



DuPont Pompton Lakes Works
2000 Cannonball Road
Pompton Lakes, NJ 07442

October 8, 2013

Mr. Philip D. Flax
USEPA REGION 2
290 Broadway
Mail Code: 22ND FL
New York, NY 10007-1866

**RE: EISB Pilot Study Status Report #3
DuPont Pompton Lakes Works
Pompton Lakes, New Jersey**

Dear Mr. Flax:

Enclosed is the monthly status report that summarizes activities associated with the interim remedial measure (IRM) pilot study using enhanced in-situ bioremediation (EISB) being conducted in accordance with the Agency-approved *Implementation Work Plan for Application of EISB to Intermediate Groundwater Near Well 128* dated January 31, 2012 and *Technical Memorandum –Response to Comments* dated March 30, 2012.

This status report covers the time period of September 1 through 30, 2013.

If you have any questions, please contact me at (973) 492-7733.

Sincerely,

A handwritten signature in black ink that reads "David E. Epps". The signature is written in a cursive, flowing style.

David E. Epps, P.G.
Project Director, Pompton Lakes Works
DuPont Corporate Remediation Group

cc: Anthony Cinque – NJDEP
PLW Central File

Monthly Progress Report – EISB Pilot Study
Report Period – September 1, 2013 through September 30, 2013

DuPont Pompton Lakes Works
Pompton Lakes, New Jersey

This monthly report summarizes activities completed from September 1 to 30, 2013 associated with the interim remedial measure (IRM) pilot study using enhanced in-situ bioremediation (EISB) in the intermediate aquifer in the area of monitoring well cluster 128 (see Figure 1 for Site layout). Work is being conducted in accordance with the Agency-approved *Implementation Work Plan for Application of EISB to Intermediate Groundwater Near Well 128* dated January 31, 2012 and *Technical Memorandum – Response to Comments* dated March 30, 2012.

Activities Completed During Reporting Period (September 1, 2013 to September 30, 2013)

Pilot study activities completed during the reporting period included system operation and sampling.

Recirculation System Operation/Maintenance

- Groundwater was extracted from EW01 at a rate of approximately 3 gallons per minute (GPM) between September 1st and September 10th. On September 10th, the flow rate was adjusted to 2 GPM to prevent excessive drawdown due to assumed silting in the extraction well.
- Bromide concentrations in groundwater continued to be monitored in the study area.
- Sodium lactate was amended to the re-injected groundwater once per day at a target time weighted average of lactate at 165 milligrams per liter (mg/L).
- Routine system maintenance (e.g., particulate filter change outs, flow rate adjustments) was conducted during the reporting period. The EW and IW vaults were visually inspected on a weekly basis to confirm integrity of system components.
- No leak detections or high pressure alarms occurred between September 1st and 30th.

Results to Date

Groundwater Pumping

From system start-up (June 24, 2013) to September 30, 2013, the total recirculated groundwater was 323,821 gallons.

Water Level Monitoring

Manual water level measurements were collected approximately once per week in the surrounding monitoring wells (Table 1). Results are reported as depth-to-water in units of feet below top of casing (ft btoc) and as the converted elevation in units of feet relative to mean sea level (ft msl). Level logger data from IW01, IW02, IW03, EW01, 128I, and 128S will be included in the final pilot study report. Drawdown in the extraction well (EW01) during operation is typically 14 feet and mounding at IW02 is 3.5 feet (based on data from level loggers). On September 10th, the extraction well flow rate was adjusted down to 2 GPM to help decrease the rate of drawdown in EW01. Rehabilitation is scheduled for early October.

Water Quality Monitoring

Groundwater samples for volatile organic compounds (VOC), dissolved hydrocarbon gases (DHG), and total organic carbon (TOC) analysis were collected during the reporting period from the wells in the 128 area as outlined in the *Implementation Work Plan for Application of EISB to Intermediate Groundwater Near Well 128* dated January 31, 2012. The water quality field parameter data recorded during well purging and prior to sampling are provided in Table 2. A summary of the VOC, DHG, and TOC data from baseline up to the second bi-weekly sampling event is presented in Table 3. The results indicate that VOC concentrations of dichloroethene (cis and trans), vinyl chloride, ethane, and ethane are starting to increase slightly in the target intermediate zone of ML02. Slight decreases in ethene and ethane have also been seen in the same zone in ML02. A complete copy of the analytical results generated during these events will be provided in the final study report.

Bromide Tracer Monitoring

Bromide detections at the various well locations are shown in Figure 2. The intent of the bromide measurements is to serve as a tracer to groundwater flow under re-circulating conditions and to aid in the understanding of extraction well capture efficiency, pore volume estimations, and correlating changes in VOC concentrations to EISB related activities.

Results to date for the field analysis of bromide indicate that re-injected groundwater has reached the target intermediate zone (nominally from 40 to 65 feet below ground surface [ft bgs]) in ML02 and ML04. Bromide has been detected in the intermediate zone at IW03 (the closest injection well) and IW01 at a maximum of 54 mg/L (August 20th) and 53 mg/L (September 5th), respectively. EW01 concentrations had spiked at 22 mg/L on September 5th. By the end of September, the bromide concentrations in the intermediate zone had all decreased below 20 mg/L. Based on the observed bromide concentrations in the extraction well at the end of three months of operation, it appears the travel time of bromide is longer than anticipated. Bromide monitoring will continue into October as outlined in the *Technical Memorandum – Response to Comments* dated March 30, 2012.

Summary

Groundwater recirculation and electron donor amendment will continue during the month. The system will be temporarily shut down in October to complete rehabilitation at EW01. Once EW01 has been rehabilitated to sustainable conditions, the system will be turned back on and amendment of lactate will proceed. Future groundwater monitoring activities will continue to monitor concentrations of key parameters in order to evaluate the operation and performance of the EISB system.

Activities Scheduled for Next Reporting Period (October 1~31, 2013)

Activities to be completed during October 2013 include:

- Continued operation of the pilot-scale EISB system,
- Rehabilitation of EW01 (week of October 7th),
- 4th bi-weekly monitoring event (week of October 14th), and
- 4th monthly monitoring event (week of October 28th).

The system will be routinely checked to confirm operation and monitor groundwater flow conditions.

Attachments

Table 1: Depth to Groundwater

Table 2: Field Parameter Results

Table 3: Select Target Compound Results

Figure 1: Site Layout

Figure 2: Field Measured Bromide Concentrations

**TABLE 1
DEPTH TO GROUNDWATER
Pompton Lakes Works
Pompton Lakes, New Jersey**

Well ID	Top of Casing Elevation (ft amsl)	Date (mm/dd/yyyy)	Time (hh:mm)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
128S	218.99	5/1/2013	12:40	9.9	209.09
		6/21/2013	16:03	8.3	210.69
		6/24/2013	11:40	8.78	210.21
		07/19/13	9:44	8.93	210.06
		07/23/13	14:49	9.05	209.94
		07/29/13	15:15	9.25	209.74
		08/06/13	16:10	9.48	209.51
		08/08/13	13:15	9.52	209.47
		08/16/13	10:47	9.66	209.33
		08/20/13	13:35	9.76	209.23
		08/29/13	13:02	10.01	208.98
		09/05/13	13:56	10.22	208.77
		09/16/13	11:55	10.53	208.46
09/19/13	14:34	10.62	208.37		
128I	218.79	5/2/2013	9:00	9.56	209.23
		6/21/2013	16:19	8.09	210.70
		6/24/2013	11:46	8.07	210.72
		07/19/13	9:47	8.75	210.04
		07/23/13	14:34	8.80	209.99
		07/29/13	15:05	9.07	209.72
		08/06/13	16:00	9.29	209.50
		08/08/13	13:12	9.26	209.53
		08/16/13	10:44	9.51	209.28
		08/20/13	13:40	9.63	209.16
		08/29/13	12:51	9.94	208.85
		09/05/13	13:45	10.10	208.69
		09/16/13	11:45	10.42	208.37
09/19/13	14:26	10.54	208.25		
EW01-Upper	218.71	5/16/2013	14:45	9.50	209.21
		6/21/2013	15:07	7.88	210.83
		6/24/2013	13:48	7.86	210.85
		6/28/2013	10:48	7.95	210.76
		07/09/13	12:18	8.38	210.33
		07/19/13	10:53	8.46	210.25
		07/23/13	8:54	8.59	210.12
		07/26/13	13:40	8.53	210.18
		08/06/13	10:20	9.08	209.63
		08/08/13	13:34	9.07	209.64
IW01-Upper	217.65	5/14/2013	10:37	9.64	208.01
		6/21/2013	16:34	7.98	209.67
		6/24/2013	11:31	7.95	209.70
		07/03/13	11:55	8.11	209.54
		07/09/13	11:45	8.45	209.20
		07/10/13	13:42	8.25	209.40
		07/19/13	9:54	8.54	209.11
		07/23/13	13:50	8.68	208.97
		07/26/13	12:20	8.78	208.87
		07/29/13	14:00	8.87	208.78
		08/06/13	15:23	9.11	208.54
		08/08/13	12:05	9.19	208.46
		08/16/13	10:37	9.31	208.34
		08/20/13	13:05	9.41	208.24
08/22/13	8:44	9.48	208.17		
08/28/13	15:03	9.64	208.01		

