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GHD Reference No: 007987

August 31, 2021

Mr. Brian Sadowski
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999

Addendum
Operation and Monitoring Report
June 2020 to May 2021
Gratwick Riverside Park
North Tonawanda, New York

Dear Mr. Sadwoski

This letter provides an addendum to the Operation and Monitoring Report (O&M Report) for the period June 2020 to May 2021 regarding the Gratwick-Riverside Park Site in North Tonawanda, New York (Site) submitted to New York State Department of Environmental Conservation (NYSDEC) on August 2, 2021.

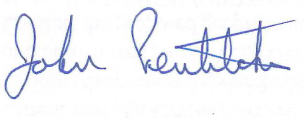
The purpose of this addendum is to present the results of groundwater quality monitoring conducted at monitoring well MW-6 on August 16, 2021. This well nest was inadvertently missed during the April 2021 sampling event, as noted in the O&M Report. The locations of MW-6 and other monitoring wells are shown on Figure 1. The sample was collected and submitted for analysis for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs in accordance with the procedures presented in report entitled "Operation and Maintenance Manual" (O&M Manual) dated March 2002 (revised January 2004, May 2009, and June 2014). The analytical results for the sample collected from MW-6 are presented in Table 1. A Quality Assurance/Quality Control (QA/QC) Review/Data Usability Summary is provided in Attachment A. A graph of historical results for this well is presented on Figure 2.

The total VOC (TVOC) concentrations for MW-6 shown on Figure 2 had been less than 5 microgram per liter (µg/L) since May 2007, but increased in recent years, rising to 104 µg/L in 2020. The TVOC concentration in the sample collected on August 16, 2021 was 2.3 µg/L, a significant decrease since 2020. The total SVOC (TSVOC) concentrations, previously low level, had increased to 5,206 µg/L in 2020. This increase was primarily due to rising phenol concentrations. The reason for this increase is unknown; however, it was likely due to flushing contaminants towards the Groundwater Withdrawal System (GWS). The TSVOC concentration in the sample collected on August 16, 2021 was 15.5 µg/L, a significant decrease since 2020. Phenol was not detected. The decrease in TVOC and TSVOC concentrations are likely due to the GWS cleaning activities conducted in 2020 as discussed in the O&M Report.

These results support the conclusions presented in the O&M Report and further demonstrate the effectives of the GWS cleaning activities conducted in 2020.

Should you have any questions on the above, please contact Chelsea Spahr or me.

Regards



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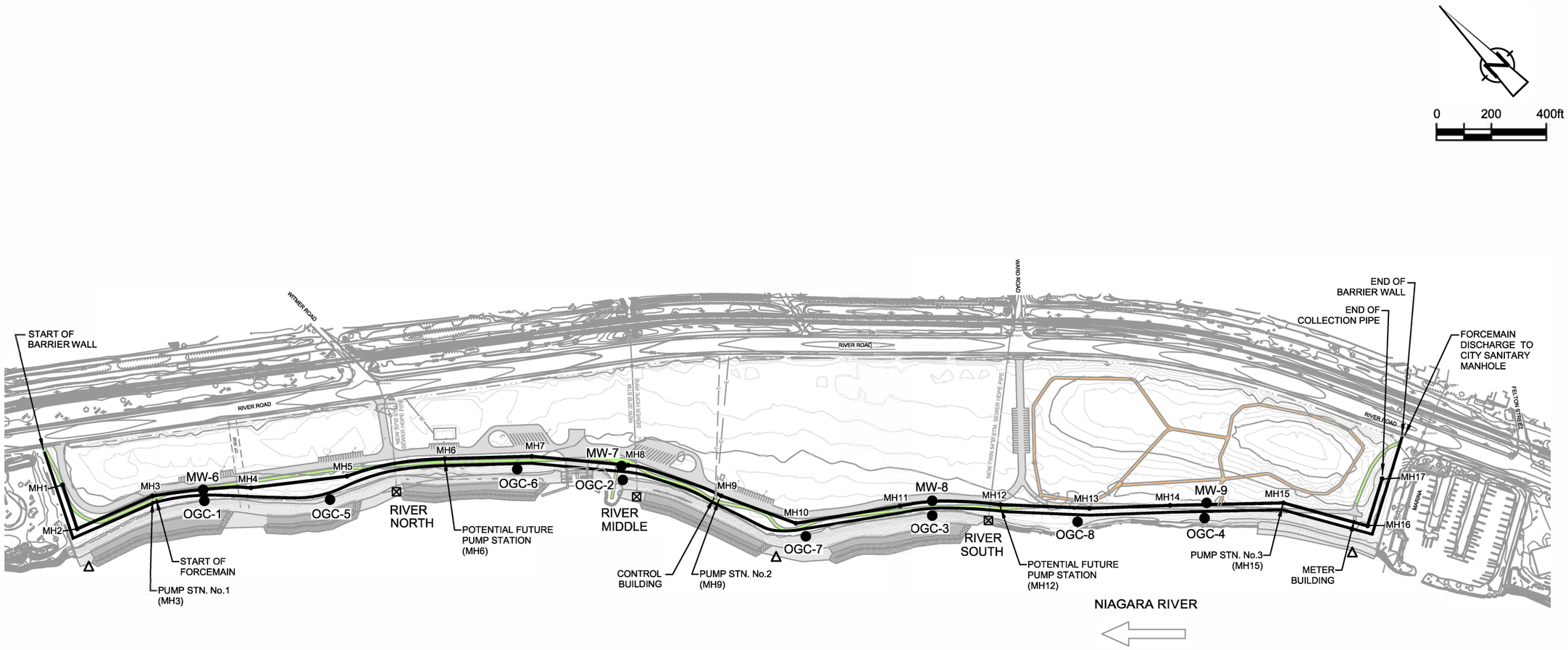
Copy to: Chelsea Spahr (City of North Tonawanda)



