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North Tonawanda, NY 14120-5493
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Dale W. Marshall, P. E.
City Engineer
Phone: **(716) 695-8565**
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August 31, 2017

Reference No. 007987

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

Dear Mr. Sadowski:

Re: Site Management Periodic Review Report
Gratwick-Riverside Park Site, North Tonawanda, New York

Pursuant to the New York State Department of Environmental Conservation (NYSDEC) letter dated April 19, 2017, attached is a PDF copy of the report entitled "Annual Operation and Monitoring Report, June 2016 to May 2017" (O&M Report). A hard copy will be provided. This report is being submitted as the Site Management Periodic Review Report (PRR) for the Gratwick-Riverside Park Site (Site) located in North Tonawanda, New York. It is noted that the due date for submission of the PRR was extended by the NYSDEC to August 31, 2017 via email dated April 20, 2017. This PRR documents the implementation of and compliance with the requirements of the Operation and Maintenance Manual (O&M Manual) dated March 2002 (revised January 2004, May 2009 and June 2014). The O&M Manual is currently being revised to include the updated procedures for the cleaning of the Groundwater Withdrawal System (GWS) manholes and piping. The O&M Manual includes the performance monitoring for the constructed remedy. NYSDEC approval for the O&M Manual was given on April 20, 2005. This is the 16th year of reporting for the Site since the implementation of the O&M program. Pursuant to the data presented in the PRR, the constructed remedy is achieving the remedial action objectives with the variances described in the O&M Report.

Also attached is the completed Institutional and Engineering Controls Certification Form which certifies that the NYSDEC listed institutional and engineering controls (ICs/ECs) are accurate as shown and are functioning properly. It is noted that the updated cleaning procedures being inserted in the O&M Manual will assist in maintaining the flow in the GWS.

The Site covers approximately 52.9 acres located adjacent to the Niagara River in the City of North Tonawanda, New York. The Site is bordered by River Road to the north, a private marina to the east, the River to the south, and a private residential area to the west. The Site is currently a public park with unrestricted access.

Construction of the remedial action was completed in June 2001 with final inspection performed in November 2001. Groundwater pumping began in May 2001. The description of the constructed remedy is presented in the report entitled "Remedial Action Construction Implementation" dated July 2002. The

Certificate of Completion dated March 17, 2008 was accepted by the NYSDEC on March 19, 2008, signifying that all remedial work has been completed.

The purpose and primary objective of the GWS is to collect groundwater that would otherwise migrate into the Niagara River by creating a hydraulic gradient from the River to the GWS. The remedial action system components at the Site that have associated O&M activities are as follows:

- Landfill cap
- Barrier slurry wall
- Groundwater withdrawal system (GWS) and discharge system
- Sloped-bank stabilization
- Post-RA system performance monitoring

A Work Plan was submitted on July 11, 2016 to address the black viscous material (BVM) in the GWS manholes and force main. In summary, the primary work performed included:

i) re-piping the three pumping stations so that they can be isolated for future cleaning

ii) cleaning the pumping stations with a 50:50 solution of muriatic acid and water

iii) cleaning the interior piping of the meter building with the acid solution

The re-piping and cleaning of the pumping stations was completed by December 29, 2016 and the cleaning of the meter building piping was completed on January 10, 2017.

Inspections of the landfill cap and sloped bank stabilization are performed monthly by GHD (consultant retained by the City). Any observed items requiring corrective actions are reported typically within three business days to the City of North Tonawanda which is responsible for the operation and maintenance of the Site.

The post-RA system performance monitoring program is conducted to collect the hydraulic and groundwater chemical data necessary to evaluate the effectiveness of the barrier wall and GWS and to track long-term trends in the groundwater chemistry. Performance monitoring of the barrier slurry wall is performed monthly by measuring river and groundwater levels to ensure that a gradient from the river to the GWS is maintained. Performance monitoring of the groundwater discharge system is performed in accordance with the City of North Tonawanda Industrial Wastewater Discharge Permit Number 2628011 which requires semi-annual collection and analyses of samples of the water that is discharged to the City of North Tonawanda WWTP. Groundwater samples are currently collected and analyzed annually from five wells and from an additional seven wells once every two years in accordance with the schedule in the modified O&M Manual to track the long-term trends in the groundwater concentrations. The May 2017 sample results show that no individual VOC compound had a concentration greater than its respective Class GA Level in 2 of the 5 wells sampled and in 2 of the 5 wells sampled for SVOCs. The total VOC and total SVOC concentrations decreased or were low level in the remaining wells except for TSVOC in MW-9 which increased slightly from the May 2016 result.

If you have any questions, please do not hesitate to contact the undersigned at 716-695-8565.

Yours truly,

Dale W. Marshall

Dale Marshall, P.E.

City Engineer

KDS/mg/6

Encl.

cc: Glenn May/Marty Doster, NYSDEC Region 9

M. Forcucci, NYSDOH (electronic copy)

C. Babcock, GSHI

J.P. Moreau/W. Jones (National Grid)

J. Kay (GHD)

Enclosure 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. **932060**

Site Name Gratwick - Riverside Park

Site Address: River Road Zip Code: 14120
City/Town: North Tonawanda
County: Niagara
Site Acreage: 52.9

Reporting Period: ~~May 31,~~ June 1 2016 to May 31, 2017

		YES	NO
1.	Is the information above correct? If NO, include handwritten above or on a separate sheet.	☐	☒
2.	Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☒
3.	Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☒
4.	Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	☒

If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.

		YES	NO
5.	Is the site currently undergoing development?	☐	☒

Box 2

		YES	NO
6.	Is the current site use consistent with the use(s) listed below? Closed Landfill	☒	☐
7.	Are all ICs/ECs in place and functioning as designed?	☒	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

____ __________________
Signature of Owner, Remedial Party or Designated Representative Date

SITE NO. 932060

Box 3

Description of Institutional Controls

Parcel	Owner	Institutional Control
175.19-1-28	City of North Tonawanda	Landuse Restriction Monitoring Plan O&M Plan Building Use Restriction Ground Water Use Restriction

Consent Order; 1996, Index # B9-0133-91-02

Deed Restriction; December 18, 2007.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
175.19-1-28	Groundwater Treatment System Cover System Leachate Collection Groundwater Containment

This site is contained/controlled by a cover system, slurry wall and a leachate collection system. The leachate collected gravity feeds into three on site pump stations. At predetermined level set points, the pumps activate and discharge the leachate to the City of North Tonawanda Municipal Wastewater Treatment Plant.

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

    a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

    b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES ☒ NO ☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

    (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

    (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

    (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

    (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

    (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES ☒ NO ☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative ____________ Date ____________

IC CERTIFICATIONS
SITE NO. 932060

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Dale W. Marshall at 216 Payne Avenue, NT/NY 14120
print name print business address

am certifying as City Engineer (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

Dale W Marshall P.E.
Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

8/31/17
Date

IC/EC CERTIFICATIONS

Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Dale W. Marshall at 216 Payne Ave., N.T./N.Y. 14120
print name print business address

am certifying as a Professional Engineer for the City of North Tonawanda
(Owner or Remedial Party)

STATE OF NEW YORK
DALE W. MARSHALL
066108
LICENSED PROFESSIONAL ENGINEER

Dale W. Marshall, P.E. 8/31/17

Signature of Professional Engineer, for the Owner or Remedial Party, Rendering Certification

Stamp (Required for PE)

Date

Operation and Monitoring Report

June 2016 to May 2017
Gratwick Riverside Park Site
North Tonawanda, New York

City of North Tonawanda

GHD | 651 Colby Drive Waterloo Ontario N2V 1C2 Canada
007987 | Report No 46 | August 312017

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1. Introduction

This report is the 16th annual Operation and Monitoring Report (O&M Report) for the remedial actions constructed at the Gratwick-Riverside Park Site (Site) located in North Tonawanda, New York. This report covers the period from June 2016 to May 2017 and was prepared pursuant to Section 7.0 of the report entitled "Operation and Maintenance Manual" (O&M Manual) dated March 2002 (revised January 2004, May 2009, and June 2014). It is noted that New York State Department of Environmental Conservation (NYSDEC) approval for the O&M Manual was given on April 20, 2005. All O&M activities have been performed in accordance with the methods and frequencies specified in the O&M Manual and as modified in previous annual reports and approved by NYSDEC. In accordance with the approved monitoring changes, the groundwater is monitored annually in five wells and an additional seven wells are monitored once every 2 years as of May 2013. The surface water quality of the Niagara River adjacent to the Site is not impacted by the Site and is no longer monitored. The collected groundwater that is discharged from the Site is monitored semi-annually in accordance with the City of North Tonawanda Wastewater Discharge Permit (effective March 1, 2016). A copy of the permit is included in Appendix A.

2. Groundwater Withdrawal System (GWS)

Full-time operation of the Groundwater Withdrawal System (GWS) at the Site started on May 4, 2001. The objectives of the GWS are to:

i) Achieve and maintain an inward gradient from the Niagara River toward the GWS.

ii) Achieve and maintain an upward gradient from the fill alluvium layer beneath the GWS.

In order to determine whether the objectives are being met, hydraulic and chemical monitoring programs have been developed. These programs include Site groundwater and GWS effluent monitoring. The wells, manholes, wet wells, and storm sewer outfalls that comprise the monitoring network are shown on Figure 2.1. The monitoring programs are described in the following subsections.

2.1 Hydraulic Monitoring

Hydraulic monitoring consists of the collection of water levels in monitoring wells and manholes, and River water levels at the storm sewer outfalls. These data are then used to determine the vertical and horizontal gradients for the groundwater.

The water levels in four GWS manholes and in the River were monitored to confirm that an inward gradient exists. The water levels in five GWS manholes and in four monitoring wells installed near the GWS alignment in the materials directly overlying the confining unit were monitored to confirm that an upward gradient exists. The specific manholes and monitoring wells used to determine the horizontal and vertical gradients are listed in Table 2.1.

Groundwater elevations are measured on a monthly basis. The measured water levels for the time period June 2012 through May 2017 are provided in Table 2.2. The horizontal and vertical gradients for this reporting period are provided in Tables 2.3 and 2.4, respectively. The water levels and horizontal and vertical gradients to May 2012 were previously provided and thus are not provided in this report.

The results for the horizontal gradient evaluation show that:

i) Inward horizontal gradients were achieved by May 11, 2001, within 1 week of the start of pumping the GWS.

ii) The inward gradients were maintained for the remainder of the 16 years except for a few short intervals in isolated areas GWS.

There were two exceptions in the June 2016 through May 2017 reporting period as follows:

i) June 2016 through May 2017 in the area of River North/MH2 and

ii) June 2016 through May 2017 in the area of River Middle/MH8

The distance which groundwater may have migrated into the barrier wall during the period of outward gradient can be calculated using the equation:

Distance = velocity x time

Both monitoring pair locations had outward gradients for a period of 12 months (365 days) (i.e., outward gradients were measured from November 30, 2015 through May 26, 2016).

Groundwater velocity into the barrier wall was calculated using:

Velocity = Hydraulic conductivity (K) x Gradient/ Porosity

The design hydraulic conductivity for the barrier wall was 1E-07 cm/s (2.84E-04 ft/day). Testing performed during construction of the barrier wall showed all test results had lower K than 1E-07 cm/s. Thus, the design K was used for the calculation.

Gradient is calculated by the difference in water levels between the monitoring pair locations. The measured levels on January 31, 2017 had the greatest difference in water levels (i.e., 567.41 ft amsl in MH2 and 563.53 ft amsl in River North). Assuming the entire 3.88 foot difference occurs as head loss through the 30-inch thick barrier wall, results in a gradient of 1.552 ft/ft.

The barrier wall was constructed using fine-grained soil and clay. Clay-based soils have porosities ranging from 0.37 to 0.84 (Peck, Hanson and Thornburn, "Foundation Engineering, 2nd Edition", John Wiley & Sons, Inc.). The lower the porosity, the farther migration into the barrier wall occurs. A conservative value of 0.25 was used for calculation.

Using the maximum head loss for the entire period of outward gradient combined with using the design K, which is greater than the constructed K of the barrier wall, and a porosity of 0.25 results in a conservative (greater) distance of migration into the barrier wall.

The calculated velocity is:

V = (1.552 x 2.83E-04)/ 0.25 = 1.76E-03 ft/day (0.64 ft/yr)

and the distance which groundwater migrated into the barrier wall for the reporting period is 0.64 ft:

Another way to look at this is that it would take approximately 4 years for the groundwater to migrate through the barrier wall at this very conservative velocity.

Thus, short periods of outward gradient (even 365 days) do not adversely affect the effectiveness of the remedy because:

i) The outward gradients occurred over only a portion of the barrier wall.

ii) The 36-inch barrier wall is 6 inches thicker than the design thickness thereby providing extra protection.

iii) Any outward migration of Site groundwater into the barrier wall during the periods of outward gradient is more than offset by the inward migration of river water into the barrier wall during the long periods of inward gradient.

iv) The groundwater level on the upgradient side of the barrier wall was never higher than the elevation of the top pf the barrier wall (i.e., 568.5 ft amsl) except in the immediate vicinity of MH14 for July through September 2016 when water levels were 568.64 to 568.77 ft amsl. Thus, no overtopping occurred except for a short section of the barrier wall for 3 months.

The results for the vertical gradient evaluation showed that the vertical gradients during the June 2016 through May 2017 reporting period were continually upward for all four monitoring locations with the following exception (i.e., June through November 2016 in the area of MH14/MH15 and MW-9).

Short periods of downward gradient do not adversely affect the effectiveness of the remedy because:

i) The gradients were downward for only short periods of time.

ii) The downward gradients occurred along only a portion of the GWS.

iii) The barrier wall and thick alluvium clay till underlying the fill which the barrier wall was keyed into prevented the migration of impacted groundwater from the Site.

iv) Any downward migration of the Site's groundwater into the underlying fill alluvium layer during the short periods of downward migration is more than offset by upward migration during the long periods of upward gradient.

2.2 Groundwater Quality Monitoring

Groundwater quality monitoring consists of the collection of water samples from on-Site overburden monitoring wells (OGC-1 through OGC-8 and MW-6 through MW-9) and the analysis of these samples to determine the concentrations of chemicals in the groundwater. The purpose of the groundwater quality monitoring program is to monitor the anticipated improvement in the quality of the overburden groundwater:

i) Between the barrier wall and the River (OGC-1 through OGC-4)

ii) In the fill/alluvium beneath the GWS (MW-6 through MW-9)

The MWs are located on the inside of the barrier wall and the OGCs are located between the barrier wall and the river.

Groundwater quality monitoring locations are presented on Figure 2.1 and the analytical parameters and frequency are listed in Table 2.5.

Groundwater sampling was performed on an annual basis between May 2004 and May 2008. As approved in the NYSDEC letter dated February 23, 2009 the sampling frequency for May 2009 through May 2012 was:

Annual	Once Every 2 Years (2010 and 2012)
MW 8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-4	OGC-2
OGC-6	OGC-5
OGC-7	
OGC-8	

As approved by the NYSDEC on March 27, 2013, the sampling frequency for May 2013 through May 2017 was:

Annual	Once Every 2 Years (2014 and 2016)
MW-8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-6	OGC-2
OGC-7	OGC -4
	OGC-5
	OGC-8

2.2.1 Sample Results

A summary of compounds detected in the groundwater samples for this reporting period is provided in Table 2.6 and pH levels are provided in Table 2.7.

To evaluate the trends in the groundwater chemistry and evaluate the appropriate frequency of future sampling, the VOCs and SVOCs were summed and plotted on Figures 2.2 through 2.13 for each of the 12 monitoring wells included in the program. It is believed that the sum of the VOCs (i.e., TVOCs) and SVOCs (i.e., TSVOCs) best represent the trends in the groundwater chemistry.

Review of the TVOC and TSVOC concentrations for the 5 wells sampled in 2017 show the following trends:

i) TVOCs:

- Low level (i.e., no individual compounds with concentrations greater than Class GA levels) in 2 of the 5 wells (i.e., OGC-3 and OGC-7)
- Relative constant concentrations with random fluctuations in MW-9
- Decreasing concentrations in wells MW-8 and OGC-6

ii) TSVOCs:

- Low level (i.e., no individual compounds with concentrations greater than Class GA levels) in 2 of the 5 wells (i.e., OGC-6 and OGC-7)
- Relatively constant concentrations with random fluctuations in MW-8 and OGC-3
- Increasing concentrations in MW-9. MW-9 is located on the landward side of the barrier wall. Thus this chemistry is not migrating to the river

All the wells had only low level TVOC concentrations in this reporting period, except for OGC-6 (87 micrograms per liter [µg/L]) which was a decrease from the 290 µg/L detected in May 2015 and the 135 µg/L detected in May 2016. With regard to TSVOC concentrations, one well had higher concentrations, MW-9 (537 µg/L in May 2016 compared to 290 µg/L in May 2015 and 520 µg/L in May 2016).

In summary, the number of wells with no individual compounds above Class GA criteria, and decreasing or constant but fluctuating low level concentrations, except for TSVOCs in MW-9, shows that the groundwater is being remediated.

Additional description of the TVOC and TSVOC concentrations is provided in the following paragraphs.

Monitoring Wells On-Site - Inside Barrier Wall

The TVOC concentrations for MW-6 shown on Figure 2.2 have been less than 5 µg/L since May 2007. The TSVOC concentrations were low level (i.e., <5 µg/L) since May 2004 until May 2010 when they increased slightly to 20 µg/L. By May 2016 the TSVOC concentration had reduced to non-detect.

The TVOC and TSVOC concentrations for MW-7 on Figure 2.3 show that both TVOC and TSVOC have remained low level. TVOC concentrations ranged from non-detect to 4 µg/L since May 2006. TSVOC concentrations ranged from non-detect to 5 µg/L since May 2004.

The TVOC concentrations for MW-8 on Figure 2.4 show that the TVOC concentrations have decreased from 140 µg/L in May 2009 to 8 µg/L in May 2017. The TSVOC concentrations since May 2011 have generally been in the 70 to 100 µg/L range (May 2017 = 91 µg/L).

The TVOC concentrations for MW-9 on Figure 2.5 show that the TVOC concentrations ranged between 9 and 30 µg/L for the entire record period. The TSVOC concentrations have fluctuated between 120 to 440 µg/L between August 2002 and May 2015 and then increased to 520 µg/L in May 2016 and further increased to 537 µg/L in May 2017.

All MWs are located on the inside of the barrier wall and a net inward gradient has been consistently maintained in the vicinity of these wells except for the 2016/2017 time period previously described. Thus, the TVOCs and TSVOCs are not migrating to the Niagara River.

Monitoring Wells between Barrier Wall and River

The TVOC concentrations for OGC-1 on Figure 2.6 show that the concentrations since November 2003 ranged between non-detect and 4 µg/L. The TSVOC concentrations since November 2003 have fluctuated between non-detect and 3 µg/L.

The TVOC concentrations for OGC-2 on Figure 2.7 have been non-detect since May 2006. The TSVOC concentrations were all non-detect since monitoring of the remedy started except for the May 2014 sample which had a TSVOC concentration of 0.8 µg/L.

The TVOC concentrations for OGC-3 shown on Figure 2.8 have been less than 11 µg/L since May 2009 with the May 2017 sample result being 2.6 µg/L. The TSVOC concentrations have decreased from 300 µg/L in November 2003 to 99 µg/L in May 2017.

The TVOC concentrations for OGC-4 shown on Figure 2.9 fluctuated between non-detect and 6 µg/L for the time period from November 2002 to May 2010 and were non-detect since May 2010 until May 2016 (3.6 µg/L). The TSVOC concentrations have fluctuated widely but have continually decreased since May 2004 with a concentration of 0.43 µg/L in the May 2016 sample. The single compound responsible for the higher historic concentrations was phenol.

The TVOC concentrations for OGC-5 shown on Figure 2.10, ranged from non-detect to 5 µg/L since November 2003 (except for May 2008 at 5.8 µg/L). The TSVOC concentrations ranged from non-detect to 2 µg/L since February 2003.

The TVOC concentrations for OGC-6 shown on Figure 2.11 have continually decreased from 1,650 µg/L in the May 2013 sample to 87 µg/L in the May 2017 sample. The TSVOC concentrations decreased from 157 µg/L in May 2008 to 2.4 µg/L in the May 2017 sample.

The TVOC concentrations for OGC-7 shown on Figure 2.12 have decreased from 160 µg/L in November 2003 to 6.7 µg/L in the May 2017 sample. The TSVOC concentrations have been less than 2 µg/L since November 2001 (May 2017 result was non-detect).

The TVOC concentrations for OGC-8 shown on Figure 2.13 decreased from 460 µg/L in May 2001 to 29 µg/L in May 2004 and have ranged from non-detect to 30 µg/L since that time (May 2016 was 10 µg/L). The TSVOC concentrations decreased from 139 µg/L in August 2001 to 25 µg/L in May 2003 and have ranged from non-detect to 11 µg/L since that time (May 2016 was 2.8 µg/L).

The QA/QC Review/ Data Usability Summary of the May 2016 groundwater results are included in Appendix C. The electronic deliverables were provided to the NYSDEC by email on July 13, 2017.

2.3 Effluent Monitoring Program

Groundwater from the GWS is discharged to the POTW without the need for pretreatment. The monitoring performed during the construction phase of the remedy clearly showed that the minimal chemical presence in the groundwater collected in the GWS is easily treated at the POTW and therefore no on-Site pretreatment is necessary. The effluent samples are collected at the monitoring station (meter building), which is located at the south end of the Site as shown on Figure 2.1. The analytical parameters monitored since 2007 are listed in Table 2.8.

2.3.1 Sample Results

Effluent samples are collected semi-annually and consist of a 24-hour composite sample collected for SVOCs, metals, and wet chemistry parameters. Three grab samples are also collected for VOCs at 8-hour intervals and the measured concentrations are averaged to give a 24-hour concentration.

QA/QC reviews of the discharge results to May 2016 have already been submitted to the NYSDEC. Thus, these reviews are not being resubmitted with this O&M Report. The QA/QC reviews of the discharge results from October 2016 and April 2017 are provided in Appendix C.

The effluent sample results for this reporting period are provided in Table 2.9. To assist in evaluating the chemical concentration trends in the effluent discharge from the GWS, the measured concentrations for the following parameters are plotted: TVOCs, TSVOCs, pH, total suspended solids (TSS), and biochemical oxygen demand (BOD) (see Figures 2.14 through 2.17). It is believed that these parameters are representative of the trends in the chemistry of the water discharged to the POTW and, as such, can also be used to determine an appropriate monitoring frequency for the effluent.

As shown on Figure 2.14, the TVOCs generally peak in the spring and then decline reaching a trough in the fall. This pattern may be attributable to additional flushing during the spring snow melt. The long-term trend of the TVOC concentrations shows an overall decrease with time from a peak concentration of 760 μg/L in April 2002 to a concentration of 9.5 μg/L in April 2017. The effluent TSVOC results on Figure 2.14 show no apparent seasonal pattern. The TSVOC concentrations decreased with time until March 2011 (non-detect) and then increased to 89 μg/L in the April 2015 sample. Since April 2015, the TSVOC concentrations have continually declined to 17 μg/L in the April 2016 sample and then increased to 150 μg/L in May 2017.

The pH levels are presented on Figure 2.15. As shown on Figure 2.15, the pH levels range between 7.3 and 11.6. An apparent trend in the pH levels is higher pH levels in the winter/spring and lower pH levels in the summer/fall.

The TSS concentrations presented on Figure 2.16 are generally low level (i.e., <20 mg/L) and show higher concentrations occurring in the early spring and late summer/fall with elevated concentrations (maximum of 278 milligrams per liter [mg/L]) in the spring of 2005. Because TSS may be related to the discharge flow rate, the monthly discharge volume (see Table 2.10) is plotted on Figure 2.18. Comparison of the results presented on these two figures shows an apparent correlation between higher flows and greater TSS concentrations except for the 2005 spring results.

The BOD concentrations are presented on Figure 2.17. As shown on Figure 2.17, BOD concentrations have randomly ranged from 4 to 29 mg/L since May 2002 with a one-time peak of 45 µg/L in September 2012. The BOD concentrations were compared with the discharge volume but showed no apparent correlation.

In summary, the trends and low level TVOC and TSVOC concentrations described above support the semi-annual sampling frequency in the current City of North Tonawanda Industrial Wastewater Discharge Permit.

2.4 GWS Operations

The volume of water pumped on a monthly basis from the Site to the City POTW for treatment is presented in Table 2.10 and plotted on Figure 2.18. The monthly volumes show that during the time period of initial dewatering of the Site (i.e., May and June 2001) the monthly volumes ranged from 2,300,000 to 2,900,000 gallons. For the time period from June 2007 to May 2017, not including the months when the flow meter malfunctioned, the monthly volumes ranged from 23,800 to 2,661,000 gallons except for March 2009 which had a volume of 4,239,000 gallons.

The total measured volume of water discharged from the Site for the time period from May 2001 to May 2016 was 133,524,200 gallons with 8,961,100 gallons (17 gallons per minute [gpm] average) pumped during the 12 months from June 2016 through May 2017. It is noted that the flow meter malfunctioned for the time period June through November 2016. Auditory observations and water level measurements made during this time period indicated that water was being pumped. Thus, the total volume of groundwater pumped and the average pumping rate are greater than those measured.

Section 5.0 of the O&M Manual describes the procedures to be followed in case pumping of the GWS needs to be stopped to prevent the discharge of untreated water from the Site by the City POTW (i.e., wet weather shutdown). Wet weather shutdowns occurred during this reporting period from:

Date	Time
April 20, 2017	18:30 to 19:00
April 20, 2017	20.42 to
April 21, 2017	13:55
May 1, 2017	15:55 to 19:00
May 5, 2017	13:55 to
May 7, 2017	20:00

Furthermore, the treatment of the Site groundwater by the City POTW did not require any modifications to the standard operations of the City POTW and did not cause any operational upsets of the City POTW from June 2016 to May 2017.

2.5 GWS Maintenance

This section describes the primary GWS maintenance activities performed during the June 2016 through May 2017 time period. A listing of the maintenance activities is provided in Table 2.11.

In response to the NYSDEC comment regarding the BVM buildup in GWS forcemain, a conference call was held on May 19, 2016 to discuss the proposed plan to address the BVM buildup. The document titled "Work Plan, Groundwater Withdrawal System Forcemain Cleaning" was submitted on July 11, 2016. A listing of principal activities performed pursuant to the Work Plan is provided in Table 2.11. In summary, the piping of the three pump stations was modified (see drawings in Appendix E) and then acid washed. The work was completed on December 29, 2016. In addition, the interior piping at the meter building was acid washed on January 10, 2017.

The monthly monitoring of the sediment in the GWS manholes indicated thicknesses typically ranging from 0.0 to 0.1 feet, except for MH-11 which had thicknesses ranging from 0.30 to 0.45 feet. In accordance with the addendum to the O&M Manual, provided as Appendix F in the June 2013 to May 2014 O&M Report, sediments are to be removed every five years unless the sediment thickness is deemed sufficient to adversely affect the operation of the GWS. The measured minimal thicknesses were deemed not sufficient to adversely impact the operation of the GWS. Thus, no sediment removal occurred in the June 2016 to May 2017 period, other than that which occurred incidentally during acid washing of the three pump stations.

2.6 NYSDEC Correspondence

An email string between the NYSDEC and the City of North Tonawanda providing more information during the time period of the GWS cleaning is provided in Appendix D.

3. Site Inspections

Site inspections were performed on a monthly basis. Copies of the Inspection Logs for the time period to May 2016 were previously submitted and thus are not being resubmitted with this O&M Report. The Monthly Inspection Logs for June 2016 through May 2017 are included in Appendix B. In summary, the June 2016 through May 2017 inspections identified:

i) Higher water levels in the southern portion of the GWS from June through November 2016 due to blockage of the forcemain with BVM in PS #3 (MH-15). Activities related to PS #3 are described in Section 2.5.

ii) Higher water levels in the middle portion of the GWS from June through November 2016 due to blockage of the forcemain with BVM. Activities related to PS #2 are described in Section 2.5.

iii) Higher water levels in the vicinity of MH-2 between April 2016 and May 2017. Investigations by the City to determine the cause of these higher levels are ongoing.

iv) Soil erosion with wire mesh exposed along portions of the shoreline from June 2016 through May 2017.

v) Drift consisting of various sizes of dead trees occasionally partially blocked the River North outlet in January, April, and May 2017. The drift was removed as needed.

Repair of the erosion is being performed on an intermittent basis by the City of North Tonawanda.

4. Conclusions/Recommendations

4.1 Operation and Maintenance

The constructed remedy is achieving the remedial action objectives.

The acid washing of the pump stations and the interior piping of the meter building was successful as supported by the increased discharge to the City POTW and the decrease in groundwater levels in the GWS manholes.

4.2 Monitoring

Based on the most recent results for the 12 wells listed in Section 2.2, the groundwater VOC concentrations are:

i) Less than Class GA levels in 9 of the 12 wells sampled

ii) Decreasing in the other three wells

The groundwater SVOC concentrations are:

i) Less than Class GA levels in 9 of the 12 wells sampled

ii) Relatively constant in two of the wells

iii) Increasing in one well (i.e., MW-9) which is inside the barrier wall and does not discharge to the river

The groundwater sample collection frequency for the 5-year period from May 2013 through May 2017 was:

Annual	Once Every 2 Years (2014 and 2016)
MW 8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-6	OGC-2
OGC-7	OGC-4
	OGC-5
	OGC-8

The individual VOC and SVOC compound concentrations in the wells scheduled to be sampled once every 2 years are all less than their respective Class GA levels. This supports the scheduled frequency for these wells.

Thus, it is recommended that the same sampling frequency be used for the 5-year period from May 2018 through May 2022.

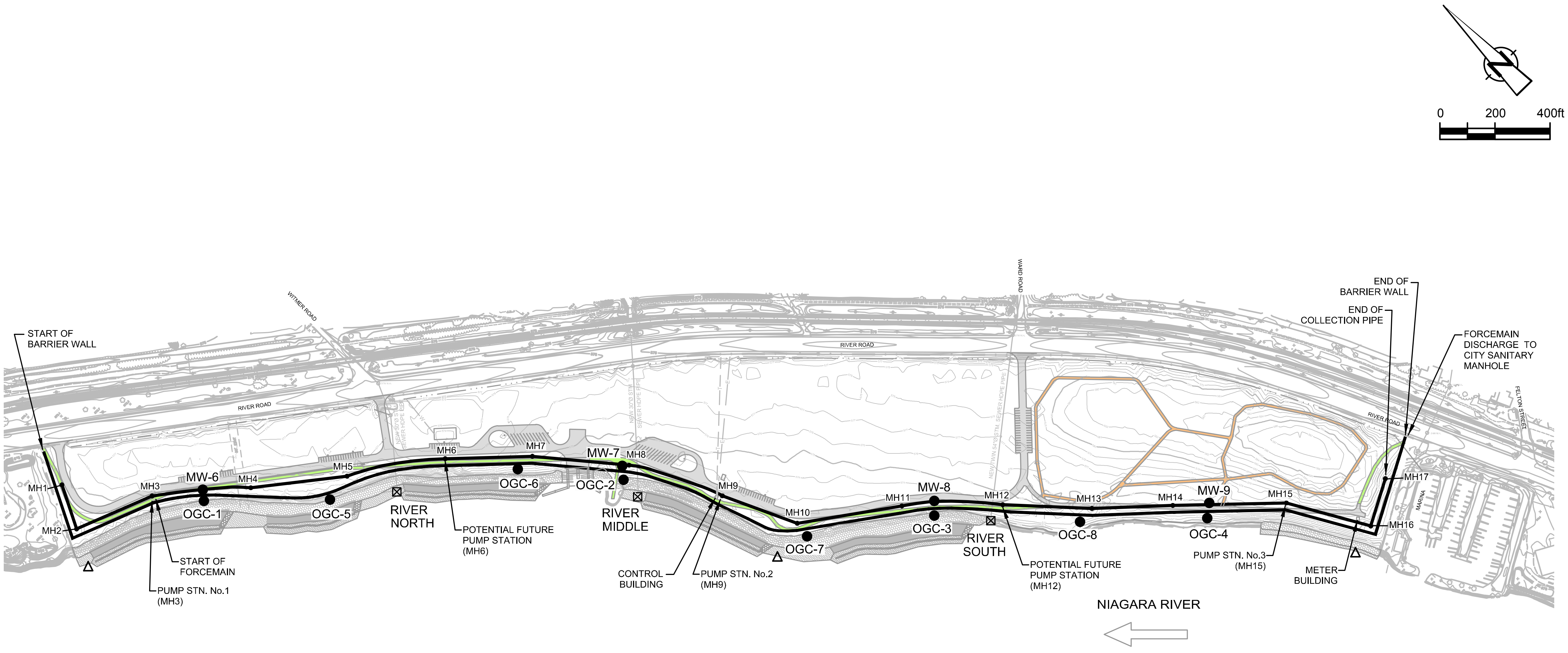
Pursuant to the discharge permit effective March 1, 2016, semi-annual monitoring was performed during the time period June 2016 through May 2017. The trends in the effluent from the GWS to the

POTW support the continuation of the sampling frequency at semi-annual. Flow monitoring will continue to be performed monthly as a check on the operation of the GWS.

Monthly monitoring of the sediment thickness in the GWS manholes will continue. The sediment is to be removed once every 5 years, if necessary. The sediment will be removed during low flow conditions which typically occur in late summer.

4.3 Notifications to City of North Tonawanda

Notifications of anomalies in the visual inspections, discharge volumes and/or groundwater levels were and will continue to be provided to the City of North Tonawanda Public Works Engineering and Wastewater Treatment Department within a few days of measurement of the anomaly to allow for timely maintenance.