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Well ID	Top of Casing Elevation (ft amsl)	Date (mm/dd/yyyy)	Time (hh:mm)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
IW01-Upper	217.65	09/05/13	13:11	9.85	207.80
		09/13/13	14:43	10.09	207.56
		09/19/13	13:34	10.25	207.40
		09/25/13	11:25	10.20	207.45
IW01-Lower	217.65	5/14/2013	14:38	9.73	207.92
		6/21/2013	16:36	8.06	209.59
		6/24/2013	11:33	8.04	209.61
		07/04/13	11:53	8.15	209.50
		07/09/13	11:43	8.55	209.10
		07/10/13	13:42	8.30	209.35
		07/19/13	9:53	8.92	208.73
		07/23/13	13:45	8.45	209.20
		07/26/13	12:21	8.87	208.78
		07/29/13	14:01	8.65	209.00
		08/06/13	15:22	9.18	208.47
		08/08/13	12:03	9.18	208.47
		08/16/13	10:37	9.41	208.24
		08/20/13	13:05	9.50	208.15
		08/22/13	8:45	9.57	208.08
		08/28/13	15:04	9.73	207.92
		09/05/13	13:10	9.96	207.69
09/13/13	14:43	10.23	207.42		
09/19/13	13:35	10.39	207.26		
09/25/13	11:35	10.55	207.10		
IW02-Upper	217.59	6/4/2013	10:15	8.38	209.21
		6/21/2013	16:53	7.24	210.35
		6/24/2013	15:34	7.22	210.37
		6/28/2013	13:16	7.32	210.27
		07/19/13	10:02	7.80	209.79
		07/23/13	12:11	7.96	209.63
		07/26/13	12:59	8.05	209.54
		07/29/13	14:55	8.14	209.45
		08/06/13	15:07	8.36	209.23
		08/08/13	13:05	8.43	209.16
		08/20/13	13:50	8.28	209.31
08/22/13	8:50	8.73	208.86		
IW03-Upper	217.58	5/15/2013	11:30	9.62	207.96
		6/21/2013	17:02	7.98	209.60
		6/24/2013	11:26	7.95	209.63
		6/28/2013	12:10	8.01	209.57
		07/04/13	10:34	8.13	209.45
		07/09/13	10:49	8.48	209.10
		07/10/13	9:40	8.26	209.32
		07/19/13	10:22	8.55	209.03
		07/23/13	11:17	8.67	208.91
		07/26/13	11:27	8.78	208.80
		07/29/13	12:35	8.87	208.71
		08/06/13	14:12	9.13	208.45
		08/08/13	11:25	9.18	208.40
		08/16/13	10:28	9.32	208.26
08/20/13	12:30	9.46	208.12		
08/22/13	8:36	9.48	208.10		
08/28/13	14:41	9.65	207.93		
09/05/13	12:07	9.87	207.71		

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Well ID	Top of Casing Elevation	Date	Time	Depth to Water	Groundwater Elevation
	(ft amsl)				
IW03-Upper	217.58	09/13/13	13:48	10.09	207.49
		09/19/13	11:42	10.27	207.31
		09/25/13	11:55	10.50	207.08
IW03-Lower	217.58	5/16/2013	10:25	9.62	207.96
		6/21/2013	17:03	8.03	209.55
		6/24/2013	11:27	8.08	209.50
		6/28/2013	12:11	8.15	209.43
		07/03/13	10:27	8.25	209.33
		07/09/13	10:49	8.50	209.08
		07/10/13	9:40	8.20	209.38
		07/19/13	10:22	8.58	209.00
		07/23/13	11:16	8.55	209.03
		07/26/13	11:26	8.81	208.77
		07/29/13	12:36	8.92	208.66
		08/06/13	14:13	9.11	208.47
		08/08/13	11:25	9.17	208.41
		08/16/13	10:28	9.36	208.22
		08/20/13	12:30	9.48	208.10
		08/22/13	8:35	9.51	208.07
		08/28/13	14:40	9.70	207.88
		09/05/13	12:06	9.93	207.65
		09/13/13	13:48	10.21	207.37
09/19/13	11:41	10.37	207.21		
09/25/13	12:00	10.40	207.18		
ML02-1	217.80	5/14/2013	8:50	9.70	208.10
		6/24/2013	11:53	7.75	210.05
		07/02/13	14:30	7.91	209.89
		07/09/13	9:59	8.21	209.59
		07/10/13	13:12	8.00	209.80
		07/12/13	10:20	8.07	209.73
		07/19/13	10:15	8.64	209.16
		07/23/13	10:27	8.79	209.01
		07/26/13	10:30	8.89	208.91
		07/29/13	11:32	8.98	208.82
		07/31/13	10:45	9.02	208.78
		08/06/13	11:28	9.21	208.59
		08/08/13	10:31	9.27	208.53
		08/14/13	NR	9.51	208.29
		08/16/13	10:15	9.42	208.38
		08/20/13	10:24	9.52	208.28
		08/27/13	9:15	9.37	208.43
		09/05/13	10:40	10.05	207.75
		09/12/13	8:48	10.11	207.69
09/19/13	10:43	10.37	207.43		
09/24/13	9:14	10.15	207.65		
ML02-2	217.80	5/15/2013	10:25	9.69	208.11
		6/24/2013	11:54	7.73	210.07
		07/02/13	14:31	7.91	209.89
		07/09/13	9:59	8.21	209.59
		07/10/13	13:12	7.98	209.82
		07/12/13	10:20	8.05	209.75
		07/19/13	10:16	8.63	209.17
07/23/13	10:27	8.79	209.01		
07/26/13	10:31	8.89	208.91		

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Pompton Lakes Works
Pompton Lakes, New Jersey**

Well ID	Top of Casing Elevation (ft amsl)	Date (mm/dd/yyyy)	Time (hh:mm)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
ML02-2	217.80	07/29/13	11:33	8.96	208.84
		07/31/13	10:45	9.00	208.80
		08/06/13	11:29	9.16	208.64
		08/08/13	10:31	9.19	208.61
		08/14/13	NR	9.04	208.76
		08/16/13	10:15	9.39	208.41
		08/20/13	10:24	9.48	208.32
		08/27/13	9:15	9.33	208.47
		09/05/13	10:41	9.93	207.87
		09/12/13	8:49	10.11	207.69
ML02-3	217.80	5/14/2013	15:10	9.69	208.11
		6/24/2013	11:54	7.78	210.02
		07/02/13	14:31	7.92	209.88
		07/09/13	9:59	7.97	209.83
		07/10/13	13:13	7.68	210.12
		07/12/13	10:21	8.05	209.75
		07/19/13	10:16	8.38	209.42
		07/23/13	10:26	8.81	208.99
		07/26/13	10:31	8.61	209.19
		07/29/13	11:33	8.70	209.10
		07/31/13	10:46	8.76	209.04
		08/06/13	11:30	8.89	208.91
		08/08/13	10:32	8.98	208.82
		08/14/13	NR	8.79	209.01
		08/16/13	10:16	9.12	208.68
		08/20/13	10:25	9.23	208.57
		08/27/13	9:16	9.03	208.77
		09/05/13	10:42	9.66	208.14
ML02-4	217.80	5/14/2013	13:35	9.69	208.11
		6/24/2013	11:55	7.67	210.13
		07/02/13	14:32	7.93	209.87
		07/09/13	10:00	8.15	209.65
		07/10/13	13:13	7.90	209.90
		07/12/13	10:21	8.05	209.75
		07/19/13	10:17	8.57	209.23
		07/23/13	10:26	8.82	208.98
		07/26/13	10:31	8.78	209.02
		07/29/13	11:34	8.89	208.91
		07/31/13	10:47	8.96	208.84
		08/06/13	11:30	9.11	208.69
		08/08/13	10:33	9.16	208.64
		08/14/13	NR	8.98	208.82
		08/16/13	10:16	9.34	208.46
		08/20/13	10:25	9.44	208.36
		08/27/13	9:16	9.29	208.51
		09/05/13	10:43	9.89	207.91
09/12/13	8:50	10.12	207.68		
09/19/13	10:45	10.30	207.50		
09/24/13	9:17	10.08	207.72		

TABLE 1
DEPTH TO GROUNDWATER
Pompton Lakes Works
Pompton Lakes, New Jersey

Well ID	Top of Casing Elevation	Date	Time	Depth to Water	Groundwater Elevation
	(ft amsl)				
ML02-5	217.80	5/14/2013	11:35	9.71	208.09
		6/24/2013	11:56	7.71	210.09
		07/02/13	14:33	7.92	209.88
		07/09/13	10:00	8.20	209.60
		07/10/13	13:14	7.99	209.81
		07/12/13	10:21	8.04	209.76
		07/19/13	10:17	8.64	209.16
		07/23/13	10:25	8.78	209.02
		07/26/13	10:32	8.84	208.96
		07/29/13	11:34	8.94	208.86
		07/31/13	10:47	9.02	208.78
		08/06/13	11:31	9.17	208.63
		08/08/13	10:33	9.22	208.58
		08/14/13	NR	9.05	208.75
		08/16/13	10:24	9.40	208.40
		08/20/13	10:26	9.51	208.29
		08/27/13	9:16	9.35	208.45
09/05/13	10:44	9.95	207.85		
09/12/13	8:51	10.12	207.68		
09/19/13	10:46	10.33	207.47		
09/24/13	9:18	10.12	207.68		
ML02-6	217.80	5/14/2013	10:07	9.69	208.11
		6/24/2013	11:56	7.71	210.09
		07/02/13	14:33	7.92	209.88
		07/09/13	10:00	8.20	209.60
		07/10/13	13:14	7.98	209.82
		07/12/13	10:21	8.04	209.76
		07/19/13	10:18	8.63	209.17
		07/23/13	10:25	8.76	209.04
		07/26/13	10:32	8.84	208.96
		07/29/13	11:35	8.94	208.86
		07/31/13	10:48	9.02	208.78
		08/06/13	11:31	9.18	208.62
		08/08/13	10:33	9.25	208.55
		08/14/13	NR	9.05	208.75
		08/16/13	10:24	9.40	208.40
		08/20/13	10:26	9.53	208.27
		08/27/13	9:17	9.35	208.45
09/05/13	10:45	9.95	207.85		
09/12/13	8:51	10.12	207.68		
09/19/13	10:47	10.34	207.46		
09/24/13	9:19	10.12	207.68		
ML02-7	217.8	5/15/2013	12:20	9.71	208.09
		6/24/2013	11:57	7.77	210.03
		07/02/13	14:34	7.98	209.82
		07/09/13	10:01	8.34	209.46
		07/10/13	13:15	8.01	209.79
		07/12/13	10:27	8.03	209.77
		07/19/13	10:18	8.77	209.03
		07/23/13	10:24	8.70	209.10
		07/26/13	10:33	8.98	208.82
07/29/13	11:35	9.08	208.72		
07/31/13	10:48	9.14	208.66		

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Well ID	Top of Casing Elevation (ft amsl)	Date (mm/dd/yyyy)	Time (hh:mm)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
ML02-7	217.8	08/06/13	11:32	9.21	208.59
		08/08/13	10:34	9.26	208.54
		08/14/13	NR	9.18	208.62
		08/16/13	10:25	9.49	208.31
		08/20/13	10:26	9.63	208.17
		08/27/13	9:17	9.47	208.33
		09/05/13	10:45	10.02	207.78
		09/12/13	8:52	10.26	207.54
		09/19/13	10:47	10.47	207.33
		09/24/13	9:20	10.25	207.55
ML04-1	217.71	5/16/2013	10:00	9.19	208.52
		6/24/2013	12:03	7.75	209.96
		6/28/2013	11:14	7.99	209.72
		07/02/13	11:48	8.13	209.58
		07/09/13	9:19	8.05	209.66
		07/10/13	9:04	7.83	209.88
		07/12/13	8:56	7.91	209.80
		07/19/13	8:35	8.52	209.19
		07/23/13	9:37	8.62	209.09
		07/26/13	9:22	8.75	208.96
		07/29/13	10:17	8.83	208.88
		07/31/13	8:59	9.10	208.61
		08/06/13	9:43	9.09	208.62
		08/08/13	9:35	9.16	208.55
		08/15/13	9:20	9.34	208.37
		08/16/13	10:08	9.30	208.41
		08/20/13	9:27	9.45	208.26
		08/27/13	9:20	9.18	208.53
		09/05/13	9:01	9.86	207.85
		09/12/13	8:54	10.10	207.61
09/13/13	11:49	10.11	207.60		
09/19/13	9:16	10.32	207.39		
09/24/13	9:25	9.96	207.75		
ML04-2	217.71	5/17/2013	9:25	9.18	208.53
		6/24/2013	12:04	7.76	209.95
		6/28/2013	11:14	8.33	209.38
		07/02/13	11:49	8.39	209.32
		07/09/13	9:20	8.45	209.26
		07/10/13	9:04	8.20	209.51
		07/12/13	8:56	8.13	209.58
		07/19/13	8:35	8.90	208.81
		07/23/13	9:36	9.01	208.70
		07/26/13	9:23	9.19	208.52
		07/29/13	10:18	9.26	208.45
		07/31/13	9:00	9.27	208.44
		08/06/13	9:44	9.37	208.34
		08/08/13	9:36	9.43	208.28
		08/15/13	9:21	9.58	208.13
		08/16/13	10:08	9.65	208.06
		08/20/13	9:28	9.72	207.99
		08/27/13	9:20	9.70	208.01
		09/05/13	9:03	10.29	207.42
		09/12/13	8:55	10.38	207.33
09/13/13	11:52	10.42	207.29		

TABLE 1
DEPTH TO GROUNDWATER
Pompton Lakes Works
Pompton Lakes, New Jersey

Well ID	Top of Casing Elevation (ft amsl)	Date (mm/dd/yyyy)	Time (hh:mm)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
ML04-2	217.71	09/19/13	9:17	10.64	207.07
		09/24/13	9:26	10.30	207.41
ML04-3	217.71	5/16/2013	15:05	9.19	208.52
		6/24/2013	12:05	7.58	210.13
		6/28/2013	11:15	8.03	209.68
		07/02/13	11:49	8.15	209.56
		07/09/13	9:20	8.07	209.64
		07/10/13	9:04	7.82	209.89
		07/12/13	8:57	7.90	209.81
		07/19/13	8:35	8.52	209.19
		07/23/13	9:35	8.67	209.04
		07/26/13	9:25	8.80	208.91
		07/29/13	10:19	8.86	208.85
		07/31/13	9:01	8.93	208.78
		08/06/13	9:44	9.09	208.62
		08/08/13	9:36	9.14	208.57
		08/15/13	9:21	9.31	208.40
		08/16/13	10:09	9.31	208.40
		08/20/13	9:29	9.36	208.35
		08/27/13	9:21	9.16	208.55
09/05/13	9:04	9.81	207.90		
09/12/13	8:55	10.00	207.71		
09/13/13	11:53	10.02	207.69		
09/19/13	9:18	10.24	207.47		
09/24/13	9:27	9.90	207.81		
ML04-4	217.71	5/16/2013	13:15	9.20	208.51
		6/24/2013	12:06	7.57	210.14
		6/28/2013	11:15	8.04	209.67
		07/02/13	11:49	8.16	209.55
		07/09/13	9:20	8.06	209.65
		07/10/13	9:05	7.82	209.89
		07/12/13	8:57	7.90	209.81
		07/19/13	8:35	8.51	209.20
		07/23/13	9:33	8.67	209.04
		07/26/13	9:25	8.81	208.90
		07/29/13	10:19	8.87	208.84
		07/31/13	9:02	8.94	208.77
		08/06/13	9:45	9.09	208.62
		08/08/13	9:37	9.16	208.55
		08/15/13	9:22	9.30	208.41
		08/16/13	10:09	9.32	208.39
		08/20/13	9:29	9.40	208.31
		08/27/13	9:21	9.16	208.55
09/05/13	9:05	9.85	207.86		
09/12/13	8:56	10.01	207.70		
09/13/13	11:54	10.06	207.65		
09/19/13	9:19	10.26	207.45		
09/24/13	9:28	9.97	207.74		
ML04-5	217.71	5/16/2013	12:15	9.20	208.51
		6/24/2013	12:07	7.57	210.14
		6/28/2013	11:16	8.05	209.66
		07/02/13	11:50	8.16	209.55
		07/09/13	9:21	8.06	209.65
07/10/13	9:05	7.83	209.88		

**TABLE 1
DEPTH TO GROUNDWATER
Pompton Lakes Works
Pompton Lakes, New Jersey**

Well ID	Top of Casing Elevation (ft amsl)	Date (mm/dd/yyyy)	Time (hh:mm)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
ML04-5	217.71	07/12/13	8:57	7.89	209.82
		07/19/13	8:35	8.53	209.18
		07/23/13	9:32	8.65	209.06
		07/26/13	9:25	8.80	208.91
		07/29/13	10:20	8.87	208.84
		07/31/13	9:04	8.97	208.74
		08/06/13	9:47	9.13	208.58
		08/08/13	9:37	9.19	208.52
		08/15/13	9:23	9.32	208.39
		08/16/13	10:09	9.34	208.37
		08/20/13	9:30	9.44	208.27
		08/27/13	9:21	9.20	208.51
		09/05/13	9:05	9.87	207.84
		09/12/13	8:57	10.09	207.62
09/13/13	11:55	10.09	207.62		
09/19/13	9:20	10.28	207.43		
09/24/13	9:28	9.98	207.73		
ML04-6	217.71	5/16/2013	11:20	9.18	208.53
		6/24/2013	12:08	7.56	210.15
		6/28/2013	11:16	8.03	209.68
		07/02/13	11:50	8.15	209.56
		07/09/13	9:21	8.06	209.65
		07/10/13	9:05	7.81	209.90
		07/12/13	8:58	7.89	209.82
		07/19/13	8:35	8.48	209.23
		07/23/13	9:31	8.64	209.07
		07/26/13	9:26	8.76	208.95
		07/29/13	10:20	8.86	208.85
		07/31/13	9:05	8.93	208.78
		08/06/13	9:48	9.11	208.60
		08/08/13	9:38	9.18	208.53
		08/15/13	9:24	9.31	208.40
		08/16/13	10:10	9.34	208.37
		08/20/13	9:30	9.43	208.28
		08/27/13	9:22	9.20	208.51
		09/05/13	9:06	9.89	207.82
		09/12/13	8:57	10.08	207.63
09/13/13	11:56	10.08	207.63		
09/19/13	9:21	10.26	207.45		
09/24/13	9:25	9.96	207.75		

**TABLE 1
DEPTH TO GROUNDWATER
Pompton Lakes Works
Pompton Lakes, New Jersey**

Well ID	Top of Casing Elevation (ft amsl)	Date (mm/dd/yyyy)	Time (hh:mm)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
ML04-7	217.71	5/17/2013	10:45	9.22	208.49
		6/24/2013	12:09	7.70	210.01
		6/28/2013	11:17	8.13	209.58
		07/02/13	11:50	8.25	209.46
		07/09/13	9:21	8.23	209.48
		07/10/13	9:05	7.95	209.76
		07/12/13	8:58	7.89	209.82
		07/19/13	8:35	8.79	208.92
		07/23/13	9:30	8.82	208.89
		07/26/13	9:26	9.14	208.57
		07/29/13	10:20	9.05	208.66
		07/31/13	9:06	9.24	208.47
		08/06/13	9:49	9.19	208.52
		08/08/13	9:38	9.32	208.39
		08/15/13	9:25	9.41	208.30
		08/16/13	10:10	9.40	208.31
		08/20/13	9:31	9.46	208.25
		08/27/13	9:22	9.31	208.40
		09/05/13	9:06	9.99	207.72
		09/12/13	8:58	10.20	207.51
09/13/13	11:57	10.17	207.54		
09/19/13	9:22	10.41	207.30		
09/24/13	9:28	10.09	207.62		

Notes:

- hh:mm - hour:minute
- ft amsl - feet above mean sea level
- ft btoc - feet below top of casing
- mm/dd/yyyy - month/day/year

TABLE 2
FIELD PARAMETER RESULTS
Pompton Lakes Works
Pompton Lakes, New Jersey

Well Identifier	Well Screen Interval (ft bgs)	Date Sampled	Time	Flow Rate (ml/m)	Temperature (°C)	pH	Conductivity (µs)	ORP (mV)	Dissolved Oxygen (mg/L)	Volume Purged (gal)	Water Level (ft btoc)	Comments
128	6.24-26.24	01-May-13	14:02	200	13.2	6.61	0.86	213	6.9	4.0	9.92	Slightly turbid
128-1	61.36-71.36	02-May-13	11:45	150	14.9	9.29	0.93	-108	0.7	5.0	10.20	Slightly tan-brown/clear
128-D	125.2-145.2	02-May-13	15:35	140	16.3	8.85	0.30	-246	0.8	3.5	12.54	Sulfur/degradation odor
EW-01-Upper	21.60 - 45.92	16-May-13	16:09	375	15.3	7.65	0.45	-92	0.8	7.0	9.50	Clear, No Odor
		17-Jul-13	15:00	200	19.6	7.57	0.39	200	0.4	--	--	Clear, No Odor
		02-Aug-13	10:25	200	17.3	7.33	0.42	-2	1.6	3.0	7.33	Clear, No Odor
		15-Aug-13	11:15	250	17.4	7.58	0.44	40	0.5	3.0	9.25	Clear, No Odor
		28-Aug-13	10:30	200	18.6	7.39	0.42	50	0.9	2.5	--	Clear, No Odor
		13-Sep-13	11:05	200	17.1	7.56	0.45	-8	0.8	3.5	--	Clear, No Odor
		25-Sep-13	10:20	200	16.0	8.15	0.42	3	0.5	3.5	--	Clear, No Odor
EW-01-Lower	50.69 - 75.00	17-Jul-13	10:08	375	19.7	8.97	0.92	239	1.6	1.6	--	Clear, No Odor
		01-Aug-13	16:30	200	17.2	9.00	0.77	-118	0.9	2.0	--	
		15-Aug-13	9:50	300	15.9	8.98	0.84	-61	0.4	3.0	--	Clear, No Odor
		28-Aug-13	11:40	300	16.8	8.82	0.82	-173	0.3	5.0	--	Clear, No Odor
		13-Sep-13	9:30	250	15.8	8.84	0.93	-141	1.2	3.0	--	Goldish brown, No Odor
25-Sep-13	12:05	200	14.5	9.38	0.90	-49	0.4	3.8	--			
IW-01-Upper	19.90-44.90	14-May-13	12:30	275	15.4	7.94	0.45	73	0.7	7.0	9.64	Clear, No Odor
IW-01-Lower	49.70-74.20	14-May-13	16:31	360	15.1	8.57	0.81	8	0.7	--	9.73	Clear, No Odor
IW-02-Upper	21.60-45.92	04-Jun-13	12:33	360	16.7	7.60	0.35	-81	1.5	5.7	8.38	Clear, No Odor
IW-02-Lower	50.69-75.00	15-May-13	15:00	200	16.0	8.87	0.91	-118	0.9	2.5	9.22	Slightly turbid/gray
IW-03-Upper	21.10-45.42	15-May-13	12:20	350	15.1	7.29	0.53	117	1.2	6.0	9.62	Clear, No Odor
IW-03-Lower	50.19-75.50	16-May-13	12:22	370	16.3	9.03	0.98	-55	0.8	12.5	9.62	Slight tan/yellow
ML02-1	14.42-14.92	14-May-13	10:00	200	15.0	6.85	0.31	109	1.5	2.5	9.70	Clear, No Odor
		31-Jul-13	12:10	240	17.8	8.93	0.42	-133	1.0	4.0	--	Clear, No Odor
		27-Aug-13	10:10	190	18.1	6.94	0.39	-151	0.7	2.1	--	Clear, very slight sulfur odor
ML02-6	24.39-24.89	14-May-13	11:28	200	15.7	7.77	0.40	-5	0.8	4.0	9.69	Light brown/turbid
		31-Jul-13	13:35	180	17.3	9.63	0.38	-97	0.7	3.0	--	Very clear, no odor.
		27-Aug-13	11:10	175	17.1	7.71	0.39	-82	0.5	2.2	--	Clear, no odor.
		24-Sep-13	10:35	200	15.5	9.00	0.38	-31	0.6	2.5	--	Clear, no odor.
ML02-5	34.36-34.86	14-May-13	12:45	200	16.3	8.35	0.37	-106	0.7	2.5	9.71	Slightly brown, Slightly turbid
		17-Jul-13	11:00	200	17.3	8.28	0.35	-107	0.3	3.0	8.23	Slightly turbid, gray
		31-Jul-13	15:25	180	18.2	10.02	0.36	-170	0.6	2.4	--	Clear, No Odor
		14-Aug-13	10:25	190	17.1	8.10	0.36	-72	0.7	3.0	--	Clear, very slight sulfur degradation odor
		27-Aug-13	12:25	200	17.3	8.04	0.37	-166	0.5	2.4	--	Clear, No Odor
		12-Sep-13	9:35	160	20.7	7.35	0.71	-160	1.1	1.4	--	Clear, No Odor
24-Sep-13	11:15	200	15.3	7.98	1.10	-143	0.6	2.5	--	Slight pale yellow, no odor		

**TABLE 2
FIELD PARAMETER RESULTS
Pompton Lakes Works
Pompton Lakes, New Jersey**

Well Identifier	Well Screen Interval (ft bgs)	Date Sampled	Time	Flow Rate (ml/m)	Temperature (°C)	pH	Conductivity (µs)	ORP (mV)	Dissolved Oxygen (mg/L)	Volume Purged (gal)	Water Level (ft btoc)	Comments
ML02-4	44.39-44.89	14-May-13	15:00	200	16.5	8.80	0.47	-97	1.0	--	9.69	Clear, No Odor
		17-Jul-13	11:40	200	18.0	8.57	0.95	-46	0.4	2.5	8.18	Slightly turbid, Gray
		01-Aug-13	10:45	180	18.2	7.83	1.04	-310	0.9	3.0	--	Slightly yellow, sulfur degradation odor
		14-Aug-13	11:35	180	17.0	7.94	0.91	-173	0.6	3.0	--	Clear, very slight yellow brown, sulfur degradation odor
		27-Aug-13	13:55	180	17.1	7.80	0.82	-230	0.4	2.7	--	Clear, very slight yellow brown, sulfur degradation odor
		12-Sep-13	10:40	145	20.3	7.47	0.99	-203	1.1	1.8	--	Clear, No Odor
ML02-3	54.38-54.88	24-Sep-13	12:00	200	15.1	7.78	0.99	-205	0.4	2.0	--	Slight pale yellow, no odor
		14-May-13	16:00	200	15.9	9.55	0.77	-119	0.9	--	9.69	Clear, No Odor
		17-Jul-13	12:30	300	17.4	9.17	1.14	-271	0.1	2.5	8.03	Clear, No Odor
		01-Aug-13	12:05	190	17.3	8.97	1.12	-320	0.7	3.0	--	Clear, slight yellow, sulfur degradation odor
		14-Aug-13	13:00	160	17.4	8.94	0.97	-217	0.5	2.5	--	Clear, very slight yellow, sulfur degradation odor
		28-Aug-13	10:10	200	19.3	8.66	0.88	-210	0.4	2.5	--	Slight pale yellow, no odor
ML02-2	64.40-64.90	12-Sep-13	12:00	170	21.0	8.00	1.15	-194	1.0	1.7	--	Clear, No Odor
		24-Sep-13	12:45	200	16.2	9.46	0.98	-179	0.3	2.5	--	Pale amber color, organic odor
		15-May-13	11:10	200	15.1	8.50	0.80	16	1.3	2.5	9.69	Slightly turbid, gray
		17-Jul-13	13:25	300	17.3	9.10	0.93	-144	0.2	2.5	8.25	Clear, No Odor
		01-Aug-13	15:05	170	17.4	8.69	0.93	-219	1.1	3.5	--	Slight yellow, sulfur degradation odor
		14-Aug-13	14:55	185	18.1	8.84	0.86	-293	0.3	4.0	--	Clear, sulfur degradation odor
ML02-7	74.45-74.95	28-Aug-13	11:15	200	18.6	8.52	0.78	-240	0.7	3.0	--	Slight pale yellow, No odor
		12-Sep-13	14:50	180	19.2	8.26	0.91	-204	1.0	2.9	--	Clear, No Odor
		24-Sep-13	13:35	200	16.1	9.82	0.98	-215	0.5	2.5	--	Slight amber color, slight organic odor
		15-May-13	13:20	200	16.8	8.83	1.82	-108	0.9	2.5	9.71	Slightly turbid/gray
		17-Jul-13	14:15	300	16.6	8.97	1.80	-135	0.1	2.5	8.38	Clear, No Odor
		02-Aug-13	10:05	190	18.2	8.38	1.80	-143	0.9	3.5	--	Medium brown to gold, No Odor
ML04-1	14.62-15.12	14-Aug-13	16:10	195	18.0	8.89	1.79	-169	0.3	3.5	--	Yellow-gold, sulfur degradation odor
		28-Aug-13	12:10	200	19.3	8.77	1.92	-139	0.4	3.0	--	Amber colored, mineral odor
		12-Sep-13	16:00	155	19.0	8.75	1.84	-132	0.7	2.4	--	Brown, no odor
		14-Sep-13	14:30	200	16.6	10.07	1.92	-138	0.3	2.5	--	amber, organic odor
ML04-6	24.69-25.19	16-May-13	12:00	200	16.7	7.49	0.38	-105	0.7	2.5	9.18	Clear, No Odor
		31-Jul-13	13:25	170	18.3	8.29	0.38	-137	0.9	3.0	--	Clear, No Odor
		27-Aug-13	11:10	200	18.3	8.23	0.39	-127	0.4	3.0	--	Clear, No Odor
		24-Sep-13	12:05	195	15.8	8.33	0.42	-113	0.7	3.0	--	Clear, No Odor

**TABLE 2
FIELD PARAMETER RESULTS
Pompton Lakes Works
Pompton Lakes, New Jersey**

Well Identifier	Well Screen Interval (ft bgs)	Date Sampled	Time	Flow Rate (ml/m)	Temperature (°C)	pH	Conductivity (µs)	ORP (mV)	Dissolved Oxygen (mg/L)	Volume Purged (gal)	Water Level (ft btoc)	Comments
ML04-5	34.59-35.09	16-May-13	12:55	200	18.3	8.21	0.41	-118	0.5	2.5	9.20	Clear, No Odor
		31-Jul-13	15:15	170	20.7	8.22	0.42	-156	0.7	2.0	--	Clear, No Odor
		27-Aug-13	12:05	200	18.7	8.01	0.49	-156	0.3	3.0	--	Clear, No Odor
		24-Sep-13	13:45	210	17.0	8.06	0.56	-148	0.5	3.3	--	Clear, No Odor
ML04-4	44.32-44.82	11-May-13	14:45	160	18.9	8.80	0.47	-165	0.4	3.5	9.20	Silty, gray-black, no odor
		01-Aug-13	10:25	150	16.4	8.26	0.86	-103	1.2	3.0	--	Clear, No Odor
		27-Aug-13	12:55	200	18.3	8.22	1.06	-126	0.4	3.0	--	Slight pale yellow, no odor
		24-Sep-13	14:50	165	17.6	8.34	1.00	-113	0.6	2.4	--	Slight gold-brown, no odor
ML04-3	54.62-55.12	16-May-13	16:05	200	19.8	9.13	0.80	-130	0.6	2.5	9.19	Gray/turbid
		01-Aug-13	11:50	150	15.7	8.89	0.92	-148	1.0	3.0	--	Slight pale yellow, no odor
		27-Aug-13	13:55	200	19.1	8.97	1.15	-140	0.4	2.5	--	Slight pale yellow, no odor
		24-Sep-13	15:45	200	17.0	8.98	1.03	-152	0.4	2.4	--	
ML04-2	64.66-65.16	17-May-13	10:25	200	15.3	8.47	1.06	-138	0.6	2.5	9.18	Gray/turbid
		01-Aug-13	14:20	150	16.7	8.59	1.00	-70	0.9	6.0	--	Slight pale yellow, no odor
		27-Aug-13	14:40	200	18.4	8.91	0.90	-87	0.8	3.0	--	Slight pale yellow, no odor
		25-Sep-13	9:30	200	15.2	8.90	1.04	-172	1.6	3.0	--	Clear, No Odor
ML04-7	74.75-75.25	17-May-13	11:50	200	15.6	8.91	1.60	-157	0.3	2.5	9.22	Turbid, brown
		01-Aug-13	15:35	150	15.9	8.77	1.58	-198	0.9	3.0	--	Clear, slight sulfur degradation odor
		27-Aug-13	15:30	200	19.1	9.11	1.50	-161	0.3	2.5	--	Slight pale brown, mineral odor
		25-Sep-13	10:35	200	15.7	9.18	1.57	-150	2.3	2.6	--	Slight pale brown, mineral odor

Notes:

-- - not available

°C - degrees Celsius

ft btoc - feet below top of casing

GMW - groundwater monitoring well

µmhos/cm - micromhos per centimeter

mg/L - milligrams per liter

mL - milliliters

ml/m - milliliter per minute

mV - millivolts

NTU - Nephelometric Turbidity Units

ORP - oxidation reduction potential

TDS - total dissolved solids

**TABLE 3
SELECT TARGET COMPOUND RESULTS - EISB PILOT STUDY
Pompton Lakes Works
Pompton Lakes, New Jersey**

Location	Screen Interval (ft bgs)	Sample Event	Sampling Date	VOCs										DHGs			Other				
				1,1,1 TCA	1,1-DCA	1,1-DCE	1,2-DCA	CT	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC	Ethane	Ethene	Methane	Bromide	Chloride	Sulfate	Sulfide	TOC
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
ML04-5	34.59-35.09	Baseline - May/June 2013	16-May-13	<0.2	<0.2	0.5 J	<0.2	<0.2	7.8	32	44	23	1.3	<1.0	<1.0	3.4 J	<2.0	30.5	25.9	--	--
		Monthly - July/Aug 2013	31-Jul-13	<0.1	0.4 J	0.7	<0.1	<0.1	17	32	61	22	12	--	--	--	--	--	--	--	2.3
ML04-4	44.32-44.82	Baseline - May/June 2013	16-May-13	0.4 J	0.4 J	1.1 J	<0.3	<0.3	39	70	75	38	4.2	<1.0	<1.0	7.4	<2.0	28.9	37.5	--	--
		Monthly - July/Aug 2013	1-Aug-13	<0.5	2.4 J	2.7	<0.5	<0.5	36	91	350	85	95	4.6 J	5.1	680	--	--	--	--	3.8
ML04-3	54.62-55.12	Baseline - May/June 2013	16-May-13	<0.1	0.3 J	0.6	<0.1	<0.1	1.7	17	64	23	7.7	<1.0	<1.0	110	<2.0	45.3	44.7	--	--
		Monthly - July/Aug 2013	1-Aug-13	<0.5	2.5	3.2	<0.5	<0.5	3.4	72	400	140	88	3.9 J	3.8 J	460	--	--	--	--	4.6
ML04-2	64.66-65.16	Baseline - May/June 2013	17-May-13	<0.2	1.5	1.9	<0.2	<0.2	3.8	24	200	62	45	20	31	4100	<2.0	118	31.9	--	--
		Monthly - July/Aug 2013	1-Aug-13	<1.0	7	7.7	<1.0	<1.0	<1.0	33	1300	430	280	11	16	1700	--	--	--	--	7.9
ML04-7	74.75-75.25	Baseline - May/June 2013	17-May-13	<0.5	1.7 J	1.2 J	<0.5	<0.5	<0.5	4.6	220	35	150	5.4	11	2700	<2.0	64.9	34.5	--	--
		Monthly - July/Aug 2013	1-Aug-13	<0.2	1.7	0.7 J	<0.2	<0.2	<0.2	0.4 J	100	6.3	170	5.7	12	2400	--	--	--	--	16.1

Notes:

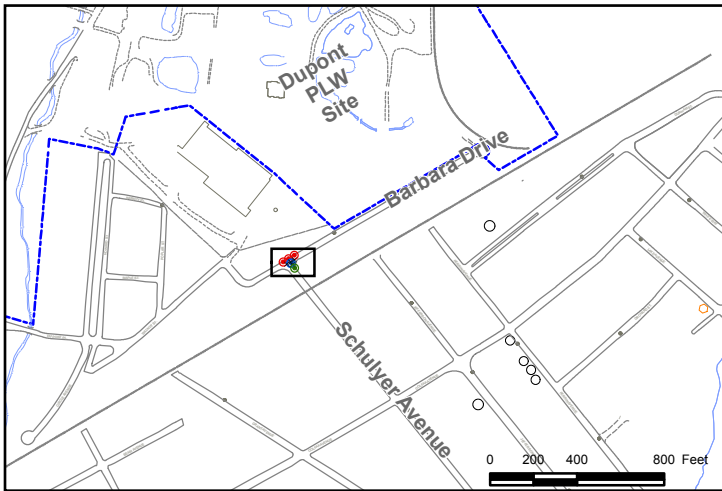
< Less than the laboratory reporting limit shown
 -- Analyte not measured

Laboratory-Assigned Qualifiers

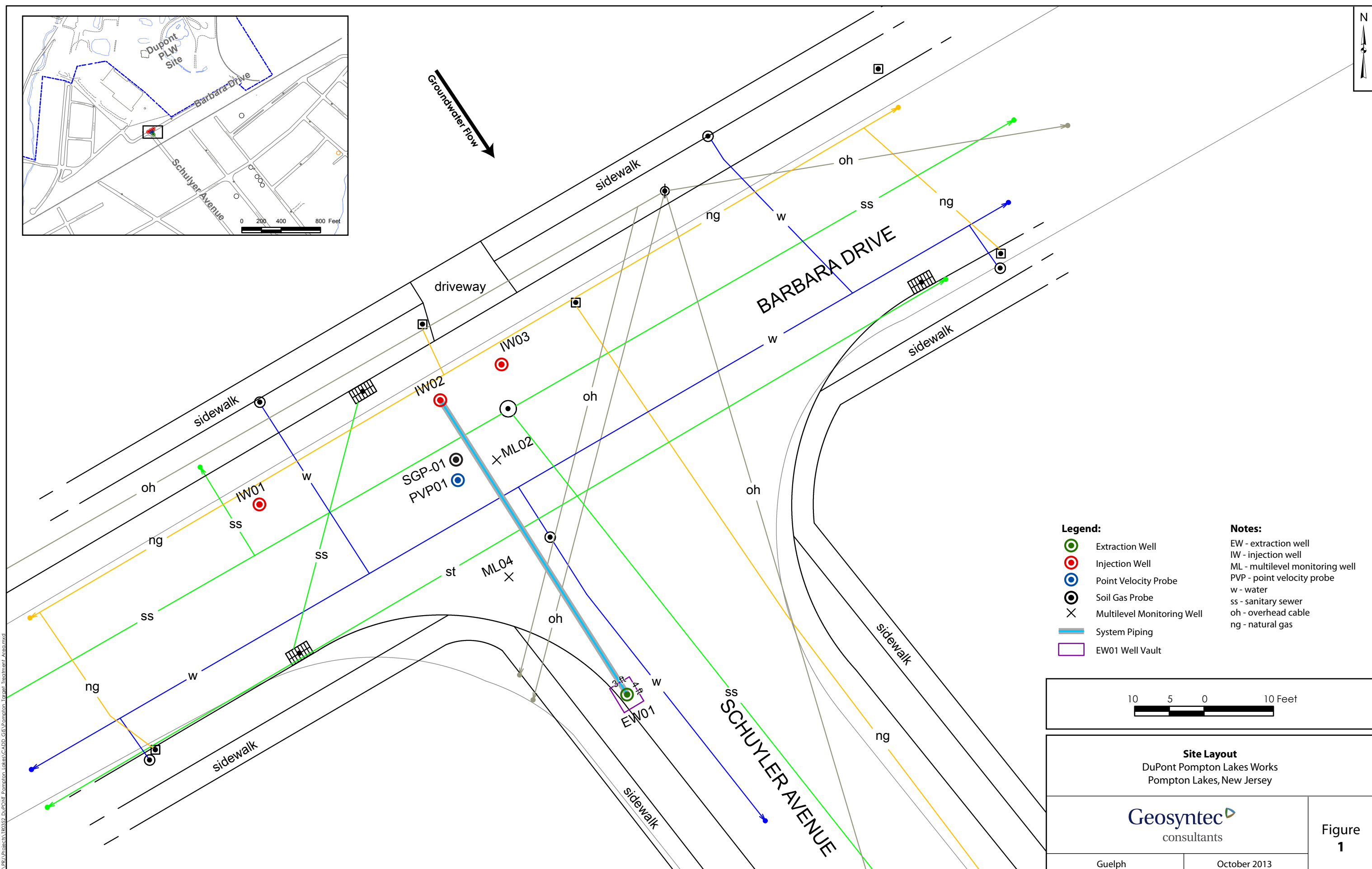
J Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).
 R Associated MS and/or MSD analysis had relative percent recovery values less than the data rejection level. The reported non-detect result is unusable.

Definitions

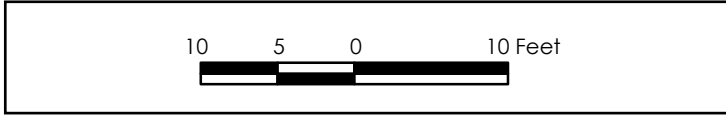
ft bgs feet below ground surface
 CT carbon tetrachloride
 cis-1,2-DCE cis-1,2-dichloroethene
 1,1-DCA 1,1-dichloroethane
 1,2-DCA 1,2-dichloroethane
 1,1-DCE 1,1-dichloroethene
 DHG dissolved hydrocarbon gases
 mg/L milligrams per liter
 µg/L micrograms per liter
 PCE tetrachloroethene
 trans-1,2-DCE trans-1,2-dichloroethene
 1,1,1-TCA 1,1,1-trichloroethane
 TCE trichloroethene
 TOC total organic carbon
 VC vinyl chloride
 VOC volatile organic compounds



Groundwater Flow



- Legend:**
- Extraction Well
 - Injection Well
 - Point Velocity Probe
 - Soil Gas Probe
 - Multilevel Monitoring Well
 - System Piping
 - EW01 Well Vault
- Notes:**
- EW - extraction well
 - IW - injection well
 - ML - multilevel monitoring well
 - PVP - point velocity probe
 - w - water
 - ss - sanitary sewer
 - oh - overhead cable
 - ng - natural gas



Site Layout
 DuPont Pompton Lakes Works
 Pompton Lakes, New Jersey

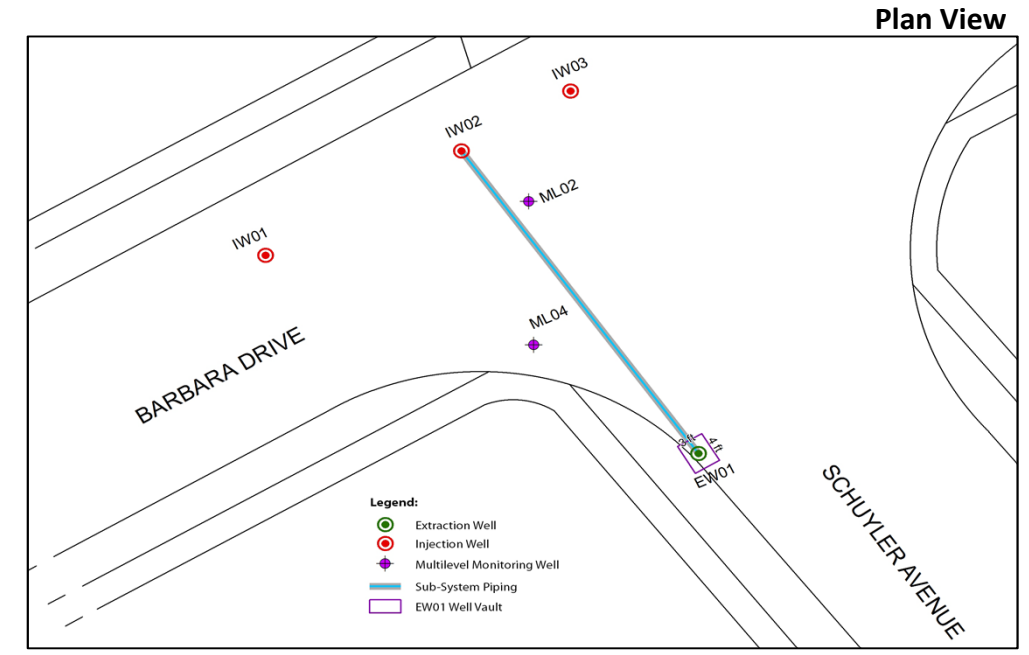
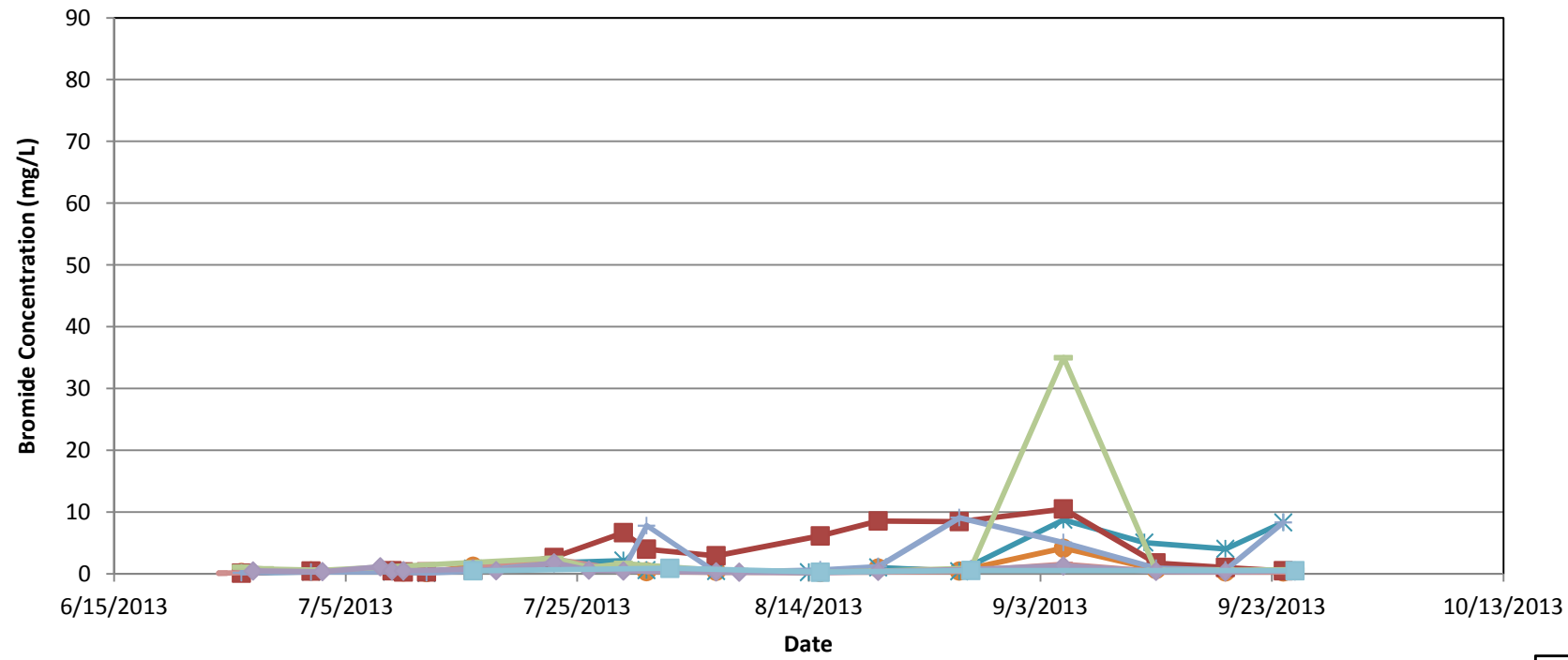
Geosyntec
 consultants

Figure 1

Guelph October 2013

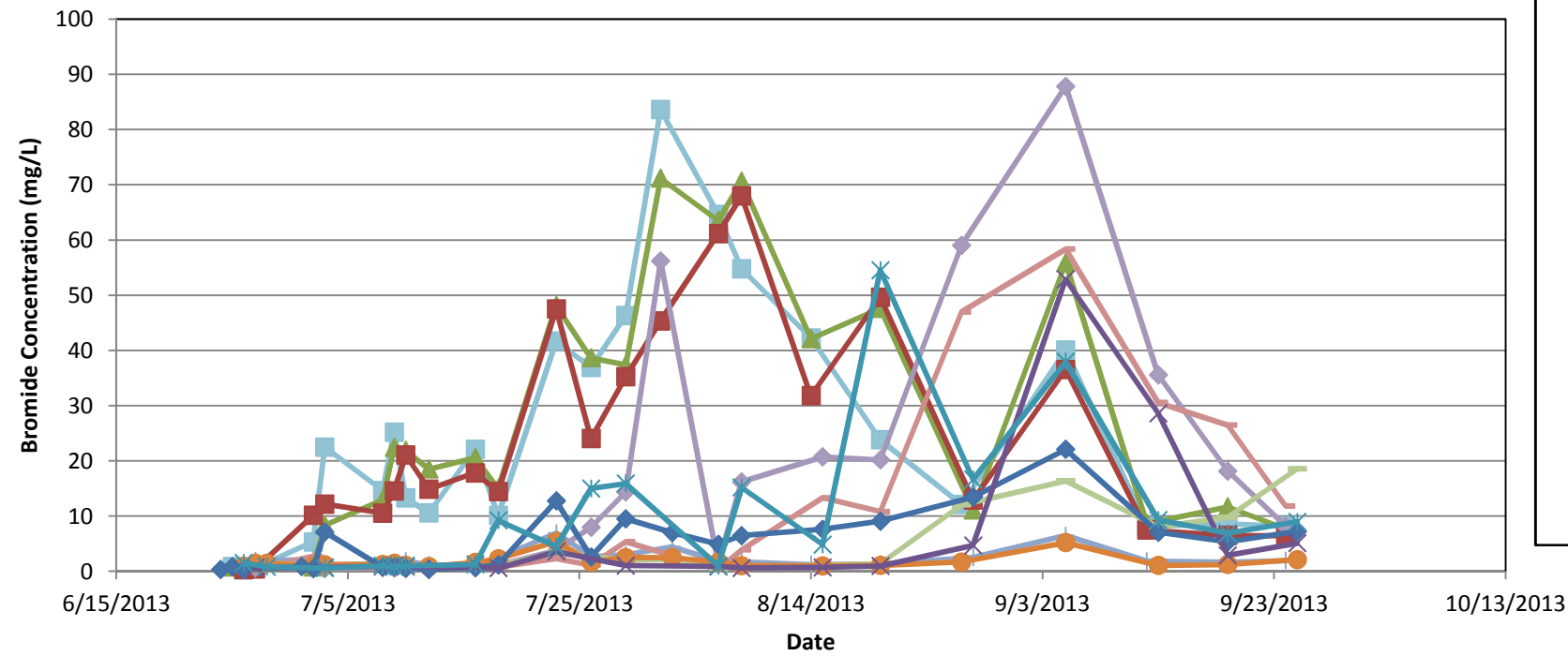
Proposed In-Situ Pilot Study Layout.dwg
 Date: 10/23/13
 User: Guelph
 Project: DuPont PLW Site
 Location: Pompton Lakes, NJ
 Scale: 1" = 100'

Upper Aquifer



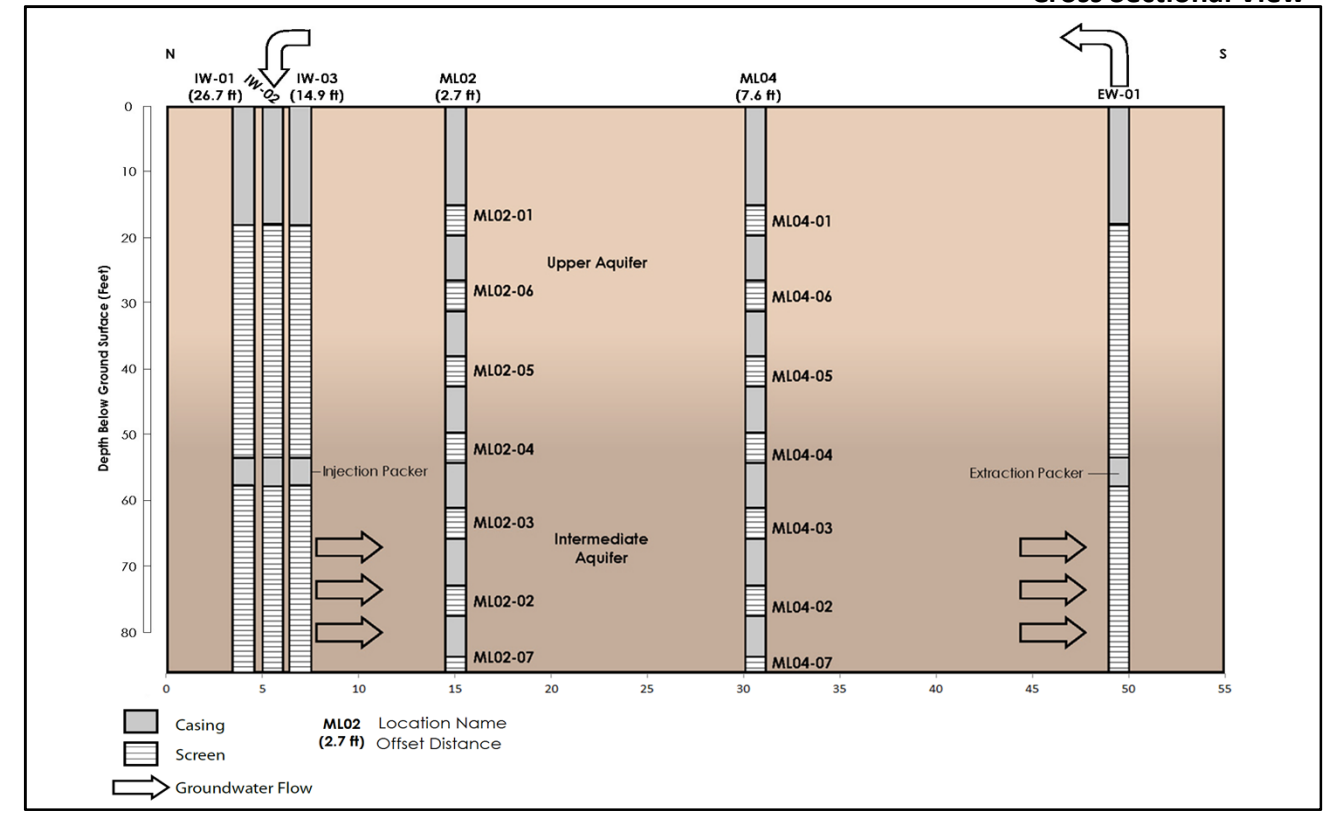
- ML02-06 (24.39 ft bgs)
- ML02-05 (34.36 ft bgs)
- ML04-01 (14.62 ft bgs)
- ML04-06 (24.69 ft bgs)
- ML04-05 (34.59 ft bgs)
- IW03 Upper
- IW01 Upper
- EW01 Upper

Intermediate Aquifer



- ML02-04 (44.39 ft bgs)
- ML02-03 (54.38 ft bgs)
- ML02-02 (64.40 ft bgs)
- ML02-07 (74.45 ft bgs)
- ML04-04 (44.32 ft bgs)
- ML04-03 (54.62 ft bgs)
- ML04-02 (64.66 ft bgs)
- ML04-07 (74.75 ft bgs)
- EW01 Lower
- IW01 Lower
- IW03 Lower

Cross Sectional View



Field Measured Bromide Concentrations, Pilot Test
Pompton Lakes Works, Pompton Lakes, New Jersey



Guelph October-2013

Figure
2

P:\P10\Projects\180852_Durham\Pompton_Lakes\128181M\Phase 2 - ESB\Operation\Bromide\Tracer Test Br Data 2013\09_30.xlsx Bromide-Alt