LEGEND

- BARRIER WALL
- MH11 — GROUNDWATER COLLECTION SYSTEM
- ● OGC-1 / MW-1 — MONITORING WELL LOCATION
- ⊠ RIVER SOUTH — SURFACE WATER LEVEL MONITORING LOCATION
- △ — SURFACE WATER CHEMICAL MONITORING LOCATION (NO SAMPLING AFTER APRIL 2008)

figure 1

MONITORING NETWORK
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

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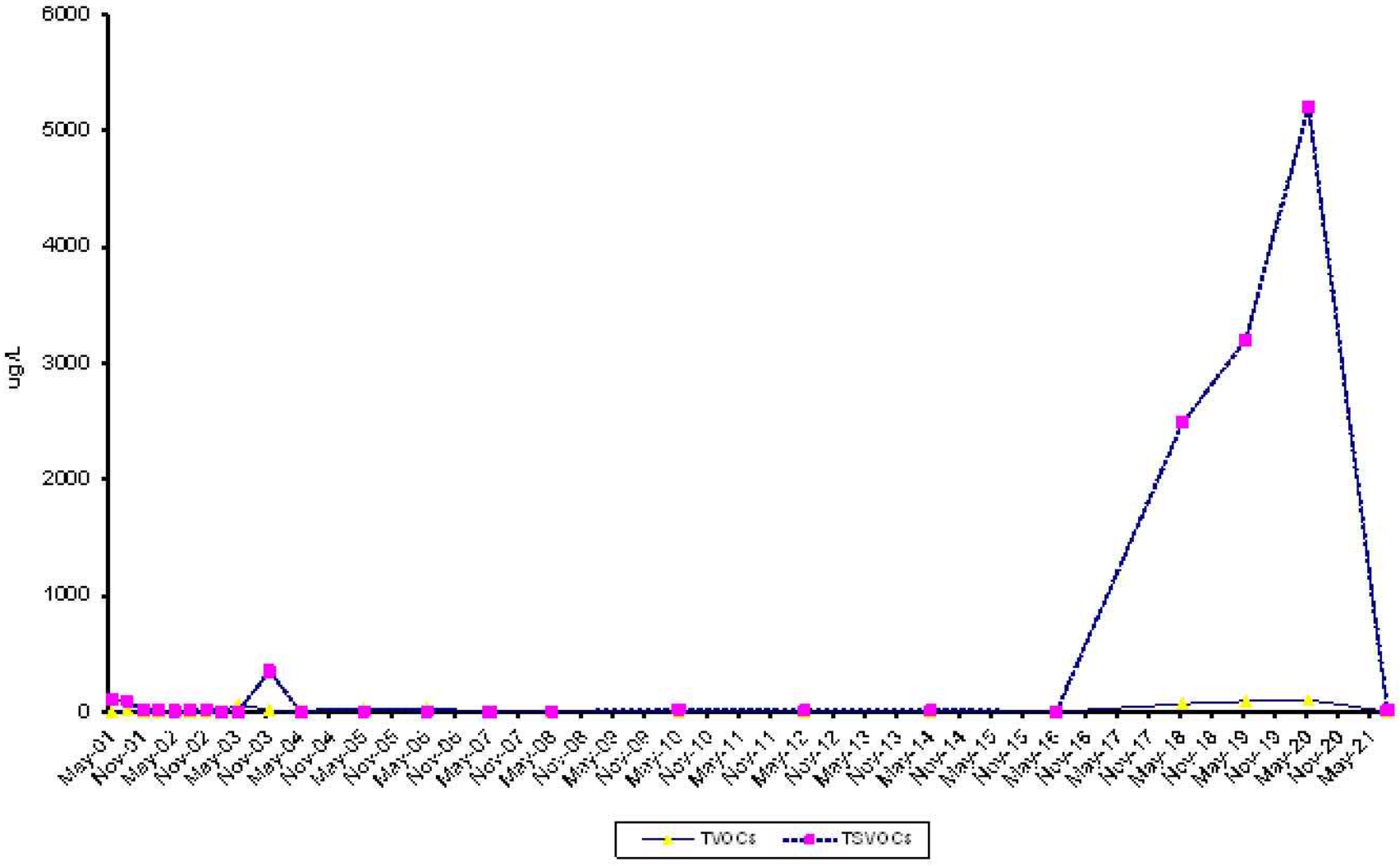

