc. tract, a distance of 75.00 feet to a iron rod with cap found in the centerline of a 50 feet wide Harris County Flood Control District (HCFCD) Easement as recorded in Volume 2685, Page 439 HCDR for a interior corner of the herein described tract of land;

THENCE S 27°23'01" E along the centerline of said HCFCD Easement and the common East line of said Rescar of Channelview, Inc. tract and the West line of said SWS Services Co., Inc. tract, a distance of 150.75 feet to a iron rod with cap found for corner of the herein described tract of land;

THENCE S 11°38'01" E along the centerline of said 50 feet wide HCFCD Easement and a East line of said Rescar of Channelview, Inc. tract, a distance of 246.10 feet to a point for the Southwest corner of said SWS Services Co., Inc. tract in the South line of said Old River Terrace Fourth Section being an interior corner of said Rescar of Channelview, Inc. tract and of the herein described tract of land;

THENCE N 86°39'59" E along a common line being the North line of said Rescar of Channelview, Inc. tract and the South line of said Old River Terrace Fourth Section subdivision at a distance of 181.00 feet passing the Southeast corner of said SWS Services Co., Inc. tract, at a distance of 379.02 feet passing a 5/8-inch iron rod found for line at a distance of 529.31 feet passing a 5/8-inch iron rod for line continuing a total distance of 1428.34 feet to a point for the most Easterly North corner of said Rescar of Channelview, Inc. tract and of the herein described tract of land;

THENCE S 03°20'01" E along the most Easterly line of said Rescar of Cannelview, Inc. distance of 432.27 feet to a point in the North line of said called 153,767 SF (3.53 AC) Centerpoint Energy Houston 85' Wide Fee Strip for the most Easterly South corner of said Rescar of Cannelview, Inc. tract and of the herein described tract of land;

THENCE S 86°57'26" W along the North line of said called 153,767 SF (3.53 AC) Centerpoint Energy Houston 85' Wide Fee Strip a distance of 768.62 feet to point for an interior corner of the herein described tract of land;

THENCE S 03°32'52" E over and across said called 153,767 SF (3.53 AC) Centerpoint Energy Houston 85' Wide Fee Strip at a distance of 85 feet passing the North line of said called 152,939 SF (3.51 AC) Centerpoint Energy Houston

50' Wide Fee Strip at a distance of 135 feet passing the Northeast corner of said Harrods Eastbelt, LTD. tract and the start of the centerline of a ditch for a total a distance of 285.62 feet to a point for angle in the East line of the herein described tract of land;

THENCE S 07°13'55" W continuing along the East line of said Harrods Eastbelt, LTD. tract and centerline of ditch a distance of 85.72 feet to a point for angle in the East line of the herein described tract of land;

THENCE S 12°37'02" W continuing along the East line of said to Harrods Eastbelt, LTD. tract and centerline of ditch a distance of 246.96 feet to a point for angle in the East line of the herein described tract of land;

THENCE S 07°15'01" W continuing along the East line of said to Harrods Eastbelt, LTD. tract and centerline of ditch a distance of 48.00 feet to a point in the North Right of Way line of Interstate Highway 10 (300' Wide) for the Southeast corner of said to Harrods Eastbelt, LTD. tract and of the herein described tract of land;

THENCE S 72°30'19" W along the common South line of said Harrods Eastbelt, LTD. tract and the North line of said Interstate Highway 10 a distance of 396.50 feet to a point for the Southwest corner of said Harrods Eastbelt, LTD. tract and the Southeast corner of said Restricted Reserve "A" of Channelview Medical Center and the most Southwesterly corner of the herein described tract of land;

THENCE N 03°03'11" W along the common West line of said Harrods Eastbelt, LTD. tract and the East line of said Restricted Reserve "A" of Channelview Medical Center plat a distance of 279.61 feet to a point for corner of the herein described tract of land;

THENCE S 86°54'45" W over and across said Restricted Reserve "A" of Cannelview Medical Center at a distance of 525.55 feet passing a 5/8-inch iron rod found with cap for the Southeast corner of said Channelview Medical Center Condominiums continue a total distance of 568.67 feet to a 5/8-inch iron rod found with cap for Southwest corner of said Channelview Medical Center Condominiums and of the herein described tract of land;

THENCE N 03°05'17" W along the West line of said Channelview Medical Center Condominiums at a distance of 339.76 feet passing a 3/4-inch iron rod found in the South line of a 50 feet wide HL&P Fee strip and the common Northwest corner of said Channelview Medical Center Condominiums and the Southwest corner of called 0.65 acre tract as granted to Houston Lighting & Power Company (Centerpoint Energy Houston) continue at a distance of 389.76 passing the South line of said 85 feet wide fee strip continue for a total distance of 474.76 feet to the South line of said Rescar of Channelview, Inc. tract to a point for interior corner of the herein described tract of land;

THENCE S 86°57'24" W along the common South line of said Rescar of Cannelview, Inc. tract and the north line of said 85 feet wide fee strip at a distance of 445.00 feet passing the Southeast corner of said Rescar Industries,

Inc. tract continue along the common South line of said Rescar Industries, Inc. tract and the North line of said 85 feet wide fee strip a total distance of 1069.91 feet a 5/8-inch iron rod found with Terra Surveying cap for the Southeast corner of a Arco Pipe Line Company called 0.611 acre tract of land as recorded in HCCF# N115138 also being the Southwest corner of said Rescar Industries, Inc. tract and the herein described tract of land;

THENCE N 03°17'13" W along the common West line of said Rescar Industries, Inc. tract and the East line of said Arco Pipe Line Company tract a distance of 417.67 feet tract to a point for corner in the South line of said Rescar of Channelview, Inc. tract also being the Northeast corner of said Arco Pipe Line Company tract and the Northwest corner of said Rescar Industries, Inc for an interior corner of the herein described tract of land;

THENCE S 86°39'59" W along a common South line of said Rescar of Cannelview, Inc. tract and the North line of said Arco Pipe Line Company tract a distance of 123.63 feet to a point in the Southeast line of a Houston North Shore R.R. Missouri-Pacific System (100' wide) for a the most Westerly corner of said Rescar of Cannelview, Inc. tract and of the herein described tract of land;

THENCE N 58°37'10" E along the common Northwesterly line of said Rescar of Cannelview, Inc. tract and the Southeast line of Houston North Shore R.R. Missouri-Pacific System a distance of 168.52 feet to a point for the beginning of a non-tangent curve to the right having a Radius of 2815.00 feet for point of the herein described tract of land;

THENCE in Northeasterly direction along the common Northwesterly line of said Rescar of Cannelview, Inc. tract and the Southeast line of said Houston North Shore R.R. Missouri-Pacific System having a Radius of 2815.00 feet, a length of 720.16 feet, a Delta of 14°39'29", a Chord Bearing of N 61°29'51" E -718.20 feet to a point of the herein described tract of land;

THENCE N 69°11'32" E along the common Northwesterly line of said Rescar of Cannelview, Inc. tract and the Southeast line of said Houston North Shore R.R. Missouri-Pacific System a distance of 1009.50 feet to the **Point of Beginning** containing 54.0464-acres (2,354,263 sq. ft.) of land;

Robert J. Armitage
Registered Professional Land Surveyor No.5685
AMANI ENGINEERING, Inc.
8313 Southwest Freeway, Ste 350
Houston, Texas 77074

STATE OF TEXAS
REGISTERED
ROBERT J. ARMITAGE
5685
PROFESSIONAL
LAND SURVEYOR

5-12-12

Thursday, August 01, 2013

Account Number | Address | Owner Name | ?

13-Digit Number search

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Tax Year: 2013

HARRIS COUNTY APPRAISAL DISTRICT
REAL PROPERTY ACCOUNT INFORMATION
0420930000258

Print E-mail

File A Protest | Similar Owner Name | Nearby Addresses | Same Street Name | Related Map 5958A

Ownership History

Owner and Property Information

Owner Name & Mailing Address:	**RESCAR INDUSTRIES INC** **1101 31ST ST STE 250** **DOWNERS GROVE IL 60515-5532**	Legal Description:	**TRS 23 & 29** **ABST 232 P J DUNCAN**
		Property Address:	**0 EAST FWY** **CHANNELVIEW TX 77530**

State Class Code	Land Use Code	Building Class	Total Units
D2 -- Real, Unqualified Agricultural Land	4400 -- Vacant Industrial Land	--	0

Land Area	Building Area	Net Rentable Area	Neighborhood	Market Area	Map Facet	Key Map®
261,950 SF	0	0	9230	3060 -- Channelview ISD	5958A	497H

Value Status Information

Capped Account	Value Status	Notice Date	Shared CAD
No	Noticed	06/14/2013	No

Exemptions and Jurisdictions

Exemption Type	Districts	Jurisdictions	ARB Status	2012 Rate	2013 Rate	Online Tax Bill
None	006	CHANNELVIEW ISD	Not Certified	1.495600		View
	040	HARRIS COUNTY	Not Certified	0.400210		View
	041	HARRIS CO FLOOD CNTRL	Not Certified	0.028090		
	042	PORT OF HOUSTON AUTHY	Not Certified	0.019520		
	043	HARRIS CO HOSP DIST	Not Certified	0.182160		
	044	HARRIS CO EDUC DEPT	Not Certified	0.006617		
	047	SAN JACINTO COM COL D	Not Certified	0.185602		
	602	HC WCID 21	Not Certified	0.366000		View
	667	HC EMERG SERV DIST 50	Not Certified	0.050000		

Valuations

Value as of January 1, 2012			Value as of January 1, 2013		
	Market	Appraised		Market	Appraised
Land	130,975		Land	130,975	
Improvement	0		Improvement	0	
Total	130,975	130,975	Total	130,975	130,975

5-Year Value History

Land

Market Value Land

Line	Description	Site Code	Unit Type	Units	Size Factor	Site Factor	Appr O/R Factor	Appr O/R Reason	Total Adj	Unit Price	Adj Unit Price	Value

1	4400 -- Vacant Industrial Land	SF5	SF	261,950	1.00	1.00	0.50	Shape or Size	0.50	1.00	0.50	130,975

Building

Vacant (No Building Data)

Thursday, August 01, 2013

Account Number | Address | Owner Name | ?

13-Digit Number search

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Tax Year: 2013

HARRIS COUNTY APPRAISAL DISTRICT
REAL PROPERTY ACCOUNT INFORMATION
0420930000012

Print E-mail

File A Protest | Similar Owner Name | Nearby Addresses | Same Street Name | Related Map 5958A

Ownership History

Owner and Property Information

Owner Name & Mailing Address:	**RESCAR INC** **1101 31ST ST STE 110** **DOWNERS GROVE IL 60515-5562**	Legal Description:	**TRS 12H 12R 26 26A 27 & 30 ABST 232 P J DUNCAN**
		Property Address:	**407 W BRENTWOOD ST CHANNELVIEW TX 77530**

State Class Code	Land Use Code	Building Class	Total Units
F2 -- Real, Industrial	4422 -- Machinery & Transportation Equipment	E	0

Land Area	Building Area	Net Rentable Area	Neighborhood	Market Area	Map Facet	Key Map®
982,887 SF	0	0	9230	4018 -- FM 1960 Interstate 45	5958A	498E

Value Status Information

Capped Account	Value Status	Notice Date	Shared CAD
No	Noticed	06/14/2013	No

Exemptions and Jurisdictions

Exemption Type	Districts	Jurisdictions	ARB Status	2012 Rate	2013 Rate	Online Tax Bill
None	006	CHANNELVIEW ISD	Not Certified	1.495600		View
	040	HARRIS COUNTY	Not Certified	0.400210		View
	041	HARRIS CO FLOOD CNTRL	Not Certified	0.028090		
	042	PORT OF HOUSTON AUTHY	Not Certified	0.019520		
	043	HARRIS CO HOSP DIST	Not Certified	0.182160		
	044	HARRIS CO EDUC DEPT	Not Certified	0.006617		
	047	SAN JACINTO COM COL D	Not Certified	0.185602		
	667	HC EMERG SERV DIST 50	Not Certified	0.050000		

Valuations

Value as of January 1, 2012			Value as of January 1, 2013		
	Market	Appraised		Market	Appraised
Land	491,444		Land	491,444	
Improvement	1,274,130		Improvement	1,274,130	
Total	1,765,574	1,765,574	Total	1,765,574	1,765,574

5-Year Value History

Land

Market Value Land

Line	Description	Site Code	Unit Type	Units	Size Factor	Site Factor	Appr O/R Factor	Appr O/R Reason	Total Adj	Unit Price	Adj Unit Price	Value
1	4422 -- Machinery & Transportation	AC6	AC	22.5640	1.00	1.00	0.50	Shape or	0.50	43,560.00	21,780.00	491,444

	Equipment							Size				

Building

(No Building Data)

Thursday, August 01, 2013

Account Number | Address | Owner Name | ?

13-Digit Number search

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Tax Year: 2013

HARRIS COUNTY APPRAISAL DISTRICT
REAL PROPERTY ACCOUNT INFORMATION
0420930000054

Print E-mail

Owner Services | Similar Owner Name | Nearby Addresses | Same Street Name | Related Map 5958C

Ownership History | Fiduciary Information

Owner and Property Information

Owner Name & Mailing Address:	**HARRODS EASTBELT LTD** **PO BOX 771207** **HOUSTON TX 77215-1207**	Legal Description:	**TR 25** **ABST 232 P J DUNCAN**
		Property Address:	**15157 EAST FWY # 177** **CHANNELVIEW TX 77530**

State Class Code	Land Use Code	Building Class	Total Units
F1 -- Real, Commercial	4315 -- Hotel/Motel, Low-Rise 1 to 3 Stories	C	177

Land Area	Building Area	Net Rentable Area	Neighborhood	Market Area	Map Facet	Key Map®
249,599 SF	70,717	70,717	9234.01	2311 -- East	5958C	498E

Value Status Information

Capped Account	Value Status	Notice Date	Shared CAD
No	Noticed	04/12/2013	No

Exemptions and Jurisdictions

Exemption Type	Districts	Jurisdictions	ARB Status	2012 Rate	2013 Rate	Online Tax Bill
None	006	CHANNELVIEW ISD	Not Certified	1.495600		View
	040	HARRIS COUNTY	Not Certified	0.400210		View
	041	HARRIS CO FLOOD CNTRL	Not Certified	0.028090		
	042	PORT OF HOUSTON AUTHY	Not Certified	0.019520		
	043	HARRIS CO HOSP DIST	Not Certified	0.182160		
	044	HARRIS CO EDUC DEPT	Not Certified	0.006617		
	047	SAN JACINTO COM COL D	Not Certified	0.185602		
	602	HC WCID 21	Not Certified	0.366000		View
	667	HC EMERG SERV DIST 50	Not Certified	0.050000		

Valuations

Value as of January 1, 2012			Value as of January 1, 2013		
	Market	Appraised		Market	Appraised
Land	550,448		Land	550,448	
Improvement	3,479,421		Improvement	3,436,978	
Total	4,029,869	4,029,869	Total	3,987,426	3,987,426

5-Year Value History

Land

Market Value Land

Line	Description	Site Code	Unit Type	Units	Size Factor	Site Factor	Appr O/R Factor	Appr O/R Reason	Total Adj	Unit Price	Adj Unit Price	Value

1	4315 -- Hotel/Motel, Low-Rise 1 to 3 Stories	SF1	SF	205,000	1.00	1.00	0.90	Shape or Size	0.90	2.50	2.25	461,250
2	4315 -- Hotel/Motel, Low-Rise 1 to 3 Stories	SF3	SF	44,599	1.00	1.00	1.00	--	1.00	2.00	2.00	89,198

Building

Building	Year Built	Type	Style	Quality	Impr Sq Ft	Building Details
1	1980	Hotel/Motel, Low-Rise 1 to 3 Stories	8353 -- Retail Store	Good	15,357	Displayed
2	1980	Hotel/Motel, Low-Rise 1 to 3 Stories	8343 -- Motel	Good	14,400	View
3	1980	Hotel/Motel, Low-Rise 1 to 3 Stories	8343 -- Motel	Good	7,560	View
4	1980	Hotel/Motel, Low-Rise 1 to 3 Stories	8343 -- Motel	Good	18,000	View
5	1980	Hotel/Motel, Low-Rise 1 to 3 Stories	8343 -- Motel	Good	15,400	View

Building Details (1)

Texas law prevents us from displaying residential sketches on our website.
You can see the sketch or get a copy at **HCAD's information center at 13013 NW Freeway.**

Building Data	
Element	Details
Cooling Type	Central / Forced
Construction Type	Wood / Steel Joist
Functional Utility	Avg/Normal
Heating Type	Hot Air
Partition Type	Normal
Physical Condition	Good
Plumbing Type	Adequate
Sprinkler Type	None
Exterior Wall	Concr Block
Economic Obsolescence	Normal
Element	Units
Wall Height	9
Interior Finish Percent	100

Building Areas	
Description	Area
BASE AREA PRI	15,357

Extra Features	
Description	Units
Load Dock, Stone or Concrete	1
Loading Dock, Interior	1
Paving - Asphalt	1
Paving - Light Concrete	1
Swimming Pool	1

Thursday, August 01, 2013

Account Number | Address | Owner Name | ?

13-Digit Number search

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Tax Year: 2013

HARRIS COUNTY APPRAISAL DISTRICT
REAL PROPERTY ACCOUNT INFORMATION
1160490000001

Print E-mail

Owner Services | Similar Owner Name | Nearby Addresses | Same Street Name | Related Map 5958C

Ownership History | Related Accounts

Owner and Property Information

Owner Name & Mailing Address: **I-10 EAST TRUST**
C/O KINDRED HEALTHCARE TAX DEPT#4873
680 S 4TH ST
LOUISVILLE KY 40202-2407

Legal Description: **RES A**
CHANNELVIEW MEDICAL CENTER

Property Address: **15101 EAST FWY # 83**
CHANNELVIEW TX 77530

State Class Code	Land Use Code	Building Class	Total Units
F1 -- Real, Commercial	4640 -- Hospitals	C	83

Land Area	Building Area	Net Rentable Area	Neighborhood	Market Area	Map Facet	Key Map®
220,880 SF	74,021	0	9234.01	1118 -- Channelview - Sheldon	5958C	498E

Value Status Information

Capped Account	Value Status	Notice Date	Shared CAD
No	Noticed	04/05/2013	No

Exemptions and Jurisdictions

Exemption Type	Districts	Jurisdictions	ARB Status	2012 Rate	2013 Rate	Online Tax Bill
None	006	CHANNELVIEW ISD	Not Certified	1.495600		View
	040	HARRIS COUNTY	Not Certified	0.400210		View
	041	HARRIS CO FLOOD CNTRL	Not Certified	0.028090		
	042	PORT OF HOUSTON AUTHY	Not Certified	0.019520		
	043	HARRIS CO HOSP DIST	Not Certified	0.182160		
	044	HARRIS CO EDUC DEPT	Not Certified	0.006617		
	047	SAN JACINTO COM COL D	Not Certified	0.185602		
	602	HC WCID 21	Not Certified	0.366000		View
	667	HC EMERG SERV DIST 50	Not Certified	0.050000		

Valuations

Value as of January 1, 2012			Value as of January 1, 2013		
	Market	Appraised		Market	Appraised
Land	496,980		Land	496,980	
Improvement	5,301,192		Improvement	5,573,989	
Total	5,798,172	5,798,172	Total	6,070,969	6,070,969

5-Year Value History

Land

Market Value Land

Line	Description	Site Code	Unit Type	Units	Size Factor	Site Factor	Appr O/R Factor	Appr O/R Reason	Total Adj	Unit Price	Adj Unit Price	Value

1	4640 -- Hospitals	SF1	SF	220,880	1.00	1.00	0.90	Shape or Size	0.90	2.50	2.25	496,980

Building							
Building	Year Built	Remodeled	Type	Style	Quality	Impr Sq Ft	Building Details
1	1983	2002	Hospitals	8331 -- Hospital	Low	74,021	Displayed

Building Details (1)

Texas law prevents us from displaying residential sketches on our website.
You can see the sketch or get a copy at **HCAD's information center at 13013 NW Freeway.**

Building Data	
Element	Details
Cooling Type	Central / Forced
Construction Type	Fireproof Concrete
Functional Utility	Avg/Normal
Heating Type	Hot Air
Partition Type	Normal
Physical Condition	Avg/Normal
Plumbing Type	Adequate
Sprinkler Type	Wet
Exterior Wall	Brick / Stone
Economic Obsolescence	Normal
Market Adjustment	3% Market Adjustment
Element	Units
Wall Height	13
Wall Height	10
Interior Finish Percent	100
Interior Finish Percent	0
Elev: Elect / Pass	2

Building Areas	
Description	Area
BASE AREA PRI	16,270
BASE AREA PRI	4,380
BASE AREA PRI	12,302
BASE AREA UPR	16,270
BASE AREA PRI	2,280
BASE AREA PRI	4,428
BASE AREA UPR	18,091

Extra Features	
Description	Units
Paving - Asphalt	1
Penthouse, Mechanical Good	1
Penthouse, Mechanical Good	1
Petroleum Stg Tank - Coated S -Dbl Wall - 6000 Gal	1

Thursday, August 01, 2013

Account Number | Address | Owner Name | ?

13-Digit Number search

HOME ABOUT RECORD SEARCH FORMS MAPS RESOURCES VIDEOS HELP EN ESPAÑOL

Tax Year: 2013

HARRIS COUNTY APPRAISAL DISTRICT
REAL PROPERTY ACCOUNT INFORMATION
0650910140001

Print E-mail

File A Protest | Similar Owner Name | Nearby Addresses | Same Street Name | Related Map 5958A

Ownership History

Owner and Property Information

Owner Name & Mailing Address:	**RESCAR OF CHANNELVIEW INC** **1101 31ST ST STE 110** **DOWNERS GROVE IL 60515-5562**
Legal Description:	**LTS 1 2 3 & 4 & TRS 5B & 6B BLK 11** **OLD RIVER TERRACE SEC 4**
Property Address:	**407 W BRENTWOOD ST** **CHANNELVIEW TX 77530**

State Class Code	Land Use Code	Building Class	Total Units
F2 -- Real, Industrial	4401 -- Manufacturing/Processing	E	0

Land Area	Building Area	Net Rentable Area	Neighborhood	Market Area	Map Facet	Key Map®
517,113 SF	0	0	9230	6010 -- Pasadena - LaPorte	5958A	497H

Value Status Information

Capped Account	Value Status	Notice Date	Shared CAD
No	Noticed	06/14/2013	No

Exemptions and Jurisdictions

Exemption Type	Districts	Jurisdictions	ARB Status	2012 Rate	2013 Rate	Online Tax Bill
None	006	CHANNELVIEW ISD	Not Certified	1.495600		View
	040	HARRIS COUNTY	Not Certified	0.400210		View
	041	HARRIS CO FLOOD CNTRL	Not Certified	0.028090		
	042	PORT OF HOUSTON AUTHY	Not Certified	0.019520		
	043	HARRIS CO HOSP DIST	Not Certified	0.182160		
	044	HARRIS CO EDUC DEPT	Not Certified	0.006617		
	047	SAN JACINTO COM COL D	Not Certified	0.185602		
	602	HC WCID 21	Not Certified	0.366000		View
	667	HC EMERG SERV DIST 50	Not Certified	0.050000		

Valuations

Value as of January 1, 2012			Value as of January 1, 2013		
	Market	Appraised		Market	Appraised
Land	258,557		Land	258,557	
Improvement	1,535,663		Improvement	2,428,257	
Total	1,794,220	1,794,220	Total	2,686,814	2,686,814

5-Year Value History

Land

Market Value Land

Line	Description	Site Code	Unit Type	Units	Size Factor	Site Factor	Appr O/R Factor	Appr O/R Reason	Total Adj	Unit Price	Adj Unit Price	Value

1	4401 -- Manufacturing/Processing	AC6	AC	11.8713	1.00	1.00	0.50	Shape or Size	0.50	43,560.00	21,780.00	258,557

Building

(No Building Data)

Deeds

Rescar Companies

P025607

STATE OF TEXAS }
COUNTY OF HARRIS } SS:

117-46-0449

12/31/92 00147999 P025607 $ 19.00

KNOW ALL MEN BY THESE PRESENTS:

THAT THE UNDERSIGNED, Itel Rail Corporation, a Delaware corporation, hereinafter referred to as "Grantor", for and in consideration of the sum of TEN DOLLARS ($10.00) cash, and other good and valuable consideration in hand paid by the Grantee herein named, the receipt and sufficiency of which are hereby fully acknowledged and confessed, has GRANTED, SOLD and CONVEYED, and by these presents does hereby GRANT, SELL and CONVEY unto Resoar of Channelview, Inc., a Texas corporation, herein referred to as "Grantee", all Grantor's right, title and interest in and to the land described on Exhibit "A" attached hereto and made a part hereof and all improvements located thereon.

This conveyance, however, is made and accepted subject to the matters set forth on attached Exhibit "B".

[illegible]

EXECUTED as of the 30th day of December, 1992.

ITEL RAIL CORPORATION,
a Delaware corporation

By: [signature]
Title: Vice President

STATE OF ILLINOIS }
COUNTY OF COOK } SS:

This instrument was acknowledged before me on December 30, 1992, by James E. Kraly, the Vice President of ITEL RAIL CORPORATION, a Delaware corporation, on behalf of said corporation.

[signature]
Notary Public

My Commission Expires: 3-9-93

LINDA C. GARTNER
Printed Name of Notary Public

" OFFICIAL SEAL "
LINDA C. GARTNER
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 3/9/93

AFTER RECORDING, RETURN TO:

Shayle P. Fox
Fox and Grove Chtd.
Suite 6200
311 South Wacker Drive
Chicago, Illinois 60606

RETURN TO:
WILLIAM D. CLEVELAND
909 FANNIN #100
HOUSTON, TEXAS 77010

DJL3632F

179415

Clerk's File No. P025607
Film Code: 117-46-0449
Executed: 12/30/1992
Recorded: 12/31/1992

EXHIBIT A
(5 Pages)

117-46-0450

TRACT ONE (1)"

5.539 acres in the Peter J. Duncan Survey, Abstract No. 232, Harris County, Texas, being out of and a part of that certain 17.86-acre tract described as Tract Two in deed dated April 10, 1963, from Magnolia Park Land Company to Malcom C. Dauuth et al, recorded in Volume 5090, Page 38, Deed Records of Harris County, Texas, said 5.539 acres being described as follows:

Beginning at a set 5/8 inch iron rod marking the Northwest corner of said 17.86 acre tract;

THENCE South 89° 54' 13" East along the north line of said 17.86 acre tract a total distance of 379 feet to a point in the center line of a drainage easement;

THENCE South 18° 00' East along the center-line of said drainage easement 34 feet to an angle point in said drainage easement;

THENCE South 42° 12' East along the center-line of said 448.61 feet to an angle point in said easement;

THENCE South 74° 55' East along the center-line of said easement 244.5 feet to the intersection of said center-line with the South line of said 17.86 acre tract, same being the North line of the Houston Lighting and Power Company 135 feet wide fee strip;

THENCE North 89° 38' 33" West along said common line 929.36 feet to the Southwest corner of said 17.86 acre tract, also, being an existing fence corner;

THENCE North 00° 04' 00" East along fence on the West line of said 17.86 acre tract a distance of 424.85 feet to the PLACE OF BEGINNING AND CONTAINING 5.539 acres of land.

EXHIBIT A
(5 Pages)

117-46-2451

TRACT TWO (2)

12.221 Acres in the Peter J. Duncan Survey, Abstract No. 232, Harris County, Texas, being out of and a part of that certain 17.86 acre tract described as Tract Two in deed dated April 10, 1963, from Magnolia Park Land Company to Malcom C. Damuth et al, recorded in Volume 5090, Page 38, Deed Records of Harris County, Texas, said 12.221 acres being described as follows:

BEGINNING at a creosoted fence corner post set in concrete, at the Northeast corner of said 17.86 acre tract;

THENCE South 431.85 feet to a found 1 inch G.I.P.;

THENCE North 89° 38' West with the South line of said 17.86-acre tract, at 645.42 feet passing a 1 inch G.I.P., a total distance of 880.42 feet to a point in the center-line of a drainage easement and the Southeast corner of 5.539 acres previously conveyed by Malcolm C. Damuth et al to Houston Tank Car & Manufacturing Corp.;

THENCE North 74° 55' West along the center line of said drainage easement 244.50 feet to an angle point in said drainage easement;

THENCE North 42° 12' West along the center point of said drainage easement 448.61 feet to an angle point in said drainage easement;

THENCE North 18° 00' West along the center line of said drainage easement 34.0 feet to the intersection of said center line with the North line of said 17.86-acre tract, same being the Northeast corner of 5.539 acres heretofore conveyed by Malcolm C. Damuth et al to Houston Tank Car & Manufacturing Corp.;

THENCE South 89° 54' 13" East, at 45.60 feet passing a 1 inch G.I.P., a total distance of 1,435.05 feet to the PLACE OF BEGINNING AND CONTAINING 12.221 acres of land

EXHIBIT A
(5 Pages)

117-46-0452

TRACT THREE(3):
All that certain 6.4501 acres of land in the Peter Duncan Survey, Harris County, Texas, being part of the 10 acres of land described in deed fromH.E. Roberts to Joseph Rex Cavanaugh recorded in Volume 1296, Page 84 of the Deed Records, said 6.894 acres being more particularly described as follows:

Beginning at a 3/4 inch iron pipe found at a fence corner on the northwest line of State Highway No. 73,said pipe marking the west line of said 10 acres conveyed by Roberts to Canvnaugh;

THENCE North along a fence crossing a power line at 902 feet and continuing in all 1435.6 feet to a 3/4 inch iron pipe found 0.7 feet west of a fence corner;

THENCE North 89° 55' East along a fence, passing a fence corner at 111.2 feet, and continuing in all 221.2 feet to a 1/2 inch pipe found in fence;

THENCE South, passing a 5/8 inch iron rod at 424.68 feet,being the north line of the 135 foot H.L.&P. Strip, thence passing the south line of the H.L. & P. Strip a distance of 559.68 a total distance of 1379.65 feet;

THENCE South 75° 44 ' West 228.24 feet along the northwest line of State Highway No. 73 to the PLACE OF BEGINNING and containing 7.1480 acres less 0.6979 acre conveyed to the Houston and Lighting and Power Company.

EXHIBIT A
(5 Pages)

117-46-0453

TRACT FOUR(4)

The North 2.19 acres of land, more or less, of that certain 10 acre tract of land in the Peter J. Duncan Survey, Abstract No. 232, in Harris County, Texas, described in Deed dated February 2, 1958, from L.L. D. Tuttle, et ux, to Yvonne Tuttle Streit, et al, recorded in Volume 3646, Page 445 of the Deed Records of Harris County, Texas, said 2.19 acres being more particularly described by metes and bounds as follows:

BEGINNING at the Northwest corner of said 10 acre tract above referred to, marked by a found 1/2 inch G.I.P.;

THENCE Southerly along the West line of said 10 acre tract a distance of 424.68 feet to a point for corner, said point also being the Northwest corner of that certain 0.433 acre tract conveyed by Deed dated June 20, 1959, from Yvonne Tuttle Streit, et al, to Houston Lighting & Power Company recorded in Volume 3724, Page 365 of the Deed Records of Harris County, Texas;

THENCE Easterly along the North line of said 0.433 acre tract a distance of 222.02 feet to its Northeast corner in the East line of said 10 acre tract;

THENCE Northerly along the East line of said 10 acre tract, 424.85 feet, more or less, to its Northeast corner;

THENCE Westerly along the North line of said 10 acre tract 222.01 feet to the PLACE OF BEGINNING.

EXHIBIT A
(5 Pages)

T17-46-0454

TRACT FIVE (5)

Lot Nos. 1,2,3,4, and a portion of Lot Nos. 5 and 6 all in Block 11 of OLD RIVER TERRACE-Fourth Section, an Addition in Harris County, Texas, according to the map or plat thereof recorded in Volume 17, Page 50 of the Map Records of Harris County, Texas; said portion of Lot Nos. 5 and 6 being more particularly described by metes and bounds as follows, to-wit:

BEGINNING at the Northwest corner of Lot No. 5, Block 11 and the Northeast corner of Lot No.4, Block 11, lying in the South right-of-way line of the Houston-North Shore R.R., and being marked by a set 5/8 inch iron rod;

THENCE South 1° 01' West a distance of 513 ft. along the West line of Lot Nos. 5 and 6 to a set 5/8 inch iron rod for corner, said corner being the Southwest corner of Lot No. 6 and the Southeast corner of Lot No. 4;

THENCE East a distance of 380 feet to the center line of a 50 foot wide drainage easement, said point being the center line of a 30 foot wide drainage easement;

THENCE North 08° 18' West a distance of 246.1 foot along the center line of said easement to a point for corner;

THENCE North 24° 03' West a distance of 150.75 feet along the center line of said easement to a point for corner, said point lying in the dividing line of Lot Nos. 5 and 6;

THENCE North 65° 52' East a distance of 75 feet to a point marked with a set 5/8 inch iron rod for corner; said point also lying in the dividing line between Lot Nos. 5 and 6;

THENCE North 22° 39' West a distance of 72.8 feet to a set 5/8" iron rod for corner, said line lying 75 feet Easterly of and parallel to the center line of the said easement;

THENCE North 08° 28' East a distance of 87.20 feet to a set 5/8 inch iron rod for corner, said line also lying 75 feet, Easterly of and parallel to the center line of said easement;

THENCE North 72° 15' East a distance of 297.15 feet to a point for corner in the West right-of-way line of Bentwood Drive;

THENCE North 17° 45' West a distance of 50 feet to the Northeast corner of Lot No. 5 marked by a set 5/8" iron rod for corner;

THENCE South 72° 15' West a distance of 536 feet along the North line of Lot No. 5 and the South right-of-way line of Houston-North Shore R.R. to the PLACE OF BEGINNING ; and being the same property described in Deed dated July 16, 1960, from Travis Wade Johnson, et ux, as Grantors, to Herman S. Welsh, et ux, as Grantees, recorded in the Deed Records of Harris County, Texas;

EXHIBIT B
PERMITTED EXCEPTIONS

T17-46-0455

1. Restrictive Covenants recorded in Volume 1217, Page 107, of the Deed Records of Harris County, Texas concerning Tract Three and those recorded in Volume 1209, Page 140, of the Deed Records of Harris County, Texas concerning Tract Four.

2. Survey Matters.

3. Standby fees and general real estate taxes for the current tax fiscal year and subsequent years, and subsequent assessments for prior years due to change in land usage or ownership.

4. INTENTIONALLY OMITTED.

5. Any titles or rights asserted by anyone including, but not limited to, persons, corporations, governments or other entities to tidelands, or lands comprising the shores or beds of navigable or perennial rivers and streams, lakes, bays, gulfs or oceans, or to any land extending from the line of mean low tide to the line of vegetation, or to lands beyond the line of the harbor or bulkhead lines as established or changed by any government, or to filled-in lands or artificial islands, or to riparian rights or other statutory water rights, or the rights or interests of the State of Texas or the public generally in the area extending from the line of mean low tide to the line of vegetation or the right of access thereto, or right of easement along and across the same.

6. An easement for purposes of drainage located on subject property granted to Harris County Flood Control District by Assessment recorded in Volume 2685, Page 439, of the Deed Records of Harris County, Texas. (As to Lots 5 and 6, Block 11 of Tract Five only)

7. An easement for purposes of flood control and drainage located on subject property granted to Harris County Flood Control District by instrument recorded in Volume 2704, Page 704, of the Deed Records of Harris County, Texas. (As to Tracts One and Two only)

8. A pipeline right of way and easement 10 feet wide along the south property line of Tract Five granted to United Gas corporation as set forth in instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number B238215.

9. Easements located across, over, along, upon, and under Tract Five granted to Houston Lighting and Power Company as shown on sketches attached to instruments recorded under Harris County Clerk's File Numbers B690782 and C451284.

10. Easements located across, over, along, upon, and under Tracts Four and Five granted to Houston Lighting and Power Company as shown on sketch attached to instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number C555593.

11. Easements located across, over, along, upon, and under Tract Four granted to Houston Lighting and Power Company as shown on sketch attached to instrument recorded in

the Office of the County Clerk of Harris County, Texas under Clerk's File Number E374598.

12. Easement extending in a northerly and southerly direction through Lots 5 and 6 in Block 11 of Tract Five as shown on map recorded in Volume 17, Page 50 of the Map Records of Harris County, Texas.

13. A drainage easement 16 feet wide along either side of the centerline of all natural drainage courses in Tract Five as set forth in instrument recorded in Volume 1153, Page 118 of the Deed Records of Harris County, Texas.

14. Pipeline right of way 10 feet in width located on, over, and through Lot 1 in Block 11 of Tract Five granted to ARCO Pipeline Company, a Delaware corporation as shown on sketch attached to instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number M-842257.

15. 1/2 of all the oil, gas and other minerals, the royalties, bonuses, rentals, and all other rights in connection with same are excepted herefrom, as set forth in instrument recorded in Volume 1421, Page 254, of the Deed Records of Harris County, Texas and as may be affected by instrument recorded in Volume 460, Page 624 of the Contract Records of Harris County, Texas concerning Tracts One and Two. Title to said interest has not been investigated subsequent to the date of the aforesaid instrument.

16. 1/2 of all the oil, gas and other minerals, the royalties, bonuses, rentals, ad all other rights in connection with same are excepted herefrom, as set forth in instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number C149293 concerning Tract One. Title to said interest has not been investigated subsequent to the date of the aforesaid instrument.

17. 1/2 of all the oil, gas and other minerals, the royalties, bonuses, rentals, and all other rights in connection with same are excepted herefrom, as set forth in instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number C386936 concerning Tract Two. Title to said interest has not been investigated subsequent to the date of the aforesaid instrument.

18. All of the oil, gas and other minerals and all other elements not considered a part of the surface estate are excepted herefrom, not insured herein nor guaranteed hereunder, all having been reserved in instrument recorded in Volume 5676, Page 37, of the Deed Records of Harris County, Texas as to Tract Four (surface rights waived as set out therein). Title to said interest has not been investigated subsequent to the date of the aforesaid instrument.

