



Memorandum

May 29, 2018

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**Subject: LNAPL Transmissivity Testing in monitoring well QPTW-03R2
RACER Trust Saginaw Malleable Industrial Land, Saginaw Michigan**

1. Introduction

This memorandum presents the results of LNAPL transmissivity (T_n) at RACER's Saginaw Malleable Industrial Land (Site) in Saginaw, Michigan.

The evaluation of T_n provides a standardized science-based method to quantify the potential mobility and recoverability of LNAPL at a given site. Results can be compared against widely accepted de minimis criteria to assess whether LNAPL may be considered to be sufficiently mobile such that hydraulic recovery may be feasible and/or provide some technical benefit in terms of mitigating migration potential. Where T_n is found to be of de minimis magnitude, LNAPL is typically considered to be largely present at residual levels and hydraulically immobile/unrecoverable.

Pursuant to the MDEQ approved monitoring plan (email correspondence dated September 2, 2016) on February 27, 2018, GHD conducted a round of gauging at the Quench Pit Area monitoring wells, which is summarized in Table 1. All water levels/LNAPL thicknesses were below the top of screen, with the exception of QPTW-13R. This is the first event of three completed since this well was re-installed for which the water level was higher than the top of the screen. Based on the February 27, 2018 gauging event, the only monitoring well with sufficient LNAPL thickness to evaluate T_n (i.e., greater than 0.25 feet LNAPL thickness), was QPTW-03R2.

2. Methodology - T_n Testing

The field methodology was performed consistent with the manual skimming technique detailed in ASTM International Standard E2856-13 *Standard Guide for Estimation of LNAPL Transmissivity*. The manual skimming procedure provides a method to quantify LNAPL recoverability through the estimation of LNAPL transmissivity based on LNAPL recovery rates observed during a test. The fundamental premise of the manual skimming technique is that LNAPL is removed from a well such that a relatively consistent level of



LNAPL drawdown is maintained until a stabilized/consistent removal rate is observed. The basic field procedure was as follows:

1. The test well was gauged using an oil-water interface probe and initial depths to LNAPL and water recorded. The corresponding in-well LNAPL thickness was calculated.
2. As much of the LNAPL was initially purged from the test well using a peristaltic pump, taking care to minimize the amount of water removed with the LNAPL. Record the volume of LNAPL purged and the purging start and stop times.
3. The recharge of LNAPL into the well was monitored by periodically recording depths to LNAPL and water and time of measurement.
4. LNAPL was repeatedly removed from the well to maintain in-well thickness below 25% of its pre-purging value. Start and stop times for each purging event and volume of LNAPL purged were also recorded.
5. The recovery rate for each purge event was estimated by dividing the volume of LNAPL recovered during the purge event (typically in gallons) by the time from the end of the previous purge event to the end of the current purge event (typically in minutes).

The LNAPL recovery rates measured in the field were then used to estimate LNAPL transmissivity according to the following equation (ASTM 2013, Eq. 16):

$$T_n = \frac{Q_n \ln\left(\frac{R_{oi}}{r_w}\right)}{2\pi s_n} \quad (1)$$

Where: T_n = LNAPL transmissivity (ft²/day)

Q_n = stabilized LNAPL recovery rate (ft³/day)

R_{oi} = radius of influence (ft)

r_w = well radius (ft)

s_n = LNAPL drawdown, the geometric mean of LNAPL drawdown values measured/calculated that correspond to the LNAPL recovery rate range used in the calculations (see below)

Based on available historical well gauging data, GHD assumed the LNAPL is present in an unconfined setting given the apparent indirect relationship between in-well LNAPL thickness changes and fluctuations in the potentiometric surface (i.e., in-well LNAPL thickness increases with a rising potentiometric surface and



vice versa). As such, the following calculation for LNAPL in a unconfined setting was used to estimate LNAPL drawdown (ASTM 2012):

$$S_{nt} = Z_{AN*} - Z_{ANt} \quad (2)$$

Where: S_{nt} = LNAPL drawdown at time t (feet)
 Z_{AN*} = elevation of air/LNAPL interface in well for equilibrium/pre-test conditions (ft)
 Z_{ANt} = elevation of air/LNAPL interface in well at time t (ft)

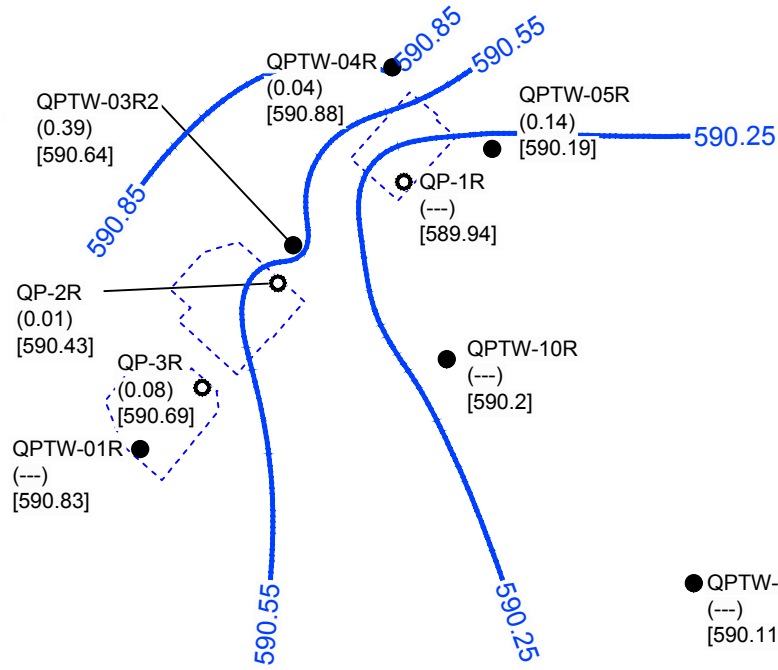
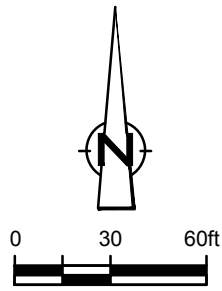
3. Results – T_n Testing

Transmissivity testing occurred on April 26, 2018 for QPTW-03R2. Figure 1 presents the location of monitoring well QPTW-03R2. The results of the T_n testing are provided in Table 2. The estimate indicates a T_n value on the order of 0.30 square feet/day (ft^2/day). The estimate is less than the State of Michigan de minimis LNAPL recoverability range of 0.5 ft^2/day (see Michigan Department of Environmental Quality Remediation and Redevelopment Division Resource Materials-25-2014-01). Based on this result, the mass recovery of LNAPL would not be considered technically feasible or expected to provide any technical benefit in terms of the mitigation of risk or migration potential at this well.

A summary of historical T_n evaluations on Quench Pit monitoring wells is presented in Table 3.

4. Recommendation

Based on the monitoring and transmissivity results, LNAPL monitoring will continue in accordance with the MDEQ approved plan.



KEY MAP
SCALE: 1" = 1500'

LEGEND

- QPTW-01R ● MONITORING WELL (2-INCH DIAMETER)
- QP-1R ○ RECOVERY POINT (4-INCH DIAMETER)
- EDGE OF CONCRETE FLOOR SLAB
- - - FORMER QUENCH PIT
- (0.86) LNAPL THICKNESS (FEET)
- [589.61] CORRECTED GROUNDWATER ELEVATION (FT AMSL)
- 589.80 — GROUNDWATER ELEVATION CONTOUR (FT AMSL)

**GAUGING SUMMARY OF QUENCH PIT AREA MONITORING WELLS
RACER SAGINAW MALLEABLE INDUSTRIAL LAND
Saginaw, Michigan**

NOTE:
MICHIGAN SOUTH STATE PLANE COORDINATE SYSTEM
NAD 83, IN U.S. INTERNATIONAL FEET.

figure 1

FEBRUARY 27, 2018



Summary of Groundwater Gauging Data - Quench Pit Area
RACER Trust - Saginaw Malleable Iron Industrial Land
Saginaw, Michigan

Well ID	Date	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Screen (ft btoc)	Total Depth (ft btoc)	Depth to Water (ft btoc)	Depth to Product (ft btoc)	LNAPL Thickness (ft)	Corrected Groundwater Elevation ¹ (ft amsl)	Corrected Water Table Depth ¹ (ft btoc)
QPTW-01	03/17/05	592.3	591.95	2.85	12.85	10.48	7.28	3.20	584.29	7.66
	04/12/05	592.3	591.95	2.85	12.85	10.63	7.30	3.33	584.25	7.70
	05/31/05	592.3	591.95	2.85	12.85	10.69	7.36	3.33	584.19	7.76
	06/24/05	592.3	591.95	2.85	12.85	10.45	7.04	3.41	584.50	7.45
	08/12/05	592.3	591.95	2.85	12.85	10.20	6.95	3.25	584.61	7.34
	10/14/05	592.3	591.95	2.85	12.85	10.58	7.29	3.29	584.27	7.68
	11/08/05	592.3	591.95	2.85	12.85	10.82	7.44	3.38	584.10	7.85
	12/19/05	592.3	591.95	2.85	12.85	10.91	7.52	3.39	584.02	7.93
	01/31/06	592.3	591.95	2.85	12.85	10.53	7.29	3.24	584.27	7.68
	02/15/06	592.3	591.95	2.85	12.85	10.46	7.21	3.25	584.35	7.60
	03/13/06	592.3	591.95	2.85	12.85	9.71	6.93	2.78	584.69	7.26
	04/10/06	592.3	591.95	2.85	12.85	10.02	7.04	2.98	584.55	7.40
	05/22/06	592.3	591.95	2.85	12.85	10.23	7.11	3.12	584.47	7.48
	06/21/06	592.3	591.95	2.85	12.85	10.22	7.05	3.17	584.52	7.43
	07/11/06	592.3	591.95	2.85	12.85	9.67	6.82	2.85	584.79	7.16
	08/23/06	592.3	591.95	2.85	12.85	9.99	6.78	3.21	584.78	7.17
	09/26/06	592.3	591.95	2.85	12.85	9.90	6.82	3.08	584.76	7.19
	10/30/06	592.3	591.95	2.85	12.85	9.62	6.83	2.79	584.79	7.16
	11/27/06	592.3	591.95	2.85	12.85	9.79	6.91	2.88	584.69	7.26
	12/27/06	592.3	591.95	2.85	12.85	9.97	6.96	3.01	584.63	7.32
	01/15/07	592.3	591.95	2.85	12.85	9.79	6.94	2.85	584.67	7.28
	02/21/07	592.3	591.95	2.85	12.85	10.35	7.29	3.06	584.29	7.66
	03/23/07	592.3	591.95	2.85	12.85	10.18	7.27	2.91	584.33	7.62
	04/09/07	592.3	591.95	2.85	12.85	10.39	7.25	3.14	584.32	7.63
	05/15/07	592.3	591.95	2.85	12.85	10.09	7.32	2.77	584.30	7.65
	06/11/07	592.3	591.95	2.85	12.85	10.36	7.47	2.89	584.13	7.82
	07/11/07	592.3	591.95	2.85	12.85	10.36	7.43	2.93	584.17	7.78
	08/16/07	592.3	591.95	2.85	12.85	10.41	7.48	2.93	584.12	7.83
	09/17/07	592.3	591.95	2.85	12.85	10.11	7.38	2.73	584.24	7.71
	11/26/07	592.3	591.95	2.85	12.85	10.62	7.64	2.98	583.95	8.00
	12/12/07	592.3	591.95	2.85	12.85	10.79	7.77	3.02	583.82	8.13
	01/11/08	592.3	591.95	2.85	12.85	10.32	7.56	2.76	584.06	7.89
	02/05/08	592.3	591.95	2.85	12.85	9.91	7.42	2.49	584.23	7.72
	04/11/08	592.3	591.95	2.85	12.85	8.41	6.60	1.81	585.13	6.82
	05/16/08	592.3	591.95	2.85	12.85	8.65	6.56	2.09	585.14	6.81
	10/29/08	592.3	591.95	2.85	12.85	8.71	6.39	2.32	585.28	6.67
	01/21/09	592.3	591.95	2.85	12.85	8.22	6.26	1.96	585.45	6.50
	03/18/09	592.3	591.95	2.85	12.85	8.07	6.16	1.91	585.56	6.39
	10/17/09	592.3	591.95	2.85	12.85	8.46	6.39	2.07	585.31	6.64
	10/23/09	592.3	591.95	2.85	12.85	8.07	6.34	1.73	585.40	6.55
	06/24/10	592.3	591.95	2.85	12.85	8.31	5.06	3.25	586.50	5.45
	07/08/10	592.3	591.95	2.85	12.85	8.88	4.62	4.26	586.82	5.13
	07/22/10	592.3	591.95	2.85	12.85	9.86	4.81	5.05	586.53	5.42
	07/29/10	592.3	591.95	2.85	12.85	8.27	5.11	3.16	586.46	5.49
	08/06/10	592.3	591.95	2.85	12.85	8.13	5.41	2.72	586.21	5.74
	08/13/10	592.3	591.95	2.85	12.85	6.83	4.04	2.79	587.58	4.37
	08/27/10	592.3	591.95	2.85	12.85	7.40	4.42	2.98	587.17	4.78
09/23/10	592.3	591.95	2.85	12.85	5.54	3.05	2.49	588.60	3.35	
10/15/10	592.3	591.95	2.85	12.85	7.14	4.01	3.13	587.56	4.39	
10/29/10	592.3	591.95	2.85	12.85	6.90	3.99	2.91	587.61	4.34	
12/07/10	592.3	591.95	2.85	12.85	7.61	3.87	3.74	587.63	4.32	
03/18/11	592.3	591.95	2.85	12.85	6.57	3.54	3.03	588.05	3.90	
04/08/11	592.3	591.95	2.85	12.85	6.15	2.77	3.38	588.77	3.18	
05/09/11	592.3	591.95	2.85	12.85	5.98	3.11	2.87	588.50	3.45	
06/09/11	592.3	591.95	2.85	12.85	6.31	3.16	3.15	588.41	3.54	
07/05/11	592.3	591.95	2.85	12.85	5.62	3.31	2.31	588.36	3.59	
08/23/11	592.3	591.95	2.85	12.85	4.21	2.88	1.33	588.91	3.04	
10/14/11	592.3	591.95	2.85	12.85	5.72	3.81	1.91	587.91	4.04	
01/24/12	592.3	591.95	2.85	12.85	6.28	1.66	4.62	589.74	2.21	
03/20/12	592.3	591.95	2.85	12.85	5.41	2.67	2.74	588.95	3.00	
04/23/12	592.3	591.95	2.85	12.85	5.53	2.16	3.37	589.39	2.56	
06/11/12	592.3	591.95	2.85	12.85	6.72	2.87	3.85	588.62	3.33	
07/10/12	592.3	591.95	2.85	12.85	5.41	3.69	1.72	588.05	3.90	
08/29/12	592.3	591.95	2.85	12.85	5.75	3.04	2.71	588.58	3.37	
09/12/12	592.3	591.95	2.85	12.85	4.25	2.90	1.35	588.89	3.06	
11/06/12	592.3	591.95	2.85	12.85	4.06	3.04	1.02	588.79	3.16	
12/05/12	592.3	591.95	2.85	12.85	4.41	3.26	1.15	588.55	3.40	
04/03/13	592.3	591.95	2.85	12.85	4.91	3.37	1.54	588.40	3.55	
07/18/13	592.3	591.95	2.85	12.85	3.48	2.80	0.68	589.07	2.88	
09/23/13	592.3	591.95	2.85	12.85	4.34	3.74	0.60	588.14	3.81	
06/02/14	592.3	591.95	2.85	12.85	3.06	2.36	0.70	589.51	2.44	
07/09/14	592.3	591.95	2.85	12.85	2.92	1.07	1.85	590.66	1.29	
07/31/14	592.3	591.95	2.85	12.85	3.17	1.99	1.18	589.82	2.13	
09/16/14	592.3	591.95	2.85	12.85	3.31	2.27	1.04	589.56	2.39	
03/24/15	592.3	591.95	2.85	12.85	4.51	3.14	1.37	588.65	3.30	
06/17/15	592.3	591.95	2.85	12.85	3.31	1.25	2.06	590.45	1.50	
09/09/15	592.3	591.95	2.85	12.85	3.81	1.11	2.70	590.52	1.43	
12/04/15	592.3	591.95	2.85	12.85	4.70	3.48	1.22	588.32	3.63	
03/15/16	592.3	591.95	2.85	12.85	5.13	1.94	3.19	589.63	2.32	
06/17/16	592.3	591.95	2.85	12.85	2.23	1.17	1.06	590.65	1.30	
09/22/16	592.3	591.95	2.85	12.85	3.82	2.86	0.96	588.97	2.98	
09/27/16		ABANDONED								
QPTW-01R	09/06/17	594.69	594.49	2.00	12.00	4.14	---	---	590.35	4.14
	11/27/17	594.69	594.49	2.00	12.00	4.17	---	---	590.32	4.17
	02/27/18	594.69	594.49	2.00	12.00	3.66	---	---	590.83	3.66

Summary of Groundwater Gauging Data - Quench Pit Area
RACER Trust - Saginaw Malleable Iron Industrial Land
Saginaw, Michigan

Well ID	Date	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Screen (ft btoc)	Total Depth (ft btoc)	Depth to Water (ft btoc)	Depth to Product (ft btoc)	LNAPL Thickness (ft)	Corrected Groundwater Elevation ¹ (ft amsl)	Corrected Water Table Depth ¹ (ft btoc)
QPTW-02	03/17/05	592.6	592.35	2.80	12.80	7.54	7.51	0.03	584.84	7.51
	04/12/05	592.6	592.35	2.80	12.80	7.64	7.58	0.06	584.76	7.59
	05/31/05	592.6	592.35	2.80	12.80	7.54	7.50	0.04	584.85	7.50
	06/24/05	592.6	592.35	2.80	12.80	7.41	7.38	0.03	584.97	7.38
	08/12/05	592.6	592.35	2.80	12.80	7.30	7.26	0.04	585.09	7.26
	10/14/05	592.6	592.35	2.80	12.80	7.50	7.44	0.06	584.90	7.45
	11/08/05	592.6	592.35	2.80	12.80	7.52	7.49	0.03	584.86	7.49
	12/19/05	592.6	592.35	2.80	12.80	7.67	7.63	0.04	584.72	7.63
	01/31/06	592.6	592.35	2.80	12.80	7.53	7.48	0.05	584.86	7.49
	02/15/06	592.6	592.35	2.80	12.80	7.50	7.47	0.03	584.88	7.47
	03/13/06	592.6	592.35	2.80	12.80	7.30	7.26	0.04	585.09	7.26
	04/10/06	592.6	592.35	2.80	12.80	7.39	7.36	0.03	584.99	7.36
	05/22/06	592.6	592.35	2.80	12.80	7.38	7.35	0.03	585.00	7.35
	06/21/06	592.6	592.35	2.80	12.80	7.33	7.29	0.04	585.06	7.29
	07/11/06	592.6	592.35	2.80	12.80	7.29	7.26	0.03	585.09	7.26
	08/23/06	592.6	592.35	2.80	12.80	7.28	7.26	0.02	585.09	7.26
	09/26/06	592.6	592.35	2.80	12.80	7.39	7.37	0.02	584.98	7.37
	10/30/06	592.6	592.35	2.80	12.80	7.38	7.35	0.03	585.00	7.35
	11/27/06	592.6	592.35	2.80	12.80	7.41	7.38	0.03	584.97	7.38
	12/27/06	592.6	592.35	2.80	12.80	7.44	7.42	0.02	584.93	7.42
	01/15/07	592.6	592.35	2.80	12.80	7.46	7.42	0.04	584.93	7.42
	02/21/07	592.6	592.35	2.80	12.80	7.47	7.46	0.01	584.89	7.46
	03/23/07	592.6	592.35	2.80	12.80	7.42	7.40	0.02	584.95	7.40
	04/09/07	592.6	592.35	2.80	12.80	7.45	7.43	0.02	584.92	7.43
	05/15/07	592.6	592.35	2.80	12.80	7.50	7.48	0.02	584.87	7.48
	08/16/07	592.6	592.35	2.80	12.80	7.65	7.62	0.03	584.73	7.62
	09/17/07	592.6	592.35	2.80	12.80	7.51	7.48	0.03	584.87	7.48
	11/26/07	592.6	592.35	2.80	12.80	7.73	7.71	0.02	584.64	7.71
	12/12/07	592.6	592.35	2.80	12.80	7.76	7.74	0.02	584.61	7.74
	01/11/08	592.6	592.35	2.80	12.80	7.15	7.14	0.01	585.21	7.14
	02/05/08	592.6	592.35	2.80	12.80	7.27	7.26	0.01	585.09	7.26
	04/11/08	592.6	592.35	2.80	12.80	6.79	---	---	585.56	6.79
	05/16/08	592.6	592.35	2.80	12.80	7.30	---	---	585.05	7.30
	10/29/08	592.6	592.35	2.80	12.80	6.99	---	---	585.36	6.99
	01/21/09	592.6	592.35	2.80	12.80	6.53	---	---	585.82	6.53
	03/18/09	592.6	592.35	2.80	12.80	6.28	---	---	586.07	6.28
	10/17/09	592.6	592.35	2.80	12.80	6.93	---	---	585.42	6.93
	10/23/09	592.6	592.35	2.80	12.80	7.08	---	---	585.27	7.08
	10/15/10	592.6	592.35	2.80	12.80	5.23	---	---	587.12	5.23
	10/29/10	592.6	592.35	2.80	12.80	5.30	---	---	587.05	5.30
	03/18/11	592.6	592.35	2.80	12.80	3.96	---	---	588.39	3.96
	04/08/11	592.6	592.35	2.80	12.80	3.19	---	---	589.16	3.19
	05/09/11	592.6	592.35	2.80	12.80	3.47	---	---	588.88	3.47
	06/09/11	592.6	592.35	2.80	12.80	3.58	---	---	588.77	3.58
	07/05/11	592.6	592.35	2.80	12.80	3.79	---	---	588.56	3.79
	08/23/11	592.6	592.35	2.80	12.80	3.11	---	---	589.24	3.11
	10/14/11	592.6	592.35	2.80	12.80	4.04	---	---	588.31	4.04
	11/23/11	592.6	592.35	2.80	12.80	3.81	---	---	588.54	3.81
	03/20/12	592.6	592.35	2.80	12.80	2.77	---	---	589.58	2.77
	04/23/12	592.6	592.35	2.80	12.80	3.02	---	---	589.33	3.02
	06/11/12	592.6	592.35	2.80	12.80	3.22	---	---	589.13	3.22
	07/10/12	592.6	592.35	2.80	12.80	3.86	---	---	588.47	3.86
	08/29/12	592.6	592.35	2.80	12.80	3.22	---	---	589.13	3.22
	09/12/12	592.6	592.35	2.80	12.80	3.01	---	---	589.34	3.01
	10/01/12	592.6	592.35	2.80	12.80	3.79	---	---	588.56	3.79
	11/06/12	592.6	592.35	2.80	12.80	2.98	---	---	589.37	2.98
	12/05/12	592.6	592.35	2.80	12.80	3.61	---	---	588.74	3.61
	04/03/13	592.6	592.35	2.80	12.80	3.25	---	---	589.10	3.25
	07/18/13	592.6	592.35	2.80	12.80	2.59	---	---	589.76	2.59
	09/23/13	592.6	592.35	2.80	12.80	3.94	---	---	588.41	3.94
	04/25/14	592.6	592.35	2.80	12.80	1.81	---	---	590.54	1.81
	06/02/14	592.6	592.35	2.80	12.80	2.62	---	---	589.73	2.62
	07/31/14	592.6	592.35	2.80	12.80	2.31	---	---	590.04	2.31
	09/16/14	592.6	592.35	2.80	12.80	2.36	---	---	589.99	2.36
	03/24/15	592.6	592.35	2.80	12.80	3.20	---	---	589.15	3.20
	06/17/15	592.6	592.35	2.80	12.80	under water	---	---	---	under water
	09/09/15	592.6	592.35	2.80	12.80	1.84	---	---	590.51	1.84
	12/04/15	592.6	592.35	2.80	12.80	3.85	---	---	588.50	3.85
	03/15/16	592.6	592.35	2.80	12.80	1.98	---	---	590.37	1.98
	06/17/16	592.6	592.35	2.80	12.80	1.66	---	---	590.69	1.66
09/22/16	592.6	592.35	2.80	12.80	2.98	---	---	589.37	2.98	
09/27/16	ABANDONED									
QPTW-03R	04/25/14	592.5	592.13	2.75	12.75	2.19	1.82	0.37	590.27	1.86
	06/02/14	592.5	592.13	2.75	12.75	3.13	2.86	0.27	589.24	2.89
	07/09/14	592.5	592.13	2.75	12.75	2.10	1.98	0.12	590.14	1.99
	07/31/14	592.5	592.13	2.75	12.75	2.74	2.66	0.08	589.46	2.67
	09/16/14	592.5	592.13	2.75	12.75	3.27	---	---	588.86	3.27
	03/24/15	592.5	592.13	2.75	12.75	3.56	3.55	0.01	588.58	3.55
	06/17/15	592.5	592.13	2.75	12.75	3.36	2.72	0.64	589.33	2.80
	09/09/15	592.5	592.13	2.75	12.75	2.74	2.46	0.28	589.64	2.49
	12/04/15	592.5	592.13	2.75	12.75	4.14	---	---	587.99	4.14
	03/15/16	592.5	592.13	2.75	12.75	2.46	2.39	0.07	589.73	2.40
	06/17/16	592.5	592.13	2.75	12.75	2.30	1.77	0.53	590.30	1.83
	09/22/16	592.5	592.13	2.75	12.75	3.78	3.05	0.73	588.99	3.14
	09/27/16	ABANDONED								
QPTW-03R2	09/06/17	594.91	594.61	2.00	12.00	5.24	---	---	589.37	5.24
	11/27/17	594.91	594.61	2.00	12.00	5.07	4.85	0.22	589.73	4.88
	02/27/18	594.91	594.61	2.00	12.00	4.31	3.92	0.39	590.64	3.97

**Summary of Groundwater Gauging Data - Quench Pit Area
RACER Trust - Saginaw Malleable Iron Industrial Land
Saginaw, Michigan**

Well ID	Date	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Screen (ft btoc)	Total Depth (ft btoc)	Depth to Water (ft btoc)	Depth to Product (ft btoc)	LNAPL Thickness (ft)	Corrected Groundwater Elevation ¹ (ft amsl)	Corrected Water Table Depth ¹ (ft btoc)
QPTW-04	03/17/05	592.3	591.73	2.50	12.50	8.54	7.51	1.03	584.10	7.63
	04/12/05	592.3	591.73	2.50	12.50	8.53	7.54	0.99	584.07	7.66
	05/31/05	592.3	591.73	2.50	12.50	8.58	7.50	1.08	584.10	7.63
	06/24/05	592.3	591.73	2.50	12.50	8.34	7.29	1.05	584.31	7.42
	08/12/05	592.3	591.73	2.50	12.50	8.28	7.26	1.02	584.35	7.38
	10/14/05	592.3	591.73	2.50	12.50	8.61	7.68	0.93	583.94	7.79
	11/08/05	592.3	591.73	2.50	12.50	8.70	7.72	0.98	583.89	7.84
	12/19/05	592.3	591.73	2.50	12.50	8.87	7.83	1.04	583.78	7.95
	01/31/06	592.3	591.73	2.50	12.50	8.58	7.46	1.12	584.14	7.59
	02/15/06	592.3	591.73	2.50	12.50	8.45	7.33	1.12	584.27	7.46
	03/13/06	592.3	591.73	2.50	12.50	8.14	7.16	0.98	584.45	7.28
	04/10/06	592.3	591.73	2.50	12.50	8.29	7.32	0.97	584.29	7.44
	05/22/06	592.3	591.73	2.50	12.50	8.41	7.39	1.02	584.22	7.51
	06/21/06	592.3	591.73	2.50	12.50	8.34	7.41	0.93	584.21	7.52
	07/11/06	592.3	591.73	2.50	12.50	8.16	7.12	1.04	584.49	7.24
	08/23/06	592.3	591.73	2.50	12.50	8.39	7.10	1.29	584.48	7.25
	09/26/06	592.3	591.73	2.50	12.50	8.09	7.11	0.98	584.50	7.23
	10/30/06	592.3	591.73	2.50	12.50	8.05	7.08	0.97	584.53	7.20
	11/27/06	592.3	591.73	2.50	12.50	8.08	7.19	0.89	584.43	7.30
	12/27/06	592.3	591.73	2.50	12.50	8.58	7.48	1.10	584.12	7.61
	01/15/07	592.3	591.73	2.50	12.50	8.07	7.29	0.78	584.35	7.38
	02/21/07	592.3	591.73	2.50	12.50	8.45	7.57	0.88	584.05	7.68
	03/23/07	592.3	591.73	2.50	12.50	8.32	7.56	0.76	584.08	7.65
	04/09/07	592.3	591.73	2.50	12.50	8.47	7.52	0.95	584.10	7.63
	05/15/07	592.3	591.73	2.50	12.50	8.42	7.51	0.91	584.11	7.62
	06/11/07	592.3	591.73	2.50	12.50	8.61	7.64	0.97	583.97	7.76
	07/11/07	592.3	591.73	2.50	12.50	8.67	7.61	1.06	583.99	7.74
	08/16/07	592.3	591.73	2.50	12.50	8.80	7.69	1.11	583.91	7.82
	09/17/07	592.3	591.73	2.50	12.50	8.62	7.54	1.08	584.06	7.67
	11/26/07	592.3	591.73	2.50	12.50	9.05	7.99	1.06	583.61	8.12
	12/12/07	592.3	591.73	2.50	12.50	9.15	8.09	1.06	583.51	8.22
	01/11/08	592.3	591.73	2.50	12.50	8.81	7.82	0.99	583.79	7.94
	02/05/08	592.3	591.73	2.50	12.50	8.69	7.64	1.05	583.96	7.77
	04/11/08	592.3	591.73	2.50	12.50	7.75	6.68	1.07	584.92	6.81
	05/16/08	592.3	591.73	2.50	12.50	7.82	6.81	1.01	584.80	6.93
	10/29/08	592.3	591.73	2.50	12.50	7.70	6.69	1.01	584.92	6.81
	01/21/09	592.3	591.73	2.50	12.50	7.35	6.61	0.74	585.03	6.70
	03/18/09	592.3	591.73	2.50	12.50	6.86	6.12	0.74	585.52	6.21
	10/17/09	592.3	591.73	2.50	12.50	7.76	6.85	0.91	584.77	6.96
	10/23/09	592.3	591.73	2.50	12.50	7.76	6.83	0.93	584.79	6.94
	06/09/10	592.3	591.73	2.50	12.50	6.23	5.65	0.58	586.01	5.72
	08/27/10	592.3	591.73	2.50	12.50	7.06	6.17	0.89	585.45	6.28
	09/17/10	592.3	591.73	2.50	12.50	5.61	5.02	0.59	586.64	5.09
	09/23/10	592.3	591.73	2.50	12.50	5.47	4.87	0.60	586.79	4.94
	10/15/10	592.3	591.73	2.50	12.50	6.03	5.20	0.83	586.43	5.30
	10/29/10	592.3	591.73	2.50	12.50	6.39	5.86	0.53	585.81	5.92
	03/18/11	592.3	591.73	2.50	12.50	5.16	4.20	0.96	587.41	4.32
04/08/11	592.3	591.73	2.50	12.50	4.27	3.54	0.73	588.10	3.63	
05/09/11	592.3	591.73	2.50	12.50	4.60	3.64	0.96	587.97	3.76	
06/09/11	592.3	591.73	2.50	12.50	4.35	3.63	0.72	588.01	3.72	
07/05/11	592.3	591.73	2.50	12.50	4.84	3.87	0.97	587.74	3.99	
08/23/11	592.3	591.73	2.50	12.50	4.16	3.34	0.82	588.29	3.44	
03/20/12	592.3	591.73	2.50	12.50	5.21	2.78	2.43	588.66	3.07	
04/23/12	592.3	591.73	2.50	12.50	5.59	3.06	2.53	588.37	3.36	
06/11/12	592.3	591.73	2.50	12.50	5.85	3.16	2.69	588.25	3.48	
07/10/12	592.3	591.73	2.50	12.50	5.97	3.40	2.57	588.02	3.71	
08/29/12	592.3	591.73	2.50	12.50	5.32	2.99	2.33	588.46	3.27	
09/12/12	592.3	591.73	2.50	12.50	5.03	2.68	2.35	588.77	2.96	
10/01/12	592.3	591.73	2.50	12.50	5.80	3.31	2.49	588.12	3.61	
11/06/12	592.3	591.73	2.50	12.50	4.85	2.88	1.97	588.61	3.12	
12/05/12	592.3	591.73	2.50	12.50	5.49	3.50	1.99	587.99	3.74	
04/03/13	592.3	591.73	2.50	12.50	5.36	3.16	2.20	588.31	3.42	
07/18/13	592.3	591.73	2.50	12.50	4.74	2.48	2.26	588.98	2.75	
09/23/13	592.3	591.73	2.50	12.50	4.73	3.61	1.12	587.99	3.74	
04/25/14	592.3	591.73	2.50	12.50	3.16	1.73	1.43	589.83	1.90	
06/02/14	592.3	591.73	2.50	12.50	3.98	2.39	1.59	589.15	2.58	
07/09/14	593.3	592.73	2.50	12.50	2.74	1.61	1.13	590.98	1.75	
07/31/14	592.3	591.73	2.50	12.50	3.53	2.33	1.20	589.26	2.47	
09/16/14	591.3	590.73	2.50	12.50	4.00	2.10	1.90	588.40	2.33	
03/24/15	590.3	589.73	2.50	12.50	4.66	3.02	1.64	586.51	3.22	
06/17/15	589.3	588.73	2.50	12.50	3.51	2.05	1.46	586.50	2.23	
09/09/15	588.3	587.73	2.50	12.50	4.09	2.64	1.45	584.92	2.81	
12/04/15	587.3	586.73	2.50	12.50	5.56	3.51	2.05	582.97	3.76	
03/15/16	586.3	585.73	2.50	12.50	3.68	1.76	1.92	583.74	1.99	
06/17/16	585.3	584.73	2.50	12.50	2.27	2.16	0.11	582.56	2.17	
09/22/16	584.3	583.73	2.50	12.50	4.61	2.80	1.81	580.71	3.02	
09/27/16	ABANDONED									
QPTW-04R	09/06/17	594.96	594.46	2.00	12.00	5.61	4.75	0.86	589.61	4.85
	11/27/17	594.96	594.46	2.00	12.00	5.10	4.51	0.59	589.88	4.58
	02/27/18	594.96	594.46	2.00	12.00	3.62	3.58	0.04	590.88	3.58

**Summary of Groundwater Gauging Data - Quench Pit Area
RACER Trust - Saginaw Malleable Iron Industrial Land
Saginaw, Michigan**

Well ID	Date	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Screen (ft btoc)	Total Depth (ft btoc)	Depth to Water (ft btoc)	Depth to Product (ft btoc)	LNAPL Thickness (ft)	Corrected Groundwater Elevation ¹ (ft amsl)	Corrected Water Table Depth ¹ (ft btoc)
QPTW-05	03/17/05	592.4	592.13	2.70	12.70	8.94	7.67	1.27	584.31	7.82
	04/12/05	592.4	592.13	2.70	12.70	8.98	7.69	1.29	584.29	7.84
	05/31/05	592.4	592.13	2.70	12.70	9.10	7.73	1.37	584.24	7.89
	06/24/05	592.4	592.13	2.70	12.70	8.65	7.50	1.15	584.49	7.64
	08/12/05	592.4	592.13	2.70	12.70	8.76	7.68	1.08	584.32	7.81
	10/14/05	592.4	592.13	2.70	12.70	9.38	7.91	1.47	584.04	8.09
	11/08/05	592.4	592.13	2.70	12.70	9.55	7.99	1.56	583.95	8.18
	12/19/05	592.4	592.13	2.70	12.70	9.74	8.05	1.69	583.88	8.25
	01/31/06	592.4	592.13	2.70	12.70	8.84	7.68	1.16	584.31	7.82
	02/15/06	592.4	592.13	2.70	12.70	8.63	7.54	1.09	584.46	7.67
	03/13/06	592.4	592.13	2.70	12.70	8.20	7.33	0.87	584.70	7.43
	04/10/06	592.4	592.13	2.70	12.70	8.44	7.47	0.97	584.54	7.59
	05/22/06	592.4	592.13	2.70	12.70	8.65	7.58	1.07	584.42	7.71
	06/21/06	592.4	592.13	2.70	12.70	8.70	6.71	1.99	585.18	6.95
	07/11/06	592.4	592.13	2.70	12.70	8.35	7.38	0.97	584.63	7.50
	08/23/06	592.4	592.13	2.70	12.70	8.52	7.46	1.06	584.54	7.59
	09/26/06	592.4	592.13	2.70	12.70	8.46	7.45	1.01	584.56	7.57
	10/30/06	592.4	592.13	2.70	12.70	8.32	7.33	0.99	584.68	7.45
	11/27/06	592.4	592.13	2.70	12.70	8.50	7.44	1.06	584.56	7.57
	12/27/06	592.4	592.13	2.70	12.70	8.18	7.23	0.95	584.79	7.34
	01/15/07	592.4	592.13	2.70	12.70	8.55	7.49	1.06	584.51	7.62
	02/21/07	592.4	592.13	2.70	12.70	9.27	7.84	1.43	584.12	8.01
	03/23/07	592.4	592.13	2.70	12.70	9.19	7.81	1.38	584.15	7.98
	04/09/07	592.4	592.13	2.70	12.70	9.27	7.77	1.50	584.18	7.95
	05/15/07	592.4	592.13	2.70	12.70	9.11	7.74	1.37	584.23	7.90
	06/11/07	592.4	592.13	2.70	12.70	9.41	7.92	1.49	584.03	8.10
	07/11/07	592.4	592.13	2.70	12.70	9.52	7.96	1.56	583.98	8.15
	08/16/07	592.4	592.13	2.70	12.70	9.71	8.04	1.67	583.89	8.24
	09/17/07	592.4	592.13	2.70	12.70	9.25	7.82	1.43	584.14	7.99
	11/26/07	592.4	592.13	2.70	12.70	10.10	8.21	1.89	583.69	8.44
	12/12/07	592.4	592.13	2.70	12.70	10.31	8.30	2.01	583.59	8.54
	01/11/08	592.4	592.13	2.70	12.70	9.62	8.07	1.55	583.87	8.26
	02/05/08	592.4	592.13	2.70	12.70	9.05	7.90	1.15	584.09	8.04
	04/11/08	592.4	592.13	2.70	12.70	7.50	7.00	0.50	585.07	7.06
	05/16/08	592.4	592.13	2.70	12.70	7.67	7.12	0.55	584.94	7.19
	10/29/08	592.4	592.13	2.70	12.70	7.71	7.23	0.48	584.84	7.29
	01/21/09	592.4	592.13	2.70	12.70	7.43	6.87	0.56	585.19	6.94
	03/18/09	592.4	592.13	2.70	12.70	7.11	6.57	0.54	585.50	6.63
	10/17/09	592.4	592.13	2.70	12.70	7.98	7.18	0.80	584.85	7.28
	10/23/09	592.4	592.13	2.70	12.70	7.68	7.09	0.59	584.97	7.16
	06/09/10	592.4	592.13	2.70	12.70	7.07	6.23	0.84	585.80	6.33
	06/24/10	592.4	592.13	2.70	12.70	7.40	6.59	0.81	585.44	6.69
	07/29/10	592.4	592.13	2.70	12.70	7.34	6.14	1.20	585.85	6.28
	08/06/10	592.4	592.13	2.70	12.70	7.31	6.28	1.03	585.73	6.40
	08/13/10	592.4	592.13	2.70	12.70	6.08	5.57	0.51	586.50	5.63
	08/27/10	592.4	592.13	2.70	12.70	6.51	5.70	0.81	586.33	5.80
	09/17/10	592.4	592.13	2.70	12.70	6.36	5.83	0.53	586.24	5.89
	09/23/10	592.4	592.13	2.70	12.70	6.12	5.59	0.53	586.48	5.65
10/15/10	592.4	592.13	2.70	12.70	6.31	6.01	0.30	586.08	6.05	
10/29/10	592.4	592.13	2.70	12.70	5.48	5.14	0.34	586.95	5.18	
12/07/10	592.4	592.13	2.70	12.70	6.46	5.72	0.74	586.32	5.81	
01/03/11	592.4	592.13	2.70	12.70	5.99	5.71	0.28	586.39	5.74	
03/18/11	592.4	592.13	2.70	12.70	5.43	5.11	0.32	586.98	5.15	
04/08/11	592.4	592.13	2.70	12.70	4.63	4.32	0.31	587.77	4.36	
05/09/11	592.4	592.13	2.70	12.70	4.55	4.31	0.24	587.79	4.34	
06/09/11	592.4	592.13	2.70	12.70	4.83	4.56	0.27	587.54	4.59	
07/05/11	592.4	592.13	2.70	12.70	5.11	4.64	0.47	587.43	4.70	
08/23/11	592.4	592.13	2.70	12.70	4.26	4.03	0.23	588.07	4.06	
10/14/11	592.4	592.13	2.70	12.70	5.28	4.94	0.34	587.15	4.98	
11/23/11	592.4	592.13	2.70	12.70	4.75	4.42	0.33	587.67	4.46	
01/24/12	592.4	592.13	2.70	12.70	3.73	3.58	0.15	588.53	3.60	
03/20/12	592.4	592.13	2.70	12.70	4.05	3.72	0.33	588.37	3.76	
04/23/12	592.4	592.13	2.70	12.70	4.10	3.74	0.36	588.35	3.78	
06/11/12	592.4	592.13	2.70	12.70	4.44	4.00	0.44	588.08	4.05	
07/10/12	592.4	592.13	2.70	12.70	5.17	4.52	0.65	587.53	4.60	
08/29/12	592.4	592.13	2.70	12.70	4.44	3.80	0.64	588.25	3.88	
09/12/12	592.4	592.13	2.70	12.70	4.39	3.63	0.76	588.41	3.72	
11/06/12	592.4	592.13	2.70	12.70	4.49	3.69	0.80	588.34	3.79	
12/05/12	592.4	592.13	2.70	12.70	5.28	4.31	0.97	587.70	4.43	
04/03/13	592.4	592.13	2.70	12.70	5.07	4.01	1.06	587.99	4.14	
07/18/13	592.4	592.13	2.70	12.70	4.80	3.10	1.70	588.83	3.30	
09/23/13	592.4	592.13	2.70	12.70	6.20	4.26	1.94	587.64	4.49	
04/25/14	592.4	592.13	2.70	12.70	4.87	2.36	2.51	589.47	2.66	
06/02/14	592.4	592.13	2.70	12.70	4.45	3.16	1.29	588.82	3.31	
07/09/14	592.4	592.13	2.70	12.70	3.66	2.19	1.47	589.76	2.37	
07/31/14	592.4	592.13	2.70	12.70	4.25	2.93	1.32	589.04	3.09	
09/16/14	592.4	592.13	2.70	12.70	4.77	2.99	1.78	588.93	3.20	
03/24/15	592.4	592.13	2.70	12.70	5.11	3.70	1.41	588.26	3.87	
06/17/15	592.4	592.13	2.70	12.70	4.77	2.59	2.18	589.28	2.85	
09/09/15	592.4	592.13	2.70	12.70	5.30	2.49	2.81	589.30	2.83	
12/04/15	592.4	592.13	2.70	12.70	6.38	4.10	2.28	587.76	4.37	
03/15/16	592.4	592.13	2.70	12.70	4.86	2.49	2.37	589.36	2.77	
06/17/16	592.4	592.13	2.70	12.70	4.14	1.99	2.15	589.88	2.25	
09/22/16	592.4	592.13	2.70	12.70	5.67	3.15	2.52	588.68	3.45	
09/27/16	ABANDONED									
QPTW-05R	09/06/17	595	594.28	2.00	12.00	5.64	4.98	0.66	589.22	5.06
	11/27/17	595	594.28	2.00	12.00	5.41	4.75	0.66	589.45	4.83
	02/27/18	595	594.28	2.00	12.00	4.21	4.07	0.14	590.19	4.09

**Summary of Groundwater Gauging Data - Quench Pit Area
RACER Trust - Saginaw Malleable Iron Industrial Land
Saginaw, Michigan**

Well ID	Date	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Screen (ft btoc)	Total Depth (ft btoc)	Depth to Water (ft btoc)	Depth to Product (ft btoc)	LNAPL Thickness (ft)	Corrected Groundwater Elevation ¹ (ft amsl)	Corrected Water Table Depth ¹ (ft btoc)
QPTW-10	03/17/05	592.4	592.15	2.60	12.60	9.83	7.58	2.25	584.30	7.85
	04/12/05	592.4	592.15	2.60	12.60	9.96	7.63	2.33	584.24	7.91
	05/31/05	592.4	592.15	2.60	12.60	10.29	7.83	2.46	584.02	8.13
	06/24/05	592.4	592.15	2.60	12.60	9.72	7.43	2.29	584.45	7.70
	08/12/05	592.4	592.15	2.60	12.60	9.79	7.58	2.21	584.30	7.85
QPTW-10	10/14/05	592.4	592.15	2.60	12.60	10.56	7.80	2.76	584.02	8.13
	11/08/05	592.4	592.15	2.60	12.60	10.82	7.88	2.94	583.92	8.23
	12/19/05	592.4	592.15	2.60	12.60	11.01	7.95	3.06	583.83	8.32
	01/31/06	592.4	592.15	2.60	12.60	9.79	7.54	2.25	584.34	7.81
	02/15/06	592.4	592.15	2.60	12.60	9.73	7.44	2.29	584.44	7.71
	03/13/06	592.4	592.15	2.60	12.60	9.22	7.23	1.99	584.68	7.47
	04/10/06	592.4	592.15	2.60	12.60	9.59	7.34	2.25	584.54	7.61
	05/22/06	592.4	592.15	2.60	12.60	9.95	7.43	2.52	584.42	7.73
	06/21/06	592.4	592.15	2.60	12.60	10.00	7.49	2.51	584.36	7.79
	07/11/06	592.4	592.15	2.60	12.60	9.69	7.30	2.39	584.56	7.59
	08/23/06	592.4	592.15	2.60	12.60	9.58	7.30	2.28	584.58	7.57
	09/26/06	592.4	592.15	2.60	12.60	9.85	7.33	2.52	584.52	7.63
	10/30/06	592.4	592.15	2.60	12.60	9.68	7.19	2.49	584.66	7.49
	11/27/06	592.4	592.15	2.60	12.60	9.91	7.33	2.58	584.51	7.64
	12/27/06	592.4	592.15	2.60	12.60	9.99	7.34	2.65	584.49	7.66
	01/15/07	592.4	592.15	2.60	12.60	9.90	7.37	2.53	584.48	7.67
	02/21/07	592.4	592.15	2.60	12.60	10.81	7.78	3.03	584.01	8.14
	03/23/07	592.4	592.15	2.60	12.60	10.71	7.72	2.99	584.07	8.08
	04/09/07	592.4	592.15	2.60	12.60	10.63	7.64	2.99	584.15	8.00
	05/15/07	592.4	592.15	2.60	12.60	10.38	7.46	2.92	584.34	7.81
	06/11/07	592.4	592.15	2.60	12.60	10.81	7.81	3.00	583.98	8.17
	07/11/07	592.4	592.15	2.60	12.60	11.05	7.86	3.19	583.91	8.24
	08/16/07	592.4	592.15	2.60	12.60	11.27	7.95	3.32	583.80	8.35
	09/17/07	592.4	592.15	2.60	12.60	10.54	7.73	2.81	584.08	8.07
	11/26/07	592.4	592.15	2.60	12.60	11.57	8.11	3.46	583.62	8.53
	12/12/07	592.4	592.15	2.60	12.60	11.80	8.18	3.62	583.54	8.61
	01/11/08	592.4	592.15	2.60	12.60	10.96	7.95	3.01	583.84	8.31
	02/05/08	592.4	592.15	2.60	12.60	10.21	7.78	2.43	584.08	8.07
	04/11/08	592.4	592.15	2.60	12.60	8.71	6.83	1.88	585.09	7.06
	05/16/08	592.4	592.15	2.60	12.60	8.91	6.95	1.96	584.96	7.19
	10/29/08	592.4	592.15	2.60	12.60	9.12	6.94	2.18	584.95	7.20
	01/21/09	592.4	592.15	2.60	12.60	7.96	6.68	1.28	585.32	6.83
	03/18/09	592.4	592.15	2.60	12.60	8.69	6.36	2.33	585.51	6.64
	10/17/09	592.4	592.15	2.60	12.60	9.10	7.04	2.06	584.86	7.29
	10/23/09	592.4	592.15	2.60	12.60	8.67	6.97	1.70	584.98	7.17
	06/09/10	592.4	592.15	2.60	12.60	8.42	6.23	2.19	585.66	6.49
	06/24/10	592.4	592.15	2.60	12.60	8.91	6.48	2.43	585.38	6.77
	07/29/10	592.4	592.15	2.60	12.60	9.37	6.51	2.86	585.30	6.85
	08/06/10	592.4	592.15	2.60	12.60	9.22	6.71	2.51	585.14	7.01
	08/13/10	592.4	592.15	2.60	12.60	8.06	5.73	2.33	586.14	6.01
	08/27/10	592.4	592.15	2.60	12.60	8.83	6.03	2.80	585.78	6.37
	09/17/10	592.4	592.15	2.60	12.60	8.68	5.72	2.96	586.07	6.08
	09/23/10	592.4	592.15	2.60	12.60	8.54	5.64	2.90	586.16	5.99
	10/15/10	592.4	592.15	2.60	12.60	8.92	5.82	3.10	585.96	6.19
	10/29/10	592.4	592.15	2.60	12.60	8.87	5.68	3.19	586.09	6.06
03/18/11	592.4	592.15	2.60	12.60	8.03	4.92	3.11	586.86	5.29	
04/08/11	592.4	592.15	2.60	12.60	7.75	4.06	3.69	587.65	4.50	
05/09/11	592.4	592.15	2.60	12.60	8.24	3.95	4.29	587.69	4.46	
06/09/11	592.4	592.15	2.60	12.60	8.28	4.24	4.04	587.43	4.72	
07/05/11	592.4	592.15	2.60	12.60	8.75	4.38	4.37	587.25	4.90	
08/23/11	592.4	592.15	2.60	12.60	8.50	3.67	4.83	587.90	4.25	
10/14/11	592.4	592.15	2.60	12.60	8.64	4.58	4.06	587.08	5.07	
11/23/11	592.4	592.15	2.60	12.60	8.38	3.98	4.40	587.64	4.51	
04/23/12	592.4	592.15	2.60	12.60	4.13	3.78	0.35	588.33	3.82	
07/10/12	592.4	592.15	2.60	12.60	5.65	4.51	1.14	587.50	4.65	
11/12/14	592.4	592.15	2.60	12.60	4.83	3.91	0.92	588.13	4.02	
09/09/15	592.4	592.15	2.60	12.60	2.99	2.85	0.14	589.28	2.87	
03/15/16	592.4	592.15	2.60	12.60	3.37	2.77	0.60	589.31	2.84	
06/17/16	592.4	592.15	2.60	12.60	2.84	2.41	0.43	589.69	2.46	
09/22/16	592.4	592.15	2.60	12.60	5.60	3.27	2.33	588.60	3.55	
09/27/16	ABANDONED									
QPTW-10R	09/06/17	594.82	594.20	2.00	12.00	4.99	---	---	589.21	4.99
	11/27/17	594.82	594.20	2.00	12.00	4.77	---	---	589.43	4.77
	02/27/18	594.82	594.20	2.00	12.00	4.00	---	---	590.20	4.00
QPTW-13	10/15/10	592.7	592.36	2.76	12.76	7.17	6.65	0.52	585.65	6.71
	10/29/10	592.7	592.36	2.76	12.76	6.77	6.49	0.28	585.84	6.52
	03/18/11	592.7	592.36	2.76	12.76	4.56	4.47	0.09	587.88	4.48
	05/09/11	592.7	592.36	2.76	12.76	4.59	4.56	0.03	587.80	4.56
	06/09/11	592.7	592.36	2.76	12.76	4.88	4.85	0.03	587.51	4.85
	07/05/11	592.7	592.36	2.76	12.76	5.08	5.02	0.06	587.33	5.03
	08/23/11	592.7	592.36	2.76	12.76	4.43	4.38	0.05	587.97	4.39
	10/14/11	592.7	592.36	2.76	12.76	5.12	5.03	0.09	587.32	5.04
	03/20/12	592.7	592.36	2.76	12.76	4.12	---	---	588.24	4.12
	04/23/12	592.7	592.36	2.76	12.76	4.16	4.15	0.01	588.21	4.15
	06/11/12	592.7	592.36	2.76	12.76	4.38	---	---	587.98	4.38
	07/10/12	592.7	592.36	2.76	12.76	5.06	4.84	0.22	587.49	4.87
	08/29/12	592.7	592.36	2.76	12.76	4.30	4.24	0.06	588.11	4.25
	09/12/12	592.7	592.36	2.76	12.76	4.13	4.09	0.04	588.27	4.09
	04/15/13	592.7	592.36	2.76	12.76	2.85	---	---	589.51	2.85
	07/18/13	592.7	592.36	2.76	12.76	3.54	---	---	588.82	3.54
	09/23/13	592.7	592.36	2.76	12.76	4.74	4.71	0.03	587.65	4.71
	04/25/14	592.7	592.36	2.76	12.76	2.98	---	---	589.38	2.98
	06/02/14	592.7	592.36	2.76	12.76	3.65	---	---	588.71	3.65
	07/09/14	592.7	592.36	2.76	12.76	2.73	---	---	589.63	2.73
	07/31/14	592.7	592.36	2.76	12.76	3.41	---	---	588.95	3.41

Summary of Groundwater Gauging Data - Quench Pit Area
 RACER Trust - Saginaw Malleable Iron Industrial Land
 Saginaw, Michigan

Well ID	Date	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Screen (ft btoc)	Total Depth (ft btoc)	Depth to Water (ft btoc)	Depth to Product (ft btoc)	LNAPL Thickness (ft)	Corrected Groundwater Elevation ¹ (ft amsl)	Corrected Water Table Depth ¹ (ft btoc)
	09/16/14	592.7	592.36	2.76	12.76	3.48	---	---	588.88	3.48
	03/24/15	592.7	592.36	2.76	12.76	4.12	---	---	588.24	4.12
	06/17/15	592.7	592.36	2.76	12.76	3.17	---	---	589.19	3.17
	09/09/15	592.7	592.36	2.76	12.76	3.17	---	---	589.19	3.17
	03/15/16	592.7	592.36	2.76	12.76	3.11	---	---	589.25	3.11
	06/17/16	592.7	592.36	2.76	12.76	2.53	---	---	589.83	2.53
	09/22/16	592.7	592.36	2.76	12.76	3.72	---	---	588.64	3.72
	09/27/16	ABANDONED								
QPTW-13R	09/06/17	594.8	594.04	4	14	4.83	---	---	589.21	4.83
	11/27/17	594.8	594.04	4	14	4.61	---	---	589.43	4.61
	02/27/18	594.8	594.04	4	14	3.93	---	---	590.11	3.93
QP-1	06/24/10	---	---	5	15	9.65	9.51	0.14	---	9.53
	07/22/10	---	---	5	15	12.22	12.14	0.08	---	12.15
	08/06/10	---	---	5	15	4.40	4.21	0.19	---	4.23
	08/13/10	---	---	5	15	1.63	1.56	0.07	---	1.57
	08/27/10	---	---	5	15	9.79	---	---	---	9.79
	09/17/10	---	---	5	15	8.64	---	---	---	8.64
	09/23/10	---	---	5	15	8.45	---	---	---	8.45
	10/15/10	---	---	5	15	8.91	---	---	---	8.91
	10/29/10	---	---	5	15	8.85	---	---	---	8.85
	12/07/10	---	---	5	15	9.22	---	---	---	9.22
	01/03/11	---	---	5	15	8.73	---	---	---	8.73
	03/18/11	---	---	5	15	8.83	---	---	---	8.83
	04/08/11	---	---	5	15	8.26	---	---	---	8.26
	05/09/11	---	---	5	15	8.19	---	---	---	8.19
	06/09/11	---	---	5	15	7.72	---	---	---	7.72
	07/05/11	---	---	5	15	8.54	---	---	---	8.54
	08/23/11	---	---	5	15	7.47	---	---	---	7.47
	10/14/11	---	---	5	15	8.82	---	---	---	8.82
	11/23/11	---	---	5	15	8.21	---	---	---	8.21
	01/24/12	---	---	5	15	6.58	---	---	---	6.58
	03/20/12	---	---	5	15	7.63	---	---	---	7.63
	04/23/12	---	---	5	15	7.15	---	---	---	7.15
	06/11/12	---	---	5	15	7.91	---	---	---	7.91
	07/10/12	---	---	5	15	8.54	---	---	---	8.54
	08/29/12	---	---	5	15	7.91	---	---	---	7.91
	09/12/12	---	---	5	15	7.66	---	---	---	7.66
	10/01/12	---	---	5	15	8.47	---	---	---	8.47
	11/06/12	---	---	5	15	7.66	---	---	---	7.66
	12/05/12	---	---	5	15	7.68	---	---	---	7.68
	04/03/13	---	---	5	15	7.93	---	---	---	7.93
	07/18/13	---	---	5	15	7.37	---	---	---	7.37
	09/23/13	---	---	5	15	8.55	---	---	---	8.55
	04/25/14	---	---	5	15	6.49	---	---	---	6.49
06/02/14	---	---	5	15	7.17	---	---	---	7.17	
07/09/14	---	---	5	15	6.16	---	---	---	6.16	
07/31/14	---	---	5	15	6.48	---	---	---	6.48	
09/16/14	---	---	5	15	6.94	---	---	---	6.94	
03/24/15	---	---	5	15	7.55	---	---	---	7.55	
06/17/15	---	---	5	15	6.51	---	---	---	6.51	
09/09/15	---	---	5	15	6.12	---	---	---	6.12	
12/04/15	---	---	5	15	8.25	---	---	---	8.25	
03/15/16	---	---	5	15	6.88	---	---	---	6.88	
06/17/16	---	---	5	15	6.12	---	---	---	6.12	
09/22/16	---	---	5	15	7.45	---	---	---	7.45	
09/27/16	ABANDONED									
QP-1R	09/06/17	594.87	594.59	1.5	12	5.20	---	---	589.39	5.20
	11/27/17	594.87	594.59	1.5	12	5.11	---	---	589.48	5.11
	02/27/18	594.87	594.59	1.5	12	4.65	---	---	589.94	4.65
QP-2	06/24/10	---	---	5	15	10.27	10.25	0.02	---	10.25
	06/28/10	---	---	5	15	9.49	9.45	0.04	---	9.45
	07/08/10	---	---	5	15	8.57	8.48	0.09	---	8.49
	07/22/10	---	---	5	15	8.31	8.22	0.09	---	8.23
	07/29/10	---	---	5	15	8.55	8.46	0.09	---	8.47
	08/06/10	---	---	5	15	8.88	8.74	0.14	---	8.76
	08/13/10	---	---	5	15	6.70	6.61	0.09	---	6.62
	08/27/10	---	---	5	15	7.76	7.66	0.10	---	7.67
	09/17/10	---	---	5	15	7.44	7.28	0.16	---	7.30
	09/23/10	---	---	5	15	7.14	6.98	0.16	---	7.00
	10/15/10	---	---	5	15	7.96	7.73	0.23	---	7.76
	10/29/10	---	---	5	15	7.74	7.48	0.26	---	7.51
	12/07/10	---	---	5	15	7.71	7.40	0.31	---	7.44
	01/03/11	---	---	5	15	7.62	7.31	0.31	---	7.35
	03/18/11	---	---	5	15	7.51	7.25	0.26	---	7.28
	04/08/11	---	---	5	15	7.03	6.73	0.30	---	6.77
	05/09/11	---	---	5	15	6.97	6.61	0.36	---	6.65
	06/09/11	---	---	5	15	7.36	6.93	0.43	---	6.98
	07/05/11	---	---	5	15	7.45	6.92	0.53	---	6.98
	08/23/11	---	---	5	15	7.13	6.42	0.71	---	6.51
	10/14/11	---	---	5	15	8.31	7.34	0.97	---	7.46
	11/23/11	---	---	5	15	7.99	7.07	0.92	---	7.18
	01/24/12	---	---	5	15	6.79	5.81	0.98	---	5.93
	03/20/12	---	---	5	15	7.25	6.29	0.96	---	6.41
	04/23/12	---	---	5	15	7.21	6.18	1.03	---	6.30
	06/11/12	---	---	5	15	7.20	6.48	0.72	---	6.57
	07/10/12	---	---	5	15	8.43	7.04	1.39	---	7.21
	08/29/12	---	---	5	15	8.00	6.44	1.56	---	6.63
	09/12/12	---	---	5	15	7.75	6.17	1.58	---	6.36
	10/01/12	---	---	5	15	8.66	6.81	1.85	---	7.03

Summary of Groundwater Gauging Data - Quench Pit Area
 RACER Trust - Saginaw Malleable Iron Industrial Land
 Saginaw, Michigan

Well ID	Date	Ground Surface Elevation (ft amsl)	Top of Casing Elevation (ft amsl)	Top of Screen (ft btoc)	Total Depth (ft btoc)	Depth to Water (ft btoc)	Depth to Product (ft btoc)	LNAPL Thickness (ft)	Corrected Groundwater Elevation ¹ (ft amsl)	Corrected Water Table Depth ¹ (ft btoc)
	11/06/12	---	---	5	15	7.02	6.29	0.73	---	6.38
	12/05/12	---	---	5	15	7.59	6.86	0.73	---	6.95
	04/03/13	---	---	5	15	7.12	6.40	0.72	---	6.49
	07/18/13	---	---	5	15	6.91	5.86	1.05	---	5.99
	09/23/13	---	---	5	15	7.73	6.95	0.78	---	7.04
	04/25/14	---	---	5	15	5.86	5.40	0.46	---	5.46
	06/02/14	---	---	5	15	6.24	5.74	0.50	---	5.80
	07/09/14	---	---	5	15	5.86	5.29	0.57	---	5.36
	07/31/14	---	---	5	15	6.16	5.55	0.61	---	5.62
	09/16/14	---	---	5	15	5.93	5.76	0.17	---	5.78
	03/24/15	---	---	5	15	6.51	6.30	0.21	---	6.33
	06/17/15	---	---	5	15	5.79	5.53	0.26	---	5.56
	09/09/15	---	---	5	15	5.71	5.36	0.35	---	5.40
	12/04/15	---	---	5	15	7.35	6.88	0.47	---	6.94
	03/15/16	---	---	5	15	5.77	5.51	0.26	---	5.54
	06/17/16	---	---	5	15	5.53	5.22	0.31	---	5.26
	09/22/16	---	---	5	15	6.38	5.99	0.39	---	6.04
	09/27/16	ABANDONED								
QP-2R	09/06/17	594.81	594.22	2	12	4.29	4.27	0.02	589.95	4.27
	11/27/17	594.81	594.22	2	12	4.36	4.35	0.01	589.87	4.35
	02/27/18	594.81	594.22	2	12	3.80	3.79	0.01	590.43	3.79
QP-3	06/24/10	---	---	5	15	17.53	16.80	0.73	---	16.89
	06/28/10	---	---	5	15	12.56	12.53	0.03	---	12.53
	07/08/10	---	---	5	15	12.37	12.32	0.05	---	12.33
	07/29/10	---	---	5	15	12.47	12.35	0.12	---	12.36
	08/06/10	---	---	5	15	12.89	12.81	0.08	---	12.82
	08/13/10	---	---	5	15	11.69	11.62	0.07	---	11.63
	08/27/10	---	---	5	15	11.78	11.71	0.07	---	11.72
	09/17/10	---	---	5	15	11.78	11.69	0.09	---	11.70
	09/23/10	---	---	5	15	11.55	11.41	0.14	---	11.43
	10/15/10	---	---	5	15	8.19	8.03	0.16	---	8.05
	10/29/10	---	---	5	15	8.27	8.09	0.18	---	8.11
	12/07/10	---	---	5	15	7.92	7.82	0.10	---	7.83
	01/03/11	---	---	5	15	7.70	7.57	0.13	---	7.59
	03/18/11	---	---	5	15	7.69	7.59	0.10	---	7.60
	04/08/11	---	---	5	15	6.78	6.72	0.06	---	6.73
	05/09/11	---	---	5	15	7.08	7.02	0.06	---	7.03
	06/09/11	---	---	5	15	7.33	7.25	0.08	---	7.26
	07/05/11	---	---	5	15	7.26	7.18	0.08	---	7.19
	08/23/11	---	---	5	15	6.41	6.37	0.04	---	6.37
	10/14/11	---	---	5	15	7.44	7.35	0.09	---	7.36
	11/23/11	---	---	5	15	7.06	7.00	0.06	---	7.01
	01/24/12	---	---	5	15	5.63	5.60	0.03	---	5.60
	03/20/12	---	---	5	15	6.25	6.22	0.03	---	6.22
	04/23/12	---	---	5	15	6.02	6.00	0.02	---	6.00
	06/11/12	---	---	5	15	6.55	6.51	0.04	---	6.51
	07/10/12	---	---	5	15	7.21	7.11	0.10	---	7.12
	08/29/12	---	---	5	15	6.58	6.49	0.09	---	6.50
	09/12/12	---	---	5	15	6.16	6.10	0.06	---	6.11
	10/01/12	---	---	5	15	7.11	7.01	0.10	---	7.02
	11/06/12	---	---	5	15	7.07	7.01	0.06	---	7.02
	12/05/12	---	---	5	15	6.58	6.55	0.03	---	6.55
	04/03/13	---	---	5	15	6.57	6.54	0.03	---	6.54
	07/18/13	---	---	5	15	5.98	5.92	0.06	---	5.93
	09/23/13	---	---	5	15	7.01	6.91	0.10	---	6.92
	04/25/14	---	---	5	15	5.41	5.39	0.02	---	5.39
	06/02/14	---	---	5	15	5.74	5.71	0.03	---	5.71
	07/09/14	---	---	5	15	5.17	5.13	0.04	---	5.13
	07/31/14	---	---	5	15	5.25	5.24	0.01	---	5.24
	09/16/14	---	---	5	15	5.47	5.41	0.06	---	5.42
	03/24/15	---	---	5	15	6.36	6.34	0.02	---	6.34
	06/17/15	---	---	5	15	5.20	5.18	0.02	---	5.18
	09/09/15	---	---	5	15	5.12	5.09	0.03	---	5.09
	12/04/15	---	---	5	15	6.40	6.39	0.01	---	6.39
	03/15/16	---	---	5	15	5.40	5.39	0.01	---	5.39
	06/17/16	---	---	5	15	5.13	5.11	0.02	---	5.11
	09/22/16	---	---	5	15	5.72	5.68	0.04	---	5.68
	09/27/16	ABANDONED								
QP-3R	09/06/17	594.8	594.41	2	12	4.17	4.08	0.09	590.32	4.09
	11/27/17	594.8	594.41	2	12	4.15	4.04	0.11	590.36	4.05
	02/27/18	594.8	594.41	2	12	3.79	3.71	0.08	590.69	3.72

Notes

- LNAPL Light Non-Aqueous Phase Liquid
- ft Feet
- ft amsl Feet Above Mean Sea Level
- ft btoc Feet Below Top of Casing
- No LNAPL measured
- ¹ A specific gravity of 0.88 (quench/hydraulic oil) was used to calculate corrected groundwater levels

Table 2

LNAPL Transmissivity Testing: QPTW-03R2
 RACER Saginaw Malleable Industrial Land
 Saginaw, MI

Day	Time	Elapsed Time (hours)	DTP (ft btor)	DTW (ft btor)	In-Well LNAPL Thickness (in)	Volume Removed (fl oz)	Volume Removed (gal)	LNAPL Recovery Rate - Q _n (gal/day)	LNAPL Drawdown - S _n (feet)	LNAPL Recovery Rate - Q _n (ft ³ /day)
4/26/2018	8:00	0:00	3.72	4.26	6.48	11.00	0.09			
4/26/2018	8:10	0:10	3.76	3.91	1.80	3.00	0.02	3.4	0.04	0.45
4/26/2018	8:15	0:15	3.75	3.81	0.72				0.03	
4/26/2018	8:20	0:20	3.74	3.81	0.84	2.00	0.02	2.3	0.02	0.30
4/26/2018	8:25	0:25	3.74	3.77	0.36				0.02	
4/26/2018	8:30	0:30	3.74	3.77	0.36				0.02	
4/26/2018	8:35	0:35	3.74	3.78	0.48				0.02	
4/26/2018	8:40	0:40	3.74	3.79	0.60				0.02	
4/26/2018	8:45	0:45	3.74	3.79	0.60				0.02	
4/26/2018	8:50	0:50	3.74	3.79	0.60				0.02	
4/26/2018	8:55	0:55	3.74	3.79	0.60				0.02	
4/26/2018	9:00	1:00	3.74	3.79	0.60				0.02	
4/26/2018	9:10	1:10	3.74	3.79	0.60				0.02	
4/26/2018	9:20	1:20	3.74	3.79	0.60				0.02	
4/26/2018	9:30	1:30	3.74	3.79	0.60				0.02	
4/26/2018	9:40	1:40	3.74	3.79	0.60				0.02	
4/26/2018	9:50	1:50	3.74	3.79	0.60				0.02	
4/26/2018	10:00	2:00	3.74	3.80	0.72				0.02	
4/26/2018	10:15	2:15	3.74	3.80	0.72				0.02	
4/26/2018	10:30	2:30	3.74	3.80	0.72				0.02	
4/26/2018	10:45	2:45	3.74	3.80	0.72				0.02	
4/26/2018	11:00	3:00	3.73	3.80	0.84				0.01	
4/26/2018	11:15	3:15	3.73	3.80	0.84				0.01	
4/26/2018	11:30	3:30	3.73	3.80	0.84				0.01	
4/26/2018	11:45	3:45	3.73	3.80	0.84				0.01	
4/26/2018	12:00	4:00	3.73	3.80	0.84				0.01	
4/26/2018	12:20	4:20	3.73	3.80	0.84				0.01	
4/26/2018	12:40	4:40	3.74	3.80	0.72				0.02	
4/26/2018	13:00	5:00	3.74	3.80	0.72	1.5	0.01	0.06	0.02	0.01
4/26/2018	13:10	5:10	3.73	3.80	0.84				0.01	
4/26/2018	13:20	5:20	3.73	3.80	0.84				0.01	
4/26/2018	13:30	5:30	3.73	3.80	0.84				0.01	
4/26/2018	14:00	6:00	3.73	3.80	0.84				0.01	
4/26/2018	14:30	6:30	3.73	3.80	0.84				0.01	
4/26/2018	15:00	7:00	3.73	3.80	0.84				0.01	
4/26/2018	15:30	7:30	3.74	3.80	0.72				0.02	
4/26/2018	16:00	8:00	3.74	3.80	0.72				0.02	
4/27/2018	10:45	2:45	3.77	3.80	0.36				0.05	

Inputs

0.02	0.01
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LNAPL Transmissivity - T_n (ft²/day)

0.30

**Summary of Historical Tn Evaluations on Quench Pit Monitoring Wells
RACER Saginaw Malleable Industrial Land
Saginaw, MI**

Location	Date	LNAPL Drawdown - S _n (feet)	LNAPL Recovery Rate - Q _n (ft ³ /day)	LNAPL Transmissivity - T _n (ft ² /day)
QPTW-01	5/10/2016	0.42	0.03	0.05
QPTW-03R2*	4/27/2018	0.02	0.01	0.30
QPTW-03R	4/28/2016	0.32	0.05	0.11
QPTW-04R*	9/19/2017	0.08	0.02	0.21
QPTW-04	5/10/2016	0.11	0.01	0.08
QPTW-05R*	9/19/2017	de minimis	de minimis	de minimis
QPTW-05	4/29/2016	0.27	0.11	0.31
QPTW-05	10/30/2014	0.23	0.10	0.31
QPTW-10	4/28/2016	0.01	0.00	0.00
QPTW-10	9/30/2015	0.04	0.07	1.17
QPTW-10	10/30/2014	0.17	0.36	1.58

* monitoring well re-installed between June 29 and August 16, 2017

1.58

greater than the State of Michigan de minimis LNAPL recoverability range of 0.5 ft²/day (see Michigan Department of Environmental Quality Remediation and Redevelopment Division Resource Materials-25-2014-01)