figure 2

MW-6 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

N:\CA\Waterloo\Projects\662\007987\Digital_Design\ACAD\Figures\RPT-050\007987-GHD-0000-RPT-EN-0102_WA-001.DWG Plot Date: Aug 31, 2021

Table 1

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		GW-6S		MW-6											
Date		**12/15/1987**	**08/10/88**	**05/18/01**	**08/21/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**05/14/04**	**05/27/05**
Volatiles (µg/L)	**Class GA Level**														
Acetone	50	684	4.9J						4.4J			44		6.7	13
Benzene	1	3			0.64J			0.65J	0.59J	0.56J		0.57J			
2-Butanone	50														
Chlorobenzene	5		3.3J		1.5J	1.3J		0.65J		0.54J		0.81J		0.37J	
trans-1,2-Dichloroethene	5	58	4.4J		1.1J			0.37J	0.32J	0.34J		1.4		0.52J	
Ethylbenzene	5	2			0.21J										
Methylene Chloride	5						1.8J								2.1
Tetrachloroethene	5	43			0.44J							0.67J		0.25J	
Toluene	5	16	3.0J		2.2J	0.29J		1.3	0.91J	1.1		2.1	3.6	0.92J	
Trichloroethene	5	62	5.1J		2.0J		1.2J		1.1	1.5	3.2	14	12	3.7	1.5
Vinyl Chloride	2	11	1.7J					0.29J	0.24J	0.22J		0.52J			
Total Xylenes	5	7			0.90J	0.44J		0.36J	0.27J						
Semi-Volatiles (µg/L)															
1,2-Dichlorobenzene	3*														
1,4-Dichlorobenzene	3*			1J		0.7J	2J						2J		
2,4-Dimethylphenol	50	5		5J	5J	3J	2J	1J	0.9J	9J			6J		
2-Methylphenol	NL	3		5J	6J	2J	2J	2J	1J	0.9J			5J		
4-Methylphenol	NL	4		15	13	5J	4J	3J	2J	2J			12		
Naphthalene	10			67	69		1J		14	13			76		5J
Di-n-octyl phthalate	50						2J								
Phenol	1	3		14	4J	2J	0.8J						250		

Notes:

* Applies to sum of compounds
NL - Not listed
Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 1

Summary of Detected Compounds
Site Groundwater and River Water
Gratwick-Riverside Park
North Tonawanda, New York