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 2.1

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

07987-00(046)GN-WA001 JUL 12, 2017

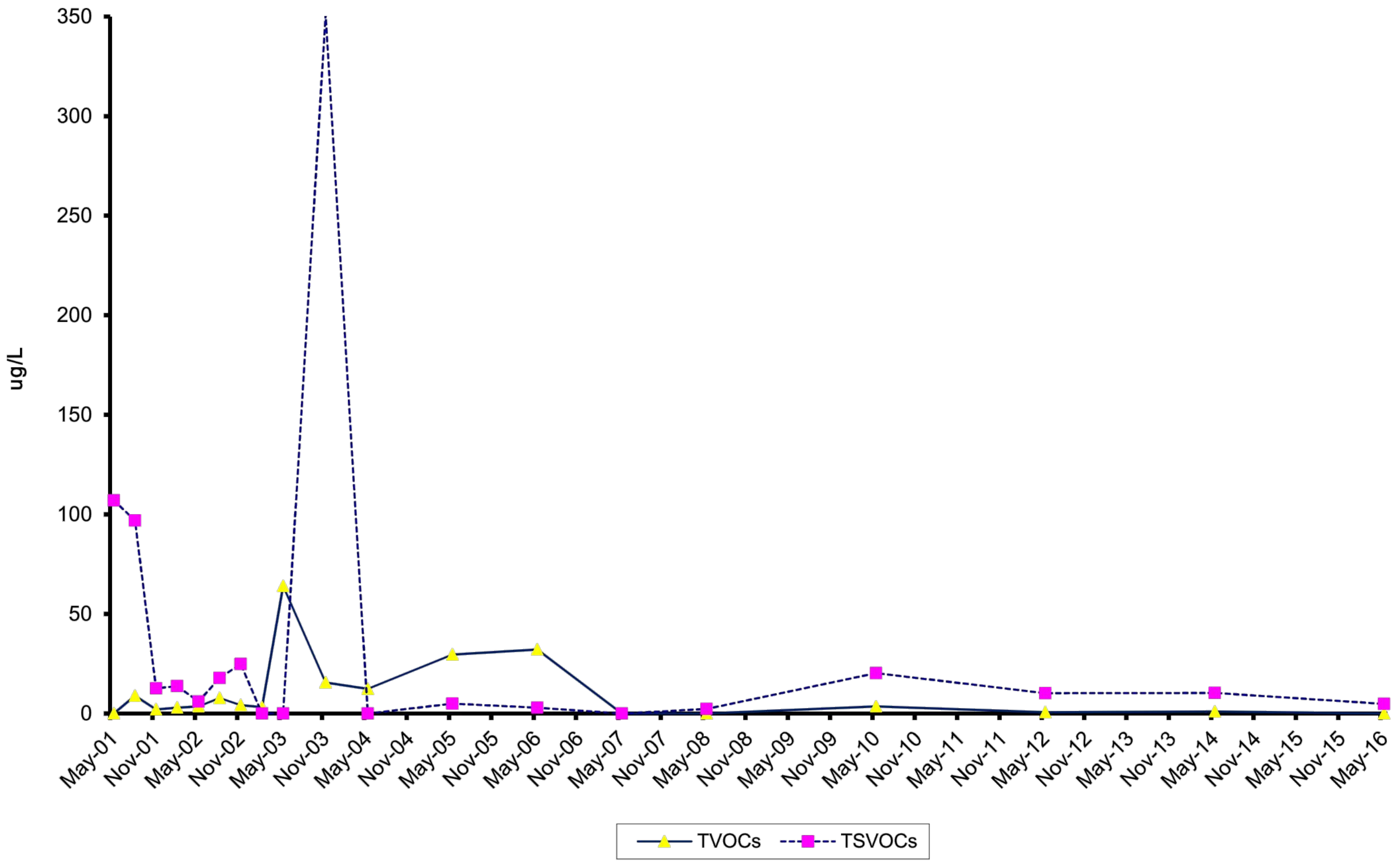


figure 2.2

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

07987-00(046)GN-WA002 JUL 12, 2017

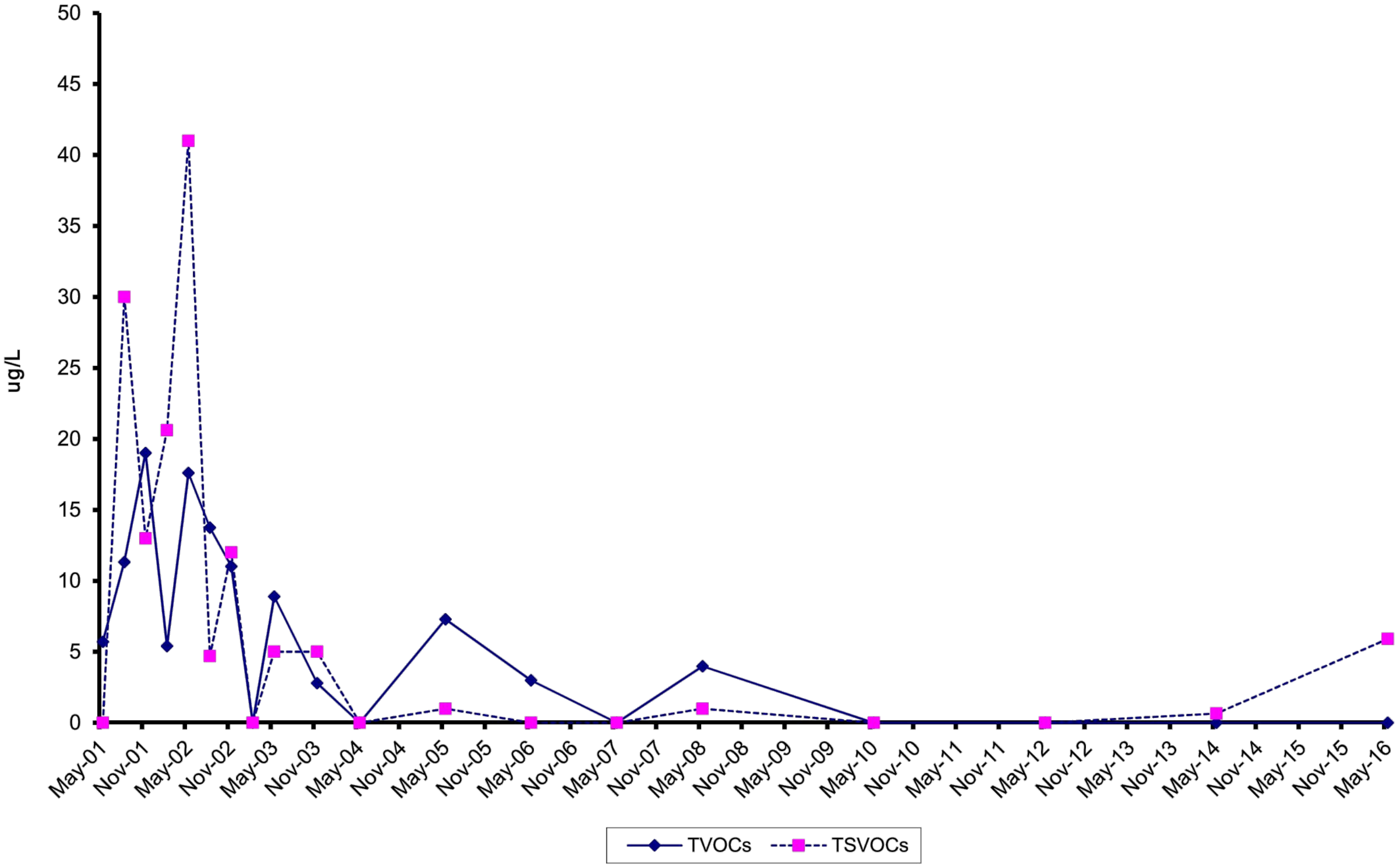


figure 2.3

MW-7 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

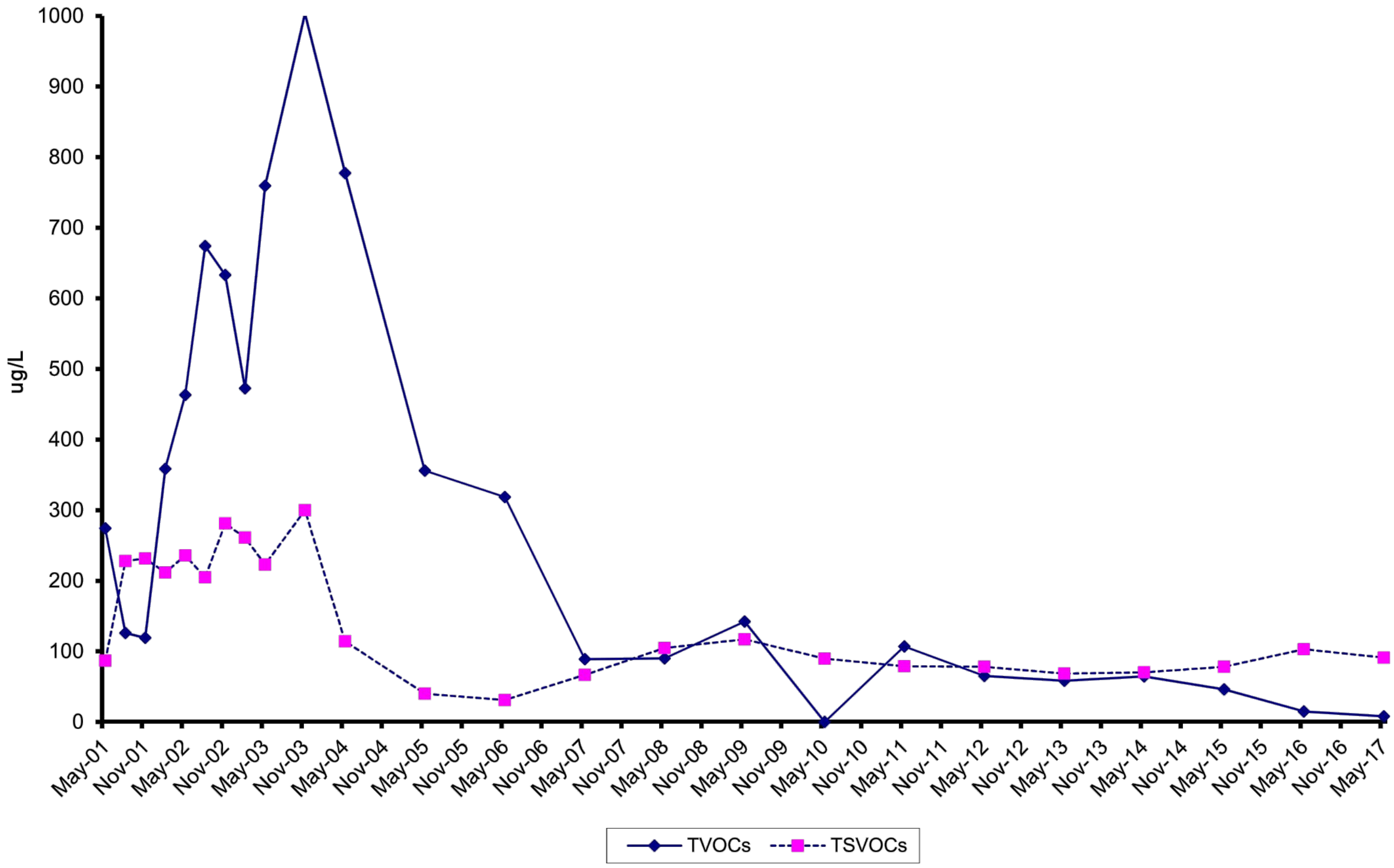


figure 2.4

MW-8 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

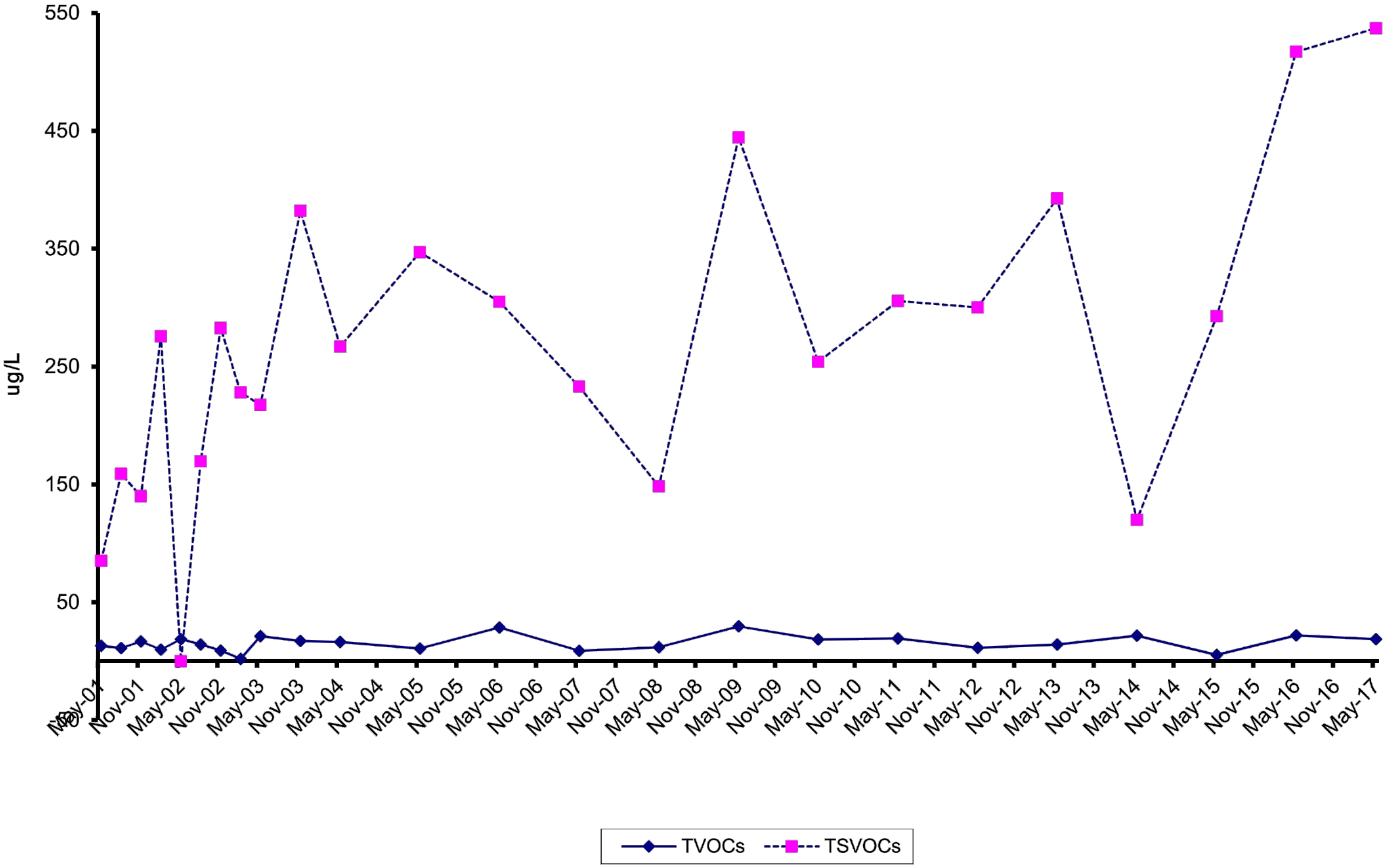


figure 2.5

MW-9 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

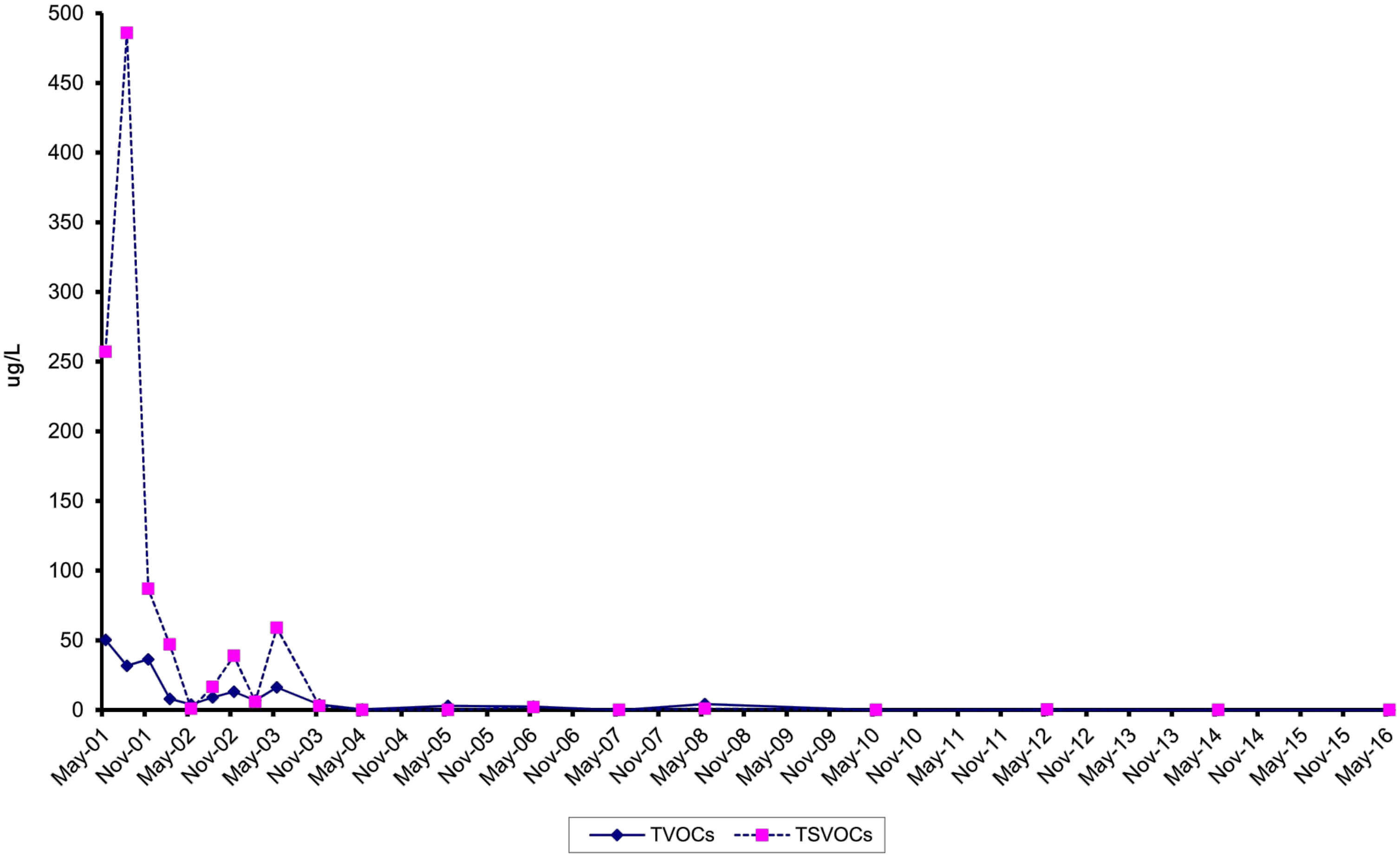


figure 2.6

OGC-1 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

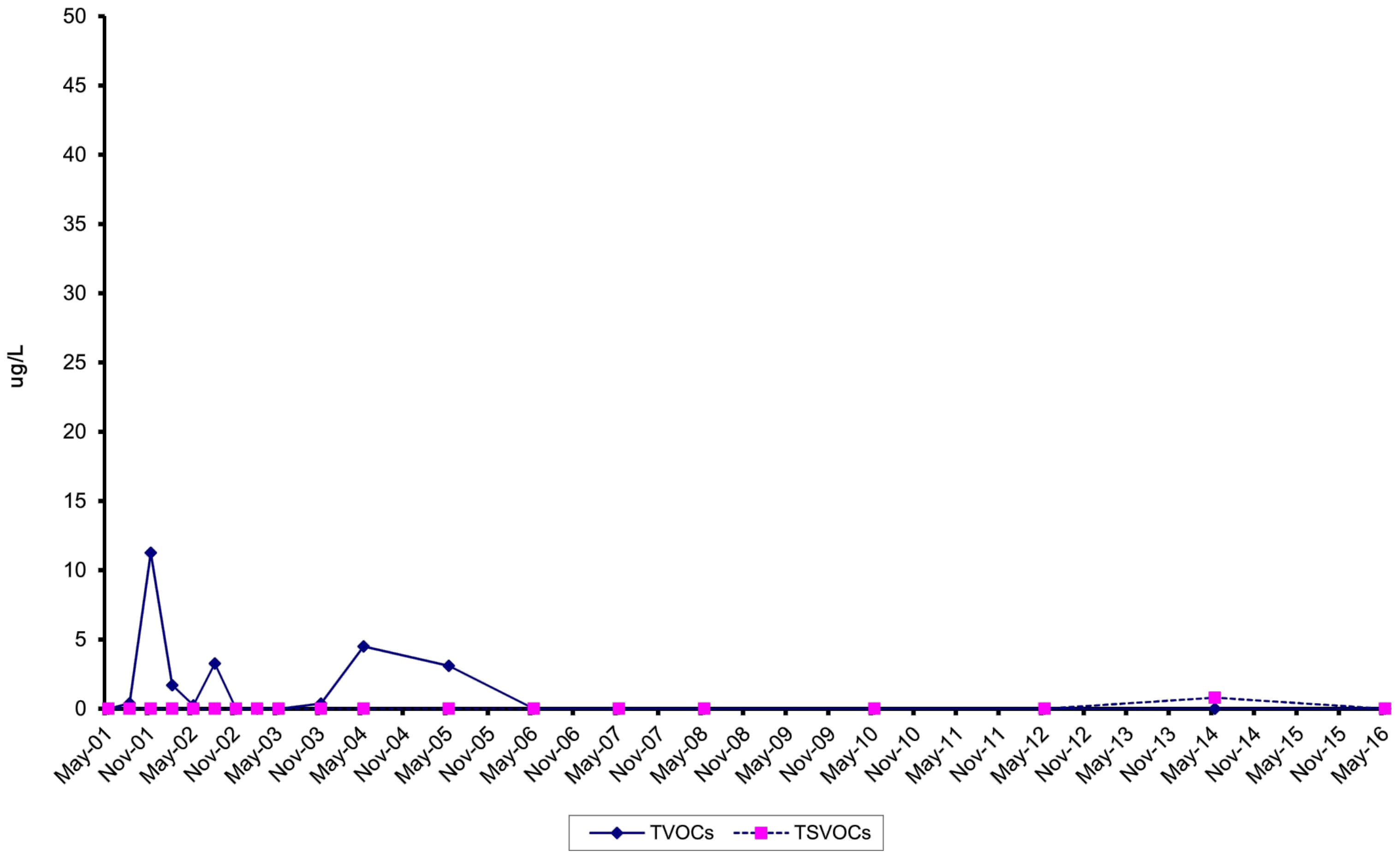


figure 2.7

OGC-2 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

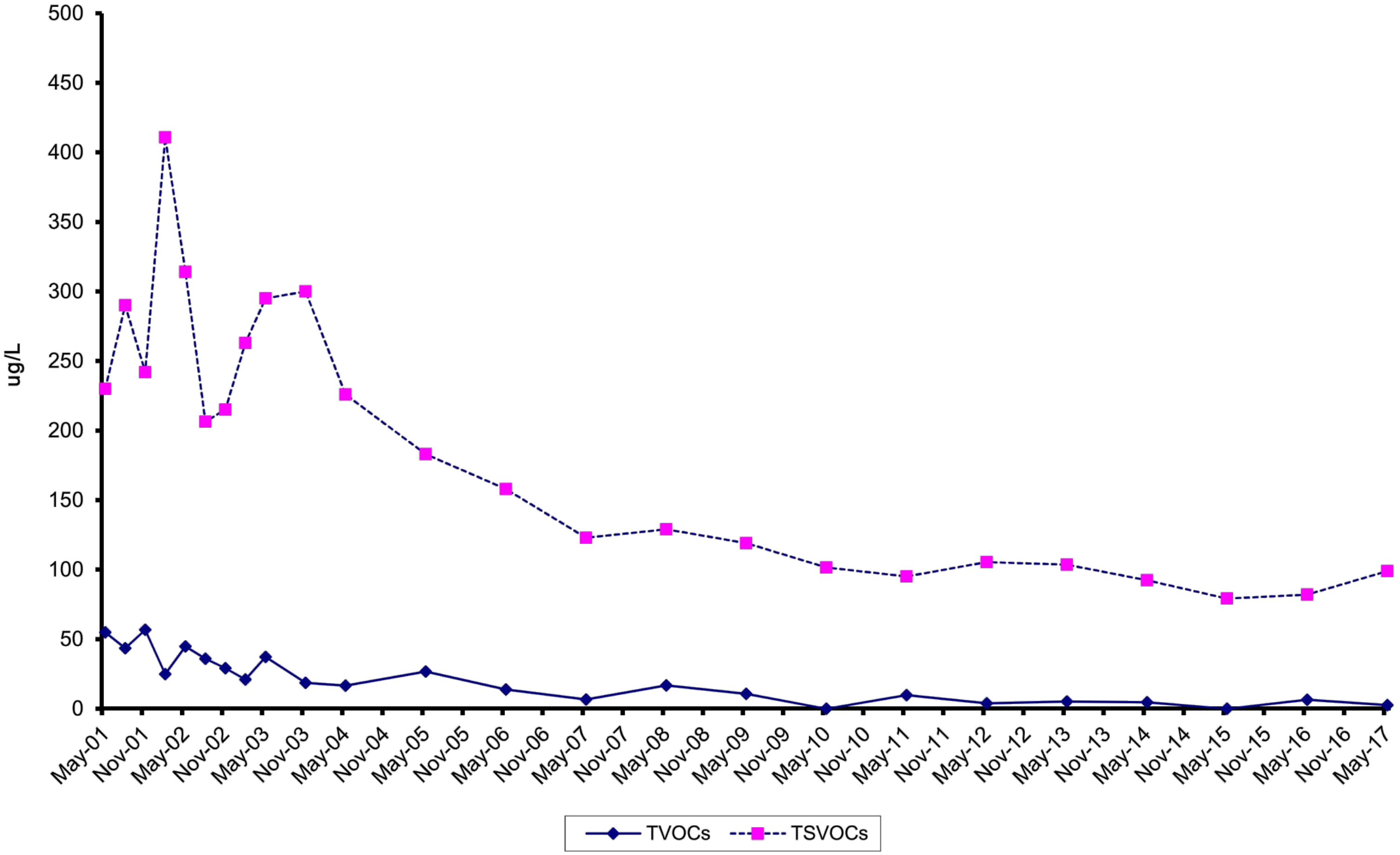


figure 2.8

OGC-3 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

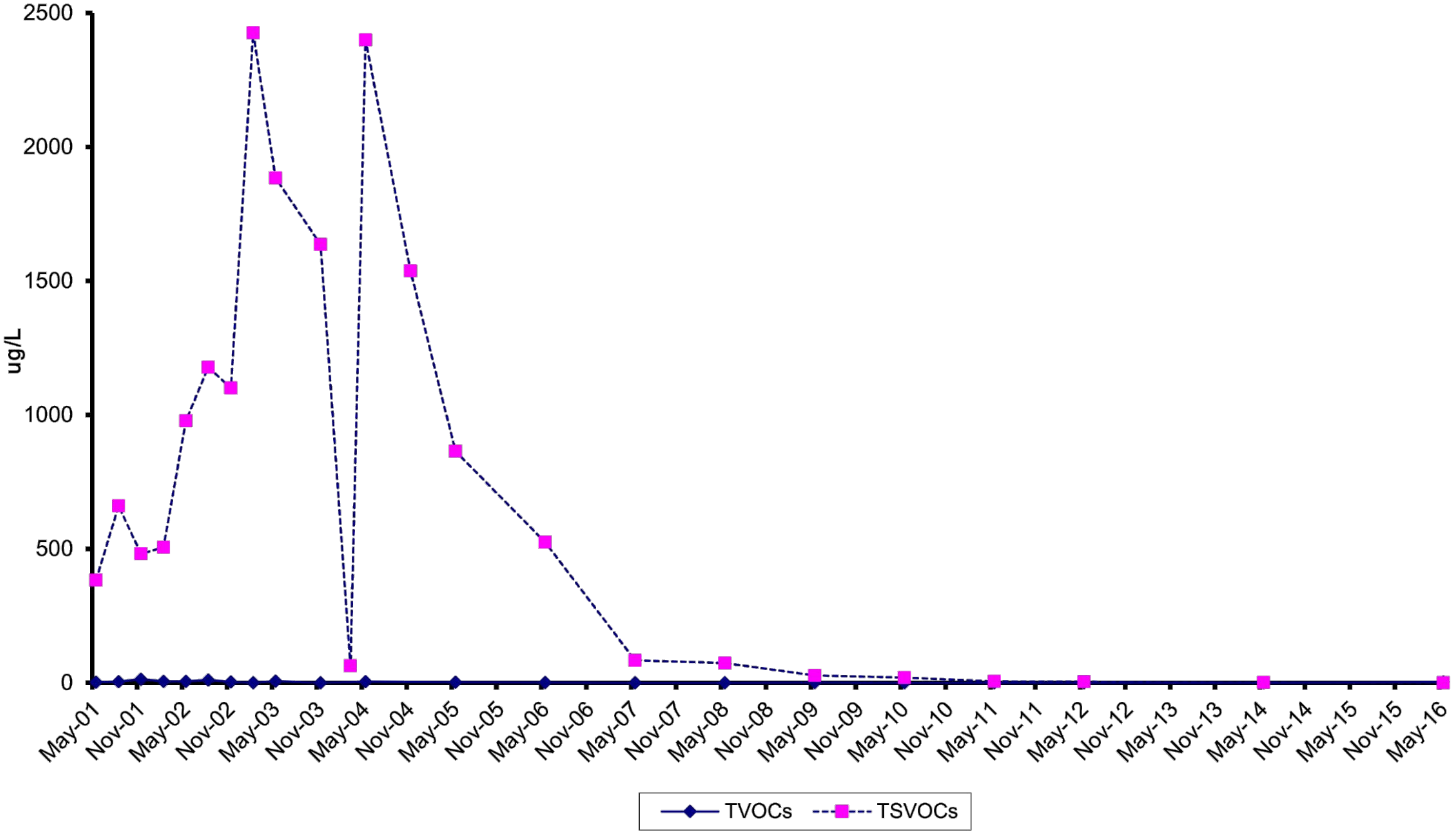


figure 2.9

OGC-4 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

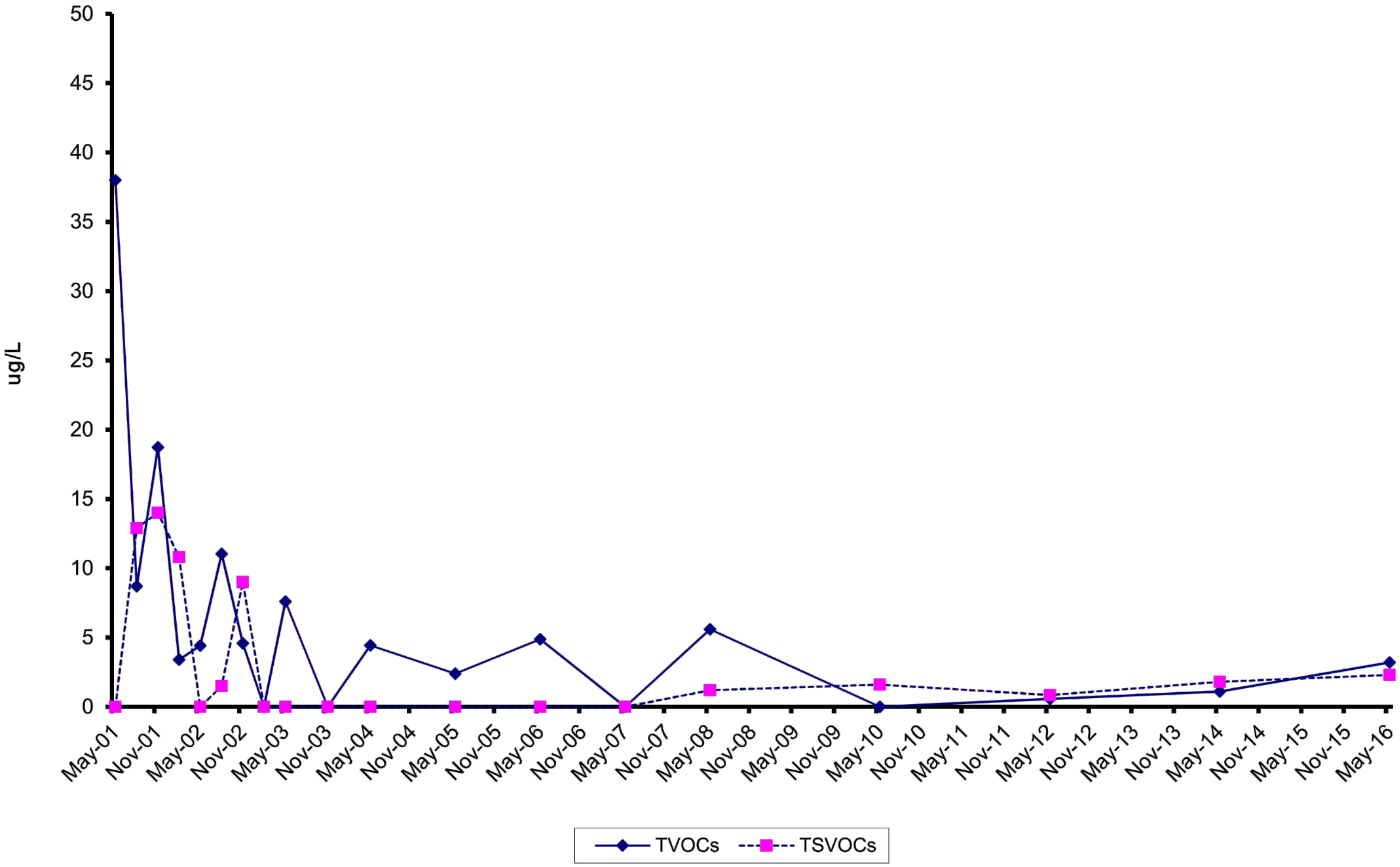


figure 2.10

OGC-5 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

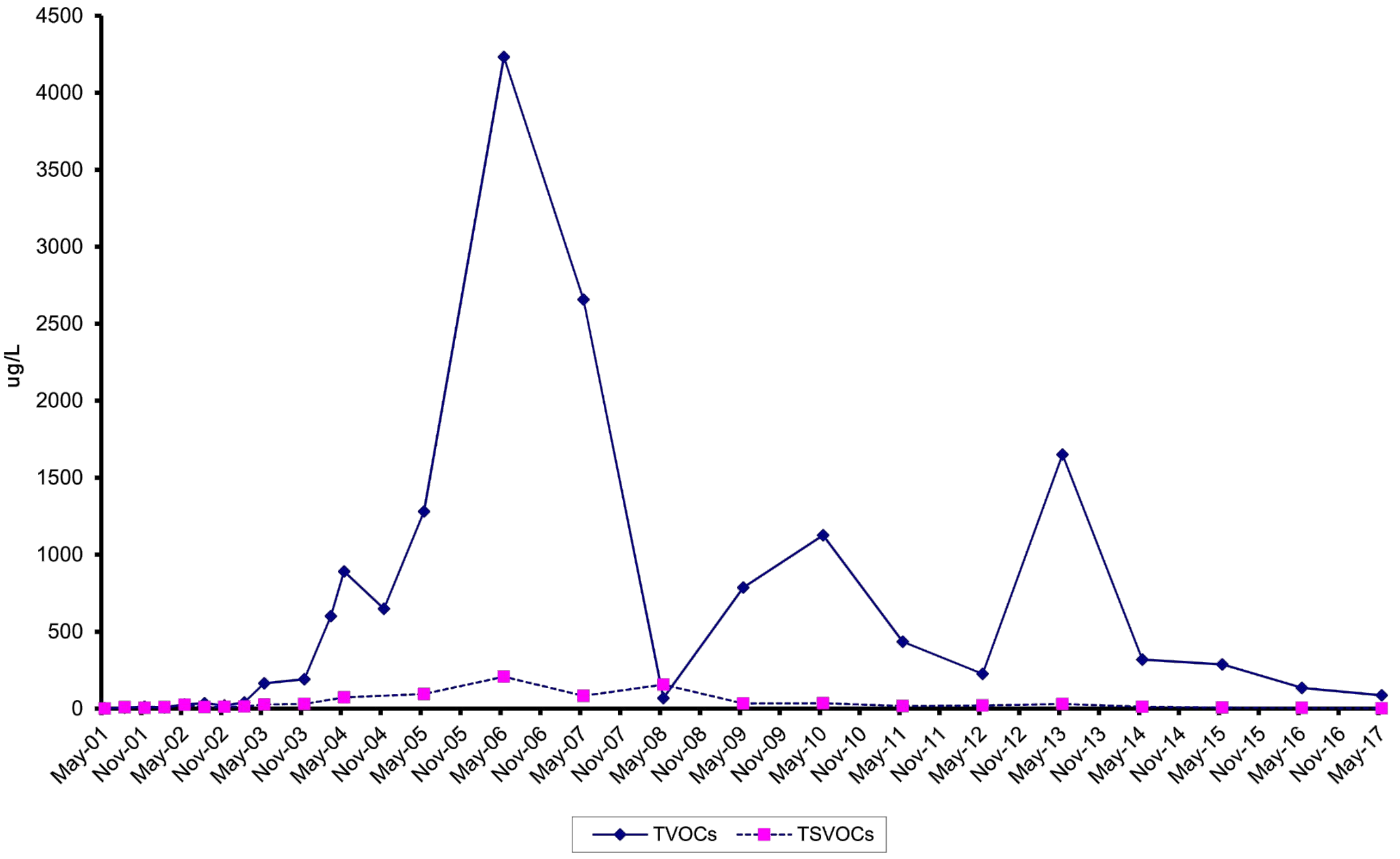


figure 2.11

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

GHD

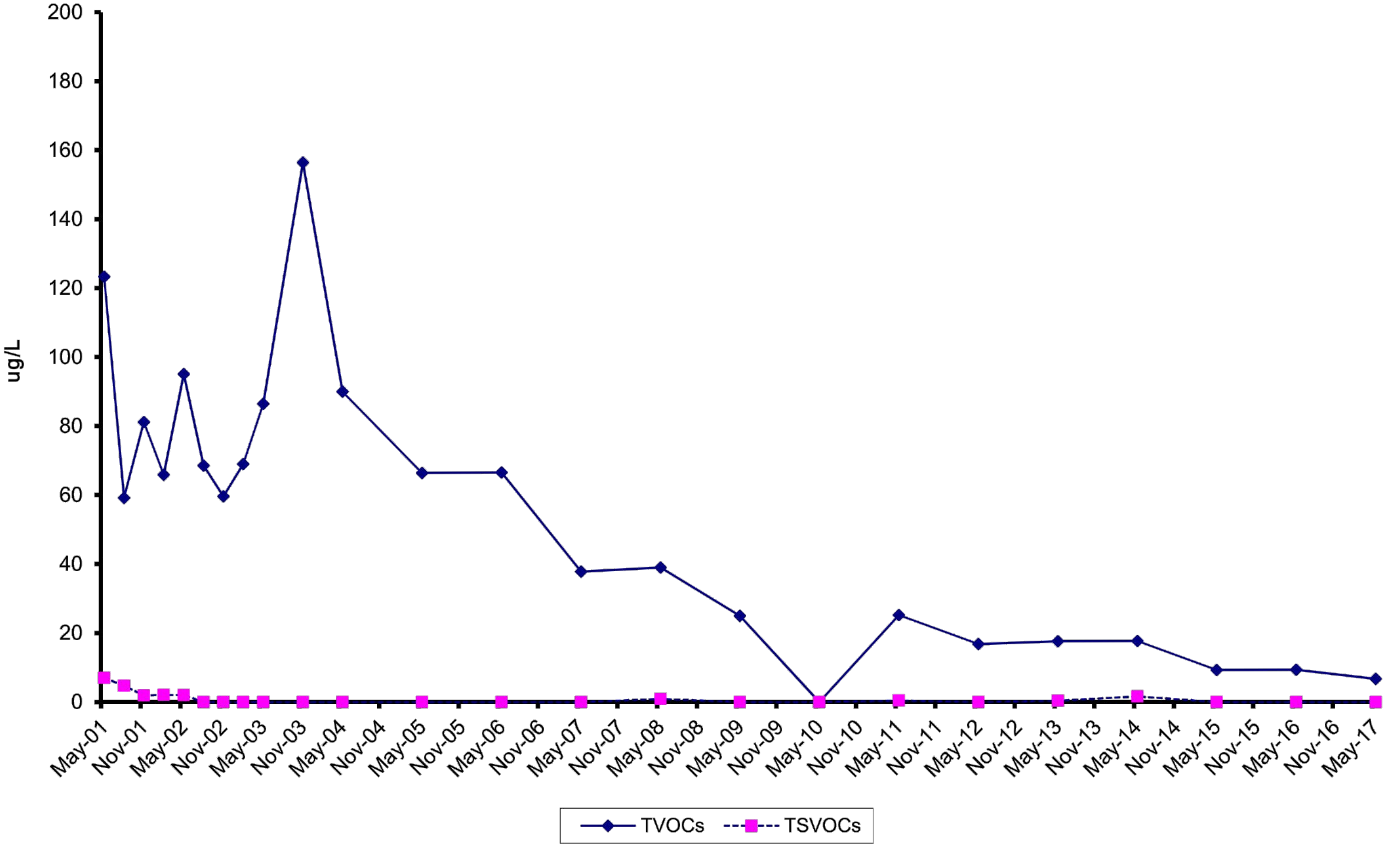


figure 2.12

OGC-7 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

GHD

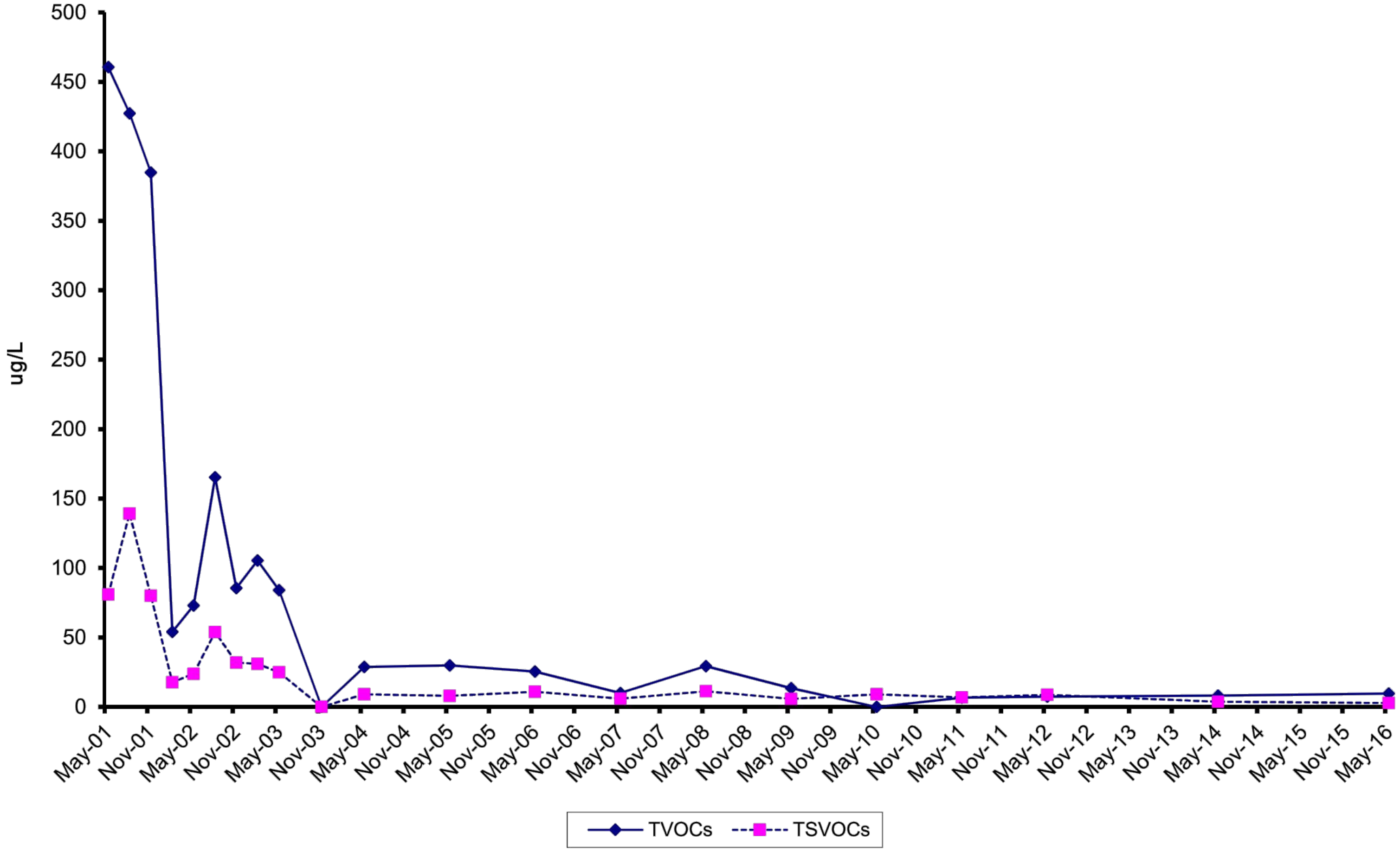


figure 2.13

OGC-8 TVOC AND TSVOC CONCENTRATIONS
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

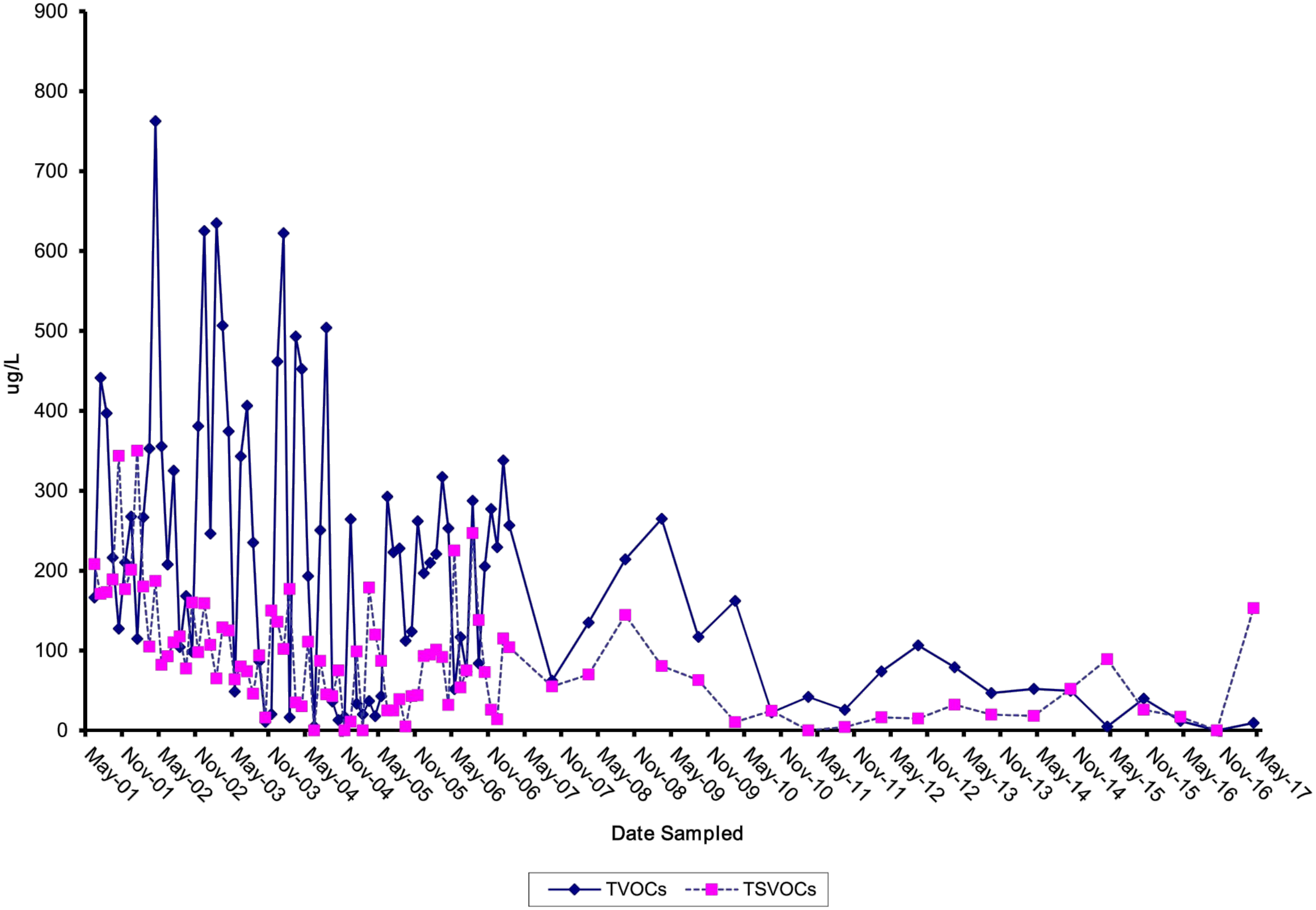


figure 2.14

EFFLUENT TVOCs AND TSVOCs vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

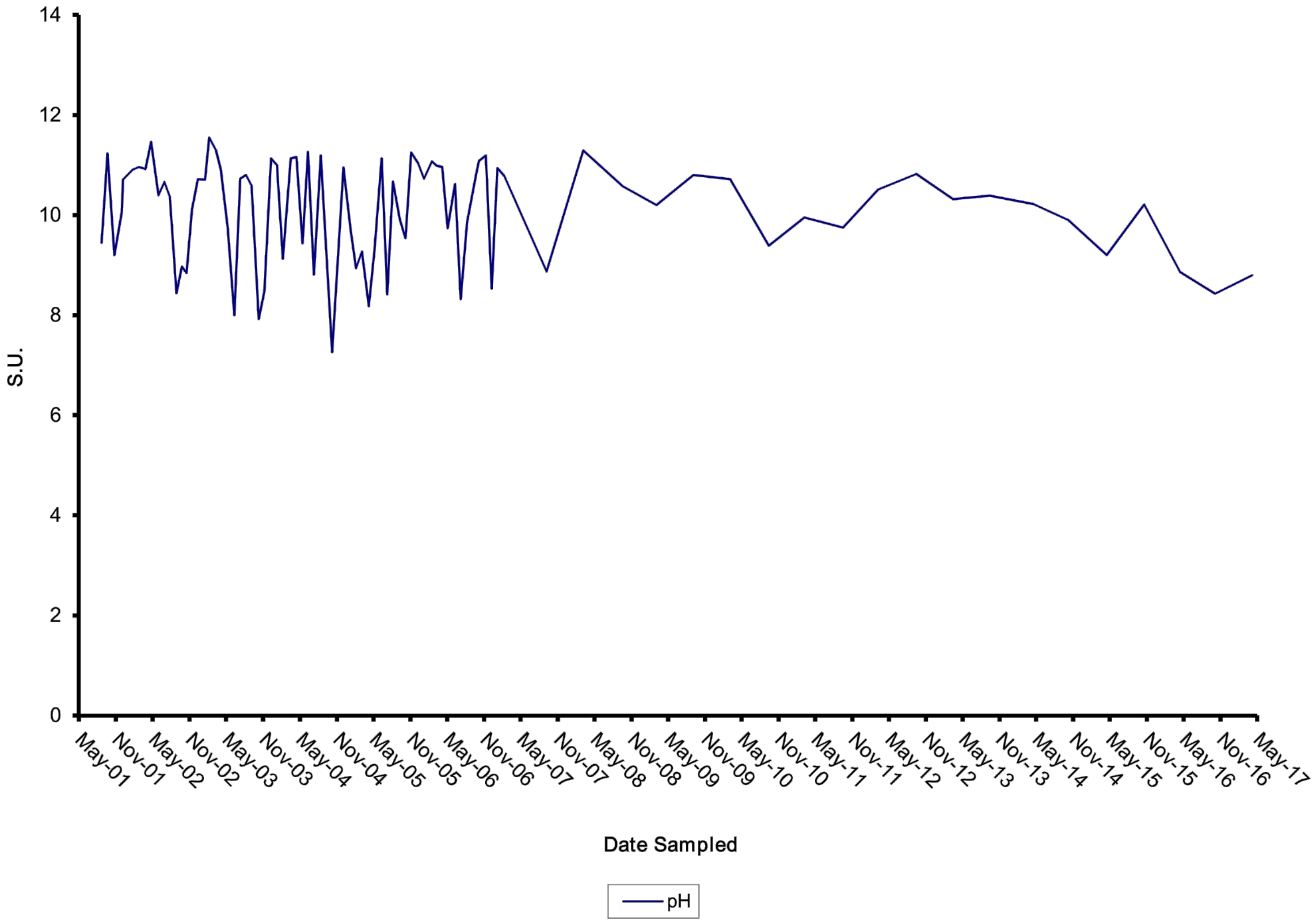


figure 2.15

EFFLUENT pH vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

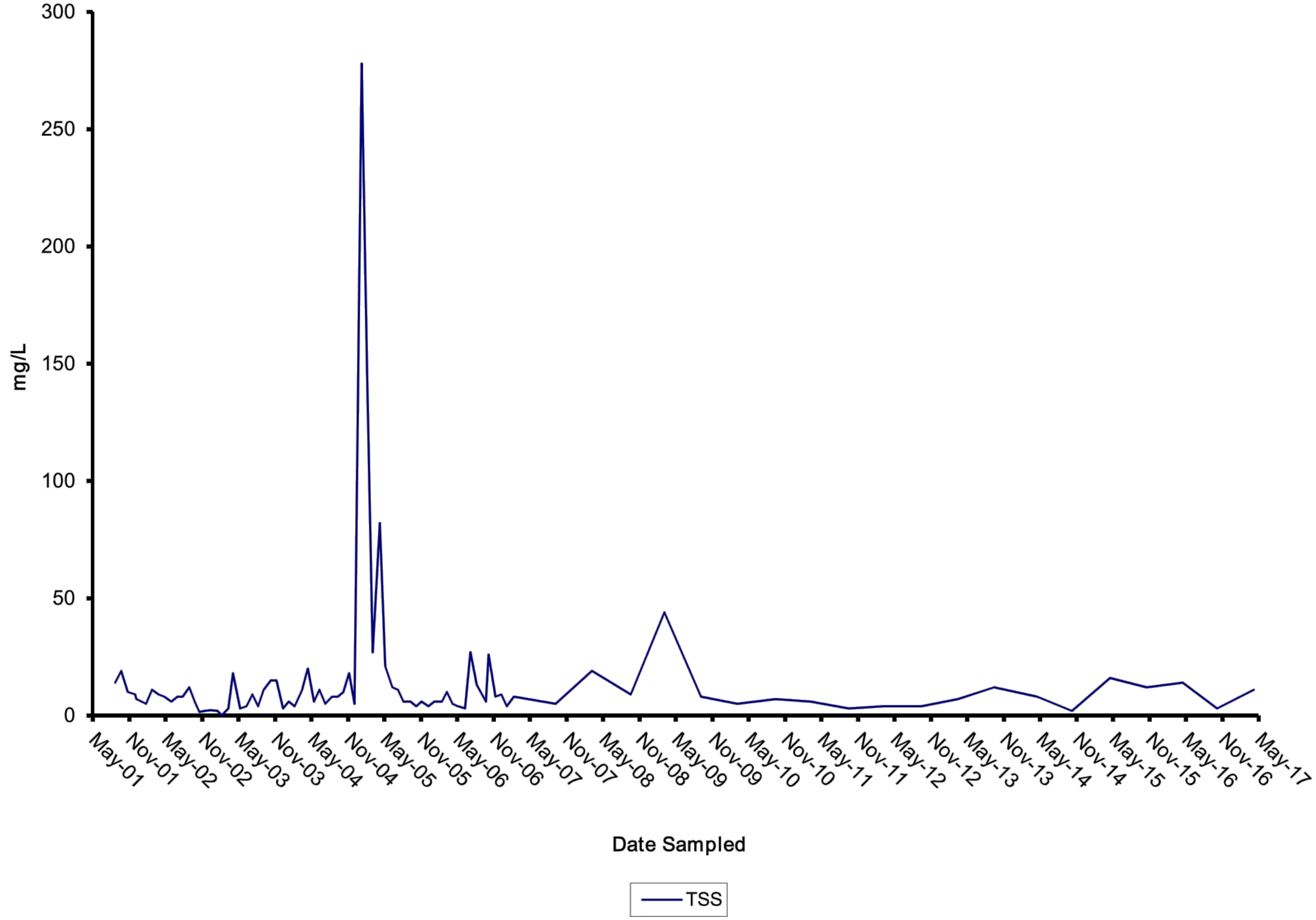


figure 2.16

EFFLUENT TOTAL SUSPENDED SOLIDS vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

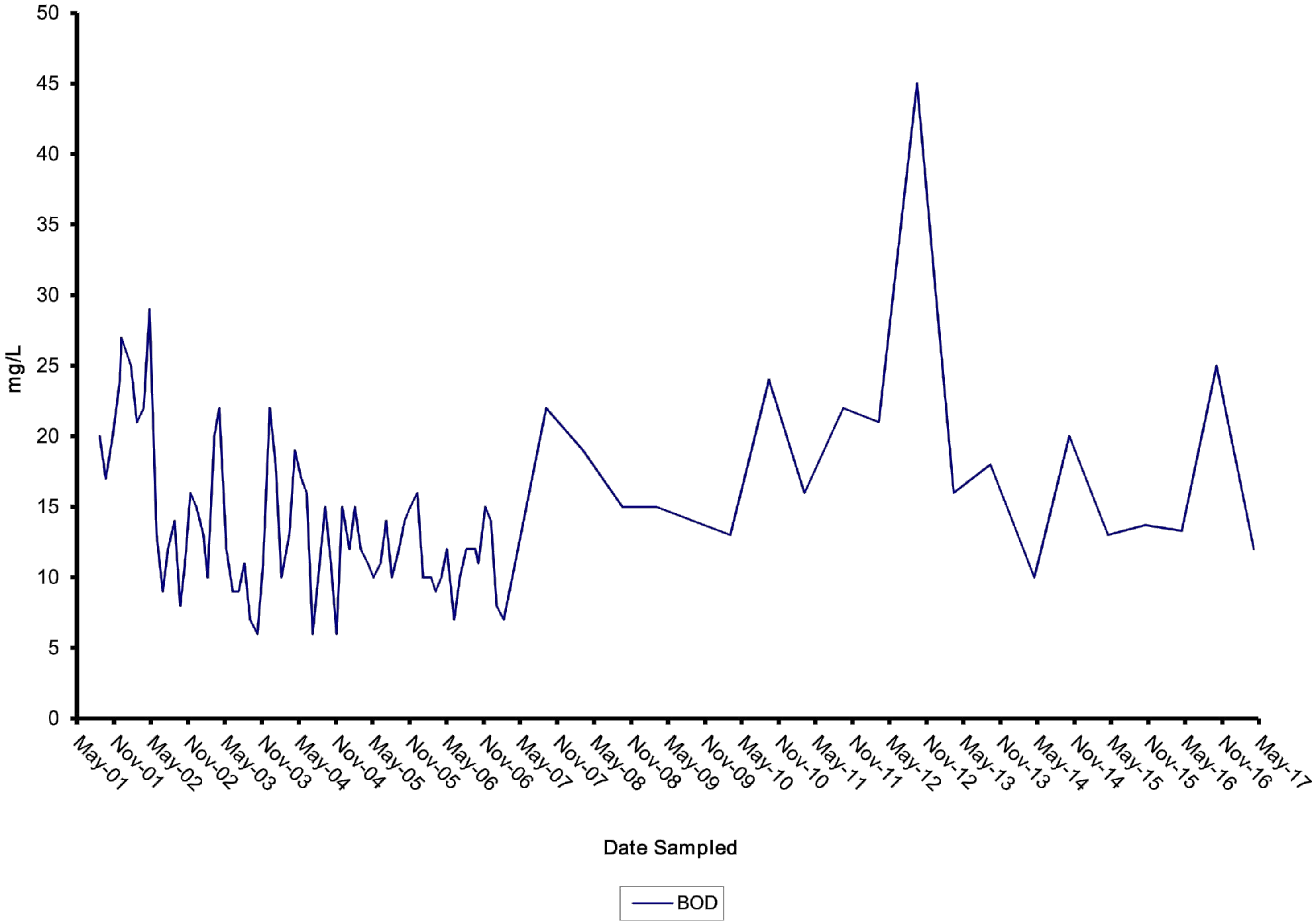


figure 2.17

EFFLUENT BOD vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

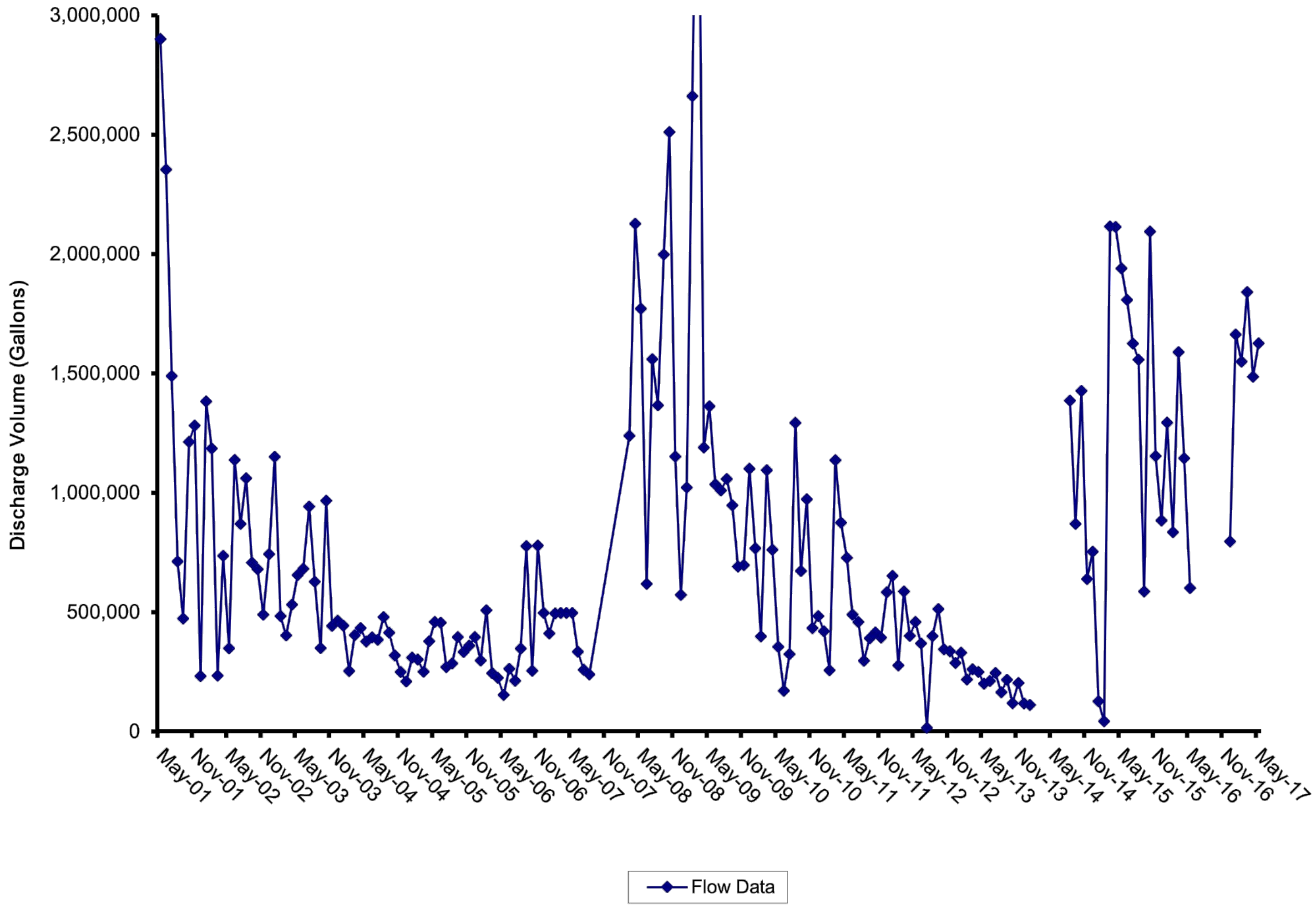


figure 2.18

EFFLUENT VOLUME vs. TIME
GRATWICK-RIVERSIDE PARK SITE
North Tonawanda, New York

Table 2.1

Groundwater Hydraulic Monitoring Locations
Operation and Maintenance
Gratwick-Riverside Park Site
North Tonawanda, New York

Inward Hydraulic Gradient Monitoring Locations

Inner (1)	**Outer**
MH2	Niagara River North (Downstream)
MH6	Niagara River North (Downstream)
MH8	Niagara River Middle
MH12	Niagara River South (Upstream)

Upward Hydraulic Gradient Monitoring Locations

Upper (1)	**Lower**
MH3	MW-6
MH8	MW-7
MH11	MW-8
MH14/MH15 (2)	MW-9

Frequency

- Weekly following GWS startup until six consecutive inward gradients are achieved.
- Monthly thereafter for the remainder of the initial 2-year period (review after 2 years).
- 2-Year and 5-Year reviews indicated that the monitoring frequency remain monthly.

Notes:

(1) These manholes will be monitored twice daily by POTW staff during a wet weather bypass event pursuant to Section 5.0 of the O&M Manual.

(2) Distance weighted averages of water levels used (MH14 - two thirds and MH15 - one third).

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH2	MH3	MH6	OGC-1	MW-6	OGC-5	River North	OGC-6	MH8	MW-7	OGC-2	River Middle	OGC-7
RIM Elevation	573.28	573.81	572.03						572.37				
TOC Elevation (ft amsl)				575.01	575.40	573.82	566.80	576.65		575.57	574.08	566.48	572.49
June 27, 2012	563.35	561.29	557.84	564.62	563.97	563.90	564.77	564.51	562.22	562.31	564.69	564.59	564.85
July 31, 2012	564.51	561.19	559.08	564.70	564.64	564.80	(1)	564.55	563.85	564.69	564.79	564.72	564.93
August 27, 2012	564.34	561.22	558.34	564.66	564.61	564.78	564.72	564.44	562.99	563.35	564.75	564.60	564.90
September 24, 212	563.36	561.20	557.36	564.84	563.60	564.82	564.67	564.65	561.94	562.29	564.79	564.60	564.98
October 26, 2012	563.39	559.91	557.40	564.54	563.54	564.31	(1)	564.32	561.94	562.34	564.49	564.04	564.49
November 26, 2012	563.50	561.25	557.20	564.09	563.57	563.99	(1)	564.01	561.66	561.94	564.17	563.71	564.11
December 26, 2012	563.64	561.19	557.37	564.00	563.66	563.39	(1)	563.94	561.75	562.21	564.04	(1)	563.71
January 30, 2013	564.00	560.19	557.80	564.27	564.12	564.16	(1)	563.96	562.33	562.45	564.26	563.03	564.35
February 27, 2013	563.96	560.71	557.86	564.27	563.92	563.86	(1)	563.87	562.79	562.38	564.77	563.18	563.98
March 27, 2013	536.97	560.29	557.45	564.13	563.98	564.13	(1)	563.97	561.94	562.05	564.06	563.86	564.21
April 24, 2013	564.33	560.57	557.97	564.69	564.58	564.64	(1)	564.54	562.49	562.57	564.65	564.31	564.75
May 24, 2013	564.09	560.85	557.81	564.44	563.18	564.39	(1)	564.36	562.41	562.40	564.54	564.16	564.49
June 27, 2013	564.37	559.69	557.96	564.70	564.59	564.78	564.23	564.57	562.69	562.86	564.78	564.58	564.89
July 24, 2013	564.38	560.60	558.10	565.22	564.52	565.11	565.11	566.04	562.93	563.28	565.25	564.95	565.28
August 22, 2013	564.18	560.40	557.71	565.02	564.24	565.10	565.02	564.93	562.41	562.46	565.05	564.95	565.25
September 30, 2013	564.17	560.68	557.72	564.88	564.28	564.98	564.87	564.76	564.40	562.48	564.97	564.74	565.11
October 30, 2013	564.47	560.63	558.05	564.81	564.64	564.57	(1)	564.53	562.79	562.98	564.76	564.30	564.69
November 27, 2013	564.44	560.33	557.69	564.44	564.52	564.14	(1)	564.24	562.35	562.40	564.43	563.63	564.29
December 31, 2013	564.41	561.39	558.11	564.64	564.74	564.41	(1)	564.33	562.86	563.09	564.45	564.43	564.56
January 30, 2014	564.13	559.88	557.64	565.03	564.14	564.90	564.80	564.87	562.41	562.40	565.09	(2)	565.07
February 26, 2014	567.53	570.48	558.01	564.44	565.29	564.32	(1)	564.20	562.81	562.78	564.44	563.98	564.45
March 28, 2014	564.10	559.36	557.62	564.26	564.01	564.09	564.96	564.13	562.21	562.01	564.29	564.39	564.21
April 25, 2014	564.42	560.21	558.36	564.81	564.74	564.50	(1)	564.44	563.03	562.95	564.67	564.28	564.63
May 29, 2014	564.46	559.12	558.41	564.92	564.71	564.57	(1)	564.70	563.20	563.21	564.91	564.60	564.88
June 25, 2014	564.38	560.62	558.14	564.88	564.46	564.93	564.80	564.87	562.88	562.94	565.08	564.67	565.13
July 29, 2014	564.24	560.42	557.93	565.04	564.28	564.96	(1)	564.81	562.72	562.84	565.11	564.78	565.10
August 26, 2014	564.26	561.12	557.84	564.80	564.26	564.91	564.91	564.69	562.58	562.49	564.90	564.77	565.08
September 30, 2014	564.01	560.65	557.82	564.63	564.07	564.65	564.67	564.50	562.51	562.36	564.70	564.54	564.78
October 29, 2014	564.06	559.77	557.82	564.73	564.09	564.83	564.81	564.63	562.54	562.35	564.77	564.65	565.00
November 25, 2014	563.88	560.70	557.44	565.39	563.89	565.64	565.41	564.96	562.09	561.92	565.13	NM	565.71
December 30, 2014	567.26	571.05	557.71	564.58	564.53	564.29	(1)	564.33	562.31	562.20	564.40	563.90	564.45

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH2	MH3	MH6	OGC-1	MW-6	OGC-5	River North	OGC-6	MH8	MW-7	OGC-2	River Middle	OGC-7
RIM Elevation	573.28	573.81	572.03						572.37				
TOC Elevation (ft amsl)				575.01	575.40	573.82	566.80	576.65		575.57	574.08	566.48	572.49
January 28, 2015	565.60	565.06	559.07	564.59	564.82	564.91	564.85	564.46	563.96	564.72	564.55	564.78	564.98
February 24, 2015	565.75	565.39	559.45	564.37	565.18	564.55	(2)	564.21	(2)	565.17	564.62	(2)	564.66
March 25, 2015	564.69	560.93	558.97	564.50	565.07	564.04	(1)	564.16	563.76	564.14	564.36	563.63	564.21
April 23, 2015	565.70	560.48	559.94	565.13	565.89	565.03	564.82	564.93	564.85	565.34	565.03	564.60	565.17
May 29, 2015	564.77	561.40	558.47	564.74	564.58	564.70	564.78	564.70	563.26	563.59	564.93	564.65	564.95
June 24, 2015	564.80	560.99	558.20	565.15	564.62	565.20	565.15	565.07	562.96	563.10	565.23	565.07	565.28
July 28, 2015	564.79	559.51	557.84	565.31	564.53	565.40	565.27	565.25	562.60	562.76	565.41	565.16	565.53
August 27, 2015	564.62	559.38	557.71	565.23	564.29	565.30	565.13	565.14	562.46	562.41	565.36	565.06	565.45
September 25, 2015	564.70	559.57	557.81	564.99	564.47	565.06	565.01	564.92	562.53	562.55	565.07	564.91	565.23
October 30, 2015	564.69	560.63	557.51	565.76	564.31	565.06	564.71	566.07	562.24	562.34	565.42	564.49	565.41
November 30, 2015	564.59	560.10	557.23	564.35	564.23	564.12	(1)	564.16	561.85	561.80	564.42	563.83	564.23
December 30, 2015	564.50	560.89	557.26	565.32	564.18	564.57	(1)	564.33	561.94	562.35	564.75	564.18	564.88
January 28, 2016	564.77	560.05	557.42	564.79	564.48	564.60	(1)	564.56	562.05	561.98	564.68	564.15	564.76
February 23, 2016	564.86	560.75	558.15	564.81	564.69	564.19	(1)	564.29	562.94	563.51	564.46	563.48	564.38
March 31, 2016	565.66	560.53	559.61	565.28	565.97	564.83	(1)	564.84	564.43	564.91	565.01	564.20	565.03
April 28, 2016	566.56	561.19	560.20	565.22	566.08	564.91	564.76	564.89	565.05	565.69	565.20	564.55	565.05
May 26, 2016	566.95	559.81	560.61	565.10	566.38	564.96	564.82	564.97	565.45	566.20	565.38	564.64	565.10
June 30, 2016	567.09	561.03	560.81	565.18	566.51	565.21	565.21	565.13	565.65	566.94	565.49	565.09	565.30
July 28, 2016	567.28	559.17	561.01	565.29	566.67	565.24	565.18	565.17	565.79	566.61	565.59	565.05	565.45
August 24, 2016	567.40	559.53	561.12	565.32	566.81	565.23	565.22	565.26	565.96	566.77	565.68	565.12	565.47
September 27, 2016	567.56	561.19	561.30	565.33	566.98	565.58	565.48	565.33	566.15	566.94	565.56	565.38	565.77
October 25, 2016	567.57	565.12	561.25	565.19	566.97	565.02	564.76	564.94	566.08	566.84	565.32	564.60	565.26
November 30, 2016	567.37	561.33	561.11	564.39	566.79	564.22	(1)	564.29	565.95	566.75	564.76	563.86	564.36
December 28, 2016	567.41	561.39	560.85	565.09	566.82	564.51	(1)	564.58	565.60	566.37	564.98	563.88	564.69
January 31, 2017	567.41	560.44	560.72	564.73	566.67	564.41	(1)	564.53	565.46	566.18	564.86	563.66	564.49
February 28, 2017	567.06	560.62	560.36	564.98	566.44	564.56	(1)	564.67	565.23	565.88	564.89	564.08	564.69
March 31, 2017	567.37	559.48	561.11	565.45	566.78	564.53	(1)	564.52	565.58	566.36	564.90	564.23	564.83
April 27, 2017	568.05	560.59	561.53	565.32	567.45	565.15	564.91	565.14	566.36	567.14	565.41	564.76	565.25
May 31, 2017	568.17	559.79	561.73	565.54	567.57	565.55	565.56	565.54	566.53	567.34	565.75	565.29	565.66

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH9	OGC-3	MH11	MW-8	River South	MH12	OGC-8	OGC-4	MW-9	MH14	MH15	MH16
RIM Elevation			572.11			572.37				574.30	575.84	574.82
TOC Elevation (ft amsl)	572.55	573.35		574.37	568.46		574.01	574.66	576.23			
June 27, 2012		564.96	562.11	562.70	565.03	560.31	565.08	564.94	564.84	564.88	563.82	564.83
July 31, 2012		565.01	564.00	564.55	565.07	561.88	565.11	565.02	564.71	564.77	563.72	564.66
August 27, 2012		564.99	562.42	563.00	565.03	560.56	565.08	565.00	564.81	564.87	563.81	564.79
September 24, 212		565.03	562.05	562.64	565.00	560.22	565.08	565.04	564.52	564.58	563.52	564.50
October 26, 2012		564.48	561.96	562.55	564.43	560.09	564.53	564.55	564.49	564.57	563.51	564.47
November 26, 2012		564.17	562.29	562.96	564.15	560.58	564.20	564.23	564.91	565.02	563.96	564.97
December 26, 2012		563.73	562.52	563.09	(1)	560.75	563.63	563.77	565.17	565.22	564.15	565.14
January 30, 2013		564.36	563.02	563.84	564.36	561.37	564.42	564.37	565.67	565.63	564.58	565.66
February 27, 2013		564.13	563.08	563.61	564.16	561.48	564.17	564.12	565.70	565.68	564.62	565.72
March 27, 2013		564.26	563.17	563.54	564.24	561.41	564.35	564.35	565.59	565.66	564.61	565.61
April 24, 2013		564.82	563.22	563.78	564.74	561.66	564.87	564.83	565.85	565.89	564.82	566.60
May 24, 2013		562.59	562.86	563.38	564.60	561.27	564.72	564.66	565.31	565.39	564.32	565.34
June 27, 2013		562.02	563.08	563.61	565.00	561.50	565.08	564.99	565.66	565.68	564.63	565.69
July 24, 2013		565.36	563.04	563.56	565.37	561.40	565.42	565.30	565.47	565.40	564.27	565.44
August 22, 2013		565.37	562.87	563.37	565.37	561.17	565.38	565.29	565.19	565.16	564.08	565.18
September 30, 2013		565.17	563.73	563.25	565.15	561.03	565.24	565.15	565.05	565.06	564.01	565.03
October 30, 2013		564.73	562.96	563.53	564.74	561.35	564.83	564.73	565.50	565.48	564.45	565.54
November 27, 2013		564.33	563.08	563.58	564.30	561.39	564.39	564.38	565.47	565.53	564.52	565.35
December 31, 2013		564.72	563.53	564.06	564.87	561.78	564.89	564.63	565.76	565.78	564.71	565.86
January 30, 2014		565.14	563.40	563.95	565.63	561.65	565.20	565.17	565.52	565.51	564.51	565.61
February 26, 2014		564.55	563.28	563.83	564.55	561.48	564.65	564.59	565.46	565.57	564.51	565.55
March 28, 2014	560.87	564.24	563.58	564.10	564.38	561.78	564.40	564.26	565.93	565.98	564.88	565.97
April 25, 2014	559.42	564.72	563.90	564.44	564.70	562.08	564.77	564.73	566.12	566.22	565.18	566.24
May 29, 2014	561.05	564.99	564.01	564.37	564.92	562.06	564.98	564.88	565.77	566.07	565.00	566.07
June 25, 2014	561.27	565.14	563.53	564.03	565.11	561.68	565.84	565.21	565.60	565.69	564.62	565.64
July 29, 2014	560.93	565.18	563.41	563.75	565.15	561.37	565.25	565.14	565.21	565.30	564.23	565.14
August 26, 2014	560.63	565.18	563.11	563.61	565.15	561.25	565.28	565.11	565.20	565.28	564.16	565.20
September 30, 2014	559.52	564.92	562.89	563.31	564.96	560.97	565.01	564.89	564.89	565.04	563.92	564.96
October 29, 2014	560.59	565.14	562.78	563.23	565.15	560.87	565.18	565.14	564.77	564.91	563.80	564.81
November 25, 2014	561.55	565.76	562.71	563.18	565.56	560.85	565.80	565.89	564.76	564.92	563.85	564.79
December 30, 2014	560.91	564.52	562.98	563.43	564.45	561.15	564.59	564.62	565.13	565.22	564.15	565.16

Table 2.2

Water Levels (FT AMSL)
Gratwick-Riverside Park Site
North Tonawanda, New York

Date	MH9	OGC-3	MH11	MW-8	River South	MH12	OGC-8	OGC-4	MW-9	MH14	MH15	MH16
RIM Elevation	572.55		572.11			572.37				574.30	575.84	574.82
TOC Elevation (ft amsl)		573.35		574.37	568.46		574.01	574.66	576.23			
January 28, 2015	564.64	565.19	564.19	564.70	565.24	562.14	565.28	565.18	564.26	565.39	564.31	565.33
February 24, 2015	565.12	564.74	(2)	565.15	564.60	562.51	564.80	564.78	565.41	(2)	564.44	565.44
March 25, 2015	559.25	564.22	563.88	564.44	563.86	561.78	564.22	563.24	566.11	(2)	565.10	566.13
April 23, 2015	560.40	565.22	564.86	565.41	565.04	562.69	565.25	565.26	566.41	566.53	565.26	566.54
May 29, 2015	561.88	565.01	563.36	563.93	565.05	561.28	565.13	564.99	565.56	565.67	564.57	565.61
June 24, 2015	560.38	565.67	563.33	563.87	565.44	561.25	565.47	565.45	565.54	565.62	564.54	565.57
July 28, 2015	560.55	565.59	563.27	563.84	565.50	561.16	565.63	565.64	565.38	565.49	564.43	565.43
August 27, 2015	559.82	565.53	563.09	563.60	565.47	560.96	565.59	565.60	565.14	565.23	564.11	565.17
September 25, 2015	559.75	565.35	563.20	563.58	565.31	560.91	565.39	565.30	565.16	565.30	564.14	565.21
October 30, 2015	561.54	565.24	562.82	563.34	565.00	560.69	565.23	565.45	564.25	562.52	560.35	564.33
November 30, 2015	559.78	564.52	562.52	563.03	564.19	560.35	564.40	564.39	563.61	562.72	561.17	563.69
December 30, 2015	560.97	564.93	562.22	562.79	564.73	560.14	565.00	565.03	563.10	562.57	561.16	563.39
January 28, 2016	561.19	564.77	562.68	563.18	564.64	560.48	564.83	564.84	563.44	562.49	561.02	563.60
February 23, 2016	560.92	564.39	563.03	563.54	564.16	560.88	564.41	564.48	563.55	562.69	561.63	563.71
March 31, 2016	560.12	564.96	564.19	564.76	564.60	562.06	565.01	565.05	564.54	562.28	559.76	564.54
April 28, 2016	564.63	565.12	564.97	564.49	565.04	562.79	565.18	565.15	565.27	563.07	561.01	565.34
May 26, 2016	565.53	565.22	565.42	565.93	565.14	563.25	565.25	565.27	565.61	562.95	559.66	565.63
June 30, 2016	566.03	565.49	565.77	566.30	565.49	563.62	565.55	565.47	566.36	566.12	567.30	566.37
July 28, 2016	565.62	565.53	565.99	566.55	565.48	563.83	565.58	565.54	566.62	568.64	567.51	566.60
August 24, 2016	565.82	565.60	566.09	566.62	565.57	563.92	565.63	565.56	566.64	568.77	568.01	566.69
September 27, 2016	566.36	565.92	566.33	566.84	565.84	564.14	565.95	565.88	566.87	568.70	567.96	566.89
October 25, 2016	565.73	565.30	566.29	566.85	565.19	564.13	565.29	565.33	566.86	566.97	567.43	566.92
November 30, 2016	566.27	564.42	566.23	566.74	564.34	564.07	564.44	564.48	566.88	568.17	567.36	566.93
December 28, 2016	559.75	564.62	565.75	566.35	564.45	563.68	564.71	564.80	566.50	562.67	559.88	566.60
January 31, 2017	559.53	564.46	565.58	566.09	564.24	563.44	564.58	564.58	566.22	562.34	560.72	566.31
February 28, 2017	564.92	564.68	565.32	565.85	564.57	563.15	564.76	564.83	565.92	562.03	559.68	565.99
March 31, 2017	559.97	565.07	565.82	566.35	564.96	563.68	565.28	565.16	566.47	562.88	560.73	566.53
April 27, 2017	560.70	565.33	566.59	567.14	565.24	564.40	565.33	565.40	567.26	563.07	560.81	567.30
May 31, 2017	559.08	565.73	566.88	567.27	565.66	564.57	565.79	565.78	567.40	564.63	560.33	567.42

Notes:

(1) River level too low to obtain a measurement at the measuring location.
(2) Unable to access

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

		06/27/2012		07/31/2012		08/27/2012		09/24/2012		10/26/2012		11/26/2012	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Monitoring Location													
Outer	River North	564.77	Inward	564.82 (2)	Inward	564.72	Inward	564.67	Inward	564.18 (2)	Inward	563.90 (2)	Inward
Inner	MH2	563.35		564.51		564.34		563.36		563.39		563.50	
Outer	River North	564.77	Inward	564.82 (2)	Inward	564.72 (1)	Inward	564.67	Inward	564.18 (2)	Inward	563.90 (2)	Inward
Inner	MH6	557.84		559.08		558.34		557.36		557.40		557.20	
Outer	River Middle	564.59	Inward	564.72	Inward	564.60	Inward	564.60	Inward	564.04	Inward	563.71	Inward
Inner	MH8	562.22		563.85		562.99		561.94		561.94		561.66	
Outer	River South	565.03	Inward	565.07	Inward	565.03	Inward	565.00	Inward	564.43	Inward	564.15	Inward
Inner	MH12	560.31		561.88		560.56		560.22		560.09		560.58	

		12/26/2012		01/30/2013		02/27/2013		03/27/2013		04/24/2013		05/24/2013	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Monitoring Location													
Outer	River North	563.67 (2)	Inward	564.11 (2)	Inward	563.91 (2)	Outward	563.99 (2)	Inward	564.49 (2)	Inward	564.35 (2)	Inward
Inner	MH2	563.64		564.00		563.96		563.97		564.33		564.09	
Outer	River North	563.67 (2)	Inward	564.11 (2)	Inward	563.91 (2)	Inward	563.99 (2)	Inward	564.49 (2)	Inward	564.35 (2)	Inward
Inner	MH6	557.37		557.80		557.86		557.45		557.97		557.81	
Outer	River Middle	563.79 (1)	Inward	563.83	Inward	563.18	Inward	563.86	Inward	564.31	Inward	564.16	Inward
Inner	MH8	561.75		562.33		562.79		561.94		562.57		562.41	
Outer	River South	563.92 (3)	Inward	564.36	Inward	564.16	Inward	564.24	Inward	564.74	Inward	564.60	Inward
Inner	MH12	560.75		561.37		561.48		561.41		561.66		561.27	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

		06/27/2013		07/24/2013		08/22/2013		09/30/2013		10/30/2013		11/27/2013	
		Water Level (ft amsl)	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**
Monitoring Location													
Outer	River North	564.75	Inward	565.11 (2)	Inward	565.10	Inward	564.87	Inward	564.49 (2)	Inward	564.05 (2)	Inward
Inner	MH2	564.37		564.38		564.18		564.17		564.47		564.94	
Outer	River North	564.75	Inward	565.11 (2)	Inward	565.10 (1)	Inward	564.87	Inward	564.49 (2)	Inward	564.05 (2)	Inward
Inner	MH6	557.96		558.10		557.71		557.72		558.05		557.69	
Outer	River Middle	564.58	Inward	564.95	Inward	564.95	Inward	564.74	Inward	564.30	Inward	563.63	Inward
Inner	MH8	562.69		562.93		562.41		562.48		562.79		562.35	
Outer	River South	565.00	Inward	565.37	Inward	565.37	Inward	565.15	Inward	564.74	Inward	564.30	Inward
Inner	MH12	561.50		561.40		561.17		561.03		561.35		561.39	

		12/31/2013		01/30/2014		2/26/2014		3/28/2014		4/25/2014		5/29/2014	
		Water Level (ft amsl)	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**
Monitoring Location													
Outer	River North	564.62 (2)	Inward	564.80	Inward	564.30 (2)	Outward	564.96	Inward	564.45 (2)	Inward	564.67 (2)	Inward
Inner	MH2	564.41		564.13		567.53		564.10		564.42		564.46	
Outer	River North	564.62 (2)	Inward	564.80	Inward	564.30 (2)	Inward	564.96	Inward	564.45 (2)	Inward	564.67 (2)	Inward
Inner	MH6	558.11		557.64		558.01		557.62		558.36		558.41	
Outer	River Middle	564.93 (1)	Inward	565.50 (1)	Inward	563.98	Inward	564.39	Inward	564.28	Inward	564.60	Inward
Inner	MH8	562.86		562.41		562.81		562.21		563.03		563.20	
Outer	River South	564.87 (3)	Inward	565.63	Inward	564.55	Inward	564.38	Inward	564.70	Inward	564.92	Inward
Inner	MH12	561.78		561.65		561.48		561.78		562.08		562.06	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

		06/25/2014		07/29/2014		08/26/2014		09/30/2014		10/29/2014		11/25/2014	
Monitoring Location		**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**
Outer	River North	564.80	Inward	564.90 (2)	Inward	564.91	Inward	564.67	Inward	564.81	Inward	565.41	Inward
Inner	MH2	564.38		564.24		564.26		564.01		564.06		563.88	
Outer	River North	564.80	Inward	564.90 (2)	Inward	564.91 (1)	Inward	564.67	Inward	564.81	Inward	565.41	Inward
Inner	MH6	558.14		557.93		557.84		557.82		557.82		557.44	
Outer	River Middle	564.67	Inward	564.78	Inward	564.77	Inward	564.54	Inward	564.65	Inward	565.43 (1)	Inward
Inner	MH8	562.94		562.84		562.58		562.51		562.54		562.09	
Outer	River South	565.11	Inward	565.15	Inward	565.15	Inward	564.96	Inward	565.15	Inward	565.56	Inward
Inner	MH12	561.68		561.37		561.25		560.97		560.87		560.85	

		12/30/2014		01/28/2015		02/24/2015		03/25/2015		04/23/2015		05/29/2015	
Monitoring Location		**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**
Outer	River North	564.20 (2)	Outward	564.85	Outward	564.35 (2)	Outward	563.61 (2)	Outward	564.82	Outward	564.78	Inward
Inner	MH2	567.26		565.50		565.75		564.69		565.70		564.77	
Outer	River North	564.20 (2)	Inward	564.85	Inward	564.35 (2)	Inward	563.61 (2)	Inward	564.82	Inward	564.78	Inward
Inner	MH6	557.71		559.07		559.45		558.97		559.94		558.47	
Outer	River Middle	563.90	Inward	564.78	Inward	564.47 (1)	NC	563.63	Outward	564.60	Outward	564.65	Inward
Inner	MH8	562.20		563.96		NM		563.76		564.85		563.26	
Outer	River South	564.45	Inward	565.24	Inward	564.80	Inward	563.86	Inward	565.04	Inward	565.05	Inward
Inner	MH12	561.15		562.14		562.51		561.78		562.69		561.28	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

		06/24/2015		07/28/2015		08/27/2015		09/25/2015		10/30/2015		11/25/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Monitoring Location													
Outer	River North	565.15	Inward	565.27	Inward	565.13	Inward	565.01	Inward	564.71	Inward	563.94 (2)	Outward
Inner	MH2	564.80		564.79		564.62		564.70		564.69		564.59	
Outer	River North	565.15	Inward	565.27	Inward	565.13	Inward	565.01	Inward	564.71	Inward	563.94 (2)	Inward
Inner	MH6	558.20		557.84		557.71		557.81		557.51		557.23	
Outer	River Middle	565.07	Inward	565.16	Inward	565.06	Inward	564.91	Inward	564.49	Inward	563.83	Inward
Inner	MH8	562.96		562.60		562.46		562.53		562.24		561.85	
Outer	River South	565.44	Inward	565.50	Inward	565.47	Inward	565.31	Inward	565.00	Inward	564.19	Inward
Inner	MH12	561.25		561.16		560.96		560.91		560.69		560.35	

		12/30/2015		01/28/2015		02/24/2015		03/25/2015		04/23/2015		05/29/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Monitoring Location													
Outer	River North	564.48 (2)	Outward	564.39 (2)	Outward	563.91 (2)	Outward	564.35 (2)	Outward	564.76	Outward	564.82	Outward
Inner	MH2	564.50		564.77		564.86		565.66		566.56		566.95	
Outer	River North	564.48 (2)	Inward	564.39 (2)	Inward	563.91 (2)	Inward	564.35 (2)	Inward	564.76	Inward	564.82	Inward
Inner	MH6	557.26		557.42		558.15		559.61		560.20		560.61	
Outer	River Middle	564.18	Inward	564.15	Inward	563.48	Inward	564.20	Outward	564.55	Outward	564.64	Outward
Inner	MH8	561.94		562.05		562.94		564.43		565.05		565.45	
Outer	River South	564.73	Inward	564.64	Inward	564.16	Inward	564.60	Inward	565.04	Inward	565.14	Inward
Inner	MH12	560.14		560.48		560.88		562.06		562.79		563.25	

Table 2.3

Summary of Horizontal Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

		6/30/2016		07/28/2016		08/24/2016		09/27/2016		10/25/2016		11/30/2016	
		Water Level (ft amsl)	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**
Monitoring Location													
Outer	River North	565.21	Outward	565.24	Outward	565.22	Outward	565.48	Outward	564.76	Outward	563.73 (1)	Outward
Inner	MH2	567.09		567.28		567.40		567.56		567.57		567.37	
Outer	River North	565.21	Inward	565.24	Inward	565.22	Inward	565.48	Inward	564.76	Inward	563.73 (1)	Inward
Inner	MH6	561.03		561.01		561.12		561.30		561.25		561.11	
Outer	River Middle	565.09	Outward	565.05	Outward	565.12	Outward	565.38	Outward	564.60	Outward	563.86	Outward
Inner	MH8	565.65		565.79		566.77		566.15		566.08		565.95	
Outer	River South	565.49	Inward	565.48	Inward	565.57	Inward	565.84	Inward	565.19	Inward	564.34	Inward
Inner	MH12	563.62		563.83		563.95		564.14		564.13		564.07	

		12/28/2016		01/31/2017		02/28/2017		03/31/2017		04/27/2017		05/31/2017	
		Water Level (ft amsl)	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**	**Water Level (ft amsl)**	**Gradient Direction**
Monitoring Location													
Outer	River North	563.75 (1)	Outward	563.53 (1)	Outward	563.95 (1)	Outward	564.10 (1)	Outward	564.91	Outward	565.56	Outward
Inner	MH2	567.41		567.41		567.06		567.37		568.05		568.17	
Outer	River North	563.75 (1)	Inward	563.53 (1)	Inward	563.95 (1)	Inward	564.10 (1)	Inward	564.91	Inward	565.56	Inward
Inner	MH6	560.85		560.72		560.36		561.11		561.53		561.73	
Outer	River Middle	563.88	Outward	563.66	Outward	564.08	Outward	564.23	Outward	564.76	Outward	565.29	Outward
Inner	MH8	565.60		565.46		565.23		565.58		566.36		566.53	
Outer	River South	564.45	Inward	564.24	Inward	564.57	Inward	564.96	Inward	565.24	Inward	565.66	Inward
Inner	MH12	563.68		563.44		563.15		563.68		564.40		564.57	

Notes:

(1) River level too low to obtain a measurement. Water level shown is River Middle water level minus 0.13 feet.
(2) River level too low to obtain a measurement. Water level shown is River South Water level minus 0.25 feet.
(3) River level too low to obtain a measurement. Lowest recorded level (i.e., 563.92) since start of system operation used
NM - Not Measured
NC - Not Calculated

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Location		06/27/2012		07/31/2012		08/27/2012		09/24/2012		10/26/2012		11/26/2012	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	561.29	Upward	561.19	Upward	561.22	Upward	561.20	Upward	559.91	Upward	561.25	Upward
Lower	MW-6	563.97		564.64		564.61		563.60		563.54		563.57	
Upper	MH8	562.22	Upward	563.85	Upward	562.99	Upward	561.94	Upward	561.94	Upward	561.66	Upward
Lower	MW-7	562.31		564.69		563.35		562.29		562.34		561.94	
Upper	MH11	562.11	Upward	564.00	Upward	562.42	Upward	562.05	Upward	561.96	Upward	562.29	Upward
Lower	MW-8	562.70		564.55		563.00		562.64		562.55		562.96	
Average (1)		564.53	Upward	564.42	Upward	564.52	Upward	564.23	Upward	564.22	Upward	564.67	Upward
Lower	MW-9	564.84		564.71		564.81		564.52		564.49		564.91	

Location		12/26/2012		01/30/2013		02/27/2013		3/27/2013		4/24/2013		5/24/2013	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.19	Upward	560.19	Upward	560.71	Upward	560.29	Upward	560.57	Upward	560.85	Upward
Lower	MW-6	563.66		564.12		563.92		563.98		564.58		564.18	
Upper	MH8	561.75	Upward	562.33	Upward	562.79	Downward	561.94	Upward	562.49	Upward	562.41	Downward
Lower	MW-7	562.21		562.45		562.38		562.05		562.57		562.40	
Upper	MH11	562.52	Upward	563.02	Upward	563.08	Upward	563.17	Upward	563.22	Upward	562.86	Upward
Lower	MW-8	563.09		563.84		563.61		563.54		563.78		563.38	
Average (1)		564.86	Upward	565.28	Upward	565.33	Upward	565.31	Upward	565.53	Upward	565.03	Upward
Lower	MW-9	565.17		565.67		565.70		565.59		565.85		565.31	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/27/2013		07/24/2013		08/22/2013		09/30/2013		10/30/2013		11/27/2013	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	559.69	Upward	560.60	Upward	560.40	Upward	560.68	Upward	560.63	Upward	560.33	Upward
Lower	MW-6	564.59		564.52		564.24		564.28		564.64		564.52	
Upper	MH8	562.69	Upward	562.95	Upward	562.41	Upward	562.40	Upward	562.79	Upward	562.35	Upward
Lower	MW-7	562.86		563.28		562.46		562.48		562.98		562.40	
Upper	MH11	563.08	Upward	563.04	Upward	562.87	Upward	562.73	Upward	561.96	Upward	563.08	Upward
Lower	MW-8	563.61		563.56		563.37		563.23		563.53		563.58	
Average (1)		565.33	Upward	565.06	Upward	564.80	Upward	564.71	Upward	565.14	Upward	565.19	Upward
Lower	MW-9	565.66		565.47		565.19		565.05		565.50		565.47	

Monitoring Location		12/31/2013		01/30/2014		2/26/2014		3/28/2014		4/25/2014		5/29/2014	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	561.39	Upward	559.88	Upward	570.48	Downward	559.36	Upward	560.21	Upward	559.12	Upward
Lower	MW-6	564.74		564.14		565.29		564.01		564.74		564.71	
Upper	MH8	562.86	Upward	562.41	Downward	562.81	Downward	562.21	Downward	563.03	Downward	563.20	Upward
Lower	MW-7	563.09		562.40		562.78		562.01		562.95		563.21	
Upper	MH11	563.53	Upward	563.40	Upward	563.28	Upward	563.58	Upward	563.90	Upward	564.01	Upward
Lower	MW-8	564.06		563.95		563.83		564.10		564.44		564.37	
Average (1)		565.42	Upward	565.18	Upward	565.22	Upward	565.61	Upward	565.87	Upward	565.71	Upward
Lower	MW-9	565.76		565.52		565.46		565.93		566.12		565.77	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/25/2014		07/29/2014		08/26/2014		09/30/2014		10/29/2014		11/25/2014	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.62	Upward	560.42	Upward	561.12	Upward	560.65	Upward	559.77	Upward	560.70	Upward
Lower	MW-6	564.46		564.28		564.26		564.07		564.09		563.89	
Upper	MH8	562.88	Upward	562.72	Upward	562.58	Downward	562.51	Downward	562.54	Downward	562.09	Downward
Lower	MW-7	562.94		562.84		562.49		562.36		562.35		561.92	
Upper	MH11	563.53	Upward	563.41	Upward	563.11	Upward	562.89	Upward	562.78	Upward	562.71	Upward
Lower	MW-8	564.03		563.75		563.61		563.31		563.23		563.18	
Average (1)		565.33	Upward	564.94	Upward	564.91	Upward	564.67	Upward	564.54	Upward	564.56	Upward
Lower	MW-9	565.60		565.21		565.20		564.89		564.77		564.76	

Monitoring Location		12/30/2014		01/28/2015		2/24/2015		3/25/2015		4/23/2015		5/29/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	571.05	Downward	565.06	Downward	565.39	Downward	560.93	Upward	560.48	Upward	561.40	Upward
Lower	MW-6	564.53		564.82		565.18		565.07		565.89		564.58	
Upper	MH8	562.31	Downward	563.96	Upward	NM	NA	563.76	Upward	564.85	Upward	563.26	Upward
Lower	MW-7	562.20		564.72		565.17		564.14		565.34		563.59	
Upper	MH11	562.98	Upward	564.19	Upward	NM	NA	563.88	Upward	564.86	Upward	563.36	Upward
Lower	MW-8	563.43		564.70		565.15		564.44		565.41		563.93	
Average (1)		564.86	Upward	565.03	Downward	NM	NA	NM	NA	566.11	Upward	565.30	Upward
Lower	MW-9	565.13		564.26		565.41		566.11		566.41		565.56	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/24/2015		07/28/2015		08/28/2015		09/25/2015		10/30/2015		11/30/2015	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.99	Upward	559.51	Upward	559.38	Upward	559.57	Upward	560.63	Upward	560.10	Upward
Lower	MW-6	564.62		564.53		564.29		564.47		564.31		564.23	
Upper	MH8	562.96	Upward	562.60	Upward	562.46	Downward	562.53	Upward	562.24	Upward	561.85	Downward
Lower	MW-7	563.10		562.76		562.41		562.55		562.34		561.80	
Upper	MH11	563.33	Upward	563.27	Upward	563.09	Upward	563.20	Upward	562.82	Upward	562.52	Upward
Lower	MW-8	563.87		563.84		563.60		563.58		563.34		563.03	
Average (1)		565.26	Upward	565.14	Upward	564.86	Upward	564.91	Upward	563.80	Upward	562.20	Upward
Lower	MW-9	565.54		565.38		565.14		565.16		564.25		563.61	

Monitoring Location		12/30/2015		01/28/2016		2/23/2016		3/31/2016		4/28/2016		5/26/2016	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	560.89	Upward	560.05	Upward	560.75	Upward	560.53	Upward	561.19	Upward	559.81	Upward
Lower	MW-6	564.18		564.48		564.69		565.97		566.08		566.38	
Upper	MH8	561.94	Upward	562.05	Downward	562.94	Upward	564.43	Upward	565.05	Upward	565.45	Upward
Lower	MW-7	562.35		561.98		563.51		564.91		565.69		566.20	
Upper	MH11	562.22	Upward	562.68	Upward	563.03	Upward	564.19	Upward	564.97	Downward	565.42	Downward
Lower	MW-8	562.79		563.18		563.54		564.76		564.49		565.14	
Average (1)		562.10	Upward	562.00	Upward	562.34	Upward	561.44	Upward	562.38	Upward	561.85	Upward
Lower	MW-9	563.10		563.44		563.55		564.54		565.27		565.61	

Table 2.4

Summary of Vertical Gradients
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location		06/30/2016		07/28/2016		08/24/2016		09/27/2016		10/25/2016		11/30/2016	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	561.03	Upward	559.17	Upward	559.53	Upward	561.19	Upward	565.12	Upward	561.33	Upward
Lower	MW-6	565.18		566.67		566.81		566.98		566.97		564.39	
Upper	MH8	565.13	Upward	565.79	Upward	565.96	Upward	566.15	Upward	566.08	Upward	565.95	Upward
Lower	MW-7	566.44		566.61		566.67		566.94		566.84		566.75	
Upper	MH11	565.77	Upward	565.99	Upward	566.09	Upward	566.33	Upward	566.29	Upward	566.23	Upward
Lower	MW-8	566.30		566.55		566.62		566.84		566.85		566.74	
Average (1)		567.85	Downward	568.26	Downward	568.52	Downward	568.45	Downward	567.12	Downward	567.90	Downward
Lower	MW-9	566.36		566.62		566.64		566.87		566.86		566.88	

Monitoring Location		12/28/2016		01/31/2017		02/28/2017		03/31/2017		04/27/2017		05/31/2017	
		Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction	Water Level (ft amsl)	Gradient Direction
Upper	MH3	561.39	Upward	560.44	Upward	560.62	Upward	559.48	Upward	560.59	Upward	559.79	Upward
Lower	MW-6	566.82		566.67		566.44		566.78		567.45		567.57	
Upper	MH8	565.60	Upward	565.46	Upward	565.23	Upward	565.58	Upward	566.36	Upward	566.53	Upward
Lower	MW-7	566.37		566.18		565.88		566.36		567.14		567.34	
Upper	MH11	565.75	Upward	565.58	Upward	565.32	Upward	565.82	Upward	566.59	Upward	566.88	Upward
Lower	MW-8	566.35		566.09		565.85		566.35		567.14		567.27	
Average (1)		561.74	Upward	561.80	Upward	561.25	Upward	562.16	Upward	562.85	Upward	563.20	Upward
Lower	MW-9	566.50		566.22		565.92		566.47		567.26		567.40	

Notes:

NA - Not Applicable.
NM - Not monitored.
(1) - Distance weighted for MH14 (two thirds) and MH15 (one third).
(2) - Buried with snow.
(3) - Not Monitored - MH14 was buried with snow and could not be accessed.

Table 2.5

Groundwater Sampling Summary
Operation and Maintenance Manual
Gratwick-Riverside Park Site
North Tonawanda, New York

LOCATIONS

OGC1
OGC2
OGC3
OGC4
OGC5
OGC7
MW-6
MW-7
MW-8
MW-9
OGC6
OGC8

FREQUENCY

- quarterly for 2 years following GWS startup.
- semi-annually for Year 3 except for OGC-4 (quarterly for SVOCs) and OGC-6 (quarterly for VOCs).
- annually for Years 4 through 7 (until May 2008).

SAMPLING PROGRAM (MAY 2009 THROUGH MAY 2012)

Annual	***Once Every 2 Years (2010 and 2012)***
MW-8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-4	OGC-2
OGC-6	OGC-5
OGC-7	
OGC-8	

SAMPLING PROGRAM (MAY 2013 THROUGH MAY 2017)

Annual	***Once Every 2 Years (2014 and 2016)***
MW-8	MW-6
MW-9	MW-7
OGC-3	OGC-1
OGC-6	OGC-2
OGC-7	OGC-4
	OGC-5
	OGC-8

PARAMETERS

Volatiles

Acetone
Benzene
2-Butanone
Chlorobenzene
1,1-Dichloroethane
trans-1,2-Dichloroethene
Ethylbenzene
Methylene Chloride
Tetrachloroethene
Toluene
Trichloroethene
Vinyl Chloride
Xylenes (Total)

Semi-Volatiles

1,2-Dichlorobenzene
1,4-Dichlorobenzene
2,4-Dimethylphenol
2-Methylphenol
4-Methylphenol
Naphthalene
Di-n-octylphthalate
Phenol

Table 2.6

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

Location		**MW-9**												
Date	**Class GA Level**	**05/18/01**	**08/20/01**	**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**	**05/30/06**
Volatiles (µg/L)														
Acetone	50	9.4J	4.3J	7.3J/6.7J		4.2J	7.0/7.2			13/12			17	17
Benzene	1		0.24J	0.39J/0.35J		0.44J	0.29J/0.30J	0.29J/0.29J		0.40J/ND0.70				0.54J
2-Butanone	50													2.6J
Chlorobenzene	5		0.50J	0.86J/0.85J		1.3		1.0/1.1		0.91J/0.87J		1.1	1.7	1.5
trans-1,2-Dichloroethene	5			0.22J/ND		0.31J	0.24J/0.24J	0.22J/0.20J						0.42J
Ethylbenzene	5		0.30J	0.46J/0.42J		0.73J	0.44J/0.42J	0.46J/0.46J		0.40J/0.38J				0.83J
Methylene Chloride	5		0.34J	0.33J/ND	4.0J	0.53J						$\boxed{7.2}$	1.6	
Tetrachloroethene	5	1.6J	1.1J	1.0J/0.92J		1.6	0.92J/0.80J	0.77J/0.74J		0.67J/0.71J				0.57J
Toluene	5		1.6J	3.0J/2.5J	2.8J	2.7	2.1/2.0	2.7/2.7	2.0	2.0/1.9	4.6	3.2	2.6	
Trichloroethene	5	2.2J	1.8J	2.4J/2.2J	3.0J	4.4	2.0/2.0	2.2/2.3		1.8/1.8	$\boxed{9.5}$	4.9	3.0	1.8
Vinyl Chloride	2									1.7/1.7			$\boxed{3.6}$	$\boxed{4.0}$
Total Xylenes	5		1.0J	1.5J/1.5J		2.5J	1.3J/1.3J	1.4J/1.4J		0.98J/1.0J	3.0			2.0J
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*				0.6J									
1,4-Dichlorobenzene	3*												2J	
2,4-Dimethylphenol	50	12	12	18/17	38		20/22	30/34	30	35/36	36	42	50	$\boxed{58}$
2-Methylphenol	NL	1J	3J	3J/3J	7J		4J/4J	6J/6J	6J	6J/6J	6J	5J	8J	8J
4-Methylphenol	NL	69	110	97/92	230		100/110	190/230	150	130/130	160	190	260	190
Naphthalene	10													
Di-n-octyl phthalate	50													
Phenol	1	$\boxed{3J}$	$\boxed{34}$	$\boxed{28/22}$	$\boxed{24}$		$\boxed{38/41}$	$\boxed{34/35}$	$\boxed{42}$	$\boxed{46/46}$	$\boxed{180}$	$\boxed{30}$	$\boxed{27}$	$\boxed{49}$

Notes:

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

Table 2.6

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

Location		MW-9										
Date		05/25/07	05/29/08	05/27/09	05/26/10	05/26/11	05/30/12	05/24/13	05/29/14	05/29/15	05/26/16	05/31/17
Volatiles (µg/L)	**Class GA Level**											
Acetone	50		5.7	4.8J	5.9	4.3J			6.2		15J	5.8
Benzene	1			0.76		0.53J	0.44J	0.62J	0.57J			0.62J
2-Butanone	50											
Chlorobenzene	5	2.8	1.4	5.3	2.5	2.4	2.3	2.5	3.1			3.1
trans-1,2-Dichloroethene	5		0.55J	0.74J								
Ethylbenzene	5			1.2	0.82J	1.1	0.74J	1.0	0.97J			1.1
Methylene Chloride	5											
Tetrachloroethene	5			0.82J	0.57J	0.66J	0.54J		0.66J			0.43J
Toluene	5	3.1	2.4	3.8	3.8	4.3	3.5	4.4	4.6	5.3J	4.4J	
Trichloroethene	5	2.9	1.7	4.7	2.6	2.7	2.3	3.0	3		2.6J	4.8
Vinyl Chloride	2			4.2		1.4						2.9
Total Xylenes	5			3.3	2.2J	2.7	1.5J	2.7	2.6			3.1
Semi-Volatiles (µg/L)												
1,2-Dichlorobenzene	3*	0.9J	0.7J		1.4J	1.0J	1.1J	0.98J	1.6J	1.2J	1.5J	
1,4-Dichlorobenzene	3*	3J	1J	2.3J	1.7J	1.6J	1.8J	0.87J	2.3J	0.48J	2.6J	
2,4-Dimethylphenol	50	46	31	110	41	43	47	82J	76J	62J	130J	140
2-Methylphenol	NL	6	6	12	9.9J	11	11	12	13J	13	16	20J
4-Methylphenol	NL	170	96	300	180	230	230	280	0.75J	200	340	340
Naphthalene	10	0.2J	0.5J								1.2J	
Di-n-octyl phthalate	50											
Phenol	1	11	13	20	20	17	9.3J	16	26	16	26	37J

Notes:

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

Table 2.6

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

Location		**OGC-4**														
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**3/04/04**	**05/14/04**	**11/23/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**											NA		NA		
Acetone	50			7.9J			4.0J									
Benzene	1		0.21J	0.2J												
2-Butanone	50															
Chlorobenzene	5		0.49J	0.66J		0.83J/0.79J		0.46J		0.83J						
trans-1,2-Dichloroethene	5			0.22J												
Ethylbenzene	5		0.41J	0.39J		0.54J/0.53J	0.48J	0.39J		0.77J						0.44J
Methylene Chloride	5				5.1J/4.9J								4.6		2.0	
Tetrachloroethene	5	1.0J	1.2J	0.87J		0.86J/0.84J	1.1	0.78J		0.77J						
Toluene	5			1.0J		1.0/0.98J	1.4	0.72J		1.2						
Trichloroethene	5	1.6J	1.4J	1.5J		1.5/1.4	1.7	0.96J		1.5						0.53J
Vinyl Chloride	2															
Total Xylenes	5		1.0J	0.94J		0.84J/0.82J	1.1J			0.95J						
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50	8J	12	6J	8J/6J	7J/7J	8J		7J/7J	8J	4J	6J		4J		
2-Methylphenol	NL	0.9J	2J	35	2J/ND	1J/2J	2J			3J		3J		2J		
4-Methylphenol	NL	64	86	40	58/55	61/67	68		69/68	73	32	55		31	14	15
Naphthalene	10															
Di-n-octyl phthalate	50															
Phenol	1	$\boxed{310}$	$\boxed{560}$	$\boxed{400}$	$\boxed{420/460}$	$\boxed{710/1100}$	$\boxed{1100}$	$\boxed{1100}$	$\boxed{2400/2300}$	$\boxed{1800}$	$\boxed{1600}$		$\boxed{2400}$	$\boxed{1500}$	$\boxed{850}$	$\boxed{510}$

Notes:

* Applies to sum of compounds
NL - Not listed
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J - Estimated
Blank = Non-Detect

Table 2.6

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

Location		OGC-4							
Date		05/25/07	05/29/08	05/27/09	05/26/10	05/26/11	05/30/12	05/29/14	05/26/16
Volatiles (µg/L)	**Class GA Level**								
Acetone	50			1.6J					3.6J
Benzene	1								
2-Butanone	50								
Chlorobenzene	5								
trans-1,2-Dichloroethene	5								
Ethylbenzene	5								
Methylene Chloride	5								
Tetrachloroethene	5								
Toluene	5								
Trichloroethene	5								
Vinyl Chloride	2								
Total Xylenes	5								
Semi-Volatiles (µg/L)									
1,2-Dichlorobenzene	3*								
1,4-Dichlorobenzene	3*								
2,4-Dimethylphenol	50		0.9J		0.51J/ND				
2-Methylphenol	NL		0.5J	2.7J					
4-Methylphenol	NL	3J	6				2.8J	0.87J	
Naphthalene	10		0.5J		3.4J/3.4J				
Di-n-octyl phthalate	50								
Phenol	1	$\boxed{84}$	$\boxed{66}$	$\boxed{25}$	$\boxed{15/15}$	$\boxed{5.5}$	0.97J	0.68J	0.43J

Notes:

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NS - Not Sampled
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Blank = Non-Detect

Table 2.6

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

Location		**OGC-8**												
Date	**Class GA Level**	**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**05/08/03**	**05/14/04**	**05/27/05**	**05/30/06**
Volatiles (µg/L)														
Acetone	50	78	31/29	19J		4.7J	3.6J				6.2	5.8	4.7J	
Benzene	1	11	14/14	14		2.6	5.3	3.3	3.6	3.1	1.8	1.2	1.1	0.92
2-Butanone	50	4.0J												
Chlorobenzene	5	3.7J	4.1J/4.1J	4.0J		0.87J	1.7	1.1		1.1	0.65J	0.48J	0.43J	0.44J
trans-1,2-Dichloroethene	5	4.3J	3.2J/3.1J	4.0J		0.76J	1.5	0.88J		1.0	0.50J	0.41J	1.0	
Ethylbenzene	5	13	16/16	15	1.6J	2.8	5.8	3.1	3.9	3.1	1.8	1.2		0.99J
Methylene Chloride	5		0.52J/0.48J	0.62J	1.8J									
Tetrachloroethene	5	40	51/52	59	7.7J	9.9	22	12	14	11	7.0	5.0	3.8	4.0
Toluene	5	140	140/140	110	17J	21	53	28	38	27	16	11	8.1	8.3
Trichloroethene	5	120	110/110	110	20J	22	53	27	35	27	17		7.7	7.6
Vinyl Chloride	2	3.7J	3.4/3.6	3.1	1.1J		1.4	0.70J		0.78J				
Total Xylenes	5	43	55/54	46	4.8J	8.3	18	9.5	11	9.9	5.4	3.7	3.0	3.2
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*													
1,4-Dichlorobenzene	3*													
2,4-Dimethylphenol	50	2J	4J/2J	4J	0.8J	0.8J	3J	1J						
2-Methylphenol	NL	18	30/25	16	4J	5J	13	7J	11	7J	4J	2J	2J	3J
4-Methylphenol	NL	30	51/45	28	8J	10	26	14	20	14J	9	5J	6J	8J
Naphthalene	10	1J	3J/25	1J			0.9J							
Di-n-octyl phthalate	50		0.1J/ND											
Phenol	1	30	49/44	31	5J	8J	11	10		4J	6J	2J		

Notes:

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NL - Not listed
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NS - Not Sampled
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Blank = Non-Detect

Table 2.6

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

Location		**OGC-8**							
Date		**05/24/07**	**05/29/08**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**								
Acetone	50		9.9	1.5J					
Benzene	1	0.54J	0.84	0.58J				0.50J	0.47J
2-Butanone	50								
Chlorobenzene	5								
trans-1,2-Dichloroethene	5								
Ethylbenzene	5	0.53J	0.84J	0.50J					
Methylene Chloride	5								
Tetrachloroethene	5	2.0	2.3	1.6		0.94J	1.3	0.91J	1.0
Toluene	5	4.0	6.4	3.7		2.4	2.6	2.8	3.3
Trichloroethene	5	4.0	6.5	4.0		2.4	2.7	3.1	3.9
Vinyl Chloride	2								
Total Xylenes	5	1.1J	2.5J	1.5J		0.82J	0.86J	0.78J	1.0J
Semi-Volatiles (µg/L)									
1,2-Dichlorobenzene	3*								
1,4-Dichlorobenzene	3*		0.2J						
2,4-Dimethylphenol	50		1J		0.73J		0.52J	1.1J	0.86
2-Methylphenol	NL	2J	2J		2.2J	1.5J	2.0J	2.6J	1.9J
4-Methylphenol	NL	6	8	5.7	6.5J	5.3J	6.2J		
Naphthalene	10								
Di-n-octyl phthalate	50								
Phenol	1								

Notes:

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Table 2.6

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

Location		**River South**														
Date	**Class GA Level**	**05/18/01**	**09/17/01**	**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**	**05/30/06**	**05/24/07**	**05/29/08**
Volatiles (µg/L)																
Acetone	50						3.0J						3.2J			12
Benzene	1										0.42J					
2-Butanone	50												3.9J			3.1J
Chlorobenzene	5															
trans-1,2-Dichloroethene	5															
Ethylbenzene	5															
Methylene Chloride	5															
Tetrachloroethene	5						0.30J									
Toluene	5			0.29J			0.72J	0.35J			1.8					
Trichloroethene	5						0.44J									
Vinyl Chloride	2						0.27J									
Total Xylenes	5										1.8J					
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50															
2-Methylphenol	NL															
4-Methylphenol	NL															
Naphthalene	10															
Di-n-octyl phthalate	50															
Phenol	1															

Notes:

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Table 2.6

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

Location		MW-8												
Date	Class GA Level	05/18/01	08/20/01	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	05/30/06
Volatiles (µg/L)														
Acetone	50	52	12J	11J	75J	67	20			73		28/33	26	16
Benzene	1	6.5	4.3	4.1		8.6	12	12	8.1	12	23/24	10/12	4.2	4.4
2-Butanone	50													
Chlorobenzene	5	1.8J	1.0J	1.0J		3.2	4.9	4.4	3.6	6.2	6.0/6.4	2.7/3.3	2.4	2.4
trans-1,2-Dichloroethene	5	2.2J	1.8J	2.9J	4.8J	7.3	11	16	12	13	10/12	7.3/9.4	7.4	5.3
Ethylbenzene	5	5.7	3.7J	4.4J	8.2J	12	18	18	15	23	30/32	20/24	4.6	5.8
Methylene Chloride	5	1.1J	0.58J	0.66J	4.4J	1.2	1.4	1.6		1.3	2.2/2.2	7.3/9.2	1.7	0.64J
Tetrachloroethene	5	21	12	9.8	23J	32	61	58	54	80	91/100	120/130	62	71
Toluene	5	75	36	31	80	100	140	160	100	120	240/240	97/120	30	33
Trichloroethene	5	82	40	35	110	180	320	280	210	320	460/460	380/390	180	150
Vinyl Chloride	2	5.2	1.6J	3.3	23	12	18	14	12	18	21/21	13/16	5.8	5.1
Total Xylenes	5	22	13	16	30J	40	68	69	58	93	120/120	92/110	32	25
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*				2J	2J		2J		4J	3J/3J			
1,4-Dichlorobenzene	3*			0.6J	2J	1J	1J	2J		4J	3J/3J	19U/2J	4J	5J
2,4-Dimethylphenol	50	1J	11	16	19	18	15	27	20	27	37/38	15J/14	7J	6J
2-Methylphenol	NL	33	55	41	48	44	38	56	37	35	45/46	18J/18	18J	16
4-Methylphenol	NL	10	32	34	55	60	59	83	64	75	130/130	34/31		
Naphthalene	10				0.7J	0.8J	0.8J	1J			2J/2J			
Di-n-octyl phthalate	50													
Phenol	1	43	130	140	85	110	91	110	140	78	80/80	28/28	11J	4J

Notes:

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NL - Not listed
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Blank = Non-Detect

Table 2.6

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

Location		MW-8										
Date	Class GA Level	05/24/07	05/29/08	05/29/09	05/26/10	05/26/11	05/30/12	05/24/13	05/29/14	05/29/15	05/26/16	05/31/17
Volatiles (µg/L)												
Acetone	50	6.6/7.5	23	2.6J		3.1J						
Benzene	1	1.6/1.5	1.5	2.7		2.7	2.1	2.5	3.5	2.8J/2.9J		
2-Butanone	50		4.4J									
Chlorobenzene	5	0.84J/0.82J	0.54J	0.99J		3.8	3.4	3.4	7.0	4.6J/4.8J		
trans-1,2-Dichloroethene	5	4.4/3.9	3.6	6.8		3.5	3.4	3.4	6.5	5.3/6.1		
Ethylbenzene	5	2.5/2.2	1.8	4.2		5.2	4.4	4.4	6.2	3.9J/3.9J		
Methylene Chloride	5											
Tetrachloroethene	5	16/14	9.5	12		12	7.7	5.3	3.5	2.9J/2.8J		
Toluene	5	12/11	10	26		18	6.5	6.5	4.9	4.0J/4.1J		
Trichloroethene	5	40/36	29	68		34	22	21	22	17/17	15	7.9J
Vinyl Chloride	2					3.0						
Total Xylenes	5	9.8/9.1	6.7	19		22	16	12	11	5.4J/5.0J		
Semi-Volatiles (µg/L)												
1,2-Dichlorobenzene	3*		0.4J		1.5J	1.2J	1.3J	0.87J	1.7J	1.2J/0.91J	1.4	
1,4-Dichlorobenzene	3*	0.5J/0.4J	0.5J		2.1J	3.3J	6.9J	7.1J	21	12/11	17	11J
2,4-Dimethylphenol	50	0.8J/0.6J	14	14	13	14	16	17	19	18/16	20	16J
2-Methylphenol	NL	7/7	26	32	22	16	20	16	23	21/19	29	36J
4-Methylphenol	NL	18/16	31	29	38	41J	30	25	1.0J	27/24	28	28J
Naphthalene	10	22/22	1J								0.98J	
Di-n-octyl phthalate	50											
Phenol	1	20/21	32	15	13	3.4J	4.0J	2.5J	4.5J	3.3J/2.7J	6.5J	

Notes:

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NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

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

Location		OGC-3												
Date		**05/18/01**	**08/20/01**	**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**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**													
Acetone	50	13J / 19J	3.8J	15J		7.1	6.7			5.6			10/8.4	2.8J
Benzene	1	1.6J / 1.6J	1.6	1.8		1.8	1.2	1.5		1.6	1.4		1.2/1.1	0.93J
2-Butanone	50													
Chlorobenzene	5		0.24J	0.28J		0.28J		0.22J						
trans-1,2-Dichloroethene	5	1.6J / 1.6J	1.0J	1.4J	1.1J	1.1	0.98J	0.44J		1.0				
Ethylbenzene	5	1.6J / 1.5J	2.0J	2.3J	1.5J	2.4	1.7	1.8		2.0			1.4/1.3	1.1
Methylene Chloride	5				1.9J							6.3	1.2/1.0	
Tetrachloroethene	5	2.4J / 2.2J	3.0J	2.2J	1.7J	2.2	1.8	1.8		1.5			0.71J/0.63J	0.61J
Toluene	5	5.7 / 5.1	5.9	5.3		5.1	3.7	4.6	4.0	4.3	3.6	2.6	2.6/2.4	
Trichloroethene	5	20 / 20	18	19	14J	17	14	13	12	14	9.8	7.7	6.4/6.1	5.6
Vinyl Chloride	2	ND / 1.0J	0.4	0.72						0.62J				
Total Xylenes	5	5.6J / 5.4J	7.5	8.7	4.8J	7.8	5.8	5.8	5.0	6.6	3.9		3.3/3.0	2.9J
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*				1J									
1,4-Dichlorobenzene	3*				0.7J		0.5J							
2,4-Dimethylphenol	50	5J / 5J	9	8J	11	11	7J	8J	11	12	10	9J	8J/4J	6J
2-Methylphenol	NL	98 / 96	120	87	160	140	100	100	120	140	150	110	83/73	64
4-Methylphenol	NL	13 / 13	21	17	28	23	14	15	22	23	20	17	14/12	13
Naphthalene	10													
Di-n-octyl phthalate	50													
Phenol	1	120 / 110	140	130J	210	140	85	92	110	120	120	90	78/74	75

Notes:

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NS - Not Sampled
J - Estimated
Blank = Non-Detect

Table 2.6

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

Location		**OGC-3**										
Date		**05/24/07**	**05/29/08**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/24/13**	**05/29/14**	**05/29/15**	**05/26/16**	**05/31/17**
Volatiles (µg/L)	**Class GA Level**											
Acetone	50	0.76	6.0	2.9J/2.6J		3.7J			3.1J		3.3J	
Benzene	1		0.93	0.75/0.78		0.67J	0.45J	0.64J/0.71	5.3J		0.62J	0.50J
2-Butanone	50											
Chlorobenzene	5											
trans-1,2-Dichloroethene	5											
Ethylbenzene	5	0.85J	0.92J	0.69J/0.73J		0.75J						
Methylene Chloride	5											
Tetrachloroethene	5	0.56J										
Toluene	5	1.7	1.8	1.4/1.4		1.2	0.88J	1.2/1.3	1.2J		0.95J	0.70J
Trichloroethene	5	4.3	4.9	3.3/3.5		2.5	0.87J	2.6/2.5	0.48J		1.6	1.4
Vinyl Chloride	2								62J			
Total Xylenes	5	2.1J	2.3J	1.7J/1.7J		1.0J	0.71J	0.81J/0.77J	13			
									200			
Semi-Volatiles (µg/L)												
1,2-Dichlorobenzene	3*	0.6J	0.7J		0.86J	0.40J	0.61J	0.46J/0.49J	16	0.47J	0.52J	
1,4-Dichlorobenzene	3*		0.6J		0.58J							
2,4-Dimethylphenol	50		6	6.2/5.9	4.3J	3.7J	5.8J	4.8J/4.8J	4.8J	4.1J	4.9J	4.5J
2-Methylphenol	NL	47	45	44/43	36	33	35	31/32	34	23	24	23J
4-Methylphenol	NL	10	11	11/11	9.9	10	11	9.1J/9.5J	0.91J	7.6J	9.6	9.4J
Naphthalene	10		0.8J									
Di-n-octyl phthalate	50											
Phenol	1	60	65	60/57	50	48	53	58/57	52	44J	43	62

Blank = Non-Detect

Notes:

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

Table 2.6

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

Location		GW-5S		OGC-7												
Date	Class GA Level	12/17/87	08/12/88	05/18/01	08/20/01	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	05/30/06
Volatiles (µg/L)																
Acetone	50	293		21J	0.25J	8.2J			3.6J							
Benzene	1	2				0.30J		0.28J	0.20J	0.26J				0.34J	0.34J	
2-Butanone	50	27														
Chlorobenzene	5															
trans-1,2-Dichloroethene	5	180	89	6.3	3.1J	5.4	4.9J	4.8J	4.2	4.7	4.0	5.4	5.0	5.9	4.9	5.8
Ethylbenzene	5	9	7J	1.1J	0.80J	1.0J		1.3	0.84J	0.91J		1.4	0.93J	1.5	1.4	1.3
Methylene Chloride	5	1														
Tetrachloroethene	5	11	7J	4.3J	3.6J	3.4J	2.9J	4.0	3.4	2.7	2.8	4.1	2.2	4.1	2.9	2.8
Toluene	5	75	49	12	5.8	6.7	5.7J	6.9	5.2	6.0	6.7	8.6	5.8	9.3	8.3	8.6
Trichloroethene	5	287	220	70	40	48	45	68	44	38	50	56	38	56	37J	37
Vinyl Chloride	2	7	4J	2.6J	0.84	1.7J	3.5J	2.2	1.8	1.8		2.3	2	2.9	3.0	2.9
Total Xylenes	5	54	37	6.0J	4.8J	6.5	3.9J	7.6	5.3	5.3	5.5	8.7	5.4	10	8.6	8.2
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*		2J													
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50	10	11		2J											
2-Methylphenol	NL	24	24	3J	2J	1.0J	0.8J	1J								
4-Methylphenol	NL	38				0.9J	0.7J	1J								
Naphthalene	10															
Di-n-octyl phthalate	50						0.6J									
Phenol	1	61	92	4J	0.7J											

Notes:

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

Table 2.6

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

Location						**OGC-7**					
Date		**05/24/07**	**05/27/09**	**05/26/10**	**05/26/11**	**05/30/12**	**05/24/13**	**05/29/14**	**05/29/15**	**05/26/16**	**05/31/17**
Volatiles (µg/L)	**Class GA Level**										
Acetone	50										
Benzene	1										
2-Butanone	50										
Chlorobenzene	5										
trans-1,2-Dichloroethene	5	3.8		2.7	2.7	2.0	2.0	1.7		0.95J	
Ethylbenzene	5	0.87J	0.84J	0.62J							
Methylene Chloride	5										
Tetrachloroethene	5	1.7	1.2J	0.80J	0.72J	0.69J	0.43J	0.50J	0.38J		
Toluene	5	5.0	4.9J	3.3	3.4	2.4	2.6	2.5	1.9	1.6	1.4/1.3
Trichloroethene	5	22	21J	14	12	7.7	9.7	8.5	5.1	4.9	4.6/4.2
Vinyl Chloride	2		2.6J		2.4	1.6		1.7	0.94J		
Total Xylenes	5	5.3	5.0J	3.6	4.0	2.8	2.9	2.8	0.95J	1.9J	0.93J/0.86J
Semi-Volatiles (µg/L)											
1,2-Dichlorobenzene	3*								0.43J		
1,4-Dichlorobenzene	3*										
2,4-Dimethylphenol	50										
2-Methylphenol	NL	0.6J	0.5J		0.45J		0.38J	0.52J			
4-Methylphenol	NL	0.6J	0.4J					1.1J			
Naphthalene	10										
Di-n-octyl phthalate	50										
Phenol	1										

Blank = Non-Detect

Notes:

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

Table 2.6

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

Location		River Middle														
Date	Class GA Level	05/18/01	09/17/01	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	05/31/06	05/24/07	05/29/08
Volatiles (µg/L)																
Acetone	50						3.1J									2.8J
Benzene	1															
2-Butanone	50															
Chlorobenzene	5															
trans-1,2-Dichloroethene	5															
Ethylbenzene	5															
Methylene Chloride	5															
Tetrachloroethene	5														1.3	
Toluene	5															
Trichloroethene	5							0.21J								
Vinyl Chloride	2															
Total Xylenes	5															
Semi-Volatiles (µg/L)																
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50															
2-Methylphenol	NL															
4-Methylphenol	NL															
Naphthalene	10															
Di-n-octyl phthalate	50				0.7J											
Phenol	1															

Notes:

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

Table 2.6

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

Location		**MW-7**															
Date	**Class GA Level**	**05/18/01**	**08/20/01**	**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**	**05/31/06**	**05/24/07**	**05/29/08**	**05/26/10**
Volatiles (µg/L)																	
Acetone	50	5.7J		6.5J		4.3J	5.4			4.8			4.3J	3.0J	3.9J	3.3J/3.4J	
Benzene	1		$\boxed{1.9}$	$\boxed{2.0}$		$\boxed{2.0}$	$\boxed{1.3}$	$\boxed{1.8}$		0.90			0.58J				
2-Butanone	50																
Chlorobenzene	5																
trans-1,2-Dichloroethene	5		0.82J	1.1J		0.98J	0.89J	1					0.36J				
Ethylbenzene	5		0.85J	0.81J		1.0	0.61J	0.75J					0.32J				
Methylene Chloride	5				1.6J												
Tetrachloroethene	5			0.27J													
Toluene	5		3.5J	3.6J		3.3	1.9	3		1.1	2.8		0.93J				
Trichloroethene	5		0.55J	0.63J		0.43J	0.45J	0.36J									
Vinyl Chloride	2		1.6J	2.0	$\boxed{3.8J}$	$\boxed{2.9}$	1.7	$\boxed{2.2}$		1.3			0.80J			0.64J/0.61J	
Total Xylenes	5		2.1J	2.1J		2.7J	1.5J	1.9J		0.76J							
Semi-Volatiles (µg/L)																	
1,2-Dichlorobenzene	3*																
1,4-Dichlorobenzene	3*																
2,4-Dimethylphenol	50			2J	2J	3J	0.7J	2J									
2-Methylphenol	NL		3J	2J	4J	6J	1J	2J			2J					0.4J/0.5J	
4-Methylphenol	NL		3J	2J	4J	6J	1J	2J			1J				0.3J	0.5J/0.6J	
Naphthalene	10																
Di-n-octyl phthalate	50				0.6J												
Phenol	1		$\boxed{24}$	$\boxed{7J}$	$\boxed{10}$	$\boxed{26}$	$\boxed{2J}$	$\boxed{6J}$		$\boxed{5J}$	$\boxed{2J}$		1J				

Notes:

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

Table 2.6

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

Location			**MW-7**	
Date		**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**			
Acetone	50			
Benzene	1			
2-Butanone	50			
Chlorobenzene	5			
trans-1,2-Dichloroethene	5			
Ethylbenzene	5			
Methylene Chloride	5			
Tetrachloroethene	5			
Toluene	5			
Trichloroethene	5			
Vinyl Chloride	2			
Total Xylenes	5			
Semi-Volatiles (µg/L)				
1,2-Dichlorobenzene	3*			
1,4-Dichlorobenzene	3*			
2,4-Dimethylphenol	50			
2-Methylphenol	NL			5.7J/6.1J
4-Methylphenol	NL		0.65J	
Naphthalene	10			
Di-n-octyl phthalate	50			
Phenol	1			

Blank = Non-Detect

Notes:

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

Table 2.6

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

Location		OGC-2															
Date		**05/18/01**	**08/20/01**	**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**	**05/30/06**	**05/25/07**	**05/29/08**	**05/26/10**
Volatiles (µg/L)	**Class GA Level**																
Acetone	50			11J			3.0J					4.5J	3.1				
Benzene	1																
2-Butanone	50																
Chlorobenzene	5																
trans-1,2-Dichloroethene	5																
Ethylbenzene	5																
Methylene Chloride	5				1.7J												
Tetrachloroethene	5																
Toluene	5										0.37J						
Trichloroethene	5		0.39J														
Vinyl Chloride	2			0.26J		0.25J	0.26J										
Total Xylenes	5																
Semi-Volatiles (µg/L)																	
1,2-Dichlorobenzene	3*																
1,4-Dichlorobenzene	3*																
2,4-Dimethylphenol	50																
2-Methylphenol	NL																
4-Methylphenol	NL																
Naphthalene	10																
Di-n-octyl phthalate	50																
Phenol	1																

Notes:

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

Table 2.6

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

Location		**OGC-2**		
Date		**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**			
Acetone	50			
Benzene	1			
2-Butanone	50			
Chlorobenzene	5			
trans-1,2-Dichloroethene	5			
Ethylbenzene	5			
Methylene Chloride	5			
Tetrachloroethene	5			
Toluene	5			
Trichloroethene	5			
Vinyl Chloride	2			
Total Xylenes	5			
Semi-Volatiles (µg/L)				
1,2-Dichlorobenzene	3*			
1,4-Dichlorobenzene	3*			
2,4-Dimethylphenol	50			
2-Methylphenol	NL			
4-Methylphenol	NL		0.79J	
Naphthalene	10			
Di-n-octyl phthalate	50			
Phenol	1			

Blank = Non-Detect

Notes:

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

Table 2.6

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

Location		OGC-6														
Date		**05/18/01**	**08/20/01**	**11/27/01**	**02/11/02**	**05/21/02**	**08/06/02**	**11/22/02**	**02/25/03**	**05/08/03**	**11/04/03**	**03/04/04**	**05/14/04**	**11/23/04**	**05/27/05**	**05/31/06**
Volatiles (µg/L)	**Class GA Level**															
Acetone	50			6.6J			5.0			3.7J						8.6/8.7
Benzene	1									0.71	0.87	$\boxed{1.4}$		$\boxed{2.5}$	$\boxed{5.2}$	$\boxed{12/12}$
2-Butanone	50															
Chlorobenzene	5															
trans-1,2-Dichloroethene	5			0.23J	0.23J	0.37J	0.45J	0.55J		1.4	2.0	2.1		3.6	$\boxed{5.3}$	$\boxed{11/12}$
Ethylbenzene	5					0.31J				0.85J	1.1	2.0	3.3	3.1	$\boxed{7.4}$	$\boxed{20/20}$
Methylene Chloride	5				2.1J								4.4	2.5	2.2	
Tetrachloroethene	5		1.4J	0.73J		$\boxed{6.6}$	$\boxed{7.4}$	5	$\boxed{12}$	$\boxed{49}$	$\boxed{51}$	$\boxed{230}$	$\boxed{300}$	$\boxed{260}$	$\boxed{550}$	$\boxed{2000/2100}$
Toluene	5			0.55J		2.0	1.6	1.5	2.4	$\boxed{9.3}$	$\boxed{12}$	$\boxed{27}$	$\boxed{40}$	$\boxed{35}$	$\boxed{72}$	$\boxed{240/260}$
Trichloroethene	5	3.0J	4.7J	3.1J	$\boxed{5.9}$	$\boxed{16}$	$\boxed{19}$	$\boxed{13}$	$\boxed{26}$	$\boxed{95}$	$\boxed{120}$	$\boxed{330}$	$\boxed{530}$	$\boxed{330}$	$\boxed{610}$	$\boxed{1800/1800}$
Vinyl Chloride	2					0.22J	0.25J			0.45J						$\boxed{2.9/2.8}$
Total Xylenes	5		0.22J	0.53J	0.26J	1.7J	1.2J	1.0J		4.1	4.7	8.6	$\boxed{13}$	$\boxed{12}$	$\boxed{28}$	$\boxed{79/76}$
Semi-Volatiles (µg/L)												NA		NA		
1,2-Dichlorobenzene	3*															
1,4-Dichlorobenzene	3*															
2,4-Dimethylphenol	50							1J								
2-Methylphenol	NL		2J	2J	32	11	8J	9J	13	22	27		63		85	89/110
4-Methylphenol	NL			1J	0.02J	10							1J		2J	84/100
Naphthalene	10															1J/2J
Di-n-octyl phthalate	50															
Phenol	1		7J	$\boxed{2J}$	$\boxed{4J}$	$\boxed{5J}$	$\boxed{3J}$	$\boxed{2J}$		$\boxed{5J}$	$\boxed{3J}$		$\boxed{9J}$		$\boxed{8J}$	$\boxed{13/16}$

Notes:

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

Table 2.6

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

Location		OGC-6										
Date		05/24/07	05/29/08	05/27/09	05/26/10	05/26/11	05/30/12	05/24/13	05/29/14	05/29/15	05/26/16	05/31/17
Volatiles (µg/L)	**Class GA Level**											
Acetone	50			1.6J								
Benzene	1	7.2		3.2	3.6	1.8	1.9	4.7	1.3/1.4			0.83
2-Butanone	50											
Chlorobenzene	5											
trans-1,2-Dichloroethene	5	7.1		4.4	8.2	7.6	4.8	7.3	4.5/4.6			11
Ethylbenzene	5	12		4.8	5.2	2.4	2.0	4.8	1.2/1.2			
Methylene Chloride	5											
Tetrachloroethene	5	1400	34	400	640	220	100	1100	190/190	180	71	29
Toluene	5	97	2.9	34	38	14	16	57	10/10	8.1J	4.0J	2.7
Trichloroethene	5	1100	31	320	410	180	92	460	100/110	99	60	41
Vinyl Chloride	2	1.5			1.2							1.3
Total Xylenes	5	46		18	20	9.1	8.9	21	5.1/5.1			1.3J
Semi-Volatiles (µg/L)												
1,2-Dichlorobenzene	3*											
1,4-Dichlorobenzene	3*											
2,4-Dimethylphenol	50		0.9J						0.54J/0.59J			
2-Methylphenol	NL	76	76	32	32	15	16	23	9.4J/9.3	4.8J	3.6J	2.4J
4-Methylphenol	NL	2J	70	1.1J	1.4J	1.2J	1.1J	1.1J		0.88J		
Naphthalene	10	2J	2J	1.2J	1.4J	1.1J	1.1J	1.2J	1.1J/1.1J	0.89J	0.97J	
Di-n-octyl phthalate	50											
Phenol	1	8	8				1.5J	57	1.2J/1.2J	0.71J		
Blank = Non-Detect												

Notes:

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

Table 2.6

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

Location		**River North**													
Date	**Class GA Level**	**05/18/01**	**09/17/01**	**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**	**05/30/06**	**05/31/07**
Volatiles (µg/L)															
Acetone	50						2.4J		NS			3.6J	3.6J		
Benzene	1					0.21J					$\boxed{2.0}$	0.39J			
2-Butanone	50														
Chlorobenzene	5					1.3						3.2			
trans-1,2-Dichloroethene	5					0.25J						1.0			
Ethylbenzene	5					$\boxed{20}$						$\boxed{40}$		2.9	
Methylene Chloride	5				1.6J										
Tetrachloroethene	5					3.8						$\boxed{7.7}$		1.3	
Toluene	5			0.39J		$\boxed{63}$				0.96J		$\boxed{130}$	2.2	$\boxed{14}$	
Trichloroethene	5			0.35J		4.5						$\boxed{6.4}$		0.59J	
Vinyl Chloride	2					$\boxed{3.7}$						$\boxed{9.3}$			
Total Xylenes	5					$\boxed{80}$				0.96J		$\boxed{210}$	3.7	$\boxed{23}$	
Semi-Volatiles (µg/L)															
1,2-Dichlorobenzene	3*														
1,4-Dichlorobenzene	3*														
2,4-Dimethylphenol	50							1J							
2-Methylphenol	NL														
4-Methylphenol	NL														
Naphthalene	10														
Di-n-octyl phthalate	50														
Phenol	1														

Notes:

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

Table 2.6

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

Location		**OGC-5**												
Date		**05/20/01**	**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**	**05/30/06**
Volatiles (µg/L)	**Class GA Level**													
Acetone	50	38J		11J			6.4			4.9J		0.61J		3.0J
Benzene	1		$\boxed{1.5}$	$\boxed{1.4}$		0.87	0.92	0.87		0.77				0.67J
2-Butanone	50													
Chlorobenzene	5													
trans-1,2-Dichloroethene	5		0.65J	0.76J		0.42J	0.57J	0.52J				0.34J		
Ethylbenzene	5		0.21J	0.23J										
Methylene Chloride	5				3.4J								2.4	
Tetrachloroethene	5		0.38J	0.27J										
Toluene	5		2.5J	2.2J		0.99J	0.87J	1.2		0.80J		0.80J		
Trichloroethene	5		0.87J	0.66J		0.36J	0.41J	0.40J				0.28J		
Vinyl Chloride	2		1.6J	1.2J		1.1	1.5	1.2		1.1		1.4		1.2
Total Xylenes	5		1.0J	1.0J		0.67J	0.37J	0.40J				1.0J		
Semi-Volatiles (µg/L)														
1,2-Dichlorobenzene	3*													
1,4-Dichlorobenzene	3*													
2,4-Dimethylphenol	50		8J	6J	5J		1J	6J						
2-Methylphenol	NL		1J	1J	1J									
4-Methylphenol	NL		2J	5J	4J			2J						
Naphthalene	10		1J	1J			0.5J	1J						
Di-n-octyl phthalate	50			1J	0.8J									
Phenol	1		0.9J											

Notes:

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

Table 2.6

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

Location		**OGC-5**					
Date		**05/24/07**	**05/29/08**	**05/26/10**	**05/30/12**	**05/29/14**	**05/26/16**
Volatiles (µg/L)	**Class GA Level**						
Acetone	50		3.5J				
Benzene	1	0.54J	0.69J		0.58J	$\boxed{1.1}$	$\boxed{1.4}$
2-Butanone	50						
Chlorobenzene	5						
trans-1,2-Dichloroethene	5						
Ethylbenzene	5						
Methylene Chloride	5						
Tetrachloroethene	5						
Toluene	5						
Trichloroethene	5						0.70J
Vinyl Chloride	2	0.95J	1.4				1.1J
Total Xylenes	5						
Semi-Volatiles (µg/L)							
1,2-Dichlorobenzene	3*						
1,4-Dichlorobenzene	3*						
2,4-Dimethylphenol	50						
2-Methylphenol	NL	0.5J	0.3J				
4-Methylphenol	NL	0.9J	0.4J			0.66J	
Naphthalene	10	2J	0.5J	1.6J	0.85J	1.1J	2.3J
Di-n-octyl phthalate	50						
Phenol	1						

Blank = Non-Detect

Notes:

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

Table 2.6

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

Location		**GW-6S**		**MW-6**												
Date	**Class GA Level**	**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**	**05/30/06**
Volatiles (µg/L)																
Acetone	50	$\boxed{684}$	4.9J						4.4J			44		6.7	13	31
Benzene	1	$\boxed{3}$			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	$\boxed{58}$	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	$\boxed{43}$			0.44J							0.67J		0.25J		
Toluene	5	$\boxed{16}$	3.0J		2.2J	0.29J		1.3	0.91J	1.1		2.1	3.6	0.92J		
Trichloroethene	5	$\boxed{62}$	$\boxed{5.1J}$		2.0J		1.2J		1.1	1.5	3.2	$\boxed{14}$	$\boxed{12}$	3.7	1.5	1.2
Vinyl Chloride	2	$\boxed{11}$	1.7J					0.29J	0.24J	0.22J		0.52J				
Total Xylenes	5	$\boxed{7}$			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			1J
Naphthalene	10			$\boxed{67}$	$\boxed{69}$		1J		$\boxed{14}$	$\boxed{13}$			$\boxed{76}$		5J	
Di-n-octyl phthalate	50						2J									
Phenol	1	$\boxed{3}$		$\boxed{14}$	$\boxed{4J}$	$\boxed{2J}$	0.8J						$\boxed{250}$			$\boxed{2J}$

Notes:

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NS - Not Sampled
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Blank = Non-Detect

Table 2.6

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

Location		**MW-6**						
Date		**05/24/07**	**05/29/08**	**05/26/10**	**05/30/12**	**05/29/14**	**05/26/16**	**05/27/16**
Volatiles (µg/L)	**Class GA Level**							
Acetone	50							
Benzene	1							
2-Butanone	50							
Chlorobenzene	5							
trans-1,2-Dichloroethene	5							
Ethylbenzene	5							
Methylene Chloride	5							
Tetrachloroethene	5			0.55J				
Toluene	5			0.73J				
Trichloroethene	5	0.97J		2.3J	0.66J	1.0		
Vinyl Chloride	2							
Total Xylenes	5							
Semi-Volatiles (µg/L)								
1,2-Dichlorobenzene	3*			0.66J				
1,4-Dichlorobenzene	3*	0.8J	0.6J	4.2J	2.9J	2.9J		1.5J
2,4-Dimethylphenol	50			1.4J	1.4J	1.0J		0.87J
2-Methylphenol	NL	0.5J	0.3J	1.8J	0.71J	1.1J		0.47J
4-Methylphenol	NL	1J		2.5J	1.3J	1.0J		
Naphthalene	10	2J	1J	7.8J	3.9J			2.0J
Di-n-octyl phthalate	50							
Phenol	1	0.6J	0.4J	$\boxed{\text{1.9J}}$		$\boxed{\text{4.4J}}$		

Notes:

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NS - Not Sampled
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Table 2.6

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

Location		**OGC-1**													
Date		**05/18/01**	**05/25/07**	**8/21/2001**	**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**	**05/31/06**
Volatiles (µg/L)	**Class GA Level**														
Acetone	50	20J			11J			4.8J							
Benzene	1			0.64J	0.55J				0.26J						
2-Butanone	50	1.1J													
Chlorobenzene	5	2.2J	2.8	2.0J	1.7J		0.24J		0.78J		0.91J				
trans-1,2-Dichloroethene	5	$\boxed{5.6}$		3.7J	4.6J	1.8J	0.48J	0.58J	2.7		2.8	0.85J			0.55J
Ethylbenzene	5			0.52J	0.43J				0.21J						
Methylene Chloride	5					1.6J								1.8	
Tetrachloroethene	5			0.78J	0.54J		0.42J	0.53J	0.30J			0.29J			
Toluene	5	$\boxed{5.2}$	3.1	$\boxed{5.4}$	4.2J		0.48J	0.43J	1.9	1.7	2.6	0.59J			
Trichloroethene	5	$\boxed{15}$	2.9	$\boxed{16}$	$\boxed{11}$	4.5J	2.2	2.7	$\boxed{6.1}$	$\boxed{5.1}$	$\boxed{8.4}$	2.2	0.47J	1.2	1.9
Vinyl Chloride	2	1.3J		0.51J	0.72J				0.42J		0.64J				
Total Xylenes	5			2.1J	1.6J				0.49J		0.86J				
Semi-Volatiles (µg/L)															
1,2-Dichlorobenzene	3*		0.9J												
1,4-Dichlorobenzene	3*	1J	3J	3J	2J	1J			1J						
2,4-Dimethylphenol	50	$\boxed{9J}$	46	16	8J	3J		0.6J	9J		4J				
2-Methylphenol	NL	6J	6	12	5J	2J			2J		3J				
4-Methylphenol	NL	20	170	35	15J	5J		1J	5J	6J	8J				2J
Naphthalene	10	$\boxed{71}$	0.2J	$\boxed{130}$		$\boxed{21}$		7J	$\boxed{18}$		$\boxed{25}$	3J			
Di-n-octyl phthalate	50														
Phenol	1	$\boxed{150}$	$\boxed{11}$	$\boxed{290}$	$\boxed{57}$	$\boxed{15}$	1J	$\boxed{8J}$	$\boxed{4J}$		$\boxed{19}$				

Notes:

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J - Estimated
Blank = Non-Detect

Table 2.6

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

Location		**OGC-1**					
Date		**05/24/07**	**05/29/08**	**05/26/10**	**05/30/12**	**05/29/14**	**05/27/16**
Volatiles (µg/L)	**Class GA Level**						
Acetone	50						
Benzene	1						
2-Butanone	50						
Chlorobenzene	5						
trans-1,2-Dichloroethene	5						
Ethylbenzene	5						
Methylene Chloride	5						
Tetrachloroethene	5						
Toluene	5						
Trichloroethene	5	0.53J	4.2				
Vinyl Chloride	2						
Total Xylenes	5						
Semi-Volatiles (µg/L)							
1,2-Dichlorobenzene	3*						
1,4-Dichlorobenzene	3*						
2,4-Dimethylphenol	50						
2-Methylphenol	NL						
4-Methylphenol	NL		0.4J		0.46J		
Naphthalene	10		0.5J				
Di-n-octyl phthalate	50						
Phenol	1						
					0.97J		0.43J

Notes:

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Blank = Non-Detect

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	MH2	MH3	MW-6	OGC-1	OGC-5	MH6	OGC-6	MW-7	MH8	OGC-2
Date										
06/27/12	10.20	10.53	10.18	10.23	9.62	9.91	10.55	10.08	9.86	10.19
07/31/12	9.80	11.00	11.34	10.74	9.22	9.42	11.15	11.84	9.56	10.48
08/27/12	9.55	10.69	11.55	10.77	8.56	9.44	10.94	11.89	8.98	10.54
09/24/12	9.50	9.67	10.42	9.89	9.31	9.82	10.31	10.27	9.71	10.29
10/26/12	9.56	9.97	10.14	9.41	9.32	9.90	10.11	10.37	9.77	10.17
11/26/12	9.43	9.59	10.02	9.79	8.87	9.64	10.18	9.63	9.48	9.49
12/26/12	9.79	9.69	10.62	8.78	8.71	9.37	10.05	9.50	9.31	9.42
01/30/13	9.91	8.85	8.45	8.52	8.53	9.07	9.46	8.76	8.76	8.94
02/27/13	9.14	9.20	9.26	9.30	8.46	8.39	9.97	9.09	8.87	8.91
03/27/13	10.65	9.01	9.82	8.54	8.30	8.57	9.73	9.01	8.74	8.90
04/24/13	10.20	8.75	9.32	9.09	8.63	9.06	9.78	9.36	9.74	9.16
05/24/13	9.44	9.29	10.02	8.49	8.39	8.70	10.49	9.00	8.85	8.94
06/27/13	8.49	8.74	9.89	8.39	8.63	9.55	10.75	8.66	8.84	9.16
07/24/13	8.02	8.59	9.75	9.16	8.13	8.73	10.82	9.68	8.43	8.80
08/22/13	8.99	9.07	10.08	8.83	8.32	8.84	10.58	9.25	8.53	9.26
09/30/13	8.45	9.48	9.17	8.46	8.20	8.95	10.52	9.24	8.17	9.00
10/30/13	8.45	10.00	9.68	8.24	8.09	8.83	10.13	8.77	8.05	8.77
11/27/13	8.70	10.06	10.01	7.99	8.04	8.62	10.38	8.89	8.29	8.90
12/31/13	9.10	7.45	10.07	8.63	8.23	7.62	10.14	9.52	8.51	9.17

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	MH2	MH3	MW-6	OGC-1	OGC-5	MH6	OGC-6	MW-7	MH8	OGC-2	MH9
Date											
01/30/14	8.98	8.56	9.97	9.06	8.17	8.52	10.44	9.45	8.89	9.26	
02/26/14	10.35	10.21	10.46	9.12	8.60	9.33	10.34	9.41	8.95	9.24	
03/28/14	8.97	8.54	10.15	9.24	8.43	8.61	10.37	9.24	8.63	9.06	10.33
04/25/14	8.68	8.29	10.19	8.24	8.43	8.68	10.52	8.94	8.57	9.04	10.36
05/29/14	8.81	8.42	10.74	8.76	8.57	9.34	11.23	9.88	9.04	9.81	11.01
06/25/14	8.91	9.25	10.32	8.63	8.62	9.39	10.96	9.52	9.30	9.33	10.99
07/29/14	8.51	8.59	8.75	8.26	7.99	8.35	10.34	9.37	8.18	9.25	10.39
08/26/14	8.27	8.69	8.77	8.64	7.95	8.65	10.35	8.56	8.04	8.94	10.56
09/30/14	8.43	9.64	8.94	8.39	8.26	8.70	10.34	9.22	8.15	9.05	10.66
10/29/14	8.12	9.66	9.80	8.83	8.16	8.87	10.22	9.11	8.29	8.94	10.42
11/25/14	9.11	10.59	9.72	9.19	8.44	8.90	10.84	9.25	8.60	8.80	10.74
12/30/14	10.84	10.75	10.55	9.17	8.83	9.13	10.60	9.69	8.88	9.51	10.98
01/28/15	9.25	7.51	10.18	9.01	8.40	8.65	10.33	9.11	8.63	8.94	5.97
02/24/15	9.28	9.08	10.49	9.63	8.90	9.14	9.93	9.08	NM	9.12	8.14
03/25/15	8.34	8.26	10.59	8.19	8.31	8.70	10.38	9.65	7.63	9.20	9.46
04/23/15	7.87	8.63	8.29	8.46	8.59	8.67	8.11	7.74	7.88	7.69	8.09
05/29/15	7.94	8.01	10.73	8.75	8.10	8.57	10.54	9.24	7.63	9.36	11.11
06/24/15	8.47	8.56	10.48	9.47	8.29	9.32	10.88	9.15	8.51	9.29	10.83
07/28/15	8.49	8.75	9.47	8.42	8.19	8.73	10.92	9.33	8.35	9.27	10.58
08/27/15	8.75	9.37	9.83	8.71	8.42	8.41	10.32	NM	9.30	9.58	10.53
09/25/15	8.40	10.02	9.57	8.86	8.41	9.13	10.83	9.72	8.26	9.38	10.79
10/30/15	8.24	9.60	9.50	9.42	8.65	9.43	11.08	9.49	8.35	9.38	10.81
11/30/15	9.11	10.58	9.18	8.92	8.51	9.16	9.96	9.70	8.68	9.62	11.05
12/30/15	9.17	10.26	10.32	8.63	8.77	9.53	10.34	10.00	9.02	9.57	11.28
01/28/16	9.24	10.55	9.76	9.09	8.59	8.99	10.66	9.68	8.68	9.37	10.95
02/23/16	7.85	9.87	10.36	8.65	8.75	8.67	11.03	9.98	8.63	9.56	9.55
03/31/16	9.05	9.49	10.49	8.74	8.44	8.96	10.88	9.49	8.50	9.39	9.56
04/28/16	7.72	7.71	10.43	8.12	8.44	8.53	10.84	9.39	8.41	9.49	8.97
05/26/16	8.30	8.17	10.55	8.52	8.10	9.02	10.59	8.95	7.93	9.39	9.48
06/30/16	8.48	8.53	10.96	9.59	8.51	9.06	10.89	9.24	8.10	9.40	9.99
07/28/16	8.42	8.39	10.68	9.40	8.24	8.88	10.67	9.47	8.31	9.34	9.89
08/24/16	8.76	9.32	9.16	8.94	8.74	9.47	9.07	9.37	9.70	9.59	10.25
09/27/16	8.35	8.57	10.41	8.99	8.10	8.84	10.93	10.38	8.22	9.31	9.84
10/25/16	8.73	9.04	8.37	8.34	8.62	9.01	9.13	9.25	9.51	9.20	9.53
11/30/16	8.23	8.34	10.26	9.49	8.17	8.79	9.65	9.39	8.25	9.32	10.76
12/28/16	8.25	8.41	10.81	8.87	8.55	9.02	10.07	9.49	8.43	9.40	9.65
01/31/17	7.51	7.60	10.40	7.89	8.44	8.52	9.25	9.21	8.16	9.34	9.20
02/28/17	8.07	8.38	10.38	8.88	7.95	8.36	8.84	8.14	6.39	8.88	2.65(1)
03/31/17	7.76	7.23	10.42	7.65	8.49	8.64	9.28	9.44	8.19	9.58	9.71
04/28/17	8.37	8.60	10.58	9.08	8.29	9.11	9.50	9.45	8.37	9.55	10.10
05/31/17	8.26	8.37	10.53	10.08	8.47	8.99	9.98	9.91	8.60	9.79	10.19

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	OGC-7	MH11	MW-8	OGC-3	MH12	OGC-8	MH14	MW-9	OGC-4	MH15	MH16
Date											
06/27/12	11.33	11.02	11.03	11.32	10.20	11.23	10.27	10.80	11.32	8.88	9.65
07/31/12	11.73	10.93	12.12	12.07	9.73	11.84	9.78	11.60	11.39	8.12	8.74
08/27/12	12.23	10.51	12.44	12.48	9.63	12.06	9.57	11.98	11.61	7.46	8.07
09/24/12	11.41	10.96	11.40	11.41	9.91	11.37	9.83	11.07	11.21	9.15	9.14
10/26/12	11.13	10.92	11.26	11.85	9.97	11.32	10.04	10.17	11.21	8.32	8.23
11/26/12	11.46	10.82	11.48	11.94	9.92	10.87	9.92	11.50	11.59	8.51	8.63
12/26/12	11.45	10.26	11.60	12.05	9.92	11.43	8.92	11.33	10.34	8.65	8.03
01/30/13	10.95	9.36	10.67	11.42	9.44	10.37	8.38	11.04	11.28	7.60	7.56
02/27/13	10.80	9.53	11.20	11.45	9.58	11.25	8.80	10.95	11.26	8.80	8.27
03/27/13	10.93	9.59	11.14	11.20	9.47	11.12	8.77	10.99	11.19	7.95	8.14
04/24/13	11.01	10.00	11.21	10.89	9.57	10.16	8.94	10.65	10.74	8.06	8.22
05/24/13	11.01	9.19	11.25	11.47	9.37	11.36	8.33	11.01	11.20	8.10	8.08
06/27/13	10.27	10.61	10.48	10.86	8.78	8.69	8.82	11.25	11.25	9.05	9.07
07/24/13	10.96	8.54	11.17	11.30	8.70	10.60	8.10	10.62	10.54	8.71	8.94
08/22/13	11.26	8.63	11.37	11.66	9.01	11.16	8.41	11.23	11.16	7.51	7.56
09/30/13	10.97	8.81	11.10	11.39	8.87	11.00	8.25	10.95	10.98	7.54	7.42
10/30/13	10.71	8.62	10.83	11.08	8.66	10.47	8.25	10.57	10.46	7.18	6.85
11/27/13	10.91	8.97	11.05	11.31	8.88	10.21	8.02	10.65	10.80	6.83	6.34
12/31/13	11.07	9.11	11.27	11.58	7.60	11.15	8.55	11.08	11.32	7.11	6.39

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	OGC-7	MH11	MW-8	OGC-3	MH12	OGC-8	MH14	MW-9	OGC-4	MH15	MH16
Date											
01/30/14	11.06	9.14	11.37	11.53	9.24	11.37	9.15	11.14	11.47	7.56	7.83
02/26/14	10.94	9.22	11.37	11.48	9.39	11.09	9.41	10.93	11.27	8.04	7.84
03/28/14	10.90	9.41	11.16	11.40	9.15	11.11	8.48	11.09	11.18	8.07	8.43
04/25/14	10.89	8.75	10.97	11.43	9.38	11.18	8.18	11.02	10.80	7.54	7.47
05/29/14	11.55	8.88	11.97	12.18	8.54	11.90	8.72	11.73	11.10	8.46	8.65
06/25/14	11.25	7.62	11.52	11.90	9.94	11.68	9.38	11.45	11.14	8.50	8.97
07/29/14	10.83	8.51	11.10	11.43	8.65	11.05	8.71	10.94	10.51	7.09	7.75
08/26/14	10.82	8.16	11.12	11.39	8.63	10.87	8.25	10.99	10.58	6.52	6.41
09/30/14	11.07	8.53	11.35	11.53	8.90	11.04	8.41	11.02	11.16	7.54	7.60
10/29/14	10.85	8.32	11.01	11.25	8.94	10.80	8.18	10.68	10.65	7.66	7.40
11/25/14	11.05	8.92	11.27	11.55	9.22	11.03	8.63	10.87	11.36	7.73	7.46
12/30/14	11.49	9.67	11.83	12.01	9.47	11.51	8.47	11.34	11.71	8.25	8.11
01/28/15	10.85	8.87	11.08	11.36	8.92	11.09	8.27	10.93	11.12	6.55	7.25
02/24/15	10.86	NM	10.85	11.00	8.57	10.88	NM	11.56	11.72	7.63	7.22
03/25/15	9.92	9.53	6.27	5.96	6.15	8.66	NM	8.97	8.96	8.99	8.89
04/23/15	8.46	8.33	8.05	8.73	9.36	8.99	9.26	11.26	11.26	8.38	8.21
05/29/15	11.49	8.35	11.58	11.95	8.77	11.92	9.32	11.54	11.40	8.21	7.51
06/24/15	11.35	7.78	11.73	11.93	9.60	11.82	8.85	11.57	11.22	7.91	8.03
07/28/15	11.09	9.33	11.57	11.69	8.54	11.20	8.37	11.08	10.91	8.05	8.12
08/27/15	11.35	9.75	11.75	11.76	10.18	11.50	9.32	11.39	10.98	7.50	7.79
09/25/15	11.37	8.35	11.55	11.94	9.05	11.44	8.63	11.41	10.93	7.97	7.77
10/30/15	11.48	8.79	11.71	12.03	9.55	11.51	11.34	11.02	11.49	10.46	7.80
11/30/15	11.26	8.82	11.63	11.93	9.52	11.36	11.52	11.10	11.45	11.16	7.98
12/30/15	11.62	9.71	11.85	12.19	9.33	11.68	11.76	11.27	11.92	11.46	8.04
01/28/16	11.36	8.77	11.62	11.86	9.37	11.75	11.42	11.09	11.62	11.01	8.08
02/23/16	11.65	9.57	11.90	12.26	9.46	11.94	11.46	11.27	11.76	10.93	8.51
03/31/16	11.43	8.72	11.69	11.99	9.20	11.77	10.02	10.95	11.40	9.09	7.81
04/28/16	11.52	8.81	11.77	12.08	9.20	11.95	10.16	11.61	11.60	9.74	7.63
05/26/16	11.60	8.72	11.69	12.02	8.90	11.94	10.10	11.53	11.49	9.74	8.41
06/30/16	11.47	8.40	11.69	12.07	9.04	11.87	10.19	11.73	11.20	9.98	9.13
07/28/16	11.30	8.20	11.56	11.93	8.90	11.78	9.96	11.57	11.18	10.34	9.44
08/24/16	10.26	10.40	11.72	11.39	10.89	11.91	10.53	11.55	11.80	8.97	7.11
09/27/16	11.38	8.09	11.46	11.95	9.03	11.62	9.91	11.44	11.37	10.80	8.33
10/25/16	9.31	8.77	10.35	10.22	10.00	10.47	10.18	10.66	9.02	8.06	7.47
11/30/16	11.20	8.60	11.53	11.87	9.14	11.54	10.43	11.45	11.48	9.94	7.45
12/28/16	11.32	8.65	11.49	11.67	8.65	11.29	8.47	11.18	11.19	7.61	7.47
01/31/17	11.51	8.78	11.89	12.03	8.91	11.89	9.19	11.66	11.49	8.92	8.05
02/28/17	11.46	8.68	11.73	11.97	8.89	11.78	9.38	11.58	11.15	8.01	7.29
03/31/17	11.58	8.92	11.90	12.17	9.08	11.87	9.71	11.80	11.59	9.37	8.11
04/28/17	11.52	9.15	11.85	12.13	9.06	11.90	9.43	11.72	11.40	8.21	7.84
05/31/17	11.54	9.20	11.87	12.04	9.49	11.75	9.12	11.67	10.89	7.85	7.48

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	City MH1	City MH2	City MH3
Date			
06/27/12	10.99	10.92	10.83
07/31/12	9.83	8.60	7.98
08/27/12	10.19	10.21	9.81
09/24/12	11.10	9.86	10.01
10/26/12	9.41	9.13	9.10
11/26/12	10.02	9.75	9.47
12/26/12	8.89	9.17	8.08
01/30/13	6.20	6.49	8.05
02/27/13	9.84	9.69	9.34
03/27/13	10.15	8.91	8.64
04/24/13	9.06	9.10	9.04
05/24/13	10.21	8.97	9.02
06/27/13	9.55	9.05	9.34
07/24/13	6.49	6.99	7.03
08/22/13	8.09	7.96	7.92
09/30/13	8.74	7.75	7.57
10/30/13	8.88	7.48	7.30
11/27/13	NM	NM	NM
12/31/13	NM	NM	NM

Table 2.7

PH Readings
Gratwick-Riverside Park Site
North Tonawanda, New York

Monitoring Location	City MH1	City MH2	City MH3
Date			
01/30/14	10.87	8.86	7.57
02/26/14	8.59	7.91	7.70
03/28/14	9.61	8.79	9.06
04/25/14	8.70	8.57	8.76
05/29/14	10.66	9.69	9.53
06/25/14	10.42	10.05	9.84
07/29/14	9.78	9.01	8.80
08/26/14	10.04	9.26	8.83
09/30/14	10.09	9.44	8.96
10/29/14	10.05	9.63	9.29
11/25/14	10.46	8.21	8.41
12/30/14	10.62	8.82	9.02
01/28/15	7.50	6.75	6.28
02/24/15	6.17	6.61	6.22
03/25/15	7.61	7.49	7.73
04/23/15	8.63	8.46	8.30
05/29/15	10.46	9.80	8.98
06/24/15	9.36	8.99	8.82
07/28/15	6.86	6.84	7.30
08/27/15	9.49	8.85	9.08
09/25/15	10.13	9.50	9.24
10/30/15	10.00	8.96	8.98
11/30/15	10.71	9.79	9.29
12/30/15	10.66	9.25	9.22
01/28/16	10.72	9.90	9.43
02/23/16	6.78	6.90	6.96
03/31/16	8.48	8.39	8.25
04/28/16	8.16	7.96	7.69
05/26/16	8.49	7.94	7.10
06/30/16	7.92	7.49	7.22
07/28/16	7.82	Dry	7.33
08/24/16	7.27	7.50	7.51
09/27/16	7.30	7.49	7.51
10/25/16	7.20	7.23	7.47
11/30/16	7.04	7.51	7.47
12/28/16	7.83	7.74	7.69
01/31/17	7.96	7.85	7.52
02/28/17	7.61	6.92	7.23
03/31/17	8.48	7.75	7.84
04/28/17	8.44	8.26	8.07
05/31/17	8.5	8.27	8.06

Note:

(1) - Affected by muriatic acid addition

NM - Not Measured due to Unsafe Road Conditions or Inaccessible due to Snow Cover.

Table 2.8

Effluent Sampling Summary
Subsequent to February 2007
Gratwick-Riverside Park Site
North Tonawanda, New York

LOCATIONS

Effluent monitoring station at Site discharge point

FREQUENCY

Semi-Annual (Spring and Fall as dictated by the City of North Tonawanda Industrial Wastewater Discharge Permit dated March 1, 2016)

PARAMETERS

Volatiles

Acetone
Benzene
2-Butanone
Chlorobenzene
1,1-Dichloroethane
1,2-Dichloroethane
trans-1,2-Dichloroethene
Ethylbenzene
Methylene Chloride
Styrene
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
Trichloroethene
Vinyl Chloride
Xylenes (Total)

Semi-Volatiles

1,4-Dichlorobenzene
1,2-Dichlorobenzene
2,4-Dimethylphenol
2-Methylphenol
4-Methylphenol
Naphthalene
Di-n-octylphthalate
Phenols (4AAP)

Wet Chemistry

Chloride
Cyanide
NH3
NO3
Phosphorous
Sulfate
Sulfide

Table 2.9

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park Site

Sample ID:															
Sample Date:		**03/07/11**	**09/15/11**	**03/08/12**	**09/13/12**	**03/14/13**	**09/12/13**	**04/16/14**	**10/07/14**	**04/16/15**	**10/8/15**	**04/14/16**	**10/04/16**	**04/06/17**	**Surface Water Standard** (1)
Parameter	**Unit**														
Volatiles															
1,1,1-Trichloroethane	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
1,1-Dichloroethane	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
1,2-Dichloroethane	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	0.6
2-Butanone	µg/L	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	50
Acetone	µg/L	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	25U	50
Benzene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	1
Chlorobenzene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.1	5.0U	5.0U	5.0U	5.0U	9.5	5
Ethylbenzene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
Methylene chloride	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
Styrene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5
Tetrachloroethene	µg/L	5.0U	5.0U	5.0U	6.3	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	0.7 (2)
Toluene	µg/L	12	11	15	27	16	13	14	13	5.0U	12	5.0U	5.0U	5.0U	5
trans-1,2-Dichloroethene	µg/L	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.4	5.0U	5.1	5.0U	5.0U	5.0U	5
Trichloroethene	µg/L	30	20	43	50	45	34	38	26	5.0	23	12	5.0U	5.0U	5
Vinyl chloride	µg/L	5.0U	5.0U	5.0U	5.3	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	0.3 (2)
Xylene (total)	µg/L	10U	10U	17	18	18	10U	10U	10U	10U	10U	10U	10U	10U	5
Semi-Volatiles															
1,2-Dichlorobenzene	µg/L	0.15U	0.15U	0.84	0.68	1.2	6.2	0.92	4.8U	4.8U	4.7U	4.7U	4.8U	4.8U	3 (7)
1,4-Dichlorobenzene	µg/L	0.090U	1.7	3.6	3.6	7.7	5.7	6.4	9.4	7.0	9.2	4.7U	5.9U	26	3 (7)
2,4-Dimethylphenol	µg/L	0.13U	2.5	7.4	5.5	7.3	6.5	10	7.8J	13	5.0	5.9	1.3U	53	50 (2)
2-Methylphenol	µg/L	0.22U	0.22U	0.91	0.62	3.4	0.22U	0.44	5.3	6.2	4.9	2.7	0.77U	7.7	NL
4-Methylphenol	µg/L	0.62U	0.62U	3.1	3.0	6.7	1.3	0.62	7.4	59	3.7	8.5	0.75U	62	NL
Di-n-octyl phthalate	µg/L	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	4.6U	50 (2)
Naphthalene	µg/L	0.080U	0.080U	0.57	1.4	0.53	0.080U	0.47	0.82U	0.97	0.81U	0.81U	0.82U	1.3	10
Phenol	µg/L	0.12U	0.12U	0.12U	0.12U	5.5	0.12U	0.12U	22	4.0	3.0	0.33U	0.33U	3.0	1

Table 2.9

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park Site

Sample ID:															
Sample Date:		**03/07/11**	**09/15/11**	**03/08/12**	**09/13/12**	**03/14/13**	**09/12/13**	**04/16/14**	**10/07/14**	**04/16/15**	**10/8/15**	**04/14/16**	**10/04/16**	**04/06/17**	**Surface Water Standard** (1)
Parameter	**Unit**														
Metals															
Aluminum	mg/L	0.45	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U	0.67	0.20U	0.20U	NL
Antimony	mg/L	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.020U	0.003
Arsenic	mg/L	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.015U	0.015U	0.015U	0.050
Barium	mg/L	0.086	0.063	0.083	0.068	0.085	0.064	0.096	0.067	0.092	0.068	0.096	0.130	0.081	1.0
Beryllium	mg/L	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	0.0020U	1.1 (6)
Cadmium	mg/L	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0010U	0.0020U	0.0020U	0.0020U	0.005
Chromium	mg/L	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.0040U	0.050
Copper	mg/L	0.023	0.010U	0.010U	0.013	0.050	0.013	0.010U	0.014	0.010U	0.010U	0.010U	0.010U	0.010U	0.023 (3)
Iron	mg/L	0.39	0.050U	0.050U	0.050U	0.050U	0.050U	0.40	0.050U	0.17	0.050U	0.18	0.30	1.0	0.30
Lead	mg/L	0.0050U	0.0050U	0.0050U	0.0067	0.0050U	0.0050U	0.0050U	0.0050U	0.0050U	0.0050U	0.010U	0.010U	0.010U	0.012
Magnesium	mg/L	3.5	1.6	2.2	0.99	2.9	0.78	5.5	1.1	6.5	1.4	15.2	45.2	9.6	35
Manganese	mg/L	0.012	0.030U	0.0030U	0.0030U	0.0030U	0.0030U	0.010	0.0030U	0.018	0.0030U	0.26	0.062	0.053	0.30
Mercury	mg/L	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	0.00020U	2.6E-06 (4)
Nickel	mg/L	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.014	0.10
Selenium	mg/L	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.015U	0.025U	0.025U	0.025U	0.0046 (4)
Silver	mg/L	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0030U	0.0060U	0.0060U	0.0060U	0.050
Sodium	mg/L	372	267	380	238	353	206	359	233	361	245	351	258	319	NL
Zinc	mg/L	0.010	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U	0.017	2.0 (2)

Table 2.9

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park Site

Sample ID: Sample Date: Parameter	Unit	03/07/11	09/15/11	03/08/12	09/13/12	03/14/13	09/12/13	04/16/14	10/07/14	04/16/15	10/8/15	04/14/16	10/04/16	04/06/17	Surface Water Standard (1)
General Chemistry															
pH	S.U.	9.95	9.75	10.51	10.82	10.32	10.38	10.22	9.90	9.20	10.21	8.86	8.43	8.80	NL
Hardness	mg/L	235	244	268	176	250	192	252	180	340	192	332	352	276	NL
Total Dissolved Solids (TDS)	mg/L	1450	1030	1280	911	1170	823	1360	872	1430	977	1450	1180	1280	NL
Total Suspended Solids (TSS)	mg/L	6	3	4	4	7	12	8	2	16	12	14	3	11	NL
Chloride	mg/L	655	425	551	326	398	333	633	386	662	409	648	421	576	250
BOD	mg/L	16	22	21	45	16	18	10.3	20	13.3	13.7	13.3	25	12	NL
COD	mg/L	37	28	33	70	37	21	17	75	5.0U	50U	25U	125	67	NL
Oil and Grease	mg/L	0.10U	0.10U	0.20	0.10U	0.2	0.10U	0.10U	0.10U	0.10U	0.10U	0.001	0.10U	0.20	NL
Organic Carbon	mg/L	8.1	7.2	6.9	8.2	8.0	7.6	6.6	13.4	5.0U	5.5	6.1	11	8.7	NL
Alkalinity, Total (As CaCO3)	mg/L	57	30.5	32.0	44.6	48.9	47.2	29	47.3	40.0	43.5	75.3	381	94	NL
Bicarbonate (as CaCO3)	mg/L	11.1	5.0	8.0	5.0U	5.0U	5.0U	21	5.0U	40.0	5.0U	38.2	349	94	NL
Ammonia	mg/L	1.12	1.12	1.68	2.52	2.52	0.84	1.1	1.12	0.84	1.40	1.12	1.12	1.12	2.0
Nitrate (as N)	mg/L	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.050U	0.15	0.050U	0.050U	10
TKN	mg/L	2.24	1.68	2.24	4.48	3.08	1.12	1.68	1.68	1.12	2.24	1.68	1.68	1.12	NL
Sulfate	mg/L	135	150	191	159	118	166	183	136	216	127	237	65.4	159	250
Sulfide	mg/L	2.0	4.8	4.0	3.0	4.4	3.6	3.2	3.6	2.0	3.6	1.6	30.2	6.2	0.002
Phenol	mg/L	0.008U	0.009U	0.009	0.008U	0.012U	0.011U	0.009U	0.011U	0.085U	0.11U	0.10U	0.095U	0.10U	0.001
Phosphorous	mg/L	0.13	0.17	0.09	0.15	0.12	0.16	0.16	0.17	0.10	0.10U	0.10U	1.30	0.10U	0.020 (2)
Cyanide	mg/L	0.005	0.005U	0.005	0.005U	0.005U	0.005U	0.005U	0.005U	0.005U	0.005	0.005U	0.3	0.005U	0.0052

Notes:

U - Non-detect at associated value
- - Not Analyzed
J - Estimated
NL - Not Listed
SL - Sample Lost
(1) - Lowest Standard/Guidance Value shown
(2) - Guidance Value
(3) - Calculated using a hardness of 300 ppm
(4) - Applies to dissolved form
(5) - TOC analyzer malfunction prevented analysis of this compound
(6) - Hardness >75 mg/L
(7) - Sum of isomers <5 µg/L

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

	Volumes (gallons)	
Month	Monthly	Total
May 2001	2,900,000	2,900,000
June 2001	2,353,800	5,253,800
July 2001	1,488,500	6,742,300
August 2001	712,800	7,455,100
September 2001	473,100	7,928,200
October 2001	1,213,100	9,141,300
November 2001	1,281,100	10,422,400
December 2001	231,700 (1)	10,654,100
January 2002	1,383,200 (2)	12,037,300
February 2002	1,186,000	13,223,300
March 2002	233,600	13,456,900
April 2002	736,000	14,192,900
May 2002	348,200	14,541,100
June 2002	1,137,200	15,678,300
July 2002	869,300	16,547,600
August 2002	1,060,800	17,608,400
September 2002	707,000	18,315,400
October 2002	679,800	18,995,100
November 2002	489,500	19,484,700
December 2002	743,500	20,228,200
January 2003	1,150,700	21,378,900
February 2003	483,300	21,862,200
March 2003	402,300	22,264,500
April 2003	531,900	22,796,400
May 2003	655,600	23,452,000
June 2003	682,100	24,134,000
July 2003	942,000	25,076,100
August 2003	627,500	25,703,600
September 2003	349,600	26,053,200
October 2003	966,500	27,019,700
November 2003	442,200	27,461,900
December 2003	463,900	27,925,800
January 2004	443,900	28,369,700
February 2004	253,700	28,623,400
March 2004	403,700	29,027,100
April 2004	433,600	29,460,700
May 2004	377,400	29,838,100
June 2004	395,000	30,233,100
July 2004	384,300	30,617,400
August 2004	479,700	31,097,100
September 2004	413,900	31,511,000
October 2004	319,400	31,902,400
November 2004	249,200	32,151,600
December 2004	209,900	32,361,500

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons)	
	Monthly	Total
January 2005	310,100	32,671,600
February 2005	301,100	32,972,700
March 2005	250,200	33,222,900
April 2005	378,400	33,601,300
May 2005	458,800	34,060,100
June 2005	455,900	34,516,000
July 2005	270,200	34,786,200
August 2005	285,100	35,071,300
September 2005	395,600	35,466,900
October 2005	333,200	35,800,100
November 2005	360,200	36,160,300
December 2005	395,300	36,555,600
January 2006	297,500	36,853,100
February 2006	508,300	37,361,400
March 2006	244,700	37,606,100
April 2006	224,400	37,830,500
May 2006	153,300	37,983,800
June 2006	262,300	38,246,100
July 2006	212,900	38,459,000
August 2006	357,500	38,816,500
September 2006	777,000	39,593,500
October 2006	254,700	39,848,200
November 2006	778,700	40,626,900
December 2006	496,600	41,123,500
January 2007	410,500	41,534,000
February 2007	494,600	42,028,600
March, April & May 2007	1,489,200(3)	43,517,800
June 2007	334,300	43,852,100
July 2007	258,600	44,110,700
August 2007	239,000	44,349,700
September 2007	59,500(4)	44,409,200
October 2007 through January 2008	50,600(4)	44,459,800
February 2008	23,800(4)	44,483,600
March 2008	1,238,300	45,721,900
April 2008	2,126,700	47,848,600
May 2008	1,771,100	49,619,700
June 2008	618,000	50,237,700
July 2008	1,559,200	51,796,900
August 2008	1,365,900	53,162,800
September 2008	1,998,000	55,160,800
October 2008	2,511,100	57,671,900
November 2008	1,151,600	58,823,500
December 2008	572,700	59,396,200

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

	Volumes (gallons)	
Month	Monthly	Total
January 2009	1,021,700	60,417,900
February 2009	2,661,400	63,079,300
March 2009	4,239,300	67,318,600
April 2009	1,189,900	68,508,500
May 2009	1,362,500	69,871,000
June 2009	1,035,200	70,906,200
July 2009	1,010,100	71,916,300
August 2009	1,058,000	72,974,400
September 2009	947,000	73,921,400
October 2009	690,800	74,612,200
November 2009	697,500	75,309,700
December 2009	1,100,900	76,410,600
January 2010	767,100	77,177,700
February 2010	398,600	77,576,300
March 2010	1,094,500	78,670,800
April 2010	761,000	79,431,800
May 2010	354,700	79,786,500
June 2010	170,300	79,956,800
July 2010	323,600	80,280,400
August 2010	1,292,400	81,572,800
September 2010	672,800	82,245,600
October 2010	972,800	83,218,400
November 2010	433,500	83,651,900
December 2010	483,900	84,135,800
January 2011	420,300	84,556,100
February 2011	257,000	84,813,100
March 2011	1,136,700	85,949,800
April 2011	875,300	86,825,100
May 2011	727,500	87,552,600
June 2011	489,500	88,042,100
July 2011	459,300	88,501,400
August 2011	296,900	88,798,300
September 2011	390,300	89,188,600
October 2011	414,800	89,603,400
November 2011	393,100	89,996,500
December 2011	583,300	90,579,800
January 2012	651,800	91,231,600
February 2012	276,900	91,508,500
March 2012	586,600	92,095,100
April 2012	400,600	92,495,700
May 2012	458,800	92,954,500
June 2012	369,300	93,323,800
July 2012	15,600(5)	93,339,400
August 2012	399,400	93,738,800
September 2012	513,500	94,252,300

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons)	
	Monthly	Total
October 2012	344,500	94,596,800
November 2012	336,600	94,933,400
December 2012	286,800	95,220,200
January 2013	329,800	95,550,000
February 2013	217,400	95,767,400
March 2013	260,200	96,027,600
April 2013	249,900	96,277,500
May 2013	200,500	96,478,000
June 2013	211,300	96,689,300
July 2013	245,600	96,934,900
August 2013	165,100	97,100,000
September 2013	216,500	97,316,500
October 2013	118,600	97,435,100
November 2013	203,800	97,638,900
December 2013	117,400	97,756,300
January 2014	111,700	97,868,000
February 2014 (6)	66,700	97,934,700
March 2014 (6)	5,800	97,940,500
April 2014 (6)	5,000	97,945,500
May 2014 (6)	8,600	97,954,100
June 2014 (6)	8,500	97,962,600
July 2014 (6)	15,400	97,978,000
August 2014	1,385,800	99,363,800
September 2014	869,700	100,233,500
October 2014	1,426,200	101,659,700
November 2014	638,400	102,298,100
December 2014	753,200	103,051,300
January 2015 (7)	126,600	103,177,900
February 2015 (7)	43,200	103,221,100
March 2015	2,115,700	105,336,800
April 2015	2,113,500	107,450,300
May 2015	1,939,200	109,389,500
June 2015	1,808,100	111,197,600
July 2015	1,625,600	112,823,200
August 2015	1,557,900	114,381,100
September 2015	586,800	114,967,900
October 2015	2,094,300	117,062,200
November 2015	1,153,700	118,159,900
December 2015	884,000	119,099,900
January 2016	1,293,500	120,393,400
February 2016	834,800	121,228,200
March 2016	1,589,500	122,817,700
April 2016	1,144,200	123,961,900
May 2016	601,200	124,563,100

Table 2.10

Groundwater Volumes Discharged
to North Tonawanda POTW
Gratwick-Riverside Park Site
North Tonawanda, New York

Month	Volumes (gallons)	
	Monthly	Total
June 2016	(8)	124,563,100
July 2016	(8)	124,563,100
August 2016	(8)	124,563,100
September 2016	(8)	124,563,100
October 2016	(8)	124,563,100
November 2016	(8)	124,563,100
December 2016	796,500	125,359,600
January 2017	1,662,500	127,022,100
February 2017	1,549,600	128,571,700
March 2017	1,840,700	130,412,400
April 2017	1,486,100	131,898,500
May 2017	1,625,700	133,524,200

Notes:

(1)	To December 7, 2001.
(2)	From December 8, 2001.
(3)	Plotted as 496,400 gallons on Figure 2.18 for each of March, April, and May 2007.
(4)	Flow Meter malfunctioned due to tar-like material buildup inside meter. Meter was cleaned on March 14, 2008. Volumes not plotted on Figure 2.18 as volumes are not representative of actual volume removed.
(5)	Flow low due to pump failure. Two pumps replaced.
(6)	Flow meter malfunctioning. Cleaned and repaired on August 8, 2014. Volumes not plotted on Figure 2.18.
(7)	PS#1, PS#2 and PS#3 not operational as of January 28, 2015. PS#1 operational on March 2, 2015. PS#2 operational on March 17, 2015.
(8)	Flow meter malfunctioning.

Table 2.11

Summary of Operation and Maintenance Activities
June 2016 to May 2017
Gratwick-Riverside Park, North Tonawanda, NY

Date	Description
June 2016	Discussion/meetings with Kandey for GWS forcemain cleaning
July 11, 2016	GWS Forcemain Cleaning Work Plan submitted to NYSDEC
August 25, 2016	Kandey proposal for GW forcemain cleaning accepted by city
October 2016	Replace interior piping of P.S.#3. Work identified that new ball checks should be swing sets and that an additional valve was needed to isolate the forcemains so that the P.S. interior could be isolated and acid washed in the future.
November 2016	Kandey provided updated proposal with revised valving
December 5, 2016	Update Kandey proposal accepted by City
December 20, 2016	Repiping and acid washing of P.S.#3 completed
December 27, 2016	Repiping and acid washing of P.S.#2 completed
December 29, 2016	Repiping and acid washing of P.S.#1 completed
January 10, 2017	Acid washing of interior piping of meter building completed.

Appendices

Appendix A
City of North Tonawanda Industrial Wastewater Discharge Permit

CITY OF NORTH TONAWANDA
INDUSTRIAL WASTEWATER DISCHARGE PERMIT

Permit Number: 2628011

In accordance with the provisions of the Clean Water Act as amended, all terms and conditions set forth in this permit, the City of North Tonawanda Local Sewer Use Ordinance and any applicable Federal, State or local laws or regulations, authorization is hereby granted to:

City of North Tonawanda
830 River Road
North Tonawanda, New York 14120

Site: **Gratwick Riverside Park**
River Road
North Tonawanda, New York 14120

Classified by S.I.C. Number(s): N/A

for the discharge of remedial action ground water into the City of North Tonawanda Sewerage System.

This permit is granted in accordance with an application filed on 05/01/96 in the offices of the Wastewater Treatment Plant Superintendent located at 830 River Road, and in conformity with specifications and other required data submitted in support of the above named application, all of which are filed with and considered part of this permit. This permit is also granted in accordance with discharge limitations and requirements, monitoring and reporting requirements, and all other conditions set forth in Parts I and II hereof.

Effective this 1st day of March, 2016

To expire the 28th day of February, 2019

Will M. Davignon

William M. Davignon, Water Works Superintendent

Signed this 11th day of March, 2016

PART I. SPECIFIC CONDITIONS

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge from the permitted facility outfall(s) shall be limited and monitored by the permittee as specified below (Refer to attached map for sampling and monitoring sites).

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max.	Sampling Period	Sampling Type
001	Total Flow		1 Sampling Day Monthly	continuous
	pH	Monitor Only	1 Sampling Day Monthly	grab
	Vinyl Chloride	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Acetone	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Methylene Chloride	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,1,1-Trichloroethane	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,1-Dichloroethane	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,2-Dichloroethane (total)	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	2-Butanone	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Trichlorethene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Benzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max. Monthly Avg.	Sampling Period	Sampling Type
001	Tetrachloroethene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Toluene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Chlorobenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Ethylbenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Styrene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Xylenes (total)	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Phenol (4AAP)	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	trans-1,2-Dichloroethene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,4-Dichlorobenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	1,2-Dichlorobenzene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	2-Methylephenol	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	4-Methylephenol	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	2,4-Dimethylphenol	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Di-n-octylphthalate	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Napthalene	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Cyanide	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	NH3	Monitor Only	1 Sampling Day semi-annual	grab
	Chloride	Monitor Only	1 Sampling Day semi-annual	24 hr comp.

Sample Point	Parameter	Discharge Limitations mg/l except pH Daily Max. Monthly Avg.	Sampling Period	Sampling Type
001	NO3	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Phosphorous	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Sulfate	Monitor Only	1 Sampling Day semi-annual	24 hr comp.
	Sulfide	Monitor Only	1 Sampling Day semi-annual	24 hr comp.

*/- See Special requirements page for sub-note requirements.

PART I. SPECIFIC CONDITIONS
DISCHARGE MONITORING AND REPORTING REQUIREMENTS

During the period beginning the effective date of this permit and lasting until the expiration date, discharge monitoring results shall be summarized and reported by the permittee no later than the days specified below.

Sample Point	Parameter	Initial Monitoring Report	Subsequent Monitoring Reports
001	Vinyl Chloride	January 31, 2007	Semi-annual for all
	Acetone	January 31, 2007	
	Carbon Disulfide	January 31, 2007	
	1,1-Dichloroethene	January 31, 2007	
	1,1-Dichloroethane	January 31, 2007	
	1,2-Dichloroethane (total)	January 31, 2007	
	2-Butanone	January 31, 2007	
	Trichlorethene	January 31, 2007	
	Benzene	January 31, 2007	
	Tetrachloroethene	January 31, 2007	
	Toluene	January 31, 2007	
	Chlorobenzene	January 31, 2007	
	Ethylbenzene	January 31, 2007	
	Styrene	January 31, 2007	
	Xylenes (total)	January 31, 2007	

Sample Point	Parameter	Initial Monitoring Report	Subsequent Monitoring Reports
001	Phenol	January 31, 2007	Semi-annual for all
	1,3-Dichlorobenzene	January 31, 2007	
	1,4-Dichlorobenzene	January 31, 2007	
	1,2-Dichlorobenzene	January 31, 2007	
	2-Methylephenol	January 31, 2007	
	4-Methylephenol	January 31, 2007	
	2,4-Dimethylphenol	January 31, 2007	
	1,2,4-Trichlorobenzene	January 31, 2007	
	Napthalene	January 31, 2007	
	2-Methylnaphthalene	January 31, 2007	
	n-Nitrosodidiphenylamine	January 31, 2007	
	Di-n-butylphthalate	January 31, 2007	

PART I. SPECIFIC CONDITIONS

C. SPECIAL REQUIREMENTS

1) This permit is written for a duration of three (3) years. Upon renewal of this permit, all parameters will be re-evaluated to develop a parameter list based on chemical concentrations present in the extracted groundwater.

2) Fequency of monitoring is to be re-evaluated after each year. Sampling to be done semi-annual (Spring – Fall).

3) All monitoring reports (initial and subsequent), are to be received by the Superintendent, no later than thirty (30) days after receipt of validated data.

4) It is required that the Permittee have a Site Operations Manual available at all times. All emergency phone numbers must be listed in an appropriate place for easy access by operations personnel. All pumping operations shall be accomplished under no-bypass conditions. The Permittee is required to cease all pumping operations upon verbal request of the North Tonawanda Water/Wastewater Superintendent or his designee. Pumping operations shall not recommence until approval by the North Tonawanda Water/Wastewater Superintendent or his designee.

5) Analysts are required to use GC/MS method detection limits for most organics (if GC/MS is appropriate); GC/ECD for PCB's/Pesticides and GF method detection limits for metals (where GF is appropriate), as contained in attachment 5 of the NYSDEC TOGs 1.3.8 – New Discharges to Publicly Owned Treatment Works – dated 10/26/94.

Appendix B
Monthly Inspection Logs
(June 2015 to May 2016)

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 0 6 3 0 1 6 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely	NONE	
☒		- condition of cover		
☒		- condition of inside of manhole		
☒		- flow conditions		
☒	Wet Wells	- cover on securely	W/LS IN PUMP CHAMBERS	3(MH-15) AND 2(MH-9)
☒		- condition of cover	ARE VERY HIGH NEITHER	PUMPS WERE RUNNING
☒		- condition of inside of wet well		
2.	**Landfill Cap**			
☒	Vegetated Soil Cover	- erosion	NONE	
☒		- bare areas		
☒		- washouts		
☒		- leachate seeps		
☒		- length of vegetation		
☒		- dead/dying vegetation		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 06 30 16 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
☒	Access Roads	- bare areas, dead/dying veg.	NONE	
☒		- erosion	↓	
☒		- potholes or puddles	↓	
☒		- obstruction	↓	
3.	Wetlands (Area "F")	- dead/dying vegetation	↓	
X		- change in water budget	↓	
X		- general condition of wetlands	↓	
X				
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates	↓	
☐		- integrity of locks	↓	
☐		- placement and condition of signs	↓	

FORM 17

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 0 6 3 0 1 6 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	Inspect For	Action Required	Comments
4. Other Site Systems (continued)			
☒ Drainage Ditches/ Swale Outlets	- sediment build-up	RIVER SOUTH OUTFALL	SOME EROSION WHERE
☒	- erosion	PIPE MEETS EMBANKMENT	
☒	- condition of erosion protection	NONE	
☒	- flow obstructions	↓	
☒	- dead/dying vegetation	↓	
☒	- cable concrete/gabion mats and riprap	↓	
☒ Culverts	- sediment build-up	↓	
☒	- erosion	↓	
☒	- condition of erosion protection	↓	
☒	- flow obstructions	↓	
☒ Gas Vents	- intact / damage		
☒ Wells	- locks secure		
☒ Shoreline Stabilization	- condition of gabion mats and riprap	GABION MATS EXPOSED @ VARIOUS	LOCATIONS ALONG
		THE SHORELINE	

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 07 28 16 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	Inspect For	Action Required	Comments
1. Perimeter Collection System/Off-Site Forcemain			
☒ Manholes	- cover on securely	NONE	
☒	- condition of cover	↓	
☒	- condition of inside of manhole	↓	
☒	- flow conditions	↓	
☒ Wet Wells	- cover on securely	W/L'S IN PUMP CHAMBERS 3(MH-15) AND 2(MH-9)	
☒	- condition of cover	ARE VERY HIGH NEITHER PUMPS WERE RUNNING	
☒	- condition of inside of wet well		
2. Landfill Cap			
☒ Vegetated Soil Cover	- erosion	NONE	
☒	- bare areas	↓	
☒	- washouts	↓	
☒	- leachate seeps	↓	
☒	- length of vegetation	↓	
☒	- dead/dying vegetation	↓	

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 07 28 16
(MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	Inspect For	Action Required	Comments
2.	Landfill Cap (continued)			
☒	Access Roads	- bare areas, dead/dying veg.	NONE	
☒		- erosion	↓	
☒		- potholes or puddles	↓	
☒		- obstruction	↓	
3.	Wetlands (Area "F")	- dead/dying vegetation	↓	
X		- change in water budget	↓	
X		- general condition of wetlands	↓	
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates	↓	
☐		- integrity of locks	↓	
☐		- placement and condition of signs	↓	

FORM 17

CRA 7987 (24)

Shaun Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 0 1 2 8 1 6 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	Inspect For	Action Required	Comments
4.	**Other Site Systems (continued)**			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	RIVER SOUTH OUTFALL SOME EROSION WHERE	
☒		- erosion	PIPE MEETS EMBANKMENT	
☒		- condition of erosion protection	NONE	
☒		- flow obstructions		
☒		- dead/dying vegetation		
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☒	Gas Vents	- intact / damage		
☒	Wells	- locks secure	GABION MATS EXPOSED @ VARIOUS LOCATIONS	
☒	Shoreline Stabilization	- condition of gabion mats and riprap	ALONG THE SHORELINE	

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 08 24 16
(MM DD YY)

INSPECTOR(S): D. Tyran

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely	None	
☒		- condition of cover		
☒		- condition of inside of manhole		
☒		- flow conditions		
☒	Wet Wells	- cover on securely	W/Ls in Pump chamber 2 & 3 very high	
☒		- condition of cover	niether of the pumps were running	
☒		- condition of inside of wet well		
2.	**Landfill Cap**			
☒	Vegetated Soil Cover	- erosion	None	
☒		- bare areas		
☒		- washouts		
☒		- leachate seeps		
☒		- length of vegetation		
☒		- dead/dying vegetation		

FORM 17

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 08 31 16 (MM DD YY)

INSPECTOR(S): D. Tyran

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
☒	Access Roads	- bare areas, dead/dying veg.	None	
☒		- erosion	↓	
☒		- potholes or puddles	↓	
☒		- obstruction	↓	
3.	**Wetlands (Area "F")**			
X		- dead/dying vegetation	↓	
X		- change in water budget	↓	
X		- general condition of wetlands	↓	
4.	**Other Site Systems**			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates	↓	
☐		- integrity of locks	↓	
☐		- placement and condition of signs	↓	

FORM 17

CRA 7987 (24)

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 08 31 16 (MM DD YY)

INSPECTOR(S): D. Tyran

4. Other Site Systems (continued)

	Item	*Inspect For*	*Action Required*	*Comments*
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	Some erosion @ River South	outfall where
☒		- erosion	pipe meets embankment	
☒		- condition of erosion protection	None	
☒		- flow obstructions		
☒		- dead/dying vegetation		
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☒	Gas Vents	- intact / damage		
☒	Wells	- locks secure	Gabion mats exposed @	various locations
☒	Shoreline Stabilization	- condition of gabion mats and riprap	along the shoreline	

FORM 17

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 09 27 16 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	Inspect For	Action Required	Comments
1.	**Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely	NONE	
☒		- condition of cover		
☒		- condition of inside of manhole		
☒		- flow conditions		
☒	Wet Wells	- cover on securely	W/L'S IN PUMP CHAMBER 2 AND 3 WERE VERY	
☒		- condition of cover	HIGH, NEITHER OF THE PUMPS WERE RUNNING	
☒		- condition of inside of wet well		
2.	Landfill Cap			
☒	Vegetated Soil Cover	- erosion	NONE	
☒		- bare areas		
☒		- washouts		
☒		- leachate seeps		
☒		- length of vegetation		
☒		- dead/dying vegetation		

FORM 17

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 09 27 16 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	Inspect For	Action Required	Comments
2.	Landfill Cap (continued)			
☒	Access Roads	- bare areas, dead/dying veg.	NONE	
☒		- erosion		
☒		- potholes or puddles		
☒		- obstruction		
3.	Wetlands (Area "F")			
X		- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates		
☐		- integrity of locks		
☐		- placement and condition of signs		

FORM 17

Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 0|9|2|7|1|6 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	*Inspect For*	*Action Required*	*Comments*
4.	Other Site Systems (continued)			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	SOME EROSION AT RIVER	SOUTH OUTFALL
☒		- erosion	WHERE PIPE MEETS EMBANKMENT	
☒		- condition of erosion protection	NONE	
☒		- flow obstructions		
☒		- dead/dying vegetation		
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☒	Gas Vents	- intact / damage		
☒	Wells	- locks secure	GABION MATS EXPOSED AT	VARIOUS LOCATIONS
☒	Shoreline Stabilization	- condition of gabion mats and riprap	ALONG THE SHORELING	

FORM 17

Shaun Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 0 2 5 1 6
(MM DD YY)

INSPECTOR(S): D TYRAN

	Item	*Inspect For*	*Action Required*	*Comments*
	1. **Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely		
☒		- condition of cover		
☒		- condition of inside of manhole		
☒		- flow conditions		
☒	Wet Wells	- cover on securely	CREW FROM NORTH TONAWANDA WORKING ON PUMP CHAMBER #3 (MH15) CLEANED PUMP W/ ACID, SETTING UP NEW DISCHARGE HOSE, UNABLE TO GET SEDIMENT DEPTH	
☒		- condition of cover		
☒		- condition of inside of wet well		
	2. **Landfill Cap**			
☒	Vegetated Soil Cover	- erosion	NONE	
☒		- bare areas		
☒		- washouts		
☒		- leachate seeps		
☒		- length of vegetation		
☒		- dead/dying vegetation		

FORM 17

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 0 2 5 1 6 (MM DD YY)

INSPECTOR(S): D TYRAN

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
☒	Access Roads	- bare areas, dead/dying veg.	NONE	
☒		- erosion	↓	
☒		- potholes or puddles	↓	
☒		- obstruction	↓	
3. X	**Wetlands (Area "F")**	- dead/dying vegetation	↓	
X		- change in water budget	↓	
X		- general condition of wetlands	↓	
4.	**Other Site Systems**			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates	↓	
☐		- integrity of locks	↓	
☐		- placement and condition of signs	↓	

FORM 17

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 0 2 5 1 6 (MM DD YY)

INSPECTOR(S): D TYRAN

	Item	*Inspect For*	*Action Required*	*Comments*
	4. Other Site Systems (continued)			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	SOME EROSION @ RIVER SOUTH OUTFALL WHERE	
☒		- erosion	PIPE MEETS EMBANKMENT	
☒		- condition of erosion protection	NONE	
☒		- flow obstructions		
☒		- dead/dying vegetation		
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☐	Gas Vents	- intact / damage		
☒	Wells	- locks secure	GABION MATS EXPOSED @	VARIOUS LOCATIONS
☒	Shoreline Stabilization	- condition of gabion mats and riprap	ALONG SHORELINE	

FORM 17

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1|1|3|0|1|6 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely	None	
☒		- condition of cover	↓	
☒		- condition of inside of manhole	↓	
☒		- flow conditions	↓	
☒	Wet Wells	- cover on securely	Pump chambers 2 & 3 both	have high levels.
☒		- condition of cover	Pump for chamber 3 is	sitting on grating
☒		- condition of inside of wet well		
2.	**Landfill Cap**			
☒	Vegetated Soil Cover	- erosion	None	
☒		- bare areas	↓	
☒		- washouts	↓	
☒		- leachate seeps	↓	
☒		- length of vegetation	↓	
☒		- dead/dying vegetation	↓	

FORM 17

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 11 30 16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

Item	Inspect For	Action Required	Comments
2. Landfill Cap (continued)			
☒ Access Roads	- bare areas, dead/dying veg.	None	
☒	- erosion	↓	
☒	- potholes or puddles	↓	
☒	- obstruction	↓	
3. Wetlands (Area "F") X	- dead/dying vegetation	↓	
X	- change in water budget	↓	
X	- general condition of wetlands	↓	
4. Other Site Systems			
☐ Perimeter Fence	- integrity of fence	NA	
☐	- integrity of gates	↓	
☐	- integrity of locks	↓	
☐	- placement and condition of signs	↓	

David Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 1 3 0 1 6 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
4.	**Other Site Systems (continued)**			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	Some erosion @ River South	where pipe meets
☒		- erosion	embankment	
☒		- condition of erosion protection		
☒		- flow obstructions		
☒		- dead/ dying vegetation		
☒		- cable concrete/ gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☒	Gas Vents	- intact / damage		
☒	Wells	- locks secure	Gabion Mats exposed @	various locations
☒	Shoreline Stabilization	- condition of gabion mats and riprap	along shoreline	

FORM 17

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 1 2 2 8 1 6 (MM DD YY)

INSPECTOR(S): D. Tyran S Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely	None	
☒		- condition of cover		
☒		- condition of inside of manhole		
☒		- flow conditions		
☒	Wet Wells	- cover on securely		
☒		- condition of cover		
☒		- condition of inside of wet well		
2.	**Landfill Cap**			
☒	Vegetated Soil Cover	- erosion		
☒		- bare areas		
☒		- washouts		
☒		- leachate seeps		
☒		- length of vegetation		
☒		- dead/dying vegetation		

FORM 17

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 12 28 16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
2.	**Landfill Cap (continued)**			
☒	Access Roads	- bare areas, dead/dying veg.	None	
☒		- erosion	↓	
☒		- potholes or puddles	↓	
☒		- obstruction	↓	
3.	**Wetlands (Area "F")**			
X		- dead/dying vegetation	↓	
X		- change in water budget	↓	
X		- general condition of wetlands	↓	
4.	**Other Site Systems**			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates	↓	
☐		- integrity of locks	↓	
☐		- placement and condition of signs	↓	

FORM 17

Dave J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 12 28 16 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
4.	**Other Site Systems (continued)**			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	Some erosion @ River South	where pipe meets
☒		- erosion	the embankment	
☒		- condition of erosion protection	None	
☒		- flow obstructions		
☒		- dead/dying vegetation		
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☒	Gas Vents	- intact/damage		
☒	Wells	- locks secure	Gabion Mats exposed @	various points along
☒	Shoreline Stabilization	- condition of gabion mats and riprap	Shoreline	

FORM 17

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 0 1 3 1 1 7
(MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	*Inspect For*	*Action Required*	*Comments*
1.	**Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely	NONE	
☒		- condition of cover		
☒		- condition of inside of manhole		
☒		- flow conditions		
☒	Wet Wells	- cover on securely		
☒		- condition of cover		
☒		- condition of inside of wet well		
2.	**Landfill Cap**			
☒	Vegetated Soil Cover	- erosion		
☒		- bare areas		
☒		- washouts		
☒		- leachate seeps		
☒		- length of vegetation		
☒		- dead/dying vegetation		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 01 31 17
(MM DD YY)

INSPECTOR(S): D TYRAN S GARDNER

	Item	*Inspect For*	*Action Required*	*Comments*
2.	Landfill Cap (continued)			
☒	Access Roads	- bare areas, dead/dying veg.	NONE	
☒		- erosion		
☒		- potholes or puddles		
☒		- obstruction		
3.	Wetlands (Area "F")	- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
X				
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates		
☐		- integrity of locks		
☐		- placement and condition of signs		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 01 31 17 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

4. Other Site Systems (continued)

	Item	*Inspect For*	*Action Required*	*Comments*
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	RIVER NORTH OUTFALL BLOCKED BY A 8x8 PIECE	
☒		- erosion	OF TIMBER, WE REMOVED IT	
☒		- condition of erosion protection	SOME EROSION AT RIVER SOUTH OUTFALL WHERE	
☒		- flow obstructions	PIPE MEETS THE EMBANKMENT	
☒		- dead/dying vegetation	NONE	
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☐	Gas Vents	- intact / damage		
☒	Wells	- locks secure	GABION MATS EXPOSED AT VARIOUS POINTS ALONG	
☒	Shoreline Stabilization	- condition of gabion mats and riprap	SHORELINE	

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 02 28 17
(MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
	1. Perimeter Collection System/Off-Site Forcemain			
☒	Manholes	- cover on securely	None	
☒		- condition of cover		
☒		- condition of inside of manhole		
☒		- flow conditions		
☒	Wet Wells	- cover on securely		
☒		- condition of cover		
☒		- condition of inside of wet well		
	2. Landfill Cap			
☒	Vegetated Soil Cover	- erosion		
☒		- bare areas		
☒		- washouts		
☒		- leachate seeps		
☒		- length of vegetation		
☒		- dead/dying vegetation		

FORM 17

Dave S Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 02 28 17 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

Item		Inspect For	Action Required	Comments
2.	**Landfill Cap (continued)**			
☒	Access Roads	- bare areas, dead/dying veg.	None	
☒		- erosion		
☒		- potholes or puddles		
☒		- obstruction		
3.	Wetlands (Area "F")	- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
X				
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	N/A	
☐		- integrity of gates		
☐		- integrity of locks		
☐		- placement and condition of signs		

FORM 17

CRA 7987 (24)

D J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 02 28 17 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
4.	Other Site Systems (continued)			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection	Some erosion @ River South outfall where	
☒		- flow obstructions	pipe meets the embankment	
☒		- dead/dying vegetation		
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☑	Gas Vents	- intact / damage		
☒	Wells	- locks secure	Gabion Mats exposed at various points along	
☒	Shoreline Stabilization	- condition of gabion mats and riprap	Shoreline	

FORM 17

David Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 03 31 17 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	Inspect For	Action Required	Comments
1.	**Perimeter Collection System/Off-Site Forcemain**			
☒	Manholes	- cover on securely	NONE	
☒		- condition of cover	↓	
☒		- condition of inside of manhole	↓	
☒		- flow conditions	↓	
☒	Wet Wells	- cover on securely	↓	
☒		- condition of cover	↓	
☒		- condition of inside of wet well	↓	
2.	**Landfill Cap**			
☒	Vegetated Soil Cover	- erosion	↓	
☒		- bare areas	↓	
☒		- washouts	↓	
☒		- leachate seeps	↓	
☒		- length of vegetation	↓	
☒		- dead/dying vegetation	↓	

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 03 31 17 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	*Inspect For*	*Action Required*	*Comments*
2.	Landfill Cap (continued)			
☒	Access Roads	- bare areas, dead/dying veg.	NONE	
☒		- erosion	↓	
☒		- potholes or puddles	↓	
☒		- obstruction	↓	
3.	Wetlands (Area "F")			
X		- dead/dying vegetation	↓	
X		- change in water budget	↓	
X		- general condition of wetlands	↓	
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates	↓	
☐		- integrity of locks	↓	
☐		- placement and condition of signs	↓	

FORM 17

Shaun Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

LOCATION: North Tonawanda, New York

PROJECT NAME: Gratwick-Riverside Park Site

DATE: 0 3 3 1 1 7 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	*Inspect For*	*Action Required*	*Comments*
4. Other Site Systems (continued)			
☒ Drainage Ditches/ Swale Outlets	- sediment build-up		
☒	- erosion		
☒	- condition of erosion protection	SOME EROSION AT RIVER SOUTH OUTFALL WHERE	
☒	- flow obstructions	PIPE MEETS THE EMBANKMENT	
☒	- dead/dying vegetation		
☒	- cable concrete/gabion mats and riprap		
☒ Culverts	- sediment build-up		
☒	- erosion		
☒	- condition of erosion protection		
☒	- flow obstructions		
☐ Gas Vents	- intact / damage	GABION MATS EXPOSED AT VARIOUS POINTS ALONG	
☒ Wells	- locks secure	SHORELINE	
☒ Shoreline Stabilization	- condition of gabion mats and riprap		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 04 27 17 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item	Inspect For	Action Required	Comments
1. **Perimeter Collection System/Off-Site Forcemain**			
☒ Manholes	- cover on securely	NONE ↓	
☒	- condition of cover		
☒	- condition of inside of manhole		
☒	- flow conditions		
☒ Wet Wells	- cover on securely		
☒	- condition of cover		
☒	- condition of inside of wet well		
2. Landfill Cap			
☒ Vegetated Soil Cover	- erosion		
☒	- bare areas		
☒	- washouts		
☒	- leachate seeps		
☒	- length of vegetation		
☒	- dead/dying vegetation		

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 04 27 17 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

	Item	Inspect For	Action Required	Comments
2.	Landfill Cap (continued)			
☒	Access Roads	- bare areas, dead/dying veg.	NONE	
☒		- erosion	↓	
☒		- potholes or puddles	↓	
☒		- obstruction	↓	
3.	Wetlands (Area "F")			
X		- dead/dying vegetation	↓	
X		- change in water budget	↓	
X		- general condition of wetlands	↓	
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates	↓	
☐		- integrity of locks	↓	
☐		- placement and condition of signs	↓	

FORM 17

Shawn Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 0 4 2 7 1 7 (MM DD YY)

INSPECTOR(S): D TYRAN, S GARDNER

Item		*Inspect For*	*Action Required*	*Comments*
4.	Other Site Systems (continued)			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up	RIVER NORTH OUTFALL THERE IS A 10" DIA, 8'	
☒		- erosion	LONG DRIFT WOOD UP IN THE OUTFALL PIPE	
☒		- condition of erosion protection		
☒		- flow obstructions	SOME EROSION AT RIVER SOUTH OUTFALL WHERE	
☒		- dead/dying vegetation	PIPE MEETS THE EMBANKMENT	
☒		- cable concrete/gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions		
☐	Gas Vents	- intact / damage	GABION MATS EXPOSED AT VARIOUS POINTS ALONG	
☒	Wells	- locks secure	SHORELINE	
☒	Shoreline Stabilization	- condition of gabion mats and riprap		

FORM 17

Gardner

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 05 31 17 (MM DD YY)

INSPECTOR(S): D. Tygan S. Gardner

Item	Inspect For	Action Required	Comments
1. Perimeter Collection System/Off-Site Forcemain			
☒ Manholes	- cover on securely	None	
☒	- condition of cover		
☒	- condition of inside of manhole		
☒	- flow conditions		
☒ Wet Wells	- cover on securely		
☒	- condition of cover		
☒	- condition of inside of wet well		
2. Landfill Cap			
☒ Vegetated Soil Cover	- erosion		
☒	- bare areas		
☒	- washouts		
☒	- leachate seeps		
☒	- length of vegetation		
☒	- dead/dying vegetation		

FORM 17

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 05 31 17
(MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	Inspect For	Action Required	Comments
2.	Landfill Cap (continued)			
☒	Access Roads	- bare areas, dead/dying veg.	None	
☒		- erosion		
☒		- potholes or puddles		
☒		- obstruction		
3.	Wetlands (Area "F")			
X		- dead/dying vegetation		
X		- change in water budget		
X		- general condition of wetlands		
4.	Other Site Systems			
☐	Perimeter Fence	- integrity of fence	NA	
☐		- integrity of gates		
☐		- integrity of locks		
☐		- placement and condition of signs		

David J Tyran

GRATWICK-RIVERSIDE PARK SITE
MONTHLY INSPECTION LOG

PROJECT NAME: Gratwick-Riverside Park Site

LOCATION: North Tonawanda, New York

DATE: 0 5 3 1 1 7 (MM DD YY)

INSPECTOR(S): D. Tyran S. Gardner

	Item	*Inspect For*	*Action Required*	*Comments*
4.	Other Site Systems (continued)			
☒	Drainage Ditches/ Swale Outlets	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection	Some erosion at	River South outfall
☒		- flow obstructions	where pipe meets the	embankment
☒		- dead/dying vegetation		
☒		- cable concrete/ gabion mats and riprap		
☒	Culverts	- sediment build-up		
☒		- erosion		
☒		- condition of erosion protection		
☒		- flow obstructions	24" Ø Log in front of	River North outfall
☐	Gas Vents	- intact / damage		
☒	Wells	- locks secure	Gabion mats exposed at	various points
☒	Shoreline Stabilization	- condition of gabion mats and riprap	along shoreline	

FORM 17

CRA 7987 (24)

Appendix C
QA/QC Reviews and Data Usability Summary

Memorandum

July 3, 2017

To:	Klaus Schmidtke	Ref. No.:	007987
From:	scs Susan Scrocchi/adh/24	Tel:	716-205-1984

Subject: **Analytical Results and Reduced Validation**
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
October 2016

1. Introduction

This document details a reduced validation of analytical results for one effluent sample collected in support of the semiannual monitoring program at the North Tonawanda Waste Water Treatment Plant during October 2016. Samples were submitted to TestAmerica Laboratories, Inc. 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.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, method blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS).

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 documents entitled:

i) "National Functional Guidelines for Superfund Organic Methods Data Review", United States Environmental Protection Agency (USEPA) 540-R-2016-002, September 2016

ii) "National Functional Guidelines for Inorganic Superfund Data Review", USEPA 540-R-2016-001, September 2016

These items 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. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

GHD
2055 Niagara Falls Boulevard Niagara Falls New York 14304 USA
T 716 297 6150 **F** 716 297 2265 **W** www.ghd.com

3. Laboratory Method 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.

4. Surrogate Spike Recoveries - Organic Analyses

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 volatile and semi-volatile 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 semi-volatile organic compound (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 met the above criteria.

5. 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.

Organic Analyses

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

Inorganic Analyses

The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision.

MS/MSD analyses were performed for SVOC determinations.

Organic Analyses

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

7. Field QA/QC Samples

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

Trip Blank Sample Analysis

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

8. Analyte Reporting

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

9. Conclusion

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

Table 1

Sample Collection and Analysis Summary
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
October 2016

					Analysis/Parameters									
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**TAL Metals**	**Chloride/Sulfate**	**Nitrate**	**Site-Specific VOCs**	**Site-Specific SVOCs**	**Alkalinity**	**Total Hardness**	**TDS**	**Sulfide**	**Comments**
GRATWICK RIVERSIDE (GRP)	Effluent	Water	10/04/2016	8:00	X	X	X	X	X	X	X	X	X	
TRIP BLANK	-	Water	10/04/2016	-				X						Trip Blank

Notes:

VOCs	- Volatile Organic Compounds
SVOCs	- Semi-volatile Organic Compounds
TAL	- Target Analyte List
TDS	- Total Dissolved Solids
-	- Not applicable

Table 2

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
October 2016

Location ID:		**Effluent**
Sample Name:		**GRATWICK RIVERSIDE (GRP)**
Sample Date:		**10/04/2016**
Parameters	**Unit**	
Volatile Organic Compounds		
1,1,1-Trichloroethane	µg/L	5.0 U
1,1-Dichloroethane	µg/L	5.0 U
1,2-Dichloroethane	µg/L	5.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	25 U
Acetone	µg/L	25 U
Benzene	µg/L	5.0 U
Chlorobenzene	µg/L	5.0 U
Ethylbenzene	µg/L	5.0 U
Methylene chloride	µg/L	5.0 U
Styrene	µg/L	5.0 U
Tetrachloroethene	µg/L	5.0 U
Toluene	µg/L	5.0 U
trans-1,2-Dichloroethene	µg/L	5.0 U
Trichloroethene	µg/L	5.0 U
Vinyl chloride	µg/L	5.0 U
Xylenes (total)	µg/L	10 U
Semi-volatile Organic Compounds		
1,2-Dichlorobenzene	µg/L	4.8 U
1,4-Dichlorobenzene	µg/L	5.4 U
2,4-Dimethylphenol	µg/L	1.3 U
2-Methylphenol	µg/L	0.77 U
4-Methylphenol	µg/L	0.75 U
Di-n-octyl phthalate (DnOP)	µg/L	4.6 U
Naphthalene	µg/L	0.82 U
Phenol	µg/L	0.33 U
Metals		
Aluminum	mg/L	0.20 U
Antimony	mg/L	0.020 U
Arsenic	mg/L	0.015 U
Barium	mg/L	0.13
Beryllium	mg/L	0.0020 U
Cadmium	mg/L	0.0020 U
Chromium	mg/L	0.0040 U
Copper	mg/L	0.010 U
Iron	mg/L	0.30
Lead	mg/L	0.010 U
Magnesium	mg/L	45.2
Manganese	mg/L	0.062
Mercury	mg/L	0.00020 U

Table 2

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
October 2016

	Location ID:	**Effluent**
	Sample Name:	**GRATWICK RIVERSIDE (GRP)**
	Sample Date:	**10/04/2016**
Parameters	**Unit**	
Metals-Continued		
Nickel	mg/L	0.010 U
Selenium	mg/L	0.025 U
Silver	mg/L	0.0060 U
Sodium	mg/L	258
Zinc	mg/L	0.010 U
General Chemistry		
Alkalinity, bicarbonate	mg/L	349
Alkalinity, total (as CaCO3)	mg/L	381
Ammonia	mg/L	1.12
Biochemical oxygen demand (BOD)	mg/L	24.88
Chemical oxygen demand (COD)	mg/L	124.8
Chloride	mg/L	421
Cyanide (total)	mg/L	0.3
Hardness	mg/L	352
Nitrate (as N)	mg/L	0.050 U
Oil and grease	mg/L	0.10 U
pH (water)	mg/L	8.43
Phenolics (total)	mg/L	0.095 U
Phosphorus	mg/L	1.30
Sulfate	mg/L	65.4
Sulfide	mg/L	30.2
Total dissolved solids (TDS)	mg/L	1180
Total kjeldahl nitrogen (TKN)	mg/L	1.68
Total organic carbon (TOC)	mg/L	10.93
Total suspended solids (TSS)	mg/L	3

Notes:

U - Not detected at the associated reporting limit

Table 3

Analytical Methods
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
October 2016

			Holding Time	
Parameter	**Method**	**Matrix**	**Collection to Extraction (Days)**	**Collection or Extraction to Analysis (Days)**
Volatile Organic Compounds	EPA 624	Water	-	14
Semi-volatile Organic Compounds	EPA 625	Water	7	40
Target Analyte List Metals	EPA 200.7	Water	-	180
Mercury	EPA 245.1	Water	-	28
Chloride/Sulfate	EPA 300.0	Water	-	28
Nitrate	EPA 353.2	Water	-	48 hours
Hardness	SM 2340	Water	-	180
Alkalinity	SM2320B	Water	-	14
Total Dissolved Solids	SM2540C	Water	-	7
Sulfide	SM4500-S2-F	Water	-	7

Notes:

\- - Not applicable

Method References:
SM - "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, with subsequent revisions
EPA - "Methods for Chemical Analysis of Water and Wastes", USEPA-600/4-79-020, March 1983, with subsequent revisions

Memorandum

July 3, 2017

To:	Klaus Schmidtke	Ref. No.:	007987
From:	scs Susan Scrocchi/adh/25	Tel:	716-205-1984

Subject: **Analytical Results and Reduced Validation**
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
April 2017

1. Introduction

This document details a reduced validation of analytical results for one effluent sample collected in support of the semiannual monitoring program at the North Tonawanda Waste Water Treatment Plant during April 2017. Samples were submitted to TestAmerica Laboratories, Inc., 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.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, method blank data, and recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spikes (MS).

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 documents entitled:

i) "National Functional Guidelines for Superfund Organic Methods Data Review", United States Environmental Protection Agency (USEPA) 540-R-2016-002, September 2016

ii) "National Functional Guidelines for Inorganic Superfund Data Review", USEPA 540-R-2016-001, September 2016

These items 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. Sample chain of custody document and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Method 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.

4. Surrogate Spike Recoveries - Organic Analyses

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 volatile and semi-volatile 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 semi-volatile organic compound (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 met the above criteria.

5. 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.

Organic Analyses

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

Inorganic Analyses

The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision.

MS/MSD analyses were performed for chloride and sulfate.

Inorganic Analyses

The MS/MSD samples were spiked with the analytes of interest, and the results were evaluated using the "Guidelines". All percent recoveries and RPD values were within the control limits, demonstrating acceptable analytical accuracy and precision.

7. Field QA/QC Samples

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

Trip Blank Sample Analysis

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

8. Analyte Reporting

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

9. Conclusion

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

Table 1

Sample Collection and Analysis Summary
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
April 2017

					Analysis/Parameters									
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**TAL Metals**	**Chloride/Sulfate**	**Nitrate**	**Site-Specific VOCs**	**Site-Specific SVOCs**	**Alkalinity**	**Total Hardness**	**TDS**	**Sulfide**	**Comments**
GRATWICK RIVERSIDE (GRP)	Effluent	Water	04/06/2017	8:00	X	X	X	X	X	X	X	X	X	
TRIP BLANK	-	Water	04/06/2017	-				X						Trip Blank

Notes:

VOCs	- Volatile Organic Compounds
SVOCs	- Semi-volatile Organic Compounds
TAL	- Target Analyte List
TDS	- Total Dissolved Solids
-	- Not applicable

Table 2

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
April 2017

	Location ID:	**Effluent**
	Sample Name:	**NTWWTP (GRP)**
	Sample Date:	**04/06/2017**
Parameters	**Unit**	
Volatile Organic Compounds		
1,1,1-Trichloroethane	µg/L	5.0 U
1,1-Dichloroethane	µg/L	5.0 U
1,2-Dichloroethane	µg/L	5.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	25 U
Acetone	µg/L	25 U
Benzene	µg/L	5.0 U
Chlorobenzene	µg/L	9.5
Ethylbenzene	µg/L	5.0 U
Methylene chloride	µg/L	5.0 U
Styrene	µg/L	5.0 U
Tetrachloroethene	µg/L	5.0 U
Toluene	µg/L	5.0 U
trans-1,2-Dichloroethene	µg/L	5.0 U
Trichloroethene	µg/L	5.0 U
Vinyl chloride	µg/L	5.0 U
Xylenes (total)	µg/L	10 U
Semi-volatile Organic Compounds		
1,2-Dichlorobenzene	µg/L	4.8 U
1,4-Dichlorobenzene	µg/L	26
2,4-Dimethylphenol	µg/L	53
2-Methylphenol	µg/L	7.7
4-Methylphenol	µg/L	62
Di-n-octyl phthalate (DnOP)	µg/L	4.6 U
Naphthalene	µg/L	1.3
Phenol	µg/L	3.0
Metals		
Aluminum	mg/L	0.20 U
Antimony	mg/L	0.020 U
Arsenic	mg/L	0.015 U
Barium	mg/L	0.081
Beryllium	mg/L	0.0020 U
Cadmium	mg/L	0.0020 U
Chromium	mg/L	0.0040 U
Copper	mg/L	0.010 U
Iron	mg/L	1.0
Lead	mg/L	0.010 U
Magnesium	mg/L	9.6
Manganese	mg/L	0.053
Mercury	mg/L	0.00020 U
Nickel	mg/L	0.014

Table 2

Analytical Results Summary
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
April 2017

Location ID:		**Effluent**
Sample Name:		**NTWWTP (GRP)**
Sample Date:		**04/06/2017**
Parameters	**Unit**	
Metals-Continued		
Selenium	mg/L	0.025 U
Silver	mg/L	0.0060 U
Sodium	mg/L	319
Zinc	mg/L	0.017
General Chemistry		
Alkalinity, bicarbonate	mg/L	94.2
Alkalinity, total (as CaCO3)	mg/L	94.2
Ammonia	mg/L	1.12
Biochemical oxygen demand (BOD)	mg/L	11.73
Chemical oxygen demand (COD)	mg/L	67.40
Chloride	mg/L	576
Cyanide (total)	mg/L	0.005 U
Hardness	mg/L	276
Nitrate (as N)	mg/L	0.050 U
Oil and grease	mg/L	0.20
pH (water)	mg/L	8.80
Phenolics (total)	mg/L	0.100 U
Phosphorus	mg/L	0.10 U
Sulfate	mg/L	159
Sulfide	mg/L	6.2
Total dissolved solids (TDS)	mg/L	1280
Total kjeldahl nitrogen (TKN)	mg/L	1.12
Total organic carbon (TOC)	mg/L	8.66
Total suspended solids (TSS)	mg/L	11.00

Notes:

U - Not detected at the associated reporting limit

Table 3

Analytical Methods
Sampling Event
Site Effluent
Gratwick-Riverside Park
North Tonawanda, New York
April 2017

			Holding Time	
Parameter	**Method**	**Matrix**	**Collection to Extraction (Days)**	**Collection or Extraction to Analysis (Days)**
Volatile Organic Compounds	EPA 624	Water	-	14
Semi-Volatile Organic Compounds	EPA 625	Water	7	40
Target Analyte List Metals	EPA 200.7	Water	-	180
Mercury	EPA 245.1	Water	-	28
Chloride/Sulfate	EPA 300.0	Water	-	28
Nitrate	EPA 353.2	Water	-	48 hours
Hardness	SM 2340	Water	-	180
Alkalinity	SM2320B	Water	-	14
Total Dissolved Solids	SM2540C	Water	-	7
Sulfide	SM4500-S2-F	Water	-	7

Notes:

-	- Not applicable

Method References:

SM	- "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, with subsequent revisions
EPA	- "Methods for Chemical Analysis of Water and Wastes", USEPA-600/4-79-020, March 1983, with subsequent revisions

Memorandum

July 3, 2017

To: Klaus Schmidtke Ref. No.: 007987

scs

From: Susan Scrocchi/adh/26 Tel: 716-205-1984

Subject: **Analytical Results and Full Validation**
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2017

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1. Introduction

This Data Usability Summary Report (DUSR) has been prepared per the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation DER-10, Technical Guidance for the Site Investigation and Remediation, Appendix 2B-Guidance for the Data Deliverables and Development of Data Usability Summary Reports, May 2010.

The following document details a reduced validation of analytical results for groundwater samples collected in support of the Annual Monitoring Program at the Gratwick-Riverside Part Site (Site) during May 2017.

2. Analytical Methodologies and Data Validation

Samples were submitted to TestAmerica Laboratories, Inc. (TA), located in Amherst, New York. Samples were analyzed for:

i) Selected Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method SW-846 8260

ii) Selected Semi-volatile Organic Compounds (SVOCs) by USEPA Method SW-846 8270

The quality assurance/quality control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the document entitled "National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-2016-002, September 2016.

The reduced validation included a review of completeness of all required deliverables to determine if the data are within acceptable QC limits and specification. These included reviews of holding times, instrument tunes, calibration summaries, blanks, spike recoveries, field duplicate analyses, and surrogate/internal standard recoveries. Evaluation of the data was based on information obtained from the chain of custody form, finished report forms, QC summary forms, and calibration summary forms.

A summary of qualified data is presented in Table 1.

3. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in the methods. Sample chain of custody document and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

4. 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.

5. Initial and Continuing Calibration

Initial and continuing calibration summary forms were reviewed for VOCs and SVOCs.

The proper calibration procedures were followed, and all compounds met the method criteria for sensitivity and linearity.

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.

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

8. 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.

9. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The relative percent difference (RPD) between the MS and MSD is used to assess analytical precision.

MS/MSD analyses were performed using investigative sample MW8.

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

10. Field QA/QC Samples

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

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.

10.2 Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample was collected and submitted "blind" to the laboratory. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criterion is one times the RL value for water samples.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

11. Analyte Reporting

The laboratory reported detected results down to the laboratory's method detection limit (MDL) for each analyte. Positive analyte detections less than the practical quantitation limit (PQL) but greater than the MDL were qualified as estimated (J) in Table 1 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the RL in Table 1.

12. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 1 are acceptable without qualification.

Table 1

Analytical Results Summary
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2017

Location ID:		MW8	MW9	OGC3
Sample Name:		WG-7987-053117-SG-004	WG-7987-053117-SG-006	WG-7987-053117-SG-005
Sample Date:		05/31/2017	05/31/2017	05/31/2017
Parameters	**Unit**			
Volatile Organic Compounds				
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	50 U	5.0 U	5.0 U
Acetone	µg/L	50 U	5.8	5.0 U
Benzene	µg/L	7.0 U	0.62 J	0.50 J
Chlorobenzene	µg/L	10 U	3.1	1.0 U
Ethylbenzene	µg/L	10 U	1.1	1.0 U
Methylene chloride	µg/L	10 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	10 U	0.43 J	1.0 U
Toluene	µg/L	10 U	4.8	0.70 J
trans-1,2-Dichloroethene	µg/L	10 U	1.0 U	1.0 U
Trichloroethene	µg/L	7.9 J	2.9	1.4
Vinyl chloride	µg/L	10 U	1.0 U	1.0 U
Xylenes (total)	µg/L	20 U	3.1	2.0 U
Semi-volatile Organic Compounds				
1,2-Dichlorobenzene	µg/L	50 U	50 U	50 U
1,4-Dichlorobenzene	µg/L	11 J	50 U	50 U
2,4-Dimethylphenol	µg/L	16 J	140	4.5 J
2-Methylphenol	µg/L	36 J	20 J	23 J
4-Methylphenol	µg/L	28 J	340	9.4 J
Di-n-octyl phthalate (DnOP)	µg/L	50 U	50 U	50 U
Naphthalene	µg/L	50 U	50 U	50 U
Phenol	µg/L	50 U	37 J	62

Table 1

Analytical Results Summary
Annual Groundwater Monitoring
Gratwick-Riverside Park Site
North Tonawanda, New York
May 2017

	Location ID:	**OGC6**	**OGC7**	**OGC7**
	Sample Name:	**WG-7987-053117-SG-001**	**WG-7987-053117-SG-002**	**WG-7987-053117-SG-003**
	Sample Date:	**05/31/2017**	**05/31/2017**	**05/31/2017**
				Duplicate
Parameters	**Unit**			
Volatile Organic Compounds				
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	5.0 U	5.0 U	5.0 U
Acetone	µg/L	5.0 U	5.0 U	5.0 U
Benzene	µg/L	0.83	0.70 U	0.70 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	29	1.0 U	1.0 U
Toluene	µg/L	2.7	1.4	1.3
trans-1,2-Dichloroethene	µg/L	11	1.0 U	1.0 U
Trichloroethene	µg/L	41	4.6	4.2
Vinyl chloride	µg/L	1.3	1.0 U	1.0 U
Xylenes (total)	µg/L	1.3 J	0.93 J	0.86 J
Semi-volatile Organic Compounds				
1,2-Dichlorobenzene	µg/L	50 U	50 U	50 U
1,4-Dichlorobenzene	µg/L	50 U	50 U	50 U
2,4-Dimethylphenol	µg/L	50 U	50 U	50 U
2-Methylphenol	µg/L	2.4 J	50 U	50 U
4-Methylphenol	µg/L	50 U	50 U	50 U
Di-n-octyl phthalate (DnOP)	µg/L	50 U	50 U	50 U
Naphthalene	µg/L	50 U	50 U	50 U
Phenol	µg/L	50 U	50 U	50 U

Notes:

J - Estimated concentration
U - Not detected at the associated reporting limit

Appendix D
NYSDEC Correspondence

Schmidtke, Klaus

From: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Sent: Wednesday, January 25, 2017 2:09 PM
To: dalemar@northtonawanda.org
Cc: rowlesdpw@northtonawanda.org; Schmidtke, Klaus; Joe Aiello; Mark Zellner; Bill Davignon; May, Glenn (DEC)
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Thanks Dale. After cleaning the force mains the flow rate should increase and be more than adequate. Given enough "bath time", I would be surprised if it wasn't like new.

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, January 24, 2017 11:33 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; Joe Aiello <jaiello@northtonawanda.org>; Mark Zellner <mzellner@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

So far so good. On January 10, DPW cleaned the interior piping inside the meter building as you can see on the attached photos. Flow rates are adequate and all three stations are operating. We plan to continue to clean the forcemain at each location.

Regards,
Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Tuesday, January 24, 2017 10:01 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Dale,

Just following up. How is the GWS operating?

Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Thursday, January 05, 2017 9:19 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Mark Zellner <mzellner@northtonawanda.org>; Joe Aiello <jaiello@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Brian,

We're on the same page with you. I just spoke to the assistant superintendent of DPW yesterday about acid washing at PS 1 and PS 2 to clean the elbow and tee at the forcemain at those two locations, using our new valving. This should be good practice for us for the overall cleaning of the system.

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Thursday, January 05, 2017 8:14 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: Brad Rowles <rowlesdpw@northtonawanda.org>; Mark Zellner <mzellner@northtonawanda.org>; Joe Aiello <jaiello@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Dale,

I agree this is the best approach for cost savings. You, DPW and GHD know the site and the level of effort it took for periodic acid bathing to occur. By proper monthly o&m; if you mean acid dosing, that should be more than adequate. If you didn't mean that, your forces will have to find the best acid bathing frequency to keep the system running and still be amongst public activity. I can't tell you what to do, however if it were me, I would aggressively acid wash the chambers and forcemain sections during the quieter late fall or winter seasons. This would be followed by monitoring the flowrates as an indicator of the effectiveness. Once you have a baseline there, you can adjust the bath frequency. This is more or less what you said, but in a different way. If the pumps start to trip on overload again, acid bathing is way too infrequent.

Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, January 03, 2017 4:12 PM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Mark Zellner <mzellner@northtonawanda.org>; Joe Aiello <jaiello@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

At this point we have fairly good flow that we can record at the meter building and observe at the discharge point into the chamber at the marina. We can probably calculate the friction loss and reduced diameter from this information. We think we're done with Kandey at this point and believe that our forces can acid wash the four forcemain sections individually using the new valve system at each pump station. We can now add acid at each pump station location from above and clean the forcemain in either direction. We then can look at pumping and flowrates to determine the effectiveness of the cleaning by increases in flowrate. As long as it is flowing at an acceptable rate then I am happy. We're trying to save costs and with proper monthly o & m we should be able to maintain flow from now on.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Tuesday, January 03, 2017 2:40 PM
To: Dale Marshall <dalemar@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Ok good. Are you considering the project complete? Or does the forcemain still have to be muriatically bathed and then camera inspected? Asking because I'm not sure if you had Kandey follow the Scope of Work or if it was modified in the field and you're satisfied.

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, January 03, 2017 1:48 PM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Yes all three pumps stations are re-piped with new control valves and are operational and working. We finished up the interior piping on PS 1 late on the 29th just in time to end the year on a good note.

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Tuesday, January 03, 2017 1:38 PM
To: Dale Marshall <dalemar@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Hi Dale,

Hope the ring in for the New Year went well for you. Hard to believe how fast time ticks away.

Once again, back to the work scene. Everything online now and pumping away?

Thanks,
Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Thursday, December 29, 2016 2:41 PM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

It was a pretty good day today. We have about 2 hours to go because we were waiting for some parts to get delivered.

The existing three inch piping at PS 1 was choked down to about one inch and the lower elbow had to be chipped out. The first thing we're going to do is acid wash the elbow again though the new piping scheme.

You have a Happy New Year too Brian!

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Thursday, December 29, 2016 2:21 PM
To: Dale Marshall <dalemar@northtonawanda.org>
Subject: FW: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Hi Dale,

First. Since tomorrow is the last workday of 2016. Happy New Year to you! Second. Were you successful in reaching your goal (by the end of the year) of having all Pump Stations re-piped and running properly?

Thanks,
Brian

From: Sadowski, Brian (DEC)
Sent: Wednesday, December 28, 2016 1:19 PM
To: 'Dale Marshall' <dalemar@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

As you mentioned last week. Most people don't know what they're standing on. The pictures are worth a thousand words, as they say. Thanks for sharing.

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Wednesday, December 28, 2016 11:54 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; David Maziarz <davidmaz@northtonawanda.org>; danquinn@northtonawanda.org; Joe Aiello <jaiello@northtonawanda.org>; Mark Zellner <mzellner@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Dear Brian,

We are converting video from old VHS tapes to CD and found these interesting shots. They show us installing the twin 54 inch hdpe fused storm sewer pipe at Gratwick at the foot of Ward Road. You can see how thick the slag was that was poured over the original river bottom that created the shelf that is now the park.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Wednesday, December 28, 2016 11:19 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: Brad Rowles <rowlesdpw@northtonawanda.org>; Joe Aiello <jaiello@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>; Amanda Reimer <amandarei@northtonawanda.org>; Daniel Quinn <danquinn@northtonawanda.org>; David Maziarz <davidmaz@northtonawanda.org>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; Katherine Alexander <kalexander@northtonawanda.org>; May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

That's great news! Hope PS 1 goes as smooth as PS 2. And I agree, what better feeling than to finish the year on having those pumps move serious water. Love it!

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Wednesday, December 28, 2016 11:06 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Joe Aiello <jaiello@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>; Amanda Reimer <amandarei@northtonawanda.org>; danquinn@northtonawanda.org; David Maziarz <davidmaz@northtonawanda.org>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; Katherine Alexander <kalexander@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Dear Brian,

We finished PS 2 yesterday and it went very smooth. The lower elbow was very clean when we got into it. The acid must have worked. Tomorrow we hope to start and finish piping PS 1.

I feel we have turned a corner and things are finally starting to go in our favor after a lot of start and stops. It will be good to have everything replaced and running properly before the end of this year.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Wednesday, December 21, 2016 2:30 PM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Dale,

Good talking to you on site today and reviewing the remediation from origin to current. I hope the piping measured up so that Kandey didn't have a hard time with the new valve installation. Please keep me posted.

Thanks,
Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, December 20, 2016 9:35 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Yes. I'll take pictures for you today. DPW has been there for a couple hours now.

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Tuesday, December 20, 2016 9:15 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: Brad Rowles <rowlesdpw@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Dale,

Delayed until tomorrow then. 10 still good for all parties?

Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, December 20, 2016 9:02 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org
Subject: FW: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Brian,

We'll be out there anyway pumping and acid washing if you still want to come out today.

Regards,

Dale

From: Dale Marshall
Sent: Tuesday, December 20, 2016 8:59 AM
To: 'Sadowski, Brian (DEC)' <brian.sadowski@dec.ny.gov>
Cc: Brad Rowles <rowlesdpw@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Brian,

Kandey pulled off our job today due to an emergency. They promised tomorrow. So let's delay you coming out until tomorrow.

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Monday, December 19, 2016 10:47 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: Brad Rowles <rowlesdpw@northtonawanda.org>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Good number. See you then.

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Monday, December 19, 2016 10:45 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Brad says 10.

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Monday, December 19, 2016 9:17 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

OK.

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Monday, December 19, 2016 9:08 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

I'll check with the superintendent. They (DPW) should be pumping down the wet well to 3 today in preparation.

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Monday, December 19, 2016 9:04 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

What time did you have in mind?

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Monday, December 19, 2016 8:59 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>

Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; rowlesdpw@northtonawanda.org; Katherine Alexander <kalexander@northtonawanda.org>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Joe Aiello <jaiello@northtonawanda.org>; Amanda Reimer <amandarei@northtonawanda.org>; Bill Davignon <billdavignon@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

I'll see you there...dress warm.

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Friday, December 16, 2016 1:52 PM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; Brad Rowles <rowlesdpw@northtonawanda.org>; Katherine Alexander <kalexander@northtonawanda.org>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Joe Aiello <jaiello@northtonawanda.org>; Amanda Reimer <amandarei@northtonawanda.org>; Bill Davignon <billdavignon@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Thanks Dale for the detail and in-site. No one here has asked, "What's going on out there?", but as routine and more so on a schedule overrun, I need to be prepared to answer. Glad to hear that the direction is forward. Rich of Kandey followed up shortly after your email and said that they'll be on site next Tuesday. I'm planning to visit.

Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Thursday, December 15, 2016 2:36 PM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; rowlesdpw@northtonawanda.org; Katherine Alexander <kalexander@northtonawanda.org>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Joe Aiello <jaiello@northtonawanda.org>; Amanda Reimer <amandarei@northtonawanda.org>; Bill Davignon <billdavignon@northtonawanda.org>
Subject: RE: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Dear Brian,

As you know, the City of North Tonawanda contracted with Kandey Company, Inc. To re-pipe the three pump stations at Gratwick Park due to the build-up of resin material. Valves were to be added and the existing check valve was to be replaced. The amount for this work was $8,500 per station for a total of $25,500. Work began at pump station 3 in October with DPW performing the acid wash of the lower pipe elbow at the pump discharge and Kandey re-piping its interior. It was during Kandey's work that I became aware of two things; that the new ball checks should have been swing checks; and that an additional valve was required to isolate the forcemain so in the future the DPW can acid wash just the interior station piping.

I requested Kandey for a proposal to add the three valves and to swap out the check valves. Attached is Kandey's proposal in the amount of $7,407 for this work. I thought it was too high and asked to meet with them. The city met with Kandey on December 5th and it was explained to us that the three additional valves were approximately $1,000 each, that the three swing checks would have to be purchased; and that the supplier was unwilling to take back the ball checks so the city would have to eat that cost. I believe there was some additional time built into their estimate also. We agreed to the proposal at the meeting and the city will have to deal with the supplier on the return of the unused check valves. Kandey then informed us that they would order the valves immediately that requires a two week lead time because they are not in stock. Kandey assured us that they would complete all the pump stations once the new materials arrive.

We got pushed into December due to my reluctance to approve the additional costs and Kandey also got busy on other work in the interim.

Once we start back up, you will be the first to know and you will be invited to observe our work as it progresses.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Tuesday, December 13, 2016 9:20 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: FW: GWS Pump Chamber(s) Re-Pipe, Check Valve Replacing, Forcemain Cleaning

Hi Dale,

I've been thinking for a long time on how to word the following. I think it will go something like……As a Municipality, I know that you have limitations on money, appropriating that and the workforce. But, with that said, how is the GWS doing now with the re-pipe, check valve replacing and forcemain cleaning? Can you give me a percentage completion of the project and/or overall collection and discharge performance.

Thanks,
Brian

From: Sadowski, Brian (DEC)
Sent: Tuesday, November 29, 2016 3:25 PM
To: 'Dale Marshall' <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: GWS Pump Chamber Re-Pipe

Thanks Dale.

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, November 29, 2016 1:46 PM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Joe Blahowicz <jblahowicz@kandeycompany.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; Bill Davignon <wmd_ntwwtp@live.com>; salem26@verizon.net
Subject: RE: GWS Pump Chamber Re-Pipe

Dear Brian,

The acid wash of the internal piping is complete. PS 1 is running. We're hoping to get Kandey out there this week to add the new valve and swap out the check valve for a swing check at PS 3. After that PS 3 should be back online. PS 2 still need to be re-piped.

Attached are two sketches I gave the contractor so you can get an idea of the new control we'll have over the system for future o & m.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Tuesday, November 29, 2016 1:33 PM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: FW: GWS Pump Chamber Re-Pipe

Hi Dale,

How's it going with this project? The weather has been on our side for work activities. Now were approaching late fall in comparison to the Work Plan's completion schedule of late summer or early fall. I know that there was a delay in obtaining parts for the Pump Stations-re pipe. PS-3 was underway including the Pilot Test to the Meter Shed and then to the River Road sanitary manhole. How did that go? Did the solution and/or procedure need to be modified? Are you now on to PS-1, PS-2 and force main cleaning? Kindly respond to this message and let us know the status.

Thanks,
Brian

From: Sadowski, Brian (DEC)
Sent: Tuesday, November 15, 2016 3:09 PM
To: 'Dale Marshall' <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: GWS Pump Chamber Re-Pipe

Dale,

How is the project coming along? Are any of the pumps online?

Thanks,
Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Monday, November 07, 2016 11:32 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Subject: RE: GWS Pump Chamber Re-Pipe

Yes...the more we can isolate the pumps stations from the system, the easier it will be to routinely clean them without a lot of pain and expense.

Thanks,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Monday, November 07, 2016 10:25 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; Brad Rowles <rowlesdpw@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Joe Blahowicz <jblahowicz@kandeycompany.com>
Subject: RE: GWS Pump Chamber Re-Pipe

Dale,

I'm familiar with the challenges of collection systems, pump chambers, pumps, various products and the headaches they can bring. Not too much fun sometimes.

I follow the reasoning to switch to a swing check from a ball check. Whichever procedure works the best, knowing there might be some trial and error, it eventually has to get into the OM&M Plan for the current and/or next operators/maintenance personnel to follow.

Keep me posted. More pictures would be great.

Thanks,
Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Thursday, November 03, 2016 4:43 PM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; rowlesdpw@northtonawanda.org; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Joe Blahowicz <jblahowicz@kandeycompany.com>
Subject: RE: GWS Pump Chamber Re-Pipe

Dear Brian,

The project is not derailed, it's just been very difficult for various reasons. Kandey will be going back in this week to verify the pipe was cleaned. I'm assuming it worked from the chemical reaction we observed.

The reason for the swing check, in lieu of the ball check, is for future cleaning because we're assuming that the new piping will get gunked up once again. When that happens, we close the new valve leading to the forcemain in order to isolate the interior pump station piping; we lower the pump on its rail system with a blank plate to block the pump discharge from leaking acid into the wet well; and we then open the new swing check to allow the acid to flow from the new hose bib connection up top, all the way down to the pump discharge, cleaning the entire pipe. This could be done on a fairly regular basis.

I'll keep you posted and will Kandey to get some interior pictures.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Wednesday, November 02, 2016 9:52 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; Brad Rowles <rowlesdpw@northtonawanda.org>; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>
Subject: RE: GWS Pump Chamber Re-Pipe

Hi Dale,

Thanks for responding. I was getting concerned that this project was derailed for some reason.

I follow your logic and procedures; acid wash all lower PS plumbing, replace ball check with swing check and other plumbing to force main tee to accommodate future cleaning, follow with mainline cleaning.

Question. How will you know that enough acid washing or entrapment to dissolve was done on the lower plumbing to see that it's clear? The answer of a flash light or spotting light to peer down the pipe or the observation of grey matter floc out in the PS/Wetwell isn't a stupid answer. Just wondering what the guys are using to give them the confidence and best shot on getting this up and running the first time.

Thanks,
Brian

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Tuesday, November 01, 2016 4:44 PM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; rowlesdpw@northtonawanda.org; Bill Davignon <wmd_ntwwtp@live.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>
Subject: RE: GWS Pump Chamber Re-Pipe

Dear Brian,

Sorry for not getting back to you sooner but my assistant retired last week which leaves me the sole survivor in my department.

I've attached some pictures I took last week of the sewer crew acid washing the lower plumbing in PS 3. As you may remember, the lower piping portion at the pump flange was not to be replaced. The plumbing is now new from the ball check all the way to the forcemain tee. We are going to swap out the ball check with a swing check valve this week to accommodate future cleaning of the interior piping. The city crew should be done acid washing the other interior lower piping at 1 and 2 this week. We're hoping to have PS 3 back online this week after the valve is replaced. Mainline acid cleaning will be performed after this work is completed.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Wednesday, October 26, 2016 10:55 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: FW: GWS Pump Chamber Re-Pipe

Hi Dale,

What is the status now? PC Re-pipe completed? On to dissolving BVM fouling in the forcemain?

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Thursday, October 13, 2016 11:12 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; David Maziarz <davidmaz@northtonawanda.org>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Joe Blahowicz <jblahowicz@kandeycompany.com>
Subject: RE: GWS Pump Chamber Re-Pipe

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We're hoping to be substantially complete by early next week with the interior piping.

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Thursday, October 13, 2016 11:00 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: GWS Pump Chamber Re-Pipe and Cleaning of Forcemain

I haven't heard. I suspect this project is well underway?

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Monday, September 26, 2016 9:24 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Bill Davignon <wmd_ntwwtp@live.com>
Subject: RE: Site Management Periodic Review Report

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Kandey's getting the parts as we speak so I'm going to say this week.

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Monday, September 26, 2016 9:13 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: FW: Site Management Periodic Review Report

Hi Dale,

Any scheduled dates yet for the PS-re-piping and forcemain cleaning?

Thanks,
Brian

From: Sadowski, Brian (DEC)
Sent: Monday, September 12, 2016 3:28 PM
To: 'Dale Marshall' <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>
Subject: RE: Site Management Periodic Review Report

OK.

From: Dale Marshall [mailto:dalemar@northtonawanda.org]
Sent: Monday, September 12, 2016 8:51 AM
To: Sadowski, Brian (DEC) <brian.sadowski@dec.ny.gov>
Cc: rowlesdpw@northtonawanda.org; Bill Davignon <wmd_ntwwtp@live.com>; Amanda Reimer <amandarei@northtonawanda.org>; David Maziarz <davidmaz@northtonawanda.org>; rszucs (rszucs@kandeycompany.com) <rszucs@kandeycompany.com>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>; McGarvey, Paul GHD <paul.mcgarvey@ghd.com>
Subject: RE: Site Management Periodic Review Report

Dear Brian,

We have contracted with Kandey to first re-pipe all three pump stations before the forcemain cleaning is performed. They will be working here today cleaning various clogged storm sewers for DPW. We then will segue to the plumbing work hopefully soon after. I'll keep you posted.

Regards,

Dale

From: Sadowski, Brian (DEC) [mailto:brian.sadowski@dec.ny.gov]
Sent: Friday, September 09, 2016 9:52 AM
To: Dale Marshall <dalemar@northtonawanda.org>
Cc: May, Glenn (DEC) <glenn.may@dec.ny.gov>; Schmidtke, Klaus <Klaus.Schmidtke@ghd.com>
Subject: FW: Site Management Periodic Review Report

Dear Dale,

In addition to the below. The August 8, 2016 PRR cover letter, states that the Work Plan activities to remove BVM in the GWS force main is to occur late summer/fall 2016. Has a date been scheduled? Thank you.

Brian

From: Sadowski, Brian (DEC)
Sent: Thursday, September 01, 2016 9:47 AM
To: 'Dale Marshall' <dalemar@northtonawanda.org>
Subject: Site Management Periodic Review Report

Dear Dale,

I received the above subject report. Thank you. Of quick note before it slips my mind. Greg Sutton and Marty Doster have retired. Please remove them from all future correspondence cc lists and insert Glenn May.

Brian

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