19. Notice disclosing dump site over portions of Tract One and Two as shown on sketch attached to instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number L-552585.

20. Acts of Buyer and those claiming by, through or under Buyer.

117-46-0457

ANY PROVISION HEREIN WHICH RESTRICTS THE SALE, RENTAL OR USE OF THE DESCRIBED REAL PROPERTY BECAUSE OF COLOR OR RACE IS INVALID AND UNENFORCEABLE UNDER FEDERAL LAW.

THE STATE OF TEXAS }
COUNTY OF HARRIS }

I hereby certify that this instrument was FILED in File Number Sequence on the date and at the time stamped hereon by me and was duly RECORDED, in the Official Public Records of Real Property of Harris County, Texas on

DEC 31 1992

COUNTY CLERK,
HARRIS COUNTY, TEXAS

FILED

92 DEC 31 PM 3:50

COUNTY CLERK
HARRIS COUNTY, TEXAS

P025606

QUITCLAIM DEED

117-46-0446

STATE OF TEXAS }
COUNTY OF HARRIS } SS:

KNOW ALL MEN BY THESE PRESENTS:

THAT THE UNDERSIGNED, Itel Rail Corporation, a Delaware corporation, hereinafter referred to as "Grantor", for and in consideration of the sum of TEN DOLLARS ($10.00) cash, and other good and valuable consideration in hand paid by the Grantee herein named, the receipt and sufficiency of which are hereby fully acknowledged and confessed, has QUITCLAIMED, and by these presents does hereby QUITCLAIM unto Hescar of Channelview, Inc., a Texas corporation, herein referred to as "Grantee", all Grantor's right, title and interest in and to the land described on Exhibit "A" attached hereto and made a part hereof and all improvements located thereon.

EXECUTED as of the 30th day of December, 1992.

FILED
92 DEC 31 PM 3:50

ITEL RAIL CORPORATION,
a Delaware corporation

By: [signature]
Title: Vice President

STATE OF ILLINOIS }
COUNTY OF COOK } SS:

This instrument was acknowledged before me on December 30, 1992, by James E. Kroy the Vice President of ITEL RAIL CORPORATION, a Delaware corporation, on behalf of said corporation.

[signature]
Notary Public

My Commission Expires: 3.9.93

Linda C. Gardner
Printed Name of Notary Public

OFFICIAL SEAL
LINDA C. GARDNER

AFTER RECORDING, RETURN TO:

Shayle P. Fox
Fox and Grove Chtd.
Suite 6200
311 South Wacker Drive
Chicago, Illinois 60606

Clerk's File No. P025606
Film Code: 117-46-0446
Executed: 12/30/1992
Recorded: 12/31/1992

EXHIBIT A

117-46-0447

LEGAL DESCRIPTION
34.6387 ACRES OF LAND
HARRIS COUNTY, TEXAS

34.6387 acres of land located in the Peter J. Duncan Survey, A-232, Harris County, Texas being all of Lots 1, 2, 3 and 4 and portions of lots 5 and 6, of Block 11, in Old River Terrace Fourth Section as recorded in Volume 17, Page 50, Map Records of said County and all of that certain 17.86 acre tract, as described and recorded in Volume 5090, Page 39, Deed Records of said County; said 34.6387 acres being more particularly described by metes and bounds as follows:

BEGINNING at a fence post in concrete found for the northeast corner of said 17.86 acre tract in the south line of said Old River Terrace;

THENCE South, along the east line of said 17.06 acre tract; a distance of 432.27 feet to a 1 inch iron pipe found for the southeast corner of said 17.06 acre tract in the north line of a 135 feet wide H.L. & P. Company easement;

THENCE North 89°42'12" West, along the north line of said H.L. & P. Company easement; a distance of 2252.37 feet to a 5/8 inch iron rod set for corner;

THENCE North, a distance of 420.61 feet to a 5/8 inch iron rod set for corner in the south line of said Old River Terrace Subdivision;

THENCE West, along said south line, at 222.00 feet pass a 2 inch galvanized iron pipe for the southwest corner of said Lot 2, in all a total distance of 750.50 feet to a 5/8 inch iron rod set for corner in the southerly right-of-way line of Houston-North Shore Railroad, (Missouri Pacific R.R.);

THENCE along said southerly railroad right-of-way line the following:

North 61°37'11" East, a distance of 168.52 feet to a 5/8 inch iron rod set for point of curve;

Northeasterly along the arc of a curve to the right having a central angle of 14°39'17" and a radius of 2815.00 feet, a distance of 720.00 feet to a 5/8 inch iron rod set for point of tangency;

North 72°16'00" East, a distance of 1009.00 feet to a 1 inch iron pipe found for the most northerly corner of said Lot 5, in the westerly right-of-way line of Brentwood Street (60 feet wide) as shown on said plat;

THENCE South 17°44'00" East, a distance of 50.00 feet to a found 3/4 inch iron rod for corner;

THENCE South 72°16'00" West, a distance of 257.15 feet to a found 3/4 inch iron rod for corner;

THENCE South 00°28'00" West, a distance of 07.20 feet to a found 12 inch painted fence post for corner;

THENCE South 22°38'00" East, a distance of 72.00 feet to a found 12 inch painted fence post for corner;

THENCE South 65°52'00" West, a distance of 75.00 feet to a found 12 inch painted fence post for corner in the centerline of a 50 feet wide Harris County Flood Control District easement as described and recorded in Volume 2685, Page 439 Deed Records of said County;

THENCE South 24°03'00" East, along said centerline, a distance of 150.75 feet to a point for corner;

THENCE South 00°18'00" East, continuing along said centerline, a distance of 246.10 feet to a point for corner in the south line of said Old River Terrace Subdivision;

THENCE East, along said south line, a distance of 1428.34 feet to the POINT OF BEGINNING and containing 34.6387 acres (1,508,860 square feet) of land.

117-46-0448

THE STATE OF TEXAS
COUNTY OF HARRIS

I hereby certify that this instrument was FILED in File Number Sequence on the date and at the time stamped hereon by me and was duly RECORDED, in the Official Public Records of Real Property of Harris County, Texas on

DEC 3 1 1992

COUNTY CLERK
HARRIS COUNTY, TEXAS

Apr-16-98 03:11pm From-STEWART TITLE COMMERCIAL 7132821155 T-219 P.12/15 F-219

9711 0EA6 / MTR / 41 (a)

STEWART TITLE HOUSTON DIVISION 04/22/98 20031027 S977172 $13.00

S977172 **GENERAL WARRANTY DEED** 518-13-3584

Date: April 20, 1998

Grantor: TIC UNITED CORP. F/K/A TIC SERVICES, CO., A Texas Corporation

Grantor's Mailing Address:
4665 North Central Expressway
Dallas, Dallas County, Texas 75205

Grantee: RESCAR INDUSTRIES, INC.

Grantee's Mailing Address:
1101 31st Street, Suite 250
Downers Grove, Illinois 60515

Consideration: TEN AND NO/100 DOLLARS ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged

Property (including any improvements, interests in common areas and other hereditaments and appurtenances):

[illegible]

purposes.

Reservations from and Exceptions to Conveyance and Warranty: All restrictions, easements, rights-of-way, reservations, mineral and otherwise, ordinances, conditions, covenants, and other encumbrances, if any, applicable to and enforceable against the above described property as shown in the records of said county, and rights of tenants in possession.

1

RETURN TO: MARY RITCHIE
STEWART TITLE HOUSTON
P. O. BOX 1504
HOUSTON, TEXAS 77251-1504

Clerk's File No: S977172
Film Code: 518-13-3584
Executed: 04/20/1998
Recorded: 04/22/1998

518-13-3595

Grantor, for the consideration and subject to the reservations from and exceptions to conveyance and warranty, grants, sells and conveys to Grantee the property, together with all and singular the rights and appurtenances thereto in any wise belonging, to have and hold it to Grantee, Grantee's heirs, executors, administrators, successors or assigns forever. Grantor binds Grantor and Grantor's heirs, executors, administrators, and successors to warrant and forever defend all and singular the property to Grantee and Grantee's heirs, executors, administrators, successors and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof.

When the context requires, singular nouns and pronouns include the plural.

GRANTOR:

TIC UNITED CORP.

By: J B Wilson
Name: J. B. WILSON
Title: DIRECTOR-ADMIN.

THE STATE OF TEXAS)

COUNTY OF HARRIS)

This instrument was acknowledged before me on this 16th day of April, 1998, by J.B. Wilson, of TIC United Corp., a Texas corporation, on behalf of said corporation and in the capacity therein stated.

Mary W. Miller
Notary Public in and for
The State of Texas.

MARY W. MILLER
MY COMMISSION EXPIRES
January 26, 2001

RETURN TO:

518-13-3586

METES AND BOUNDS DESCRIPTION
6.014 ACRES (261,950 SQUARE FEET)
PETER J. DUNCAN SURVEY, ABSTRACT NUMBER 232
HARRIS COUNTY, TEXAS

Being a tract or parcel containing 6.014 acres (261,950 square feet) of land situated in the Peter J. Duncan Survey, Abstract Number 232, Harris County, Texas, being that same Tract Two conveyed by deed to T.I.C. Services Company recorded under Harris County Clerk's File (H.C.C.F.) Number K770229, save and except that called 0.611 acre tract conveyed by deed to Arco Pipeline Company recorded under H.C.C.F. Number N115138, Harris County, Texas; said 6.014 acre tract being more particularly described as follows (bearings are oriented to said 0.611 acre tract).

COMMENCING for reference at the northwesterly corner of a called 4.308 acre tract conveyed by deed to Houston Lighting and Power Company (H.L.&P. Co.) recorded in Volume 5941, Page 108 of the Harris County Deed Records (H.C.D.R.) and being in the southerly line of an H.L.&P. Co. Fee Strip recorded in Volume 1246, Page 276 of the H.C.D.R. from which a found 3/4-inch iron rod bears South 46°20' West, 0.38 feet;

THENCE, North 03°13'49" West, across said H.L.&P. Co. Fee Strip, a distance of 135.00 feet to a 5/8-inch iron rod found in the northerly line of said H.L.&P. Co. Fee Strip and marking the common southwesterly corner of a tract conveyed by deed to Rescar of Channelview, Inc. recorded under H.C.C.F. Number P025607 and the southeasterly corner and POINT OF BEGINNING of the herein described tract;

THENCE, South 86°57'50" West, along the northerly line of said H.L.&P. Co. Fee Strip, a distance of 624.91 feet to a 5/8-inch iron rod with cap stamped "Terra Surveying" set marking the common southeasterly corner of the aforesaid called 0.611 acre tract and the southwesterly corner of the herein described tract;

THENCE, North 03°13'49" West, departing the northerly line of said H.L.&P. Co. Fee Strip, a distance of 417.67 feet to a point in a southerly line of the aforesaid Rescar tract and being the common northeasterly corner of said 0.611 acre tract and the northwesterly corner of the herein described tract, from which a disturbed, 5/8-inch iron rod found for reference bears South 39°27' West, 0.45 feet;

THENCE, North 86°43'24" East, along a southerly line of said Rescar tract, a distance of 404.87 feet to a 1-1/2-inch galvanized iron pipe found marking a common angle point of said Rescar tract and the herein described tract;

THENCE, North 86°25'34" East, along a southerly line of said Rescar tract, a distance of 220.04 feet to a 5/8-inch iron rod found marking a common interior corner of said Rescar tract and the northeasterly corner of the herein described tract;

THENCE, South 03°13'49" East, along a westerly line of said Rescar tract, a distance of 421.44 feet to the POINT OF BEGINNING and containing 6.014 acres (261,950 square feet) of land. The description is based on the Land Title Survey and plat made by Terra Surveying Company, Inc., dated July, 1997, TSC Project Number 0194-9703-S.

RECORDER'S MEMORANDUM
AT THE TIME OF RECORDATION, THIS INSTRUMENT WAS FOUND TO BE INADEQUATE FOR THE BEST PHOTOGRAPHIC REPRODUCTION BECAUSE OF ILLEGIBILITY, CARBON COPY, COLOR, OR PHOTOCOPY, ETC.

CenterPoint Energy Houston Electric, LLC

5-22-57

1761423

STATE OF TEXAS }
COUNTY OF HARRIS }

KNOW ALL MEN BY THESE PRESENTS:

THAT Magnolia Park Land Company, a Texas corporation of Houston, Harris County, Texas, for and in consideration of the sum of TEN DOLLARS ($10.00) CASH to it in hand paid by Houston Lighting & Power Company, and other considerations, the receipt of all of which is hereby acknowledged, has GRANTED, SOLD and CONVEYED, and by these presents does GRANT, SELL and CONVEY unto the Houston Lighting & Power Company, a Texas corporation domiciled in Houston, Harris County, Texas, a three and five-hundred thirty thousandths (3.530) acre tract of land in the Peter J Duncan Survey, Abstract No 232, in Harris County, Texas, and being two and four-hundred twenty-four thousandths (2.424) acres out of a fifty-three and ninety-two hundredths (53.92) acre tract described in deed dated December 31, 1945 from O M Wolfe to Magnolia Park Land Company, recorded in Volume 1421, Page 255 of Harris County Deed Records, and one and one-hundred six thousandths (1.106) acres out of a six and six-hundred thirty-three thousandths (6.633) acre tract described in deed dated May 5, 1954 from John Noffke to Magnolia Park Land Company, recorded in Volume 2952, Page 545 of Harris County Deed Records, said 3.530-acre tract is described by metes and bounds as follows, all coordinates and bearings being referred to the Texas Plane Coordinate System South Central Zone as established by the U S Coast and Geodetic Survey in 1934 and based on the position of U S C and G S triangulation station "Church-1942": X = 3,287,650.26; Y = 721,754.57:

BEGINNING at a point with coordinate X = 3,224,228.8; Y = 726,323.5, the northeast corner of a 1.43-acre tract described in deed dated May 25, 1942 from Texas Prudential Insurance Company to Houston Lighting & Power Company;

THENCE from the point of beginning N 86° 57' 50" W with ~~the northerly line of said Grantee's 1.43-acre tract and~~ with the northerly line of the Grantee's 0.65-acre tract hereinafter referred to 1808.94 feet to a point, the southwesterly corner of said 6.633-acre tract, said point being also the northwesterly corner of said 0.65-acre tract described in deed dated November 13, 1941 from Mrs Augusta Noffke to Houston Lighting & Power Company;

THENCE N 02° 36' 00" W with the westerly line of said 6.633-acre tract 85.0 feet to a point for corner;

THENCE N 86° 57' 50" E 1808.49 feet to a point in the easterly line of said 53.92-acre tract;

THENCE S 03° 02' 10" E with the easterly line of said 53.92-acre tract 85.0 feet to the place of beginning and containing 3.530 acres of land and being a strip of land

85.0 feet wide located north of and adjacent to the Grantee's existing 50 feet wide strip.

THE GRANTOR HEREIN, its successors and assigns, reserve the right to extend roads or streets from north to south across the tract of land herein conveyed, also reserve the right to extend public utilities on said roads or streets. Said roads or streets and public utilities are to be located so as not to interfere with the improvements of the Grantee herein, its successors or assigns, which may at any time hereafter be placed on, under or over said tract of land, and before any such roads or streets are located, the Grantor herein, or its successors or assigns, shall first submit to the Grantee herein, its successors or assigns, a sketch or full information in writing showing the proposed crossing and its location.

TO HAVE AND TO HOLD the above described premises, together with all and singular the rights and appurtenances thereto in anywise belonging, unto the said Houston Lighting & Power Company, its successors or assigns, forever, and Magnolia Park Land Company does hereby bind itself, its successors and assigns, to warrant and forever defend all and singular the said premises unto the said Houston Lighting & Power Company, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof.

TAXES for the year 1957 shall be prorated as of date of deed.

WITNESS our hands this 25th day of May, A D 1957.

ATTEST: MAGNOLIA PARK LAND COMPANY

Sarah Gordon
Secretary

By: David L. Stirton
President

STATE OF TEXAS ()

COUNTY OF HARRIS ()

APPROVED AS TO FORM:
B., B., A. & S.
BY A. H. F.

BEFORE ME, the undersigned authority, a Notary Public in and for Harris County, Texas, on this day personally appeared DAVID L. STIRTON, President of Magnolia Park Land Company, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein expressed, in the capacity therein stated and as the act and deed of said corporation.

GIVEN under my hand and seal of office this 27 day of MAY, A D 1957.

J. D. O'Bryant
Notary Public, Harris County, Texas

THE STATE OF TEXAS
County of Harris

I, W. D. MILLER, Clerk of the County Court of Harris County, Texas, do hereby certify that the within instrument with its certificate of authentication was filed for registration in my office June 4, 19 57, at 1:45 o'clock P M., and duly recorded on July 3, 1957, at 1:52 o'clock P M., in Vol. 3345 Page 336 of record of Deeds for said County.

WITNESS my hand and seal of office, at Houston, the day and date last above written.

W. D. MILLER
Clerk, County Court, Harris County, Texas

By Mary Gatlin, Deputy

(461)

Bertron-Channelview

C-799-006
PS 119

STATE OF TEXAS I

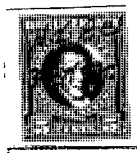
COUNTY OF HARRIS I

KNOW ALL MEN BY THESE PRESENTS:

That I, Mrs. Augusta Noffke, a feme sole, of Harris County, Texas, for and in consideration of the sum of TEN ($10.00) DOLLARS cash to me in hand paid and other considerations, the receipt of all of which is hereby acknowledged, have granted, sold and conveyed, and by these presents, do grant, sell and convey unto the Houston Lighting & Power Company, a Texas Corporation domiciled in Houston, Harris County, Texas, all that certain tract or parcel of land containing sixty-five hundredths (0.65) of one acre out of that certain tract or parcel of land in the Peter J. Duncan Survey, Abstract No. 232, and being that portion of a 55.48 acre tract that lies east of and adjacent to the L. L. D. Tuttle 10 acre tract, said 55.48 acre tract being described in deed dated May 21, 1936, from John Noffke, et ux, to Augusta Noffke and being of record in Volume 1014, Page 405, of the Deed Records of Harris County, Texas and said 0.65 acre tract is described by metes and bounds as follows:

> Beginning at a point in the east line of L. L. D. Tuttle 10 acre tract said point being 507.6 feet south of a ½" iron pipe that marks the northeast corner of said L. L. D. Tuttle 10 acre tract;
>
> Thence from the point of beginning N 88° 59'50" E 566.01 feet to a point in the east line of said 55.48 acre tract said point being 509.5 feet south of a post that marks the northeast corner of said 55.48 acre tract;
>
> Thence south with the east line of said 55.48 acre tract 50.0 feet to a point for corner;
>
> Thence S 88° 59'50" W 566.01 feet to a point in the east line of said L. L. D. Tuttle 10 acre tract;
>
> Thence north with the east line of said L. L. D. Tuttle 10 acre tract 50.0 feet to the place of beginning.

The Grantee herein, its successors and assigns, acquires no mineral rights with this conveyance, the said mineral rights being excepted and reserved to the Grantor, her heirs and assigns, but it is expressly understood and so stipulated that the Grantor, her heirs and assigns, shall not be permitted to drill or operate for minerals on the land herein conveyed.

T5-743

I.D.# 5645

The Grantor herein, her heirs and assigns, also reserve the right to extend streets from north to south across the tract of land herein conveyed, said streets are to be located so as not to interfere with improvements of the Grantee herein, its successors or assigns, which may at any time hereafter be placed on or over said tract of land.

The Grantee herein, its successors and assigns, agree not to fence the tract of land herein conveyed so long as the ownership on both sides of said tract of land remains the same.

There is also granted herewith the right to remove trees or other obstructions within 25 feet of said tract of land herein conveyed.

TO HAVE AND TO HOLD the above described premises, together with all and singular the rights and appurtenances thereto in anywise belonging unto the said Houston Lighting & Power Company, its successors or assigns, forever, and I do hereby bind myself, my heirs, executors and administrators to warrant and forever defend all and singular the said premises unto the said Houston Lighting & Power Company, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof.

WITNESS my hand this 13 day of November, A. D. 1941.

Mrs Augusta Noffke

STATE OF TEXAS]

COUNTY OF HARRIS]

BEFORE ME, the undersigned authority a Notary Public in and for Harris County, Texas, on this day personally appeared Mrs. Augusta Noffke, a feme sole, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that she executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 13 day of November, A. D. 1941.

Charles D. Wood

Notary Public, Harris County, Texas

The Grantor herein, her heirs and assigns, also reserve the right to extend streets from north to south across the tract of land herein conveyed, said streets are to be located so as not to interfere with improvements of the Grantee herein, its successors or assigns, which may at any time hereafter be placed on or over said tract of land.

The Grantee herein, its successors and assigns, agree not to fence the tract of land herein conveyed so long as the ownership on both sides of said tract of land remains the same.

There is also granted herewith the right to remove trees or other obstructions within 25 feet of said tract of land herein conveyed.

TO HAVE AND TO HOLD the above described premises, together with all [illegible] rights and appurtenances thereto in anywise belonging unto

THE STATE OF TEXAS,
County of Harris. } I, W. D. MILLER, Clerk of the County Court of Harris County, Texas, do hereby certify that the within instrument with its certificate of authentication was filed for registration in my office on Mar. 17, 194 2, at 2.15 o'clock P M., and duly recorded on Apr. 17, 194 2, at 4.30 o'clock P M., in Vol 1236, Page 117 of record of Deeds for said County.

WITNESS my hand and seal of office, at Houston, the day and date last above written.

W. D. MILLER
Clerk County Court, Harris County, Texas

By Sylvia Shultz Deputy.

75M 3-42

Bertron - Channelview

C-799-007
C-798-007
PS 119

THE STATE OF TEXAS |
COUNTY OF HARRIS |

KNOW ALL MEN BY THESE PRESENTS: That Texas Prudential Insurance Company, a corporation, of Galveston County, Texas, for and in consideration of the sum of Ten Dollars ($10) cash to it in hand paid and other considerations, the receipt of all of which is hereby acknowledged, has granted, sold and conveyed and by these presents does grant, sell and convey, subject to the exceptions and reservations hereinafter set forth, to the Houston Lighting & Power Company, a Texas corporation domiciled in Houston, Harris County, Texas, all that certain tract or parcel of land containing one and forty-three hundredths (1.43) acres out of a 53.92 acre tract in the Peter J. Duncan Survey, Abstract No. 232, in Harris County, Texas, as described in deed dated June 6, 1933, from C. Canion, et ux, by Trustee, to Texas Prudential Insurance Company and recorded in Volume 923, Page 665, of the Deed Records of Harris County, Texas, said 1.43 acre tract being described by metes and bounds as follows:

> BEGINNING at a point in the west line of said 53.92 acre tract, said point being 509.5 feet south of a fence post that marks the northwest corner of said 53.92 acre tract;
>
> THENCE from the point of beginning N. 88 deg. 59' 50" E 1246 feet to a point in the east line of said 53.92 acre tract, said point being 516.4 feet south of a fence post that marks the northeast corner of said 53.92 acre tract;
>
> THENCE south with the east line of said 53.92 acre tract 50.0 feet to a point for corner;
>
> THENCE S 88 deg. 59' 50" W 1246 feet to a point in the west line of said 53.92 acre tract;
>
> THENCE north with the west line of said 53.92 acre tract 50.0 feet to the place of beginning;

except that the grantor hereby excepts and reserves unto itself, its successors and assigns, all of the oil and gas

T5-745
I.D.# 5646

or other minerals or the proceeds therefrom, which may be found or produced from, under and on the above described premises; but, it is understood that the grantor, its successors and assigns, shall not be permitted to drill or operate for mineral on the right of way herein conveyed until said right of way shall have been abandoned.

The grantor herein, its successors and assigns, shall also have the right to remove trees or other obstructions within twenty-five (25) feet of the tract of land herein conveyed.

As a part of the consideration hereof, it is further understood that the grantor herein, its successors and assigns, also reserve the right to extend streets and roads from north to south across the tract of land herein conveyed, said streets and roads are to be located so as not to interfere with improvements of the grantee herein, its successors or assigns, which may at any time hereafter be placed on or over said tract of land herein conveyed.

TO HAVE AND TO HOLD the above described premises, subject to the above reservations and restrictions, together with all and singular the rights and appurtenances thereto in anywise belonging unto the said Houston Lighting & Power Company, its successors and assigns, forever; and Texas Prudential Insurance Company does hereby bind itself, its successors and assigns, to warrant and forever defend, all and singular, the said premises unto the said Houston Lighting & Power Company, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof, by, through or under it, but not otherwise.

This is a correction deed executed, delivered and accepted in lieu and in stead of that certain deed from grantor herein to the grantee herein dated December 29,

1941, and recorded in Volume 1236, page 118, of the Deed Records of Harris County, Texas.

WITNESS our hands this 25th day of May, A. D. 1942.

TEXAS PRUDENTIAL INSURANCE COMPANY

By _____ President

ATTEST: _____ Secretary

THE STATE OF TEXAS)

COUNTY OF GALVESTON)

BEFORE ME, the undersigned authority, on this day personally appeared S. E. Kempner and T. E. Flick, President and Secretary respectively of Texas Prudential Insurance Company, a corporation, both known to me to be the persons whose names are subscribed to the foregoing instrument, and acknowledged to me that they executed the same for the purposes and consideration therein expressed, in the capacity therein stated and as the act and deed of said corporation.

GIVEN under my hand and seal of office, this the 25 day of May, A. D. 1942.

_____

Fred R. Mann My Commission Expires June 1, 1943
Notary Public in and for
Galveston County, Texas.

THE STATE OF TEXAS, County of Harris. } I, W. D. MILLER, Clerk of the County Court of Harris County, Texas, do hereby certify that the within instrument with its certificate of authentication was filed for registration in my office on May 27, 1942, at 12;30 o'clock P M., and duly recorded on June 25, 1942, at 11;20 o'clock A M., in Vol 1251, Page 88 of record of deeds for said County.

WITNESS my hand and seal of office, at Houston, the day and date last above written.

W. D. MILLER
Clerk County Court, Harris County, Texas

Japage Partnership

U353024
252-317

531-94-0894

Recording Requested by
and Return to:

04/26/00 300394548 U353024 $27.00

Chicago Title
3815 Richmond
Hs. Tx 77024

Special Warranty Deed With Vendor's Lien and Use Restrictions

THE STATE OF TEXAS)
) KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF HARRIS)

THAT Sunbelt Regional Medical Center, Inc., Inc., a Texas corporation ("Grantor"), for and in consideration of the sum of ten Dollars ($10.00) and other good and valuable consideration to it in hand paid by I-10 East Trust, a Texas trust ("Grantee"), the receipt and sufficiency of which are hereby acknowledged, has granted, sold and conveyed, and by these presents does grant, sell and convey unto Grantee, the following described real property located in the County of Harris, State of Texas, to wit: (a) the land described in Exhibit A attached hereto (the "Land"); (b) all of the existing structures or improvements situated on the Land; (c) all right, title and interest of Grantor, if any, in and to all easements and rights of way used in connection with any of the Land or as a means of ingress to or egress from the Land; (d) all right, title and interest of Grantor (present or reversionary), if any, in and to any and all mineral rights (including, without limitation, all oil, gas and other hydrocarbons) and any other minerals relating to the Land; and (e) all of Grantor's right title and interest, if any, in each and every right, benefit, privilege, tenement, hereditament, and appurtenance on or in any wise incident or appertaining to the Land (the real property and real property interests described in the foregoing clauses (a) through (e) being herein collectively referred to as the "Property").

The Property is conveyed subject to all of the matters set forth in Exhibits B and C attached hereto.

TO HAVE AND TO HOLD the Property, unto Grantee, its successors and assigns, forever; and Grantor does hereby bind itself, its heirs, executors, legal representatives, successors and assigns, to WARRANT AND FOREVER DEFEND all and singular the Property unto Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same, or any part thereof, by, through or under Grantor, other than the rights, interests, and claims described or referred to in Exhibit B attached hereto and the terms, conditions,

covenants, agreements, easements and other provisions set forth below, but not otherwise.

As part of the consideration for this conveyance and by acceptance of this deed, Grantee, on behalf of itself and all successor owners of the Property, agrees that the Property shall be held and conveyed subject to the terms, conditions, covenants, agreements, easements and other provisions set forth below.

As used in this Special Warranty Deed and the Exhibits, the following terms shall have the following meanings:

(a) "Grantor" shall mean and include Sunbelt Regional Medical Center, Inc., or any other person, firm or corporation, who (1) shall hereafter acquire all or substantially all of the assets and business of the Grantor by virtue of corporate merger or consolidation of, with or into Columbia/HCA Healthcare Corp., or (2) is the purchaser of substantially all of the assets and business of the Grantor.

(b) "Grantee" as used herein shall mean I-10 East Trust, and each subsequent owner of the Property or any part thereof or any interest in the Property.

(c) "Owner" shall mean and include Grantee and the subsequent owner or owners, from time to time, of a recorded fee simple interest in the Property and any buildings and improvements thereon, or any portion of the Property or any such buildings and improvements, including any reversion or remainder following any leasehold estate of less than 99 years, or a leasehold estate of 99 years or more in and with respect to the Property or any portion thereof.

The covenants and agreements set forth in this Special Warranty Deed and the Exhibits to this Special Warranty Deed shall be covenants running with the land and shall be binding upon and inure to the benefit of Grantor and Grantee and their respective successors and assigns; provided that Grantee shall be liable for the performance of the covenants and agreements to be performed by it hereunder only during the and with respect to the period of time that it is the owner of the Property.

As a portion of the other consideration for the conveyance herein made, Grantee shall execute and deliver to _____ ("Noteholder"), that certain Term Promissory Note ("Note") dated _____, 2000 in the maximum principal amount of $_____ executed by Grantee payable to the order of Noteholder, and the payment of the Note shall be secured by the vendor's lien and superior title herein renewed and assigned to Noteholder and by that certain Deed of Trust ("Deed of Trust") _____, 2000 with the Note from Grantee to _____, as Trustee, for the benefit of Noteholder, covering the Property.

IN WITNESS WHEREOF, this Special Warranty Deed With Vendor's Lien and Use Restrictions is executed as of the 14 day of April, 2000.

GRANTOR:

Sunbelt Regional Medical Center, Inc.,
a Texas corporation

By: Howard K. Patterson
Howard K. Patterson
Vice President

STATE OF TENNESSEE)
)
COUNTY OF DAVIDSON)

On April 14, 2000, before me, the undersigned, a Notary Public in and for said State, personally appeared Howard K. Patterson, personally known to me or proved to me on the basis of satisfactory evidence to be the person who executed the within instrument as the vice President of Sunbelt Regional Medical Center, Inc., a Texas corporation, the corporation that executed the within instrument, and acknowledged to me that such corporation executed the within instrument pursuant to its by-laws or a resolution of its board of directors.

WITNESS my hand and official seal.

Helen W. Cook
Notary Public

My Commission Expires: July 27, 2002

HELEN W. COOK
NOTARY PUBLIC AT LARGE
DAVIDSON COUNTY, TENN.

Tract 1 531-94-0897

Ex A

D

METES & BOUNDS DESCRIPTION
5.5722 ACRES OUT OF RESERVE "A",
CHANNELVIEW MEDICAL CENTER,
IN THE PETER J. DUNCAN SURVEY, A-232
CITY OF CHANNELVIEW, HARRIS COUNTY, TEXAS

Being 5.5722 acres of land out of Restricted Reserve "A", Channelview Medical Center, according to the plat thereof filed at Volume 328, Page 28, Harris County Map Records, Harris County, Texas, being the remainder of that certain called 6.8835 acres (Parcel 1) described in a deed dated 09-17-1987 from HCA Health Services of Texas to East Sunbelt Regional Medical Corporation filed for record in the Official Public Records of Real Property of Harris County, Texas, Clerk's File No. L-385668, Film Code No. 195-31-0143, in the Peter J. Duncan Survey, A-232, and being more particularly described by metes and bounds as follows:

BEGINNING at a found 1" iron pipe marking the southeast corner of said Reserve "A", being in the north right-of-way line Interstate Highway No. 10 (300' wide);

THENCE S 75° 36' 30" W – 372.04', with the said north right-of-way line, to a found 5/8" iron rod with cap for corner;

THENCE N 00° 26' 38" W – 270.81', with the east line of the following two tracts; that certain 0.8097 acre tract described in a deed dated 06-15-1988 from Sunbelt Regional Medical Center to Willits Family Investments, L.C. recorded in the Official Public Records of Real Property of Harris County, Texas, Clerk's File T-112414, Film Code No. 519-51-1903; and that certain 0.5015 acre tract (Tr. 1) described in a deed dated 01-16-2000 from Sunbelt Regional Medical Center to Willits Family Investments, L.C. recorded in the Official Public Records of Real Property of Harris County, Texas, Clerk's File U-209082, Film Code No. 530-50-3934, to a found 5/8" iron rod with cap for corner;

THENCE with the meanders of the northerly line of the said 0.5015 acre tract the following courses and distances:

THENCE N 50° 47' 55" W – 22.32', to a found 5/8" iron rod with cap for corner;

THENCE N 85° 49' 51" W – 50.59', to a found "60-D" nail for corner;

THENCE N 48° 04' 40" W – 69.45', to a found "X" in concrete for corner;

THENCE N 75° 06' 03" W – 19.50', to a found "X" in concrete for corner;

THENCE S 74° 53' 57" W – 20.21', to a found "PK" nail for corner;

THENCE S 29° 53' 57" W – 29.31', to a found "X" in concrete for corner;

THENCE S 00° 06' 03" E – 353.95', with the west line of the said 0.5015 and 0.8097 acre tracts, to a found "PK" nail for corner;

THENCE S 75° 36' 30" W – 35.11', with the south line of aforementioned Reserve "A" and the aforementioned north right-of-way line, to a found 5/8" iron rod with cap for corner;

THENCE N 00° 06' 03" W – 424.43', with the west line of aforementioned Reserve "A", to a found 5/8" iron rod with cap for corner;

THENCE N 89° 53' 57" E – 43.13', with the south line of Channelview Medical Center Condominiums according to the plat thereof filed at Volume 148, Page 94, Condominium Records, Harris County, Texas, and being all that certain 2.1495 acres described in a deed dated 09-07-1984 from HCA Health Services of Texas, Inc. to Hospital Corporation of America filed for record in the Official Public Records of Real Property of Harris County, Texas, Film Code No. 093-97-0488, to a found 5/8" iron rod with cap for corner;

THENCE N 44° 56' 04" E – 220.70', continuing with the said south line, to a Point of Curvature of a curve to the right having a central angle of 44° 56' 49", a radius of 160.00', to a found "X" in concrete for corner;

THENCE continuing with the said south line, with said curve for an arc distance of 125.52', to a found "X" in concrete for the Point of Tangency;

THENCE N 89° 52' 53" E – 113.23', continuing with the said south line, to the Point of Curvature of a curve to the left having a central angle of 89° 48' 14", a radius of 42.00', and a found "PK" nail for corner;

THENCE continuing with the said south line, and with said curve for an arc distance of 65.83', to a found "X" in concrete for the Point of Tangency;

THENCE N 00° 04' 39" E – 95.18', with the east line of the said Channelview Medical Center Condominiums and 2.1495 acres, to a found 5/8" iron rod with cap for corner;

THENCE N 89° 55' 07" E – 101.08', with the north line of the aforementioned Reserve "A", to a found 3/4" iron pipe for corner;

THENCE S 00° 03' 59" E – 819.42', with the east line of aforementioned Reserve "A", to the POINT OF BEGINNING and containing 5.5722 acres (242,727 square feet) of land, more or less.

Compiled from survey by:
PREJEAN & COMPANY, INC.
surveying/mapping
36-32-4c.mb
April 14, 2000

Exhibit B

1. The easements, covenants and agreements herein set forth in this Special Warranty Deed.

2. Rights of the public in streets and highways adjoining the Property, if any.

3. Zoning and building laws, ordinances, resolutions and regulations.

4. Real estate taxes and assessments for public improvements which are not delinquent and not yet due and payable.

5. Covenants, agreements, conditions, restrictions, reservations and other exceptions of record and all easements and rights of way, including without limitation the following:

A. Easement ten (10) feet in width located on, over, under, and across the western portion of subject property together, with an aerial easement adjoining thereto and down guy granted to Houston Lighting and Power Company as set forth in instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number C051126, as shown on sketch attached thereto, and as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas.

B. Easement ten (10) feet in width along a portion of the Westerly property line of subject property together with an aerial easement adjoining thereto granted to Houston Lighting and Power Company as set forth in instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number C659209, as shown on sketch attached thereto, and as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas, as shown on survey prepared by Prejean & Company, Inc., dated February 8, 2000, marked Job No. 36-32-4a.

Concrete and Asphalt pavement encroaches over and into above said easement.

C. Easement ten (10) feet in width located on, over, under, and across the Easterly portion of subject property together with aerial easements adjoining thereto granted to Houston Lighting and Power Company as set forth in instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number H741359, as shown on sketch attached thereto, and as shown on sketch attached thereto, and as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas, as shown on survey prepared by Prejean & Company, Inc., dated February 8, 2000, marked Job No. 36-32-4a.

Concrete driveway encroaches over and into above said easement.

D. Easement ten (10) feet in width along a portion of the Westerly property line of such subject property together with an aerial easement adjoining thereto granted to Houston Lighting and Power Company as set forth in instrument record in the Office of the County Clerk of Harris County Texas under Clerk's File Number H912125, as shown on sketch attached thereto, and as shown on map recorded in Volume 326, page 28 of the Map Records of Harris County, Texas, as shown on survey prepared by Prejean & Company, Inc., dated February 8, 2000, marked Job No. 36-32-4a.

Asphalt pavement and concrete encroaches over and into above said easement.

E. (i) (2) 10' x 30' Fire Hydrant easements throughout subject property as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas as shown on survey prepared by Prejean & Company, Inc., dated February, 2000, marked Job No. 36-43-4a.

(ii) (1) 10' x 35' Fire Hydrant easement as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas as shown on survey prepared by Prejean & Company, Inc., dated February 8, 2000, marked Job No. 36-32-4a.

(iii) 10' x 10' water meter easement as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas, as shown on survey prepared by Prejean & Company, Inc., dated February 8, 2000, marked Job No. 36-32-4a.

F. 5' x 50' sign easement located on, over, under, and across subject property, including but not limited to those certain driveway, parking spaces, and sign easements set forth in instrument recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number J687071.

G. Terms, conditions and stipulations contained in Ordinance No. 83-1696 concerning the right to encroachment on a public right-of-way for a period not to exceed 30 years, a certified copy of which is recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number J249690.

H. Terms, conditions and provisions of that certain oil, gas and mineral lease(s) recorded in the Office of the County Clerk of Harris County, Texas under Clerk's File Number T443412 and T443413. Title to said interest has not been investigated subsequent to the date of the aforesaid instrument.

The consequences of any claim of right to damage or destroy the building (herein after referred to as "land", for the purpose of this item) located upon said property in the exercise of the right of access to subsurface oil, gas, and other

minerals in, under and which may be produced from said property as reserved in instrument filed under Harris County Clerk's File no. T443412.

I. 10' water line easement running north and south through middle of subject property, as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas, as shown on survey prepared by Prejean & Company, Inc., dated February 8, 2000, marked Job No. 36-32-4a.

Asphalt pavement and parking spaces encroaches over and into above said easement.

J. 10' utility easement along with an adjoining 5' aerial easement along the south property line as shown on map recorded in Volume 326, Page 28 of the Map Records of Harris County, Texas, as shown on survey prepared by Prejean & Company, Inc., dated February 8, 2000, marked Job No. 36-32-4a.

Asphalt pavement encroaches over and into above said easement.

K. Those certain driveway parking spaces and sign easements set forth in instrument recorded under Harris County Clerk's File Number(s) J687071.

L. Building setback line twenty-five (25) feet wide located along the south property line(s) of subject property, as shown on the recorded plat of said addition.

M. A driveway easement over and across the subject tract as set forth in instrument recorded under Harris County Clerk's File Number(s) J687071.

Exhibit C

1. The Property may be used for any Purposes allowed by applicable zoning codes and regulations. However, the following uses shall not be permitted on the Property: (a) a general or acute care hospital, medical or surgical or specialty hospital, except for those activities associated with a licensed inpatient long term acute care hospital (LTAC), (b) a facility providing outpatient surgery services, (c) a facility providing birthing services; (d) a facility providing outpatient psychiatric services, (e) a facility providing outpatient laboratory, pathology and radiology or imaging services, (f) the provision of skilled nursing services, or (g) a facility providing "Ancillary Medical Services or Facilities" (as defined herein). Notwithstanding the foregoing, however, nothing in this Paragraph shall prevent Grantee from performing outpatient surgeries under conscious sedation or that do not require general anesthesia or from rendering diagnostic radiological services to those licensed physicians who conduct a medical practice and related activities on the Property ("Physicians") for any such Physician's own patients, so long as all of the following criteria are met: (i) the radiological services are merely ancillary and incidental to such Physician's primary medical practice; (ii) the radiological services do not constitute the Physician's primary medical practice or specialty nor the predominant services rendered by the Physician to the Physician's patients; (iii) the radiological services, and (iv) the request for radiological services do not include ultrasound, radiation therapy, mammography and breast diagnostics, nuclear medicine testing and/or magnetic resonance imaging. As used herein, an "Ancillary Medical care Service or Facility" shall mean and include: (x) any form of outpatient testing for diagnostic or therapeutic purposes, provision or operation of a laboratory (including, without limitation, a pathology, laboratory or clinical laboratory), diagnostic imaging services (including, without limitation, the following testing facilities: fluoroscopy, x-ray, plane file radiography, computerized tomography (CT), ultrasound, radiation therapy, mammography and breast diagnostics, nuclear medicine testing and magnetic resonance imaging), physical therapy services, or respiratory therapy services, and (y) the provision of any medical or related services to or for any person that is in addition to the examination, diagnosis, and treatment of patients performed directly by a Physician or by other health care professionals under the direct supervision of a Physician, or a facility operated for the provision of any such service with the exception of an outpatient wound care center including hyperbaric oxygen. Notwithstanding anything contained herein to the contrary, it is expressly

recognized the intended use of the Property is as a Long Term Acute Care Hospital (LTAC) with all the services, equipment and facilities reasonable related to such use.

2. The Grantor shall not, individually or jointly with others, directly or indirectly, whether for its own account or for that of any other person or entity engage in any manner in the provision of inpatient long term acute care services within a radius of ten (10) miles of the Property; and Grantor shall not act as a partner, independent contractor, consultant, principal, agent, proprietor, or in any other capacity for, nor lend any assistance (financial, managerial, professional or otherwise) or cooperation to, nor perform any services for, any such person or entity seeking to establish or perform inpatient long term acute care services within said ten (10) mile radius of the Property.

3. The provisions of this Exhibit shall remain in effect and be enforceable until such time as the hospital facilities operated by Grantor or any of Grantor's Affiliates in Harris County, Texas, or any successor health care facilities are permanently closed; provided however, (i) the provisions of this Exhibit shall in any event terminate, lapse and be of no further effect on the date ninety-nine (99) years after the recording of this Exhibit (the "Restriction Period"). The Grantor's hospital facilities, Affiliates in Harris County, Texas, or successor health care facilities shall, for the purpose of the preceding sentence, be deemed to have permanently closed when and if such facilities have been closed and no health care services of any kind have been provided therein for period of eighteen (18) consecutive months; provided, however, if no such health care services have been provided at such facility or facilities for such period of time because of damage or destruction by fire or any other casualty, and such facility or facilities is or are being repaired or reconstructed, then such facility or facilities shall not be deemed to have closed, permanently or otherwise, from the date of such casualty to the date of completion of such repairs or restoration.

4. The covenants and restrictions provided for in this Exhibit shall be effective upon the date hereof and shall run with the land. The agreements provided for herein shall inure to the benefit of and be binding upon (a) the Grantor and its Affiliates in Harris County, Texas, hospital facilities, successors and assigns; (b) the Grantee, and (c) the respective successors, successors-in-title, assigns, heirs, and lessees of the property and the Grantee, and their respective agents, employees, lessees and invitees. The covenants and restrictions provided for in this Exhibit shall remain in full force and effect and shall be unaffected by any change in ownership of the Property, or by any change of use, demolition, reconstruction, expansion or other circumstances, except as specified herein. Irreparable harm will result to grantor by reason of any breach of the agreements, covenants and restrictions set forth in this Exhibit, and therefore, Grantor shall be entitled

to relief by way of injunction or specific performance to enforce the provisions of this Exhibits, as well as any other relief available at law or equity. The failure of Grantor, in any one or more instances, to insist upon compliance with any of the terms and conditions of this Exhibit, or to exercise any right or privilege conferred in this Exhibit, shall not constitute or be construed as the waiver of such or any similar restriction, right, option or privilege, but the same shall continue and remain in full force and effect as if no such forbearance has occurred.

5. This Exhibit shall be governed, construed and enforced in accordance with the laws of the State of Texas. If any covenant, condition, restriction, option, right of first refusal or other provision of this Exhibit shall be unlawful, void or voidable for the violation of any rule of law, including, but not limited to, the rule against perpetuities, any law regarding unreasonable restraints on alienation or any similar rule of law, then such provision shall continue only until the date twenty-one (21) years after the death of the last survivor of the now living lineal descendants of Elizabeth II, Queen of England.

U353025

250-317

531-94-0904

Recording Requested by
and Return to:

Chicago Title
3815 Richmond
Hs TX 77027

04/26/00 300394549 U353025 $23.00

Special Warranty Deed With Vendor's Lien and Use Restrictions

THE STATE OF TEXAS)
) KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF HARRIS)

THAT Hospital Development Properties, Inc., a Delaware corporation ("Grantor"), for and in consideration of the sum of ten Dollars ($10.00) and other good and valuable consideration to it in hand paid by I-10 East Trust, a Texas trust ("Grantee"), the receipt and sufficiency of which are hereby acknowledged, has granted, sold and conveyed, and by these presents does grant, sell and convey unto Grantee, the following described real property located in the County of Harris, State of Texas, to wit: (a) the land described in Exhibit A attached hereto (the "Land"); (b) all of the existing structures or improvements situated on the Land; (c) all right, title and interest of Grantor, if any, in and to all easements and rights of way used in connection with any of the Land or as a means of ingress to or egress from the Land; (d) all right, title and interest of Grantor (present or reversionary), if any, in and to any and all mineral rights (including, without limitation, all oil, gas and other hydrocarbons) and any other minerals relating to the Land; and (e) all of Grantor's right title and interest, if any, in each and every right, benefit, privilege, tenement, hereditament, and appurtenance on or in any wise incident or appertaining to the Land (the real property and real property interests described in the foregoing clauses (a) through (e) being herein collectively referred to as the "Property").

The Property is conveyed subject to all of the matters set forth in Exhibits B and C attached hereto.

TO HAVE AND TO HOLD the Property, unto Grantee, its successors and assigns, forever; and Grantor does hereby bind itself, its heirs, executors, legal representatives, successors and assigns, to WARRANT AND FOREVER DEFEND all and singular the Property unto Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same, or any part thereof, by, through or under Grantor, other than the rights, interests, and claims described or referred to in Exhibit B attached hereto and the terms, conditions,

covenants, agreements, easements and other provisions set forth below, but not otherwise.

As part of the consideration for this conveyance and by acceptance of this deed, Grantee, on behalf of itself and all successor owners of the Property, agrees that the Property shall be held and conveyed subject to the terms, conditions, covenants, agreements, easements and other provisions set forth below.

As used in this Special Warranty Deed and the Exhibits, the following terms shall have the following meanings:

(a) "Grantor" shall mean and include Hospital Development Properties, Inc., or any other person, firm or corporation, who (1) shall hereafter acquire all or substantially all of the assets and business of the Grantor by virtue of corporate merger or consolidation of, with or into Columbia/HCA Healthcare Corp., or (2) is the purchaser of substantially all of the assets and business of the Grantor.

(b) "Grantee" as used herein shall mean I-10 East Trust, and each subsequent owner of the Property or any part thereof or any interest in the Property.

(c) "Owner" shall mean and include Grantee and the subsequent owner or owners, from time to time, of a recorded fee simple interest in the Property and any buildings and improvements thereon, or any portion of the Property or any such buildings and improvements, including any reversion or remainder following any leasehold estate of less than 99 years, or a leasehold estate of 99 years or more in and with respect to the Property or any portion thereof.

The covenants and agreements set forth in this Special Warranty Deed and the Exhibits to this Special Warranty Deed shall be covenants running with the land and shall be binding upon and inure to the benefit of Grantor and Grantee and their respective successors and assigns; provided that Grantee shall be liable for the performance of the covenants and agreements to be performed by it hereunder only during the and with respect to the period of time that it is the owner of the Property.

As a portion of the other consideration for the conveyance herein made, Grantee shall execute and deliver to _____ ("Noteholder"), that certain Term Promissory Note ("Note") dated _____, 2000 in the maximum principal amount of $_____ executed by Grantee payable to the order of Noteholder, and the payment of the Note shall be secured by the vendor's lien and superior title herein renewed and assigned to Noteholder and by that certain Deed of Trust ("Deed of Trust") _____, 2000 with the Note from Grantee to _____, as Trustee, for the benefit of Noteholder, covering the Property.

IN WITNESS WHEREOF, this Special Warranty Deed With Vendor's Lien and Use Restrictions is executed as of the 14 day of April, 2000.

GRANTOR:

Hospital Development Properties, Inc.,
a Delaware corporation

By: Howard K. Patterson
Howard K. Patterson
Vice President

STATE OF TENNESSEE)
)
COUNTY OF DAVIDSON)

On April 14, 2000, before me, the undersigned, a Notary Public in and for said State, personally appeared Howard K. Patterson, personally known to me or proved to me on the basis of satisfactory evidence to be the person who executed the within instrument as the vice President of Hospital Development Properties, Inc., a Delaware corporation, the corporation that executed the within instrument, and acknowledged to me that such corporation executed the within instrument pursuant to its by-laws or a resolution of its board of directors.

WITNESS my hand and official seal.

Helen W. Cook
Notary Public

My Commission Expires: July 27, 2002

HELEN W. COOK
NOTARY PUBLIC AT LARGE
DAVIDSON COUNTY, TENN.

Ex. A

Tract 2 531-94-0907

METES & BOUNDS DESCRIPTION
2.1495 ACRES, ALL OF
CHANNELVIEW MEDICAL CENTER
HARRIS COUNTY, TEXAS

D

All that certain 2.1495 acres of land, being all of Channelview Medical Center Condominiums according to the plat there of filed at Volume 148, Page 94 Harris County Condominium Records, all that certain 2.1495 acres described in a deed dated 09-07-1984 from HCA Health Services of Texas, Inc. to Hospital Corporation of America, filed in the Official Public Records of Real Property of Harris County, Texas, Clerk's File No. J-687072, Film Code No. 093-97-0488 and being more particularly described by metes and bounds as follows:

BEGINNING at the northwest corner of said Channelview Medical Center Condominiums;

THENCE N 89° 55' 07" E - 467.82', with the north line of said Channelview Medical Center Condominiums, to a found 5/8" iron rod with cap for corner;

THENCE with the northerly and westerly lines of that certain called 6.8835 acres described in a deed dated 09-17-1987 from HCA Health Services of Texas to East Sunbelt Regional Medical Corporation filed for record in the Official Public Records of Real Property of Harris County, Texas, at Clerk File No. L-385668, Film Code No. 195-31-0143, the following 6 courses and distances:

THENCE S 00° 04' 39" W - 95.18', to a found "X" in concrete for the Point of Curvature of a curve to the right having a central angle of 89° 48' 14", a radius of 42.00';

THENCE with said curve for an arc distance of 65.83', to a found "PK" nail for the Point of Tangency;

THENCE S 89° 52' 53" W - 113.23', to a found "X" in concrete for the Point of Curvature of a curve to the left having a central angle of 44° 56' 49", a radius of 160.00';

THENCE with said curve for an arc distance of 125.52', to a found "X" in concrete for the Point of Tangency;

THENCE S 44° 56' 04" W - 220.70', to a found 5/8" iron rod with cap for corner;

THENCE S 89° 53' 57" W - 43.13', to a to a found 5/8" iron rod with cap for corner;

THENCE N 00° 06' 03" W - 340.00', with the west line of the aforementioned Channelview Medical Center Condominiums, to the POINT OF BEGINNING and containing 2.1495 acres (93,633 square feet) of land, more or less.

Compiled from survey by:

PREJEAN & COMPANY, INC.
surveying / mapping
Job No. 36-32-4b

April 14, 2000

Exhibit B

1. The easements, covenants and agreements herein set forth in this Special Warranty Deed.

2. Rights of the public in streets and highways adjoining the Property, if any.

3. Zoning and building laws, ordinances, resolutions and regulations.

4. Real estate taxes and assessments for public improvements which are not delinquent and not yet due and payable.

5. Covenants, agreements, conditions, restrictions, reservations and other exceptions of record and all easements and rights of way, including without limitation the following:

A. A(n) ten (10 feet water line easement along a portion of the Easterly property line(s) of subject property, as shown on the recorded plat of said addition.

B. A 286 square foot water main easement along the Easterly property line(s) of subject property, as shown on the recorded plat of said addition.

C. An easement ten (10) feet wide along the North and West property line(s) and an unobstructed aerial easement adjoining thereto five (5) feet wide from a plane twenty (20) feet above the ground upward for the use of public utilities, as shown on recorded plat of said addition.

D. A(n) eight (8) foot Houston Lighting and Power Company easement along the North property line(s) of subject property, as shown on the recorded plat of said addition. (and recorded under Harris County Clerk's File Number(s) H956713)

E. A(n) ten (10) foot Houston Lighting and Power Company easement along the West property line(s) of subject property, as shown on the recorded plat of said addition.

F. Easement for driveway located in the most Southerly corner as set forth in J687071 and reflected on the survey dated November 9, 1999 by N.M. Mathis, R.P.S. No. 4517.

Exhibit C

1. The Property may be used for any Purposes allowed by applicable zoning codes and regulations. However, the following uses shall not be permitted on the Property: (a) a general or acute care hospital, medical or surgical or specialty hospital, except for those activities associated with a licensed inpatient long term acute care hospital (LTAC), (b) a facility providing outpatient surgery services, (c) a facility providing birthing services; (d) a facility providing outpatient psychiatric services, (e) a facility providing outpatient laboratory, pathology and radiology or imaging services, (f) the provision of skilled nursing services, or (g) a facility providing "Ancillary Medical Services or Facilities" (as defined herein). Notwithstanding the foregoing, however, nothing in this Paragraph shall prevent Grantee from performing outpatient surgeries under conscious sedation or that do not require general anesthesia or from rendering diagnostic radiological services to those licensed physicians who conduct a medical practice and related activities on the Property ("Physicians") for any such Physician's own patients, so long as all of the following criteria are met: (i) the radiological services are merely ancillary and incidental to such Physician's primary medical practice; (ii) the radiological services do not constitute the Physician's primary medical practice or specialty nor the predominant services rendered by the Physician to the Physician's patients; (iii) the radiological services, and (iv) the request for radiological services do not include ultrasound, radiation therapy, mammography and breast diagnostics, nuclear medicine testing and/or magnetic resonance imaging. As used herein, an "Ancillary Medical care Service or Facility" shall mean and include: (x) any form of outpatient testing for diagnostic or therapeutic purposes, provision or operation of a laboratory (including, without limitation, a pathology, laboratory or clinical laboratory), diagnostic imaging services (including, without limitation, the following testing facilities: fluoroscopy, x-ray, plane file radiography, computerized tomography (CT), ultrasound, radiation therapy, mammography and breast diagnostics, nuclear medicine testing and magnetic resonance imaging), physical therapy services, or respiratory therapy services, and (y) the provision of any medical or related services to or for any person that is in addition to the examination, diagnosis, and treatment of patients performed directly by a Physician or by other health care professionals under the direct supervision of a Physician, or a facility operated for the provision of any such service with the exception of an outpatient wound care center including hyperbaric oxygen. Notwithstanding anything contained herein to the contrary, it is expressly

recognized the intended use of the Property is as a Long Term Acute Care Hospital (LTAC) with all the services, equipment and facilities reasonable related to such use.

2. The Grantor shall not, individually or jointly with others, directly or indirectly, whether for its own account or for that of any other person or entity engage in any manner in the provision of inpatient long term acute care services within a radius of ten (10) miles of the Property; and Grantor shall not act as a partner, independent contractor, consultant, principal, agent, proprietor, or in any other capacity for, nor lend any assistance (financial, managerial, professional or otherwise) or cooperation to, nor perform any services for, any such person or entity seeking to establish or perform inpatient long term acute care services within said ten (10) mile radius of the Property.

3. The provisions of this Exhibit shall remain in effect and be enforceable until such time as the hospital facilities operated by Grantor or any of Grantor's Affiliates in Harris County, Texas, or any successor health care facilities are permanently closed; provided however, (i) the provisions of this Exhibit shall in any event terminate, lapse and be of no further effect on the date ninety-nine (99) years after the recording of this Exhibit (the "Restriction Period"). The Grantor's hospital facilities, Affiliates in Harris County, Texas, or successor health care facilities shall, for the purpose of the preceding sentence, be deemed to have permanently closed when and if such facilities have been closed and no health care services of any kind have been provided therein for period of eighteen (18) consecutive months; provided, however, if no such health care services have been provided at such facility or facilities for such period of time because of damage or destruction by fire or any other casualty, and such facility or facilities is or are being repaired or reconstructed, then such facility or facilities shall not be deemed to have closed, permanently or otherwise, from the date of such casualty to the date of completion of such repairs or restoration.

4. The covenants and restrictions provided for in this Exhibit shall be effective upon the date hereof and shall run with the land. The agreements provided for herein shall inure to the benefit of and be binding upon (a) the Grantor and its Affiliates in Harris County, Texas, hospital facilities, successors and assigns; (b) the Grantee, and (c) the respective successors, successors-in-title, assigns, heirs, and lessees of the property and the Grantee, and their respective agents, employees, lessees and invitees. The covenants and restrictions provided for in this Exhibit shall remain in full force and effect and shall be unaffected by any change in ownership of the Property, or by any change of use, demolition, reconstruction, expansion or other circumstances, except as specified herein. Irreparable harm will result to grantor by reason of any breach of the agreements, covenants and restrictions set forth in this Exhibit, and therefore, Grantor shall be entitled

to relief by way of injunction or specific performance to enforce the provisions of this Exhibits, as well as any other relief available at law or equity. The failure of Grantor, in any one or more instances, to insist upon compliance with any of the terms and conditions of this Exhibit, or to exercise any right or privilege conferred in this Exhibit, shall not constitute or be construed as the waiver of such or any similar restriction, right, option or privilege, but the same shall continue and remain in full force and effect as if no such forbearance has occurred.

5. This Exhibit shall be governed, construed and enforced in accordance with the laws of the State of Texas. If any covenant, condition, restriction, option, right of first refusal or other provision of this Exhibit shall be unlawful, void or voidable for the violation of any rule of law, including, but not limited to, the rule against perpetuities, any law regarding unreasonable restraints on alienation or any similar rule of law, then such provision shall continue only until the date twenty-one (21) years after the death of the last survivor of the now living lineal descendants of Elizabeth II, Queen of England.

Harrods Eastbelt Ltd

99-181439

525-83-3574

T745129

GENERAL WARRANTY DEED
(Assumption)

WD

05/26/99 200972787 T745129 $19.00

STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF HARRIS §

THAT, SOUTHWEST ASSOCIATES - EAST BELT, a Texas joint venture (hereinafter referred to as "Grantor"), for and in consideration of the sum of TEN AND NO/100 DOLLARS ($10.00) and other good and valuable consideration to Grantor paid by HARRODS EASTBELT, LTD, a Texas limited partnership, whose address is 15919 I-10 East, Channelview, Harris County, Texas 77530 (hereinafter referred to as "Grantee"), the receipt and sufficiency of which is hereby acknowledged, and the further consideration of Grantee's assuming and agreeing to pay and discharge, as the same becomes due and payable, the unpaid principal balance owing on that certain Promissory Note dated June 9, 1998, in the original principal amount of FIVE MILLION AND NO/100 DOLLARS ($5,000,000.00) (the "First Lien Note"), secured by that certain Deed of Trust and Security Agreement dated June 9, 1998, to Fidelity National Title Insurance Company, as Trustee (the "First Lien Deed of Trust"), filed for record in the Official Public Records of Real Property of Harris County, Texas, under Clerk's File No. T-072945 and Grantee assuming and promising to keep and perform all of the covenants and obligations of the Grantor in said First Lien Deed of Trust, has GRANTED, SOLD, and CONVEYED, and by these presents does GRANT, SELL and CONVEY, unto said Grantee the real property situated in Harris County, Texas, as more particularly described on Exhibit "A" attached hereto (the "Property").

This conveyance is expressly made by Grantor and accepted by Grantee subject to the Permitted Exceptions specified in Exhibit "B" attached hereto and incorporated herein by reference, to the extent same are now in full force and affecting the Property.

19

TO HAVE AND TO HOLD the Property, together with all and singular the rights and appurtenances thereto in anywise belonging unto the said Grantee, its successors and assigns forever; and Grantor does hereby bind itself, its successors and assigns to WARRANT AND FOREVER DEFEND, all and singular, the said Property unto the said Grantee, its successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof.

It is expressly agreed and stipulated that a vendor's lien and the superior title are retained against the Property until the First Lien Note has been fully paid according to its face, tenor, effect and reading, when this Deed shall become absolute.

Taxes for the current year have been prorated as of the date hereof and Grantee assumes and agrees to pay the same.

525-83-3575

EXECUTED effective as of the 24 day of MAY, 1999.

GRANTOR:

SOUTHWEST ASSOCIATES - EAST BELT, a Texas joint venture

By: SWA-EB Venture Management, L.P., a Texas limited partnership, its Managing Venturer

By: Southwest Inns, L.L.C., a Texas limited liability company, a Co-General Partner

By: _____
Raymond E. Hankamer, Jr.
President

GRANTEE:

HARRODS EASTBELT, LTD., a Texas limited partnership

By: Eastbelt Hospitality, Inc., a Texas corporation, its General Partner

By: Steve Hsu
Name: STEVE HSU
Title: President

THH\001623\00002\81100.03

525-83-3576

THE STATE OF TEXAS §
§
COUNTY OF HARRIS §

This instrument was acknowledged before me on this 24 day of MAY, 1999, by Raymond E. Hankamer, Jr., President of Southwest Inns, L.L.C., a Texas limited liability company, a co-general partner of SWA-EB Venture Management, L.P., a Texas limited partnership, the managing venturer of SOUTHWEST ASSOCIATES – EAST BELT, a Texas joint venture, on behalf of said joint venture.

Diann M. Bruce
Notary Public in and for
the State of Texas

[personalized seal]

DIANN M. BRUCE
Notary Public, State of Texas
My Commission Expires 2-24-2000

THE STATE OF TEXAS §
§
COUNTY OF HARRIS §

This instrument was acknowledged before me on this 24 day of MAY, 1999, by STEVE HSU, PRESIDENT of Eastbelt Hospitality, Inc., a Texas corporation, as general partner of HARRODS EASTBELT, LTD., a Texas limited partnership, on behalf of said limited partnership.

Diann M. Bruce
Notary Public in and for
the State of Texas

[personalized seal]

DIANN M. BRUCE
Notary Public, State of Texas
My Commission Expires 2-24-2000

THH\001623\00002\81100.03

525-83-3577

EXHIBIT "A"

Property description

A tract of land containing 5.7264 acres of land, more or less, being part of and out of that certain tract called 53.92 acre tract of land described in deed dated December 31, 1945 of record In Volume 1421, Page 255, of the Deed Records of Harris County, Texas, said tract also being part of and out of that certain called 13.02 acre tract of land described in Tract I, in deed dated April 10, 1963 of record in Volume 5090, Page 38, of the Deed Records of Harris County, Texas, said tract of land lying and being situated in the Peter Duncan Survey, Abstract 232, Harris County, Texas, and being more particularly described by metes and bounds as follows:

BEGINNING at a 1 inch iron pipe found for corner marking the intersection of the Westerly line of the aforesaid called 53.92 acre tract of land and the Northerly Right-Of-Way line of I.H.10, said 1 inch iron pipe being South 75 deg. 56 min. 23 sec. West, 1263.62 feet from the Southwest corner of Lot 37 of Delldale Addition as recorded in Volume 998, Page 319 of Deed Records of Harris County, Texas; said 1 inch iron pipe also being the Southwesterly corner of the aforesaid called 13.02 acre tract of land;

THENCE North 00 deg. 22 min. 53 sec. East, along the Westerly line of the said called 53.92 acre tract of land and being the East line of a 9.0330 acre tract of land recorded in Volume 326, Page 28 Map Records of Harris County, Texas, a distance of 618.96 feet to a 1 inch iron pipe found in the Southerly line of 135 foot wide Houston Lighting & Power Company Fee Strip recorded in Volume 1236, Page 117 Deed Records of Harris County, Texas marking the Northwesterly corner of herein described tract of land;

THENCE South 89 deg. 38 min. 17 sec. East, along the Southerly line of the aforesaid Houston Lighting & Power Fee Strip, a distance of 473.26 feet to the centerline of a ditch for corner;

THENCE in the Southwesterly and Southeasterly direction along the centerline of said ditch and being the Westerly line of a 3.933 acre tract of land and recorded under Harris County Clerk's Film Code No. [redacted]-1812 as follows:

South 00 deg. 06 min. 48 sec. East, a distance of 150.88 feet;..
South 10 deg. 39 min. 59 sec. West, a distance of 85.72 feet;
South 16 deg. 03 min. 06 sec. West, a distance of 246.96 feet;
South 10 deg. 41 min. 05 sec. West, a distance of 48.00 feet;
to the Northerly Right-Of-Way line of I.H.10 for corner;

THENCE South 75 deg. 56 min. 23 sec. West, along the Northerly Right-Of-Way line of I.H.10, a distance of 396.50 feet to the Place Of Beginning.

(NOTE: Bearings shown are based on the Northerly Right-Of-Way line of I.H.10 as recorded under Harris County Clerk's Film Code No. [redacted]1812.)

525-83-3578

EXHIBIT "B"

Permitted Exceptions

1. An unobstructed easement 10 feet in width along the west property line(s) together with an aerial easement 5 feet in width from a plane 20 feet above the ground upward located adjacent thereto, as granted to Houston Lighting and Power Company in instrument recorded under Harris County Clerk's File No. G558012 and as shown on sketch attached thereto. Same being shown on survey dated October 9, 1995, revised November 14, 1995 and updated April 28, 1998, prepared by Ralph L. Hennessy, R.P.L.S. No. 905.

2. A drainage easement and ditch 25 feet wide along the easterly property line(s), as set forth in instrument recorded in Volume 2704, Page 704 and Volume 2685, Page 469, of the Deed Records of Harris County, Texas. Same being shown on survey dated October 9, 1995, revised November 14, 1995 and updated April 28, 1998, prepared by Ralph L. Hennessy, R.P.L.S. No. 905.

3. A road easement 50 feet in width located along the front line of the Property and a sign easement located adjacent thereto as set forth in instruments recorded under Harris County Clerk's File No. F975700, G227088 and G772041. Said easement having been conveyed to Wayne G. Mulloy for the benefit of the property adjacent to the Property as set forth in instrument recorded under Harris County Clerk's File No. G174060. Same being shown on survey dated October 9, 1995, revised November 14, 1995 and updated April 28, 1998, prepared by Ralph L. Hennessy, R.P.L.S. No. 905.

4. Encroachment of concrete and asphalt parking and/or driveway into the above mentioned 50 foot wide sign access and road easement as shown on survey dated October 9, 1995, revised November 14, 1995 and updated April 28, 1998, prepared by Ralph L. Hennessy, R.P.L.S. No. 905.

5. One-half (1/2) of all oil, gas and other minerals, the royalties, bonuses, rentals and all other rights in connection with same are excepted herefrom as set forth in instrument filed for record in Volume 1421, Page 254, of the Deed Records of Harris County, Texas. Waiver of surface rights as contained in instrument recorded under Harris County Clerk's File No. F910657.

6. All oil, gas and other minerals, the royalties, bonuses, rentals and all other rights in connection with same are excepted herefrom as set forth in instrument recorded under Harris County Clerk's File No. F975700. Surface rights waived therein.

7. Oil, gas and mineral lease as set forth in instrument recorded in Volume 460, Page 524 of the Contract Records of Harris County, Texas.

525-83-3579

8. Oil, gas and mineral lease(s) as set forth in instrument filed under Clerk's File No.(s), N952979, S787491, S787492, S787493, S787494, S787495, S814974, S839489, S850906, T387018 and T387021.

9. Terms, conditions and provisions contained in all leases together with the right of the lessees thereunder.

10. Subject to the terms, conditions and stipulations contained in those two certain unrecorded Outdoor Sign Lease Agreements as mentioned in instrument recorded under Harris County Clerk's File No. D449436.

11. Lease Agreement dated June 19, 1986, executed by and between Southwest Associates, lessor, and ARA/Solon Automated Services, Inc., lessee, filed for record under Harris County Clerk's File No. K638548.

12. Subject to terms, conditions and stipulations set forth in Non-Disturbance and Attornment Agreement dated May 28, 1998 and filed June 16, 1998 under Harris County Clerk's File No. T083655.

13. Deed of Trust dated June 9, 1998, filed for record on June 10, 1998, under Clerk's File No. T072945 in the Official Records of Harris County, Texas, executed by Southwest Associates-East Belt, a Texas joint venture, to Fidelity National Title Insurance, Trustee, securing the payment of a Note in the principal sum of $5,000,000.00, and other indebtedness as provided therein, payable to the order of WMF Capital Corp., a Delaware corporation, said Note being additionally secured by an Assignment of Leases and Rents dated June 9, 1998, and filed for record on June 10, 1998 under Harris County Clerk's File No. T072946. Security Interest granted to WMF Capital Corp., Secured Party, by Southwest Associates-East Belt, Debtor, as shown by UCC-1 Financing Statement recorded under Harris County Clerk's File No. T072947.

FILED
99 MAY 26 AM 11:27
COUNTY CLERK
HARRIS COUNTY, TEXAS

ANY PROVISION HEREIN WHICH RESTRICTS THE SALE, RENTAL, OR USE OF THE DESCRIBED REAL PROPERTY BECAUSE OF COLOR OR RACE IS INVALID AND UNENFORCEABLE UNDER FEDERAL LAW

THE STATE OF TEXAS }
COUNTY OF HARRIS }

I hereby certify that this instrument was FILED in File Number Sequence on the date and at the time stamped hereon by me, and was duly RECORDED, in the Official Public Records of Real Property of Harris County, Texas on

MAY 26 1999

COUNTY CLERK
HARRIS COUNTY TEXAS

Return To:
Diann M. Bruce
1800 West Loop South
Suite 200
Houston, TX 77027

THH\001623\00002\81100.03

Appendix B

A description of the current use, and, to the extent known, the anticipated use(s), of the designated property and properties within 500 feet of the boundary of the designated property.

Current Use of Designated Property

The designated property includes four parcels: Rescar property, part of the CenterPoint Right-of-Way, part of the Kindred Hospital property, and the Clarion Inn property. The Rescar property is currently used as a railcar cleaning facility by Rescar for railcar cleaning, maintenance, and repair. The property will remain commercial/industrial.

The other properties included within the proposed MSD boundary are commercial facilities to the south of the Rescar Property. Kindred Hospital is a healthcare facility and Clarion Inn is a hotel. It is anticipated that these properties will remain in commercial use. The utility right-of-way separating Rescar from Kindred Hospital and Clarion Inn will remain a right-of-way.

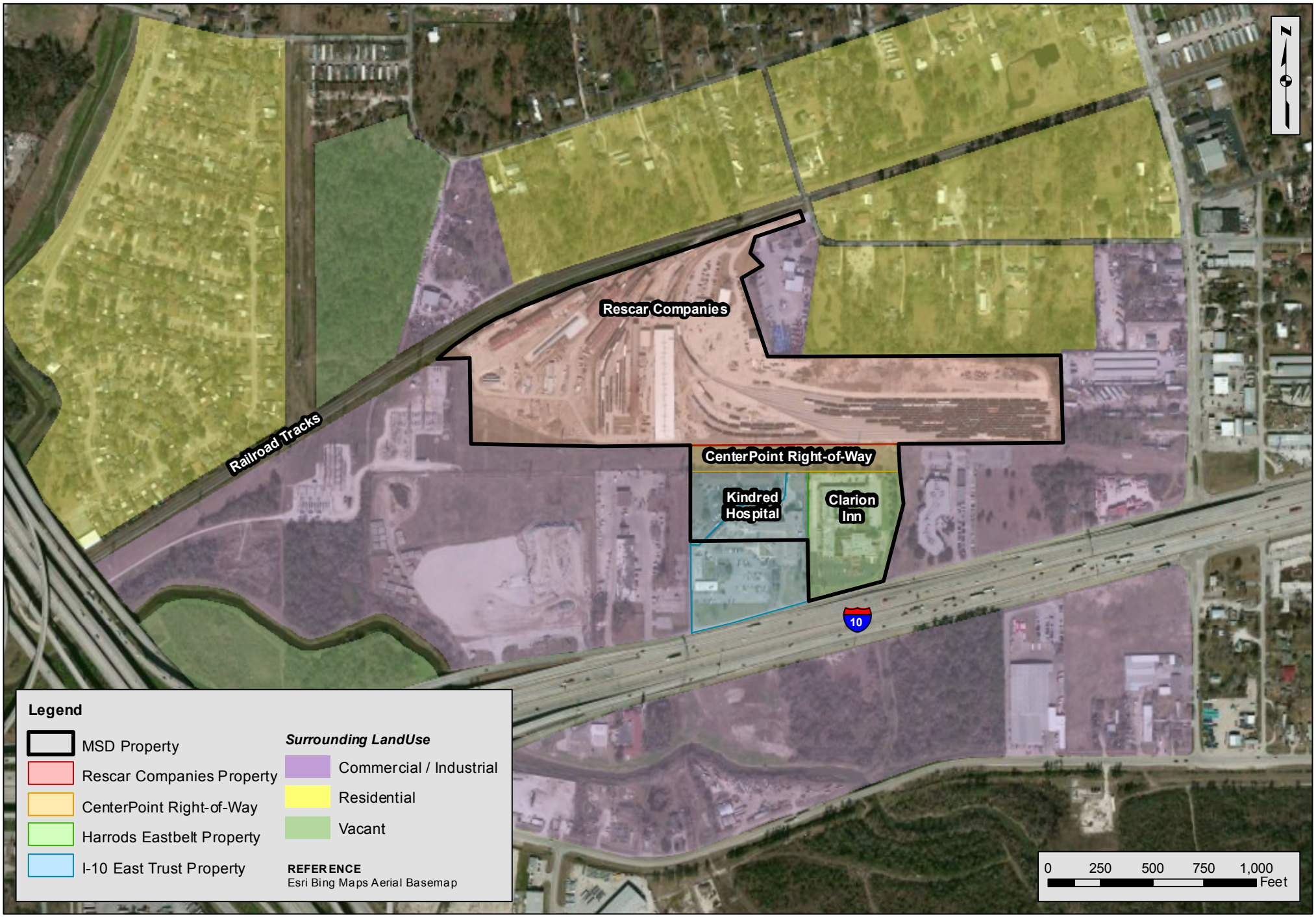
Figure B-1 presents a map of land uses of the area within 500 feet of the designated property.

Anticipated Use of Designated Property

The anticipated future use of the designated property will continue in commercial/industrial use as a railcar cleaning and maintenance facility, utility right-of-way, hospital, and hotel.

Current and Anticipated Use of Properties within 500 feet of the Designated Property

The properties located within 500 feet of the designated property are commercial and light industrial with some residential properties to the north. Interstate 10 lies immediately south of the designated property. It is anticipated that the surrounding area will remain commercial/light industrial mixed with some residential properties.



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Channelview Facility
MUNICIPAL SETTING DESIGNATION APPLICATION

Surrounding Land Use

ARCADIS U.S.
March 2014

Figure B-1

Appendix C

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 <u>including the nearest surface water body</u> and whether the designated property is located in a floodplain or floodway, as those terms are defined in Chapter 19 of the Code of Ordinances.**

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.**

---

a. **Figure C-1** shows the location of the designated property in Channelview, Texas east of Houston in an area with a history of commercial/industrial and residential development.

b. **Figure C-2** presents a topographic map of the area around the designated property. The closest surface water body is Carpenter's Bayou which lies approximately 850 feet south of the designated property.

   Figure C-3 presents a watershed map of the area around the designated property. The designated property lies within the Carpenter's Bayou Watershed.

   Figure C-4 presents a floodplain map of the area around the designated property based on the Federal Emergency Management effective Flood Insurance Rate Map. No part of the designated property lies within the floodway. Parts of the designated property lie within the 100-year floodplain and the 500-year floodplain. These areas include Clarion Inn hotel property and part of the CenterPoint Right-of-Way property.

c. **Figures C-5a** presents the estimated extent of affected groundwater in the Cleaning Track area at the designated property. The estimated extent of affected groundwater is based on the detection of COCs at a concentration exceeding the TRRP RALs in samples from monitoring wells during the most recent sampling conducted in June 2013.

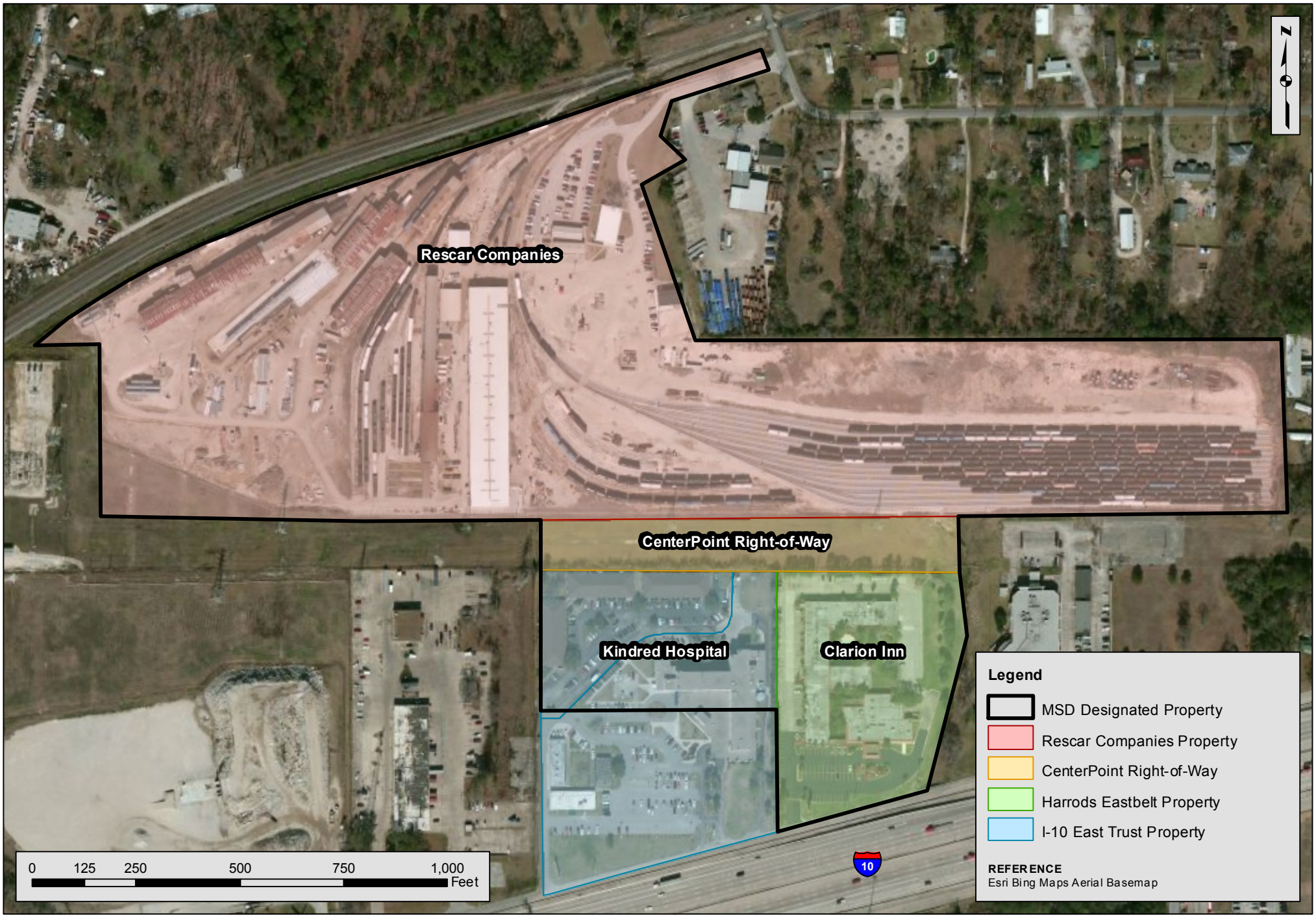
   Figure C-5b presents the estimated extent of affected groundwater in the Former Ponds area at the designated property. The estimated extent of affected groundwater is based on the detection of COCs at a concentration exceeding the TRRP RALs in samples from monitoring wells during the most recent sampling conducted in June 2013.

d. **Figures C-5a and 5b** present the groundwater sampling locations at the Cleaning Track area and the Former Ponds area.

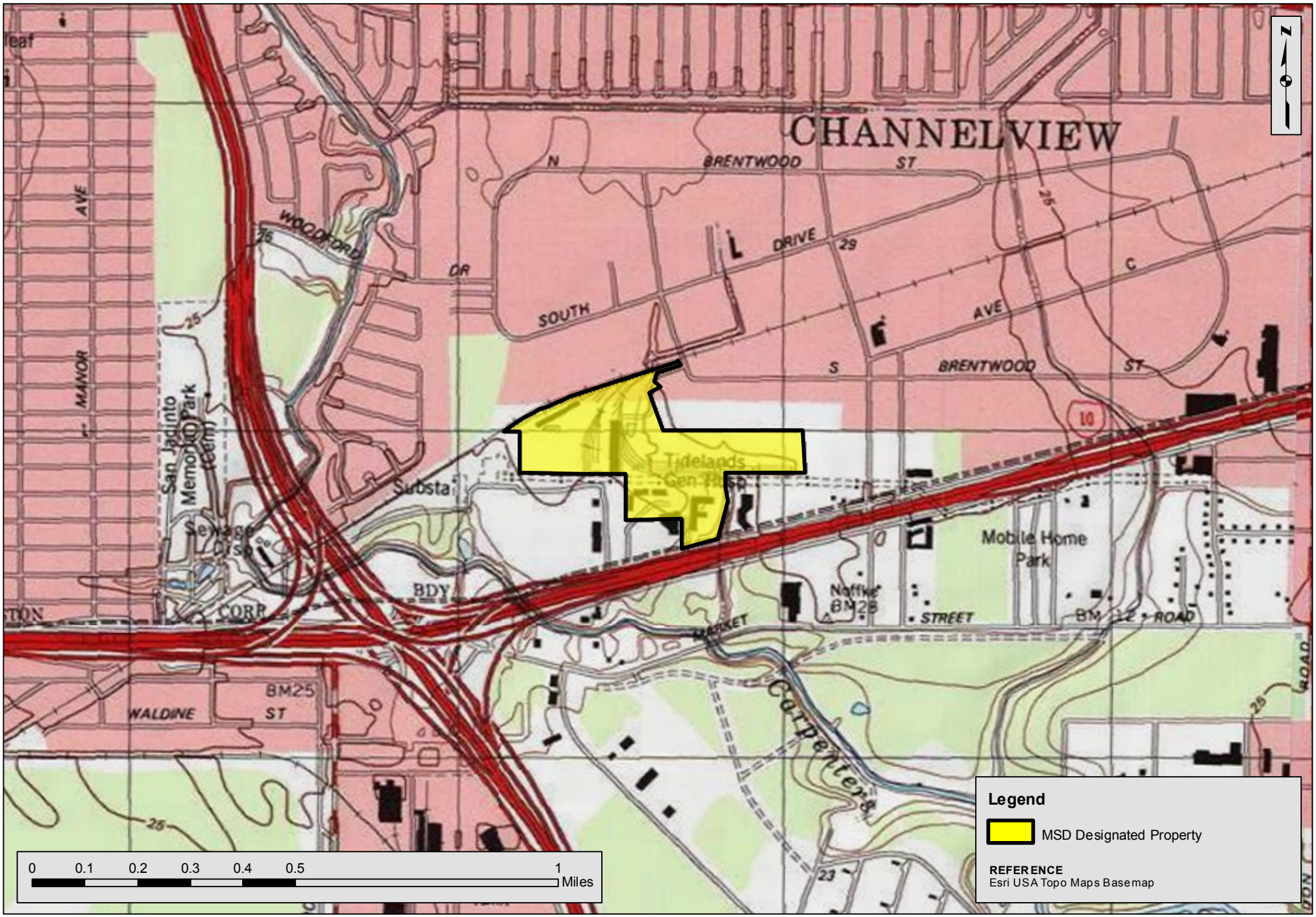
e. **Figure C-6a** presents the gradient and estimated direction of groundwater flow in the second groundwater-bearing unit at the Cleaning Track area. This direction is based on water-level data collected from monitoring wells during the May 2010 sampling event.

   Figure C-6b presents the gradient and estimated direction of groundwater flow in the uppermost groundwater-bearing unit at the Former Ponds area. This direction is based on water-level data collected from shallow monitoring wells during the June 2013 sampling event.

f. The estimated extent of the ingestion protective concentration level exceedence zones are presented on Figures C-5a and C-5b. The figures indicate the estimated extent of groundwater affected with COC concentrations exceeding the TRRP RALs.



ARCADIS Infrastructure · Water · Environment · Buildings	**Rescar Inc.** **Channelview Facility** **MUNICIPAL SETTING DESIGNATION APPLICATION**	Location of Designated Property	ARCADIS U.S. March 2014 Figure C-1



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Channelview Facility
MUNICIPAL SETTING DESIGNATION APPLICATION

Topographic Map of Designated Property

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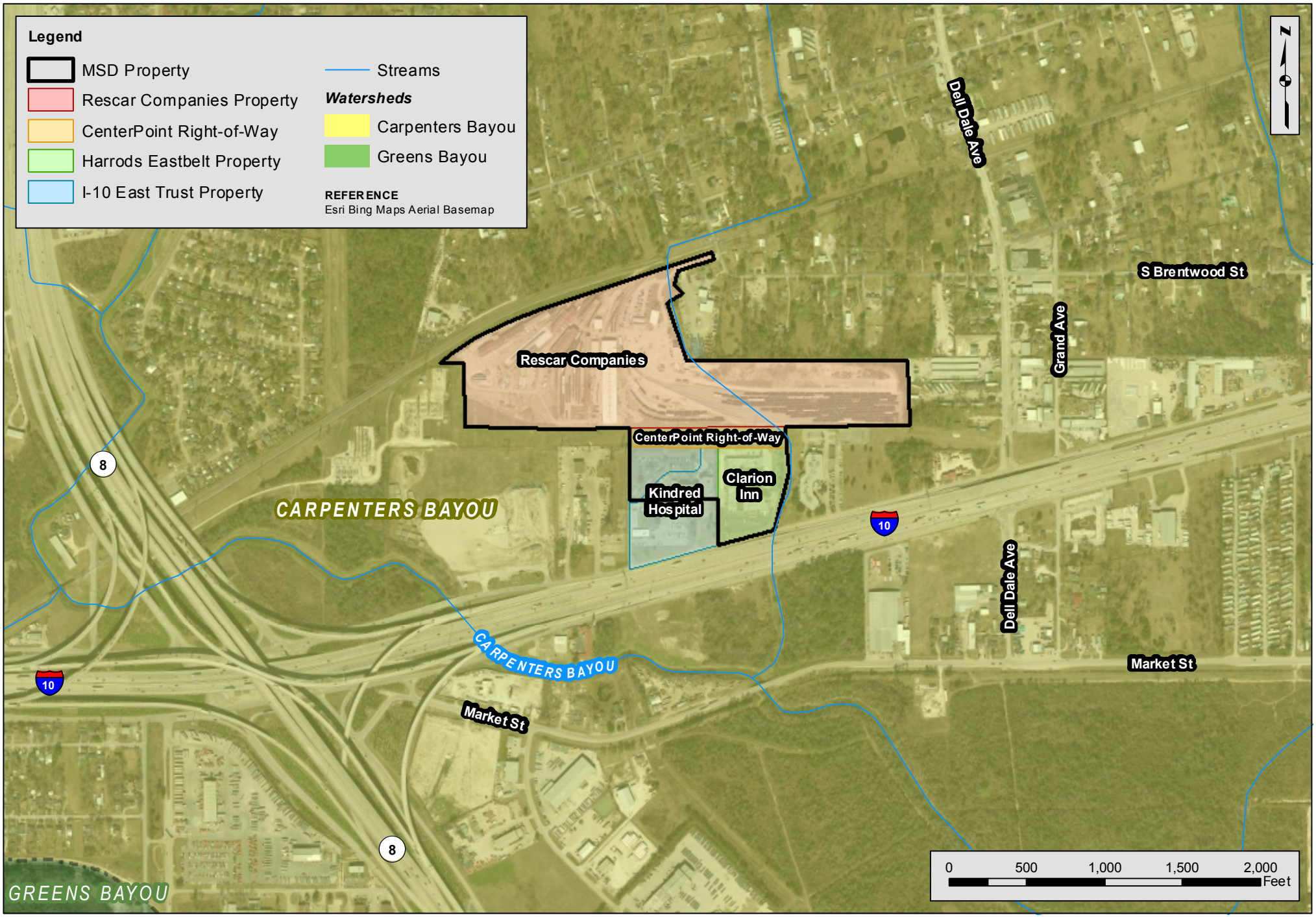
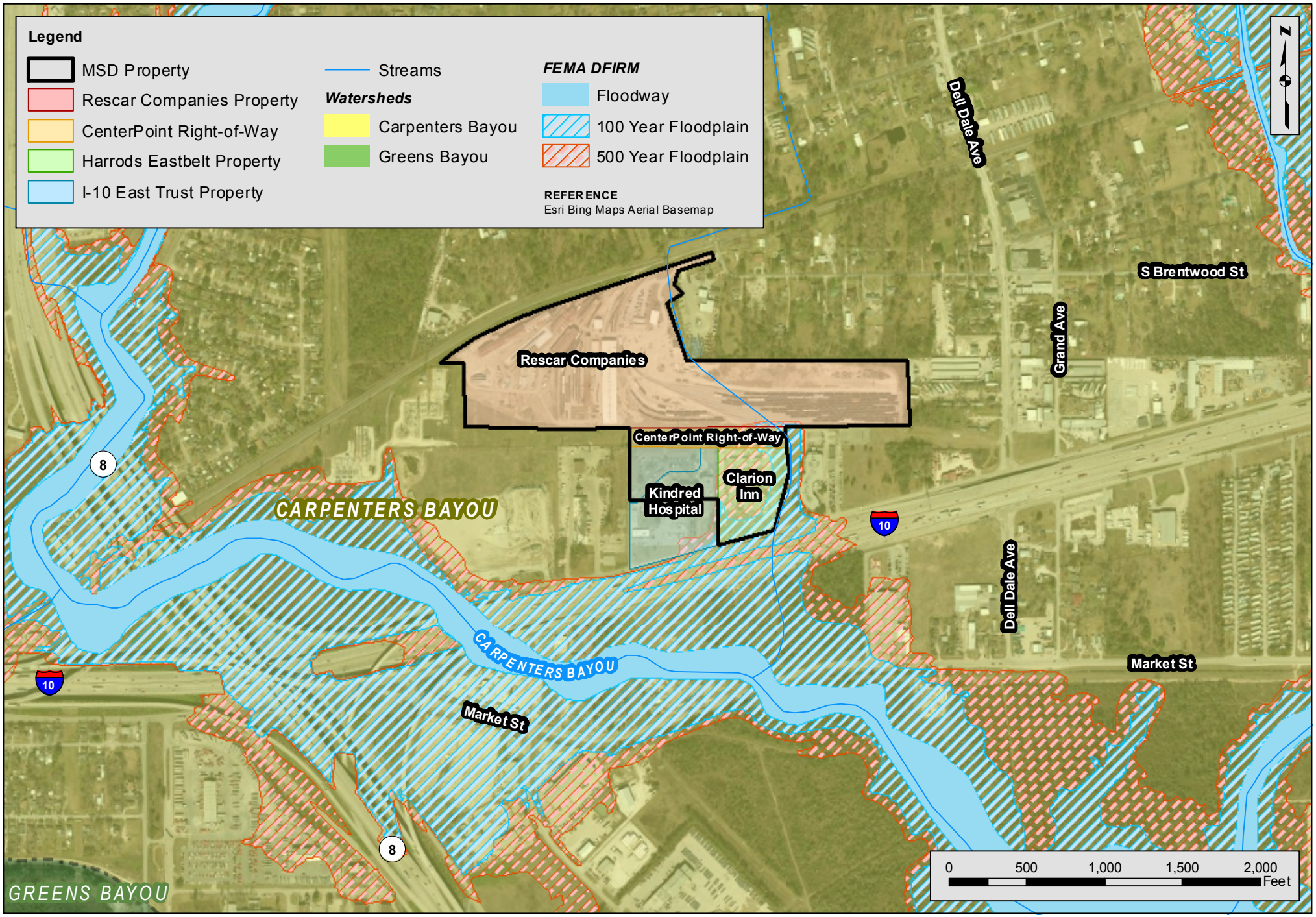
March 2014

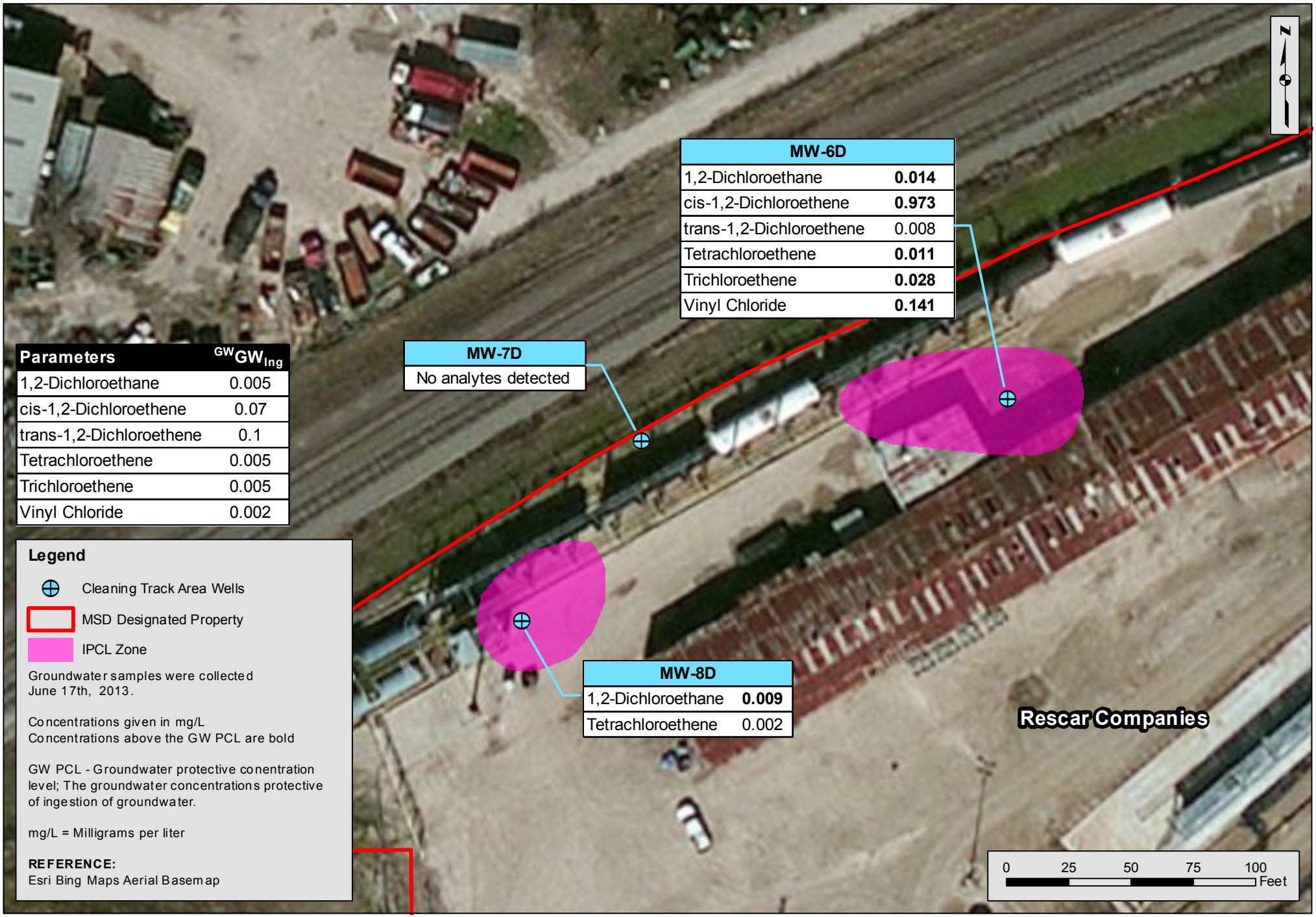
Figure C-2



ARCADIS Infrastructure · Water · Environment · Buildings	**Rescar Inc.** **Channelview Facility** **MUNICIPAL SETTING DESIGNATION APPLICATION**	Watershed Map	ARCADIS U.S. March 2014 Figure C-3



ARCADIS Infrastructure · Water · Environment · Buildings	**Rescar Inc.** **Channelview Facility** **MUNICIPAL SETTING DESIGNATION APPLICATION**	Floodplain Map	ARCADIS U.S. March 2014 Figure C-4



Parameters	$^{GW}GW_{Ing}$
1,2-Dichloroethane	0.005
cis-1,2-Dichloroethene	0.07
trans-1,2-Dichloroethene	0.1
Tetrachloroethene	0.005
Trichloroethene	0.005
Vinyl Chloride	0.002

Legend

- Cleaning Track Area Wells
- MSD Designated Property
- IPCL Zone

Groundwater samples were collected June 17th, 2013.

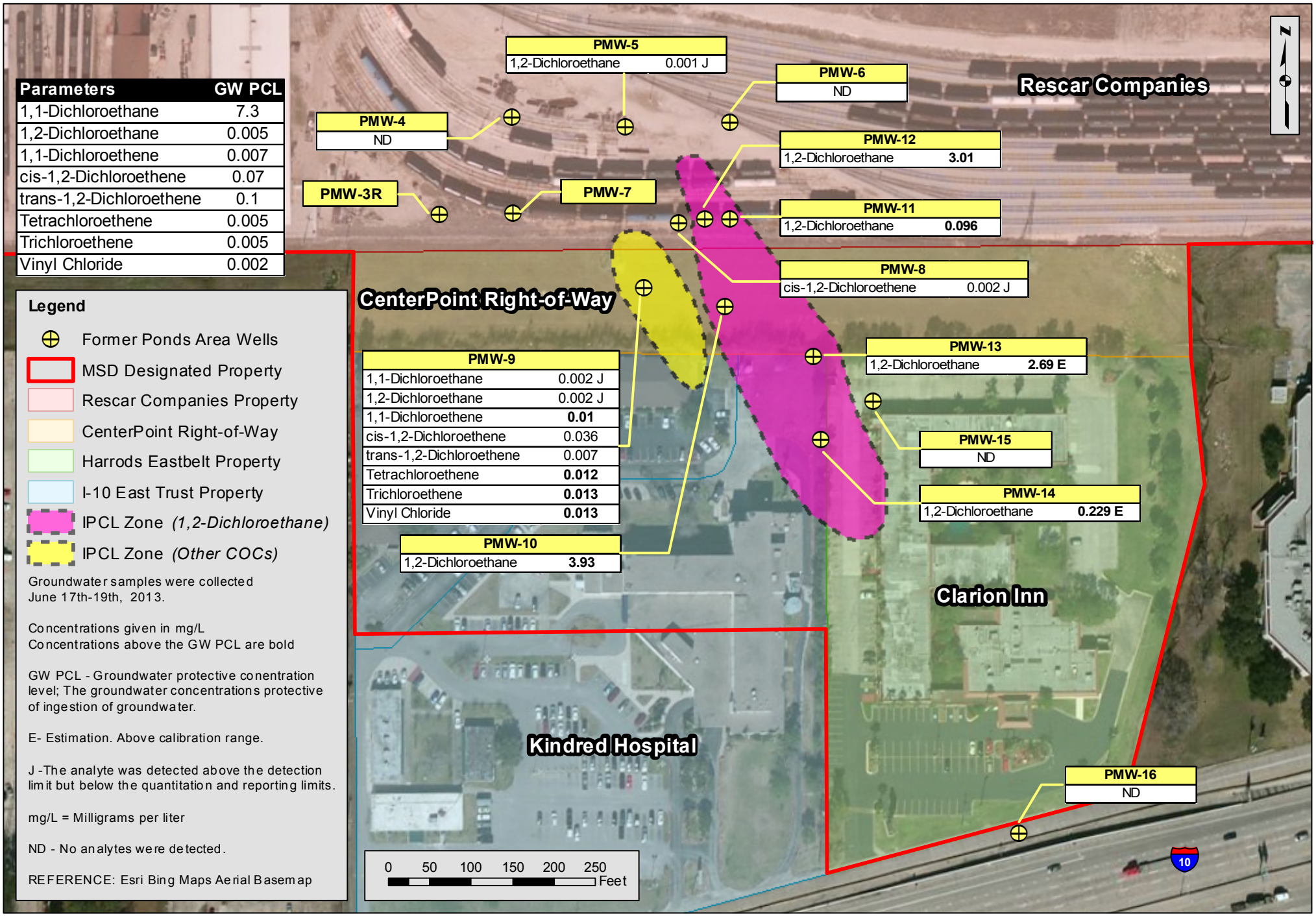
Concentrations given in mg/L
Concentrations above the GW PCL are bold

GW PCL - Groundwater protective conentration level; The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter

REFERENCE:
Esri Bing Maps Aerial Basemap

ARCADIS Infrastructure · Water · Environment · Buildings	**Rescar Inc.** **Channelview Facility** **MUNICIPAL SETTING DESIGNATION APPLICATION**	Ingestion Protective Concentration Level Exceedance Zone Cleaning Track Area June 2013	ARCADIS U.S. March 2014 Figure C-5a



Parameters	GW PCL
1,1-Dichloroethane	7.3
1,2-Dichloroethane	0.005
1,1-Dichloroethene	0.007
cis-1,2-Dichloroethene	0.07
trans-1,2-Dichloroethene	0.1
Tetrachloroethene	0.005
Trichloroethene	0.005
Vinyl Chloride	0.002

Legend

- Former Ponds Area Wells
- MSD Designated Property
- Rescar Companies Property
- CenterPoint Right-of-Way
- Harrods Eastbelt Property
- I-10 East Trust Property
- IPCL Zone *(1,2-Dichloroethane)*
- IPCL Zone *(Other COCs)*

Groundwater samples were collected June 17th-19th, 2013.

Concentrations given in mg/L
Concentrations above the GW PCL are bold

GW PCL - Groundwater protective conentration level; The groundwater concentrations protective of ingestion of groundwater.

E- Estimation. Above calibration range.

J -The analyte was detected above the detection limit but below the quantitation and reporting limits.

mg/L = Milligrams per liter

ND - No analytes were detected.

REFERENCE: Esri Bing Maps Aerial Basemap

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Ingestion Protective Concentration Level Exceedance Zone
Former Ponds Area
June 2013

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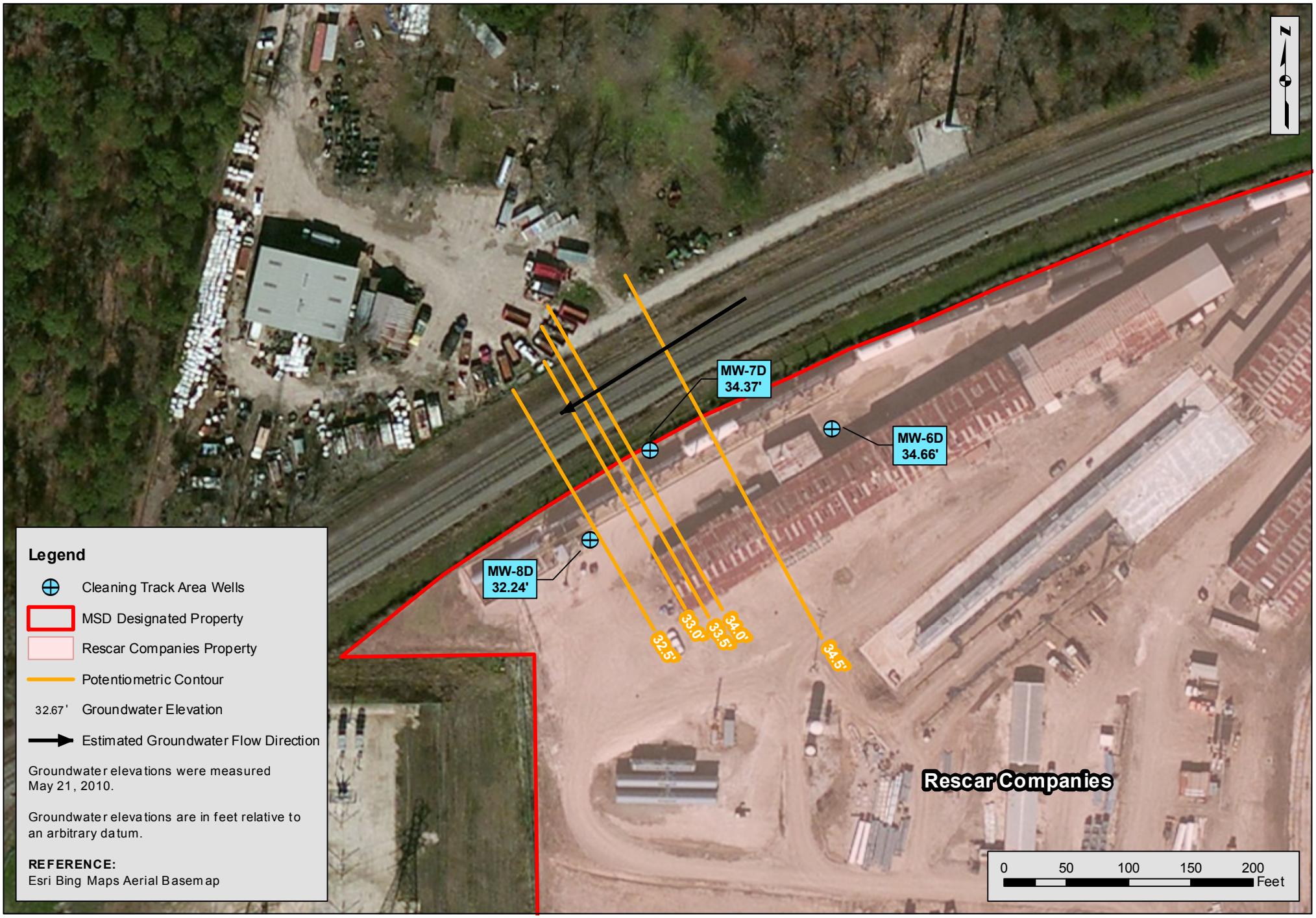
March 2014

Figure C-5b



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Groundwater Gradient Map
Cleaning Track Area
June 2013

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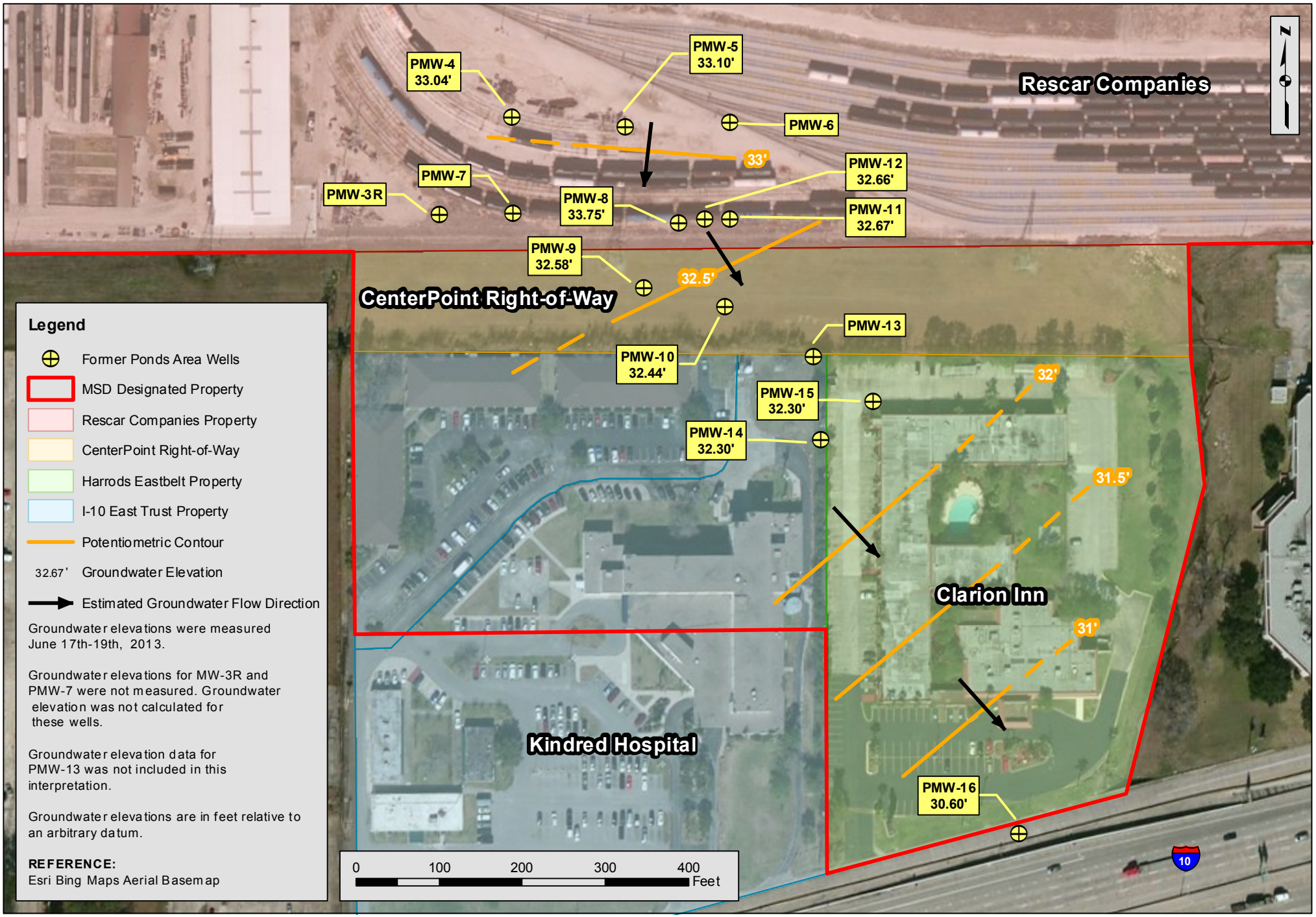
Figure C-6a



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Groundwater Gradient Map
Former Ponds Area
June 2013

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March 2014

Figure C-6b

Appendix D

For each contaminant of concern within the ingestion protective concentration level exceedence zone 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.

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 designated property is underlain by the Beaumont Formation. The Beaumont Formation is composed of thick sequences of dense clay with interlayers of more permeable silt and sand zones. The silt and sand zones are typical water-bearing units.

Former Ponds Area: The ingestion protective concentration level exceedance zone in groundwater at the Former Ponds area occurs in the uppermost water-bearing unit which is in a permeable zone at a depth of approximately 20 feet below ground surface. The horizontal area of the exceedance zone is approximately 23,800 square feet. The exceedance zone extends from the track area on the south-central part of the Rescar property southward on to the CenterPoint Right-of-Way, Kindred Hospital, and Clarion Inn properties.

Cleaning Track Area: The ingestion protective concentration level exceedance zone in groundwater at the cleaning track area occurs in the second water-bearing unit which is in a permeable zone at a depth of between approximately 35 and 70 feet below ground surface. The horizontal area of the exceedance zone is approximately 5,500 square feet. The exceedance zone is within the northwestern part of the Rescar property.

There is no non-ingestion protective concentration level exceedance zone at the designated property.

b. The August 2003 Affected Property Assessment Report (APAR) Addendum for the Rescar property identified three areas of concern:

- Slag Deposition Area on the eastern portion of the facility,
- Cleaning Track Area along the northern boundary, and
- Former Ponds Area located on the middle portion of the facility.

Table D-1 provides a summary of the analytical results for soil samples collected at the Slag Deposition area. No groundwater Protective Concentration Level Exceedance (PCLE) zone was identified at the Slag Deposition area as the concentrations of the COCs were below the ingestion PCLs.

Groundwater PCLE zones were identified for both the Cleaning Track area and the Former Ponds area. In the Cleaning Track area, PCLE zones were identified in both the uppermost GWBU and the second GWBU. The second GWBU lies between approximately 35 feet to 70 feet bgs. In the Former Ponds area, a PCLE zone was identified in the uppermost GWBU located approximately 20 feet bgs.

In May 2001, the Rescar property owner began remediation efforts for the uppermost GWBU in the Cleaning Track area to address COC concentrations exceeding ingestion PCLs. Potassium permanganate was injected into the uppermost GWBU. In September 2006, the final round of groundwater sampling for the uppermost GWBU confirmed that the GWBU had been successfully remediated reducing COC concentrations in groundwater to less than the ingestion PCLs.

Injection of potassium permanganate into the second GWBU at the Cleaning Track area was initiated in July 2006. Nineteen groundwater sample events have been conducted at the Cleaning Track area since the remedial injections were initiated. The most recent groundwater sampling event at the Cleaning Track area was conducted in June 2013. A summary of the groundwater analytical results for the second groundwater unit at the Cleaning Track area and the ingestion level protective concentrations is presented in **Table D-2.**

Groundwater samples were collected from monitoring wells MW-6D, MW-7D, and MW-8D. The data indicate that the COC concentrations have remained stable or declined. COCs were detected at concentration exceeding the ingestion protective level in samples from only monitoring wells MW-6D and MW-8D. There were no ingestion protective level exceedances in the groundwater sample from MW-7D during the June 2013 event.

At the Former Ponds area, groundwater monitoring events have been conducted from 2003 to 2013. The most recent groundwater sampling event at the Former Ponds area was conducted in June 2013. A summary of the groundwater analytical results for the Former Ponds area and the ingestion level protective concentrations is presented in **Table D-3.**

The groundwater data collected during the most recent sampling event conducted in June 2013 at the Cleaning Track area and Former Ponds area were used to determine the COCs for the designated property as addressed below. The COCs were identified based on a comparison of the maximum concentrations detected in groundwater to their respective non-MSD PCLs or RALs. The RALs for the designated property are the TCEQ residential Tier 1 default groundwater ingestion (${}^{GW}GW_{Ing}$) values. Eight COCs were detected at concentration exceeding their respective Tier 1 ingestion PCLs (${}^{GW}GW_{Ing}$).

Tables D-4 through D-11 list the COCs identified, the highest observed concentration, the ingestion-based PCL, the non-ingestion based PCL, and their associated chemical properties.

c. Information on the basic geochemical properties of the COCs identified in groundwater at the Cleaning Track area and the Former Ponds area is provided below. The tables describe whether the COC migrates with groundwater, floats, or is soluble in water. Additionally, hazardous substance technical fact sheets for each of the COCs are provided in Appendix D.

1,1-Dichloroethene

The VOC 1,1-dichloroethene (1,1-DCE) is an industrial chemical that is not found naturally in the environment. It is a colorless liquid with a mild, sweet smell. The chemical is used to make certain plastics, such as flexible films like food wrap and in packaging materials. It is also used to make flame retardant coatings for fiber and carpet backings, and in piping, coating for steel pipes, and in adhesive applications.

Table D-4. COC: 1,1-Dichloroethene

Site-Specific Information	
Highest Observed Concentration (Well ID)	0.231 mg/L (PMW-5 in 12/3/02)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.007 mg/L
Ingestion-Based PCLE Zone Area	17,500 ft^2
Non-Ingestion-Based PCL ($^{Air}GW_{Inh-V}$) 0.5 Acre	1700 mg/L
Non-Ingestion-Based PCLE Zone Area	None
Selected Geochemical/Physical Properties	
Molecular Weight	96.94 g/mole
Density/Specific Gravity	1.22 @ 20 deg C/4 deg C
Solubility in Water	2,400 mg/L
Groundwater Migration	1,1-DCE does not dissolve easily in water. High mobility. Sinks in water.
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

1,2-Dichloroethane

The VOC 1,2-dichloroethane (1,2-DCA), a clear liquid is a manufactured chemical that is not found naturally in the environment. The most common use of 1,2-DCA is in the production of vinyl chloride which is used to make a variety of plastic and vinyl products including polyvinyl chloride pipes, furniture, automobile upholstery, wall coverings, housewares, and automobile parts. It is also used as a solvent and is added to leaded gasoline to remove lead.

Table D-5. COC: 1,2-Dichloroethane

Site-Specific Information	
Highest Observed Concentration (Well ID)	45.8 (PMW-11 in 5/15/06)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.005 mg/L
Ingestion-Based PCLE Zone Area	20,700 ft^2 – Former Ponds Area 5,500 ft^2 – Cleaning Track Area
Non-Ingestion-Based PCL ($^{Air}GW_{Inh-V}$) 0.5 Acre	33 mg/L
Non-Ingestion-Based PCLE Zone Area	None
Selected Geochemical/Physical Properties	
Molecular Weight	98.95976 g/mole
Density/Specific Gravity	1.2351 @ 20 deg C
Solubility in Water	8700 mg/L
Groundwater Migration	1,2-DCA dissolves in water where it breaks down very slowly. High mobility. Sinks in water.
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

Arsenic

Arsenic is a naturally-occurring element that is widely distributed in the Earth's crust. However, arsenic is usually found in the environment combined with other elements such as oxygen, chlorine, and sulfur. Arsenic combined with these elements is called inorganic arsenic. Arsenic combined with carbon and hydrogen is referred to as organic arsenic. Most arsenic compounds are white or colorless powders that do not evaporate.

The majority of arsenic is produced and used as a preservative for wood. Naturally-occurring arsenic enters the environment during the mining and smelting of ores. Arsenic cannot be destroyed in the environment. It can only change its form, or become attached to or separated from particles. Arsenic released from power plants and other combustion processes is usually attached to very small particles.

Elementary arsenic is fairly insoluble in water, whereas arsenic compounds may readily dissolve. Arsenic is mainly present in water solutions as $HAsO_4^{2-}$(aq) and $H_2AsO_4^-$ (aq), and most likely partially as H_3AsO_4 (aq), AsO_4^{3-}(aq) or $H_2AsO_3^-$(aq). Examples of solubility of arsenic compounds: arsenic(III)hydride 700 mg/L, arsenic(III)oxide 20,000 mg/L, arsenic acid ($H_3AsO_4 \cdot 1/2\ H_2O$) 170,000 mg/L, and arsenic(III)sulfide 0.5 mg/L. Arsenic can get into lakes, rivers, or groundwater by dissolving in rain or snow or through the discharge of industrial wastes.

Table D-6. COC: Arsenic

Site-Specific Information	
Highest Observed Concentration (Well ID)	0.158 (PMW-6 in 5/19/10)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.01 mg/L
Ingestion-Based PCLE Zone Area	1,360 ft^2
Non-Ingestion-Based PCL ($^{Air}GW_{Inh-V}$) 0.5 Acre	Not applicable; COC is not volatile
Non-Ingestion-Based PCLE Zone Area	Not applicable
Selected Geochemical/Physical Properties	
Molecular Weight	74.9216 g/mole
Density/Specific Gravity	5.73 @ 20 deg C
Solubility in Water	arsenic(III)hydride 700 mg/L, arsenic(III)oxide 20 g/L, arsenic acid ($H_3AsO_4 \cdot 1/2\ H_2O$) 170 g/L, and arsenic(III)sulfide 0.5 mg/L.
Groundwater Migration	Dissolved arsenic migrates with groundwater.
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

cis-1,2-Dichloroethene

Cis-1,2-dichloroethene (cis-1,2-DCE) is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. Cis-1,2-DCE evaporates rapidly into air but some can travel through soil or dissolve in water in the soil. In groundwater, cis-1,2-DCE takes about 13-48 weeks to break down and one of the constituents it breaks down to is vinyl chloride. Cis-1,2-DCE is an intermediate breakdown product of trichloroethene and tetrachloroethene.

Table D-7. COC: Cis-1,2-Dichloroethene

Site-Specific Information	
Highest Observed Concentration (Well ID)	1.75 mg/L (MW-7D in 8/16/04)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.07 mg/L
Ingestion-Based PCLE Zone Area	575 ft^2 – Former Ponds Area 330 ft^2 – Cleaning Track Area
Non-Ingestion-Based PCL ($^{Air}GW_{Inh\text{-}V}$) 0.5 Acre	1200 mg/L
Non-Ingestion-Based PCLE Zone Area	None
Selected Geochemical/Physical Properties	
Molecular Weight	96.94388 g/mole
Density/Specific Gravity	1.2837 @ 20 deg C/4 deg C
Solubility in Water	4930 mg/L
Groundwater Migration	High mobility. Sinks in water.
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

Lead

Lead is a naturally occurring bluish-gray metal found in small amounts in the Earth's crust. It has no characteristic taste or smell. Although lead occurs naturally in the environment, it can also be released to the environment in relation to lead ore mining, ammunition manufacturing, or other industrial activities such as battery production.

Elementary lead does not dissolve in water under normal conditions. Lead may however occur dissolved in water as $PbCO_3$ or $Pb(CO_3)_2^{2-}$. A well-known example of a water soluble lead compound is lead sugar (lead(II)acetate), which derived its name from its sweet nature. Lead frequently binds to sulphur in sulphide form (S^{2-}), or to phosphor in phosphate form (PO_4^{3-}). In these forms lead is extremely insoluble, and is present as immobile compounds in the environment. Lead compounds are generally soluble in soft, slightly acidic water.

Lead compounds easily evaporate. Lead is removed from the air by rain and by particles falling to the ground or into surface water. Once lead falls onto soil, it usually adheres to soil particles. Small amounts of lead may enter rivers, lakes, and streams when soil particles are moved by rainwater. Movement of lead from soil particles into underground water or drinking water is unlikely unless the water is acidic or "soft."

Table D-8. COC: Lead

Site-Specific Information	
Highest Observed Concentration (Well ID)	0.554 mg/L (PMW-6 in 12/12/11)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.015 mg/L
Ingestion-Based PCLE Zone Area	1,360 ft^2
Non-Ingestion-Based PCL ($^{Air}GW_{Inh-V}$) 0.5 Acre	Not applicable; COC is not volatile
Non-Ingestion-Based PCLE Zone Area	Not applicable
Selected Geochemical/Physical Properties	
Molecular Weight	207.2 g/mole
Density/Specific Gravity	11.3 @ 25 deg C/4 deg C
Solubility in Water	Compounds are generally soluble.
Groundwater Migration	Low mobility unless the water is acidic or "soft".
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

Tetrachloroethene

Tetrachloroethene (PCE) is a synthetic chemical that is widely used for dry cleaning of fabrics and for metal-degreasing operations. It is also used as a starting material (building block) for making other chemicals and is used in some consumer products. PCE in the environment biodegrades to TCE, cis-1,2-DCE, and vinyl chloride.

Biodegradation is the process by which organic substances in the environment are broken down by living organism. Organic matter can be broken down by two methods: with oxygen (aerobic degradation) and without oxygen (anaerobic degradation). PCE is broken down to trichloroethene via anaerobic degradation.

Table D-9. COC: Tetrachloroethene

Site-Specific Information	
Highest Observed Concentration (Well ID)	0.391 (MW-6D in 2/25/05)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.005 mg/L
Ingestion-Based PCLE Zone Area	18,800 ft^2 – Former Ponds Area 2,800 ft^2 – Cleaning Track Area
Non-Ingestion-Based PCL ($^{Air}GW_{Inh-V}$) 0.5 Acre	500 mg/L
Non-Ingestion-Based PCLE Zone Area	None
Selected Geochemical/Physical Properties	
Molecular Weight	165.834 g/mole
Density/Specific Gravity	1.6227 @ 20 deg C/4 deg C
Solubility in Water	200 mg/L
Groundwater Migration	Moderate mobility. Sinks in water.
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

Trichloroethene

Trichloroethene (TCE) is a colorless liquid which is used mainly as a solvent for cleaning metal parts; but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers. TCE is not thought to occur naturally in the environment. However, it has been found in subsurface and many surface waters as a result of the manufacturing, use, and disposal of the chemical. TCE is soluble in water and can remain in groundwater for a long time. TCE tends to absorb to particulates in water which will cause it to eventually settle to the bottom of the groundwater zone where it is persistent. Through natural attenuation, TCE biodegrades anaerobically to the less chlorinated ethenes cis-1,2-DCE, 1,1,2-TCE, and vinyl chloride. As mentioned earlier, TCE is a daughter product of the breakdown of PCE.

Table D-10. COC: Trichloroethene

Site-Specific Information	
Highest Observed Concentration (Well ID)	0.324 (PMW-5 in 12/3/02)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.005 mg/L
Ingestion-Based PCLE Zone Area	18,900 ft^2 – Former Ponds Area 2,800 ft^2 – Cleaning Track Area
Non-Ingestion-Based PCL ($^{Air}GW_{Inh-V}$) 0.5 Acre	120 mg/L
Non-Ingestion-Based PCLE Zone Area	None
Selected Geochemical/Physical Properties	
Molecular Weight	131.38894 g/mole
Density/Specific Gravity	1.4642 @ 20 deg C/4 deg C
Solubility in Water	1100 mg/L
Groundwater Migration	High mobility. Sinks in water.
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

Vinyl Chloride

Vinyl Chloride (VC) is a colorless gas. It is a manufactured substance that does not occur naturally. It can be found when other substances such as PCE and TCE breakdown. VC is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Table D-11. COC: Vinyl Chloride

Site-Specific Information	
Highest Observed Concentration (Well ID)	0.448 (MW-7D in 8/16/04)
Ingestion-Based PCL ($^{GW}GW_{Ing}$)	0.002 mg/L
Ingestion-Based PCLE Zone Area	23,800 ft^2 – Former Ponds Area 280 ft^2 – Cleaning Track Area
Non-Ingestion-Based PCL ($^{Air}GW_{Inh-V}$) 0.5 Acre	3.8 mg/L
Non-Ingestion-Based PCLE Zone Area	None
Selected Geochemical/Physical Properties	
Molecular Weight	62.498 g/mole
Density/Specific Gravity	0.911 @ 20 deg C/4 deg C
Solubility in Water	2760 mg/L
Groundwater Migration	Some VC can dissolve in water. VC can migrate to groundwater and can be in groundwater due to the breakdown of other chemicals. High mobility. Floats in water.
Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, and Eco-USA.net	

Table D - 1

Historical Soil Analytical Data

Former Slag Deposition Area

RESCAR - Channelview Facility

Field Sample ID	**RS-1**	**RS-2**	**RS-3**	**RS-4**	**RS-5**	**RS-6**	**RS-7**	**RS-8**	**RS-9**	**RS-10**	**SS-3**	**SS-4**	**SS-5**	**SS-6**	**SS-7**	**SS-8**	**SS-9**	**SS-10**	^{GW}**Soil PCL**	^{Tot}**Soil$_{Comb}$ PCL**
Sample Depth	**0-6"**																			
Sample Date	**7/17/95**										**11/15/00**									
Metals																				
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	5.4	15
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.73	< 1.5	< 1.5	< 1.5	2.04	1.85	5.21	1.6	5	24
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	35.7	30.9	22.9	36.4	25.5	32.6	49.4	32.3	440	8100
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5	52
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2400	33000
Lead	50	140	197	700	190	3.6	8.6	150	80	500	11.8	7.42	7.25	11.9	12	13.5	34.1	9.14	3	500
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.3	310
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.48	97
SVOCs																				
HCCPD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19	14

Notes

All concentrations are in milligrams per kilogram (mg/kg)

HCCPD - Hexachlorocyclopentadiene

NA - Not analyzed

SVOCs - semivolatile organic compounds

^{GW}Soil PCL - Protective Concentration Limit for soil to groundwater ingestion pathway for 0.5-acre residential properties (TRRP Tier 1 Table - June 2012)

^{Tot}Soil$_{Comb}$ PCL- Protective Concentration Limit for total soil combined pathway for 0.5-acre residential properties (TRRP Tier 1 Table - June 2012)

Table D - 1

Historical Soil Analytical Data

Former Slag Deposition Area

RESCAR - Channelview Facility

Field Sample ID	SS-11	SS-12	SS-13	SS-14	SS-15	SS-16	SMW-1-5'	SMW-1-10'	SMW-1-15'	SMW-1-20'	^{GW}Soil PCL	^{Tot}Soil$_{Comb}$ PCL
Sample Depth	0-6"						5'	10'	15'	20'		
Sample Date	11/15/2000		12/6/2002	12/6/2002	4/11/2003	4/11/2003	12/2/2002	12/2/2002	12/2/2002	12/2/2002		
Metals												
Antimony	< 1.5	< 1.5	NA	NA	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	5.4	15
Arsenic	< 1.5	2.55	*2.49*	*0.62*	*0.572 J*	*0.899*	< 0.5	< 0.5	< 0.5	< 0.5	5	24
Barium	22.9	35.8	*37.9*	*36.8*	*14.7*	*19.4*	*9.5*	*2.1*	*10.7*	*171*	440	8100
Cadmium	NA	NA	< 0.5	< 0.5	< 0.21	< 0.21	< 0.5	< 0.5	< 0.5	< 0.5	1.5	52
Chromium	NA	NA	*8.63*	*7.94*	*3.73*	*7.03*	*6.44*	*1.6*	*1.73*	*7.75*	2400	33000
Lead	8.96	17.4	*17.7*	*4.54*	*3.98*	*5.65*	*5.4*	*3.48*	*3.68*	*11.4*	3	500
Selenium	NA	NA	< 0.5	< 0.5	< 0.44	< 0.44	< 0.5	< 0.5	< 0.5	< 0.5	2.3	310
Silver	NA	NA	< 0.5	< 0.5	< 0.09	< 0.09	< 0.5	< 0.5	< 0.5	< 0.5	0.48	97
SVOCs												
HCCPD	NA	NA	< 0.667	< 0.667	< 0.33	< 0.33	< 0.667	< 0.667	*1.102*	< 0.667	19	14

Notes

All concentrations are in milligrams per kilogram (mg/kg)

HCCPD - Hexachlorocyclopentadiene

NA - Not analyzed

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-2D																		
		4/1/03	07/16/03	11/4/03	2/13/04	4/30/04	8/16/04	11/3/04	2/25/05	5/10/05	8/11/05	11/11/05	3/22/06	6/13/06	9/20/06	12/5/06	4/12/07	6/29/07	10/19/07	12/19/07
VOCs																				
1,2-Dichloroethane	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
cis-1,2-Dichloroethene	0.07	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
trans-1,2-Dichloroethene	0.1	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Bromobenzene	4.9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
Bromoform	0.12	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Bromomethane	3.4	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.002	<0.001
Methylene Chloride	0.005	< 0.005	< 0.005	*0.015 B*	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Tetrachloroethene	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
Trichloroethene	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Vinyl Chloride	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
SVOCs																			0.024	
Pentachlorophenol	0.001	< 0.026	< 0.05	< 0.034	< 0.034	< 0.05	< 0.05	< 0.034	< 0.034	< 0.034	< 0.034	< 0.034	<0.034	<0.034	<0.034	<0.034	<0.017	<0.017	<0.003	<0.015
Di-n-butyl phthalate	2.4	< 0.01	< 0.01	*0.028*	*0.031*	< 0.01	< 0.01	*0.003 J*	< 0.003	< 0.003	< 0.003	< 0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.003	<0.003
Diethyl Phthalate	58.4	<0.008	<0.01	<0.003	--	<0.01	<0.01	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	*0.005 J*	<0.002
Metals																				
Arsenic	0.05	< 0.01	< 0.01	< 0.006	< 0.006	*0.03*	< 0.01	*0.008 J*	*0.01 J*	*0.014 J*	*0.014 J*	*0.013 J*	*0.015*	*0.01 J*	<0.008	<0.008	<0.008	<0.008	*0.022*	<0.008
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	*206*	*NA*	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	*0.23*	*0.167*	*0.16*	*0.164*	*0.157*	*0.175*	*0.208*	*0.223*	*0.318*	*0.333*	*0.195*	*0.211*
Dissolved Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	*0.066*	*0.077*	*0.174*	*0.114*	*0.157*
Potassium	no PCL	NA	NA	NA	NA	NA	NA	NA	*4.12*	*4.2*	*3.3*	*3.14*	*2.99*	*3.14*	*3.34*	*3.24*	*3.6*	*4.31*	*3.16*	*3.22*

Notes:
NA - no analysis
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
B - The analyte was detected in the method blank associated with the sample.
< - Not detected at the listed concentration.
Only analytes detected in at least one sample are reported in this table.
MW-2D was not sampled during the December 2010 sampling event because the well was not found.

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-2D							IPT-2
		3/24/08	6/10/08	10/8/08	12/17/08	6/26/09	12/2/09	5/21/10	6/13/06
VOCs									
1,2-Dichloroethane	0.005	<0.001	<0.003	*0.004 J*	<0.003	<0.001	<0.001	*0.001 J*	<0.002
cis-1,2-Dichloroethene	0.07	<0.001	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.001	*0.029*
trans-1,2-Dichloroethene	0.1	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
Bromobenzene	4.9	<0.001	<0.0008	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Bromoform	0.12	<0.002	<0.0009	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002
Bromomethane	3.4	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.002
Methylene Chloride	0.005	<0.002	<0.003	<0.003	<0.003	NA	NA	NA	<0.002
Tetrachloroethene	0.005	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	*0.002J*
Trichloroethene	0.005	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	*0.003J*
Vinyl Chloride	0.002	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	*0.002J*
SVOCs									
Pentachlorophenol	0.001	<0.015	<0.05	<0.003	<0.003	<0.003	<0.005	<0.005	***0.113***
Di-n-butyl phthalate	2.4	<0.003	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	*0.005J*
Diethyl Phthalate	58.4	<0.002	<0.003	<0.004	<0.003	<0.003	<0.004	<0.004	<0.003
Metals									
Arsenic	0.05	*0.054*	<0.008	<0.009	<0.009	0.01 J	*0.011 J*	*<0.009*	<0.008
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	*0.266*	*0.212*	*0.210*	*0.218*	*0.240*	*0.237*	***4.470***	***1.5***
Dissolved Manganese	1.1	*0.083*	*0.191*	*0.198*	*0.214*	*0.221*	*0.219*	*<0.002*	NA
Potassium	no PCL	*3.22*	NA	*2.9 B*	*3.21*	*2.53*	*1.38*	*46.9*	*15.5*

Notes:
NA - no analysis
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
B - The analyte was detected in the method blank associated with the sample.
< - Not detected at the listed concentration.
Only analytes detected in at least one sample are reported in this table.
MW-2D was not sampled during the December 2010 sampling event because the well was not found.

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-6D													
		12/6/02	12/19/02	4/1/03	7/16/03	11/4/03	2/13/04	4/30/04	8/16/04	11/3/04	2/25/05	5/10/05	8/11/05	11/11/05	3/22/06
VOCs															
1,2-Dichloroethane	0.005	***0.0106***	***0.0148***	***0.023***	***0.009***	***0.015***	***0.029***	***0.034***	***0.041***	***0.048***	***0.014***	***0.057 E***	***0.049***	***0.043***	***0.050***
cis-1,2-Dichloroethene	0.07	< 0.005	***0.094***	***0.123***	***0.127***	***0.114***	***0.174***	< 0.005	***0.084***	***0.37***	***0.208***	***0.827***	***0.926***	***0.856***	***0.957***
trans-1,2-Dichloroethene	0.1	< 0.005	< 0.005	< 0.013	< 0.005	0.002 J	*< 0.002*	< 0.005	*0.013*	0.004 J	0.003 J	*0.014*	*0.013*	*0.011*	*0.017*
Bromobenzene	4.9	--	--	<0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Bromodichloromethane	0.033	--	--	<0.013	<0.005	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Bromoform	0.12	--	--	<0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Bromomethane	3.4	--	--	<0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Dibromochloromethane	0.024	--	--	<0.013	<0.005	<0.002	--	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Methyl Ethyl Ketone	44	--	--	<0.013	<0.005	<0.002	--	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Methylene Chloride	0.005	***0.0057B***	< 0.005	< 0.013	< 0.005	< 0.002 B	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	*0.004 JB*	*< 0.002*	*<0.002*
Tetrachloroethene	0.005	***0.0774***	***0.0596***	***0.131***	***0.107***	***0.228***	***0.128***	***0.012***	***0.106***	***0.085***	***0.391***	***0.121***	***0.084***	***0.079***	***0.060***
Trichloroethene	0.005	***0.0267***	***0.0235***	***0.04***	***0.033***	***0.035***	***0.029***	< 0.005	***0.017***	***0.036***	***0.074***	***0.051 E***	***0.048***	***0.038***	***0.045***
Vinyl Chloride	0.002	***0.0269***	***0.0155***	***0.038***	***0.051***	***0.019***	***0.024***	< 0.002	< 0.002	***0.059***	***0.043***	***0.145***	***0.164***	***0.096***	***0.125***
SVOCs															
Pentachlorophenol	0.001	***0.071***	***0.1781***	***0.076***	< 0.05	< 0.034	< 0.034	< 0.05	< 0.05	< 0.034	< 0.034	< 0.034	< 0.034	< 0.034	*0.005*
Di-n-butyl phthalate	2.4	< 0.008	< 0.008	< 0.01	< 0.01	< 0.003	< 0.003	< 0.01	< 0.01	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	<0.003
Metals															
Arsenic	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.006	< 0.006	*0.02*	<0.01	< 0.008	< 0.008	< 0.008	*0.01J*	*< 0.008*	*0.008*
Barium	2	*0.69*	*0.88*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	192	NA	NA
Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	*0.29*	***1.46 E***	***5.83 E***	***5.65 E***	*0.189*
Dissolved Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	*3.07*	*3.11 B*	*2.58*	*2.82*	*2.39*

Notes:
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
Only analytes detected in at least one sample are reported in this table.
Duplicate sample results and data prior to 2005 has been hidden to conserve space.
< - Not detected at the listed concentration.
*Bromoform was detected at a concentration of 0.008 mg/L during the September 2006 sampling event. The PCL is 0.12. The presence of Bromoform is a result of the potassium permanganate treatment.
*Phenanthrene was estimated at a concentration of 0.004 J mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.73 mg/L.
B - The analyte was detected in the method blank associated with the sample.
E - Estimation. Above calibration range.
E4 - Concentration Estimated. Analyte exceeded calibration range, but within linear range.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
NA - no analysis
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J7 - Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
V7 - CCV recovery is below the control limit for this analyte, however the average %difference for all the analytes meets method criteria.
V8 - CCV recovery following analysis of product is below control limits.
Q16 - The chemical preservation may be inappropriate, since it may accelerate loss by polymerization or other rapid chemical reaction

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{ing}$	MW-6D								
		6/13/06	9/20/06	12/5/06	4/12/07	6/29/07	10/19/07	12/19/07	3/24/08	6/10/08
VOCs										
1,2-Dichloroethane	0.005	***0.027***	***0.006***	***0.010***	***0.008***	***0.010***	<0.001	***0.008***	***0.008***	***0.013***
cis-1,2-Dichloroethene	0.07	***0.488***	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	*0.026*
trans-1,2-Dichloroethene	0.1	*0.004J*	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	*0.004J*
Bromobenzene	4.9	<0.002	<0.002	*0.003J*	*0.003J*	<0.001	*0.002 J*	*0.001J*	<0.001	<0.0008
Bromodichloromethane	0.033	<0.002	<0.002	*<0.002*	<0.0014	<0.0014	*0.002 J*	<0.001	<0.001	<0.003
Bromoform	0.12	<0.002	<0.002	*0.020*	*0.012*	*0.006*	*0.016*	<0.002	*0.005*	*0.005*
Bromomethane	3.4	<0.002	<0.002	*0.004J*	<0.002	<0.0011	*0.002 J*	<0.002	<0.002	<0.002
Dibromochloromethane	0.024	<0.002	<0.002	<0.002	<0.002	<0.002	*0.002 J*	<0.001	<0.001	<0.003
Methyl Ethyl Ketone	44	<0.002	<0.002	<0.002	<0.0036	<0.0036	*0.002 J*	<0.002	<0.002	<0.003
Methylene Chloride	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003
Tetrachloroethene	0.005	***0.035***	0.024	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	***0.047***
Trichloroethene	0.005	***0.022***	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	***0.011***
Vinyl Chloride	0.002	***0.054***	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.003
SVOCs										
Pentachlorophenol	0.001	***0.012***	<0.034	<0.034	<0.017	<0.017	<0.003	<0.015	<0.015	<0.05
Di-n-butyl phthalate	2.4	<0.003	<0.003	<0.003	<0.004	<0.004	<0.003	<0.003	<0.003	<0.004
Metals										
Arsenic	0.05	<0.008	<0.008	<0.008	<0.008	<0.008	*0.039J*	*0.081*	<0.008	<0.008
Barium	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	***1.22 E***	***871E***	***373***	***1410***	***258***	***230***	***793***	***228***	***1.89***
Dissolved Manganese	1.1	NA	NA	***871***	***1190***	***105***	***144***	***352***	***262***	***1.82***
Potassium	no PCL	*2.48*	*3.62*	*565J*	*703*	*105*	*423*	*745*	*596*	NA

Notes:
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
Only analytes detected in at least one sample are reported in this table.
Duplicate sample results and data prior to 2005 has been hidden to conserve space.
< - Not detected at the listed concentration.
*Bromoform was detected at a concentration of 0.008 mg/L during the September 2006 sampling event. The PCL is 0.12. The presence of Bromoform is a result of th
*Phenanthrene was estimated at a concentration of 0.004 J mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.73 mg/L.
B - The analyte was detected in the method blank associated with the sample.
E - Estimation. Above calibration range.
E4 - Concentration Estimated. Analyte exceeded calibration range, but within linear range.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
NA - no analysis
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J7 - Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
V7 - CCV recovery is below the control limit for this analyte, however the average %difference for all the analytes meets method criteria.
V8 - CCV recovery following analysis of product is below control limits.
Q16 - The chemical preservation may be inappropriate, since it may accelerate loss by polymerization or other rapid chemical reaction

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-6D										
		10/8/08	12/17/08	6/26/09	12/4/09	5/21/10	12/10/10	7/7/11	12/13/11	5/31/2012	12/20/2012	6/17/2013
VOCs												
1,2-Dichloroethane	0.005	***0.023***	***0.016***	***0.017***	***0.02***	***0.019***	***0.019***	***0.011***	***0.03***	< 0.001	***0.019***	***0.014***
cis-1,2-Dichloroethene	0.07	***0.128***	***0.113***	*0.001 J*	*0.007*	***0.435***	***0.497***	***0.390***	***0.171***	***0.242 V7, V8***	***0.737***	***0.973***
trans-1,2-Dichloroethene	0.1	*0.008*	*0.006*	<0.002	*0.003 J*	*0.015*	*0.006*	*0.005*	*0.002J*	*0.003 J,V7, V8*	*0.007*	*0.008*
Bromobenzene	4.9	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Bromodichloromethane	0.033	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Bromoform	0.12	<0.001	<0.001	*0.017*	*0.004 J*	<0.003	<0.003	<0.003	<0.003	< 0.003	<0.002	< 0.002
Bromomethane	3.4	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	<0.001	< 0.001
Dibromochloromethane	0.024	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methyl Ethyl Ketone	44	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	0.005	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.005	***0.064***	***0.067***	***0.014***	***0.022***	***0.085***	***0.062***	***0.140***	***0.038***	***0.041***	***0.046***	***0.011***
Trichloroethene	0.005	***0.03***	***0.029***	<0.002	<0.002	***0.028***	***0.03***	***0.051 E, E4***	***0.016***	***0.015 J7***	***0.029***	***0.028***
Vinyl Chloride	0.002	***0.009***	***0.007***	<0.002	<0.002	***0.026***	***0.037***	***0.042***	***0.027***	***0.039 V7, V8***	***0.062 E4, Q16***	***0.141***
SVOCs												
Pentachlorophenol	0.001	<0.003	<0.003	<0.003	<0.005	***0.016***	***0.01***	*<0.005*	***0.009 J***	< 0.005	<0.025	< 0.005
Di-n-butyl phthalate	2.4	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.01	< 0.002
Metals												
Arsenic	0.05	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.004	<0.004	< 0.004	<0.004	< 0.004
Barium	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	***4.10***	*0.731*	***6.40***	***13.10***	***4.47***	***5.17***	***2.32***	NA	*0.988*	0.923	*0.742*
Dissolved Manganese	1.1	*0.814*	*0.703*	***3.69***	***4.49***	<0.002	<0.002	<0.004	<0.004	*0.004 J*	<0.004	*0.674*
Potassium	no PCL	*138 B*	*128*	*116*	*77.9*	*46.9*	*28.9*	*18.7*	*13.1*	*19*	13.5	8.91

Notes:
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
Only analytes detected in at least one sample are reported in this table.
Duplicate sample results and data prior to 2005 has been hidden to conserve space.
< - Not detected at the listed concentration.
*Bromoform was detected at a concentration of 0.008 mg/L during the September 2006 sampling event. The PCL is 0.12. The presence of Bromoform is a result of the potassium permanganate treatment.
*Phenanthrene was estimated at a concentration of 0.004 J mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.73 mg/L.

B - The analyte was detected in the method blank associated with the sample.
E - Estimation. Above calibration range.
E4 - Concentration Estimated. Analyte exceeded calibration range, but within linear range.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
NA - no analysis
PCL $^{GW}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
Q16 - The chemical preservation may be inappropriate, since it may accelerate loss by polymerization or other rapid chemical reaction

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-7D																		
		4/1/03	7/16/03	11/4/03	2/13/04	4/30/04	8/16/04	11/3/04	2/25/05	5/10/05	8/12/05	11/11/05	3/22/06	6/13/06	9/21/06	12/5/06	4/12/07	6/29/07	10/19/07	12/19/07
VOCs																				
1,2-Dichloroethane	0.005	< 0.005	***0.007***	< 0.002	< 0.002	< 0.002	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
cis-1,2-Dichloroethene	0.07	***1.106***	***0.484***	***0.309***	***1.25***	***1.055***	***1.405***	***0.338***	*0.013*	*0.009*	*0.003 J*	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	*0.002J*	*0.001J*
trans-1,2-Dichloroethene	0.1	*0.017*	*0.007*	0.004 J	*0.018*	*0.011*	*0.015*	0.003 J	*< 0.002*	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Bromobenzene	4.9	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001
Bromoform	0.12	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	*0.002J*	<0.002
Bromomethane	3.4	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.002	<0.002
Methylene Chloride	0.005	< 0.005	< 0.005	***0.015 B***	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	*0.003 J*	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Tetrachloroethene	0.005	***0.135***	***0.036***	***0.067***	***0.121***	***0.109***	***0.106***	***0.016***	***0.006***	0.005 J	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	*0.002J*	*0.002J*
Trichloroethene	0.005	***0.15***	***0.066***	***0.066***	***0.108***	***0.119***	***0.094***	***0.019***	***0.006***	0.005 J	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	*0.002J*	*0.002J*
Vinyl Chloride	0.002	***0.129***	***0.064***	***0.048***	***0.223***	***0.185***	***0.448***	***0.065***	***0.005***	< 0.002	***0.004 J***	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Naphthalene	1.5	*0.029*	< 0.005	< 0.002	*0.027*	< 0.01	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.005	0.024	<0.003
SVOCs																				
Pentachlorophenol	0.001	< 0.026	< 0.05	< 0.034	< 0.034	< 0.05	<0.05	< 0.034	< 0.034	< 0.034	< 0.034	< 0.034	<0.034	<0.034	<0.034	<0.034	<0.017	<0.017	<0.003	<0.015
Dibenzofuran	0.098	< 0.008	< 0.01	< 0.003	*0.016*	< 0.01	*0.0111*	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	<0.003	<0.003	<0.003	<0.002	<0.003	<0.003	<0.002	<0.002
Diethyl Phthalate	58.4	<0.008	<0.01	<0.003	--	<0.01	<0.01	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	*0.005 J*	<0.002
Di-n-butyl phthalate	2.4	< 0.008	< 0.01	*0.029*	*0.028*	< 0.01	<0.01	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	<0.003	0.009 J	<0.003	<0.003	<0.004	<0.004	<0.003	<0.003
Phenanthrene	0.73	< 0.008	< 0.01	< 0.003	*0.02*	< 0.01	*0.011*	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.003	<0.003
Metals																				
Arsenic	0.05	< 0.01	< 0.01	< 0.006	*0.006J*	*0.02*	< 0.01	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008J	*0.019J*	<0.008
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	*137*	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	*0.03*	*0.031*	*0.09*	*0.048*	*0.269*	***5.67***	*0.972*	*0.87*	*0.256*	*0.134*	*0.059*	*0.074*
Dissolved Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	*0.087*	*<0.002*	*0.03*	*0.016 J*	*0.019*
Potassium	no PCL	NA	NA	NA	NA	NA	NA	NA	*2.15*	*2.29 B*	*2.13*	*1.86*	*1.61*	*1.97*	*1.88*	*2.15*	*2.04*	*2.24*	*2.09*	2.08

Notes:
NA - no analysis
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
B - The analyte was detected in the method blank associated with the sample.
< - Not detected at the listed concentration.
Only analytes detected in at least one sample are reported in this table.
D6-Sample required dilution due to matric effects. Internal standards failed on previous run.
J7 - Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
V7 - CCV recovery is below the control limit for this analyte, however the average %difference for all the analytes meets method criteria.
V8 - CCV recovery following analysis of product is below control limits.
Q16 - The chemical preservation may be inappropriate, since it may accelerate loss by polymerization or other rapid chemical reaction

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-7D												
		3/24/08	6/10/08	10/8/08	12/17/08	6/26/09	12/2/09	5/21/10	12/10/10	7/12/11	12/12/2011	5/31/2012	12/20/2012	6/17/2013
VOCs														
1,2-Dichloroethane	0.005	<0.001	<0.003	*<0.003*	*<0.003*	*<0.001*	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.001	*0.002J*	*0.001 J*	*0.002 J*	*<0.001*	*0.003 J*	<0.001	<0.001	<0.001	*0.005 J*	*0.001 J*	*0.003*	< 0.001
trans-1,2-Dichloroethene	0.1	<0.001	<0.003	<0.003	<0.003	*<0.002*	<0.002	<0.002	<0.002	<0.002	<0.002	0.002 V7, V8	< 0.001	< 0.001
Bromobenzene	4.9	<0.001	<0.0008	<0.001	<0.001	<0.01 D6	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.001	< 0.001
Bromoform	0.12	<0.002	<0.0009	*0.002 J*	<0.001	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.002	< 0.002
Bromomethane	3.4	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.001	< 0.001
Methylene Chloride	0.005	<0.002	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.005	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	*0.005 J*	< 0.002	< 0.001	< 0.001
Trichloroethene	0.005	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	***0.011***	< 0.002 J7	< 0.003	< 0.003
Vinyl Chloride	0.002	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	*0.004 J*	<0.002	*< 0.001 Q16*	< 0.001
Naphthalene	1.5	<0.003	<0.001	<0.001	<0.001	<0.015 D6	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.002	< 0.002
SVOCs														
Pentachlorophenol	0.001	<0.015	<0.05	<0.003	<0.003	<0.003	<0.005	<0.005	<0.005	*<0.005 V7*	*<0.005*	< 0.005	< 0.005	< 0.005
Dibenzofuran	0.098	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.003	< 0.003
Diethyl Phthalate	58.4	<0.002	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.004	< 0.004	< 0.004
Di-n-butyl phthalate	2.4	<0.003	<0.004	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002
Phenanthrene	0.73	<0.003	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.003	< 0.003
Metals														
Arsenic	0.05	*0.035*	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.004	<0.004	*0.011 J*	*0.006J*	< 0.004
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	*0.273*	*0.268*	*0.458*	***1.64***	***3.88***	*0.132*	*0.275*	*0.702*	*0.017 J*	NA	*0.624*	*0.246*	*0.214*
Dissolved Manganese	1.1	*1.06*	*0.055*	*0.087*	***1.37***	***3.45***	<0.002	*0.016 J*	<0.002	*0.009 J*	*0.33*	*0.447*	*0.157*	*0.184*
Potassium	no PCL	2.21	NA	*1.99 B*	*2.50*	*1.98*	*1.55*	*1.25*	*1.22*	*1.29*	*1.57*	*4.98*	*5.75*	*2.07*

Notes:
NA - no analysis
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
B - The analyte was detected in the method blank associated with the sample.
< - Not detected at the listed concentration.
Only analytes detected in at least one sample are reported in this table.
D6-Sample required dilution due to matric effects. Internal standards failed on previous run.
J7 - Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
V7 - CCV recovery is below the control limit for this analyte, however the average %difference for all the analytes meets method criteria.
V8 - CCV recovery following analysis of product is below control limits.
Q16 - The chemical preservation may be inappropriate, since it may accelerate loss by polymerization or other rapid chemical reaction

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-8D																					
		4/1/03	07/16/03	11/4/03	2/13/04	4/20/04	8/16/04	11/3/04	2/25/05	5/10/05	8/11/05	11/11/05	3/22/06	6/13/06	9/20/06	12/5/06	04/12/07	06/07/07	6/29/07	10/19/07	12/19/07	3/24/08	6/10/08
VOCs																							
1,2-Dichloroethane	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	*0.003J*	<0.002	<0.002	***0.017***	***0.008***	***0.013***	<0.001	***0.009***	***0.006***	*0.003J*
Benzene	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.0013	<0.0013	<0.0013	<0.001	<0.001	<0.001	<0.003
Bromobenzene	4.9	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0008
Bromoform	0.12	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0009
Bromomethane	3.4	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.0011	<0.002	<0.002	<0.002	<0.002
cis-1,2-Dichloroethene	0.07	< 0.005	*0.008*	0.004	*0.012*	*0.007*	*0.006*	*0.008*	*0.012*	*0.031*	*0.018*	*0.004 J*	*0.005*	*0.016*	*0.009*	*0.010*	***0.094***	*0.058*	***0.110***	*0.026*	*0.057*	*0.061*	***0.075***
Dibromochloromethane	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	*<0.002*	*<0.001*	***<0.003***
Methylene Chloride	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003
Tetrachloroethene	0.005	< 0.005	< 0.005	0.002	*0.005*	< 0.005	< 0.005	< 0.002	< 0.002	***0.011***	***0.007***	< 0.002	<0.002	*0.003 J*	*0.002J*	*0.004J*	***0.052***	***0.013***	***0.029***	*0.004 J*	***0.008***	***0.007***	***0.006***
Trichloroethene	0.005	< 0.005	< 0.005	0.002	0.004	< 0.005	< 0.005	< 0.002	0.003	***0.008***	*0.005*	< 0.002	<0.002	<0.002	<0.002	<0.002	***0.022***	***0.007***	***0.015***	*0.004 J*	***0.007***	***0.008***	***0.01***
Vinyl Chloride	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	**0.003**	**0.003**	***0.011***	***0.01***	***0.003 J***	<0.002	***0.004 J***	<0.002	***0.003***	***0.019***	***0.008***	***0.024***	***0.006***	***0.015***	***0.016***	***0.021***
SVOCs																							
Pentachlorophenol	0.001	< 0.026	< 0.05	< 0.034	< 0.034	< 0.05	< 0.05	< 0.034	< 0.034	< 0.034	***0.029***	***0.003***	***0.031***	***0.041***	***0.014***	<0.034	***0.055***	NA	***0.084***	***0.076***	***0.073***	***0.047***	***0.034***
Diethyl Phthalate	58.4	<0.008	<0.01	<0.003	--	<0.01	<0.01	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	NA	<0.004	*0.005 J*	<0.002	<0.002	<0.003
Di-n-butyl phthalate	2.4	< 0.01	< 0.01	*0.026*	*0.019*	< 0.01	< 0.01	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	<0.003	<0.003	<0.003	<0.002	<0.002	NA	<0.004	<0.003	<0.003	<0.003	<0.004
Metals																							
Arsenic	0.05	< 0.01	< 0.01	< 0.006	< 0.006	*0.02*	< 0.01	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	<0.008	<0.008	<0.008	<0.008	<0.008	NA	<0.008	*0.01J*	<0.008	*0.023*	<0.008
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	*193*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	*0.02*	*0.021*	*0.02*	*0.014*	*0.013*	*0.017J*	*0.039*	*0.04*	*0.021*	0.676	0.593	*0.103*	*0.088*	*0.088*	*0.047*
Dissolved Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.004	<0.002	0.482	0.484	*0.047*	*0.062*	*0.022*	*0.029*
Potassium	no PCL	NA	NA	NA	NA	NA	NA	NA	2.74	*2.87 B*	*2.42*	*2.04*	*2.40*	*2.11*	*2.18*	*2.33*	*2.69*	8.82	5.86	*2.77*	*2.94*	*2.68*	NA

Notes:
NA - no analysis
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
B - The analyte was detected in the method blank associated with the sample.
< - Not detected at the listed concentration.
Only analytes detected in at least one sample are reported in this table.
E - estimated result exceeding the upper quantitation limit.
*Chlorobenzene was estimated at a concentration of 0.002 J mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.1 mg/L.
*Dibenzofuran was detected at a concentration of 0.018 mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.098 mg/L.
*Naphthalene was detected at a concentration of 0.032 mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.49 mg/L.
*Phenanthrene was estimated at a concentration of 0.005 J mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.73 mg/L.
*PW-1D was not sampled on 10/8/08 because there was no power.
J7 - Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
V7 - CCV recovery is below the control limit for this analyte, however the average %difference for all the analytes meets method criteria.
V8 - CCV recovery following analysis of product is below control limits.
Q16 - The chemical preservation may be inappropriate, since it may accelerate loss by polymerization or other rapid chemical reaction

Table D - 2
Summary of Groundwater Analytical Results - Second Groundwater Unit
Cleaning Track Area
RESCAR - Channelview Facility

Parameters	PCL $^{GW}GW_{Ing}$	MW-8D										
		10/8/08	12/17/08	6/26/09	12/2/09	5/21/10	12/10/10	7/7/11	12/12/11	5/31/12	12/20/2012	6/17/2013
VOCs												
1,2-Dichloroethane	0.005	*0.004 J*	*0.004 J*	***0.008***	***0.006***	<0.001	*0.005*	***0.006***	***0.007***	< 0.001	***0.005***	***0.009***
Benzene	0.005	<0.003	<0.003	<0.0015	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.001	< 0.001
Bromobenzene	4.9	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	*0.002 J*	< 0.001	< 0.001
Bromoform	0.12	*0.051*	*0.008*	*0.044*	*0.005*	*0.005 J*	*0.005*	*0.005 J*	*0.007*	*0.019*	*0.01*	< 0.002
Bromomethane	3.4	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001
Dibromochloromethane	0.024	<0.003	<0.003	*0.002 J*	<0.002	<0.002	<0.002	<0.002	<0.002	*0.005*	< 0.001	< 0.001
Methylene Chloride	0.005	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.005	<0.003	***0.015***	***0.008***	***0.009***	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.001	*0.002*
Trichloroethene	0.005	<0.001	*0.001 J*	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002 J7	< 0.003	< 0.003
Vinyl Chloride	0.002	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	*<0.002*	<0.002	< 0.002 V7,V8	*< 0.001 Q16*	< 0.001
SVOCs												
Pentachlorophenol	0.001	<0.003	<0.003	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005	< 0.005
Diethyl Phthalate	58.4	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	<0.004	< 0.004	< 0.004	< 0.004
Di-n-butyl phthalate	2.4	<0.004	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002
Metals												
Arsenic	0.05	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.02	<0.008	< 0.004	< 0.004	< 0.004
Calcium	no PCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	***26.1***	***2.62***	***15.2***	***14.3***	***3.59***	***36.9***	***251***	NA	***50.3***	***14.1***	***4.79***
Dissolved Manganese	1.1	***15.6***	***2.34***	***7.32***	***8.59***	***3.01***	***8.29***	***198***	***92***	***46.3***	***9.98***	***2.20***
Potassium	no PCL	*3.03*	*2.89*	*2.09*	*1.23*	*3.52*	*1.45*	*2.51*	*1.68*	*2.86*	*1.48*	*1.59*

Notes:
NA - no analysis
Concentrations are in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
PCL $^{Gw}GW_{Ing}$ - Tier 1 Protective Concentration Limit for groundwater ingestion.
J - The analyte was detected in above the detection limit but below the quantitation and reporting limits.
B - The analyte was detected in the method blank associated with the sample.
< - Not detected at the listed concentration.
Only analytes detected in at least one sample are reported in this table.
E - estimated result exceeding the upper quantitation limit.
*Chlorobenzene was estimated at a concentration of 0.002 J mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.1 mg/L.
*Dibenzofuran was detected at a concentration of 0.018 mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.098 mg/L.
*Naphthalene was detected at a concentration of 0.032 mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.49 mg/L.
*Phenanthrene was estimated at a concentration of 0.005 J mg/L during the March 2008 sampling event. The Tier 1 GW PCL is 0.73 mg/L.
*PW-1D was not sampled on 10/8/08 because there was no power.
J7 - Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
V7 - CCV recovery is below the control limit for this analyte, however the average %difference for all the analytes meets method criteria.
V8 - CCV recovery following analysis of product is below control limits.
Q16 - The chemical preservation may be inappropriate, since it may accelerate loss by polymerization or other rapid chemical reaction

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{GW}GW_{Ing}$	MW-3	MW-3R					
		11/13/92*	5/25/00	12/4/02	4/2/03	7/16/03	8/17/04	2/28/05
VOCs								
Chlorobenzene	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
1,1-Dichloroethane	7.3	*0.006*	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
1,2-Dichloroethane	0.005	***0.017***	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
1,1- Dichloroethene	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
cis-1,2-Dichloroethene	0.07	**	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
trans-1,2-Dichloroethene	0.1	**	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
Trichloroethene	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
Tetrachloroethene	0.005	***0.012***	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005
Vinyl Chloride	0.002	***0.014***	<0.005	< 0.002	<0.002	<0.002	<0.002	<0.002
Bromomethane	0.1	--	--	--	<0.005	<0.005	<0.005	<0.002
Chloromethane	0.16	--	--	--	<0.005	<0.005	<0.005	<0.002
Methylene Chloride	0.005	***0.008***	<0.005	***0.009 B***	< 0.005	< 0.005	< 0.005	< 0.005
Metals								
Arsenic	0.01	<0.006	NA	< 0.01	NA	*0.02*	NA	*0.015 J*
Barium	2	*0.222*	NA	*0.25*	NA	NA	NA	NA
Lead	0.015	<0.2	<0.01	< 0.01	NA	NA	NA	< 0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

** - cis-1,2-Dichloroethene and trans-1,2-Dichloroethene were reported together as total-1,2-Dichloroethene (0.035 mg/L) in 1992.

* = MW-3 could not be located during the March 2000 sampling event.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-4																		
		5/25/00	12/4/02	4/1/03	7/16/03	11/5/03	2/12/04	8/17/04	2/28/05	8/11/05	3/22/06	6/13/06	9/20/06	12/5/06	4/13/07	7/25/07	9/19/07	12/18/07	3/24/08	6/12/08
VOCs																				
1,1-Dichloroethane	7.3	<0.005	<0.005	<0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003
1,2-Dichloroethane	0.005	<0.005	<0.005	<0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	*0.001J*	<0.001	<0.003
1,1-Dichloroethene	0.007	<0.005	<0.005	<0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003
cis-1,2-Dichloroethene	0.07	<0.005	<0.005	<0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0008
trans-1,2-Dichloroethene	0.1	<0.005	<0.005	<0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003
Tetrachloroethene	0.005	<0.005	<0.005	<0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
Trichloroethene	0.005	<0.005	<0.005	<0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003
Vinyl Chloride	0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003
Bromomethane	0.1	NA	NA	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.0011	<0.002	<0.002	<0.002
Chloromethane	0.16	NA	NA	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	*0.004J*	<0.0013	<0.0013	<0.0013	<0.001	<0.001	<0.003
Methylene Chloride	0.005	<0.005	***0.0074B***	<0.005	< 0.005	*0.003 B*	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003
Metals																				
Arsenic	0.01	NA	<0.01	<0.01	< 0.01	NA	NA	NA	0.01 J	0.012 J	0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	***0.026***	<0.008
Barium	2	NA	*0.017*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.015	<0.01	*0.013*	NA	NA	NA	NA	NA	*0.004 J*	< 0.004	<0.01	<0.004	0.012	<0.004	<0.004	< 0.003	*0.003JB*	<0.003	<0.003	<0.003

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

J7 = Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.

L1 = Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.

$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}GW_{Ing}$	PMW-4										
		10/6/08	12/15/08	6/3/09	12/2/09	5/19/10	12/9/10	7/7/11	12/12/11	5/30/2012	12/19/2012	6/18/2013
VOCs												
1,1-Dichloroethane	7.3	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002 J7, L1	<0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	<0.003	<0.003	<0.001	<0.001	<0.001	<0.001	*0.001 J*	*0.002 J*	< 0.001	<0.001	< 0.001
1,1-Dichloroethene	0.007	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Trichloroethene	0.005	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001*Q16*	< 0.001
Bromomethane	0.1	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003 J7	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals												
Arsenic	0.01	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.004	<0.004	< 0.004	<0.004	< 0.004
Barium	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.015	<0.004	<0.004	<0.004	*0.008 J*	*0.011 J*	<0.004	*0.012J*	<0.004	0.007 J	0.006*J*	< 0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

J7 = Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.

L1 = Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.

$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-5													
		12/3/02	12/19/02	4/2/03	7/16/03	11/5/03	2/12/04	8/17/04	2/28/05	8/11/05	3/22/06	6/13/06	9/21/06	12/5/06	4/13/07
VOCs															
1,1-Dichloroethane	7.3	*0.041*	*0.005*	< 0.025	< 0.005	*0.014*	< 0.002	*0.016*	< 0.005	< 0.005	*0.003*	*<0.002*	<0.002	<0.002	<0.002
1,2-Dichloroethane	0.005	< 0.005	< 0.005	< 0.025	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	*0.004J*
1,1-Dichloroethene	0.007	***0.231***	***0.032***	***0.09***	***0.018***	***0.077***	*0.002 J*	***0.103***	*0.005*	*0.006*	***0.021***	*0.006*	*0.007*	<0.002	*0.003J*
cis-1,2-Dichloroethene	0.07	***1.088***	< 0.005	***0.314***	***0.050***	***0.335***	*0.005*	***0.32***	*0.02*	*0.028*	*0.089*	*0.034*	*0.035*	*0.004J*	*0.013*
trans-1,2-Dichloroethene	0.1	*0.017*	< 0.005	< 0.025	< 0.005	*0.004 J*	< 0.002	< 0.005	< 0.005	*0.002 J*	*0.003*	*0.004J*	*0.05J*	<0.002	*0.002J*
Tetrachloroethene	0.005	***0.327***	***0.040***	***0.09***	***0.013***	***0.083***	< 0.002	***0.089***	< 0.005	< 0.005	***0.011***	*0.002J*	*0.003J*	<0.002	<0.001
Trichloroethene	0.005	***0.324***	***0.036***	***0.105***	***0.014***	***0.095***	< 0.002	***0.07***	*0.003*	*0.003 J*	***0.017***	*0.004J*	*0.005J*	<0.002	<0.002
Vinyl Chloride	0.002	***0.269***	***0.027***	***0.091***	***0.018***	***0.08***	< 0.002	***0.155***	***0.005***	***0.006***	***0.014***	***0.006***	***0.008***	<0.002	***0.003J***
Bromomethane	0.1	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	*0.003J*	<0.0011
Chloromethane	0.16	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	*0.009*	<0.0013
Methylene Chloride	0.005	***0.008 B***	< 0.005	< 0.025	< 0.005	< 0.002 B	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002
Metals															
Arsenic	0.01	< 0.01	< 0.01	NA	< 0.01	NA	NA	NA	***0.03***	***0.02***	***0.017***	***0.014***	<0.008	<0.008	<0.008
Barium	2	*0.25*	*0.21*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.015	***0.018***	< 0.01	NA	NA	NA	NA	NA	***0.047***	< 0.004	<0.01	<0.004	<0.004	<0.004	<0.004

Notes:

Groundwater from PMW-5 and PMW-7 was collected on May 9, 2003 and analyzed for total petroleum hydrocarbons (TPH) by Method 1005 and polychlorinated biphenyls (PCBs) by Method 8082. Neither TPH nor PCBs were detected in either sample.
Concentrations given in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
< = Not detected at the listed concentration.
B = The analyte was detected in the method blank associated with the sample.
E = Concentration Estimated. Analyte exceeded calibration range, but within linear range.
J = The analyte was detected above the detection limit but below the quantitation and reporting limits.
$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.
mg/L = Milligrams per liter.
NA = Not Analyzed.
V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.
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Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-5															
		7/25/07	9/19/07	12/18/07	3/24/08	6/12/08	10/6/08	12/15/08	6/3/09	12/2/09	5/19/10	12/9/10	7/6/11	12/12/11	5/30/2012	12/19/2012	6/18/2013
VOCs																	
1,1-Dichloroethane	7.3	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	*0.005*	*0.016*	*0.011*	*0.002 J*	*0.028*	*0.002 J*	0.006	<0.001	< 0.001
1,2-Dichloroethane	0.005	***0.009***	<0.002	*0.004J*	<0.001	<0.003	<0.003	<0.003	<0.001	<0.001	*0.001 J*	***0.006***	<0.001	< 0.001	< 0.001	*0.004 J*	*0.001 J*
1,1-Dichloroethene	0.007	<0.002	*0.007*	*0.004J*	<0.001	*0.002J*	<0.003	<0.003	***0.052 E***	***0.156***	***0.136***	***0.025***	***0.166***	***0.026***	***0.074***	*0.006*	< 0.001
cis-1,2-Dichloroethene	0.07	*0.004J*	*0.031*	*0.015*	<0.001	*0.005*	<0.001	*0.003J*	***0.274***	***0.845***	***0.689***	***0.148***	***1.33***	***0.175***	***0.432***	*0.045*	< 0.001
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	*0.016*	*0.034*	*0.054*	*0.02*	*0.033 J*	*0.007*	*0.015*	*0.002 J*	< 0.001
Tetrachloroethene	0.005	<0.001	*0.003J*	*0.002J*	<0.001	<0.003	<0.003	<0.003	***0.041***	***0.193***	***0.141***	*0.004 J*	***0.344***	***0.038***	***0.131***	***0.009***	< 0.001 V7
Trichloroethene	0.005	<0.002	*0.005J*	*0.003J*	<0.001	<0.003	<0.001	<0.001	***0.109***	***0.292***	***0.236***	***0.038***	***0.332***	***0.046***	***0.131***	***0.012***	< 0.003
Vinyl Chloride	0.002	<0.002	***0.005J***	***0.003J***	<0.001	<0.003	<0.001	<0.001	***0.034***	***0.116***	***0.111***	***0.018***	***0.134***	***0.023***	***0.071***	***0.003JQ16***	< 0.001
Bromomethane	0.1	<0.0011	<0.0011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003 J7	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	<0.0013	<0.0013	<0.001	<0.001	<0.003	<0.003	<0.003	*0.002 J*	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																	
Arsenic	0.01	<0.008	<0.008	<0.008	***0.029***	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.004	< 0.004	< 0.004	*0.005J*	< 0.004
Barium	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.015	<0.003	<0.003	<0.003	<0.003	<0.003	*0.005 J*	<0.004	<0.004	*0.01 J*	*0.011 J*	*0.004 J*	*0.008 J*	*0.004 J*	0.007 J	*0.005J*	< 0.004

Notes:

Groundwater from PMW-5 and PMW-7 was collected on May 9, 2003 and analyzed for total petroleum hydrocarbons (TPH) by Method 1005 and polychlorinated biphenyls (PCBs) by Method 8082. Neither TPH nor PCBs were detected in either sample.

Concentrations given in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
< = Not detected at the listed concentration.
B = The analyte was detected in the method blank associated with the sample.
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J = The analyte was detected above the detection limit but below the quantitation and reporting limits.
$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.
mg/L = Milligrams per liter.
NA = Not Analyzed.
V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.
Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-6															
		4/2/03	7/16/03	11/5/03	2/12/04	8/17/04	2/28/05	8/11/05	3/22/06	6/14/06	9/21/06	12/5/06	4/13/07	7/25/07	9/19/07	12/18/07	03/24/08
VOCs																	
1,1-Dichloroethane	7.3	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
1,2-Dichloroethane	0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	0.004J	<0.002	<0.002	<0.002	<0.0021	<0.0021	*0.003J*	<0.001
1,1-Dichloroethene	0.007	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
cis-1,2-Dichloroethene	0.07	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
trans-1,2-Dichloroethene	0.1	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Tetrachloroethene	0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Trichloroethene	0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Vinyl Chloride	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Bromomethane	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.0011	<0.002	<0.002
Chloromethane	0.16	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	*0.003J*	<0.0013	<0.0013	<0.0013	<0.001	<0.001
Methylene Chloride	0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Metals																	
Arsenic	0.01	NA	< 0.01	NA	NA	NA	*0.009 J*	*0.012 J*	*0.012*	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	***0.019J***
Lead	0.015	NA	NA	NA	NA	NA	< 0.004	< 0.004	<0.01	<0.004	<0.004	<0.004	<0.004	<0.003	*0.004JB*	<0.003	<0.003
Nitrate as N	10	NA	NA	NA	< 0.04	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	NA	NA	NA	0.1	2.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

J7 = Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.

L1 = Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.

$^{GW}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

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Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-6											
		06/12/08	10/06/08	12/15/08	06/03/09	12/02/09	05/19/10	12/09/10	07/07/11	12/12/11	5/30/2012	12/19/2012	6/18/2013
VOCs													
1,1-Dichloroethane	7.3	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002 J7, L1	<0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	*0.003 J*	<0.001	<0.001	< 0.001	<0.001	< 0.001
1,1-Dichloroethene	0.007	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.0008	<0.001	<0.001	0.003 J	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	<0.003	<0.003	<0.003	0.002 J	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001 V7
Trichloroethene	0.005	<0.003	<0.001	<0.001	0.004 J	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	*<0.001Q16*	< 0.001
Bromomethane	0.1	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003 J7	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals													
Arsenic	0.01	<0.008	<0.009	<0.009	<0.009	*0.01 J*	***0.158***	***0.031***	***0.033***	***0.119***	**0.024**	***0.055***	***0.018 J***
Lead	0.015	<0.003	<0.004	<0.004	<0.004	***0.016 J***	***0.341***	***0.098***	***0.115***	***0.554***	**0.088**	***0.214***	***0.04***
Nitrate as N	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

J7 = Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.

L1 = Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.

$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{GW}GW_{Ing}$	PMW-7																						
		4/2/03	7/16/03	11/5/03	2/12/04	8/17/04	2/28/05	8/11/05	3/22/06	6/14/06	9/20/06	12/5/06	4/13/07	7/25/07	9/19/07	12/18/07	03/24/08	06/11/08	10/06/08	12/15/08	06/03/09	12/03/09	05/19/10	12/09/10
VOCs																								
1,1-Dichloroethane	7.3	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
1,2-Dichloroethane	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	*0.003J*	<0.0021	<0.0021	*<0.002J*	<0.001	*0.002J*	<0.003	<0.003	<0.001	<0.001	<0.001	*0.002 J*
1,1-Dichloroethene	0.007	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
cis-1,2-Dichloroethene	0.07	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,2-Dichloroethene	0.1	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
Tetrachloroethene	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
Trichloroethene	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	< 0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Vinyl Chloride	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Bromomethane	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.0011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003
Chloromethane	0.16	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.002	< 0.002	<0.002	<0.002	<0.002	*0.005*	<0.0013	<0.0013	<0.0013	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
Methylene Chloride	0.005	< 0.005	< 0.005	< 0.002	< 0.002	< 0.005	< 0.005	*0.003 JB*	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	NA	NA	NA	NA
Metals																								
Arsenic	0.01	NA	< 0.01	NA	NA	NA	*0.013 J*	*0.015 J*	*0.008*	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	***0.03***	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Lead	0.015	NA	NA	NA	NA	NA	*0.005 J*	< 0.004	<0.01	<0.004	<0.004	<0.004	<0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	*0.007 J*	*0.014 J*	*0.009 J*
Nitrate as N	10	NA	NA	NA	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1.1	NA	NA	NA	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Groundwater from PMW-5 and PMW-7 was collected on May 9, 2003 and analyzed for total petroleum hydrocarbons (TPH) by Method 1005 and polychlorinated biphenyls (PCBs) by Method 8082. Neither TPH nor PCBs were detected in either sample.

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{GW}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-8															
		2/28/05	8/11/05	3/22/06	6/14/06	9/20/06	12/5/06	4/13/07	7/25/07	9/19/07	12/18/07	03/24/08	06/11/08	10/07/08	12/15/08	06/03/09	12/03/09
VOCs																	
1,1-Dichloroethane	7.3	< 0.005	< 0.005	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002
1,2-Dichloroethane	0.005	***0.008***	*0.005*	<0.002	< 0.002	***0.011***	***0.007***	*0.004J*	<0.0021	<0.0021	*0.002J*	<0.001	***0.006***	<0.003	<0.003	<0.001	*0.001 J*
1,1-Dichloroethene	0.007	*0.003 J*	*0.005*	*0.002*	< 0.002	*0.002J*	*0.002J*	<0.002	<0.002	*0.004J*	*0.004J*	*0.002J*	***0.018***	***0.018***	***0.015***	***0.018***	***0.022***
cis-1,2-Dichloroethene	0.07	*0.007*	*0.01*	*0.004*	*0.003*	*0.006*	*0.006*	*0.003J*	*0.005*	*0.009*	*0.008*	*0.004 J*	*0.041*	*0.05*	*0.042*	*0.05*	*0.053*
trans-1,2-Dichloroethene	0.1	< 0.005	< 0.005	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002
Tetrachloroethene	0.005	***0.01***	***0.014***	*0.004*	< 0.002	***0.006***	*0.005*	*0.003J*	*0.005J*	*0.005J*	***0.006***	*0.002J*	***0.024***	***0.025***	***0.023***	***0.025***	***0.027***
Trichloroethene	0.005	*0.003 J*	***0.006***	*0.002*	<0.002	*0.003J*	*0.002J*	<0.002	*0.002J*	*0.003J*	*0.004J*	<0.001	***0.013***	***0.014***	***0.012***	***0.014***	***0.013***
Vinyl Chloride	0.002	***0.004 J***	***0.007***	<0.002	< 0.002	*0.002J*	*0.002J*	<0.002	<0.002	***0.003J***	***0.003J***	*0.001J*	***0.01***	***0.014***	***0.01***	***0.01***	***0.015***
Bromomethane	0.1	< 0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.0011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003
Chloromethane	0.16	< 0.002	< 0.002	<0.002	<0.002	<0.002	*0.004J*	<0.0013	<0.0013	<0.0013	<0.001	<0.001	<0.003	<0.003	<0.003	0.004 J	<0.002
Methylene Chloride	0.005	< 0.005	*0.003 JB*	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	NA	NA
Metals																	
Arsenic	0.01	*0.008 J*	*0.011 J*	<0.01	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	***0.011J***	<0.008	<0.009	<0.009	<0.009	<0.009
Lead	0.015	< 0.004	< 0.004	<0.01	<0.004	<0.004	<0.004	<0.004	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	*0.005 J*

Notes:

Concentrations given in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
< = Not detected at the listed concentration.
B = The analyte was detected in the method blank associated with the sample.
J = The analyte was detected above the detection limit but below the quantitation and reporting limits.
J7 = Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
L1 = Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.
$^{GW}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.
mg/L = Milligrams per liter.
NA = Not Analyzed.
V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.
Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{GW}GW_{Ing}$	PMW-8						
		05/19/10	12/9/10	7/7/11	12/12/11	5/30/2012	5/19/2012	6/18/2013
VOCs								
1,1-Dichloroethane	7.3	*0.002 J*	<0.002	<0.002 J7, L1	<0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	*0.002 J*	***0.011 J***	***0.005***	<0.001	< 0.001	<0.001	< 0.001
1,1-Dichloroethene	0.007	***0.029***	*0.006*	***0.02***	***0.01***	*0.005*	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	***0.079***	*0.02*	*0.069*	0.031	*0.018*	*0.005*	*0.002 J*
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	***0.043***	***0.007***	***0.024***	***0.015***	***0.006***	<0.001	< 0.001 V7
Trichloroethene	0.005	***0.019***	*0.005*	***0.015***	***0.008***	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	***0.022***	***0.005***	***0.013***	***0.006***	***0.004 J***	*<0.001Q16*	< 0.001
Bromomethane	0.1	<0.003	<0.003	<0.003	<0.003J7	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	NA	NA	NA	NA	NA	NA	NA
Metals								
Arsenic	0.01	<0.009	<0.009	<0.004	<0.004	< 0.004	*0.007J*	<0.004
Lead	0.015	*0.01 J*	*0.007 J*	*0.007 J*	*0.005 J*	*0.005 J*	*0.004J*	< 0.004

Notes:

Concentrations given in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
< = Not detected at the listed concentration.
B = The analyte was detected in the method blank associated with the sample.
J = The analyte was detected above the detection limit but below the quantitation and reporting limits.
J7 = Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
L1 = Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.
$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.
mg/L = Milligrams per liter.
NA = Not Analyzed.
V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.
Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{GW}GW_{Ing}$	PMW-9								
		5/15/06	6/14/06	09/21/06	12/05/06	04/16/07	06/29/07	09/19/07	12/17/07	03/25/08
VOCs										
1,1-Dichloroethane	7.3	*0.005*	*0.002J*	*0.002J*	*0.003J*	<0.002	0.002J	*0.002J*	*0.001J*	<0.001
1,2-Dichloroethane	0.005	***0.023***	<0.002	*0.003J*	<0.002	<0.002	*<0.002*	***0.015***	*0.004J*	*0.003J*
1,1-Dichloroethene	0.007	***0.048***	***0.01***	***0.009***	***0.011***	*0.007*	*0.008*	*0.007*	*0.005*	*0.003J*
cis-1,2-Dichloroethene	0.07	*0.058*	*0.026*	*0.025*	*0.027*	*0.017*	*0.019*	*0.022*	*0.013*	*0.01*
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001
Tetrachloroethene	0.005	***0.140***	***0.036***	***0.032***	***0.041***	***0.029***	***0.024***	***0.016***	***0.015***	***0.011***
Trichloroethene	0.005	***0.026***	***0.011***	***0.011***	***0.013***	***0.008***	***0.009***	***0.008***	***0.007***	***0.006***
Vinyl Chloride	0.002	***0.015***	***0.009***	***0.009***	***0.012***	***0.003J***	***0.007***	***0.01***	***0.005***	***0.003J***
Bromomethane	0.1	<0.002	<0.002	<0.002	*0.002J*	<0.0011	<0.0011	<0.0011	<0.002	<0.002
Chloromethane	0.16	<0.002	<0.002	<0.002	*0.003J*	<0.0013	<0.002	<0.0013	<0.001	<0.001
Methylene Chloride	0.005	<0.002	<0.002	<0.002	<0.002	*0.005B*	<0.002	<0.002	<0.002	<0.002
Metals										
Arsenic	0.01	<0.001	NA	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Lead	0.015	<0.001	NA	<0.004	<0.004	<0.004	<0.003	<0.004	<0.003	<0.003

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{GW}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1 = CCV recovery is above acceptance limits. This target analyte was not detected in the sample.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-9											
		06/12/08	10/06/08	12/16/08	06/02/09	12/04/09	05/20/10	12/08/10	07/08/11	12/13/11	5/30/12	12/18/2012	6/17/2013
VOCs													
1,1-Dichloroethane	7.3	*0.001J*	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	*0.002 J*	*0.002 J*	< 0.002	<0.001	*0.002 J*
1,2-Dichloroethane	0.005	*0.004J*	<0.003	*0.004 J*	*0.004 J*	*0.002 J*	*0.002 J*	*0.002 J*	*0.004 J*	*0.002 J*	*0.001 J*	<0.001	*0.002 J*
1,1-Dichloroethene	0.007	*0.003J*	<0.003	<0.003	0.002 J	*0.003 J*	*0.003 J*	*0.004 J*	*0.006*	***0.007***	*0.005*	***0.01***	***0.01***
cis-1,2-Dichloroethene	0.07	*0.011*	*0.008*	*0.009*	*0.008*	*0.01*	*0.009*	*0.012*	*0.021*	*0.023*	*0.018*	*0.038*	*0.036*
trans-1,2-Dichloroethene	0.1	<0.001	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	*0.002 J*	*0.012*	*0.007*
Tetrachloroethene	0.005	***0.009***	*0.005*	*0.005J*	***0.006***	***0.007***	***0.007***	*0.005*	***0.018***	***0.017***	*0.004 J*	***0.008***	***0.012***
Trichloroethene	0.005	***0.006***	*0.005 J*	***0.006***	*0.005*	***0.006***	*0.004 J*	***0.008***	***0.008***	***0.009***	***0.01***	***0.011***	***0.013***
Vinyl Chloride	0.002	***0.004J***	***0.004 J***	*0.002J*	*<0.002*	***0.004 J***	***0.003 J***	***0.004 J***	***0.009***	***0.011***	***0.005 J***	***0.008 Q16***	***0.013***
Bromomethane	0.1	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003 V1	<0.001	<0.001
Chloromethane	0.16	<0.001	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	<0.001
Methylene Chloride	0.005	<0.002	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals													
Arsenic	0.01	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.004	<0.004	< 0.004	0.005*J*	< 0.004
Lead	0.015	*0.003J*	<0.004	<0.004	<0.004	*0.007 J*	*0.006 J*	<0.004	*0.011J*	<0.004	*0.004 J*	<0.004	< 0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}GW_{Ing}$	PMW-10																					
		5/15/06	6/14/06	9/21/06	12/5/06	4/16/07	6/29/07	9/19/07	12/17/07	03/25/08	06/12/08	10/06/08	10/06/08	12/15/08	06/02/09	12/04/09	05/20/10	12/08/10	07/08/11	12/13/11	5/30/2012	12/18/2012	6/17/2013
VOCs																							
1,1-Dichloroethane	7.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	***4.629***	***2.15***	***2.1***	***2.22***	***1.39***	***2.05***	***1.24***	***1.54***	***1.24***	***1.20***	***1.05***	***1.04***	***1.04***	***0.86***	***0.693***	***0.824***	***0.94***	***1.19***	***2.23***	***2.25***	***3.79***	***3.93***
1,1-Dichloroethene	0.007	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Trichloroethene	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001*Q16*	< 0.001
Bromomethane	0.1	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.0011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	<0.002	<0.002	<0.002	*0.005*	<0.0013	<0.0013	<0.0013	<0.001	<0.001	<0.01	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	<0.002	<0.002	<0.002	<0.002	*0.004JB*	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																							
Arsenic	0.01	<0.001	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	***0.03***	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.004	<0.004	< 0.004	<0.004	< 0.004
Lead	0.015	<0.001	<0.004	0.012	<0.004	<0.004	<0.003	<0.004	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	<0.004	*0.006 J*	*0.006 J*	<0.004	*0.008 J*	<0.004	*0.006 J*	<0.004	< 0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

B = The analyte was detected in the method blank associated with the sample.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-11															
		5/15/06	6/14/06	9/20/06	12/5/06	4/13/07	7/25/07	9/19/07	12/18/07	03/25/08	06/11/08	10/07/08	12/15/08	06/03/09	12/03/09	05/19/10	12/09/10
VOCs																	
1,1-Dichloroethane	7.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
1,2-Dichloroethane	0.005	**45.8**	**18.5**	***18.5***	***13.9***	***15.4***	***17.2***	***15.7***	***10.6***	***9.09***	***9.63***	***9.16***	***7.74***	***6.53***	***2.59***	***1.28***	***1.79***
1,1-Dichloroethene	0.007	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
cis-1,2-Dichloroethene	0.07	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
Tetrachloroethene	0.005	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
Trichloroethene	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Vinyl Chloride	0.002	***0.009***	<0.002	<0.002	***0.008***	<0.002	<0.002	***0.004J***	<0.001	<0.001	<0.003	*0.002J*	*0.002J*	<0.002	<0.002	<0.002	<0.002
Bromomethane	0.1	<0.002	<0.002	<0.002	<0.002	<0.0011	<0.0011	<0.0011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003
Chloroethane	29	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	*0.002J*	*0.008*	<0.001	<0.003	<0.003	<0.003	<0.005	<0.005	<0.005	<0.005
Chloromethane	0.16	<0.002	<0.002	<0.002	*0.002J*	<0.0013	<0.0013	<0.0013	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002
Methylene Chloride	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	NA	NA	NA	NA
Metals																	
Arsenic	0.01	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	***0.023***	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Lead	0.015	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	*0.007 J*	*0.008 J*	<0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{Gw}GW_{ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{GW}GW_{Ing}$	PMW-11				
		07/07/11	12/12/11	5/30/2012	12/19/2012	6/18/2013
VOCs						
1,1-Dichloroethane	7.3	<0.002	<0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	***2.33***	***1.64***	***0.186***	***1.01***	***0.096***
1,1-Dichloroethene	0.007	<0.002	<0.002	< 0.002	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.001	<0.001	< 0.001	<0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	<0.002	<0.002	< 0.002	<0.001	< 0.001 V7
Trichloroethene	0.005	<0.002	<0.002	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Bromomethane	0.1	<0.003	<0.003	< 0.003 V1	<0.001	< 0.001
Chloroethane	29	<0.005	<0.005	< 0.005	<0.001	< 0.002
Chloromethane	0.16	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	NA	NA	NA	NA	NA
Metals						
Arsenic	0.01	<0.004	<0.004	< 0.004	<0.004	< 0.004
Lead	0.015	*0.008 J*	<0.004	*0.004 J*	*0.004J*	< 0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{GW}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-12															
		7/25/07	9/19/07	12/18/07	03/25/08	06/11/08	10/07/08	12/15/08	06/03/09	12/03/09	05/19/10	12/09/10	7/8/2011	12/12/11	5/30/2012	12/19/2012	6/18/2013
VOCs																	
1,1-Dichloroethane	7.3	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002 J7,L1	<0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	***11.3***	***7.42***	***6.30***	***3.59***	***5.17***	***5.04***	***4.49***	***3.85***	***3.9***	***3.65***	***3.43***	***3.69***	***4.34***	***1.71***	***2.89***	***3.01***
1,1,2-Trichloroethane	0.005	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
1,1-Dichloroethene	0.007	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.002	<0.002	<0.001	<0.001	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001 V7
Trichloroethene	0.005	<0.002	<0.002	<0.001	<0.001	<0.003	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	<0.002	<0.002	<0.001	<0.001	<0.003	*0.002 J*	<0.001	<0.002	*0.002 J*	*0.002 J*	<0.002	<0.002	<0.002	< 0.002	*<0.001Q16*	< 0.001
Bromomethane	0.1	<0.0011	<0.0011	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003J7	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	<0.0013	<0.0013	<0.001	<0.001	<0.003	<0.003	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																	
Arsenic	0.01	<0.008	<0.008	<0.008	***0.025***	<0.008	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.004	<0.004	< 0.004	<0.004	< 0.004
Lead	0.015	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.004	<0.004	*0.006 J*	*0.006 J*	<0.004	*0.012 J*	<0.004	*0.005 J*	*0.005J*	< 0.004

Notes:

Concentrations given in mg/L.
Concentrations above the detection limits are italics.
Concentrations above the $^{GW}GW_{ING}$ are bold.
< = Not detected at the listed concentration.
J = The analyte was detected above the detection limit but below the quantitation and reporting limits.
J7 = Concentration estimated. Analyte recovery in LCS did not meet acceptance criteria.
L1 = Associated LCS and/or LCSD recovery is above acceptance limits for flagged analyte. Bias may be high.
$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.
mg/L = Milligrams per liter.
NA = Not Analyzed.
V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.
Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-13									
		12/16/08	6/2/09	12/3/09	5/20/10	12/8/10	8/5/11	12/13/11	5/30/12	12/18/12	6/19/13
VOCs											
1,1-Dichloroethane	7.3	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	***15.4***	***15.5***	***15.7***	***18.4***	***17.7***	***16.5***	***17.7***	***10.9***	***12.3***	***2.69 E***
1,1,2-Trichloroethane	0.005	*0.005 J*	*0.004 J*	***0.006***	***0.007***	*0.005*	*0.003 J*	*0.003 J*	*0.002 J*	*<0.001*	< 0.001
1,1-Dichloroethene	0.007	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
Trichloroethene	0.005	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	***0.007***	***0.003 J***	***0.014***	***0.014***	***0.003 J***	***0.002 J***	***0.007***	< 0.002	<0.001*Q16*	< 0.001
Bromomethane	0.1	<0.002	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.003	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	*0.003J*	< 0.002	<0.002	*0.002 J*	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals											
Arsenic	0.01	<0.009	<0.009	<0.009	<0.009	<0.009	< 0.004	< 0.004	< 0.004	<0.004	< 0.004
Lead	0.015	<0.004	<0.004	*0.006 J*	*0.009J*	<0.004	*0.005 J*	< 0.004	*0.006 J*	*0.004 J*	< 0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{Gw}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

E = The analyte was detected above the calibration range.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{Gw}Gw_{Ing}$	PMW-14									
		12/16/08	6/2/09	12/3/09	5/20/10	12/8/10	8/5/11	12/13/11	5/30/12	12/18/12	6/19/2013
VOCs											
1,1-Dichloroethane	7.3	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
1,2-Dichloroethane	0.005	***0.006***	<0.001	*0.002 J*	*0.002 J*	***0.008***	***0.019 V7***	***0.031***	***0.07***	***0.249***	***0.229 E***
1,1,2-Trichloroethane	0.005	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
1,1-Dichloroethene	0.007	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	< 0.001	< 0.001	<0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
Tetrachloroethene	0.005	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
Trichloroethene	0.005	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.003	< 0.003
Vinyl Chloride	0.002	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001*Q16*	< 0.001
Bromomethane	0.1	<0.002	<0.003	<0.003	<0.003	<0.003	< 0.003	< 0.003	< 0.003 V1	<0.001	< 0.001
Chloromethane	0.16	<0.003	<0.002	<0.002	<0.002	<0.002	< 0.002	< 0.002	< 0.002	<0.001	< 0.001
Methylene Chloride	0.005	<0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals											
Arsenic	0.01	<0.009	<0.009	<0.009	<0.009	<0.009	< 0.004	< 0.004	< 0.004	<0.004	< 0.004
Lead	0.015	<0.004	<0.004	*0.006 J*	*0.009 J*	<0.004	*0.005 J*	< 0.004	0.004 J	<0.004	< 0.004

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{GW}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

E = The analyte was detected above the calibration range.

Table D - 3
Summary of Groundwater Analytical Results
Former Ponds Area
Rescar - Channelview Facility
Uppermost Groundwater Bearing Unit

Parameters	$^{GW}Gw_{Ing}$	PMW-15						PMW-16
		6/10/10	7/8/11	12/13/11	5/30/12	12/18/2012	6/19/2013	6/19/13
VOCs								
1,1-Dichloroethane	7.3	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001	< 0.001
1,2-Dichloroethane	0.005	<0.001	*0.002 J*	*0.001 J*	< 0.001	<0.001	< 0.001	< 0.001
1,1,2-Trichloroethane	0.005	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001	< 0.001
1,1-Dichloroethene	0.007	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001	< 0.001
cis-1,2-Dichloroethene	0.07	<0.001	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001
trans-1,2-Dichloroethene	0.1	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001	< 0.001
Tetrachloroethene	0.005	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001	< 0.001
Trichloroethene	0.005	<0.002	<0.002	<0.002	< 0.002	<0.003	< 0.003	< 0.003
Vinyl Chloride	0.002	<0.002	<0.002	<0.002	< 0.002	<0.001*Q16*	< 0.001	< 0.001
Bromomethane	0.1	<0.003	<0.003	<0.003	< 0.003 V1	<0.001	< 0.001	< 0.001
Chloromethane	0.16	<0.002	<0.002	<0.002	< 0.002	<0.001	< 0.001	< 0.001
Methylene Chloride	0.005	NA	NA	NA	NA	NA	NA	
Metals								
Arsenic	0.01	<0.004	<0.004	<0.004	< 0.004	<0.004	< 0.004	< 0.004
Lead	0.015	*0.01 J*	*0.009J*	*0.008 J*	*0.005 J*	0.004*J*	< 0.004	*0.005 J*

Notes:

Concentrations given in mg/L.

Concentrations above the detection limits are italics.

Concentrations above the $^{GW}GW_{ING}$ are bold.

< = Not detected at the listed concentration.

J = The analyte was detected above the detection limit but below the quantitation and reporting limits.

$^{GW}GW_{Ing}$ = The groundwater concentrations protective of ingestion of groundwater.

mg/L = Milligrams per liter.

NA = Not Analyzed.

V1, V7 = Continuing calibration verification recovery is below the control limit for this analyte, however the average percent difference for all the analytes meets method criteria.

Q16 = The chemical preservation may be inappropriate since it may accelerate loss by polymerization or other rapid chemical reactions.

Appendix E

Provide for each contaminant of concern within the designated groundwater:

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.

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).

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a. The ingestion protective concentration level (residential Tier 1 default $^{GW}GW_{Ing}$ PCLs) exceedance zones in groundwater are present in the Cleaning Track area and the Former Ponds area. The occurrence of these exceedance zones area described as:

> **Former Ponds Area**: The ingestion protective concentration level exceedance zone at the Former Ponds area occurs in the uppermost water-bearing unit which is in a permeable zone at a depth of between approximately 35 feet and 70 feet below ground surface. The horizontal area of the exceedance zone is approximately 23,800 square feet. The exceedance zone extends from the track area on the south-central part of the Rescar property southward on to the CenterPoint Right-of-Way, Kindred Hospital, and Clarion Inn properties.
>
> **Cleaning Track Area:** The ingestion protective concentration level exceedance zone at the cleaning track area occurs in the second water-bearing unit which is in a permeable zone at a depth of approximately 20 feet below ground surface. The horizontal area of the exceedance zone is approximately 5,500 square feet. The exceedance zone is within the northwestern part of the Rescar property.

There is no non-ingestion protective concentration level exceedance zone at the designated property. A tabular listing of the soil and groundwater data collected to date and the applicable ingestion and non-ingestion PCLs are presented in Appendix D. Maps of the Cleaning Track area and Former Ponds area ingestion PCL exceedance zones are presented in Appendix D.

b. Based on the results of the data collected, various other COCs were detected in the groundwater at the designated property at concentrations above the laboratory method quantification limits (MQL). However, except for 1,1,2-trichloroethane, methylene chloride, pentachlorophenol and manganese, the concentrations of these COCs do not exceed their respective non-MSD-adjusted ingestion PCLs. The VOCs 1,1,2-trichloroethane and pentachlorophenol were not detected during the most recent groundwater sampling event. The detections of methylene chloride are a laboratory artifact and are not indicative of groundwater conditions. The concentrations of manganese detected above the non-ingestion PCL were the result of the injection of potassium permanganate during groundwater remediation activities. These chemicals and the corresponding non-MSD-adjusted ingestion PCLs are listed in the tables presented in Table E-1.

c. The geochemical properties for COCs detected in groundwater at the designated property at concentrations above the MQL, their respective non-MSD-adjusted ingestion PCLs, are listed in Table E-1.

Right to Know Hazardous Substance Fact Sheet

NJ Health New Jersey Department of Health

Common Name: **1,1-DICHLOROETHANE**

Synonyms: 1,1-DCE; Ethylidene Chloride

Chemical Name: Ethane, 1,1-Dichloro-

Date: February 2001 Revision: September 2008

CAS Number: 75-34-3

RTK Substance Number: 0651

DOT Number: UN 2362

Description and Use

1,1 Dichloroethane is a colorless, oily liquid with an *Ether* or *Chloroform*-like odor. It is used to make other chemicals, as a grain fumigant, and a solvent.

- **ODOR THRESHOLD= 100 to 200 ppm**
- Odor thresholds vary greatly. Do not rely on odor alone to determine potentially hazardous exposures.

Reasons for Citation

- **1,1 Dichloroethane** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IRIS, NFPA and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation

- Remove the person from exposure
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	2	1
FLAMMABILITY	3	3
REACTIVITY	0	0

CARCINOGEN
FLAMMABLE
POISONOUS GASES ARE PRODUCED IN FIRE
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **1,1 Dichloroethane** can affect you when inhaled and may pass through the skin.
- **1,1 Dichloroethane** should be handled as a CARCINOGEN--WITH EXTREME CAUTION.
- Contact can irritate the skin and eyes.
- Inhaling **1,1 Dichloroethane** can irritate the nose and throat.
- Exposure can cause headache, dizziness, lightheadedness, and passing out.
- Prolonged contact can cause burns, thickening and cracking of the skin.
- **1,1 Dichloroethane** may affect the liver and kidneys.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **100 ppm** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **100 ppm** averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **100 ppm** averaged over an 8-hour workshift.

- **1,1 Dichloroethane** may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health Hazardous Substance Fact Sheet, available on the RTK website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **1,1 Dichloroethane**:

- Contact can irritate the skin and eyes.
- Inhaling **1,1 Dichloroethane** can irritate the nose and throat, causing coughing and wheezing.
- Exposure can cause headache, nausea, vomiting, dizziness, lightheadedness, and passing out.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **1,1 Dichloroethane** and can last for months or years:

Cancer Hazard

- **1,1 Dichloroethane** may be a CARCINOGEN in humans since it has been shown to cause liver, circulatory, and mammary gland cancer in animals.
- Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

- While **1,1 Dichloroethane** has been tested, further testing is required to assess its potential to cause reproductive harm.

Other Effects

- Prolonged contact can cause burns, thickening and cracking of the skin.
- This chemical has not been adequately evaluated to determine whether repeated exposure can cause brain or other nerve damage. However, many solvents and other petroleum-based chemicals have been shown to cause such damage. Effects may include reduced memory and concentration, personality changes (withdrawal, irritability), fatigue, sleep disturbances, reduced coordination, and/or effects on nerves supplying internal organs (autonomic nerves) and/or nerves to the arms and legs (weakness, "pins and needles").
- **1,1 Dichloroethane** may affect the liver and kidneys.

Medical

Medical Testing

For frequent or potentially high exposure (half the PEL or greater), the following are recommended before beginning work and at regular times after that:

- Liver and kidney function tests

If symptoms develop or overexposure is suspected, the following is recommended:

- Evaluate for brain effects such as changes in memory, concentration, sleeping patterns and mood (especially irritability and social withdrawal), as well as for headaches and fatigue. Consider evaluations of the cerebellar, autonomic and peripheral nervous systems. Positive and borderline individuals should be referred for neuropsychological testing.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures

- More than light alcohol consumption can cause liver damage. Drinking alcohol may increase the liver damage caused by **1,1 Dichloroethane**.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Before entering a confined space where **1,1 Dichloroethane** may be present, check to make sure that an explosive concentration does not exist.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- Avoid skin contact with **1,1 Dichloroethane**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- Safety equipment manufacturers recommend Viton for gloves and DuPont Tychem® BR, LV, Responder® and TK; Kappler® Zytron® 500; and Saint-Gobain ONESuit® TEC, or the equivalent, as protective materials for *Dichloromethane* and *Halogen compounds*.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **100 ppm**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **3,000 ppm** is immediately dangerous to life and health. If the possibility of exposure above **3,000 ppm** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **1,1 Dichloroethane** is a FLAMMABLE LIQUID.
- Use dry chemical, CO_2, water spray or alcohol-resistant foam as extinguishing agents. Solid streams of water may not be effective.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Phosgene*.
- CONTAINERS MAY EXPLODE IN FIRE.
- Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **1,1 Dichloroethane** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit into sealed containers.
- Ventilate area of spill or leak.
- Keep **1,1 Dichloroethane** out of confined spaces, such as sewers, because of the possibility of an explosion.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **1,1 Dichloroethane** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **1,1 Dichloroethane** you should be trained on its proper handling and storage.

- **1,1 Dichloroethane** reacts violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and POTASSIUM.
- **1,1 Dichloroethane** is not compatible with AMINES; STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); ALKALI METALS (such as LITHIUM, SODIUM and CESIUM); and ALKALINE EARTH METALS (such as BARIUM, MAGNESIUM and CALCIUM).
- Store in tightly closed containers in a cool, well-ventilated area away from COMBUSTIBLES.
- **1,1 Dichloroethane** attacks some PLASTICS; COATINGS and RUBBER.
- Sources of ignition, such as smoking and open flames, are prohibited where **1,1 Dichloroethane** is used, handled, or stored.
- Metal containers involving the transfer of **1,1 Dichloroethane** should be grounded and bonded.
- Use only non-sparking tools and equipment, especially when opening and closing containers of **1,1 Dichloroethane**.

Occupational Health Information Resources

The New Jersey Department of Health offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health
Right to Know
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Protective Action Criteria (PAC) are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.

Right to Know Hazardous Substance Fact Sheet

Emergency Responders Quick Reference

Common Name: **1,1-DICHLOROETHANE**

Synonyms: 1,1-DCE; Ethylidene Chloride
CAS No: 75-34-3
Molecular Formula: $C_2H_4Cl_2$
RTK Substance No: 0651
Description: Colorless, oily liquid with an *Ether* or *Chloroform*-like odor

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
2 - Health **3 - Fire** **0 - Reactivity** **DOT#:** UN 2362 **ERG Guide #:** 130 **Hazard Class:** 3 (Flammable)	FLAMMABLE LIQUID Use dry chemical, CO_2, water spray or alcohol-resistant foam as extinguishing agents. Solid streams of water may not be effective. POISONOUS GASES ARE PRODUCED IN FIRE, including *Phosgene.* CONTAINERS MAY EXPLODE IN FIRE. Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.	**1,1 Dichloroethane** reacts violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and POTASSIUM. **1,1 Dichloroethane** is not compatible with AMINES; STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); ALKALI METALS (such as LITHIUM, SODIUM and CESIUM); and ALKALINE EARTH METALS (such as BARIUM, MAGNESIUM and CALCIUM).

SPILL/LEAKS

Isolation Distance:
Small Spill: 30 meters (100 feet)
Large Spill: 60 meters (200 feet)
Fire: 800 meters (1/2 mile)

Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit into sealed containers.
Keep **1,1 Dichloroethane** out of confined spaces, such as sewers, because of the possibility of an explosion.
DO NOT wash into sewer.
1,1 Dichloroethane is a marine pollutant.

PHYSICAL PROPERTIES

Odor Threshold:	100 to 200 ppm
Flash Point:	2°F (-17°C)
LEL:	5.4%
UEL:	16%
Auto Ignition Temp:	856°F (458°C)
Vapor Density:	3.4 (air = 1)
Vapor Pressure:	182 mm Hg at 68°F (20°C)
Specific Gravity:	1.2 (water = 1)
Water Solubility:	Slightly soluble
Boiling Point:	135° to 138°F (57° to 59°C)
Ionization Potential:	11.06 eV
Molecular Weight:	99

EXPOSURE LIMITS

OSHA:	100 ppm, 8-hr TWA
NIOSH:	100 ppm, 10-hr TWA
ACGIH:	100 ppm, 8-hr TWA
IDLH:	3,000 ppm

PROTECTIVE EQUIPMENT

Gloves:	Viton (2.4-hr breakthrough)
Coveralls:	Tychem® BR, LV, Responder® and TK; Zytron® 500; and ONESuit® TEC (>8-hr breakthrough for *Halogen compounds*)
Respirator:	>100 ppm - Supplied air

HEALTH EFFECTS

Eyes:	Irritation
Skin:	Irritation
Inhalation:	Nose and throat irritation with coughing and wheezing Headache, nausea, vomiting, dizziness and passing out
Chronic:	Cancer (liver, circulatory, and mammary gland) in animals

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.
Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.
Begin artificial respiration if breathing has stopped and CPR if necessary.
Transfer promptly to a medical facility

Technical Factsheet on: 1,2-DICHLOROETHANE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: zero mg/L
MCL: 0.005 mg/L
HAL(child): 1- to 10-day: 0.7 mg/L; Longer-term: 0.7 mg/L

Health Effects Summary

Acute: EPA has found acute oral exposures to 1,2-dichloroethane to potentially cause central nervous system disorders, and adverse lung, kidney, liver circulatory and gastrointestinal effects.

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day: upto a 7-year exposure to 0.7 mg/L.

Chronic: No reliable data are available concerning toxic effects from chronic exposures to 1,2-dichloroethane at levels above the MCL.

Cancer: There is some evidence that 1,2-Dichloroethane may have the potential to cause cancer from a lifetime exposure at levels above the MCL.

Usage Patterns

Production of 1,2-dichloroethane has increased steadily: from about 14 billion lbs. in 1990 to 18 billion lbs. in 1993. In 1985 it was estimated that industries consumed 1,2-dichloroethane as follows: Vinyl chloride monomer, 97%; chlorinated solvents, 2%; miscellaneous, 1%.

The greatest use of 1,2-dichloroethane is in chemical manufacture, including: vinyl chloride, tri- & tetra-chloroethylene, vinylidene chloride & trichloroethane, ethylene glycol,

diaminoethylene, polyvinyl chloride, nylon, viscose rayon, styrene-butadiene rubber, and various plastics; as a lead scavenger in gasoline.

1,2-dichloroethane has a variety of uses as a solvent uses: for resins, asphalt, bitumen, rubber; for fats, oils, waxes, gums resins; used as pickling agent and a dry clean agent; in photography, xerography, water softening & in production of cosmetics; for processing pharmaceutical products; in leather cleaning, degreaser compounds, rubber cement, and acrylic adhesives. It is also used in extracting spices such as annatto, paprika & turmeric.

Other uses include as a fumigant for harvested grain, in orchards, in mushroom houses; fumigant for upholstery and carpets.

Release Patterns

Major atmospheric releases of 1,2-dichloroethane are due to its production and use as a chemical intermediate, lead scavenger, extraction and cleaning solvent, diluent for pesticides, grain fumigant and in paint, coatings and adhesives. Other releases are from waste water, spills, and/or improper disposal primarily from its use as a cleaning solvent and chemical intermediates. Land release is primarily from its production and use as a cleaning solvent and diluent for pesticides. Chlorination of water does not appear to contribute to 1,2-dichloroethane in drinking water.

From 1987 to 1993, according to the Toxics Release Inventory, releases to water totalled over 433,000 lbs. Release to land totalled over 22,000 lbs. These releases were primarily from facilities classified as producing industrial organic chemicals, alkalies and chlorine. The largest releases occurred in New Jersey and Louisiana.

Environmental Fate

Releases to water will primarily be removed by evaporation (half-life several hours to 10 days). Although firm experimental data are lacking, the photooxidation of 1,2-dichloroethane in water is expected to be slow. The rate of hydrolysis is not significant, being much slower than other pertinent environmental processes such as volatilization and photooxidation.

Releases on land will dissipate by volatilization to air and by percolation into groundwater where it is likely to persist for a very long time. Little adsorption to soil is expected based upon an experimental Koc of 33 for silt loam which in agreement with values calculated from the water solubility. 1,2-Dichloroethane rapidly percolates through sandy soil.

Once in the atmosphere, it may be transported long distances and is primarily removed by photooxidation (half-life approx 1 month). The direct photolysis of 1,2-dichloroethane is not a significant loss process. It is primarily degraded in the atmosphere by reaction with hydroxyl radicals, having a half-life of a little over a month with a 1.9% loss for a 12 hour sunlit day. Indirect evidence for photooxidation of 1,2-dichloroethane comes from the observation that monitoring levels are highest during the night and early morning. The products of photooxidation are CO_2 and HCl.

Biodegradability tests with 1,2-dichloroethane resulted in little or no biodegradation in aerobic systems using sewage seed or activated sludge. The one river die-away test reported no degradation. The percent BOD produced in 5-10 days was 0-7%. Another investigator reported slow to moderate biodegradation activity. The extent of biodegradation is difficult to assess due to compounds' susceptibility to volatilization. No degradation occurred in an acclimated anaerobic system after 4 months incubation.

1,2-Dichloroethane is not expected to bioconcentrate in fish due to its low octanol/water partition function (1.48). The measured log BCF in bluegill sunfish is 0.30. Its presence in some food products is probably due to its use as an extractant. Major human exposure is from urban air, drinking water from contaminated aquifers and occupational atmospheres.

Chemical/Physical Properties

CAS Number: 107-06-2

Color/ Form/Odor: Colorless, oily liquid with a pleasant, sweet, chloroform-like odor

M.P.: N/A B.P.: N/A

Vapor Pressure: N/A; highly volatile

Density/Spec. Grav.: 1.235 at 20 C

Octanol/Water Partition (Kow): Log Kow = 1.48

Solubilities: 8.7 g/L of water at 20 C;

Soil sorption coefficient: Koc measured at 33 for silt/loam; high to very high mobility in soil

Odor/Taste Thresholds: Taste threshold in water is 29 mg/L

Bioconcentration Factor: Log BCF is 0.30 in fish; not expected to bioconcentrate in fish.

Henry's Law Coefficient: N/A

Trade Names/Synonyms: 1,2-Ethylene dichloride; Glycol dichloride; Freon 150; Borer sol; Brocide; Destruxol borer-sol; Dichlor-mulsion; Dutch oil; Granosan

Other Regulatory Information

Monitoring:

--For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

--Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source	**Method Numbers**
EPA 600/4-88-039	502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

		Water	**Land**
TOTALS (in pounds)		**433,056**	**22,616**
Top Six States*			
NJ	192,700	231	
LA	136,508	2,292	
TX	36,459	7,028	
MO	6,786	8,730	
NY	11,330	0	
KY	10,309	0	
Major Industries			
Industrial organics		211,146	363
Alkalies, chlorine		120,283	3,254
Cyclic crudes, intermed.		32,945	119
Agricultural chemicals		11,918	8,980
Industrial gases		15,497	0
Plastics materials, resins		6,908	6,895

Photographic equip.	11,566	0
Other Chemicals	8,179	0
Pharmaceuticals	7,525	521
Petroleum refining	1,730	1,479

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

Technical Factsheet on: 1,1-DICHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: 0.007 mg/L
MCL: 0.007 mg/L
HAL(child): 1 day: 2 mg/L; Longer-term: 1 mg/L

Health Effects Summary

Acute: EPA has found 1,1-dichloroethylene to potentially cause adverse liver effects due to acute exposures at levels above the MCL.

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day: a one-day exposure of 2 mg/L; upto a 7-year exposure to 1 mg/L.

Chronic: Chronic exposure to 1,1-dichloroethylene at levels above the MCL has the potential to cause liver and kidney damage, as well as toxicity to the developing fetus.

Cancer: There is some evidence that 1,1-dichloroethylene may have the potential to cause cancer at levels above the MCL.

Usage Patterns

An estimated 90,700 tons/yr of the monomer were produced in the USA during the early 1980s. Virtually all of the 1,1-dichloroethylene produced is used in the production of copolymers with vinyl chloride or acrylonitrile. A small percentage (4%) of 1,1-dichloroethylene is used as chemical intermediates. These products are then used in adhesives, synthetic fibers, refrigerants, food packaging and coating resins such as the saran types.

Release Patterns

1,1-Dichloroethylene may be released into the environment as emissions or in wastewater during its production and use in the manufacture of plastic wrap, adhesives, and synthetic fiber.

1,1-Dichloroethylene is formed by a minor pathway during the anaerobic biodegradation of trichloroethylene and also by the hydrolysis of 1,1,1-trichloroethane. Therefore there is a potential for it to form in groundwater that has been contaminated by chlorinated solvents.

1,1-Dichloroethylene is also produced by the thermal decomposition of 1,1,1-trichloroethane, a reaction that is catalyzed by copper. 1,1,1-Trichloroethane is used as a degreasing agent in welding shops so there is a potential for 1,1-dichloroethylene to be formed in these shops as well as in other industrial environments where 1,1,1-trichloroethane is used near sources of heat.

From 1987 to 1993, according to the Toxics Release Inventory, releases to water totalled over 10,000 lbs. Releases to land totalled about 1,500 lbs. These releases were primarily from facilities classified as producing alkalies/chlorine and plastics materials/resins. The largest releases occurred in Kentucky.

Environmental Fate

Releases to water will primarily be lost to the atmosphere through evaporation. The mass transfer coefficient between water and the atmosphere of 1,1-dichloroethylene relative to oxygen has been measured to be 0.62. Using data for the oxygen re-aeration rate of typical bodies of water, one can calculate the half-life for evaporation of 1,1-dichloroethylene to be 5.9, 1.2 and 4.7 days from a pond, river and lake, respectively. In water, the photooxidation of 1,1-dichloroethylene is insignificant. A hydrolysis half-life of 6-9 months has been observed with no significant difference in hydrolysis rate between pH 4.5 and 8.5. This value differs markedly from the estimated hydrolytic half-life of 2 yr at pH 7.

If spilled on land, part of the 1,1-dichloroethylene will evaporate and part will leach into the groundwater where its fate is unknown, but degradation is expected to be slow based upon microcosm studies. No experimental data is available on the adsorption of 1,1-dichloroethylene. A low Koc of 150 are calculated from a regression equation based on its octanol/water partition coefficient (log Kow= 1.48).

Once in the atmosphere it will degrade rapidly by photooxidation with a half-life of 11 hours in relatively clean air or under 2 hours in polluted air.

Few studies on the biodegradation of vinylidene could be found In one study, 45-78% of the chemical was lost in 7 days when incubated with a wastewater inoculum; however, a sizeable fraction of the loss was due to volatilization. 97% of 1,1-dichloroethylene was reported to be removed in a municipal wastewater plant but again the fraction lost by evaporation is unknown.

Under anaerobic conditions in microcosms designed to simulate the anaerobic conditions in groundwater and landfills, 1,1-dichloroethylene undergoes reductive dechlorination to vinyl chloride. In the microcosms designed to simulate a groundwater environment, 50% of the 1,1-dichloroethylene disappeared in 5-6 mo.

Under the simulated landfill conditions, degradation occurred in 1-3 weeks. In another anaerobic biodegradation study that used materials from an aquifer that receive municipal landfill leachate and is known to support methanogenesis, the 1,1-dichloroethylene disappeared in 40 weeks. However, no significant degradation occurred for 16 weeks. 1,1-Dichloroethylene was formed as a degradation product.

No experimental data could be found on the bioconcentration of 1,1-dichloroethylene in fish or aquatic invertebrates. Based on its low octanol/water partition coefficient (log Kow= 1.48) one would not expect any significant bioconcentration.

The general population may be exposed to low levels of 1,1-dichloroethylene in ambient air, indoor air, contaminated drinking water, and food which has come in contact with plastic wrap which contains residual monomer.

Chemical/Physical Properties

CAS Number: 75-35-4

Color/ Form/Odor: Colorless liquid with a mild, sweet, chloroform-like odor

M.P.: -122.5 C B.P.: 31.7 C

Vapor Pressure: 591 mm Hg at 25 C; highly volatile

Octanol/Water Partition (Kow): Estimated log Kow= 1.32

Density/Spec. Grav.: 1.213 at 20 C

Solubilities: 2.5 g/L of water at 25 C

Soil sorption coefficient: Koc estimated at 150

Odor/Taste Thresholds: N/A

Bioconcentration Factor: N/A; not expected to bioconcentrate in fish.

Henry's Law Coefficient: N/A

Trade Names/Synonyms: 1,1-DCE; 1,1-Dichloroethene; Asym-dichloroethylene; Vinylidene chloride;

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

-- Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source	Method Numbers
EPA 600/4-88-039	502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS (in pounds)	**10,101**	**1,488**
Top States		
KY	2,880	286
TX	2,061	150
LA	2,079	3
Major Industries		
Plastics materials, resins	3,942	1,299
Alkalies, chlorine	4,173	154

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

Technical Factsheet on: TETRACHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: zero mg/L
MCL: 0.005 mg/L
HAL(child): 1- to 10-day: 2 mg/L; Longer-term: 1 mg/L

Health Effects Summary

Acute: EPA has found tetrachloroethylene to potentially cause the following health effects from acute exposures at levels above the MCL: detrimental effects to liver, kidney, and central nervous system.

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day: a one- to ten-day exposure to 2 mg/L; upto a 7-year exposure to 1 mg/L.

Chronic: Tetrachloroethylene has the potential to cause the following health effects from long-term exposures at levels above the MCL: detrimental effects to liver, kidney, and central nervous system.

Cancer: There is some evidence that tetrachloroethylene may have the potential to cause cancer from a lifetime exposure at levels above the MCL.

Usage Patterns

Production of tetrachloroethylene has decreased: from 736 million lbs. in 1978 to 405 million lbs in 1986.

In 1989 it was estimated that industries consumed tetrachloroethylene as follows: Dry cleaning and textile processing, 50%; chemical intermediate (mostly fluorocarbon F-113), 28%; industrial metal cleaning, 9%; exports, 10%; other, 3%.

The greatest use of tetrachloroethylene is in the textile industry for processing, finishing, sizing, and as a component of aerosol dry-cleaning products.

Other uses include: an intermediate in the synthesis of fluorocarbons, an insulating/cooling fluid in electric transformers, in typewriter correction fluids, as veterinary medication against worms, once used as grain protectant/fumigant.

Release Patterns

Major releases of tetrachloroethylene are: via vaporization losses from dry cleaning and industrial metal cleaning; wastewater, particularly from metal finishing, laundries, aluminum forming, organic chemical/plastics manufacturing and municipal treatment plants. It is also estimated that emissions account for approximately 90% of the tetrachloroethylene produced in the United States.

Water pollution can occur from tetrachloroethylene leaching from vinyl liners in asbestos-cement water pipelines for water distribution, and during chlorination water treatment, where it can be formed in small quantities.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, tetrachloroethylene releases to land and water totalled over 1 million lbs., of which about 75 percent was to land. These releases were primarily from alkali and chlorine industries which use tetrachloroethylene in making other chemicals. The largest releases occurred in Louisiana and South Carolina.

Environmental Fate

If PCE is released to soil, it will be subject to evaporation into the atmosphere and to leaching to the groundwater. Tetrachloroethylene was slightly adsorbed on sand and clay minerals. The Henry's adsorption coefficients were approximately in proportion to the organic content of the soil samples. Based on the reported and estimated Koc's (209 to 1685), tetrachloroethylene will be expected to exhibit low to medium mobility in soil and therefore may leach slowly to the groundwater.

There is evidence that slow biodegradation of PCE occurs under anaerobic conditions when the microorganisms have been acclimated. In experiments using continuous-flow laboratory methanogenic column with well acclimated mixed cultures and a 2-day detention time, there was an average PCE removal rate of 76%. Removal of 86% PCE occurred in a methanogenic biofilm column (8 weeks of activation followed by 9-12 weeks ofacclimation). In a microcosm containing muck from an aquifer recharge basin, 72.8% loss was observed in 21 days against 12-17% in controls. In one field ground water recharge project, degradation was observed in the 50 day recharge period.

If PCE is released to water, it will be subject to rapid volatilization with estimated half-lives ranging from <1 day to several weeks. Measured volatilization half-lives in a mesocosm simulating Narraganset Bay, RI were 11 days in winter, 25 days in spring, and 14 days in summer.

PCE will not be expected to significantly biodegrade in water or adsorb to sediment. PCE will not be expected to significantly hydrolyze in soil or water under normal environmental conditions (half-life 9 months at 25 deg C).

If PCE is released to the atmosphere, it will exist mainly in the gas-phase and it will be subject to photooxidation with estimates of degradation time scales ranging from an approximate half-life of 2 months to complete degradation in an hour. Some of the PCE in the atmosphere may be subject to washout in rain based on the solubility of PCE in water and the fact that PCE has been detected in rain.

Based on the reported and estimated BCF's, tetrachloroethylene will not be expected to significantly bioconcentrate in aquatic organisms. BCFs of 39 to 49 were measured in fish; a BCF of 226 was estimated from octanol water partition coefficient.

Major human exposure is from inhalation of contaminated urban air, especially near point sources such as dry cleaners, drinking contaminated water from contaminated aquifers and drinking water distributed in pipelines with vinyl liners, and inhalation of contaminated occupational atmospheres in metal degreasing and dry cleaning industries.

Chemical/Physical Properties

CAS Number: 127-18-4

Color/ Form/Odor: Colorless liquid with mildy sweet, chloroform-like odor; available in many forms, from worm pills to dry-cleaning grades containing various stabilizers.

M.P.: -19 C B.P.: 121 C

Vapor Pressure: 18.47 mm Hg at 25 C

Octanol/Water Partition (Kow): Log Kow = 3.40

Density/Spec. Grav.: 1.62 at 20 C

Solubility: 0.15 g/L of water at 25 C; Slightly soluble in water

Soil sorption coefficient: Koc = 210 (exp.) to 238 (est.); low to moderate mobility in soil

Odor/Taste Thresholds: Taste threshold in water is 0.3 mg/L

Bioconcentration Factor: BCFs of 39 to 49 reported in fish; not expected to bioconcentrate in aquatic organisms.

Henry's Law Coefficient: N/A

Trade Names/Synonyms: Ethylene tetrachloride, Perchloroethylene, PCE, Ankilostin, Didakene, Fedal-un, Nema, Perclene, Persec, Tetlen, Tetracap, Tetraleno, Tetropil, Antisal 1, Dow-per, Perawin, Perchlor, Percosolv, Perk, Perklone, Tetraguer, Tetralex, Tetravec

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 consecutive quarterly samples during initial compliance period (1993-1995)

Repeat Frequency- If no detects in initial samples GW systems must take annual samples during 1996-1998 compliance period and triennial samples thereafter; SW systems must take annual samples.

-- Triggers - Return to quarterly monitoring if detect at > 0.0005 mg/L, until primacy State determines otherwise

Analysis

Reference Source	Method Numbers
EPA 600/4-88-039	502.2; 524.2; 551

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS (in pounds)	**297,602**	**750,104**
Top Five States*		
LA	23,639	610,518
SC	104,728	0
NH	62,150	0
NC	42,192	13,102
IL	0	40,500

TX	36,144		720	
OH	0		32,170	
IN	1,300		27,000	
CO	0		11,000	
IA	5,112		0	
Major Industries*				
Alkalis, chlorine		63,472		611,242
Leather tanning,finishing		62,150		0
Cotton fabric finishing		51,577		0
Misc textile finishing		48,082		2,000
Knit outwear mills		45,808		0
Misc. apparel, access.		0		40,500
Transportation Equip.		3,750		27,000
Ammunition		0		20,575
Misc Chem. preparations		0		11,102
Petroleum refining		0		11,000
Ordnance, accessories		0		10,100

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

Technical Factsheet on: TRICHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: zero
MCL: 0.005 mg/L
HAL(child): none

Health Effects Summary

Acute: EPA has found trichloroethylene to potentially cause vomiting and abdominal pain from acute exposures at levels above the MCL.

No Health Advisories have been established for short-term exposures.

Chronic: Trichloroethylene has the potential to cause liver damage from a lifetime exposure at levels above the MCL.

Cancer: There is some evidence that trichloroethylene may have the potential to cause cancer from a lifetime exposure at levels above the MCL.

Usage Patterns

Production of trichloroethylene has increased from just over 260,000 lbs in 1981 to 320 million lbs. in 1991. Vapor degreasing of fabricated metal parts and some textiles accounts for 80% of its use.

Five percent is used as an intermediate in the production of organic chemicals and pharmaceuticals. Miscellaneous uses (5%) include solvents for dry cleaning, extraction and as a refrigerant/heat exchange liquid. An estimated 10% is exported.

Release Patterns

Major environmental releases of trichloroethylene are due to air emissions from metal degreasing plants. Wastewater from metal finishing, paint and ink formulation, electrical/electronic components, and rubber processing industries also may contain trichloroethylene.

From 1987 to 1993, according to the Toxics Release Inventory, trichloroethylene releases to water totalled over 100,000 lbs. Releases to land totalled over 191,000 lbs. These releases were primarily from steel pipe and tube manufacturing industries. The largest releases occurred in Pennsylvania and Illinois. The largest direct releases to water occurred in West Virginia.

Environmental Fate

Relatively high vapor pressure and low adsorption coefficient to a number of soil types indicates ready transport through soil and low potential for adsorption to sediments. The mobility in soil is confirmed in soil column studies and river bank infiltration studies. Four to six percent of environmental concentrations

of trichloroethylene adsorbed to two silty clay loams (Koc = 87 and 150). No adsorption to Ca-saturated montmorillonite and 17% adsorption to Al-saturated montmorillonite was observed.

The high Henry's Law Constant indicates rapid evaporation from water. Half-lives of evaporation have been reported to be on the order of several minutes to hours, depending upon the turbulence. Field studies also support rapid evaporation from water. Trichloroethylene is not hydrolyzed by water under normal conditions. It does not adsorb light of less than 290 nm and therefore should not directly photodegrade. However, slow (half-life -l0.7 months) photooxidation in water has been noted.

Trichloroethylene is relatively reactive under smog conditions with 60% degradation in 140 min and 50% degradation in 1 to 3.5 hours reported. Atmospheric residence times based upon reaction with hydroxyl radical is 5 days (6-8) with production of phosgene, dichloroacetyl chloride, and formyl chloride.

Marine monitoring data only suggest moderate bioconcentration (2-25 times). Bioconcentration factors of 17 to 39 have been reported in bluegill sunfish and rainbow trout.

Chemical/Physical Properties

CAS Number: 79-01-6

Color/ Form/Odor: Clear, colorless or blue mobile liquid with sweet chloroform-like odor

M.P.: -73 C B.P.: 87 C

Vapor Pressure: 57.8 mm Hg at 20 C

Density/Spec. Grav.: 1.465 at 20 C

Octanol/Water Partition (Kow): Log Kow = 2.29

Solubilities: 1.0 g/L of water at 25 C

Soil sorption coefficient: Log Koc = 2 for many soil types; high to very high mobility in soil

Bioconcentration Factor: 17 to 39 in fish; moderate.

Odor/Taste Thresholds: N/A

Henry's Law Coefficient: 0.01 atm-cu m/mole

Trade Names/Synonyms: 1,1,2-Trichloroethylene; Acetylene trichloroethylene; Algylen; Anameth; Benzinol; Chlorilen; CirCosolv; Germalgene; Lethurin; Perm-a-chlor; Petzinol; Philex; TRI-Plus M; Vitran

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 consecutive quarterly samples during initial compliance period (1993-1995)

Repeat Frequency- If no detects in initial samples GW systems must take annual samples during 1996-1998 compliance period and triennial samples thereafter; SW systems must take annual samples.

-- Triggers - Return to quarterly monitoring if detect at > 0.0005 mg/L, until primacy State determines otherwise

Analysis

Reference Source	Method Numbers
EPA 600/4-88-039	502.2; 524.2; 551

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS (in pounds)	**100,293**	**191,088**
Top Six States*		
PA	0	33,450
IL	0	30,711
GA	3,742	17,532
TX	0	21,000
MA	0	19,920
WV	12,822	0
Major Industries		
Steel pipe, tubes	31	39,288
Misc. Indust. Organics	27,708	0
Car parts, access.	4,405	19,920
Plating, polishing	3,342	20,100
Wool fabric mills	3,942	18,081

* State totals only include facilities with releases greater than 10,000 lbs.

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

Technical Factsheet on: 1,2-DICHLOROETHYLENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: cis-0.07; trans-0.1 mg/L
MCL: cis-0.07; trans-0.1 mg/L
HAL(child)- 1 day: cis-4; trans-20
: Longer-term: cis-3; trans-2

Health Effects Summary

Acute: EPA has found cis- and trans- 1,2-dichloroethylene to potentially cause central nervous system depression from short-term exposures at levels above the MCL.

Short-term exposures in drinking water which are considered "safe" for a 10-kg (22 lb.) child consuming 1 liter of water per day: for the cis form- a one-day exposure of 4 mg/L or upto a 7-year exposure to 3 mg/L. For the trans isomer: a one-day exposure of 20 mg/L or upto a 7-year exposure to 2 mg/L.

Chronic: Both cis- and trans-1,2-DCE have the potential to cause liver, circulatory and nervous system damage from long-term exposure at levels above the MCL. The trans isomer is approximately twice as potent as the cis- isomer in its ability to depress the central nervous system.

Cancer: There is inadequate evidence to state whether or not either cis- or trans-1,2-DCE have the potential to cause liver cancer from a lifetime exposure in drinking water.

Usage Patterns

Both the cis and trans forms - usually as a mixture - are used as a solvent for waxes, resins, and acetylcellulose; in the extraction of rubber; as a refrigerant; in the manufacture of pharmaceuticals and artificial pearls and in the extraction of oils and fats from fish and meat; as a chemical intermediate for making chlorinated compounds.

No data were available on recent production levels in the United States.

Release Patterns

Releases to the environment are expected to be limited to manufacturing plants in the Gulf Region of the United States. Since cis-and trans-1,2-DCE are not listed chemicals in the Toxics Release Inventory, data on releases during manufacture and handling are not available.

Trans-1,2-dichloroethylene may be released to the environment in air emissions and wastewater during its production and use as a solvent and extractant, in organic synthesis, and in the manufacture of perfumes, lacquers, and thermoplastics.

An assessment of the sources of trans-1,2-dichloroethylene is complicated by the fact that it is a priority pollutant while the cis isomer is not and the standard EPA methods of analysis do not allow the isomers to differentiated. This has resulted in monitoring reports erroneously listing the trans isomer when the cis

isomer is present. The Michigan Department of Health has the capability of distinguishing these isomers and claims that it frequently finds the cis isomer and, if concentrations are high, they occasionally find traces of the trans isomer.

Environmental Fate

Both the cis- and trans-1,2-dichloroethylenes may be released to the environment in air emissions and wastewater during its production and use. Under anaerobic conditions that may exist in landfills, aquifers, or sediment one is likely to find 1,2-dichloroethylenes that are formed as breakdown products from the reductive dehalogenation of common industrial solvents trichloroethylene, tetrachloroethylene, and 1,1,2,2-tetrachloroethane.

The cis-1,2-dichloroethylene is apparently the more common isomer found although it is mistakenly reported as the trans isomer. The trans-isomer, being a priority pollutant, is more commonly analyzed for and the analytical procedures generally used do not distinguish between isomers.

If 1,2-dichloroethylenes are released on soil, it should evaporate and leach into the groundwater where very slow biodegradation should occur. If released into water, 1,2-dichloroethylenes will be lost mainly through volatilization.

In the atmosphere, 1,2-dichloroethylenes will be lost by reaction with photochemically produced hydroxyl radicals and scavenged by rain. Because it is relatively long-lived in the atmosphere, considerable dispersal from source areas should occur.

Biodegradation, adsorption to sediment, and bioconcentration in aquatic organisms should not be significant.

Chemical/Physical Properties

CAS Number: cis- 156-59-2 trans- 156-60-5

Color/ Form/Odor: Colorless, odorless liquid

M.P.: cis- -80 C; trans- -50 C

B.P.: cis- 60.3 C; trans- 48 C

Vapor Pressure: cis- 273 mm Hg at 30 C; trans- 395 mm Hg at 30 C

Octanol/Water Partition (Kow): Log Kow = cis- 1.86; trans- 2.06

Density/Spec. Grav.: cis- 1.26 at 20 C trans- 1.28 at 20 C

Solubility: Soluble in water, cis- 3.5 g/L of water, trans- 6.3 g/L of water at 25 C

Soil sorption coefficient: Kocs of cis and trans isomers are estimated at 36 to 49; high to very high mobility in soil

Odor/Taste Thresholds: N/A

Henry's Law Coefficient: cis- 0.00337 atm-cu m/mole; trans- 0.00672 atm-cu m/mole

Bioconcentration Factor: BCFs of cis and trans isomers are estimated at 15 to 22; not expected to bioconcentrate in aquatic organisms.

Trade Names/Synonyms: Both isomers- 1,2-DCE, Acetylene dichloride; cis- Z-1,2-dichloroethene; trans- E-1,2-dichloroethene, sym-dichloroethylene

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

-- Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source	Method Numbers
EPA 600/4-88-039	502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

Technical Factsheet on: VINYL CHLORIDE

List of Drinking Water Contaminants

This fact sheet is part of a collection of fact sheets for volatile organic chemicals with drinking water regulations.

Health Effects Summary

Acute: Occupational inhalation exposure to high levels (e.g., 40 - 900 ppm) may cause neurological effects such dizziness, headaches, or narcosis in workers.

EPA's short-term health advisory a 10-kg (22 lb.) child consuming 1 liter of water per day is 3 mg/L for one-day to ten-day exposures.

Chronic: Oral ingestion at high levels (0.1 mg/L) may cause liver effects from life-time exposure.

Cancer: Based on epidemiological and animal studies, vinyl chloride is carcinogenic in humans when inhaled, and it is considered to be a human carcinogen from oral exposure.

Drinking Water Standards

MCLG: zero mg/L

MCL: 0.002 mg/L

Usage Patterns

Production of vinyl chloride in 1993 was nearly 14 billion lbs.

Vinyl chloride is used in the manufacture of numerous products in building and construction, automotive industry, electrical wire insulation and cables, piping, industrial and household equipment, medical supplies, and is depended upon heavily by the rubber, paper, and glass industries.

Limited quantities of vinyl chloride were used in the United States as an aerosol propellant, a refrigerant, an extraction solvent and as an ingredient of drug and cosmetic products. Proportions consumed for various uses in 1989 were: polyvinyl chloride products, 91%; exports, 7%; other, including chlorinated solvents, 2%.

Release Patterns

Although vinyl chloride is produced in large quantities, almost all of it is used captively for the production of polyvinyl chloride (PVC) and other polymers. Therefore, its major release to the environment will be as emissions and wastewater at these production and manufacturing facilities. Vinyl chloride is also a product of anaerobic degradation of chlorination solvents such as would be expected to occur in groundwater and landfills.

Small quantities of vinyl chloride can be released to food by migration of vinyl chloride monomer present in polyvinyl chloride food wrappings and containers. Major human exposure will be from inhalation of occupational atmospheres and from ingestion of contaminated food and drinking water which has come

into contact with polyvinyl chloride packaging material or pipe which has not been treated adequately to remove residual monomer.

Environmental Fate

If vinyl chloride is released to soil, it will be subject to rapid volatilization with reported half-lives of 0.2 and 0.5 days for evaporation from soil at 1 and 10 cm incorporation, respectively, based on a high vapor pressure of 2,600 mm Hg at 25 degrees C. Based on a reported water solubility of 2,700 mg/L, a Koc of 56 was estimated. According to estimated Koc values, vinyl chloride will be expected to be highly mobile in soil and it may leach to the groundwater. It may be subject to biodegradation under anaerobic conditions such as exists in flooded soil and groundwater.

If released to water, vinyl chloride will rapidly evaporate. Using a reported Henry's Law constant of 0.0560 atm/cu m-mole, a half-life of 0.805 hr was calculated for evaporation from a model river 1 m deep with a current of 3 m/sec and with a wind velocity of 3 m/sec. In waters containing photosensitizers such as humic acid, photodegradation will occur fairly rapidly. Limited existing data indicate that vinyl chloride is resistant to biodegradation in aerobic systems and therefore, it may not be subject to biodegradation in aerobic soils and natural waters. It will not be expected to hydrolyze in soils or natural waters under normal environmental conditions.

If vinyl chloride is released to the atmosphere, it can be expected to exist mainly in the vapor-phase in the ambient atmosphere and to degrade rapidly in air by gas-phase reaction with photochemically produced hydroxyl radicals with an estimated half-life of 1.5 days.

Some data indicate that vinyl chloride is too readily volatilized to undergo bioaccumulation, except perhaps in the most extreme exposure conditions. Based on a reported water solubility of 2,700 mg/l, a BCF of 7 was estimated, indicating that vinyl chloride will not be expected to significantly bioconcentrate in aquatic organisms.

Chemical/Physical Properties

CAS Number: 75-01-4

Color/ Form/Odor: Colorless gas, sweet odor

M.P.: -13.37 C B.P.: -153.2 C

Vapor Pressure: 2600 mm Hg at 25 C

Density/Spec. Grav.: 0.91 at 20 C

Octanol/Water Partition (Kow): Log Kow = 0.6 (calculated)

Solubility: 2.7 g/L of water; Slightly soluble in water

Soil sorption coefficient: Koc estimated at 56; highly mobile in soil

Odor/Taste Thresholds: N/A

Bioconcentration Factor: Estimated BCF = 7; not expected to bioconcentrate in aquatic organisms.

Henry's Law Coefficient: 0.0560 atm-cu m/mole;

Trade Names/Synonyms: Chlorethene; Chlorethylene; monochloroethene; Monovinyl chloride (MVC); Trovidur

Other Regulatory Information

Monitoring:

- For Ground/Surface Water Sources:
  - Initial Frequency- 4 quarterly samples every 3 years
  - Repeat Frequency- Annually after 1 year of no detection
- Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source	Method Numbers
EPA 600/4-88-039	502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

For Additional Information

EPA can provide further regulatory or other general information:

EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:

- Toxic Substance Control Act Information Line - 202/554-1404
- Toxics Release Inventory, National Library of Medicine - 301/496-6531
- Agency for Toxic Substances and Disease Registry - 404/639-6000

Technical Factsheet on: LEAD

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: zero
Action Level: > 0.015 mg/L in more than 10 percent of tap water samples
HAL(child): none

Health Effects Summary

Acute: Lead can cause a variety of adverse health effects in humans. At relatively low levels of exposure, these effects may include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing, and learning abilities of children, and slight increases in the blood pressure of some adults. It appears that some of these effects, particularly changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood lead levels so low as to be essentially without a threshold.

Chronic: Chronic exposure to lead has been linked to cerebrovascular and kidney disease in humans.

Cancer: Lead has the potential to cause cancer from a lifetime exposure at levels above the action level.

Usage Patterns

Lead is the fifth most important metal in the USA economy in terms of consumption. Of this approximately 85% of the primary lead is produced domestically and 40-50% is recovered and recycled. Eighty eight percent of the lead mined in the US comes from seven mines in the New Lead Belt in southeastern Missouri; the rest coming from eight mines in Colorado, Idaho, and Utah. Three of the six USA lead smelters are from this region, the others are located in Idaho, Montana, and Texas.

Release Patterns

Lead occurs in drinking water from two sources: (1) Lead in raw water supplies, i.e., source water or distributed water, and (2) corrosion of plumbing materials in the water distribution system (corrosion by-products). Most lead contamination is from corrosion by-products.

Occurrence in Source Water and Distributed Water. Based on a variety of water quality surveys, EPA now estimates that approximately 600 groundwater systems and about 215 surface suppliers may have water leaving the treatment plant with lead levels greater than 0.005 mg/L These two sources together indicate that less than 1 percent of the public water systems in the United States have water entering the distribution system with lead levels greater than 0.005 mg/L. These systems serve less than 3 percent of people that receive their drinking water from public water systems.

From 1987 to 1993, according to the Toxics Release Inventory lead compound releases to land and water totalled nearly 144 million lbs., almost all of which was to land. These releases were primarily from lead and copper smelting industries. The largest releases occurred in Missouri, Arizona and Montana. The largest direct releases to water occurred in Ohio.

Occurrence as a Corrosion By-Product. Lead in drinking water results primarily from corrosion of materials located throughout the distribution system containing lead and copper and from lead and copper plumbing materials used to plumb public- and privately-owned structures connected to the distribution system. The amount of lead in drinking water attributable to corrosion by-products depends on a number of factors, including the amount and age of lead and copper bearing materials susceptible to corrosion, how long the water is in contact with the lead containing surfaces, and how corrosive the water in the system is toward these materials.

The potential sources of lead corrosion by-products found in drinking water can include: Water service mains (rarely), lead goosenecks or pigtails, lead service lines and interior household pipes, lead solders and fluxes used to connect copper pipes, alloys containing lead, including some faucets made of brass or bronze.

Most public water systems serve at least some buildings with lead solder and/or lead service lines. EPA estimates that there are about 10 million lead service lines/connections. About 20 percent of all public water systems have some lead service lines/connections within their distribution system.

The amount of lead in drinking water depends heavily on the corrosivity of the water. All water is corrosive to metal plumbing materials to some degree, even water termed noncorrosive or water treated to make it less corrosive. The corrosivity of water to lead is influenced by water quality parameters such as pH, total alkalinity, dissolved inorganic carbonate, calcium, and hardness. Galvanic corrosion of lead into water also occurs with lead-soldered copper pipes, due to differences in the electrochemical potential of the two metals. Grounding of household electrical systems to plumbing may also exacerbate galvanic corrosion.

Environmental Fate

Lead may enter the environment during its mining, ore processing, smelting, refining use, recycling or disposal. The initial means of entry is via the atmosphere. Lead may also enter the atmosphere from the weathering of soil and volcanos, but these sources are minor compared with anthropogenic ones.

Lead will be retained in the upper 2-5 cm of soil, especially soils with at least 5% organic matter or a pH 5 or above. Leaching is not important under normal conditions. It is expected to slowly undergo speciation to the more insoluble sulfate, sulfide, oxide, and phosphate salts.

Lead enters water from atmospheric fallout, runoff or wastewater; little is transferred from natural ores. Metallic lead is attacked by pure water in the presence of oxygen, but if the water contains carbonates and silicates, protective films are formed preventing further attack. That which dissolves tends to form ligands. Lead is effectively removed from the water column to the sediment by adsorption to organic matter and clay minerals, precipitation as insoluble salt, and reaction with hydrous iron and manganese oxide. Under most circumstances, adsorption predominates.

Lake sediment microorganisms are able to directly methylate certain inorganic lead compounds. Under appropriate conditions, dissolution due to anaerobic microbial action may be significant in subsurface environments. The mean percentage removal of lead during the activated sludge process was 82% and was almost entirely due to the removal of the insoluble fraction by adsorption onto the sludge floc and to a much lesser extent, precipitation.

The most stable form of lead in natural water is a function of the ions present, the pH, and the redox potential. In oxidizing systems, the least soluble common forms are probably the carbonate, hydroxide, and hydroxycarbonate. In reduced systems where sulfur is present, PbS is the stable solid. The solubility of Pb is 10 ppb above pH 8, while near pH 6.5 the solubility can approach or exceed 100 ppb. Pb(0) and Pb(+2) can be oxidatively methylated by naturally occurring compounds such as methyl iodide and glycine betaine. This can result in the dissolution of lead already bound to sediment or particulate matter.

Lead does not appear to bioconcentrate significantly in fish but does in some shellfish such as mussels. Evidence suggests that lead uptake in fish is localized in the mucous on the epidermis, the dermis, and scales so that the availability in edible portions do not pose a human health danger.

Chemical/Physical Properties

CAS Number: 7439-92-1

Color/ Form/Odor: Bluish-white, silvery, gray metal, lustrous when freshly cut.

Soil sorption coefficient: N/A; Low mobility in most soils, lowest at neutral pH and high organic matter.

Common Ores: sulfide-Galena; oxide-Lanarkite; carbonate-Cerrusite; sulfate-Anglesite

Bioconcentration Factor: Log BCFs for fish, 1.65; shellfish, 3.4

Solubilities:

acetate- 443 g/L at 20 deg C
arsenate- insoluble in cold water
carbonate- 0.0011 g/L at 20 deg C
chloride- 10 g/L cold water
chromate- 0.2 mg/L
nitrate- 376.5 g/L at 0 deg C
oxide- 0.05 g/L at 20 deg C
dioxide- insoluble
phosphate- insoluble
sulfate- 0.4 g/L
sulfide- insoluble
tetraethyl- 0.29 mg/L at 25 deg C
thiocyanate- 0.5 g/L at 20 deg C
thiosulfate- 0.3 g/L cold water

Other Regulatory Information

Monitoring:	**For Lead**	**For Water Quality Parameters**	
&$160;	At Home Taps	Within the Distribution System	At Entry to the Distribution System
Monitoring Period			
Initial	Every 6 months	Every 6 months	Every 6 months
After corrosion control installation	Every 6 months	Every 6 months	Every 2 weeks
Reduced monitoring			
- Conditional	Once a year	Every 6 months	Every 2 weeks
- Final	Every 3 years	Every 3 years	Every 2 weeks

Analysis

Reference Source	**Method Number**
EPA 800/4-83-043	239.2; 200.8; 200.9

Treatment/Best Available Technologies

Source water: Ion exchange; lime softening; reverse osmosis; coagulation/filtration

Corrosion Control: pH and alkalinity adjustment; calcium adjustment; silica- or phosphate-based corrosion inhibition

Toxics Release Inventory - Water and Land Releases, 1987-93 (in pounds)

	Water	Land
TOTALS	**970,827**	**143,058,771**
Top Twelve States *		
MO	4,408	40,656,278
AZ	771	23,240,625
MT	0	20,822,517
UT	4,600	11,881,000
TX	1,988	11,515,211
OH	127,990	5,196,522
IN	62,894	4,851,940
TN	7,140	2,095,489
IL	26,601	1,930,000
WI	1,310	1,350,960
MN	0	1,313,895
NM	0	1,060,880
Major Industries*		
Lead smelting, refining	31,423	68,996,819
Copper smelting	5,371	34,942,505
Steelworks, blast furn.	379,849	18,149,696
Storage batteries	0	1,867,292
China plumbing fixtures	1,310	1,350,960
Iron foundries	10,021	1,274,777
Copper mining	0	1,240,000

* State/Industry totals only include facilities with releases greater than 100,000 lbs.

For Additional Information:

EPA can provide further regulatory and other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000

Arsenic Fact Sheet

Contaminant Data

Chemical Data Arsenic (As), inorganic element, semi-metal, stable and sparingly soluble, atomic number 33, atomic weight 74.92. Inorganic oxidation states (in water): +3 (Arsenite—most toxic) and +5 (Arsenate). Arsenic has no taste, smell, or color in water.

As

Source in Nature Arsenic is a naturally occurring element found in soils, surface water, and groundwater. Arsenic is present in nearly all geologic materials at concentrations typically ranging from 1 to 5 ppm [1]. In the Western U.S., ground water with elevated arsenic concentrations is known to be associated with geothermal environments and areas with gold and uranium deposits [1]. Higher levels of arsenic tend to be found in groundwater sources than in surface water sources [2]. The Western States have more water systmes with arsenic levels greater than 10 ppb than the rest of the U.S. [2]. In industry, arsenic is used in the production of pesticides and herbicides, from cotton and wool processing, as a wood preservative, a feed additive, in various metal alloys, and in mining. Arsenic can result from pesticide runoff from seepages from hazardous waste sites. Arsenic is ingested by either drinking contaminated water, eating food that has been washed in the water, or ingestion in small doses by way of the human food chain.

SDWA Limits MCL for arsenic is 0.01 mg/L. MCLG is 0 mg/L for drinking water. See Arsenic Rule for more information [3].

Health Effects Arsenic is a known teratogen and carcinogen; poisoning can be either acute or chronic. Acute poisoning results from ingestion of large quantities of arsenic at one time and can result in stomach pain, nausea, vomiting, or diarrhea, which may lead to shock, coma, and even death. Chronic poisoning occurs over long periods of time and can often result in skin lesions, thickening or discoloration of the skin, and numbness in the feet and hands (neuritis). Arsenic poisoning has been linked to higher rates of cancer of the lungs, bladder, kidney, liver, and skin. Young children, the elderly, unborn babies, and people with long-term illnesses are at greater risk of arsenic poisoning.

Removal Techniques

Optimal arsenic removal is dependent on many individual water characteristics, including source water pH, TDS, sulfides, other salts, and amount of arsenic present. As^{+5} is most effectively removed, therefore As^{+3} may be converted through preoxidation with Cl_2, $FeCl_3$, or $KMnO_4$ to As^{+5}. Preoxidation with Cl_2 may create undesireable concentrations of disinfection by-products.

USEPA BAT Oxidation/Coagulation/Filtration, lime softening, reverse osmosis, ion exchange, greensand filtration, and activated alumina are BAT technologies for the removal of arsenic[4].

Refer to: individual treatment technique fact sheet if available for further information.

- **Oxidation/Coagulation/Filtration** This process involves the adsorption of contaminants to an aluminum or ferric hydroxide precipitate and removal of these particles by filtration. Coagulation

and filtration uses the conventional treatment processes of chemical addition, coagulation, and dual media filtration. $Fe_2(SO_4)_3$ has been proven to be the most effective coagulant for As^{+5} removal. *Benefits*: low capital costs for proven, reliable process. *Limitations*: operator care required with chemical usage; sludge disposal.

- **Lime Softening** Lime softening for arsenic treatment uses two types of chemical additions. First, $Ca(OH)_2$ is added in sufficient quantity to raise the pH to about 10 to precipitate carbonate hardness. Next, Na_2CO_3 is added to precipitate non-carbonate hardness. *Benefits*: proven and reliable. *Limitations*: operator care required with chemical usage; sludge disposal; high cost; may not be a cost-effective alternative for small systems.

- **Reverse Osmosis** RO uses a semipermeable membrane, and the application of pressure to a concentrated solution, which causes water, but not suspended or most dissolved solids, to pass through the membrane. *Benefits*: produces highest As removal, along with high-quality water. *Limitations*: cost; pretreatment/feed pump requirements; concentrate disposal.

- **Ion Exchange** Ion exchange is a proocess in which ions are swapped between the liquid phase and the solid resin phase. The solid resin adsorbs anions and releases an ion of similar valence into the water. *Benefits*: low cost, easy to operate. *Limitations*: removal of As(III) will require preoxidation to As(V) before ion exchange; regeneration results in creation of hazardous waste requiring disposal; other ions may competitively absorb; removal of multiple ions will require more frequent regeneration and careful monitoring to prevent breakthrough [4].

- **Greensand Filtration** Greensand filtration uses manganese-coated filter media to oxidize and adsorb contaminants. Arsenic removal by greensand requires a pH > 6.8. The presence of iron is beneficial to arsenic adsorption. *Benefits*: easy to operate, requires minimal operator attention and maintenance. *Limitations*: No specific limitations. [4].

- **Activated Alumina** Activated alumina (AA) uses extremely porous and highly adsorptive aluminum ore media to adsorb As^{+5}. AA is performs optimally at a pH of 6.0 to 6.5. *Benefits*: containment of As^{+5} in adsorption bed, low cost, easy to operate. *Limitations*: removal of As(III) will require preoxidation to As(V) before AA, regeneration results in creation of hazardous waste requiring disposal, other ions may competitively absorb, removal of multiple ions will require more frequent regeneration and careful monitoring to prevent breakthrough [4].

Alternative Treatment Alternative treatment technologies are effective for removal of arsenic, but not currently listed as BAT.

- **Iron-Oxide Coated Sand** Iron-oxide coated sand filtration is an adsorption process. Iron-oxide coated sand can be used in a fixed bed column to remove As^{+3} and As^{+5} from drinking water to levels less than 5 µg/L.

References

1. Jon Spencer. 2002. Natural Occurrence of Arsenic in Southwest Ground Water. Arizona Geological Survey.

2. US Environmental Protection Agency. Basic Information About the Arsenic Rule. http://water.epa.gov/lawsregs/rulesregs/sdwa/arsenic/Basic-Information.cfm

3. US Environmental Protection Agency. 2001. Arsenic and Clarifications to Compliance and New Source Monitoring Rule: A Quick Reference Guide. http://water.epa.gov/drink/info/arsenic/upload/2005_11_10_arsenic_quickguide.pdf

4. US Environmental Protection Agency. 2007. Removing multiple contaminants from Drinking Water: Issues to Consider.

Contact Information

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Revision Date: 09/22/10

Table E-1. COCs Detected Above Method Quantitation Limit

Compound	Highest Concentration in mg/L (Well ID)	Non-MSD PCL (mg/L)	Molec. Weight (g/mol)	Density/ Specific Gravity	Solubility in Water (mg/L)	GW Migration
VOCs						
1,1-Dichloroethane	0.041 (PMW-5 in 12/3/02)	4.9	98.96	1.2 @ 20°C/4°C	5,500	Mobile
1,1,2-Trichloroethane	0.007 (PMW-13 in 5/20/10)	0.005	133.40	1.435 @ 20°C/4°C	4,420	Mobile
Bromobenzene	0.007 (MW-6D in 12/5/2006)	0.2	157.01	1.495 @ 20°C/4°C	298	Mobile
Bromoform	0.020 (MW-6D in 12/5/06)	0.12	252.73	2.889 @ 15°C/4°C	3,200	Mobile
Bromomethane	0.004 J (MW-6D in 12/5/06)	0.034	94.94	1.73 @ 0°C/4°C	15,200	Mobile
Chloroethane	0.008 (PMW-11 in 12/18/07)	29	64.51	0.92 @ 20°C/4°C	20,000	Mobile
Chloromethane	0.009 (PMW-5 in 12/5/06)	0.07	50.49	10.029 @ -24.2°C/4°C	20,400	Mobile
Methylene Chloride	0.015 B (MW-7D in 11/4/03)	0.005	84.93	1.33 @ 20°C/4°C	15,400	Mobile
trans-1,2-Dichloroethene	0.054 (PMW-5 in 5/19/10)	0.1	96.95	1.2565 @ 20°C/4°C	6,300	Mobile
SVOCs						
Dibenzofuran	0.016 (MW-7D in 2/13/04)	0.098	168.19	0.966 @ 25°C/4°C	2.86	Mobile
Diethyl Phthalate	0.005 J (MW-7D and MW-2D in 10/19/07)	20	222.237	1.12 @ 20°C/4°C	1,080	Mobile
Di-n-butyl phthalate	0.031 (MW-2D in 2/13/04)	2.4	278.343	1.043 @ 20°C/4°C	11.2	Immobile
Pentachlorophenol	0.1781 (MW-8D in 12/19/02)	0.001	266.34	1.978 @ 22°C/4°C	14	Mobile
Phenanthrene	0.02 (MW-7D in 2/13/04)	0.73	178.23	1.18 @ 25°C/4°C	0.994	Immobile
Metals						
Barium	0.88 (MW-6D in 12/19/02)	2	137.34	3.5 @ 25°C/4°C	Insoluble	Mobile
Manganese	1410 (MW-6D in 4/12/07)	1.1	54.94	7.51 @ 25°C/4°C	Insoluble	Mobile

Source: Hazardous Substances Data Bank and TRRP Toxicity and Chemical/Physical Properties updated 05/24/11, Environmental Protection Agency's Integrated Risk Information System and Review.

Appendix F – Contaminant of Concern Information

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 exceedences.

---

a. The attached Table F-1 indicates the maximum detected concentration of COCs at the designated property. Table F-1 also lists the ingestion protective concentration levels and the non-ingestion protective concentration levels for each COC. The implementation of an MSD eliminates the groundwater ingestion pathway and the critical PCL becomes the exposure to potential current and future receptors via inhalation of vapors emitted by groundwater to outdoor air (residential Tier 1 ${}^{Air}GW_{Inh\text{-}V}$ PCL) for a 0.5 acre source area. As shown on Table F-1, no COCs were detected at concentrations exceeding their respective non-ingestion Tier 1 ${}^{Air}GW_{Inh\text{-}V}$ PCLs.

b. Table F-1 lists the protective concentration levels without the municipal setting designation. The exceedances of the critical protective concentrations are highlighted.

Table F -1 Chemicals of Concern

Chemical of Concern	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	1,1,2-Trichloroethane	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Arsenic	Lead	Notes
Soil (milligrams per kilogram (mg/kg)												
Maximum concentration in soil	Not analyzed	Not analyzed	Not analyzed	nd	0.17	0.015	0.01	0.005	0.023	5.21	700	Based on sampling conducted 1992 to 1997
Ingestion protective concentration level	18	0.014	2300	0.02	0.25	0.49	0.05	0.034	0.022	5	3	Residential Tier 1 $^{GW}Soil_{Ing}$ PCL for 0.5-acre source area
Non-ingestion protective concentration level	11000	11	0.05	18	140	590	450	18	3.7	24	500	Residential Tier 1 $^{Tot}Soil_{Comb}$ PCL for 0.5-acre source area
Non-ingestion protective concentration level	37000	14	5200	22	920	920	940	31	43	na	na	Residential Tier 1 $^{Air}Soil_{Inh-V}$ PCL for 0.5-acre source area
Non-ingestion protective concentration level	160000	91	12000	320	4400	3800	5000	160	42	na	na	Residential Tier 1 ^{Air}GW-$Soil_{Inh-V}$ PCL for 0.5-acre source area
Groundwater (milligrams per liter (mg/L)												
Maximum concentration in groundwater	0.002 J	3.93	**0.01**	nd	**0.973**	0.008	**0.012**	**0.028**	**0.141**	**0.018 J**	**0.04**	Results of June 2013 sampling
Ingestion protective concentration level (critical protective concentration level without the Municipal Setting Designation)	4.9	0.005	0.007	0.005	0.07	0.1	0.005	0.005	0.002	0.01	0.015	Residential Tier 1 $^{GW}GW_{Ing}$ PCL
Non-ingestion protective concentration level	43000	33	1700	80	1200	770	500	24	3.8	na	na	Residential $^{Air}GW_{Inh-V}$ PCL for 0.5-acre source area

Notes:

Boldface values exceed the ingestion protective concentration level (Residential Tier 1 $^{GW}GW_{Ing}$ PCL) as the critical protective concentrations level without the Municipal Settings Designation.

Groundwater concentrations are for the Cleaning Track area and the Former Ponds area during the June 2013 groundwater sampling event.

PCL – Protective Concentration Level

Na – not applicable, no PCL published

Nd – not detected at the quantitation limit

Appendix G

A statement as to whether the plume of contamination is stable (i.e. no change), or contracting, and delineated, with the basis for that statement. Please include historical sampling data.

Plume Stability

Two separate groundwater plumes where COC concentrations exceed the ingestion-level PCLs have been delineated at the designated property. These plumes are located at the Cleaning Track area and the Former Ponds area. The plumes have been delineated by the installation of monitoring wells and the collection of groundwater samples during monitoring events. The groundwater monitoring data indicate that:

- COC exceedance zone (groundwater plume) in the Cleaning Track area is delineated and the chemical concentrations are stable.

- COC exceedance zone (groundwater plume) in the Former Ponds area is delineated and the chemical concentrations are stable or decreasing.

The basis for the statements on plume stability is results of the most recent groundwater sampling events conducted at the designated property from 2003 to the present. The most recent groundwater monitoring event at the Cleaning Track area and the Former Ponds area was conducted in June 2013. A new downgradient monitoring well (PMW-16) was installed downgradient of the plume on the designated property (Clarion Inn parcel). COCs were not detected in the groundwater sample from new downgradient monitoring well.

The analytical results from these sampling activities demonstrate delineation of the two groundwater plumes and that the estimated extent of affected groundwater remains on the designated property. Comparison of the June 2013 groundwater analytical results to the historical groundwater data indicates that the COC concentrations at the Cleaning Track area plume and the Former Ponds area plume are stable or declining. Historical sampling data are provided on the summary tables presented in Appendix D.

Appendix H

A statement as to whether contamination on and off the designated property without a Municipal Setting Designation will exceed a residential assessment level as defined in the Texas Risk Reduction Program or analogous residential level set by EPA, if known, and the basis for that statement.

Soil

The concentrations of COCs in soil on the designated property do not exceed the TRRP RALs (TRRP residential Tier 1 $^{GW}Soil_{Ing}$ PCLs) without an MSD. There are no soils with COC concentrations exceeding the non-ingestion residential assessment levels (TRRP residential Tier 1 $^{Tot}Soil_{Comb}$ PCL) at the designated property.

Soils located off of the designated property have not been investigated.

Groundwater

Based on data collected for the second GWBU at the Cleaning Track Area and the uppermost GWBU at the Former Ponds area, groundwater has been affected on the designated property with COCs at concentration above the TRRP ingestion-based RALs. Groundwater ingestion exceedance zones are depicted on the figures presented in Appendix C. Tabulated data are presented in Appendix D.

Monitoring wells PMW-4 through PMW-6 and PMW-8 through PMW-15 are located in the Former Ponds area. Based on analytical results, COC concentrations which exceed TRRP RALs without an MSD include 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, vinyl chloride, arsenic and lead.

Monitoring wells MW-6D, MW-7D, and MW-8D are located in the Cleaning Track Area. Based on analytical results, COC concentrations which exceed TRRP RALs without an MSD include 1,2-dichloroethane, cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, vinyl chloride, pentachlorophenol, manganese, and dissolved manganese.

There are no COCs detected in groundwater at concentrations exceeding the non-ingestion protective concentrations (TRRP residential Tier 1 $^{Air}GW_{Inh}$-v PCLs) at the designated property.

Based on past and current investigations, the plume does not currently extend beyond the designated property and will not extend beyond the designated property in the future.

Off-site groundwater sampling has not been conducted.