Location		MW-6										
Date		**05/30/06**	**05/24/07**	**05/29/08**	**05/26/10**	**05/30/12**	**05/29/14**	**05/26/16**	**05/27/16**	**5/23/2018**	**5/29/2019**	**5/11/2020**	**08/16/21**
Volatiles (µg/L)	**Class GA Level**												
Acetone	50	31								8.6J	11		
Benzene	1									1.7	1.8		
2-Butanone	50												
Chlorobenzene	5									7.5	10	17 J	0.77 J
trans-1,2-Dichloroethene	5									8.8	11		
Ethylbenzene	5									0.54J			
Methylene Chloride	5												
Tetrachloroethene	5				0.55J					3.4	6.3	11 J	
Toluene	5				0.73J					16	22	32	0.75 J
Trichloroethene	5	1.2	0.97J		2.3J	0.66J	1.0			20	28	44	0.78 J
Vinyl Chloride	2										1.5		
Total Xylenes	5									1.6J	1.7 J		
Semi-Volatiles (µg/L)													
1,2-Dichlorobenzene	3*				0.66J							8.1 J	0.46 J
1,4-Dichlorobenzene	3*		0.8J	0.6J	4.2J	2.9J	2.9J		1.5J	28J	73 J	140	6.4 J
2,4-Dimethylphenol	50				1.4J	1.4J	1.0J		0.87J	36J	59 J	92	2.7 J
2-Methylphenol	NL		0.5J	0.3J	1.8J	0.71J	1.1J		0.47J	31J	46 J	66	2.0 J
4-Methylphenol	NL	1J	1J		2.5J	1.3J	1.0J			93	120 J	200	3.9 J
Naphthalene	10		2J	1J	7.8J	3.9J			2.0J				
Di-n-octyl phthalate	50												
Phenol	1	2J	0.6J	0.4J	1.9J		4.4J			2300	2900	4700	

Notes:

* Applies to sum of compounds
NL - Not listed
[ ] Exceeds Class GA Level
NS - Not Sampled
J - Estimated
Blank = Non-Detect

Attachments

Attachment A

QA/QC Review and Data Usability Summary

Technical Memorandum

September 17, 2021

To	John Pentilchuk	**Tel**	315-802-0343
Copy to	Sue Scrocchi	**Email**	Linda.Waters@ghd.com
From	Linda Waters/cs/40-NF	**Ref. No.**	007987
Subject	Analytical Results and Full Validation Annual Groundwater Monitoring – Additional Sample Gratwick-Riverside Park North Tonawanda, New York August 2021		

1. Introduction

This document details a validation of analytical results for an additional groundwater sample collected in support of the Annual Groundwater Monitoring program at the North Tonawanda Gratwick – Riverside Park site during August 2021. The sample was submitted to Eurofins TestAmerica Laboratory located in Amherst, New York. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, raw data, chain of custody form, calibration data, blank data, recovery data from surrogate spikes/laboratory control samples (LCS) and a field quality assurance/quality (QA/QC) sample. The assessment of analytical and in house data included checks for: data consistency (by observing comparability of duplicate analyses), adherence to accuracy and precision criteria, and transmittal errors.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the document entitled: "USEPA National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-2016-002, September 2016 and will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in Table 3. The sample chain of custody document and analytical report were used to determine sample holding times. The sample was prepared and analyzed within the required holding times.

The sample was properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Gas Chromatography/Mass Spectrometer (GC/MS) – Tuning and Mass Calibration (Instrument Performance Check)

Prior to volatile organic compound (VOC) and semi-volatile organic compound (SVOC) analysis, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, methods require the analysis of specific tuning compounds bromofluorobenzene (BFB) and decafluorotriphenylphosphine (DFTPP), respectively. The resulting spectra must meet the criteria cited in the methods before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

Tuning compounds were analyzed at the required frequency throughout VOC and SVOC analysis periods. All tuning criteria were met indicating that proper optimization of the instrumentation was achieved.

4. Initial Calibration

To quantify VOCs and SVOCs of interest in samples, calibration of the GC/MS over a specific concentration range must be performed. Initially, a five-point calibration curve containing all compounds of interest is analyzed to characterize instrument response for each analyte over a specific concentration range. Linearity of the calibration curve and instrument sensitivity are evaluated against the following criteria:

1. All relative response factors (RRFs) must be greater than or equal to 0.050 (with the exception of compounds that exhibit poor response).
2. The percent relative standard deviation (%RSD) values must not exceed 20.0 percent (with the exception of compounds that exhibit poor response) or a minimum coefficient of determination (R^2) of 0.99 if linear and quadratic regression calibration curves are used.

The initial calibration data for VOCs and SVOCs were reviewed. All compounds met the above criteria for sensitivity and linearity.

5. Continuing Calibration

To ensure that instrument calibration for VOC and SVOC analyses is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve every 12 hours.

