MONITORING AND SAMPLING PLAN

Former Albion MPG Site
Albion, New York
No. 83712

Prepared for:

National Grid
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Project No. 0078000050.03.1B

MONITORING AND SAMPLING PLAN
National Grid Albion Former MGP Site
Albion, New York
NYSDEC Site No.: 837012

December 21, 2018
Project 78000050.03

I, Douglas C. Bablitch, certify that I am currently a NYS Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Monitoring and Sampling Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Douglas C. Bablitch

Douglas C. Bablitch
Principal Engineer
Wood Environment and Infrastructure Solutions Inc.

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1.0 INTRODUCTION

Niagara Mohawk Power Corporation (doing business as National Grid) entered into an Order on Consent, on November 2003 with the New York State Department of Environmental Conservation (NYSDEC) to remediate a 0.5-acre property located in the Village of Albion, Orleans County, New York (Figure 1). The property, known as the Albion Former Manufactured Gas Plant (MGP) Site Identification Number 837012, consists of two adjoining parcels formerly occupied by a single MGP. The western parcel (0.3 acres) is currently owned by National Grid and previous environmental investigations did not identify environmental conditions requiring remediation. The eastern parcel (0.2 acres) currently owned by New York State Electric and Gas Corporation (NYSEG) has been remediated to commercial use and is currently vacant and undeveloped.

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy at the former MGP. The Record of Decision (ROD) for the site was executed in 2010, and described the requirements for Site remediation, and implementation of engineering and institutional controls (NYSDEC 2010). In 2012, the Engineering Controls (EC) were constructed at the eastern parcel. This included remedial excavation of the upper two feet of impacted surficial soil and construction of a soil cap system consisting of 18 inches of clean soil underlain by a demarcation layer to delineate clean soil from historical fill. An additional six inches of topsoil was placed above the clean soil to support vegetation. In addition to ECs, Institutional Controls (ICs) including a site-wide Site Management Plan (SMP) and Environmental Easement are part of the site remedy to control exposure to remaining contamination and to maintain protection of public health and the environment. This Monitoring and Sampling Plan will ultimately be incorporated with site-wide SMP, which is currently under development, to conduct post-remediation monitoring to assess the performance and effectiveness of the remedy. The work described herein includes two main activities: groundwater monitoring and inspection of the soil cap remedy.

Data quality, usability objectives, and analytical methods for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in Appendix A. Details on the Groundwater Sampling Methods are provided in Appendix B and Monitoring Well Logs are provided in Appendix C. Example field forms including the Site Inspection Form and Groundwater Monitoring Form are found in Appendix D. Appendix E provides the approval letter from NYSDEC for the approach for the proposed Groundwater Monitoring Program.

This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC.

2.0 GROUNDWATER MONITORING PLAN

2.1 GROUNDWATER WELL NETWORK

Seven groundwater monitoring wells are included in the groundwater monitoring network to evaluate the overall performance and effectiveness of the remedy (Figure 2). The network of monitoring wells has been selected to monitor upgradient, on-site and downgradient groundwater conditions at the site. The groundwater monitoring network includes one well upgradient well (MW-1), three onsite wells (MW-5, MW-6, and MW-8R[1]), and three downgradient wells (MW-9, MW-10R, and MW-11). The current condition of MW-9 is unknown; the well is located within the public right of way along Ingersoll Street, and was likely paved over during the reconstruction of the Ingersoll Street Lift Bridge. This well will either be located and rehabilitated for use or replaced by a new well (e.g. MW-9R) in the same vicinity. MW-11 is a proposed well, added to the Groundwater Monitoring Well Network per NYSDEC's letter *Recommendations for Groundwater Monitoring Program* dated August 30, 2018 (Appendix E). As shown in Figure 2, MW-11 will located midway between MW-6 and MW-9 and southeast and hydrologically downgradient of MW-5, which historically was found to be impacted with MGP-related constituents. The actual installation locations for new wells will be determined in the field and dependent on access considerations. All other wells currently on-site (MW-2, MW-3, and MW-4) will be decommissioned and abandoned in accordance with

[1] MW-8R is a replacement well to onsite well MW-8, which was decommissioned in 2012. While MW-8R is located just beyond the eastern site boundary, it is considered an "onsite" monitoring point due to its proximity to former suspected source areas and its purpose of replacing former onsite well MW-8.

NYSDEC guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures" (NYSDEC 2009).

Table 1 summarizes the wells that will be included in the monitoring network, their identification numbers, as well as the purpose, location, depths, diameter and screened intervals of the wells.

TABLE 1

MONITORING WELL CONSTRUCTION DETAILS

Well ID	Well Location	Coordinates		Well Diameter (inches)	Elevation (feet above mean sea level)			
		latitude	longitude		Casing	Surface	Screen Top	Screen Bottom
MW-1	Up-gradient	N043° 14' 54.51"	W078° 11' 28.67"	2	515.04	512.81	500.0	490.0
MW-5	On-site	N043° 14' 54.00"	W078° 11' 26.81"	2	513.14	513.64	492.8	488.8
MW-6	On-site	N043° 14' 53.61"	W078° 11' 27.14"	2	510.74	510.98	492.7	488.7
MW-8R	On-site	N043° 14' 53.73"	W078° 11' 25.89"	2	515.53	515.78	493.3	483.3
MW-9	Down-gradient	*Unknown*						
MW-10R	Down-gradient	N043° 14' 53.66"	W078° 11' 25.32"	2	515.81	515.06	494.5	484.5
MW-11	Down-gradient	*Proposed*						

Monitoring well construction logs for existing wells included in this groundwater monitoring network are included in Appendix C-Monitoring Well Logs of this document.

Groundwater will be sampled semi-annually, once during low canal levels (e.g. winter) and once during high canal levels (e.g. non-winter). Groundwater samples will be analyzed for contaminants of concern (COC), as well as other physical parameters (i.e. temperature, pH, conductivity, and turbidity). The COCs for groundwater identified at the Site, as listed in the Record of Decision (NYSDEC 2010a) are: benzene, toluene, ethylbenzene, and xylene (collectively referred to as BTEX); poly aromatic hydrocarbons (PAHs) acenaphthene, benzo(a)pyrene, benzo(b)fluoranthene, benzo[k]fluoranthene, chrysene, fluorene, and indeno(1,2,3-cd)pyrene; and cyanide. Groundwater samples will be analyzed for COCs by a

New York State certified analytical laboratory. Results will be compared to the Ambient Water Quality Standards and Guidance Values as presented in the Operational Guidance Series (TOGS) 1.1.1 (Division of Water 1998) which comply with New York State Standards, Criteria, and Guidance (SCGs) as specified in the ROD.

Sampling locations, required analytical parameters, and sampling schedule are provided in Table 2–*Sampling Requirements and Schedule* below. Semi-annual sampling will continue for a minimum of five years or until NYSDEC approval to change the frequency. Additional details about sampling methods are outlined in Appendix B—*Groundwater Sampling Methods*. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

TABLE 2

SAMPLING REQUIREMENTS AND SCHEDULE

Sampling Location	Analytical Parameters			Schedule
	BTEX (EPA Method 8260B)	PAHs (EPA Method 8270D)	Total Cyanide (EPA Method SM4500-CN-C/E)	
MW-1	X	X	X	Semi-annually
MW-5	X	X	X	Semi-annually
MW-6	X	X	X	Semi-annually
MW-8R	X	X	X	Semi-annually
MW-9	X	X	X	Semi-annually
MW-10R	X	X	X	Semi-annually
MW-11	X	X	X	Semi-annually

2.3 MONITORING AND SAMPLING PROTOCOL

During semi-annual groundwater monitoring events, groundwater monitoring wells will be sampled using the low-flow purge method, which minimizes hydraulic stress at the well-aquifer interface producing minimal water-level drawdowns by using low pumping rates during purging and sampling operations. Groundwater samples will be collected using a low-flow pump and dedicated tubing and will be placed into laboratory-provided equipment with the required preservatives. All sampling containers will be placed in an ice-chilled cooler until

transport under chain-of-custody procedures to a New York-certified laboratory for chemical analysis.

Sampling activities will be recorded in field logs and associated sampling log as provided in Appendix D - *Site Management Forms*. Depth to groundwater will be measured as part of the routine groundwater monitoring and sampling activities. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Groundwater Sampling Methods provided as Appendix B of this document.

2.4 MONITORING WELL DECOMMISSIONING AND MAINTENANCE

Monitoring Wells MW-2, MW-3, and MW-4 which are upgradient or cross gradient wells will not be part of the groundwater monitoring network. In a letter *Recommendations for Groundwater Monitoring Program* dated August 30, 2018, NYSDEC concurred with the plan to exclude these wells from the groundwater monitoring network and abandon these wells. A copy of this letter is provided in Appendix E. These wells will be decommissioned and abandoned in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures" (NYSDEC 2009).

Repairs and replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance of the well. If biofouling or silt accumulation exists in the monitoring wells, the wells will be physically agitated/surged and redeveloped. If wells are determined to be unusable, monitoring wells will be properly decommissioned and replaced. The repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. NYSDEC will be notified prior to any repair or decommissioning of any other monitoring well. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC.

2.5 ROUTINE REPORTING – GROUNDWATER

In accordance with the ROD, groundwater analytical results are compared to Ambient Water Quality Standards and Guidance Values (Technical & Operational Guidance Series 1.1.1, Division of Water 1998). These screening levels will be used as a basis to evaluate the groundwater conditions onsite and assess the performance of the remedy. Semi-annual

groundwater reports will be prepared twice a year and submitted to NYSDEC via email. Reports will include a copy of the validated and tabulated analytical data, a figure, and a discussion of whether the data support that the groundwater objectives have been maintained.

3.0 SITE-WIDE INSPECTION PLAN

3.1 SITE WIDE INSPECTION

Site-wide inspections of the Engineering Control (EC) (i.e. Soil Cap) and Institutional controls (IC) (i.e. land use) will be performed once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Non-recurring, physical inspections will also be performed after events that may affect the integrity of the system (e.g. flooding, earthquake). During these inspections, an inspection form will be completed as provided in Appendix D – *Site Management Forms*. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC

must be given by noon of the following day. In addition, a non-recurring physical inspection of the site will be conducted within 5 days of the event (or as soon as conditions safely permit completion of the inspection) to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

3.2 ROUTINE REPORTING—SITE WIDE INSPECTION

Site-wide inspections will be completed annually, and annual site inspection reports will be provided to NYSDEC via email. Reports will include a copy of the site inspection forms, figures, and a statement certifying EC compliance indicating that cap remedy is operating as intended or note if any performance issues have been identified.

4.0 REFERENCES

NYSDEC 2010. Record of Decision. *NM-Albion MGP State Superfund Project, Albion, Orleans County Site No.:837013*. March.

NYSDEC 2009. CP-43: Groundwater Monitoring Well Decommissioning Policy. November 3. Available at https://www.dec.ny.gov/docs/remediation_hudson_pdf/cp43mwdecomm.pdf

Division of Water 1998. Technical and Operational Guidance Series (TOGS) 1.1.1. June. Available at https://www.dec.ny.gov/docs/water_pdf/togs111.pdf

FIGURES

SITE VICINITY MAP
Albion Former Manufactured Gas Plant Site
Albion, New York

wood.	By: KLU	Proj. No. 0078000050.03.1B
	Date: 10/03/2018	Figure 1

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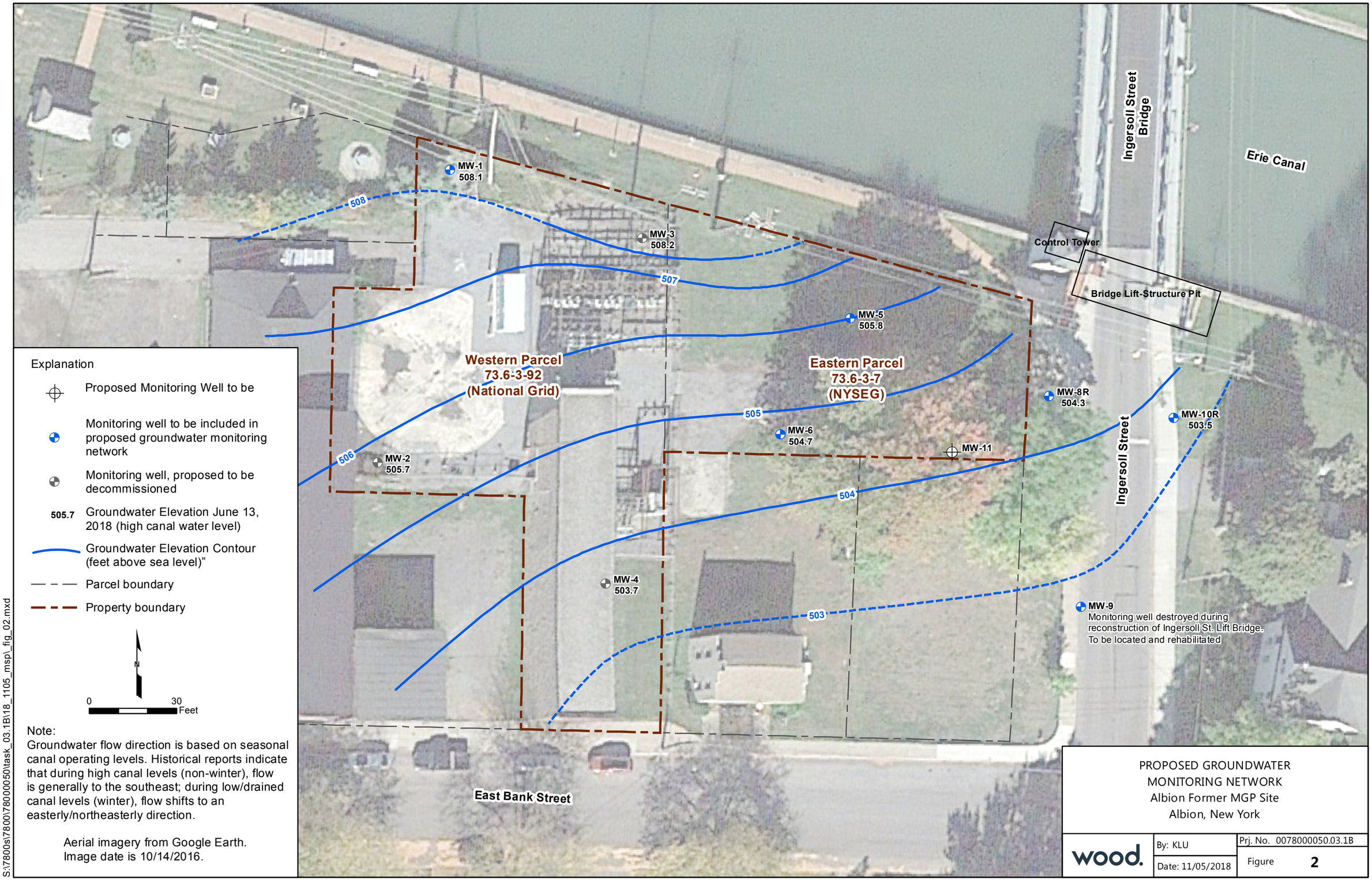

Explanation

- Proposed Monitoring Well to be
- Monitoring well to be included in proposed groundwater monitoring network
- Monitoring well, proposed to be decommissioned
- 505.7 Groundwater Elevation June 13, 2018 (high canal water level)
- Groundwater Elevation Contour (feet above sea level)"
- Parcel boundary
- Property boundary

N

0 30 Feet

Note:
Groundwater flow direction is based on seasonal canal operating levels. Historical reports indicate that during high canal levels (non-winter), flow is generally to the southeast; during low/drained canal levels (winter), flow shifts to an easterly/northeasterly direction.

Aerial imagery from Google Earth.
Image date is 10/14/2016.

PROPOSED GROUNDWATER MONITORING NETWORK
Albion Former MGP Site
Albion, New York

wood.

By: KLU	Prj. No. 0078000050.03.1B
Date: 11/05/2018	Figure 2

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APPENDIX A

Quality Assurance Project Plan

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

Former Albion MGP Site
Albion, New York

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the site. The goal of this QAPP is to support the collection and documentation of data that is accurate, precise, and complete.

1.0 SAMPLING PROGRAM

Data quality starts with the sampling program. The following describes elements of the sampling program including calibration, hold times, quality control samples, analytical procedures and decontamination procedures that can support precision, reproducibility, and accuracy of data.

1.1 CALIBRATION PROCEDURES

All field instruments will be calibrated and maintained in accordance with manufacturer's specifications. All field instrument calibration activities will be recorded in the field log or on an equivalent electronic-based form will be used to record calibration dates, results, statistics, and the resulting data measurements. All entries will be signed and dated by the personnel performing the required action.

The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.

1.2 SAMPLE HOLD TIME

Sample holding times will comply with the holding times specified in 40 CFR 136.1. Holding times for groundwater samples for the site are outlined in Table 1 below.

TABLE 1

HOLDING TIMES AND PRESERVATION

Analysis	Preservation	Holding Time
BTEX (8260B)	HCl & 4°C (no headspace)	14 days
PAHs (8270D)	4°C	7 days (for extraction)
Total Cyanide (SM4500-CN^- C/E)	NaOH & 4°C	14 days

1.3 FIELD QUALITY CONTROL SAMPLES

Field Quality Control (QC) samples (e.g., trip blanks, field duplicates) will be collected and submitted to the analytical laboratory as applicable to provide the means to assess the field sampling program's data quality. At minimum, one trip blank will be collected each day samples are collected. Results from trip blank samples will be evaluated for procedural contamination, cross-contamination, and laboratory contamination during shipment, storage, and handling of samples.

Field duplicates will also be collected during each routine sampling event; the number of field duplicate samples collected should be equal to 10% of total number of primary samples collected. Results from field duplicate samples will be evaluated for representativeness in field protocols. The relative percent difference (RPD) will be calculated for field primary and duplicate samples using the following equation:

$$RPD\% = \left| \frac{2(S_1 - S_2)}{S_1 + S_2} \right| \times 100$$

Where S_1 = primary sample concentration and S_2 = duplicate sample concentration. An RPD of up to 30 percent (%) is considered acceptable for organics and 20% for inorganics. RPD is not applicable when the sample results are less than two times the reporting limit. In those cases, duplicate results are acceptable when the absolute difference between the results is less than the reporting limit. In instances where a compound is only detected in one of the samples, the absolute difference is calculated using the detected concentration and the reporting limit of the duplicate sample.

1.4 SAMPLE TRACKING AND CUSTODY

Documentation of proper sample handling will be recorded in field logbooks, electronic-or paper-based forms, and COC forms.

1.5 ANALYTICAL PROCEDURES

Laboratory QC samples including matrix spike (MS), matrix spike duplicate (MSD), and laboratory control samples (LCS) will be prepared and analyzed by the laboratory with each sample batch, as applicable for each analytical method. The results from MS and MSD samples will be evaluated to assess if spike recoveries falling outside acceptance windows are attributable to sample matrix interferences and to assess the accuracy of the analysis in a specific matrix. The results from LCS will be evaluated to assess laboratory errors and the accuracy of laboratory protocols in the absence of matrix effects.

1.6 DECONTAMINATION

Decontamination procedures for tools and equipment are implemented to prevent cross-contamination of samples and to control potential inadvertent transport of hazardous constituents to and from the site. Additionally, sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.

2.0 DATA USABILITY SUMMARY REPORT

A Data Usability Summary Report (DUSR) report will be included in reports submitted to NYSDEC. The DUSR will review sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. The DUSR will also present the results of data validation. First, the analytical laboratory will perform an internal review of the data prior reporting the data. The laboratory will evaluate the quality of each analysis based on an established set of laboratory guidelines and this QAPP. The laboratory will review the data from each analysis for compliance of the following:

- Sample preparation information is correct and complete;
- Sample holding times were met;
- Analytical results are complete and meet PQL requirements;
- Proper analysis was requested on the COC and followed by the laboratory;

- Sample IDs, sampling date, and other information have been recorded correctly from the COC to the LIMS;
- The appropriate SOPs have been followed;
- Corrective action items are documented and included in the narrative of each data package;
- QC sample results are reported and are within appropriate QC limits;
- Special sample preparation and analytical requirements have been met; and
- Documentation is complete (e.g., all anomalies in the preparation and analysis have been documented and holding times have been documented).

The laboratory will prepare and retain full analytical and QC documentation. The second level of review and validation will be completed by National Grid's technical consultant to provide an independent review and evaluation of each lab report. The reviewer will assess the data packages provided by the laboratory for completeness and compliance with stipulated requirements in the analytical method and this QAPP. The routine data validation process will employ Level II review in accordance with the requirements defined in the U.S. EPAs *National Functional Guidelines for Organic and Inorganic Data Review (*U.S. EPA 2008, 2010). If the results of the Level II data validation indicate a need for a more in-depth review of the data, the laboratory will be requested to submit Level III or Level IV packages.

3.0 QUALITY ASSURANCE PERFORMANCE AND SYSTEM AUDITS

To monitor and evaluate the capability and performance of project personnel to conduct and document the tasks and activities required in the field investigation, performance and system audits will be performed at regularly scheduled intervals during the field investigation. The primary objective of the audits is to monitor compliance with the QA/QC procedures and to implement corrective actions, as necessary, to comply with the objectives of the QAPP. Scheduled and unscheduled audits may be performed by National Grid or their technical consultant's QA/QC Officer and may consist of field, project file, and laboratory procedures review.

4.0 CORRECTIVE ACTION MEASURES

Corrective actions may be implemented in response to field or laboratory audit findings, or if the data indicate that field or laboratory measurement error has occurred. Corrective actions

will be implemented by National Grid, their technical consultant, or the laboratory QA officer as appropriate.

4.1 FIELD CORRECTIVE ACTION

Corrective actions may be implemented in response to field audit findings, or if the data indicate that field error has occurred. Corrective actions may be implemented by National Grid, or their technical consultant, as appropriate. Field corrective actions may include, but are not limited to:

- collection of additional groundwater samples;
- collection of additional QA/QC samples;
- modification sampling and monitoring standard operating procedures; and
- implementation of additional administrative assurance measures.

4.2 LABORATORY CORRECTIVE ACTION

Laboratory corrective action will be implemented by the laboratory QA officer in response to the findings of a laboratory audit, data validation, or laboratory in-house data review. The need for corrective action will be determined by the laboratory QA officer, National Grid, or their technical consultant as appropriate. Requests for corrective action as a result of laboratory audits or data validation will be issued to the laboratory QA officer in writing by the National Grid Data Validation Manager, Wood E&IS QA/QC Officer or designee. Corrective actions may include, but are not limited to:

- Re-analyzing the samples, if holding time criteria permit;
- Reprocessing and reissuing analytical data;
- Evaluating and amending sampling and analytical procedures;
- Accepting data with an acknowledged level of uncertainty; and
- Re-sampling and analyzing.

If the results of the above corrective actions are deemed unacceptable by the National Grid Data Validation Manager or Wood E&IS Project Manager, an alternative laboratory may be selected to perform analyses.

5.0 DATA EVALUATION AND ASSESSMENT

In accordance with the Record of Decision (ROD 2010), data will be compared to Ambient Water Quality Standards and Guidance Values TOGS 1.1.1 (Division of Water 1998). These screening levels will be used as a basis to evaluate the groundwater conditions onsite.

6.0 REPORTING REQUIREMENTS

Semiannual groundwater monitoring reports will contain a discussion of project-appropriate QA/QC evaluations summarizing the quality and usability of the data collected and evaluating whether the data quality and quantity are sufficient to support the project objectives. The QA/QC summary will be maintained in the project files and will include the following items, as appropriate:

1. Tabulated results of the validated analytical data;
2. Data validation reports for each batch analysis that document the validity of the analytical data with respect to accuracy, precision, and completeness;
3. Summaries of significant QA problems and corrective actions; and
4. Reports summarizing the validity of the analytical data with respect to accuracy, precision, completeness, representativeness and comparability.

APPENDIX B

Groundwater Sampling Methods

APPENDIX B

GROUNDWATER SAMPLING METHODS

Former MPG Site No. 837012
Albion, New York

1.0 INTRODUCTION

This appendix details the methodology for the proposed investigation activities presented in the "*Monitoring and Sampling Plan*" (referred to herein as the "Work Plan").

2.0 FIELD METHODOLOGY

Before implementing fieldwork activities, the necessary permits shall be obtained, and the health and safety plan updated. If drilling work is planned (such as installation of a monitoring well), Dig Safely NY will be notified, as required by law. Additionally, a private utility locator will clear the proposed drilling area and the first 5 feet of any on-site and off-site boreholes will be advanced with hand tools or air and vacuum digging to clear for subsurface utilities.

2.2 GROUNDWATER MONITORING WELLS

The procedures for installation, development, and sampling of new monitoring wells are described in the following sections.

2.2.1 Monitoring Well Installation

The borehole will be advanced using the sonic drilling method, typically including a 7-inch-diameter drive casing and 6-inch-diameter core barrel. This method results in nearly 100 percent soil recovery. The recovered soil from the borehole will be described by a field geologist under the supervision of a New York-licensed Professional Geologist, using for guidance the visual-manual procedures of the ASTM International Standard D2488, which is based on the Unified Soil Classification System. The recovered soils will be screened for the presence of VOCs using a PID. PID readings will be recorded on the soil boring log.

The borehole will be advanced through a temporary conductor casing using a 7-inch-diameter drive casing into the shallow groundwater zone. Equipment involved in drilling activities will be

decontaminated both before drilling the borehole and before demobilization from the site. The drilling tooling and casing will be steam cleaned as they are removed from the borehole.

The monitoring well will be constructed in compliance with the appropriate state (NYSDEC) and local (Orleans County) well permitting requirements. The monitoring well will be built within the 7-inch-diameter sonic casing as it is retracted, using 2-inch-diameter Schedule 40 PVC blank casing and 10 feet of slotted (0.010 slots) screen. Centralizers will be placed along the casing to keep the casing in the center of the borehole. The annular space between the monitoring well screen and surrounding formation will be backfilled with Cemex brand #2 or #3 sized filter pack sand (or equivalent), which will be placed such that the top of the filter pack extends at least 1 foot above the screened interval. At least 2 feet of medium bentonite chips will then be placed above the filter pack sand and allowed to hydrate in place. The remaining annular space will be sealed using bentonite-cement grout. Annular materials will be placed at depth within the sonic casing to prevent bridging or borehole collapse. The monitoring well will be completed at the surface using a flush-mounted 12-inch-diameter traffic-rated well box set into concrete. A locking, watertight plug will be placed in the top of the monitoring well casing.

2.2.2 Monitoring Well Development

At least 48 hours after installation, the monitoring well will be developed using a combination of bailing, surging, and purging until 10 well volumes have been removed and/or the water is relatively visibly clear and field parameters such as temperature, pH, and specific conductance, and turbidity are relatively stable[1]. These parameters and total volume of water removed will be monitored during well development and recorded on a well development record.

2.2.3 Groundwater Level Monitoring

Depths to groundwater (groundwater level) will be measured within each well during each monitoring event to determine the groundwater elevation relative to the survey datum.

Each depth to groundwater will be measured from a surveyed reference point marked on the top of each well casing. The static water level in each well will be measured to the nearest 0.01 foot using an electronic water-level sounder, and the depth to water measurement will be recorded. Electronic water-level measurement equipment will be decontaminated before and

[1] Relatively stable is defined as parameter values changing less than 10 percent between three sequential measurements

after use at each monitoring well location by rinsing with a Liquinox and potable water solution before rinsing with potable water.

2.2.4 Groundwater Sampling

Groundwater monitoring wells will be sampled following low-flow sampling methods using a low-flow pump and dedicated tubing, and will be placed into laboratory-provided equipment such as 1-L amber glass jars, 1-L HDPE preserved with NaOH, and VOA containers preserved with HCl. All sampling containers will be placed in an ice-chilled cooler until transport under laboratory chain-of-custody procedures to a New York-certified laboratory for chemical analysis.

Blind field duplicates, trip blanks, and equipment blanks will be collected for quality control purposes as outlined in the Quality Assurance Project Plan (Appendix A). These quality control samples will be stored in the same manner as the primary samples and will be analyzed for BTEX using EPA Method 8260B, PAHs using EPA Method 8270D, and Total Cyanide using SM4500-CN^- C/E.

APPENDIX C

Monitoring Well Logs

MALCOLM PIRNIE

Project: Albion Site, PSA/IRM Study

Client: Niagara Mohawk Power Corp.
Project No: 0793-146

Logged By: JMA

Date(s): 6/25/96 - 6/25/96

Site Id: MW-1

Location: NIAGARA MOHAWK

Elevation: 515.97'

Datum: Mean Sea Level

Protecitve Casing: type: Carbon Steel — dia: 4.00in — from: -2.50' to: 2.50'

Riser Material: type: PVC — dia: 2.00in — from: -2.4' to: 8.10'

Screen: type: Slotted — dia: 2.00in size: 0.010in — from: 8.10' to: 18.10'

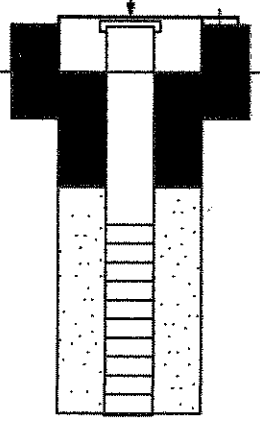
Contractor: NOTHNAGLE
Drilling Method: Hollow Stem Auger

Remarks:

Annular Fill:
type: Bentonite Grout — from: 0.00' to: 4.10'
type: Bentonite Pellets — from: 4.10' to: 6.10'
type: Sand Filter — from: 6.10' to: 18.10'

Elevation (ft)	Depth (ft)	Recovery (%)	Sample No.	Blow Count	Graphic Log	JHS (ppm)	Material Description
510	10		1	4			0.1 Dk brown topsoil, trace black asphalt particles (pulled ahead 3', drove spoon 0-2', again only 0.2' recovery)
			2				0.1 Brick w/ SANDY fill
			3				0.7 Brown SILTY SAND, wet, rust colored and grey mottles, liquifies when disturbed
			4				1.0 Brown, wet, SILTY SAND, sand very fine-fine, little silt, trace gravel, massive
			5				1.5 Brown extremly wet SILTY SAND, mostly very fine-fine sand, little silt, trace-little gravel, massive, trace black organic staining
			6				0.9 Same A/A
			7				1.3 Red/brown, moist SANDY SILT, little fine gravel, some very fine-fine sand, massive, co-pact
500			8				0.1 Red/brown wet SAND, fine-coarse, trace-little gravel, loose when disturbed
			9				1.4 Red/brown, moist SILTY SAND, little fine gravel, some very fine-fine sand, massive, compact, occasional sandstone 1" gravel
	20						0.2 Same A/A
490							1.3 Red/brown SILT, faintly laminated, one 0.1' lenses, silty sand, liquid when disturbed, wet
	30						0.2 Red/brown SILTY SAND, moist
480							0.8 Same A/A
							0.1 Weathered SANDSTONE Rock
	40						Auger refusal @ 18.2' bgs.
470							
	50						
460							

Well Construction
MP. EL. 515.97



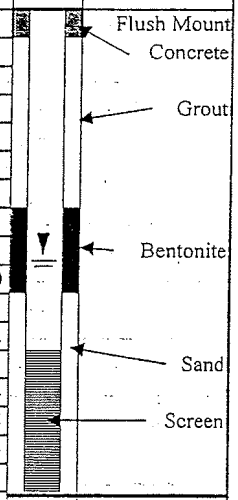
Boring/Well ID: MW-5/SB-5

Project Name:	NIMO Albion
Job. No.	90211.10.1400
Boring Location:	
Start Date & Time:	12/1/99 - 12:30
Finish Date & Time:	12/1/99 - 3:00
Drilling Co.:	ParrattWolff
Driller:	Ron Bush and Jeff
S&W Inspector:	DSS
Drilling Method:	Hollow Stem Auger
Weather:	Cold and clear

Groundwater Observations	
Time:	
Casing Depth:	17.0'
Boring Depth:	17.4'
Depth to Water:	
Below Surface:	9.65'
Below Meas. Point:	9.41'
Surface Elevation:	513.96'
Measuring Point Elevation:	513.42'
Groundwater Elevation:	504.65'

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (inches)	NAPL	Lithology	Sample Description
1	0 - 1						vegetation, red SILT and sand refusal @ 1' - concrete
2	6,7	0		10			slab, augered through
3	7,8						brown SILT and sand some rock frags slightly stained
4	8,4	0		6			may be cinders
5	3,3						
6	2,3	0		4			brown SILT and sand trace rock frags some cinders
7	2,2						
8	7,7	0		3			brown SILT and sand trace rock frags some cinders
9	7,7						wet brown SILT and sand some gravel to red dense
10	12,15	0.2		24			SILT and clay strong odor
11	7,9						
12	12,14	0		24			damp rd/brown dense SILT and clay strong odor
13	15,23						
14	36,40	0		24			damp rd/brown dense SILT and clay strong odor
15	13,19						
16	21,27	0		24			damp rd/brown dense SILT and clay strong odor
17	20,22						moist red SAND and silt trace pebbles
18	100/.4	0		14			Refusal at 17.4'
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							



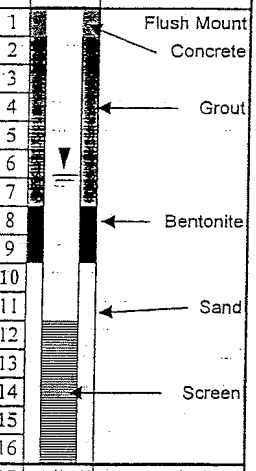
Boring/Well ID: MW-6/SB-6

Project Name:	NIMO Albion
Job. No.	90211.10.1400
Boring Location:	
Start Date & Time:	11/29/99 - 12:30
Finish Date & Time:	11/29/99 - 3:45
Drilling Co.:	ParrattWolff
Driller:	Ron Bush and Jeff
S&W Inspector:	DSS
Drilling Method:	Hollow Stem Auger
Weather:	Cold Scattered Flurries

Groundwater Observations	
Time:	
Casing Depth:	16'
Boring Depth:	16.2'
Depth to Water:	
Below Surface:	6.20'
Below Meas. Point:	5.66'
Surface Elevation:	511.30'
Measuring Point Elevation:	511.03'
Groundwater Elevation:	505.97'

Sample Log Key: Sent for Lab Analysis
NAPL Key: NAPL Observed
Depth to Groundwater

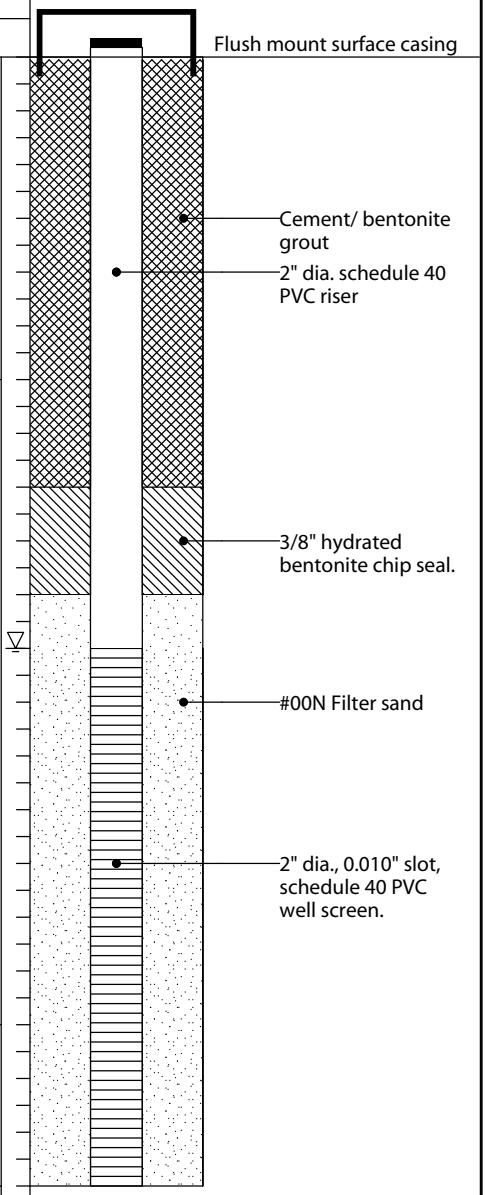
Depth (ft)	Blow Counts	PID (PPM)	Sample Log	Recovery (inches)	NAPL	Lithology	Sample Description
1	6,6	0					brown SAND and silt
2	6,7	0		15			black SAND & silt trace of coal cinders
3	4,4	0					
4	6,12	0		4			red brown, dense SILT some sand
5	5,8	0					4" black dense SILT some sand
6	13,36	0.5		18			red brown dense SILT some sand
7	18,22	0					
8	24,28	0		18			damp red brown SILT some sand, some pebbles
9	8,16	0					
10	19,25	0		18			moist red brown SILT, some sand, some pebbles
11	10.21	0					moist red brown SILT some sand, some clay
12	48,50/.1	0		22			to dry, red, dense SILT
13	80/.4	0		4			
14		0					red weathered SANDSTONE
15	50/.1	0					
16		0					Refusal (Bedrock) @ 16.2 feet
17	50/.2	0		1			
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							



PROJECT: Albion Former MGP Site Albion, NY			Log of Well No. MW-8R
BORING LOCATION: adjacent to gravel driveway on Site		TOP OF RISER ELEVATION: 515.81	DATUM: NA
DRILLING CONTRACTOR: Nothnagle Drilling, Inc.		DATE STARTED: 6/14/12	DATE FINISHED: 6/14/12
DRILLING METHOD: 4 1/4" dia. HSA		TOTAL DEPTH: 21.0 fbgs	SCREEN INTERVAL: 11-21 fbgs
DRILLING EQUIPMENT: CME 55LC ATV		DEPTH TO WATER: FIRST 11 ft COMPL.	CASING: 2" PVC
SAMPLING METHOD: 4' Macrocore Sleeves		LOGGED BY: mac	
HAMMER WEIGHT: 140#	DROP: 30"	RESPONSIBLE PROFESSIONAL: RHF	REG. NO.

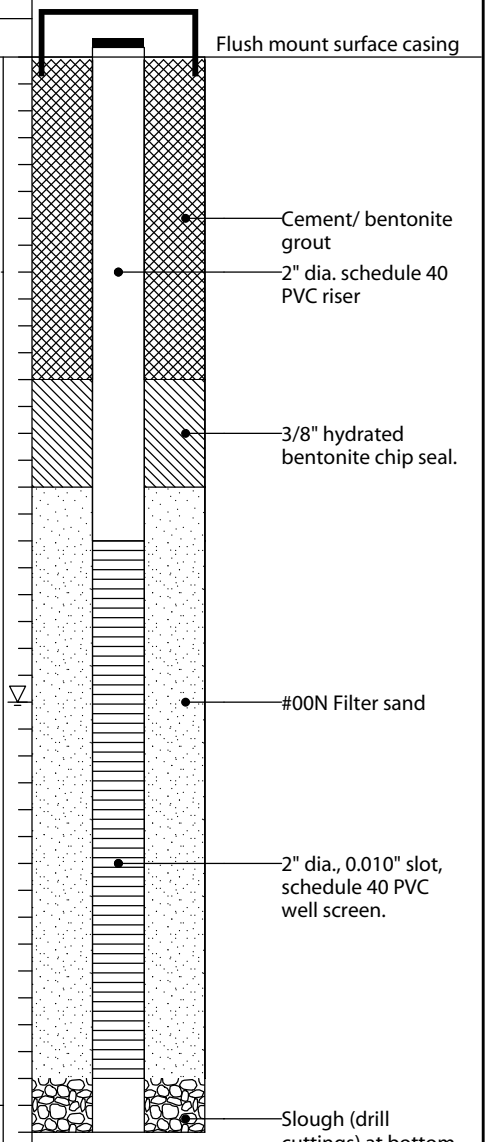
DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation: 516.08
1–5					Hand clear boring to 2.0' bgs.
3–4	1		NA	0	FILL angular limestone gravel with brown fine sand and silt, soft, moist throughout. Trace coal dust.
6–10	2		NA	0	TILL Poorly graded fine to medium sand with silt and little fine angular to rounded gravel, reddish brown (5YR 5/3), firm to hard, moist throughout.
11					Saturated at 11'bgs.
12	3		NA	0	
14–16	4		NA	12.0	As above, with thin (0.5') thick fine sand zones. NAPL stringers/ ganglia present in sandy zones with moderate coal-tar odor. Saturated conditions present in sandy zones.
18–20	5		NA	0.1	SAND and GRAVEL Greenish black (1 FOR GLEY 2.5/10Y) fine to medium sand with little fine rounded gravel. LIght septic- type odor, no MGP residuals or odors encountered. Saturated.
21–22					Red sandstone bedrock encountered at 21.0' bgs. Sampler refusal at 21.7' bgs.

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



PROJECT: Albion Former MGP Site Albion, NY			Log of Well No. MW-10R
BORING LOCATION: East side of Ingersol Street		TOP OF RISER ELEVATION: 516.08	DATUM: NA
DRILLING CONTRACTOR: Nothnagle Drilling, Inc.		DATE STARTED: 6/15/12	DATE FINISHED: 6/15/12
DRILLING METHOD: 4 1/4" dia. HSA		TOTAL DEPTH: 19.0 fbgs	SCREEN INTERVAL: 9-19 fbgs
DRILLING EQUIPMENT: CME 55LC ATV		DEPTH TO WATER: FIRST 12 ft COMPL.	CASING: 2" PVC
SAMPLING METHOD: 4' Macrocore Sleeves		LOGGED BY: mac	
HAMMER WEIGHT: 140#	DROP: 30"	RESPONSIBLE PROFESSIONAL: RHF	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ foot	OVM (ppm)	DESCRIPTION: NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation: 516.33
1					Hand clear to 2.0' bgs.
2					
3					crushed limestone gravel with some sand and silt, loose, moist.
4	1		NA	0	
5					TILL Poorly graded fine to medium sand with silt and little fine angular to rounded gravel, reddish brown (5YR 5/3), firm to hard, moist throughout.
6					
7					
8	2		NA	0	
9					
10					
11					
12	3		NA	0	
13					
14					
15					No recovery 14-18' sample. Few sandstone fragments in sampling shoe.
16	4		NA	0	
17					
18					
19					Advance augers between 18 and 19' bgs without sampling. Augers grinding lightly at 19.5' bgs.
20	5		NA	0	Macrocore sampler driven between 19.5' bgs and sampler refusal at 20.2' bgs. Sandstone bedrock fragments returned in sampler.
21					
22					Sandstone bedrock at 19.5' bgs.
23					
24					
25					



APPENDIX D

Site Inspection Form and Groundwater Monitoring Form

APPENDIX D

EXAMPLE SITE INSPECTION FORM

Former MPG Site No. 837012
Albion, New York

Date: _____ Weather: _____
Inspection By: _____ Time In: _____
Others On Site: _____ Time Out: _____

Visual Observations – Soil Cap and Monitoring Well Network:

	YES	NO	Comments
Is the Soil Cap intact?			
Any signs of significant erosion?			
Any signs of tree roots or vegetation damaging the cap?			
Any signs of intrusive work (earth disturbing activities) in the capped area?			
Are the groundwater monitoring wells accessible and intact?			

If maintenance is required to resolve any of the above noted items, describe what actions taken, if any. Were all maintenance items resolved during this site visit? If no, what items remain to be resolved?

_____

_____

_____

_____

Documentation:

	YES	NO	Comments
Are maintenance records on-site and up-to-date?			
Are monitoring records on-site and up-to-date?			

	YES	NO	Comments
Is the most recent Monitoring and Sampling Plan on-site?			
Is the Site Management Plan on-site?			
If there is intrusive work being performed: - Is there a Health and Safety Plan on-site?			
- If the surface area of construction activities is greater than 1 acre in size, is there a Stormwater Pollution Prevention Plan (SWPPP) on-site?			

If maintenance is required to resolve any of the above noted items, describe what actions taken, if any. Were all maintenance items resolved during this site visit? If no, what items remain to be resolved?

_____

_____

_____

_____

Note: This form is provided as an example template only and should be modified and updated as needed to reflect current project conditions.

wood.

MONITORING WELL
SAMPLE COLLECTION LOG

Project Name: National Grid – Former MGP Site No. 837012, Albion, New York		
Project/Task #: 0078000050.03	**Sampled By:**	**Date:**

Well Number/ID:	**Sample ID:**	**Duplicate ID:**
Method of Purging:	**Method of Sampling:**	**Intake Depth:**

Field Equipment

Equipment	Model	Serial #/Rental ID	Date Received/Serviced	Date Calibrated
Multi-Probe				
Turbidimeter				

Casing Purge Volume Calculations

A. Depth to Water = _____ft.	D. Water Column (B-A) = _____ ft.	Depth to Water After Sampling = _____ ft.
B. Well Total Depth = _____ft.	E. 1 Well Volume (C^2 x 0.0408 x D) = _____gal.	Actual Volume Purged (from below) = _____ gal/ml.
C. Well Diameter = _____in.	F. 3 Well Volumes (3 x E) = _____ gal.	(If applicable, see pumping system volume calculation below)

Pump and Flow Cell Volume	V_p	=	**N/A**	ml	**Pumping System Volume Calculation**
Tubing Inside Diameter	D	=	**N/A**	in.	Pumping System Volume (V_S)
Tubing Length	L	=	**N/A**	in.	$V_S = V_P + \pi * D^2 / 4 * L * 16.39$ ml/in^3
Conversion from Inches^3 to ml	1 in^3	=	16.39	ml	_____V_S = (_____) + (3.1415 * _____ ^{2} / 4) * (_____) * 16.39

Purging Data			**Water Quality Parameters (within range for 3 consecutive readings if low-flow sampling)**						
Time (24 hr)	**Purge Volume** ☐ gal ☐ ml	**Flow Rate** ☐ gpm ☐ ml/min	**Temp** (°C)	**Specific Conductance** (µS/cm)	**Dissolved Oxygen** (mg/L)	**pH**	**Oxidation Reduction Potential** (mV)	**Turbidity** (NTU)	**Remarks**
			Stabilization[(1)]:	**± 3%**	**± 0.2 mg/L**	**± 0.2**	**± 20 mV**	**<10 NTU**	
	Initial								

Remarks: TOC PID =

Purge pumping system volume before recording parameters on dedicated pumps only.

(1) Based on EPA low-flow sampling guidelines, ASTM D 6771-02, and research validated Best Practices (see SAP for details).

Signature:	**Checked By:**

Purging/Sampling Date:_____ **Well Number/ID:**_____

ADDITIONAL FIELD PARAMETER COLLECTION LOG for MICRO-PURGE SAMPLING (continued from frontside)

Purging Data			Water Quality Parameters (within range for 3 consecutive readings)						
Time (24 hr)	**Purge Volume** ☐ gal ☐ ml	**Flow Rate** ☐ gpm ☐ ml/min	**Temp** (°C)	**Specific Conductance** (µS/cm)	**Dissolved Oxygen** (mg/L)	**pH**	**Oxidation Reduction Potential** (mV)	**Turbidity** (NTU)	**Remarks**
			Stabilization[(1)]:	**± 3%**	**± 0.2 mg/L**	**± 0.2**	**± 20 mV**	**<10 NTU**	

Remarks:

[(1)] Based on EPA low-flow sampling guidelines, ASTM D 6771-02, and research validated Best Practices (see SAP for details).

APPENDIX E

NYSDEC Letter Recommendations for Groundwater Monitoring Program dated August 30, 2018

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 11th Floor, Albany, NY 12233-7014
P: (518) 402-9662 I F: (518) 402-9679
www.dec.ny.gov

August 30th, 2018

Daniela Hamann-Nazaroff
Technical Professional
Wood Envi & Infrastructure Solutions, Inc.
180 Grand Avenue, Suite 1100
Oakland, CA 94612

RE: Recommendations for Groundwater Monitoring Program
NYSDEC Site No. 837012
Albion MGP
Albion, New York

Dear Ms. Hamann-Nazaroff:

The New York State Department of Environmental Conservation (Department) has reviewed the Recommendations for Groundwater Monitoring Program for the Albion MGP site (the site), dated August 2018. The monitoring plan is hereby approved with one minor modification.

One additional monitoring well should be installed midway between MW-6 and MW-9 to assess whether any MGP-related contaminants of concern is present in the area, as groundwater generally flows southeast and MW-5 was found to contain MGP-related contaminants.

Please submit one (1) electronic copy of the final monitoring plan to the Department and the appropriate distribution list including the NYSDOH. Should you have any questions, please feel free to contact me at michael.squire@dec.ny.gov or at 518-402-9662.

Sincerely,

Michael Squire
Project Manager
Remedial Bureau C

ec: A. Omorogbe, NYSDEC Central Office
M. Sergott, NYSDOH
D2