The following criteria were employed to evaluate continuing calibration data:

1. All RRF values must be greater than or equal to 0.050 (with the exception of compounds that exhibit poor response)
2. Percent difference (%D) values must not exceed 20.0 percent (with the exception of compounds that exhibit poor response)

Calibration standards were analyzed at the required frequency, and the results met the above criteria for instrument sensitivity and stability.

6. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

7. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for VOC and SVOC determinations were spiked with the appropriate number of surrogate compounds prior to sample extraction and/or analysis.

Each individual surrogate compound is expected to meet the laboratory control limits with the exception of SVOC analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral or acid fractions is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries were within the laboratory criteria or met the criteria above.

8. Internal Standards (IS) Analyses

IS data were evaluated for all VOC and SVOC sample analyses.

To ensure that changes in the GC/MS sensitivity and response do not affect sample analysis results, IS compounds are added to each sample prior to analysis. All results are then calculated as a ratio of the IS responses.

The sample IS results were evaluated against the following criteria:

1. The retention time of the IS must not vary more than ±30 seconds (±10 seconds for VOCs) from the associated calibration standard.
2. IS area counts must not vary by more than a factor of two (-50 percent to +100 percent) from the associated calibration standard.

All organic IS recoveries and retention times met the above criteria.

9. Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects.

For this study, LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

10. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample.

10.1 Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for VOC analysis. All results were non-detect for the compounds of interest.

11. Analyte Reporting

The laboratory reported detected results down to the laboratory's sample-specific method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the sample-specific MDL were qualified as estimated (J) in Table 2. Non-detect results were presented as non-detect at the RL in Table 2.

12. Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra were evaluated according to the identification criteria established by the methods. The sample identified in Table 1 was reviewed. The organic compounds reported adhered to the specified identification criteria.

13. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable without qualification.

Regards,

Linda Waters

Linda Waters
Digital Intelligence – Data Validator - Chemist

Table 1

Sample Collection and Analysis Summary
Annual Groundwater Monitoring - Additional Sample
Gratwick-Riverside Park
North Tonawanda, New York
August 2021

					Analysis/Parameters		
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**Select VOCs**	**Select SVOCs**	**Comments**
WG-7987-081621-SG-001	MW6	Water	08/16/2021	09:15	X	X	MS/MSD
TB-7987-081621-SG	-	Water	08/16/2021	-	X		Trip Blank

Notes:

- - Not applicable
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
MS/MSD - Matrix Spike/Matrix Sprike Duplicate

Table 2

Analytical Results Summary
Annual Groundwater Monitoring - Additional Sample
Gratwick-Riverside Park
North Tonawanda, New York
August 2021

Location ID:	**MW6**
Sample Name:	**WG-7987-081621-SG-001**
Sample Date:	**08/16/2021**
Depth:	**--**

Parameters	**Unit**	
Volatile Organic Compounds		
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	5.0 U
Acetone	µg/L	5.0 U
Benzene	µg/L	0.70 U
Chlorobenzene	µg/L	0.77 J
Ethylbenzene	µg/L	1.0 U
Methylene chloride	µg/L	1.0 U
Tetrachloroethene	µg/L	1.0 U
Toluene	µg/L	0.75 J
trans-1,2-Dichloroethene	µg/L	1.0 U
Trichloroethene	µg/L	0.78 J
Vinyl chloride	µg/L	1.0 U
Xylenes (total)	µg/L	2.0 U
Semivolatile Organic Compounds		
1,2-Dichlorobenzene	µg/L	0.46 J
1,4-Dichlorobenzene	µg/L	6.4 J
2,4-Dimethylphenol	µg/L	2.7 J
2-Methylphenol	µg/L	2.0 J
4-Methylphenol	µg/L	3.9 J
Di-n-octyl phthalate (DnOP)	µg/L	10 U
Naphthalene	µg/L	10 U
Phenol	µg/L	10 U

Notes:

J - Estimated concentration

U - Not detected at the associated reporting limit

Table 3

Analytical Methods
Annual Groundwater Monitoring - Additional Sample
Gratwick-Riverside Park
North Tonawanda, New York
August 2021

Parameter	Method	Matrix	Holding Time	
			Collection to Extraction (Days)	Collection or Extraction to Analysis (Days)
Select VOCs	SW-846 8260	Water	-	14
Select SVOCs	SW-846 8270	Water	7	40

Notes:

- - Not applicable
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds

Method References:
SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions