8976 Wellington Road
Manassas, VA 20109

March 31, 2020

Daniel Lanners, PE
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 9th Floor
Albany, New York 12233-7250

RE: SUPPLEMENTAL SWMU M INVESTIGATION DATA REPORT
FORMER IBM KINGSTON FACILITY
NYSDEC SITE #356002
ORDER ON CONSENT INDEX NO. D3-10023-6-11

Dear Mr. Lanners:

International Business Machines Corporation (IBM) is submitting this Supplemental SWMU M Investigation Data Report (Report) to present the results of the investigation conducted in November 2019 at the former IBM Kingston Facility (site) located at 300 Enterprise Drive, Town of Ulster, Ulster County, New York.

This Report provides additional information for SMWU M in the northern portion of former Building 003 (B003) and the former Building 004 (B004) courtyard at the site, to complement previous investigation findings presented in the June 2018 *Supplemental Remedial Investigation Report: Solid Waste Management Unit M: Portions of the Industrial Waste Sewer Lines* . The investigation described herein was implemented consistent with the September 2019 *Supplemental Investigation Work Plan – SWMU M,* approved by the New York State Department of Environmental Conservation on October 25, 2019.

Please contact me if you have any questions regarding this Report.

Sincerely yours,

Dean W Chartrand

Dean W. Chartrand
Program Manager
Corporate Environmental Affairs

Enclosure

cc: w/ electronic enclosure:

K Kulow NYSDOH
A Ginsberg TechCity Properties, Inc

REPORT

Supplemental SWMU M Investigation Data Report

Former IBM Kingston Facility

Submitted to:

New York State Department of Environmental Conservation
Bureau of Hazardous Waste and Radiation Management
625 Broadway
9th Floor
Albany, New York 12233-7250

Submitted by:

IBM Corporation Environmental Affairs
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Project No.: 19133924

March 31, 2020

Distribution List

NYS Dept. of Environmental Conservation

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IBM Corporation

TechCity

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FIGURES

APPENDICES

1.0 INTRODUCTION AND BACKGROUND

Golder Associates Inc. (Golder), on behalf of International Business Machines (IBM), prepared this *Supplemental SWMU M Investigation Data Report* (Report) for Solid Waste Management Unit (SWMU) M - Portions of the Industrial Waste Sewer Lines at the former IBM Kingston Facility (site) located at 300 Enterprise Drive in Kingston, New York (Figure 1).

This Report provides additional information for SMWU M in the northern portion of former Building 003 (B003) and the former Building 004 (B004) courtyard at the site, to complement previous investigation findings presented in the June 2018 *Supplemental Remedial Investigation Report: Solid Waste Management Unit M: Portions of the Industrial Waste Sewer Lines* (SWMU M SRIR). The investigation described herein was implemented consistent with the September 2019 *Supplemental Investigation Work Plan – SWMU M,* approved by the New York State Department of Environmental Conservation (NYSDEC) on October 25, 2019.

1.1 Background

IBM completed extensive RCRA Facility Investigations (RFIs) beginning in the 1990s through 2002 to delineate the occurrence and extent of volatile organic compounds (VOCs) in groundwater beneath the site. The entire site was listed as a Class 4 Site (Site # 356002) in the Registry of Inactive Hazardous Waste Disposal sites in New York State and was managed in compliance with the October 4, 1996 Hazardous Waste Management Permit #3-5154-00067/00090 (6 NYCRR Part 373) (Permit) until the site Administrative Order on Consent Index No. D3-10023-6-11 (the Order) was signed with NYSDEC by IBM, A.G. Properties of Kingston, LLC, and Ulster Business Complex (collectively TechCity) on July 8, 2011.

Corrective Measures implemented by IBM prior to the execution of the Order include the operation and maintenance of a perimeter control system that intercepts the groundwater plume. The perimeter control system consists of two stormwater sewer systems, an unsaturated portion of the Surficial Sand Unit that underlies the western portion of the site, a utility trench barrier wall, and a groundwater collection system (GWCS). IBM currently performs groundwater quality monitoring to evaluate the effectiveness of the Corrective Measures.

The following sections provide a summary of the historical processes and previous site investigation activities in the B003 area, as well as generalized site geology and hydrogeology in the vicinity of B003.

1.2 B003 Area Overview

B003 is located east of Enterprise Drive, in the portion of the site referred to as the East Campus. The East Campus includes a majority of the site buildings, many of which are currently vacant or have been demolished. Several buildings in this area, including B003, were formerly served by portions of the network of subsurface industrial waste (IW) sewer lines identified in the Order as SWMU M. In B003, SWMU M IW sewer lines were located primarily below the building in two parallel banks aligned south to north, as illustrated on Figure 2. Additionally, IW sewer lines originating in B004 connected to the eastern bank of IW sewer lines in B003. The IW sewer lines originally comprised four primary IW sewer line systems, including: an acid/alkali rinse sewer line; two chrome and cyanide rinse sewer lines which carried waste to the Industrial Waste Treatment Facility (IWTF); and a “spare” IW sewer line. In B003, the spare IW sewer line was used to carry waste cutting oil to a 2,000-gallon tank formerly located off the northwest corner of B003 known as SWMU T – the Former Waste Oil Tank. The spare IW line is the postulated source of residual concentrations of benzene, toluene, ethylbenzene, and xylene compounds (BTEX) detected in soil and groundwater.

Many of the IW sewer lines were inactivated during the 1980s and IBM discontinued use of the IW sewer lines completely when the IWTF was closed in 1994. IBM conducted an initial sampling program in the 1980s targeting the IW sewer lines that indicated the acid/alkali waste line was carrying chlorinated volatile organic compounds (CVOCs), including: 1,1,1-trichloroethane (1,1,1-TCA), dichloromethane, chloroform, trichloromethane, tetrachloroethene (PCE), and trichloroethene (TCE). In the mid-1990s, IBM conducted investigations of the IW sewer lines (GSC, 1996), which included soil gas surveys and groundwater monitoring well installation and sampling at locations focused on known process areas that utilized organic solvents. The highest soil gas concentrations detected in the mid-1990's investigations were from samples collected near the eastern bank of IW sewer lines in B003, located west and northwest of the B004 process area. Further investigation was not possible at the time due to ongoing building operations that limited accessibility in this area.

As a result of TechCity's redevelopment activities at the site, portions of SWMU M beneath B003 that had previously been determined to be inaccessible became available for new investigations in 2013 and 2017. The results of these investigations were reported in the 2018 SRIR, and identified three residual source areas at B003:

- Two distinct areas of relatively elevated CVOC and to a lesser extent BTEX concentrations in soil and groundwater were identified in the upper (shallow) Surficial Sand unit in the northern portions of B003 along the eastern bank of IW sewer lines; and in the central portion of B003 near MW-267S. Elevated concentrations of CVOCs in these areas are associated with shallow discontinuous lenses of silt and clay. These two areas do not appear to be directly connected based on differing groundwater constituent signatures and the results of membrane interface probe (MIP) data, which indicate they are not contiguous.
- A third area of residual contamination was identified immediately east of B003 in the courtyard area north of B004. Impacts in the courtyard are comparatively deep (typically first identified in the Transition Zone), and do not exhibit the "mixed" CVOC signature detected in shallow groundwater (i.e., the deeper groundwater impacts in this area are primarily TCE).

To further evaluate shallow subsurface conditions beneath the northern portion of B003, and to better define the horizontal and vertical limits of the remaining areas of residual VOCs in soil and groundwater, IBM completed a supplemental investigation in the northern portion of B003 and the adjacent courtyard in November 2019. This report presents the results of the 2019 investigation at B003 and refines the conceptual site model, as needed.

2.0 B003 AREA GEOLOGY

Generalized descriptions of the near-surface lithologic units encountered during previous investigations in the B003 area are as follows:

- **Surficial SAND Unit:** Consists of a light brown, fine to medium grained sand containing variable amounts of finer-grained silt and clay. This unit was typically observed to be saturated below a depth of approximately 6.5 to 7.0-feet bgs during prior investigations.
  - **Intermittent Shallow SILT and CLAY:** discontinuous deposits of finer-grained soils were observed in borings north of B003, in the central and northern portions of the B003 footprint, and in the courtyard area to the east. The lenses were typically observed at depths of approximately 8 to 12 feet bgs.
- **SILTY-SAND and CLAY Transition Unit (Transition Zone):** Consists of variable amounts of reddish-brown to gray silt, sand, and clay. Typical appearance in a soil core is a silty-sand matrix containing thin lenses of

silt and sandy clay. This finer-grained zone was observed in the majority of the borings advanced in the B003 area at depths of approximately 25 feet bgs.

- **Varved CLAY Unit:** Consists of red-brown and gray, plastic, cohesive, wet, clay with intermittent silt zones. Typical appearance in a soil core is clay with laminae of silt and sometimes very fine-grained sand. Where encountered, this unit is typically observed at depths approximately 35 to 40 feet bgs.

Additional discussion of the lithology in the B003 area is included in Section 4.

3.0 INVESTIGATION ACTIVITIES

The investigation described herein was completed in November 2019 consistent with the September 2019 *Supplemental Investigation Work Plan – SWMU M* and the standard operating procedures (SOPs) developed for the site during previous investigations as part of the site quality assurance project plan (QAPP) and associated *RCRA Facility Investigation Management Plans* (Golder, 2009).

3.1 Soil Borings and Soil Sampling

Information from previous investigations was used to identify supplemental investigation locations in the northern portion of B003 and the adjacent courtyard. Golder's drilling contractor advanced the soil borings to depths of 25 to 30 feet (ft) below ground surface (bgs) using a direct-push rig and a dual-tube continuous macro-core sampler for the collection of soil cores. Golder logged the cores for lithology and screened the recovered soil cores using a photo-ionization detector (PID). A total of 20 borings were advanced at the locations indicated on Figure 2. Boring logs are provided as Appendix A.

Based upon the results of previous investigations and observations made during logging of soil cores (e.g., lithology, odor, and/or PID screening results), a total of eight discrete-depth soil samples were collected at six locations for analysis of CVOCs and BTEX. Samples were submitted under chain-of-custody procedures to Eurofins Lancaster Laboratories Environmental, Inc. (ELLE) of Lancaster, Pennsylvania (a New York State Department of Health [NYSDOH] accredited laboratory), for analysis of VOCs by EPA Method 8260C. Additionally, two soil samples were submitted under chain-of-custody procedures to Terra Systems, Inc. of Claymont, Delaware (TSI) for analysis of soil oxidant demand (SOD). Soil sampling field information is included in Appendix B. Analytical laboratory reports are presented in Appendix C.

3.2 Groundwater Sampling

Groundwater sampling locations (and depths of groundwater samples collected from temporary wells) were selected based upon the results of recent historical investigations and observations made during the soil boring program. Targeted areas included zones of elevated PID response and areas of hydrogeologic interest to evaluate extents of previously identified groundwater impacts.

One-inch diameter temporary well points screened across a two-foot interval were installed via direct-push technology at the depths indicated on Table 2. Temporary well points were purged until dry or up to approximately 3 gallons using a peristaltic pump prior to collecting a grab sample. A total of 14 discrete-depth groundwater samples at 12 locations were submitted under chain-of-custody procedures to ELLE for analysis of VOCs. Four of these samples were also submitted for analysis of semi-volatile organic compounds (SVOCs), and five of these samples were submitted for analysis of the following parameters to evaluate geochemical conditions in the B003 area:

- Dissolved gases (ethane, ethene, and methane)

- Total and dissolved iron and manganese
- Wet chemistry parameters (total alkalinity, ammonia, chloride, nitrate, nitrite, phosphate, sulfate, sulfide, and total organic carbon)

Groundwater sampling forms are presented in Appendix B, and analytical laboratory data reports are presented in Appendix C.

3.3 Data Validation

Laboratory analytical data were validated following NYSDEC Analytical Services Protocol (ASP) Category B deliverables requirements and the *NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, Appendix B Guidance for the Development of Data Usability Summary Reports* (NYSDEC, 2010a), to identify data quality issues which could affect the use of the data for decision making purposes. A Data Usability Summary Report (DUSR) for the supplementary B003 investigation is included in Appendix D.

3.4 Investigation Derived Waste

Investigation-derived waste (IDW), consisting of groundwater purge water and soil cuttings, were stored in labeled 55-gallon drums and managed consistent with SOP-8 provided in the QAPP.

4.0 INVESTIGATION RESULTS

The following sections present the results of supplementary subsurface investigation in the B003 area, including additional delineation of the nature and extent of residual CVOC source areas identified in the 2018 SRIR.

4.1 Field Observations

Observations of soils in the investigation area were generally consistent with recent historical observations. A clay layer was observed within the upper Surficial Sand Unit at most locations within the northern portion of B003. These clay intervals were typically observed to be several inches thick and ranged in depth between 6 and 14 ft bgs.

Field screening for CVOCs and BTEX using a PID identified elevated readings in shallow soils (less than 15 ft bgs) along the eastern bank of IW sewer lines in B003 and in deeper intervals (20 to 30 ft bgs) at the southern-most boring in the courtyard area to the east of B003 (Boring B-20). These results are consistent with the results of previous investigations and analytical data results collected during the B003 investigation.

4.2 Soil Sampling Analytical Results

Soil sample analytical results were compared to “Commercial Use” standards as defined in NYSDEC 6NYCRR Part 375-6.8 Environmental Remediation Programs. Soil analytical results for samples collected during the supplemental B003 investigation are presented in Table 1, and the detections of select “parent-product” CVOCs (e.g., 1,1,1-TCA, PCE, and TCE) and total detected concentrations of BTEX compounds are illustrated on Figures 3A and 3B, respectively.

Key observations include:

- Consistent with previous results, concentrations of CVOCs and BTEX were below NYSDEC Commercial Use standards and concentrations in most samples were also below the NYSDEC Restricted Residential Use standards.

- CVOCs are observed to be co-mingled with BTEX along the northern portion of the eastern bank of IW sewer lines, consistent with recent historical results.
- CVOC and BTEX detections in soil along the eastern bank of IW sewer lines are shallow and associated with silt and clay lenses in the Surficial Sand, based on analytical laboratory results, field observations of soil, and PID field screening results. The results of this investigation further support previous conclusions that these silt and clay lenses are discrete and non-contiguous beneath portions of the footprint of B003. A relatively thick and laterally expansive silt and clay deposit is in the vicinity of boring B-10.
- CVOC concentrations in soil samples are observed beneath the eastern bank of IW sewer lines over the northern third of the B003 footprint, extending to boring B-18. An area of relatively elevated CVOC concentrations is associated with the silt and clay lens identified in the vicinity of boring B-10.
- CVOC concentrations in soil samples collected beneath the northwestern portion of B003 are generally intermittent and relatively low compared to the shallow soil samples collected beneath the eastern bank of IW sewer lines.
- BTEX concentrations are not reported in soil samples collected beneath the northwestern portion of B003.
- Consistent with historical results, elevated soil concentrations in the southern portion of the courtyard area are deep (greater than 20 ft bgs), localized to a relatively small area, and consist primarily of TCE.

4.3 Groundwater Sampling Results

Groundwater sample analytical results were compared to applicable groundwater standards in 6 NYCRR Part 703, supplemented by Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. Groundwater sample analytical results collected as part of the supplemental B003 investigation are presented in Table 2. The distribution of the detected concentrations of select “parent-product” CVOCs (e.g., 1,1,1-TCA, PCE, and TCE) at B003 are illustrated on Figure 4A, and Figure 4B presents total detected concentrations of BTEX compounds.

Key observations include:

- Consistent with the soil results presented above and historical groundwater results, relatively elevated CVOC concentrations are observed to be co-mingled with BTEX impacts along the eastern bank of IW sewer lines in B003.
- CVOCs in groundwater beneath B003 (and to a lesser extent, BTEX) are generally shallow and associated with silt and clay lenses observed in the shallow Surficial Sands. The horizontal extent of elevated CVOCs is generally contained to the immediate vicinity of the northern portion of the eastern bank of IW sewer lines and extending to the center of B003.
- An area of relatively elevated CVOC concentrations in groundwater is associated with the silt and clay lens identified in the vicinity of borings B-04 and B-10.
- Significant detections of CVOCs in shallow groundwater were not identified east of B003 into the courtyard area.
- Significant detections of CVOCs in groundwater were not identified west of B003 or along the western bank of IW sewer lines.

- The groundwater results at borings B-15 (and in B-16) further support previous results; localized, elevated CVOC concentrations and the occurrence of discrete lenses of silt and clay in the vertical profile beneath B003. The results of the B-15 sample collected from 10-12 ft bgs in the center of B003 reported significantly lower results than historically reported at adjacent temporary well boring SMB3-TW-22 (14-16 ft bgs). The elevated concentrations observed at SMB3-TW-22 are likely associated with a silty clay lens observed at 14 ft bgs in B-15. In B-16, the results of the shallow groundwater sample are significantly different than the results from the deeper groundwater sample (i.e., non-detect).
- Based on field screening results and analytical results at B-12, B-16, and B-19 deeper groundwater containing CVOCs (primarily TCE) previously identified in the southern-most portion of the courtyard area are localized and attenuate over a short distance downgradient of the courtyard.

4.4 Soil Oxidant and Demand and Geochemical Parameter Sampling Results

As described above, additional groundwater geochemical parameters and SOD data were collected to evaluate potential remedial alternatives (*e.g.*, *in situ* chemical oxidation, enhanced *in situ* bioremediation, and/or *in situ* chemical reduction). The results of these analyses are summarized in the following sections.

4.4.1 Soil Oxidant Demand

Two composited groundwater and soil samples were submitted to TSI to conduct bench scale treatability tests to evaluate total persulfate soil oxidant demand and sodium hydroxide demand. Samples were composited in a ratio by weight of 80% soil and 20% groundwater as follows:

- **B-4 Shallow Composite –** Groundwater collected at B-4 from the 8-10 ft bgs interval and soil from B-4 collected from the 9-10 ft bgs interval.
- **B-4 Deep Composite –** Groundwater collected from B-4 from the 15-17 ft bgs interval and soil from B-4 from 14-15 ft bgs interval.

For each composite, three loadings of sodium persulfate (10 grams per liter [g/L], 20 g/L and 40 g/L) were tested (six total tests). Soil and groundwater composites in each sodium persulfate dose test were amended with 25% sodium hydroxide to maintain pH levels above 11 standard units (S.U.) and then incubated for 17 days. A 25% sodium hydroxide solution was added as needed throughout the incubation period to maintain pH above 11 S.U. On Day 17 of incubation, the amount of residual persulfate was measured, and the persulfate demand was estimated. The results of the sodium hydroxide and persulfate demands for each composite dose test are summarized as follows.

Table 3: Soil Oxidant Demand and Sodium Hydroxide Demand Results

Persulfate Dosage	B-4 Shallow Composite		B-4 Deep Composite	
	Sodium Hydroxide Demand (g/kg soil)	Persulfate Demand (g/kg soil)	Sodium Hydroxide Demand (g/kg soil)	Persulfate Demand (g/kg soil)
10 g/L	2.94	>2.06	1.47	>2.06
20 g/L	3.29	>4.13	2.34	>4.13
40 g/L	5.10	>8.28	4.15	>8.28

g/kg – grams per kilogram

As shown in Table 3, alkaline activation of sodium persulfate required between 1.47 and 5.10 g/kg of soil of 25% sodium hydroxide (i.e., 0.078 – 0.24 gallons of 25% sodium hydroxide per cubic foot of aquifer) to favorably modify and maintain the pH above 11 S.U. During the 17-day incubation period, sodium persulfate was exhausted for the three persulfate dosages in both composited samples due to high soil oxidant demand. As a result, a minimum of 8.28 g/kg of soil would be required to be introduced into the treatment zone for effective *in situ* chemical oxidation treatment. Due to the high persulfate mass requirement, *in situ* chemical oxidation using persulfate is not likely a cost-competitive option as a potential remedial technology.

4.4.2 Geochemical Parameters

Geochemical parameter sample results are summarized in Table 4. Key observations related to groundwater geochemistry results are summarized as follows:

- **B-4 (8-10 ft bgs):** Strongly reducing conditions (i.e., methanogenic) are present, as evidenced by comparatively lower sulfate levels and elevated methane concentrations reported. Conditions are favorable for reductive dechlorination; however, intrinsic reductive dechlorinating activity is likely limited by organic carbon availability (i.e., low total organic carbon [TOC]). Reductive dechlorination appears to be stalled at cis-1,2-dichloroethene (cis-1,2-DCE).
- **B-10 (13-15 ft bgs) and B-16 (25-27 ft bgs):** Reducing conditions are present, but less strong than observed at B-4 (8-10 ft bgs). Consumption of sulfate and low levels of methane indicate that sulfate reducing conditions are present. Conditions are favorable for reductive dechlorination, but low TOC is likely limiting intrinsic activity. Cis-1,2-DCE stall is again evident.
- **B-01 (13.5 – 15.5 ft bgs) and B-20 (28-30 ft bgs):** Weak reducing conditions are present. Comparatively higher sulfate levels are reported, with low or non-detected concentrations of methane reported. These conditions are not currently favorable for reductive dechlorination.

4.5 B003 Area Groundwater Summary

Overall, the primary sources of groundwater impacts in the SWMU M area in the vicinity of B003 are associated with lenses of shallow, fine-grained sediments that are observed more frequently in the upper portion of the Surficial Sand Unit near B003 than at other portions of the site. Historical releases from the spare waste oil IW sewer line associated with SWMU T in the northern portion of B003, from the B003 / B004 IW sewer line junction, and from within the former SWMU W tank area are hypothesized as the initial sources of the residual VOCs retained in these shallow, finer grained materials (where present), and continue to provide a source to

groundwater that form the dissolved phase groundwater plume. CVOC and BTEX concentrations attenuate over a short distance downgradient of B003 and are ultimately intercepted by the GWCS.

Based upon the results of soil and groundwater sampling completed to date, groundwater impacts from the B003 spare waste oil IW sewer line are limited to the northern portion of B003 and the area downgradient of the B003 / B004 IW sewer line junction. The residual source zones identified in SWMU M are areas where CVOCs and BTEX from discrete historical releases were transported in the dissolved phase and adsorbed to finer grained lenses of silt and clay in the shallow Surficial Sand, or the fine-grained materials that form the Transition Zone above the varved clay. Site related constituents adsorbed to these fine-grained materials continue to generate the observed elevated groundwater concentrations in the vicinity of B003 / B004 as a result of back diffusion.

5.0 CONCLUSIONS

The information presented in this Report provides improved lateral and vertical definition of the near-surface lithologic units and a better understanding of the nature and extent of CVOC and BTEX impacts associated with SWMU M in the vicinity of B003. Findings from this investigation complement previous investigation results and include the following:

- The IW sewer lines beneath B003 are not a current, continuing source of impact to groundwater.
- Consistent with previous results, concentrations of CVOCs and BTEX were below NYSDEC Commercial Use standards.
- Two areas of residual contamination identified in the B003 / B004 area were further delineated.
  - Elevated concentrations of CVOCs (and to a lesser extent, BTEX) beneath the northern portion of B003 are associated with shallow, vertically discrete, discontinuous lenses of silt and clay in the Surficial Sand Unit. Observed concentrations of CVOCs attenuate over a short distance in groundwater downgradient of the fine-grained soil lenses that are a residual source impacts to groundwater.
  - A separate area of residual CVOC impacts was delineated in the B004 courtyard. Elevated CVOC concentrations (primarily TCE) in the southern portion of B004 courtyard are localized, relatively deep (typically first identified in the Transition Zone) and attenuate over a short distance downgradient of the courtyard.

Following NYSDEC review and approval of this Report, IBM will prepare an Alternative Analysis (AA) report in accordance with NYSDEC protocols that will include a limited evaluation of remedial alternatives. Only a few remedial technologies may be viable to address the residual source locations due to the variable constituent types, the depths of residual impacts and the difficulty of distributing amendments in the fine-grained, residual source soils at the site. Subsurface soil concentrations are below NYSDEC Commercial Use standards, groundwater receptors are absent, and previously implemented Corrective Measures, including the perimeter control system/GWCS, intercept shallow groundwater and control off site migration.

6.0 REFERENCES

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Tables

Table 1: Soil Analytical Results Summary
IBM Kingston Site
Kingston, NY

			Sample ID	B-04			B-04			B-10			B-14			B-17			B-18			B-20			B-20		
			Sample Date	11/12/2019			11/12/2019			11/5/2019			11/11/2019			11/6/2019			11/6/2019			11/6/2019			11/11/2019		
			Start Depth (ft bgs)	8			15			7			10			22			7.5			27			28		
			End Depth (ft bgs)	10			18			8			12			23			8.5			28			30		
Parameter	CAS	Unit	NYSDEC SCO - COMMERCIAL RESTRICTED - 375-6.8B	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Volatile Organic Compounds																											
1,1,1-Trichloroethane	71-55-6	mg/kg	500	**0.96**		0.027	**0.003**	J	0.0006	**130**		0.61	0.0005	U	0.0005	0.0006	U	0.0006	**0.15**	J	0.028	0.031	U	0.031	0.0006	U	0.0006
1,1-Dichloroethane	75-34-3	mg/kg	240	**0.81**		0.022	**0.003**	J	0.0005	**6.6**		0.051	0.0005	U	0.0005	0.0005	U	0.0005	**0.36**		0.024	0.025	U	0.025	0.0005	U	0.0005
1,1-Dichloroethene	75-35-4	mg/kg	500	**0.062**		0.0004	0.0005	U	0.0005	**1.9**		0.051	0.0005	U	0.0005	0.0005	U	0.0005	**0.28**		0.024	0.025	U	0.025	0.0005	U	0.0005
1,2-Dichloro-1,1,2-trifluoroethane	354-23-4	mg/kg	NS	0.0005	U	0.0005	0.0006	U	0.0006	0.061	U	0.061	0.0005	U	0.0005	**0.0006**	J	0.0006	0.028	U	0.028	0.031	U	0.031	0.0006	U	0.0006
1,2-Dichloroethane	107-06-2	mg/kg	30	**0.056**		0.0005	0.0006	U	0.0006	**0.26**	J+	0.061	0.0005	U	0.0005	0.0006	U	0.0006	**0.095**	J	0.028	0.031	U	0.031	0.0006	U	0.0006
1,2-Dichloroethene, Total	540-59-0	mg/kg	NS	**3.7**		0.045	**0.032**		0.0009	**27**		0.1	**0.003**	J	0.0009	**0.001**	J	0.001	**31**		0.47	**0.14**	J	0.051	0.001	U	0.001
Benzene	71-43-2	mg/kg	44	**0.002**	J	0.0004	0.0005	U	0.0005	**0.062**	J	0.051	0.0005	U	0.0005	0.0005	U	0.0005	0.024	U	0.024	0.025	U	0.025	0.0005	U	0.0005
Benzyl Chloride	100-44-7	mg/kg	NS	0.001	U	0.001	0.001	U	0.001	0.15	UJ	0.15	0.001	U	0.001	0.002	U	0.002	**0.5**		0.071	0.076	U	0.076	0.001	UJ	0.001
Chloroethane	75-00-3	mg/kg	NS	**0.001**	J	0.0009	0.0009	U	0.0009	0.1	U	0.1	0.0009	U	0.0009	0.001	U	0.001	0.047	U	0.047	0.051	U	0.051	0.001	U	0.001
Chloroform	67-66-3	mg/kg	350	**0.001**	J	0.0005	0.0006	U	0.0006	0.061	U	0.061	0.0005	U	0.0005	0.0006	U	0.0006	0.028	U	0.028	0.031	U	0.031	0.0006	U	0.0006
Ethylbenzene	100-41-4	mg/kg	390	**0.012**		0.0003	0.0004	U	0.0004	**3.4**		0.041	0.0004	U	0.0004	0.0004	U	0.0004	**0.1**	J	0.019	0.02	U	0.02	0.0004	U	0.0004
Freon 113	76-13-1	mg/kg	NS	0.0005	U	0.0005	0.0006	U	0.0006	0.061	U	0.061	0.0005	U	0.0005	**0.006**	J	0.0006	0.028	UJ	0.028	0.031	UJ	0.031	0.0006	U	0.0006
Tetrachloroethene	127-18-4	mg/kg	150	**0.006**		0.0004	**0.047**		0.0005	**8.1**		0.051	**0.002**	J	0.0005	**0.15**		0.0005	0.024	U	0.024	0.025	U	0.025	0.0005	U	0.0005
Toluene	108-88-3	mg/kg	500	**0.009**		0.0005	**0.0006**	J	0.0006	**0.96**		0.061	0.0005	U	0.0005	0.0006	U	0.0006	**0.063**	J	0.028	0.031	U	0.031	0.0006	U	0.0006
Trichloroethene	79-01-6	mg/kg	200	**0.093**		0.0004	**0.03**		0.0005	**140**		0.51	**0.019**		0.0005	**2.1**		0.025	**5.4**		0.024	**65**		0.25	**0.0007**	J	0.0005
Vinyl Chloride	75-01-4	mg/kg	13	**0.003**	J	0.0005	0.0006	U	0.0006	**0.099**	J	0.061	0.0005	U	0.0005	0.0006	U	0.0006	0.028	U	0.028	0.031	U	0.031	0.0006	U	0.0006
Xylenes, Total	1330-20-7	mg/kg	500	**0.16**		0.001	0.001	U	0.001	**41**		0.14	0.001	U	0.001	0.001	U	0.001	**1.6**		0.066	0.071	U	0.071	0.001	U	0.001
Wet Chemistry Parameters																											
Moisture, Percent	MOIST	%	NS	**11.6**		0.5	**19.2**		0.5	**15.4**		0.5	**17.6**		0.5	**19.4**		0.5	**15.3**		0.5	**21**		0.5	**20.8**		0.5
Total Organic Carbon	TOC	mg/kg	NS	**9.68**		0.423	**0.541**		0.126	**11.2**		0.118	**1.17**		0.376	**0.762**		0.127	**11.1**		0.373	**4.29**		0.286	**1.59**		0.221

Notes and Abbreviations

All reported data was evaluated in accordance with NYSDEC DER-10 Techincal Guidance for State Investigation and Remediation (May 3, 2010).

All results are compared to the NYSDEC Soil Cleanup Objectives (SCO) for Restricted Commerical Use given in NYCRR Part 375-6.8B (December 2006).

CAS - Chemical Abstracts Service
ft bgs - Feet Below Ground Surface
J - Estimated Result
J+ - Estimated Result; High Bias
U - Not Detected Above the MDL
UJ - Not Detected; RL is Estimated
NYSDEC - New York State Department of Environmental Conservation
Qual - Interpreted Qualifier
RL - Reporting Limit
mg/kg - Milligrams per Kilogram
NS - No Standard
Bold - Analyte detected above the RDL

Table 2: Groundwater Analytical Results Summary
IBM Kingston Site
Kingston, NY

Parameter	CAS	NYSDEC-P703 SW-GW QUALITY STANDARDS	Unit	Sample ID	B-01			B-03			B-04			B-05			B-07			B-09			B-10			B-12			B-12			B-14			B-15			B-16			B-16			B-19			B-20		
				Sample Date	11/5/2019			11/8/2019			11/12/2019			11/8/2019			11/7/2019			11/8/2019			11/5/2019			11/8/2019			11/8/2019			11/11/2019			11/11/2019			11/11/2019			11/11/2019			11/11/2019			11/11/2019		
				Start Depth (ft bgs)	13.5			12			8			11			7			12			13			11			26			10			10			11			25			28			28		
				End Depth (ft bgs)	15.5			14			10			13			9			14			15			13			28			12			12			13			27			30			30		
					Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL
Volatile Organic Compounds																																															
1,1,1-Trichloroethane	71-55-6	5	ug/L		< 0.3	UJ	0.3	**210**		2	**210**		2	**0.3**	J	0.3	**0.9**	J	0.3	**6**		0.3	**1400**	J	15	< 0.3	U	0.3	< 0.3	U	0.3	**1**		0.3	**0.8**	J	0.3	< 0.3	U	0.3	**0.7**	J	0.3	< 0.3	U	0.3	< 0.3	U	0.3
1,1,2-Trichloroethane	79-00-5	1	ug/L		< 0.2	U	0.2	< 1	U	1	< 1	U	1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 1	U	1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	**0.3**	J	0.2	< 0.2	U	0.2	< 0.2	U	0.2
1,1-Dichloroethane	75-34-3	5	ug/L		**11**		0.2	**390**		1	**6200**		10	**0.3**	J	0.2	**0.6**	J	0.2	**69**		0.2	**1200**		1	**0.5**	J	0.2	< 0.2	U	0.2	**3**		0.2	**2**		0.2	< 0.2	U	0.2	**43**		0.2	< 0.2	U	0.2	< 0.2	U	0.2
1,1-Dichloroethene	75-35-4	5	ug/L		< 0.2	U	0.2	**37**		1	**270**		1	< 0.2	U	0.2	< 0.2	U	0.2	**8**		0.2	**210**		1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	**7**		0.2	< 0.2	U	0.2	< 0.2	U	0.2
1,2-Dichloro-1,1,2-trifluoroethane	354-23-4	NS	ug/L		**0.9**	J	0.4	< 2	U	2	< 2	U	2	< 0.4	U	0.4	< 0.4	U	0.4	**1**	J	0.4	< 2	U	2	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	**1**	J	0.4	< 0.4	U	0.4	< 0.4	U	0.4
1,2-Dichloroethane	107-06-2	0.6	ug/L		**0.4**	J	0.3	**35**		2	**1400**		2	< 0.3	U	0.3	< 0.3	U	0.3	**2**		0.3	**50**		2	< 0.3	U	0.3	< 0.3	U	0.3	< 0.3	U	0.3	< 0.3	U	0.3	< 0.3	U	0.3	**2**		0.3	< 0.3	U	0.3	< 0.3	U	0.3
1,2-Dichloroethene, Total	540-59-0	5	ug/L		**46**		0.4	**2400**		20	**11000**		80	**0.5**	J	0.4	**2**		0.4	**270**	J	0.4	**6900**		20	< 0.4	U	0.4	< 0.4	U	0.4	**19**		0.4	**14**		0.4	< 0.4	U	0.4	**500**	J	0.4	< 0.4	U	0.4	**0.7**	J	0.4
Benzene	71-43-2	1	ug/L		< 0.2	U	0.2	< 1	U	1	**11**		1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 1	U	1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Chloroethane	75-00-3	5	ug/L		< 0.2	U	0.2	< 1	U	1	**49**		1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 1	U	1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	**1**		0.2	< 0.2	U	0.2	< 0.2	U	0.2
Chloroform	67-66-3	7	ug/L		**1**		0.2	**2**	J	1	< 1	U	1	< 0.2	U	0.2	**0.9**	J	0.2	**0.2**	J	0.2	**1**	J	1	< 0.2	U	0.2	< 0.2	U	0.2	**2**		0.2	**0.5**	J	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Ethylbenzene	100-41-4	5	ug/L		< 0.4	U	0.4	< 2	U	2	**15**		2	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	**3**	J	2	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4	< 0.4	U	0.4
Freon 113	76-13-1	5	ug/L		**1**	J	0.2	< 1	U	1	< 1	U	1	< 0.2	U	0.2	< 0.2	U	0.2	**0.2**	J	0.2	< 1	U	1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Tetrachloroethene	127-18-4	5	ug/L		**6**		0.2	**18**		1	**2**	J	1	**1**		0.2	**1**		0.2	**3**		0.2	**30**		1	**0.9**	J	0.2	< 0.2	U	0.2	**3**		0.2	**0.3**	J	0.2	< 0.2	U	0.2	**12**		0.2	< 0.2	U	0.2	< 0.2	U	0.2
Toluene	108-88-3	5	ug/L		< 0.2	U	0.2	< 1	U	1	**30**		1	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	**4**	J	1	**0.3**	J	0.2	< 0.2	U	0.2	< 0.2	U	0.2	**0.3**	J	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2	< 0.2	U	0.2
Trichloroethene	79-01-6	5	ug/L		**11**		0.2	**290**		1	**35**		1	**3**		0.2	**19**		0.2	**51**		0.2	**290**		1	**2**		0.2	< 0.2	U	0.2	**120**		0.2	**43**		0.2	< 0.2	U	0.2	**120**		0.2	< 0.2	U	0.2	**11**		0.2
Vinyl Chloride	75-01-4	2	ug/L		**0.2**	J	0.2	**13**	J	1	**21**		1	**0.3**	J	0.2	< 0.2	UJ	0.2	**21**	J	0.2	**73**		1	**0.2**	J	0.2	< 0.2	UJ	0.2	< 0.2	UJ	0.2	< 0.2	UJ	0.2	< 0.2	UJ	0.2	**19**	J	0.2	< 0.2	U	0.2	< 0.2	UJ	0.2
Xylenes, Total	1330-20-7	5	ug/L		< 1	U	1	< 7	U	7	**190**		7	< 1	U	1	< 1	U	1	< 1	U	1	< 7	U	7	< 1	U	1	< 1	U	1	< 1	U	1	< 1	U	1	< 1	U	1	< 1	U	1	< 1	U	1	< 1	U	1
Semivolatile Organic Compounds																																															
2-Methylnaphthalene	91-57-6	NS	ug/L		< 0.1	U	0.1	NA			NA			NA			NA			NA			**0.3**	J	0.1	NA			NA			NA			NA			NA			**0.2**	J	0.1	NA			**0.2**	J	0.1
4-Methylphenol	106-44-5	NS	ug/L		< 0.5	U	0.5	NA			NA			NA			NA			NA			**1**	J	0.5	NA			NA			NA			NA			NA			< 0.5	U	0.5	NA			< 0.5	UJ	0.5
Naphthalene	91-20-3	NS	ug/L		< 0.1	U	0.1	NA			NA			NA			NA			NA			**21**		0.1	NA			NA			NA			NA			NA			**0.4**	J	0.1	NA			< 0.1	U	0.1
Dissolved Gases																																															
Ethane	74-84-0	NS	ug/L		< 1	U	1	NA			**1.5**	J	1	NA			NA			NA			< 1	U	1	NA			NA			NA			NA			NA			**1.2**	J	1	NA			< 1	U	1
Ethene	74-85-1	NS	ug/L		< 1	U	1	NA			**9.6**		1	NA			NA			NA			**3.2**	J	1	NA			NA			NA			NA			NA			**2.8**	J	1	NA			< 1	U	1
Methane	74-82-8	NS	ug/L		< 3	U	3	NA			**7900**		150	NA			NA			NA			**53**		3	NA			NA			NA			NA			NA			**110**		3	NA			**11**		3
Total Metals																																															
Iron	7439-89-6	0.6	mg/L		**23.4**		0.04	NA			**114**		0.04	NA			NA			NA			**85.4**		0.04	NA			NA			NA			NA			NA			**16**		0.04	NA			**52.3**		0.04
Manganese	7439-96-5	0.6	mg/L		**1.36**		0.003	NA			**5.99**		0.003	NA			NA			NA			**3.85**		0.003	NA			NA			NA			NA			NA			**1.98**		0.003	NA			**6.54**		0.003
Dissolved Metals																																															
Iron	7439-89-6	0.6	mg/L		< 0.04	UJ	0.04	NA			< 0.04	UJ	0.04	NA			NA			NA			< 0.04	UJ	0.04	NA			NA			NA			NA			NA			< 0.04	UJ	0.04	NA			< 0.04	UJ	0.04
Manganese	7439-96-5	0.6	mg/L		**2.02**	J	0.003	NA			**4.99**	J	0.003	NA			NA			NA			**2.68**	J	0.003	NA			NA			NA			NA			NA			**1.8**	J	0.003	NA			**2.49**	J	0.003
Wet Chemistry Parameters																																															
Alkalinity, Total	ALK	NS	mg/L		**138**		2.6	NA			**233**		2.6	NA			NA			NA			**160**		2.6	NA			NA			NA			NA			NA			**120**		2.6	NA			**139**		2.6
Ammonia	7664-41-7	2	mg/L		< 0.05	U	0.05	NA						NA			NA			NA			**0.83**		0.05	NA			NA			NA			NA			NA			**0.45**		0.05	NA			**0.23**		0.05
Chloride	16887-00-6	500	mg/L		**12**		1	NA			**694**		100	NA			NA			NA			**13.8**		1	NA			NA			NA			NA			NA			**9.8**	J-	1	NA			**136**	J-	10
Nitrate	14797-55-8	20	mg/L		**5.9**		0.08	NA			**2.1**		0.04	NA			NA			NA			**3.7**		0.08	NA			NA			NA			NA			NA			< 0.04	U	0.04	NA			< 0.04	U	0.04
Nitrite	14797-65-0	2	mg/L		< 0.015	UJ	0.015	NA			< 0.015	U	0.015	NA			NA			NA			**0.019**	J	0.015	NA			NA			NA			NA			NA			< 0.015	U	0.015	NA			< 0.015	U	0.015
Phosphate	14265-44-2	NS	mg/L		**1**		0.25	NA						NA			NA			NA			**3**		0.25	NA			NA			NA			NA			NA			**1.8**		0.25	NA			**7.4**		0.25
Sulfate	14808-79-8	500	mg/L		**68.2**		1.5	NA			**12.6**		1.5	NA			NA			NA			**37.3**		1.5	NA			NA			NA			NA			NA			**79.4**		15	NA			**127**		15
Sulfide	18496-25-8	1	mg/L		< 0.7	U	0.7	NA						NA			NA			NA			< 0.7	U	0.7	NA			NA			NA			NA			NA			< 0.7	U	0.7	NA			< 0.7	U	0.7
Total Organic Carbon	TOC	NS	mg/L		**1.2**		0.5	NA			**56.2**		0.5	NA			NA			NA			**5.5**		1	NA			NA			NA			NA			NA			**2.2**		0.5	NA			**0.7**	J	0.5

Notes and Abbreviations

All reported data was evaluated in accordance with NYSDEC DER-10 Techincal Guidance for State Investigation and Remediation (May 3, 2010).
All results are compared to the NYSDEC Groundwater and Surface Water Water Quality Standards given in the NY CRR Part 703.5 (November 2019). Results the exceeded the criteria are bolded.

CAS - Chemical Abstracts Service
ft bgs - Feet Below Ground Surface
J - Estimated Result
J- - Estimated Result; Low Bias
U - Not Detected Above the MDL
UJ - Not Detected; RL is Estimated
ug/L - Micrograms per Liter
mg/L - Milligrams per Liter
Qual - Interpreted Qualifier
RDL - Reporting Limit
CRR - Codes, Rules and Regulations
NA - Not Analyzed/Applicable
NS - No Standard
NYSDEC - New York State Department of Environmental Conservation
Yellow Highlighting - Exceedance of applicable standard
Bold - Analyte detected above the RDL

Table 4: Geochemical Parameters Results Summary
IBM Kingston Site
Kingston, NY

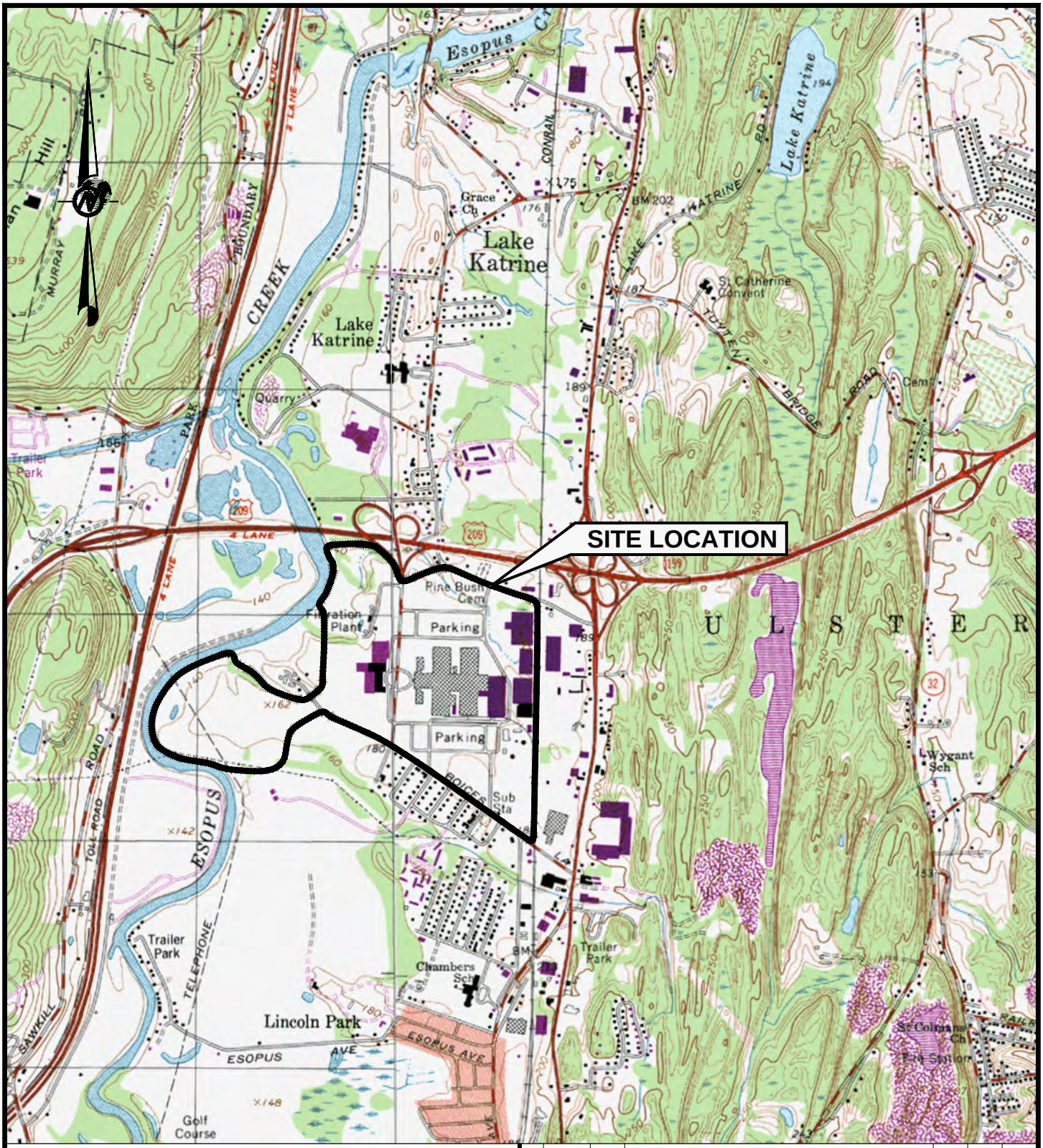
	Sample ID		B-01			B-04			B-10			B-16			B-20		
	Sample Date		11/5/2019			11/12/2019			11/5/2019			11/11/2019			11/11/2019		
	Start Depth (ft bgs)		13.5			8			13			25			28		
	End Depth (ft bgs)		15.5			10			15			27			30		
Parameter	CAS	Unit	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL
Dissolved Gases																	
Ethane	74-84-0	ug/L	< 1	U	1	**1.5**	**J**	1	< 1	U	1	**1.2**	**J**	1	< 1	U	1
Ethene	74-85-1	ug/L	< 1	U	1	**9.6**		1	**3.2**	**J**	1	**2.8**	**J**	1	< 1	U	1
Methane	74-82-8	ug/L	< 3	U	3	**7900**		150	**53**		3	**110**		3	**11**		3
Total Metals																	
Iron	7439-89-6	mg/L	**23.4**		0.04	**114**		0.04	**85.4**		0.04	**16**		0.04	**52.3**		0.04
Manganese	7439-96-5	mg/L	**1.36**		0.003	**5.99**		0.003	**3.85**		0.003	**1.98**		0.003	**6.54**		0.003
Dissolved Metals																	
Iron	7439-89-6	mg/L	< 0.04	UJ	0.04	< 0.04	UJ	0.04	< 0.04	UJ	0.04	< 0.04	UJ	0.04	< 0.04	UJ	0.04
Manganese	7439-96-5	mg/L	**2.02**	J	0.003	**4.99**	J	0.003	**2.68**	J	0.003	**1.8**	J	0.003	**2.49**	J	0.003
Wet Chemistry Parameters																	
Alkalinity, Total	ALK	mg/L	**138**		2.6	**233**		2.6	**160**		2.6	**120**		2.6	**139**		2.6
Ammonia	7664-41-7	mg/L	< 0.05	U	0.05				**0.83**		0.05	**0.45**		0.05	**0.23**		0.05
Chloride	16887-00-6	mg/L	**12**		1	**694**		100	**13.8**		1	**9.8**	**J-**	1	**136**	**J-**	10
Nitrate	14797-55-8	mg/L	**5.9**		0.08	**2.1**		0.04	**3.7**		0.08	< 0.04	U	0.04	< 0.04	U	0.04
Nitrite	14797-65-0	mg/L	< 0.015	UJ	0.015	< 0.015	U	0.015	**0.019**	**J**	0.015	< 0.015	U	0.015	< 0.015	U	0.015
Phosphate	14265-44-2	mg/L	**1**		0.25				**3**		0.25	**1.8**		0.25	**7.4**		0.25
Sulfate	14808-79-8	mg/L	**68.2**		1.5	**12.6**		1.5	**37.3**		1.5	**79.4**		15	**127**		15
Sulfide	18496-25-8	mg/L	< 0.7	U	0.7				< 0.7	U	0.7	< 0.7	U	0.7	< 0.7	U	0.7
Total Organic Carbon	TOC	mg/L	**1.2**		0.5	**56.2**		0.5	**5.5**		1	**2.2**		0.5	**0.7**	**J**	0.5
Field Parameters																	
pH	pH	S.U.	**6.53**		NA	**7.27**		NA	**6.74**		NA	**7.94**		NA	**7.53**		NA
Oxidation-Reduction Potential	ORP	mV	**112.3**		NA	**-132.3**		NA	**-2.5**		NA	**-140**		NA	**-132.4**		NA

Notes and Abbreviations

All reported data was evaluated in accordance with
NYSDEC DER-10 Techincal Guidance for State

CAS - Chemical Abstracts Service
ft bgs - Feet Below Ground Surface
J - Estimated Result
J- - Estimated Result; Low Bias
U - Not Detected Above the MDL
UJ - Not Detected; RL is Estimated
ug/L - Micrograms per Liter
mg/L - Milligrams per Liter
mV - Millivolts
Qual - Interpreted Qualifier
RDL - Reporting Limit
CRR - Codes, Rules and Regulations
NA - Not Analyzed/Applicable
NS - No Standard
NYSDEC - New York State Department of Environmental Conservation
Yellow Highlighting - Exceedance of applicable standard
Bold - Analyte detected above the RDL
S.U. - Standard Units

Figures



REFERENCE

1.) BASE MAP TAKEN FROM USGS 7.5 MINUTE SERIES QUADRANGLES OF KINGSTON EAST, NY, DATED 1963, PHOTOREVISED 1980, AND KINGSTON WEST, NY, DATED 1997.

2000 0 2000
SCALE FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FORMER IBM FACILITY
KINGSTON, NEW YORK

TITLE

SITE LOCATION MAP

NJ Authorization #24GA28029100

GOLDER

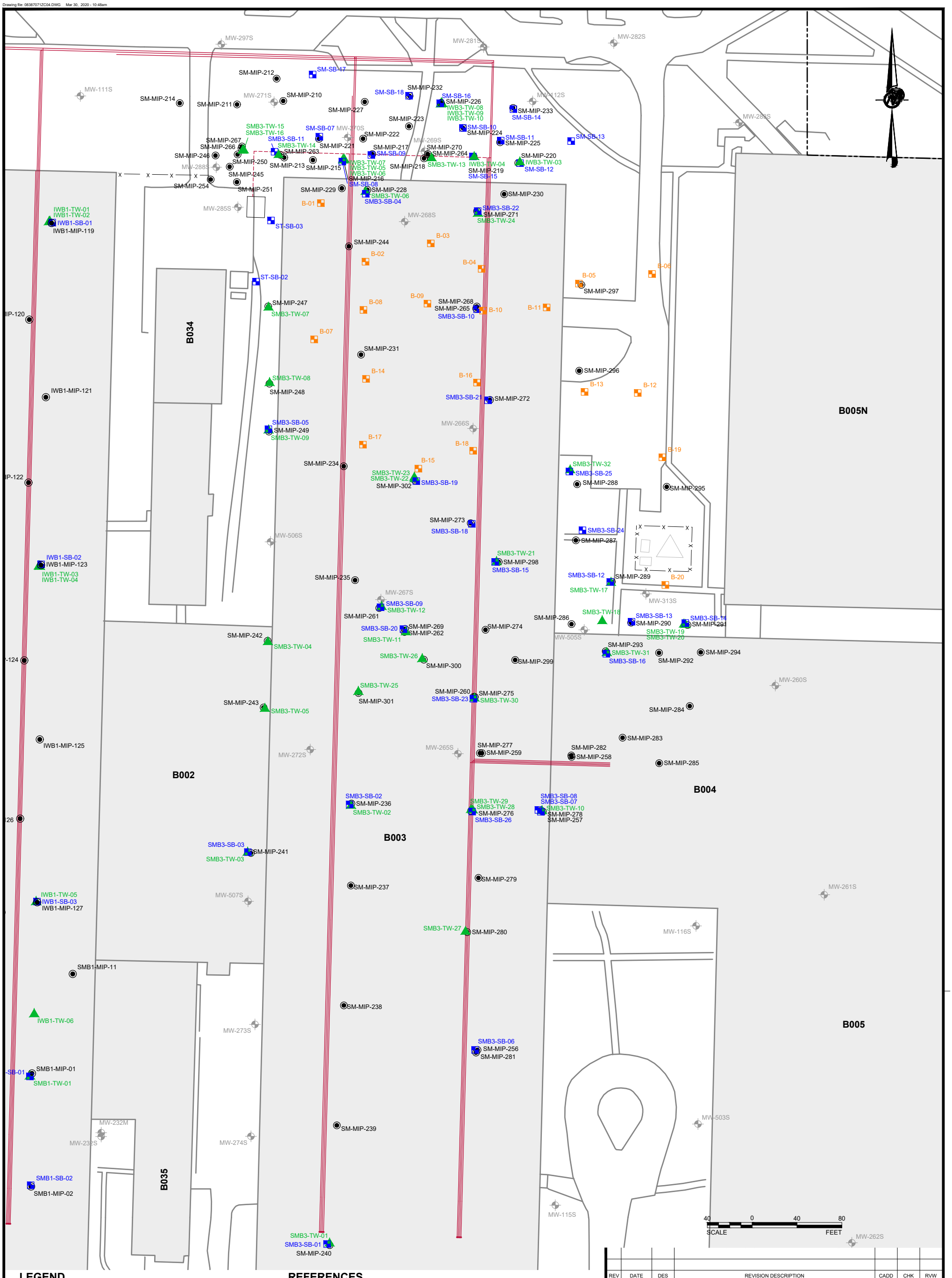
PROJECT No.		083-87071
DESIGN	HE	04/04/18
CADD	RG	04/04/18
CHECK	HE	03/30/20
REVIEW	CH	03/30/20

FILE No.		08387071ZA15
SCALE	AS SHOWN	REV. 0

FIGURE 1

Drawing file: 08387071ZA15 - Site Location Map.dwg Apr 05, 2018 - 10:12am

Drawing file: 08387071ZC04.DWG Mar 30, 2020 - 10:48am



LEGEND

B003	BUILDING NUMBER
———	INACTIVE SUBSURFACE IW SEWER LINES
- - - - - - - - -	INACTIVE "SPARE" IW SEWER LINE
⊕	EXISTING MONITORING WELL
◉	MIP LOCATION
■	SOIL BORING
▲	TEMPORARY WELL
■	SOIL BORING (2019)

REFERENCES

1.) BASE MAP TAKEN FROM DIGITAL CAD FILE SITEMAP.DWG, DRAWING NUMBER 93002-SITEMAP/2 ENTITLED "SITE MAP," DATED MAY 9, 2005, PROVIDED BY GROUNDWATER SCIENCES CORPORATION.

2.) PROPERTY LINE DIGITIZED FROM A HARD COPY FIGURE ENTITLED "ENVIRONMENTAL PARCELS," DATED DECEMBER 12, 2006, FIGURE 2, PREPARED BY DIVNEY TUNG SCHWALBE.

3.) INACTIVE SUBSURFACE IW SEWER LINES AND INACTIVE "SPARE" IW SEWER LINE TAKEN FROM DIGITAL FILE 3002-108-I3.DWG, ENTITLED "LOCATION MAP," DATED MARCH 5, 2009, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

4.) FORMER 2,000 GALLON WASTE OIL UST DIGITIZED FROM A HARDCOPY FILE ENTITLED "FORMER WASTE OIL UST SWMU," DATED FEBRUARY 26, 1997, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

5.) SWMU M SOIL BORINGS, MIP LOCATIONS AND TEMPORARY WELLS SURVEYED BY BRINNIER LARIOS, P.C. ON OCTOBER 2, 2017.

6.) 2019 SOIL BORING LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE ONLY.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FORMER IBM FACILITY
KINGSTON, NEW YORK

TITLE

B003 INVESTIGATION MAP

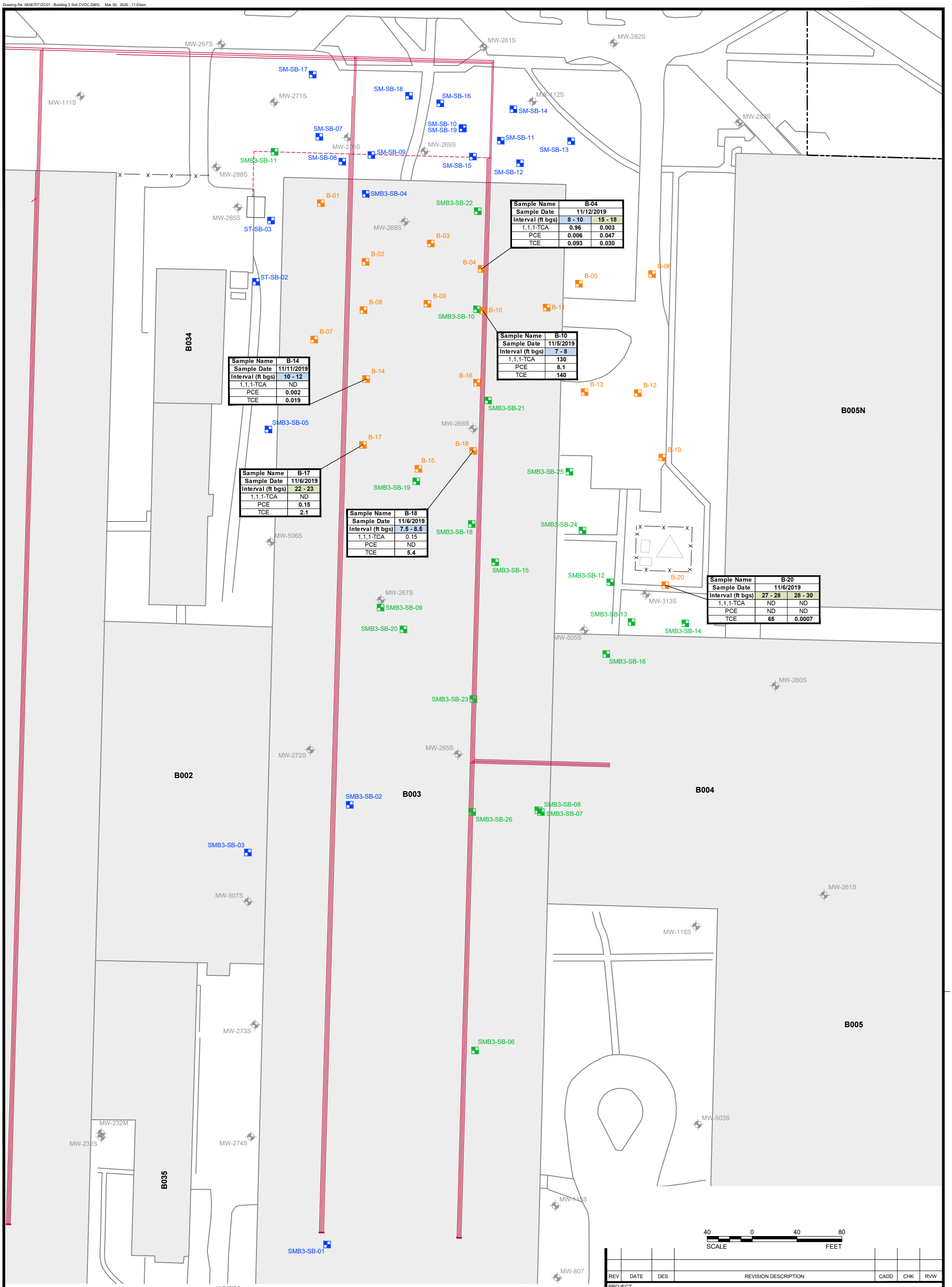
NJ Authorization #24GA28029100

GOLDER

PROJECT No.		083-87071	FILE No.		08387071ZC04
DESIGN	HE	03/30/20	SCALE	AS SHOWN	REV. 0
CADD	RG	03/30/20			
CHECK	HE	03/30/20			
REVIEW	CH	03/30/20			

FIGURE 2

Drawing file: 08387071ZC01 - Building 3 Soil CVOC.DWG Mar 30, 2020 - 11:03am



Sample Name	B-04	
Sample Date	11/12/2019	
Interval (ft bgs)	8 - 10	15 - 18
1,1,1-TCA	0.96	0.003
PCE	0.006	0.047
TCE	0.093	0.030

Sample Name	B-10
Sample Date	11/5/2019
Interval (ft bgs)	7 - 8
1,1,1-TCA	130
PCE	8.1
TCE	140

Sample Name	B-14
Sample Date	11/11/2019
Interval (ft bgs)	10 - 12
1,1,1-TCA	ND
PCE	0.002
TCE	0.019

Sample Name	B-17
Sample Date	11/6/2019
Interval (ft bgs)	22 - 23
1,1,1-TCA	ND
PCE	0.15
TCE	2.1

Sample Name	B-18
Sample Date	11/6/2019
Interval (ft bgs)	7.5 - 8.5
1,1,1-TCA	0.15
PCE	ND
TCE	5.4

Sample Name	B-20	
Sample Date	11/6/2019	
Interval (ft bgs)	27 - 28	28 - 30
1,1,1-TCA	ND	ND
PCE	ND	ND
TCE	65	0.0007

40 0 40 80
SCALE FEET

LEGEND

- B003 — BUILDING NUMBER
- INACTIVE SUBSURFACE IW SEWER LINES
- INACTIVE "SPARE" IW SEWER LINE
- EXISTING MONITORING WELL
- SOIL BORING (2013)
- SOIL BORING (2017)
- SOIL BORING (2019)

NOTES

1.) CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg).

2.) NO COMPOUNDS WERE REPORTED ABOVE NYSDEC COMMERCIAL USE STANDARDS.

3.) BLUE SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE SHALLOW SURFICIAL SAND UNIT, TYPICALLY LESS THAN 15 FEET BELOW GROUND SURFACE (FT BGS).

4.) GREEN SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE BASE OF THE SURFICIAL SAND UNIT OR THE TRANSITION ZONE, TYPICALLY GREATER THAN 15 FT BGS.

REFERENCES

1.) BASE MAP TAKEN FROM DIGITAL CAD FILE SITEMAP.DWG, DRAWING NUMBER 93002-SITEMAP/2 ENTITLED "SITE MAP," DATED MAY 9, 2005, PROVIDED BY GROUNDWATER SCIENCES CORPORATION.

2.) PROPERTY LINE DIGITIZED FROM A HARD COPY FIGURE ENTITLED "ENVIRONMENTAL PARCELS," DATED DECEMBER 12, 2006, FIGURE 2, PREPARED BY DIVNEY TUNG SCHWALBE.

3.) INACTIVE SUBSURFACE IW SEWER LINES AND INACTIVE "SPARE" IW SEWER LINE TAKEN FROM DIGITAL FILE 3002-108-I3.DWG, ENTITLED "LOCATION MAP," DATED MARCH 5, 2009, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

4.) FORMER 2,000 GALLON WASTE OIL UST DIGITIZED FROM A HARDCOPY FILE ENTITLED "FORMER WASTE OIL UST SWMU," DATED FEBRUARY 26, 1997, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

5.) SWMU M SOIL BORINGS, MIP LOCATIONS AND TEMPORARY WELLS SURVEYED BY BRINNIER LARIOS, P.C. ON OCTOBER 2, 2017.

6.) 2019 SOIL BORING LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE ONLY.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FORMER IBM FACILITY
KINGSTON, NEW YORK

TITLE

B003 SOIL RESULTS SUMMARY MAP - CVOC RESULTS

NJ Authorization #24GA28029100

GOLDER

PROJECT No.		083-87071	FILE No.	08387071ZC01A	
DESIGN	HE	03/30/20	SCALE	AS SHOWN	REV. 0
CADD	RG	03/30/20			
CHECK	HE	03/30/20			
REVIEW	CH	03/30/20			

FIGURE 3A

Drawing file: 08387071ZC01 - Building 3 Soil CVOC.DWG Mar 30, 2020 - 11:03am

Sample Name	B-04	
Sample Date	11/12/2019	
Interval (ft bgs)	8 - 10	15 - 18
BTEX	0.18	0.0006

Sample Name	B-10
Sample Date	11/5/2019
Interval (ft bgs)	7 - 8
BTEX	45

Sample Name	B-14
Sample Date	11/11/2019
Interval (ft bgs)	10 - 12
BTEX	ND

Sample Name	B-17
Sample Date	11/6/2019
Interval (ft bgs)	22 - 23
BTEX	ND

Sample Name	B-18
Sample Date	11/6/2019
Interval (ft bgs)	7.5 - 8.5
BTEX	1.8

Sample Name	B-20	
Sample Date	11/6/2019	
Interval (ft bgs)	27 - 28	28 - 30
BTEX	ND	ND

LEGEND

B003	BUILDING NUMBER
	INACTIVE SUBSURFACE IW SEWER LINES
	INACTIVE "SPARE" IW SEWER LINE
	EXISTING MONITORING WELL
	SOIL BORING (2013)
	SOIL BORING (2017)
	SOIL BORING (2019)

NOTES

1.) CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER KILOGRAM (MG/KG).

2.) TOTAL BTEX COMPOUNDS INCLUDE BENZENE, ETHYLBENZENE, TOLUENE, AND TOTAL XYLENES. NO COMPOUNDS WERE REPORTED ABOVE NYSDEC COMMERCIAL USE STANDARDS.

3.) BLUE SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE SHALLOW SURFICIAL SAND UNIT, TYPICALLY LESS THAN 15 FEET BELOW GROUND SURFACE (FT BGS).

4.) GREEN SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE BASE OF THE SURFICIAL SAND UNIT OR THE TRANSITION ZONE, TYPICALLY GREATER THAN 15 FT BGS.

REFERENCES

1.) BASE MAP TAKEN FROM DIGITAL CAD FILE SITEMAP.DWG, DRAWING NUMBER 93002-SITEMAP/2 ENTITLED "SITE MAP," DATED MAY 9, 2005, PROVIDED BY GROUNDWATER SCIENCES CORPORATION.

2.) PROPERTY LINE DIGITIZED FROM A HARD COPY FIGURE ENTITLED "ENVIRONMENTAL PARCELS," DATED DECEMBER 12, 2006, FIGURE 2, PREPARED BY DIVNEY TUNG SCHWALBE.

3.) INACTIVE SUBSURFACE IW SEWER LINES AND INACTIVE "SPARE" IW SEWER LINE TAKEN FROM DIGITAL FILE 3002-108-I3.DWG, ENTITLED "LOCATION MAP," DATED MARCH 5, 2009, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

4.) FORMER 2,000 GALLON WASTE OIL UST DIGITIZED FROM A HARDCOPY FILE ENTITLED "FORMER WASTE OIL UST SWMU," DATED FEBRUARY 26, 1997, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

5.) SWMU M SOIL BORINGS, MIP LOCATIONS AND TEMPORARY WELLS SURVEYED BY BRINNIER LARIOS, P.C. ON OCTOBER 2, 2017.

6.) 2019 SOIL BORING LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE ONLY.

40 0 40 80
SCALE FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FORMER IBM FACILITY
KINGSTON, NEW YORK

TITLE

B003 SOIL RESULTS SUMMARY MAP - TOTAL BTEX RESULTS

NJ Authorization #24GA28029100

GOLDER

PROJECT No.		083-87071	FILE No.		08387071ZC01A
DESIGN	HE	03/30/20	SCALE	AS SHOWN	REV. 0
CADD	RG	03/30/20			
CHECK	HE	03/30/20			
REVIEW	CH	03/30/20			

FIGURE 3B

Drawing file: 08387071ZC02 - Building 3 GW CVOC.DWG Mar 30, 2020 - 11:26am

Sample Name	B-01
Sample Date	11/5/2019
Interval (ft bgs)	13.5 - 15.5
1,1,1-TCA	<0.3
PCE	6
TCE	11

Sample Name	B-03
Sample Date	11/8/2019
Interval (ft bgs)	12 - 14
1,1,1-TCA	210
PCE	18
TCE	290

Sample Name	B-04
Sample Date	11/12/2019
Interval (ft bgs)	8 - 10
1,1,1-TCA	210
PCE	2
TCE	35

Sample Name	B-05
Sample Date	11/8/2019
Interval (ft bgs)	11 - 13
1,1,1-TCA	0.3
PCE	1
TCE	3

Sample Name	B-07
Sample Date	11/7/2019
Interval (ft bgs)	7 - 9
1,1,1-TCA	0.9
PCE	1
TCE	19

Sample Name	B-14
Sample Date	11/11/2019
Interval (ft bgs)	10 - 12
1,1,1-TCA	1
PCE	3
TCE	120

Sample Name	B-09
Sample Date	11/8/2019
Interval (ft bgs)	12 - 14
1,1,1-TCA	6
PCE	3
TCE	51

Sample Name	B-10
Sample Date	11/5/2019
Interval (ft bgs)	13 - 15
1,1,1-TCA	1,400
PCE	30
TCE	290

Sample Name	B-16S	B-16D
Sample Date	11/11/2019	11/11/2019
Interval (ft bgs)	11 - 13	25 - 27
1,1,1-TCA	0.7	< 0.3
PCE	12	< 0.2
TCE	120	< 0.2

Sample Name	B-12S	B-12D
Sample Date	11/8/2019	11/8/2019
Interval (ft bgs)	11 - 13	26 - 28
1,1,1-TCA	< 0.3	< 0.3
PCE	0.9	< 0.2
TCE	2	< 0.2

Sample Name	B-19
Sample Date	11/11/2019
Interval (ft bgs)	28 - 30
1,1,1-TCA	< 0.3
PCE	< 0.2
TCE	< 0.2

Sample Name	B-15
Sample Date	11/11/2019
Interval (ft bgs)	10 - 12
1,1,1-TCA	0.8
PCE	0.3
TCE	43

Sample Name	B-20
Sample Date	11/11/2019
Interval (ft bgs)	28 - 30
1,1,1-TCA	< 0.3
PCE	< 0.2
TCE	11

B005N

B002

B003

B004

B005

B035

SCALE 40 0 40 80 FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FORMER IBM FACILITY
KINGSTON, NEW YORK

TITLE

B003 GROUNDWATER RESULTS SUMMARY MAP - CVOC RESULTS

LEGEND

- B003 — BUILDING NUMBER
- INACTIVE SUBSURFACE IW SEWER LINES
- INACTIVE "SPARE" IW SEWER LINE
- EXISTING MONITORING WELL
- TEMPORARY WELL (2011)
- TEMPORARY WELL (2013)
- TEMPORARY WELL (2017)
- SOIL BORING (2019)

NOTES

1.) CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER (ug/L).

2.) YELLOW HIGHLIGHTING INDICATES THE COMPOUND WAS REPORTED AT A CONCENTRATION ABOVE THE APPLICABLE STANDARD.

3.) BLUE SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE SHALLOW SURFICIAL SAND UNIT, TYPICALLY LESS THAN 15 FEET BELOW GROUND SURFACE (FT BGS).

4.) GREEN SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE BASE OF THE SURFICIAL SAND UNIT OR THE TRANSITION ZONE, TYPICALLY GREATER THAN 15 FT BGS.

REFERENCES

1.) BASE MAP TAKEN FROM DIGITAL CAD FILE SITEMAP.DWG, DRAWING NUMBER 93002-SITEMAP/2 ENTITLED "SITE MAP," DATED MAY 9, 2005, PROVIDED BY GROUNDWATER SCIENCES CORPORATION.

2.) PROPERTY LINE DIGITIZED FROM A HARD COPY FIGURE ENTITLED "ENVIRONMENTAL PARCELS," DATED DECEMBER 12, 2006, FIGURE 2, PREPARED BY DIVNEY TUNG SCHWALBE.

3.) INACTIVE SUBSURFACE IW SEWER LINES AND INACTIVE "SPARE" IW SEWER LINE TAKEN FROM DIGITAL FILE 3002-108-I3.DWG, ENTITLED "LOCATION MAP," DATED MARCH 5, 2009, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

4.) FORMER 2,000 GALLON WASTE OIL UST DIGITIZED FROM A HARDCOPY FILE ENTITLED "FORMER WASTE OIL UST SWMU," DATED FEBRUARY 26, 1997, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

5.) SWMU M SOIL BORINGS, MIP LOCATIONS AND TEMPORARY WELLS SURVEYED BY BRINNIER LARIOS, P.C. ON OCTOBER 2, 2017.

6.) 2019 SOIL BORING LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE ONLY.

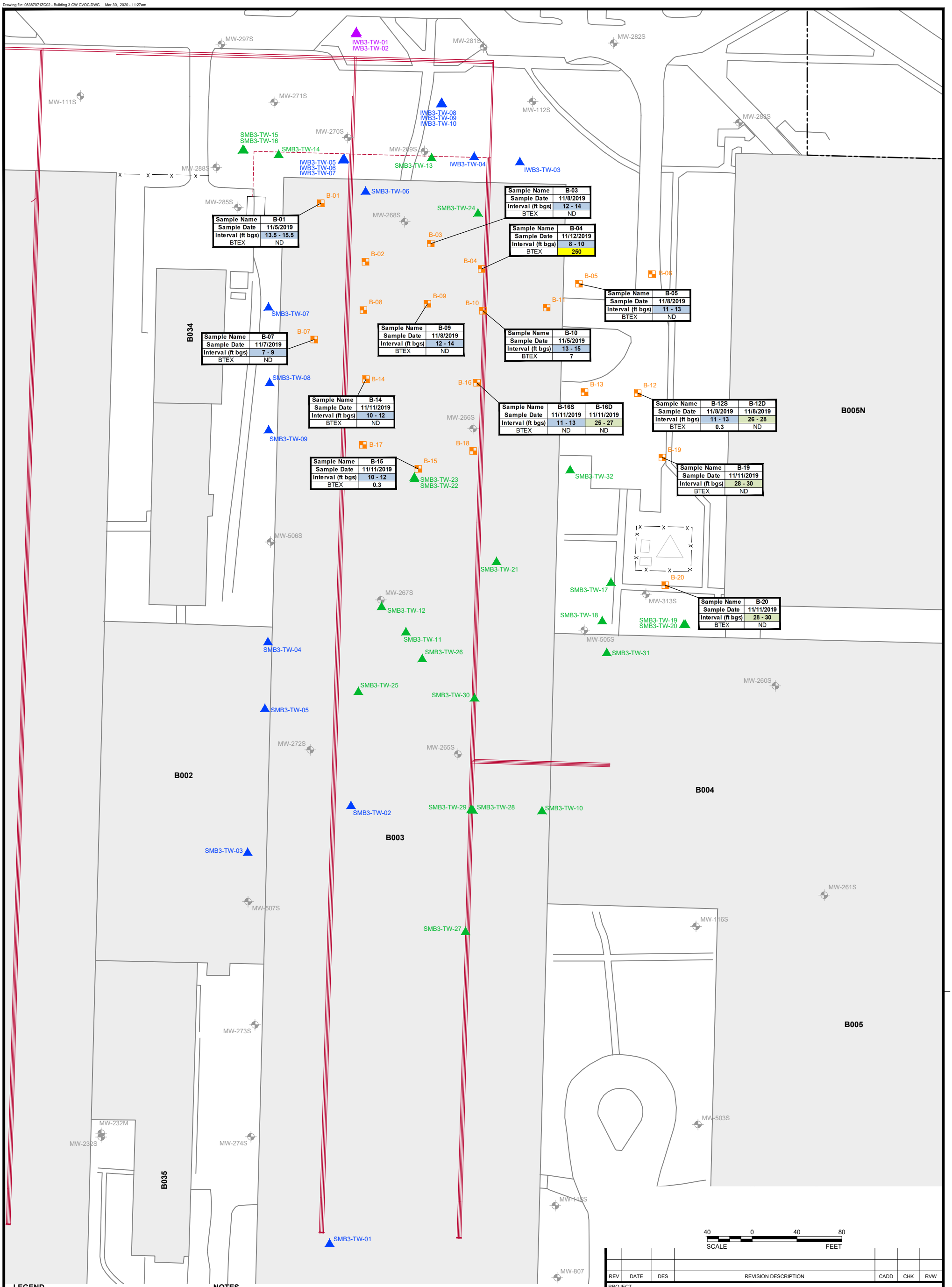
NJ Authorization #24GA28029100

GOLDER

PROJECT No.		083-87071	FILE No.		08387071ZC02A
DESIGN	HE	03/30/20	SCALE	AS SHOWN	REV. 0
CADD	RG	03/30/20			
CHECK	HE	03/30/20			
REVIEW	CH	03/30/20			

FIGURE 4A

Drawing file: 08387071ZC02 - Building 3 GW CVOC.DWG Mar 30, 2020 - 11:27am



Sample Name	B-01
Sample Date	11/5/2019
Interval (ft bgs)	13.5 - 15.5
BTEX	ND

Sample Name	B-03
Sample Date	11/8/2019
Interval (ft bgs)	12 - 14
BTEX	ND

Sample Name	B-04
Sample Date	11/12/2019
Interval (ft bgs)	8 - 10
BTEX	250

Sample Name	B-05
Sample Date	11/8/2019
Interval (ft bgs)	11 - 13
BTEX	ND

Sample Name	B-07
Sample Date	11/7/2019
Interval (ft bgs)	7 - 9
BTEX	ND

Sample Name	B-09
Sample Date	11/8/2019
Interval (ft bgs)	12 - 14
BTEX	ND

Sample Name	B-10
Sample Date	11/5/2019
Interval (ft bgs)	13 - 15
BTEX	7

Sample Name	B-14
Sample Date	11/11/2019
Interval (ft bgs)	10 - 12
BTEX	ND

Sample Name	B-16S	B-16D
Sample Date	11/11/2019	11/11/2019
Interval (ft bgs)	11 - 13	25 - 27
BTEX	ND	ND

Sample Name	B-12S	B-12D
Sample Date	11/8/2019	11/8/2019
Interval (ft bgs)	11 - 13	26 - 28
BTEX	0.3	ND

Sample Name	B-15
Sample Date	11/11/2019
Interval (ft bgs)	10 - 12
BTEX	0.3

Sample Name	B-19
Sample Date	11/11/2019
Interval (ft bgs)	28 - 30
BTEX	ND

Sample Name	B-20
Sample Date	11/11/2019
Interval (ft bgs)	28 - 30
BTEX	ND

LEGEND

B003	BUILDING NUMBER
	INACTIVE SUBSURFACE IW SEWER LINES
	INACTIVE "SPARE" IW SEWER LINE
	EXISTING MONITORING WELL
	TEMPORARY WELL (2011)
	TEMPORARY WELL (2013)
	TEMPORARY WELL (2017)
	SOIL BORING (2019)

NOTES

1.) CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER (ug/L).

2.) TOTAL BTEX COMPOUNDS INCLUDE BENZENE, ETHYLBENZENE, TOLUENE, AND TOTAL XYLENES. YELLOW HIGHLIGHTING INDICATES THAT ONE OR MORE OF THESE COMPOUNDS WAS REPORTED AT A CONCENTRATION ABOVE THE APPLICABLE STANDARD(S).

3.) BLUE SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE SHALLOW SURFICIAL SAND UNIT, TYPICALLY LESS THAN 15 FEET BELOW GROUND SURFACE (FT BGS).

4.) GREEN SHADING INDICATES THAT THE SAMPLE WAS COLLECTED FROM THE BASE OF THE SURFICIAL SAND UNIT OR THE TRANSITION ZONE, TYPICALLY GREATER THAN 15 FT BGS.

REFERENCES

1.) BASE MAP TAKEN FROM DIGITAL CAD FILE SITEMAP.DWG, DRAWING NUMBER 93002-SITEMAP/2 ENTITLED "SITE MAP," DATED MAY 9, 2005, PROVIDED BY GROUNDWATER SCIENCES CORPORATION.

2.) PROPERTY LINE DIGITIZED FROM A HARD COPY FIGURE ENTITLED "ENVIRONMENTAL PARCELS," DATED DECEMBER 12, 2006, FIGURE 2, PREPARED BY DIVNEY TUNG SCHWALBE.

3.) INACTIVE SUBSURFACE IW SEWER LINES AND INACTIVE "SPARE" IW SEWER LINE TAKEN FROM DIGITAL FILE 3002-108-I3.DWG, ENTITLED "LOCATION MAP," DATED MARCH 5, 2009, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

4.) FORMER 2,000 GALLON WASTE OIL UST DIGITIZED FROM A HARDCOPY FILE ENTITLED "FORMER WASTE OIL UST SWMU," DATED FEBRUARY 26, 1997, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

5.) SWMU M SOIL BORINGS, MIP LOCATIONS AND TEMPORARY WELLS SURVEYED BY BRINNIER LARIOS, P.C. ON OCTOBER 2, 2017.

6.) 2019 SOIL BORING LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE ONLY.

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FORMER IBM FACILITY
KINGSTON, NEW YORK

TITLE

B003 GROUNDWATER RESULTS SUMMARY MAP - TOTAL BTEX RESULTS

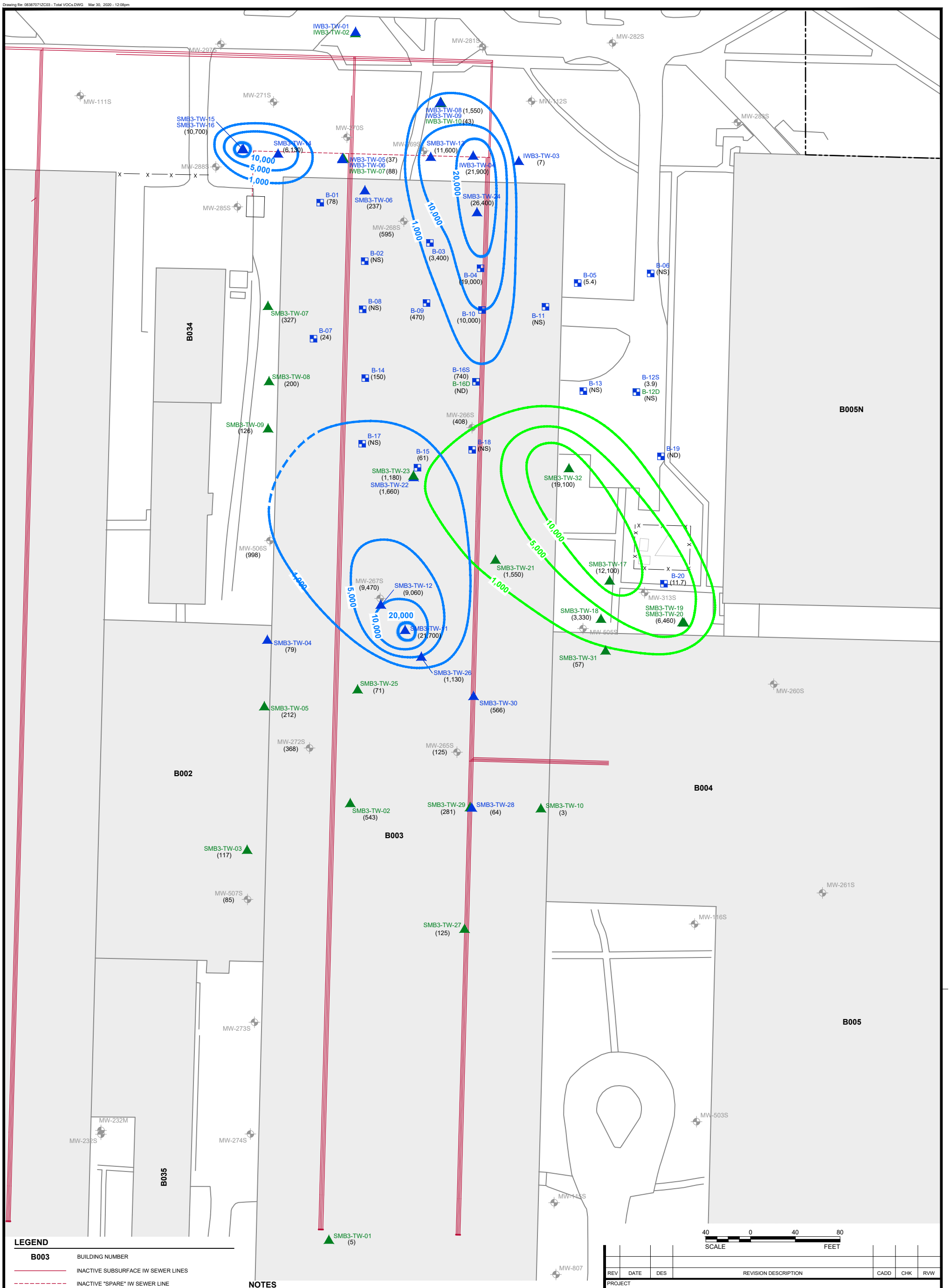
NJ Authorization #24GA28029100

GOLDER

PROJECT No.		083-87071	FILE No.		08387071ZC02A
DESIGN	HE	03/30/20	SCALE	AS SHOWN	REV. 0
CADD	RG	03/30/20			
CHECK	HE	03/30/20			
REVIEW	CH	03/30/20			

FIGURE 4B

Drawing file: 08387071ZC03 - Total VOCs.DWG Mar 30, 2020 - 12:08pm



LEGEND

B003	BUILDING NUMBER
	INACTIVE SUBSURFACE IW SEWER LINES
	INACTIVE "SPARE" IW SEWER LINE
	EXISTING MONITORING WELL
	SHALLOW TEMPORARY WELL
	DEEP TEMPORARY WELL
	2019 SHALLOW SOIL AND GROUNDWATER INVESTIGATION LOCATIONS
	2019 DEEP SOIL AND GROUNDWATER INVESTIGATION LOCATIONS
500	TOTAL VOCs SHALLOW GROUNDWATER ISOCONTOURS
500	TOTAL VOCs DEEP GROUNDWATER ISOCONTOURS
(5)	TOTAL VOCs (ug/L)
(ND)	NON-DETECTION
(NS)	NOT SAMPLED

NOTES

1.) CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER (ug/L).

2.) VOC ISOCONTOURS INTERPRETED BASED UPON HISTORICAL AND RECENT INVESTIGATION RESULTS.

3.) THE RESULTS AT B-20 WERE NOT USED TO DEVELOP ISOCONCENTRATION CONTOURS DUE TO THE GREATER RELATIVE DEPTH OF THE SAMPLE COMPARED TO OTHER NEARBY SAMPLE RESULTS.

REFERENCES

1.) BASE MAP TAKEN FROM DIGITAL CAD FILE SITEMAP.DWG, DRAWING NUMBER 93002-SITEMAP/2 ENTITLED "SITE MAP," DATED MAY 9, 2005, PROVIDED BY GROUNDWATER SCIENCES CORPORATION.

2.) PROPERTY LINE DIGITIZED FROM A HARD COPY FIGURE ENTITLED "ENVIRONMENTAL PARCELS," DATED DECEMBER 12, 2006, FIGURE 2, PREPARED BY DIVNEY TUNG SCHWALBE.

3.) INACTIVE SUBSURFACE IW SEWER LINES AND INACTIVE "SPARE" IW SEWER LINE TAKEN FROM DIGITAL FILE 3002-108-I3.DWG, ENTITLED "LOCATION MAP," DATED MARCH 5, 2009, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

4.) FORMER 2,000 GALLON WASTE OIL UST DIGITIZED FROM A HARDCOPY FILE ENTITLED "FORMER WASTE OIL UST SWMU," DATED FEBRUARY 26, 1997, PREPARED BY GROUNDWATER SCIENCES CORPORATION.

5.) SWMU M SOIL BORINGS, MIP LOCATIONS AND TEMPORARY WELLS SURVEYED BY BRINNIER LARIOS, P.C. ON OCTOBER 2, 2017.

6.) 2019 SOIL AND GROUNDWATER INVESTIGATION LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE ONLY.

40 0 40 80
SCALE FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

FORMER IBM FACILITY
KINGSTON, NEW YORK

TITLE

B003 GROUNDWATER RESULTS SUMMARY MAP - TOTAL VOC RESULTS

NJ Authorization #24GA28029100
GOLDER

PROJECT No.		083-87071	FILE No.		08387071ZC03
DESIGN	HE	03/30/20	SCALE	AS SHOWN	REV. 0
CADD	RG	03/30/20			
CHECK	HE	03/30/20			
REVIEW	CH	03/30/20			

FIGURE 5

APPENDIX A

Soil Boring Logs

RECORD OF BOREHOLE: B-1

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 04, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149677° Long: -77.772961°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	(SP) SAND medium to fine, brown (FILL)		0.0		Macro-core	80					
5	(SP) SAND medium to fine; brown (FILL)	SW	5.0		Macro-core	80					
10	(SP) SAND medium to fine, wet; gray to brown		10.0		Macro-core	80					
15	(CL) CLAY wet, brown to gray	CL	15.0		Macro-core	80			B-1 (13.5-15.5) GW		
15	(SP-SM) SILTY SAND medium to fine sand with silt, moist, brown to gray	SW-SM	15.5								
20	(SP) SAND medium to fine, moist, brown to gray	SW	20.0		Macro-core	80					
25	(CH) CLAY wet, gray	CH	24.5								
	End of hole at 25.0 ft.										

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100
SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 04, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-2

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 04, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149533° Long: -77.772846°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE (Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop)	REC %	BLOWS	N-VALUE	WATER CONTENT PERCENT (H Plastic & Liquid Limits (%); O Water Content (%); NP Nonplastic)	SHEAR STRENGTH (X Nat Vane; ⊗ Rem Vane; ■ Pocket Pen; ○ Q; ○ U)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
1			(SP) SAND medium to fine, brown, dry (FILL)			0.0		Macro-core	50							
5			(SP) SAND medium to fine, brown, dry (FILL)	SW		5.0		Macro-core	50							
8			(SP) SAND medium to fine, moist, brown			8.0		Macro-core	50							
10			(SP) SAND medium to fine, moist, brown			10.0		Macro-core	80							
12			(CL) CLAY gray, wet			12.0										
13			(SP) SAND medium to fine, gray to brown, wet	SW		12.2		Macro-core	80							
20			(SP) SAND medium to fine, gray, wet			20.0		Macro-core	80							
25			(CH) CLAY gray, varved, wet	CH		24.5										
			End of hole at 25.0 ft.													

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 04, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-3

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 07, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149612° Long: -77.772703°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CONCRETE		0.0								
1	(SP) SAND medium to fine, dry, brown	SW	0.3		Macro-core	76					
5	(SP) SAND medium to fine, moist, brown		5.0		Macro-core	86					
7	(SM) SILTY SAND brown to gray, wet	SM	7.2								
8	(SP) SAND fine, gray, wet	SW	8.2								
9	(SP) SAND fine, wet, brown										
10	(SP) SAND fine, gray to brown, moist		8.9		Macro-core	80			B-3 (12-14) GW		
11	(CL) CLAY gray, wet		10.0								
12	(SP-SM) SILTY SAND fine sand and silts, brown, moist		11.1								
13	(SP-SM) SILTY SAND fine sand and silt, gray, wet		11.4								
15	(SP-SM) SILTY SAND gray, wet	SM	12.0		Macro-core	94					
17			15.0		Macro-core	70					
27	(ML) CLAYEY SILT gray, wet	ML	27.0		Macro-core	76					
30	End of hole at 30.0 ft.										

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 07, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-4

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 04, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149542° Long: -77.772525°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	SAMPLES: TYPE (Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop)	SAMPLES: REC %	SAMPLES: BLOWS	SAMPLES: N-VALUE	WATER CONTENT PERCENT (H Plastic & Liquid Limits (%); ○ Water Content (%); NP Nonplastic)	SHEAR STRENGTH (X Nat Vane; ⊗ Rem Vane; ■ Pocket Pen; ○ U)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0			(SP) SAND medium to fine, dry, brown	SW		0.0		Macro-core	60							
5								Macro-core	60							
7			(SP) SAND fine, gray, moist			6.5										
10			(OL) SILT gray, moist	OL		10.0		Macro-core	90					B-4 (8-10) Soil, GW, and SOD GW B-4 (9-10) SOD Soil		
13			(CL) CLAY gray, wet	CL		13.5										
15								Macro-core	80					B-4 (15-17) SOD Soil and SOD GW B-4 (15-18) Soil		
18			(SP) SAND fine, gray to brown, moist	SW		17.5										
20			(ML) CLAYEY SILT gray, wet	ML		20.0		Macro-core	80							
25			End of hole at 25.0 ft.													

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 04, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-5

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 08, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149533° Long: -77.772276°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	TOPSOIL brown, dry		0.0								
1	(SP) SAND medium to fine, brown, dry	SW	0.6		Macro-core	70					
2	(SP) SAND black, medium to fine sand, dry										
3	(SP-SM) SILTY SAND medium to fine, brown, moist	SW-SM	1.8								
4			2.0								
5	(CL) CLAY PLUG gray brown, moist	CL									
6	(SP-SM) SILTY SAND fine, gray and brown, moist	SW-SM	5.0		Macro-core	94					
7			5.6								
8											
9											
10	(CL) CLAY gray brown, moist	CL	9.5								
11	(OL) SILT gray brown, wet	OL									
12	(ML) CLAYEY SILT gray, very wet	ML	10.2		Macro-core	64			B-5 (11-13) GW		
13	(SM) SILTY SAND fine, gray, wet	SW	11.0								
14			12.3								
15											
16					Macro-core	62					
17											
18											
19											
20											
21	(MH) CLAYEY SILT gray, very wet	MH	20.5		Macro-core	80					
22											
23											
24											
25											
26					Macro-core	100					
27											
28											
29											
30	End of hole at 30.0 ft.										
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100
SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100
SAMPLES: Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 08, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-6

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 05, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE
0	ASPHALT		0.0					
0	(SP) SAND medium to fine, brown, dry							
0	(SM) SILTY SAND fine, brown gray, moist	SM	0.5		Macro-core	70		
1			1.0					
6	(CL) CLAY gray brown, wet	CL	6.3		Macro-core	66		
7	(SP) SAND medium to fine, brown gray, moist	SW	6.7					
11	(MH) CLAYEY SILT brown, moist	MH	11.4		Macro-core	82		
12	(SP) SAND fine, gray, wet	SW	12.0					
12	(ML) CLAYEY SILT gray, wet	ML	13.0		Macro-core	84		
19	(SP) SAND fine, gray, wet	SW	20.0		Macro-core	90		
20	(ML) CLAYEY SILT gray, wet	ML	21.7		Macro-core	100		
28	(SP-SM) SILTY SAND fine, gray, wet	SW-SM	29.0					
29	End of hole at 30.0 ft.							

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

ADDITIONAL LAB TESTING

GROUNDWATER OBSERVATIONS

ADDITIONAL OBSERVATIONS

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 05, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-7

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 07, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149454° Long: -77.772955°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CONCRETE		0.0								
1–4	(SP) SAND medium to fine, brown, dry	SW	0.4		Macro-core	90					
5–7	(SP) SAND fine, gray, moist		5.0		Macro-core	70					
7–10	(CL) CLAY gray brown, wet	CL	7.5						B-7 (7-9) GW		
10–12	(SP-SM) SILTY SAND fine, gray brown, wet	SW-SM	10.4		Macro-core	66					
12–15	(ML) CLAYEY SILT gray, very wet	ML	12.9								
15	(OL) SILT gray, wet	OL	15.0		Macro-core	84					
15–18	(ML) CLAYEY SILT gray, very wet	ML	15.9								
18–21	(SP) SAND fine, gray, wet	SW	18.0								
21–25	(OL) SILT gray, moist	OL	21.5		Macro-core	94					
25–26	(SP) SAND fine, gray, moist	SW	25.0								
26–30	(ML) CLAYEY SILT gray, very wet	ML	26.6		Macro-core	80					
30	End of hole at 30.0 ft.										

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 07, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-8

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 07, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149413° Long: -77.772851°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE
0	CONCRETE		0.0					
1	(SP) SAND fine, brown, dry		0.5		Macro-core	84		
5	(SP) SAND fine, brown, moist	SW	5.0		Macro-core	82		
8	(CL) CLAY gray brown, wet		7.6					
9	(SP) SAND fine, gray brown, moist	SW	7.8					
11	(SP-SM) SILTY SAND fine, gray brown, moist	SW-SM	11.0		Macro-core	86		
12	(SP-SM) SILTY SAND fine, gray, wet		12.3					
15	(ML) CLAYEY SILT gray, very wet	ML	15.0		Macro-core	100		
18	(OL) SILT gray, moist	OL	17.5					
19	(SP) SAND fine, brown gray, moist	SW	18.0					
22	(OL) SILT gray, moist	OL	22.0		Macro-core	60		
25					Macro-core	100		
28	(ML) CLAYEY SILT gray, very wet	ML	28.0					
30	End of hole at 30.0 ft.							

Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U

ADDITIONAL LAB TESTING

GROUNDWATER OBSERVATIONS

ADDITIONAL OBSERVATIONS

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 07, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-9

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 04, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149465° Long: -77.772688°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	NUMBER	TYPE	REC %	BLOWS	N-VALUE
0	(SP) SAND medium to fine, brown, dry		0.0		Macro-core	50		
5	(SP) SAND medium to fine, brown, moist	SW	5.0		Macro-core	50		
7.5	(SP) SAND medium to fine, gray, moist	SW	7.5		Macro-core	50		
10	(CL) CLAY gray, moist	CL	10.0		Macro-core	60		
11.2	(SP-SM) SILTY SAND fine sand and silt, gray, moist	SW SM	11.2		Macro-core	60		
12	(SP) SAND fine, brown, moist	SW	12.0		Macro-core	60		
15	(CL) SILTY CLAY gray, moist	CL	15.0		Macro-core	80		
16	(CL) SAND fine, gray, moist	SW	16.0		Macro-core	80		
20	(ML) CLAYEY SILT gray, wet	ML	20.0		Macro-core	80		
25	End of hole at 25.0 ft.							

SAMPLES — Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

WATER CONTENT PERCENT — Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH — Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

ADDITIONAL LAB TESTING

GROUNDWATER OBSERVATIONS

ADDITIONAL OBSERVATIONS

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 04, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-10

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 04, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149413° Long: -77.772530°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	SAMPLES: TYPE (Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop)	SAMPLES: REC %	SAMPLES: BLOWS	SAMPLES: N-VALUE	WATER CONTENT PERCENT (H Plastic & Liquid Limits (%); ○ Water Content (%); NP Nonplastic)	SHEAR STRENGTH (X Nat Vane; ⊗ Rem Vane; ■ Pocket Pen; ○ Q; ○ U)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
1–8			(SP) SAND medium to fine, brown to gray, dry	SW		0.0		Macro-core	30							
8–10			(SP-SM) SILTY SAND fine sand and silt, gray, moist	SW-SM		8.5		Macro-core	70					B-10 (7-8) Soil		
10–13			(CL) CLAY wet, gray, wet	CL		10.0		Macro-core	80							
13–20			(SP) SAND fine, gray, wet	SW		13.5		Macro-core	50					B-10 (13-15) GW		
20–25			(ML) CLAYEY SILT gray, very wet	ML		20.0		Macro-core	50							
25–50			End of hole at 25.0 ft.													

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 04, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-11

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 06, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149414° Long: -77.772414°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE (Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop)	REC %	BLOWS	N-VALUE	WATER CONTENT PERCENT (H Plastic & Liquid Limits (%); ○ Water Content (%); NP Nonplastic)	SHEAR STRENGTH (X Nat Vane; ⊗ Rem Vane; ■ Pocket Pen; ○ U)	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0			CONCRETE			0.0										
1–5			(SP) SAND medium to fine, grown, moist	SW		0.8		Macro-core	86							
6–11			(SP-SM) SILTY SAND fine sand with silt, gray brown, moist	SW-SM		5.8		Macro-core	35							
12			(CL) CLAY gray, wet			12.0		Macro-core	86							
13–21			(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM		12.3		Macro-core	96							
21–24								Macro-core	96							
25			End of hole at 25.0 ft.													

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 06, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-12

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 08, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149246° Long: -77.772255°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CONCRETE		0.0								
1	(SP) SAND medium to fine, brown, dry	SW	0.8		Macro-core	60					
5	(SP-SM) SILTY SAND fine sand with silt, brown, wet	SW-SM	5.0		Macro-core	60					
7	(SP-SM) SILTY SAND fine sand with silt, gray, moist	SW-SM	6.8								
9	(OL) SILT gray, wet	OL	8.5								
11	(SP) SAND fine, brown, wet	SW	11.0		Macro-core	86			B-12 (11-13) GW		
12	(SP-SM) SILTY SAND fine sand with silt, gray, moist	SW-SM	12.6								
17	(ML) CLAYEY SILT gray, very wet	ML	17.0		Macro-core	88					
21					Macro-core	92					
26	(OL) SILT gray, moist	OL	26.0		Macro-core	78			B-12 (26-28) GW		
30	End of hole at 30.0 ft.										

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 08, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-13

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 05, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149216° Long: -77.772116°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE
0	(SP-SM) SILTY SAND fine sand with silt, brown gray, dry	SW-SM	0.0		Macro-core	70		
2	(ML) CLAYEY SILT, gray, hard, dry	ML	2.3					
5	(SP-SM) SILTY SAND fine sand with silt, gray, moist	SW-SM	5.0		Macro-core	72		
6	(ML) CLAYEY SILT black, moist	ML	6.1					
7	(SP) SAND fine, gray, moist	SW						
8	(OL) SILT black, moist	OL	6.9					
9			7.9					
10	(SP) SAND fine, gray brown, moist	SW	10.0		Macro-core	86		
17	(ML) CLAYEY SILT gray, moist to very wet	ML	17.0		Macro-core	82		
20					Macro-core	90		
25					Macro-core	90		
30	End of hole at 30.0 ft.							

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

ADDITIONAL LAB TESTING

GROUNDWATER OBSERVATIONS

ADDITIONAL OBSERVATIONS

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 05, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-14

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 06, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149254° Long: -77.772849°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CONCRETE		0.0								
1	(SP) SAND fine, brown, dry	SW	0.5		Macro-core	84					
5	(SP-SM) SILTY SAND fine sand with silt, brown, moist	SW-SM	5.0		Macro-core	100					
12	(CL) CLAY gray brown, wet	SW-SM	12.0		Macro-core	90			B-14 (10-12) Soil and GW		
13	(SP-SM) SILTY SAND fine sand with silt, brown, wet		12.3								
14	(CL) CLAY gray brown, wet										
15	(CL) CLAYEY SILT gray, very wet	ML	13.8								
16	(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM	14.1		Macro-core	80					
18	(ML) CLAYEY SILT gray, wet	ML	16.2								
19	(OL) SILT gray, moist	OL	18.1								
20			20.0		Macro-core	86					
24	(ML) CLAYEY SILT gray, wet	ML	23.9								
25	(OL) SILT gray, moist	OL	25.0		Macro-core	96					
28	(ML) CLAYEY SILT gray, wet	ML	27.7								
30	End of hole at 30.0 ft.										

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 06, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-15

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 06, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149200° Long: -77.772698°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	WATER CONTENT PERCENT	SHEAR STRENGTH	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0			CONCRETE			0.0										
1–5			(SP-SM) SILTY SAND fine sand with silt, brown, dry	SW-SM		0.5		Macro-core	30							
6–7			(CL) CLAY gray brown, wet	CL		6.0										
7–10			(SP-SM) SILTY SAND fine sand with silt, gray brown, wet	SW-SM		7.2		Macro-core	54							
10–14								Macro-core	100					B-15 (10-12) GW B-15 (12-14) GW		
14			(CL) CLAY gray, wet	SC WL		14.1										
15			(SP) SAND fine, gray, wet													
15–17			(ML) CLAYEY SILT gray, wet	ML		14.6 15.0		Macro-core	80							
18–19			(OL) SILT gray, moist	OL		18.3										
20–25			(ML) CLAYEY SILT gray, wet to very wet	ML		20.0		Macro-core	80							
25–29								Macro-core	90							
30			End of hole at 30.0 ft.													

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 06, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-16

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 06, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149238° Long: -77.772535°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CONCRETE		0.0								
1–4	(SP) SAND fine, brown, dry	SW	0.4		Macro-core	68					
5–6	(SP-SM) SILTY SAND fine sand with silt, brown, moist	SW-SM	5.0								
6–7	(CL) CLAY brown, wet		6.1								
7–11	(SP-SM) SILTY SAND fine sand with silt, gray brown, moist	SW-SM	6.3		Macro-core	82					
11–13	(ML) CLAYEY SILT gray, wet	ML	12.5		Macro-core	94			B-16 (11-13) GW		
13–18	(SP) SAND fine, gray, wet	SW	14.1		Macro-core	90					
18–25	(ML) CLAYEY SILT gray, wet to very wet	ML	18.5		Macro-core	100					
25	(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM	25.0								
26–27	(ML) CLAYEY SILT gray, wet to very wet	ML	26.2		Macro-core	94			B-16 (25-27) GW		
27–30	(OL) SILT gray, moist	OL	27.5								
30	End of hole at 30.0 ft.										

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 06, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-17

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 06, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.152886° Long: -75.046862°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CONCRETE		0.0								
1	(SP) SAND fine, brown, dry		0.7		Macro-core	80					
4	(SP-SM) SILTY SAND fine sand with silt, brown, moist	SW-SM	3.8								
6	(CL) CLAY brown, wet	CL	6.0		Macro-core	80					
7	(SP-SM) SILTY SAND fine sand with silt, brown, wet	SW-SM	6.5								
12	(OL) SILT gray, wet to very wet	OL	11.6		Macro-core	80					
13	(SP) SAND fine, gray, wet	SW	13.0		Macro-core	80					
22					Macro-core	100			B-17 922-23) Soil		
25	(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM	25.0								
27	(ML) CLAYEY SILT gray, wet to very wet	ML	27.5		Macro-core	100					
30	End of hole at 30.0 ft.										

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

DRILL RIG:
DRILL METHOD:

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 06, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-18

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 06, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149182° Long: -77.772542°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DESCRIPTION	USCS	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES REC %	SAMPLES BLOWS	SAMPLES N-VALUE	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0	CONCRETE		0.0								
1	(SP) SAND fine to medium, brown, dry		0.6		Macro-core	70					
4	(SP-SM) SILTY SAND fine sand with silt, brown, moist	SW-SM	3.5								
6	(OL) SILT gray brown, dry	OL	6.2		Macro-core	94					
8	(SP-SM) SILTY SAND fine sand with silt, gray, moist	SW-SM	7.8						B-18 (7.5-8.5) Soil		
11	(OL) SILT gray, moist	OL	11.3		Macro-core	84					
12	(ML) CLAYEY SILT gray, wet to very wet	ML	12.1								
13	(SP-SM) SILTY SAND fine sand with silt, gray, moist	SW-SM	13.0								
16	(OL) SILT gray, moist	OL	16.5		Macro-core	60					
17	(ML) CLAYEY SILT gray, wet to very wet	ML	17.5		Macro-core	100					
21					Macro-core	100					
30	End of hole at 30.0 ft.										

DEPTH SCALE: 1:263

REV:

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 06, 2019
DATE: Mar 30, 2020

RECORD OF BOREHOLE: B-19

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 07, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.149079° Long: -77.772128°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	WATER CONTENT PERCENT	SHEAR STRENGTH	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0			TOPSOIL			0.0										
1–4			(SP) SAND medium to fine, brown, moist	SW		0.8		Macro-core	70							
5–9			(SP) SAND fine, gray, wet	SW		5.0		Macro-core	76							
10			(CL) CLAY gray, wet			10.2										
11–12			(SP) SAND fine, gray, wet	SW		10.5		Macro-core	76							
13			(CL) CLAY gray, wet			13.2										
14–17			(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM		13.5		Macro-core	80							
18			(ML) CLAYEY SILT gray, wet to very wet	ML		17.5										
19			(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM		18.5										
20–21			(OL) SILT gray, wet	OL		20.0		Macro-core	90							
22			(ML) CLAYEY SILT gray, wet to very wet	ML		23.0										
23–25			(OL) SILT gray, moist	OL		24.0										
26			(ML) CLAYEY SILT gray, wet to very wet	ML		25.8										
27–29			(OL) SILT gray, wet	OL		26.4		Macro-core	70					B-19 (28-30) GW		
30			End of hole at 30.0 ft.													

Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U; 0 20 40 60 80 100

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 07, 2019
DATE: Mar 30, 2020

REV:

RECORD OF BOREHOLE: B-20

CLIENT: IBM
PROJECT: IBM Kingston
PROJECT NO: 083-87071.08
LOCATION: Kingston, NY

DATE: November 06, 2019
CONTRACTOR: EPI

GROUND ELEV: Data Not Available
COORDINATES: Lat: 3.148795° Long: -77.772096°
COORD SYS: UTM zone 18N
HORZ DATUM: NAD83 VERT DATUM: NAVD88

DEPTH (ft)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	WATER CONTENT PERCENT	SHEAR STRENGTH	ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
0			TOPSOIL			0.0										
			CONCRETE													
1–5			(SP) SAND medium to fine, brown, dry	SW		0.6 0.8		Macro-core	34							
6–12			(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM		5.3		Macro-core	46							
13–27			(ML) CLAYEY SILT gray, wet to very wet	ML		13.0		Macro-core	80							
								Macro-core	90							
								Macro-core	90							
								Macro-core	90							
28–29			(SP-SM) SILTY SAND fine sand with silt, gray, wet	SW-SM		27.5								B-20 (27-28) Soil		
30			End of hole at 30.0 ft.											B-20 (28-30) Soil and GW		

Hammer: ASTM D1586, Blows per 6 in 140-lb hammer, 30-in drop

WATER CONTENT PERCENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic

SHEAR STRENGTH: Nat Vane; Rem Vane; Pocket Pen; Q; U

DEPTH SCALE: 1:263

GOLDER

LOGGED: DVella
CHECKED: H. Elkinton

DATE: Nov 06, 2019
DATE: Mar 30, 2020

REV:

APPENDIX B

Soil and Groundwater Sampling Information

LOW FLOW GROUNDWATER PURGE/SAMPLE FIELD INFORMATION FORM

GOLDER

Site: IBM Kingston
Location: Kingston, NY
Project Number: 083-87071
MONITORING WELL ID: N/A
Depth to Water Prior to Purging [ft-bmp]: N/A
Well Casing Diameter [in]:
Start Time (purging): See Below
Purging Device: Peristaltic Pump + TeFlon-lined tubing
Pump intake setting: See Below
Well Screen Interval: See Below
As-Built Construction Well Depth [ft-bmp]: N/A
Sounded Well Depth [ft-bmp]: N/A

Meter/Type/Serial #: YSI Pro DDS
Meter Calibrated @: Please See Calibration Sheets
pH Calibration Check Measurment/Time*: Please See Calibration Sheets
Sampling Date/Time: See Below
Sampler(s): D Vella
Sampling Device: Peristaltic Pump + TeFlon-lined tubing
Sampling Purge Rate: N/A
Sample Characteristics: Clear to cloudy gray or brown, No odor to some odor
PID Measurement of Well Headspace (ppm): N/A
Analytical Parameters: VOC, SVOC, Total Mn-Fe, Nitrate, Phosphate, Ammonia, Total Sulfide, Sulfate, Chloride, Nitrate, Total Alkalinity, TOC, Methane, Ethane, Ethene

Weather Conditions: 20°F - 40°F Mostly Snow to Rain/Snow mix
Fe+2 result (field measurement):

~~Time~~ Location [hh:mm]	Temperature [°C]	pH [std]	Specific Conductance [S/m] or [mS/cm]	Turbidity [ntu]	Dissolved Oxygen [mg/l]	Redox Potential Note - Indicate if (+) or (-) [mV]	Depth To Water [ft-bmp]	Volume Purged gallons [liters]	~~Approximate Purge Rate~~ Fe^{+2} [ml/min]	Observations (PID readings, sample characteristics, equipment problems, etc.) Interval (Ft bgs)	Date/Time
B1	17.1	6.53	3.584	144.01	2.96	112.3		~1	0	13.5 - 15.5	11/5/2019 @0940
B10	15.9	6.74	4.177	407.59	2.93	-2.5		0.25	0	13-15	11/5/2019 @1225
B7	14.6	7.92	2.801	404.49	6.63	11.3		0.25	0	7-9	11/7/2019 @1225
B12	10.1	6.99	6.420	55.29	3.70	-142.1		0.25	0	11-13	11/8/2019 @0955
B12	10.2	6.93	6.462	892.78	2.98	-140.8		3	0	26-28	11/8/2019 @1040
B5	10.1	7.45	4.688	225.13	6.67	-107.3		0.75	0	11-13	11/8/2019 @1200
B9	13.3	6.71	5.770	1602.19	2.54	-17.4		0.75	0	12-14	11/8/2019 @1340
B3	14.5	6.45	5.680	1204.11	2.61	-12.2		0.25	0	12-14	11/8/2019 @1410
B14	17.2	6.77	3.394	631.07	8.85	-33.7		0.25	0	10-12	11/11/2019 @1023
B15	16.7	6.43	2.013	357.96	7.01	56.5		0.25	0	10-12	11/11/2019 @1100
B16	16.9	7.94	5.240	297.07	0.32	-140.0		0.5	0	25-27	11/11/2019 @1200
B16	19.0	7.00	3.586	167.28	3.71	-103.2		1	0	11-13	11/11/2019 @1240
B20	12.8	7.53	8.470	165.07	2.50	-132.4		2	0	28-30	11/11/2019 @1355
B19	13.1	7.69	7.950	111.27	1.88	-143.6		2	0	28-30	11/11/2019 @1530

Comments: * If the pH check differs by more than ± 0.2 S.U from the temperature adjusted pH buffer value, then the instrument will need to be recalibrated.

Signature:

NJ Cert: 03027

LOW FLOW GROUNDWATER PURGE/SAMPLE FIELD INFORMATION FORM

GOLDER

Site: IBM Kingston
Location: Kingston, NY
Project Number: 083-87071
MONITORING WELL ID: N/A
Depth to Water Prior to Purging [ft-bmp]: N/A
Well Casing Diameter [in]:
Start Time (purging): See Below
Purging Device: Peristaltic Pump + Teflon-lined tubing
Pump intake setting: See Below
Well Screen Interval: See Below
As-Built Construction Well Depth [ft-bmp]: N/A
Sounded Well Depth [ft-bmp]: N/A

Meter/Type/Serial #: YSI Pro DDS
Meter Calibrated @: Please See Calibration Sheets
pH Calibration Check Measurment/Time*: Please See Calibration Sheets
Sampling Date/Time: See Below
Sampler(s): DVella
Sampling Device: Peristaltic Pump + Teflon-lined tubing
Sampling Purge Rate: N/A
Sample Characteristics: Clear to cloudy grey or brown, No odor to Some odor
PID Measurement of Well Headspace (ppm): N/A
Analytical Parameters: VOC, SVOC, Total Mn+Fe, Nitrate, Phosphate, Ammonia, Total Sulfide, Sulfate, Chloride, Nitrate, Total Alkalinity, TOC, Methane, Ethane, Ethene

Weather Conditions:
Fe+2 result (field measurement):

~~Time~~ Location [hh:mm]	Temperature [°C]	pH [std]	Specific Conductance [S/m] or [mS/cm]	Turbidity [ntu]	Dissolved Oxygen [mg/l]	Redox Potential Note - Indicate if (+) or (-) [mV]	Depth To Water [ft-bmp]	Volume Purged gallons ~~[liters]~~	~~Approximate Purge Rate~~ Fe^{+2} ~~[ml/min]~~	Observations (PID readings, sample characteristics, equipment problems, etc.) Interval (Ft bgs)	Date
B4	6.2	7.46	5.120	2785.18	2.38	-104.5	1	1	0	15-17	11/12/2019 @ 0945
B4	6.0	7.27	9.350	66.41	026	-132.3	1	1	0	8-10	11/12/2019 @ 1145

Comments: * If the pH check differs by more than ± 0.2 S.U from the temperature adjusted pH buffer value, then the instrument will need to be recalibrated.

Signature:

NJ Cert: 03027

Version 1.0, June 2018

FIELD CALIBRATION LOG

GOLDER

Site: IBM Kingston
Location: Kingston, NY
Project #: 083-87071
Personnel: DVE/LG

Meter Model & Certification #: YSI ProDSS
Meter Serial #:
NIST Therm. Serial #: Correction Factor =
Date: 12/5/2019
Start Time: ~~0700~~ 0730

Parameter	Standard	Lot #	Exp. Date	Reading	Time	Adjusted To	Units	Comments
pH	pH 4.00	9GE1020	5/6/21		0733	4.00	S.U.	Temperature:
	pH 10.00	76L676	2/3/19		0736	10.00	S.U.	
	pH 7.00	8GB386	2/24/20	7.00	0738	Not Adjusted	S.U.	Temperature: Must meet ±0.1 S.U.
Conductivity	Air	NA	NA		0739	0.000	mS/cm	
	1.00 mS/cm	8GK310	11/30/19		0744	1.413	mS/cm	
	1.00 mS/cm(1)	8GK310	11/30/19	1.413	0745	Not Adjusted	mS/cm	Must meet 0.990 - 1.010 mS/cm
Turbidity	D.I.	NA	NA	0.00	0748	~~0.00~~	NTU	
	100 NTU	18570176	12/20/19		0750	100	NTU	
	100 NTU(2)	18570176	12/20/19	100	0750	Not Adjusted	NTU	Must meet 90-110 NTU
Dissolved Oxygen	Zero %	~~2018012998~~	12/6/19		0754	0.00	mg/L	
	D.I.	NA	NA	9.56	0756	~~9.56~~	mg/L	Temp.: 16.1
	Zero %	~~2018012998~~	12/6/19	0.00	0759	Not Adjusted	mg/L	Must meet ± 0.3 mg/L

pH Check(3)	Standard	Lot #	Exp. Date	Reading	Time	Temperature	Units	Comments
1	pH 7.00						S.U.	Must meet ±0.2 S.U.
2	pH 7.00						S.U.	Must meet ±0.2 S.U.
3	pH 7.00						S.U.	Must meet ±0.2 S.U.
4	pH 7.00						S.U.	Must meet ±0.2 S.U.

NJ Cert: 03027
Meter must be calibrated daily prior to initial use.

Notes:
(1) Result must be within ± 1% of standards nominal value, otherwise recalibrate. Percent recovery must be calculated and recorded, if using a calibration check other than 1.00 mS/cm.
(2) Must be within site range & 10% of standard's nominal value
(3) During use, meter must be checked against a standard pH 7.00 buffer every three hours.
If the pH differs by more than ± 0.2 S.U. from the standard buffer value, the meter must be recalibrated.

Signature:

FIELD CALIBRATION LOG

GOLDER

Site: IBM Kingston
Location: Kingston, NY
Project #: 08-87071
Personnel: DV

Meter Model & Certification #: YSI ProDSS
Meter Serial #:
NIST Therm. Serial #: Correction Factor =
Date: 11/7/2019
Start Time: 0745

Parameter	Standard	Lot #	Exp. Date	Reading	Time	Adjusted To	Units	Comments
pH	pH 4.00	9GE1020	5/6/21		0747	4.00	S.U.	Temperature:
	pH 10.00	7GLC70	12/3/19		0750	10.00	S.U.	
	pH 7.00	8GB386	2/29/20	7.01		Not Adjusted	S.U.	Temperature: Must meet ±0.1 S.U.
Conductivity	Air	NA	NA		0752	0.0000	mS/cm	
	1.00 mS/cm	8GB310	11/30/19		0753	1.413	mS/cm	
	1.00 mS/cm[1]	8GB310	11/30/19	1.413	0754	Not Adjusted	mS/cm	Must meet 0.990 - 1.010 mS/cm
Turbidity	D.I.	NA	NA	000	0757		NTU	
	100 NTU	16501176	12/6/19		0757	100	NTU	
	100 NTU[2]	16501176	12/6/19	100	0800	Not Adjusted	NTU	Must meet 90-110 NTU
Dissolved Oxygen	Zero %	20160012998	12/6/19		0803	0.00	mg/L	
	D.I.	NA	NA	9.92	0805		mg/L	Temp.: 13.7
	Zero %	20160012998	12/6/19	0.00	0808	Not Adjusted	mg/L	Must meet ± 0.3 mg/L

pH Check[3]	Standard	Lot #	Exp. Date	Reading	Time	Temperature	Units	Comments
1	pH 7.00						S.U.	Must meet ±0.2 S.U.
2	pH 7.00						S.U.	Must meet ±0.2 S.U.
3	pH 7.00						S.U.	Must meet ±0.2 S.U.
4	pH 7.00						S.U.	Must meet ±0.2 S.U.

NJ Cert: 03027
Meter must be calibrated daily prior to initial use.

Notes:
[1]Result must be within ± 1% of standards nominal value, otherwise recalibrate. Percent recovery must be calculated and recorded, if using a calibration check other than 1.00 mS/cm.
[2]Must be within site range & 10% of standard's nominal value
[3]During use, meter must be checked against a standard pH 7.00 buffer every three hours.
If the pH differs by more than ± 0.2 S.U. from the standard buffer value, the meter must be recalibrated.

Signature:

FIELD CALIBRATION LOG

GOLDER

Site: IBM Kingston
Location: Kingston, NY
Project #: 083-87071
Personnel: DV

Meter Model & Certification #: YSI Pro DDS
Meter Serial #:
NIST Therm. Serial #: Correction Factor =
Date: 11/8/2019
Start Time:

Parameter	Standard	Lot #	Exp. Date	Reading	Time	Adjusted To	Units	Comments
pH	pH 4.00	9GE1020	5/6/21		0728	4.00	S.U.	Temperature:
	pH 10.00	7GL620	12/3/19		0731	10.00	S.U.	
	pH 7.00	8GB386	2/29/20	7.00	0733	Not Adjusted	S.U.	Temperature: Must meet ±0.1 S.U.
Conductivity	Air	NA	NA		0734	0.000	mS/cm	
	1.00 mS/cm	8GK310	11/30/19		0738	1.413	mS/cm	
	1.00 mS/cm[1]	8GK310	11/30/19	1.413	0738	Not Adjusted	mS/cm	Must meet 0.990 - 1.010 mS/cm
Turbidity	D.I.	NA	NA	0.00	0746		NTU	
	100 NTU	18510176	12/2019		0742	100	NTU	
	100 NTU[2]	18510176	12/2019	100	0745	Not Adjusted	NTU	Must meet 90-110 NTU
Dissolved Oxygen	Zero %	20180129	12/6/19		0748	0.00	mg/L	
	D.I.	NA	NA	10.96	0750		mg/L	Temp.: 10.1
	Zero %	20180129	12/6/19	0.00	0754	Not Adjusted	mg/L	Must meet ± 0.3 mg/L

pH Check[3]	Standard	Lot #	Exp. Date	Reading	Time	Temperature	Units	Comments
1	pH 7.00						S.U.	Must meet ±0.2 S.U.
2	pH 7.00						S.U.	Must meet ±0.2 S.U.
3	pH 7.00						S.U.	Must meet ±0.2 S.U.
4	pH 7.00						S.U.	Must meet ±0.2 S.U.

NJ Cert: 03027
Meter must be calibrated daily prior to initial use.

Notes:
[1]Result must be within ± 1% of standards nominal value, otherwise recalibrate. Percent recovery must be calculated and recorded, if using a calibration check other than 1.00 mS/cm.
[2]Must be within site range & 10% of standard's nominal value
[3]During use, meter must be checked against a standard pH 7.00 buffer every three hours.
If the pH differs by more than ± 0.2 S.U. from the standard buffer value, the meter must be recalibrated.

Signature:

FIELD CALIBRATION LOG

GOLDER

Site: IBM Kingston
Location: Kingston, NY
Project #: 063-87071
Personnel: DJ

Meter Model & Certification #: YSI ProDSS
Meter Serial #:
NIST Therm. Serial #: Correction Factor =
Date: 11/11/2019
Start Time:

Parameter	Standard	Lot #	Exp. Date	Reading	Time	Adjusted To	Units	Comments
pH	pH 4.00	9GE1020	5/6/21	1	0709	4.00	S.U.	Temperature:
	pH 10.00	76L6700	12/3/19	1	0714	10.00	S.U.	
	pH 7.00	66B386	2/29/20	7.03	0717	Not Adjusted	S.U.	Temperature: Must meet ±0.1 S.U.
Conductivity	Air	NA	NA	1	0719	0.000	mS/cm	
	1.00 mS/cm	86K310	11/30/19	1	0720	1.413	mS/cm	
	1.00 mS/cm[1]	86K310	11/30/19	1.413	0720	Not Adjusted	mS/cm	Must meet 0.990 - 1.010 mS/cm
Turbidity	D.I.	NA	NA	0.00	0725	—	NTU	
	100 NTU	18510176	12/20/19	—	0728	100	NTU	
	100 NTU[2]	18510176	12/20/19	101	0728	Not Adjusted	NTU	Must meet 90-110 NTU
Dissolved Oxygen	Zero %	20B01245	12/6/19	—	0732	0.00	mg/L	
	D.I.	NA	NA	10.28	0735	—	mg/L	Temp.: 13.1
	Zero %	20B01245	12/6/19	0.00	0740	Not Adjusted	mg/L	Must meet ± 0.3 mg/L

pH Check[3]	Standard	Lot #	Exp. Date	Reading	Time	Temperature	Units	Comments
1	pH 7.00						S.U.	Must meet ±0.2 S.U.
2	pH 7.00						S.U.	Must meet ±0.2 S.U.
3	pH 7.00						S.U.	Must meet ±0.2 S.U.
4	pH 7.00						S.U.	Must meet ±0.2 S.U.

NJ Cert: 03027
Meter must be calibrated daily prior to initial use.

Notes:
[1]Result must be within ± 1% of standards nominal value, otherwise recalibrate. Percent recovery must be calculated and recorded, if using a calibration check other than 1.00 mS/cm.
[2]Must be within site range & 10% of standard's nominal value
[3]During use, meter must be checked against a standard pH 7.00 buffer every three hours.
If the pH differs by more than ± 0.2 S.U. from the standard buffer value, the meter must be recalibrated.

Signature:

FIELD CALIBRATION LOG

GOLDER

Site: IBM Kingston
Location: Kingston, NY
Project #: 083-87071
Personnel: D Villa

Meter Model & Certification #: YSI Pro DSS
Meter Serial #:
NIST Therm. Serial #: Correction Factor =
Date: 11/12/2019
Start Time:

Parameter	Standard	Lot #	Exp. Date	Reading	Time	Adjusted To	Units	Comments
pH	pH 4.00	96E1020	5/6/21		0731	4.00	S.U.	Temperature:
	pH 10.00	76L628	12/3/19		0733	10.00	S.U.	
	pH 7.00	86B386	2/29/20	7.00	0736	Not Adjusted	S.U.	Temperature: Must meet ±0.1 S.U.
Conductivity	Air	NA	NA		0739	0.00	mS/cm	
	1.00 mS/cm	86K310	11/30/19		0745	1.413	mS/cm	
	1.00 mS/cm[1]	86K310	11/30/19	1.413	0746	Not Adjusted	mS/cm	Must meet 0.990 - 1.010 mS/cm
Turbidity	D.I.	NA	NA	0.00	0749	—	NTU	
	100 NTU	18510176	12/20/19	—	0751	100	NTU	
	100 NTU[2]	18510176	12/20/19	100	0751	Not Adjusted	NTU	Must meet 90-110 NTU
Dissolved Oxygen	Zero %	20180129B		—	0753		mg/L	
	D.I.	NA	NA	11.01	0755	—	mg/L	Temp.: 9.8
	Zero %	20180129B	12/6/19	0.00	0758	Not Adjusted	mg/L	Must meet ± 0.3 mg/L

pH Check[3]	Standard	Lot #	Exp. Date	Reading	Time	Temperature	Units	Comments
1	pH 7.00						S.U.	Must meet ±0.2 S.U.
2	pH 7.00						S.U.	Must meet ±0.2 S.U.
3	pH 7.00						S.U.	Must meet ±0.2 S.U.
4	pH 7.00						S.U.	Must meet ±0.2 S.U.

NJ Cert: 03027
Meter must be calibrated daily prior to initial use.

Notes:
[1]Result must be within ± 1% of standards nominal value, otherwise recalibrate. Percent recovery must be calculated and recorded, if using a calibration check other than 1.00 mS/cm.
[2]Must be within site range & 10% of standard's nominal value
[3]During use, meter must be checked against a standard pH 7.00 buffer every three hours.
If the pH differs by more than ± 0.2 S.U. from the standard buffer value, the meter must be recalibrated.

Signature:

APPENDIX C

Laboratory Analytical Reports

eurofins | Lancaster Laboratories Environmental

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Golder Associates Incorporated
200 Century Parkway
Suite C
Mt. Laurel NJ 08054

Report Date: November 19, 2019 11:59

Project: IBM Kingston, NY

Account #: 42322
Group Number: 2072940
SDG: IBL23
PO Number: 083-87071.08
State of Sample Origin: NY

Electronic Copy To	Golder	Attn: Youki Sato
Electronic Copy To	Golder Associates, Inc.	Attn: Christopher Hemingway

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

To view our laboratory's current scopes of accreditation please go to https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/ . Historical copies may be requested through your project manager.

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
B-1 (13.5-15.5) Grab Groundwater	11/05/2019 09:40	1193709
B-1 (13.5-15.5) Filtered Grab Groundwater	11/05/2019 09:40	1193710
B-10 (13-15) Grab Groundwater	11/05/2019 12:25	1193711
B-10 (13-15) Filtered Grab Groundwater	11/05/2019 12:25	1193712
Trip Blank Water	11/05/2019	1193713

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **B-1 (13.5-15.5) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 09:40
SDG#: IBL23-01

Golder Associates Incorporated
ELLE Sample #: GW 1193709
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	1	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	11	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	0.4 J	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	46	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	1 J	0.2	10	1
11997	Freon 123a[1]	354-23-4	0.9 J	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	6	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	11	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	0.2 J	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-1 (13.5-15.5) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 09:40
SDG#: IBL23-01

Golder Associates Incorporated
ELLE Sample #: GW 1193709
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Acenaphthene	83-32-9	N.D.	0.1	0.5	1
14242	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
14242	Acetophenone	98-86-2	N.D.	4	10	1
14242	Anthracene	120-12-7	N.D.	0.1	0.5	1
14242	Atrazine	1912-24-9	N.D.	2	5	1
14242	Benzaldehyde	100-52-7	N.D.	3	10	1
14242	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.5	1
14242	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.5	1
14242	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
14242	Benzo(g,h,i)perylene	191-24-2	N.D.	0.1	0.5	1
14242	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
14242	1,1'-Biphenyl	92-52-4	N.D.	3	10	1
14242	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
14242	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
14242	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
14242	Caprolactam	105-60-2	N.D.	5	11	1
14242	Carbazole	86-74-8	N.D.	0.5	2	1
14242	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
14242	4-Chloroaniline	106-47-8	N.D.	4	10	1
14242	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
14242	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
14242	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
14242	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
14242	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
14242	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.5	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
14242	Chrysene	218-01-9	N.D.	0.1	0.5	1
14242	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.5	1
14242	Dibenzofuran	132-64-9	N.D.	0.5	2	1
14242	3,3'-Dichlorobenzidine	91-94-1	N.D.	3	10	1
14242	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
14242	Diethylphthalate	84-66-2	N.D.	2	5	1
14242	2,4-Dimethylphenol	105-67-9	N.D.	3	10	1
14242	Dimethylphthalate	131-11-3	N.D.	2	5	1
14242	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	8	22	1
14242	2,4-Dinitrophenol	51-28-5	N.D.	14	31	1
14242	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
14242	2,6-Dinitrotoluene	606-20-2	N.D.	0.5	2	1
14242	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	5	11	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-1 (13.5-15.5) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 09:40
SDG#: IBL23-01

Golder Associates Incorporated
ELLE Sample #: GW 1193709
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
14242	Fluorene	86-73-7	N.D.	0.1	0.5	1
14242	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
14242	Hexachlorobutadiene	87-68-3	N.D.	0.5	2	1
14242	Hexachlorocyclopentadiene	77-47-4	N.D.	5	11	1
14242	Hexachloroethane	67-72-1	N.D.	1	5	1
14242	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
14242	Isophorone	78-59-1	N.D.	0.5	2	1
14242	2-Methylnaphthalene	91-57-6	N.D.	0.1	0.5	1
14242	2-Methylphenol	95-48-7	N.D.	0.5	2	1
14242	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
14242	Naphthalene	91-20-3	N.D.	0.1	0.5	1
14242	2-Nitroaniline	88-74-4	N.D.	2	7	1
14242	3-Nitroaniline	99-09-2	N.D.	3	7	1
14242	4-Nitroaniline	100-01-6	N.D.	0.9	3	1
14242	Nitrobenzene	98-95-3	N.D.	0.5	2	1
14242	2-Nitrophenol	88-75-5	N.D.	3	10	1
14242	4-Nitrophenol	100-02-7	N.D.	10	31	1
14242	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.7	3	1
14242	N-Nitrosodiphenylamine	86-30-6	N.D.	0.7	3	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
14242	Di-n-octylphthalate	117-84-0	N.D.	5	11	1
14242	Pentachlorophenol	87-86-5	N.D.	1	5	1
14242	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
14242	Phenol	108-95-2	N.D.	0.5	2	1
14242	Pyrene	129-00-0	N.D.	0.1	0.5	1
14242	2,4,5-Trichlorophenol	95-95-4	N.D.	0.5	2	1
14242	2,4,6-Trichlorophenol	88-06-2	N.D.	0.5	2	1
GC Miscellaneous	**SW-846 8015C**		**ug/l**	**ug/l**	**ug/l**	
10602	Ethane[1]	74-84-0	N.D.	1.0	5.0	1
10602	Ethene[1]	74-85-1	N.D.	1.0	5.0	1
10602	Methane[1]	74-82-8	N.D.	3.0	5.0	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	23.4	0.0400	0.200	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-1 (13.5-15.5) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 09:40
SDG#: IBL23-01

Golder Associates Incorporated
ELLE Sample #: GW 1193709
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
07058	Manganese	7439-96-5	1.36	0.0030	0.0100	1
Wet Chemistry	**EPA 300.0**		**mg/l**	**mg/l**	**mg/l**	
00224	Chloride	16887-00-6	12.0	1.0	2.0	5
00228	Sulfate	14808-79-8	68.2	1.5	5.0	5
	EPA 350.1		**mg/l**	**mg/l**	**mg/l**	
12892	Ammonia Nitrogen	7664-41-7	N.D.	0.050	0.10	1
	EPA 353.2		**mg/l**	**mg/l**	**mg/l**	
00220	Nitrate Nitrogen	14797-55-8	5.9	0.080	0.20	2
00219	Nitrite Nitrogen	14797-65-0	N.D.	0.015	0.050	1
	EPA 365.1		**mg/l**	**mg/l**	**mg/l**	
00345	Total Phosphorus as PO4 water[1]	14265-44-2	1.0	0.25	0.31	1
	SM 5310 C-2011		**mg/l**	**mg/l**	**mg/l**	
00273	Total Organic Carbon	n.a.	1.2	0.50	1.0	1
	SM 2320 B-2011		**mg/l as CaCO3**	**mg/l as CaCO3**	**mg/l as CaCO3**	
12150	Total Alkalinity to pH 4.5	n.a.	138	2.6	8.0	1
	SM 4500-S2 F-2011		**mg/l**	**mg/l**	**mg/l**	
01333	Sulfide	18496-25-8	N.D.	0.70	2.0	1

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	5193172AA	11/14/2019 03:54	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	5193172AA	11/14/2019 03:53	Don V Viray	1
14242	SVOAs by 8270D in Water	SW-846 8270D	1	19312WAQ026	11/17/2019 14:29	Ashley R Transue	1
00813	BNA Water Extraction	SW-846 3510C	1	19312WAQ026	11/10/2019 14:00	Laura Duquette	1
10602	Volatile Headspace Hydrocarbon	SW-846 8015C	1	193150004A	11/12/2019 00:06	Johanna C Kennedy	1
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193111404404	11/12/2019 23:59	Elaine F Stoltzfus	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-1 (13.5-15.5) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 09:40
SDG#: IBL23-01

Golder Associates Incorporated
ELLE Sample #: GW 1193709
ELLE Group #: 2072940
Matrix: Groundwater

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193111404404	11/12/2019 23:59	Elaine F Stoltzfus	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193111404404	11/12/2019 03:23	James L Mertz	1
00224	Chloride	EPA 300.0	1	19315076115B	11/11/2019 14:49	Kevin Litwa	5
00228	Sulfate	EPA 300.0	1	19315076115B	11/11/2019 14:49	Kevin Litwa	5
12892	Ammonia Nitrogen	EPA 350.1	1	19319107101A	11/15/2019 13:27	Jonathan Saul	1
00220	Nitrate Nitrogen	EPA 353.2	1	19322106101B	11/18/2019 07:52	Ashlynn M Cornelius	2
00219	Nitrite Nitrogen	EPA 353.2	1	19310105102A	11/06/2019 22:44	Gregory Baldree	1
00345	Total Phosphorus as PO4 water	EPA 365.1	1	19318110101A	11/15/2019 11:42	Jonathan Saul	1
00273	Total Organic Carbon	SM 5310 C-2011	1	19318304505B	11/15/2019 00:29	Bethany Sandone	1
08264	Total Phos as PO4 Prep (water)	EPA 365.1	1	19318110101A	11/14/2019 21:00	Barbara A Washington	1
12150	Total Alkalinity to pH 4.5	SM 2320 B-2011	1	19311009202A	11/07/2019 21:57	Jeremy L Bolf	1
01333	Sulfide	SM 4500-S2 F-2011	1	19312133301A	11/08/2019 12:21	Nicole Munsell	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-1 (13.5-15.5) Filtered Grab Groundwater IBM-Kingston SWMU M**

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 09:40
SDG#: IBL23-02

Golder Associates Incorporated
ELLE Sample #: GW 1193710
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals Dissolved	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	N.D.	0.0400	0.200	1
07058	Manganese	7439-96-5	2.02	0.0030	0.0100	1

03277 Lab Filtration - Metals

The holding time was not met for dissolved sample filtration. The filtration time for dissolved metals is to be within 15 minutes from collection. Since the filtration occurred after receipt in the laboratory, the 15 minute criteria was exceeded. This sample was not collected per applicable Clean Water Act (40CFR136) or SW-846 regulations.

Sample Comments

State of New York Certification No. 10670
This sample was filtered in the lab for dissolved metals.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193111404404	11/13/2019 00:02	Elaine F Stoltzfus	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193111404404	11/13/2019 00:02	Elaine F Stoltzfus	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193111404404	11/12/2019 03:23	James L Mertz	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-10 (13-15) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 12:25
SDG#: IBL23-03

Golder Associates Incorporated
ELLE Sample #: GW 1193711
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	1	5	5
11997	Benzyl Chloride	100-44-7	N.D.	5	25	5
11997	Bromobenzene	108-86-1	N.D.	1	25	5
11997	Bromodichloromethane	75-27-4	N.D.	1	5	5
11997	Bromoform	75-25-2	N.D.	5	20	5
11997	Bromomethane	74-83-9	N.D.	2	5	5
11997	Carbon Tetrachloride	56-23-5	N.D.	1	5	5
11997	Chlorobenzene	108-90-7	N.D.	1	5	5
11997	Chloroethane	75-00-3	N.D.	1	5	5
11997	Chloroform	67-66-3	1 J	1	5	5
11997	Chloromethane	74-87-3	N.D.	1	5	5
11997	2-Chlorotoluene	95-49-8	N.D.	1	25	5
11997	4-Chlorotoluene	106-43-4	N.D.	1	25	5
11997	Dibromochloromethane	124-48-1	N.D.	1	5	5
11997	Dibromomethane	74-95-3	N.D.	1	5	5
11997	1,2-Dichlorobenzene	95-50-1	N.D.	1	25	5
11997	1,3-Dichlorobenzene	541-73-1	N.D.	1	25	5
11997	1,4-Dichlorobenzene	106-46-7	N.D.	1	25	5
11997	Dichlorodifluoromethane	75-71-8	N.D.	1	5	5
11997	1,1-Dichloroethane	75-34-3	1,200	1	5	5
11997	1,2-Dichloroethane	107-06-2	50	2	5	5
11997	1,1-Dichloroethene	75-35-4	210	1	5	5
11997	1,2-Dichloroethene (Total)[1]	540-59-0	6,900	20	100	50
11997	1,2-Dichloropropane	78-87-5	N.D.	1	5	5
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	1	5	5
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	1	5	5
11997	Ethylbenzene	100-41-4	3 J	2	5	5
11997	Freon 113	76-13-1	N.D.	1	50	5
11997	Freon 123a[1]	354-23-4	N.D.	2	25	5
11997	Methylene Chloride	75-09-2	N.D.	2	5	5
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	1	5	5
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	1	5	5
11997	Tetrachloroethene	127-18-4	30	1	5	5
11997	Toluene	108-88-3	4 J	1	5	5
11997	1,1,1-Trichloroethane	71-55-6	1,400	15	50	50
11997	1,1,2-Trichloroethane	79-00-5	N.D.	1	5	5
11997	Trichloroethene	79-01-6	290	1	5	5
11997	Trichlorofluoromethane	75-69-4	N.D.	1	5	5
11997	1,2,3-Trichloropropane	96-18-4	N.D.	1	25	5
11997	Vinyl Chloride	75-01-4	73	1	5	5
11997	Xylene (Total)	1330-20-7	N.D.	7	30	5

The referenced method allows a maximum of 20% of the analytes

*=This limit was used in the evaluation of the final result

Sample Description: B-10 (13-15) Grab Groundwater
IBM-Kingston SWMU M

Project Name: IBM Kingston, NY

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 12:25
SDG#: IBL23-03

Golder Associates Incorporated
ELLE Sample #: GW 1193711
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
	in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated: 1,1,1-Trichloroethane.					
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Acenaphthene	83-32-9	N.D.	0.1	0.5	1
14242	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
14242	Acetophenone	98-86-2	N.D.	4	10	1
14242	Anthracene	120-12-7	N.D.	0.1	0.5	1
14242	Atrazine	1912-24-9	N.D.	2	5	1
14242	Benzaldehyde	100-52-7	N.D.	3	10	1
14242	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.5	1
14242	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.5	1
14242	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
14242	Benzo(g,h,i)perylene	191-24-2	N.D.	0.1	0.5	1
14242	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
14242	1,1'-Biphenyl	92-52-4	N.D.	3	10	1
14242	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
14242	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
14242	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
14242	Caprolactam	105-60-2	N.D.	5	11	1
14242	Carbazole	86-74-8	N.D.	0.5	2	1
14242	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
14242	4-Chloroaniline	106-47-8	N.D.	4	10	1
14242	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
14242	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
14242	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
14242	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
14242	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
14242	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.5	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
14242	Chrysene	218-01-9	N.D.	0.1	0.5	1
14242	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.5	1
14242	Dibenzofuran	132-64-9	N.D.	0.5	2	1
14242	3,3'-Dichlorobenzidine	91-94-1	N.D.	3	10	1
14242	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
14242	Diethylphthalate	84-66-2	N.D.	2	5	1
14242	2,4-Dimethylphenol	105-67-9	N.D.	3	10	1
14242	Dimethylphthalate	131-11-3	N.D.	2	5	1
14242	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	8	22	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-10 (13-15) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 12:25
SDG#: IBL23-03

Golder Associates Incorporated
ELLE Sample #: GW 1193711
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	2,4-Dinitrophenol	51-28-5	N.D.	14	31	1
14242	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
14242	2,6-Dinitrotoluene	606-20-2	N.D.	0.5	2	1
14242	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	5	11	1
14242	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
14242	Fluorene	86-73-7	N.D.	0.1	0.5	1
14242	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
14242	Hexachlorobutadiene	87-68-3	N.D.	0.5	2	1
14242	Hexachlorocyclopentadiene	77-47-4	N.D.	5	11	1
14242	Hexachloroethane	67-72-1	N.D.	1	5	1
14242	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
14242	Isophorone	78-59-1	N.D.	0.5	2	1
14242	2-Methylnaphthalene	91-57-6	0.3 J	0.1	0.5	1
14242	2-Methylphenol	95-48-7	N.D.	0.5	2	1
14242	4-Methylphenol	106-44-5	1 J	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
14242	Naphthalene	91-20-3	21	0.1	0.5	1
14242	2-Nitroaniline	88-74-4	N.D.	2	7	1
14242	3-Nitroaniline	99-09-2	N.D.	3	7	1
14242	4-Nitroaniline	100-01-6	N.D.	0.9	3	1
14242	Nitrobenzene	98-95-3	N.D.	0.5	2	1
14242	2-Nitrophenol	88-75-5	N.D.	3	10	1
14242	4-Nitrophenol	100-02-7	N.D.	10	31	1
14242	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.7	3	1
14242	N-Nitrosodiphenylamine	86-30-6	N.D.	0.7	3	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
14242	Di-n-octylphthalate	117-84-0	N.D.	5	11	1
14242	Pentachlorophenol	87-86-5	N.D.	1	5	1
14242	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
14242	Phenol	108-95-2	N.D.	0.5	2	1
14242	Pyrene	129-00-0	N.D.	0.1	0.5	1
14242	2,4,5-Trichlorophenol	95-95-4	N.D.	0.5	2	1
14242	2,4,6-Trichlorophenol	88-06-2	N.D.	0.5	2	1
GC Miscellaneous	**SW-846 8015C**		**ug/l**	**ug/l**	**ug/l**	
10602	Ethane[1]	74-84-0	N.D.	1.0	5.0	1
10602	Ethene[1]	74-85-1	3.2 J	1.0	5.0	1
10602	Methane[1]	74-82-8	53	3.0	5.0	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-10 (13-15) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 12:25
SDG#: IBL23-03

Golder Associates Incorporated
ELLE Sample #: GW 1193711
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	85.4	0.0400	0.200	1
07058	Manganese	7439-96-5	3.85	0.0030	0.0100	1
Wet Chemistry	**EPA 300.0**		**mg/l**	**mg/l**	**mg/l**	
00224	Chloride	16887-00-6	13.8	1.0	2.0	5
00228	Sulfate	14808-79-8	37.3	1.5	5.0	5
	EPA 350.1		**mg/l**	**mg/l**	**mg/l**	
12892	Ammonia Nitrogen	7664-41-7	0.83	0.050	0.10	1
	EPA 353.2		**mg/l**	**mg/l**	**mg/l**	
00220	Nitrate Nitrogen	14797-55-8	3.7	0.080	0.20	2
00219	Nitrite Nitrogen	14797-65-0	0.019 J	0.015	0.050	1
	EPA 365.1		**mg/l**	**mg/l**	**mg/l**	
00345	Total Phosphorus as PO4 water[1]	14265-44-2	3.0	0.25	0.31	1
	SM 5310 C-2011		**mg/l**	**mg/l**	**mg/l**	
00273	Total Organic Carbon	n.a.	5.5	1.0	2.0	2
	SM 2320 B-2011		**mg/l as CaCO3**	**mg/l as CaCO3**	**mg/l as CaCO3**	
12150	Total Alkalinity to pH 4.5	n.a.	160	2.6	8.0	1
	SM 4500-S2 F-2011		**mg/l**	**mg/l**	**mg/l**	
01333	Sulfide	18496-25-8	N.D.	0.70	2.0	1

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	5193172AA	11/14/2019 04:15	Don V Viray	5
11997	Volatiles 8260C	SW-846 8260C	1	5193172AA	11/14/2019 04:36	Don V Viray	50
01163	GC/MS VOA Water Prep	SW-846 5030C	1	5193172AA	11/14/2019 04:14	Don V Viray	5
01163	GC/MS VOA Water Prep	SW-846 5030C	2	5193172AA	11/14/2019 04:35	Don V Viray	50
14242	SVOAs by 8270D in Water	SW-846 8270D	1	19312WAQ026	11/17/2019 14:58	Ashley R Transue	1
00813	BNA Water Extraction	SW-846 3510C	1	19312WAQ026	11/10/2019 14:00	Laura Duquette	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-10 (13-15) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 12:25
SDG#: IBL23-03

Golder Associates Incorporated
ELLE Sample #: GW 1193711
ELLE Group #: 2072940
Matrix: Groundwater

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10602	Volatile Headspace Hydrocarbon	SW-846 8015C	1	193150004A	11/12/2019 00:25	Johanna C Kennedy	1
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193111404404	11/13/2019 00:05	Elaine F Stoltzfus	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193111404404	11/13/2019 00:05	Elaine F Stoltzfus	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193111404404	11/12/2019 03:23	James L Mertz	1
00224	Chloride	EPA 300.0	1	19315076115B	11/11/2019 15:16	Kevin Litwa	5
00228	Sulfate	EPA 300.0	1	19315076115B	11/11/2019 15:16	Kevin Litwa	5
12892	Ammonia Nitrogen	EPA 350.1	1	19319107101A	11/15/2019 13:29	Jonathan Saul	1
00220	Nitrate Nitrogen	EPA 353.2	1	19322106101B	11/18/2019 08:16	Ashlynn M Cornelius	2
00219	Nitrite Nitrogen	EPA 353.2	1	19310105102A	11/06/2019 22:57	Gregory Baldree	1
00345	Total Phosphorus as PO4 water	EPA 365.1	1	19318110101A	11/15/2019 11:42	Jonathan Saul	1
00273	Total Organic Carbon	SM 5310 C-2011	1	19318304505B	11/15/2019 09:49	Bethany Sandone	2
08264	Total Phos as PO4 Prep (water)	EPA 365.1	1	19318110101A	11/14/2019 21:00	Barbara A Washington	1
12150	Total Alkalinity to pH 4.5	SM 2320 B-2011	1	19311009202A	11/07/2019 22:03	Jeremy L Bolf	1
01333	Sulfide	SM 4500-S2 F-2011	1	19312133301A	11/08/2019 12:21	Nicole Munsell	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-10 (13-15) Filtered Grab Groundwater IBM-Kingston SWMU M**

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 12:25
SDG#: IBL23-04

Golder Associates Incorporated
ELLE Sample #: GW 1193712
ELLE Group #: 2072940
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals Dissolved	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	N.D.	0.0400	0.200	1
07058	Manganese	7439-96-5	2.68	0.0030	0.0100	1

03277 Lab Filtration - Metals

The holding time was not met for dissolved sample filtration. The filtration time for dissolved metals is to be within 15 minutes from collection. Since the filtration occurred after receipt in the laboratory, the 15 minute criteria was exceeded. This sample was not collected per applicable Clean Water Act (40CFR136) or SW-846 regulations.

Sample Comments

State of New York Certification No. 10670
This sample was filtered in the lab for dissolved metals.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193111404404	11/13/2019 00:08	Elaine F Stoltzfus	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193111404404	11/13/2019 10:24	Lisa J Cooke	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193111404404	11/12/2019 03:23	James L Mertz	1

*=This limit was used in the evaluation of the final result

Sample Description: **Trip Blank Water**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019
SDG#: IBL23-05TB

Golder Associates Incorporated
ELLE Sample #: GW 1193713
ELLE Group #: 2072940
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

*=This limit was used in the evaluation of the final result

Sample Description: **Trip Blank Water**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019
SDG#: IBL23-05TB

Golder Associates Incorporated
ELLE Sample #: GW 1193713
ELLE Group #: 2072940
Matrix: Water

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	5193172AA	11/14/2019 03:33	Don V Viray	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	5193172AA	11/14/2019 03:32	Don V Viray	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2072940
Reported: 11/19/2019 11:59

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Batch number: 5193172AA	Sample number(s): 1193709,1193711,1193713		
Benzene	N.D.	0.2	1
Benzyl Chloride	N.D.	1	5
Bromobenzene	N.D.	0.2	5
Bromodichloromethane	N.D.	0.2	1
Bromoform	N.D.	1	4
Bromomethane	N.D.	0.3	1
Carbon Tetrachloride	N.D.	0.2	1
Chlorobenzene	N.D.	0.2	1
Chloroethane	N.D.	0.2	1
Chloroform	N.D.	0.2	1
Chloromethane	N.D.	0.2	1
2-Chlorotoluene	N.D.	0.2	5
4-Chlorotoluene	N.D.	0.2	5
Dibromochloromethane	N.D.	0.2	1
Dibromomethane	N.D.	0.2	1
1,2-Dichlorobenzene	N.D.	0.2	5
1,3-Dichlorobenzene	N.D.	0.2	5
1,4-Dichlorobenzene	N.D.	0.2	5
Dichlorodifluoromethane	N.D.	0.2	1
1,1-Dichloroethane	N.D.	0.2	1
1,2-Dichloroethane	N.D.	0.3	1
1,1-Dichloroethene	N.D.	0.2	1
1,2-Dichloroethene (Total)	N.D.	0.4	2
1,2-Dichloropropane	N.D.	0.2	1
cis-1,3-Dichloropropene	N.D.	0.2	1
trans-1,3-Dichloropropene	N.D.	0.2	1
Ethylbenzene	N.D.	0.4	1
Freon 113	N.D.	0.2	10
Freon 123a	N.D.	0.4	5
Methylene Chloride	N.D.	0.3	1
1,1,1,2-Tetrachloroethane	N.D.	0.2	1
1,1,2,2-Tetrachloroethane	N.D.	0.2	1
Tetrachloroethene	N.D.	0.2	1
Toluene	N.D.	0.2	1
1,1,1-Trichloroethane	N.D.	0.3	1
1,1,2-Trichloroethane	N.D.	0.2	1
Trichloroethene	N.D.	0.2	1
Trichlorofluoromethane	N.D.	0.2	1
1,2,3-Trichloropropane	N.D.	0.2	5

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2072940
Reported: 11/19/2019 11:59

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Vinyl Chloride	N.D.	0.2	1
Xylene (Total)	N.D.	1	6
Batch number: 19312WAQ026	Sample number(s): 1193709,1193711		
Acenaphthene	N.D.	0.1	0.5
Acenaphthylene	N.D.	0.1	0.5
Acetophenone	N.D.	4	10
Anthracene	N.D.	0.1	0.5
Atrazine	N.D.	2	5
Benzaldehyde	N.D.	3	10
Benzo(a)anthracene	N.D.	0.1	0.5
Benzo(a)pyrene	N.D.	0.1	0.5
Benzo(b)fluoranthene	N.D.	0.1	0.5
Benzo(g,h,i)perylene	N.D.	0.1	0.5
Benzo(k)fluoranthene	N.D.	0.1	0.5
1,1'-Biphenyl	N.D.	3	10
4-Bromophenyl-phenylether	N.D.	0.5	2
Butylbenzylphthalate	N.D.	2	5
Di-n-butylphthalate	N.D.	2	5
Caprolactam	N.D.	5	11
Carbazole	N.D.	0.5	2
4-Chloro-3-methylphenol	N.D.	0.5	2
4-Chloroaniline	N.D.	4	10
bis(2-Chloroethoxy)methane	N.D.	0.5	2
bis(2-Chloroethyl)ether	N.D.	0.5	2
2-Chloronaphthalene	N.D.	0.4	1
2-Chlorophenol	N.D.	0.5	2
4-Chlorophenyl-phenylether	N.D.	0.5	2
2,2'-oxybis(1-Chloropropane)	N.D.	0.5	2
Chrysene	N.D.	0.1	0.5
Dibenz(a,h)anthracene	N.D.	0.1	0.5
Dibenzofuran	N.D.	0.5	2
3,3'-Dichlorobenzidine	N.D.	3	10
2,4-Dichlorophenol	N.D.	0.5	2
Diethylphthalate	N.D.	2	5
2,4-Dimethylphenol	N.D.	3	10
Dimethylphthalate	N.D.	2	5
4,6-Dinitro-2-methylphenol	N.D.	8	21
2,4-Dinitrophenol	N.D.	14	30
2,4-Dinitrotoluene	N.D.	1	5
2,6-Dinitrotoluene	N.D.	0.5	2
bis(2-Ethylhexyl)phthalate	N.D.	5	11
Fluoranthene	N.D.	0.1	0.5
Fluorene	N.D.	0.1	0.5
Hexachlorobenzene	N.D.	0.1	0.5

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2072940
Reported: 11/19/2019 11:59

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Hexachlorobutadiene	N.D.	0.5	2
Hexachlorocyclopentadiene	N.D.	5	11
Hexachloroethane	N.D.	1	5
Indeno(1,2,3-cd)pyrene	N.D.	0.1	0.5
Isophorone	N.D.	0.5	2
2-Methylnaphthalene	N.D.	0.1	0.5
2-Methylphenol	N.D.	0.5	2
4-Methylphenol	N.D.	0.5	2
Naphthalene	N.D.	0.1	0.5
2-Nitroaniline	N.D.	2	7
3-Nitroaniline	N.D.	3	7
4-Nitroaniline	N.D.	0.9	3
Nitrobenzene	N.D.	0.5	2
2-Nitrophenol	N.D.	3	10
4-Nitrophenol	N.D.	10	30
N-Nitroso-di-n-propylamine	N.D.	0.7	3
N-Nitrosodiphenylamine	N.D.	0.7	3
Di-n-octylphthalate	N.D.	5	11
Pentachlorophenol	N.D.	1	5
Phenanthrene	N.D.	0.1	0.5
Phenol	N.D.	0.5	2
Pyrene	N.D.	0.1	0.5
2,4,5-Trichlorophenol	N.D.	0.5	2
2,4,6-Trichlorophenol	N.D.	0.5	2
Batch number: 193150004A	Sample number(s): 1193709,1193711		
Ethane	N.D.	1.0	5.0
Ethene	N.D.	1.0	5.0
Methane	N.D.	3.0	5.0
	mg/l	mg/l	mg/l
Batch number: 193111404404	Sample number(s): 1193709-1193712		
Iron	N.D.	0.0400	0.200
Manganese	N.D.	0.0030	0.0100
Batch number: 19310105102A	Sample number(s): 1193709,1193711		
Nitrite Nitrogen	N.D.	0.015	0.050
Batch number: 19315076115B	Sample number(s): 1193709,1193711		
Chloride	N.D.	0.20	0.40
Sulfate	N.D.	0.30	1.0
Batch number: 19318110101A	Sample number(s): 1193709,1193711		
Total Phosphorus as PO4 water	N.D.	0.25	0.31
Batch number: 19318304505B	Sample number(s): 1193709,1193711		
Total Organic Carbon	N.D.	0.50	1.0

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Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/19/2019 11:59

Group Number: 2072940

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/l	mg/l	mg/l
Batch number: 19319107101A	Sample number(s): 1193709,1193711		
Ammonia Nitrogen	N.D.	0.050	0.10
Batch number: 19322106101B	Sample number(s): 1193709,1193711		
Nitrate Nitrogen	N.D.	0.040	0.10
Batch number: 19312133301A	Sample number(s): 1193709,1193711		
Sulfide	0.76 J	0.70	2.0
	mg/l as CaCO3	mg/l as CaCO3	mg/l as CaCO3
Batch number: 19311009202A	Sample number(s): 1193709,1193711		
Total Alkalinity to pH 4.5	N.D.	2.6	8.0

LCS/LCSD

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 5193172AA	Sample number(s): 1193709,1193711,1193713								
Benzene	20	19.88	20	20.41	99	102	80-120	3	30
Benzyl Chloride	20	18.13	20	17.67	91	88	52-120	3	30
Bromobenzene	20	20.73	20	20.43	104	102	80-120	1	30
Bromodichloromethane	20	21.77	20	21.97	109	110	71-120	1	30
Bromoform	20	19.84	20	20.14	99	101	51-120	2	30
Bromomethane	20	17.22	20	18.45	86	92	53-128	7	30
Carbon Tetrachloride	20	22.74	20	22.6	114	113	64-134	1	30
Chlorobenzene	20	20.32	20	21	102	105	80-120	3	30
Chloroethane	20	16.83	20	17.19	84	86	55-123	2	30
Chloroform	20	21.59	20	21.78	108	109	80-120	1	30
Chloromethane	20	15.12	20	15.49	76	77	56-121	2	30
2-Chlorotoluene	20	20.78	20	20.42	104	102	80-120	2	30
4-Chlorotoluene	20	21.25	20	20.46	106	102	80-120	4	30
Dibromochloromethane	20	21.33	20	21.61	107	108	71-120	1	30
Dibromomethane	20	21.86	20	21.52	109	108	80-120	2	30
1,2-Dichlorobenzene	20	21.06	20	20.99	105	105	80-120	0	30
1,3-Dichlorobenzene	20	21.11	20	20.99	106	105	80-120	1	30
1,4-Dichlorobenzene	20	21.44	20	21.2	107	106	80-120	1	30
Dichlorodifluoromethane	20	13.65	20	13.53	68	68	41-127	1	30
1,1-Dichloroethane	20	20.24	20	20.5	101	102	80-120	1	30
1,2-Dichloroethane	20	22.85	20	23.08	114	115	73-124	1	30
1,1-Dichloroethene	20	20.22	20	21.04	101	105	80-131	4	30
1,2-Dichloroethene (Total)	40	42.5	40	41.91	106	105	80-125	1	30

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/19/2019 11:59

Group Number: 2072940

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,2-Dichloropropane	20	20.69	20	20.79	103	104	80-120	0	30
cis-1,3-Dichloropropene	20	20.58	20	20.37	103	102	75-120	1	30
trans-1,3-Dichloropropene	20	19.5	20	20.17	98	101	67-120	3	30
Ethylbenzene	20	20.4	20	21	102	105	80-120	3	30
Freon 113	20	18.94	20	19.61	95	98	73-139	3	30
Freon 123a	20	19.75	20	20.46	99	102	76-129	3	30
Methylene Chloride	20	20.3	20	20.33	102	102	80-120	0	30
1,1,1,2-Tetrachloroethane	20	20.85	20	21.14	104	106	78-120	1	30
1,1,2,2-Tetrachloroethane	20	20.12	20	19.8	101	99	72-120	2	30
Tetrachloroethene	20	18.86	20	18.82	94	94	80-120	0	30
Toluene	20	19.86	20	20.45	99	102	80-120	3	30
1,1,1-Trichloroethane	20	22.7	20	22.63	113	113	67-126	0	30
1,1,2-Trichloroethane	20	20.86	20	21.29	104	106	80-120	2	30
Trichloroethene	20	21.09	20	21.22	105	106	80-120	1	30
Trichlorofluoromethane	20	19.64	20	19.49	98	97	55-135	1	30
1,2,3-Trichloropropane	20	21.37	20	21.45	107	107	75-124	0	30
Vinyl Chloride	20	15.33	20	16.31	77	82	56-120	6	30
Xylene (Total)	60	62.33	60	64.32	104	107	80-120	3	30
	ug/l	**ug/l**	**ug/l**	**ug/l**					
Batch number: 19312WAQ026	Sample number(s): 1193709,1193711								
Acenaphthene	50	42.97			86		52-114		
Acenaphthylene	50	43.55			87		57-121		
Acetophenone	50	44.98			90		61-114		
Anthracene	50	48.25			96		62-116		
Atrazine	50	53.44			107		71-133		
Benzaldehyde	50	49.07			98		48-118		
Benzo(a)anthracene	50	50.31			101		70-118		
Benzo(a)pyrene	50	48.9			98		71-117		
Benzo(b)fluoranthene	50	50.71			101		71-115		
Benzo(g,h,i)perylene	50	47.43			95		60-119		
Benzo(k)fluoranthene	50	47.86			96		71-116		
1,1'-Biphenyl	50	42.21			84		51-112		
4-Bromophenyl-phenylether	50	45.32			91		53-117		
Butylbenzylphthalate	50	47.62			95		44-124		
Di-n-butylphthalate	50	47.76			96		62-118		
Caprolactam	50	13.31			27		10-57		
Carbazole	50	50			100		64-127		
4-Chloro-3-methylphenol	50	44.62			89		60-118		
4-Chloroaniline	50	36.77			74		35-108		
bis(2-Chloroethoxy)methane	50	44.95			90		53-119		
bis(2-Chloroethyl)ether	50	42.99			86		49-110		
2-Chloronaphthalene	50	39.18			78		42-111		
2-Chlorophenol	50	41.71			83		52-109		

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2072940
Reported: 11/19/2019 11:59

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
4-Chlorophenyl-phenylether	50	43.33			87		46-113		
2,2'-oxybis(1-Chloropropane)	50	42.64			85		40-110		
Chrysene	50	47.89			96		69-116		
Dibenz(a,h)anthracene	50	49.43			99		68-121		
Dibenzofuran	50	44.13			88		53-114		
3,3'-Dichlorobenzidine	50	32.55			65		42-107		
2,4-Dichlorophenol	50	44.71			89		58-114		
Diethylphthalate	50	44.53			89		48-113		
2,4-Dimethylphenol	50	37.49			75		48-91		
Dimethylphthalate	50	42.4			85		14-123		
4,6-Dinitro-2-methylphenol	50	42.89			86		63-129		
2,4-Dinitrophenol	100	79.42			79		44-134		
2,4-Dinitrotoluene	50	47.06			94		69-117		
2,6-Dinitrotoluene	50	44.9			90		63-122		
bis(2-Ethylhexyl)phthalate	50	48.53			97		68-120		
Fluoranthene	50	47.9			96		63-122		
Fluorene	50	45.04			90		56-115		
Hexachlorobenzene	50	45.75			91		60-117		
Hexachlorobutadiene	50	26.47			53		20-108		
Hexachlorocyclopentadiene	100	27.59			28		10-91		
Hexachloroethane	50	26.31			53		23-95		
Indeno(1,2,3-cd)pyrene	50	47.25			94		63-114		
Isophorone	50	45.64			91		56-120		
2-Methylnaphthalene	50	40.87			82		44-111		
2-Methylphenol	50	43.27			87		53-107		
4-Methylphenol	50	42.32			85		49-108		
Naphthalene	50	41.03			82		45-105		
2-Nitroaniline	50	46.17			92		66-126		
3-Nitroaniline	50	42.43			85		47-119		
4-Nitroaniline	50	40.93			82		45-107		
Nitrobenzene	50	42.31			85		49-113		
2-Nitrophenol	50	43.15			86		57-116		
4-Nitrophenol	50	27.09			54		23-89		
N-Nitroso-di-n-propylamine	50	44.59			89		51-122		
N-Nitrosodiphenylamine	50	46.24			92		63-119		
Di-n-octylphthalate	50	49.85			100		67-120		
Pentachlorophenol	50	47.08			94		54-131		
Phenanthrene	50	46.9			94		65-113		
Phenol	50	26.33			53		19-79		
Pyrene	50	47.47			95		65-115		
2,4,5-Trichlorophenol	50	45.38			91		66-118		
2,4,6-Trichlorophenol	50	45.39			91		69-122		
	ug/l	ug/l	ug/l	ug/l					

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2072940
Reported: 11/19/2019 11:59

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 193150004A	Sample number(s): 1193709,1193711								
Ethane	58.44	52.74	58.44	56.48	90	97	85-115	7	20
Ethene	60.85	54.42	60.85	58.81	89	97	83-115	8	20
Methane	59.83	52.4	59.83	55.76	88	93	85-115	6	20
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 193111404404	Sample number(s): 1193709-1193712								
Iron	0.400	0.414			103		80-120		
Manganese	0.0200	0.0217			109		80-120		
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 19310105102A	Sample number(s): 1193709,1193711								
Nitrite Nitrogen	0.700	0.675			96		90-110		
Batch number: 19315076115B	Sample number(s): 1193709,1193711								
Chloride	3.00	2.87			96		90-110		
Sulfate	7.50	7.30			97		90-110		
Batch number: 19318110101A	Sample number(s): 1193709,1193711								
Total Phosphorus as PO4 water	13.92	13.56			97		90-110		
Batch number: 19318304505B	Sample number(s): 1193709,1193711								
Total Organic Carbon	25	25.57			102		91-113		
Batch number: 19319107101A	Sample number(s): 1193709,1193711								
Ammonia Nitrogen	1.50	1.45			96		90-110		
Batch number: 19322106101B	Sample number(s): 1193709,1193711								
Nitrate Nitrogen	2.50	2.53			101		90-110		
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 19312133301A	Sample number(s): 1193709,1193711								
Sulfide	20	19.56			98		80-120		
	mg/l as CaCO3	**mg/l as CaCO3**	**mg/l as CaCO3**	**mg/l as CaCO3**					
Batch number: 19311009202A	Sample number(s): 1193709,1193711								
Total Alkalinity to pH 4.5	188	185.07			98		82-106		

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2072940
Reported: 11/19/2019 11:59

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc mg/l	MS Spike Added mg/l	MS Conc mg/l	MSD Spike Added mg/l	MSD Conc mg/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 19310105102A	Sample number(s): 1193709,1193711 UNSPK: 1193709									
Nitrite Nitrogen	N.D.	0.200	0.164			82*		90-110		

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc mg/l	DUP Conc mg/l	DUP RPD	DUP RPD Max
Batch number: 19310105102A	Sample number(s): 1193709,1193711 BKG: 1193709			
Nitrite Nitrogen	N.D.	N.D.	0 (1)	20

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Volatiles 8260C
Batch number: 5193172AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1193709	110	103	96	102
1193711	115	104	97	104
1193713	108	101	96	101
Blank	103	101	98	101
LCS	104	98	97	102
LCSD	103	102	99	102
Limits:	80-120	80-120	80-120	80-120

Analysis Name: SVOAs by 8270D in Water
Batch number: 19312WAQ026

	Phenol-d6	2-Fluorophenol	2,4,6-Tribromophenol	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
1193709	31	44	65	86	79	76
1193711	22	28	55	81	79	79
Blank	39	52	86	81	78	94
LCS	46	60	86	83	81	90

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2072940
Reported: 11/19/2019 11:59

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: SVOAs by 8270D in Water
Batch number: 19312WAQ026

Limits:	10-67	10-84	23-135	33-113	44-102	39-125

Analysis Name: Volatile Headspace Hydrocarbon
Batch number: 193150004A

	Propene
1193709	73
1193711	60
Blank	94
LCS	89
LCSD	94
Limits:	46-135

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

IBM Chain of Custody

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Acct. # 42322 For Eurofins Lancaster Laboratories Environmental use only Group # 2072940 Sample # 1193709-13

Instructions on reverse side correspond with circled numbers.

COC # 020641

Client Information

Client: Golder
Acct #:
Project Name/#: IBM-Kingston ~~SMALL~~ SWMU HPC
SSOW #: M
IBM PM: Dean Chartrand
Project State: NY
P.O. #: 083-87071.08
Sampler: Hannah Ellenton, David Vella
For Compliance: ☐ Yes ☒ No

Check One:
☐ Routine Lab GW ☐ Routine GTF O&M
☒ Non-Routine Investigation ☐ Non-Routine Upgrades/Installs

OU: ______ (Endicott Non-Routine only)

Matrix / Analyses Requested

Matrix: Soil ☐ Sediment ☐; Water: Potable ☐ Ground ☒ Surface ☐ NPDES ☐; Oil ☐ Air ☐

Preservation and Filtration Codes: H, –, N, –, S, B, –, O, H

Sample Identification	Date	Time	Grab	Composite	Soil	Water	Oil	Total # of Containers	VOCs (8260C)	SVOCs (8270D)	Total Mn + Fe	Dissolved Mn + Fe	Nitrate, total phosphorus, Ammonia	Total Sulfide, ~~Total Phosphorus~~ TKN	Sulfate, Chloride, Nitrite, total Alk	TOC	methane, ethane, ethene
B-1 (13.5-15.5)	11/5/19	0940	X			X		18	X	X	X	X	X	X	X	X	X
B-10 (13-15)	11/5/19	1225	X			X		18	X	X	X	X	X	X	X	X	X
Trip Blank	11/5/19	—				X			X								
Received at lab and added per client. NWZ005 11/12/19																	

For Lab Use Only

SCR# 25456

Preservation Codes

H = HCl, T = Thiosulfate
N = HNO_3, B = NaOH
S = H_2SO_4, O = Other
F = Field Filtered

Remarks

* lab filtered dissolved metals
* all samples on ice

Turnaround Time Requested (TAT) (please circle)

(Standard) Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharges.)

Date results are needed: ______

E-mail: cheminegway@golder.com, hellenton@golder.com

Is EDD Needed?: yes

Relinquished by	Date	Time	Received by	Date	Time
[signature]	10/31/19	16:50	[signature]	11/5/19	0800
[signature]	11/5/19	1530			
			[signature]	11/6/19	1020

Data Package Options (please circle if required)

Type I (Validation/NJ Reg)	TX TRRP-13	NY ASP A
Type III (Reduced NJ)	MA MCP	NY ASP B
Type VI (Raw Data Only)	CT RCP	

SDG Complete? Yes (No)

Site-specific QC (MS/MSD/Dup)? Yes (No)
(If yes, indicate QC sample and submit triplicate volume.)

Temperature upon receipt 0.8 °C

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The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client.

7052 0418

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Sample Administration Receipt Documentation Log

Doc Log ID: 265382

Group Number(s): 2072940

Client: Golder

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Date:	11/06/2019
Number of Packages:	1	Number of Projects:	2
State/Province of Origin:	NY		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	Total Trip Blank Qty:	1
Samples Chilled:	Yes	Trip Blank Type:	HCl
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	No		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Tamara Lugardo

Samples Chilled Details

Thermometer Types: *DT = Digital (Temp. Bottle)* *IR = Infrared (Surface Temp)* *All Temperatures in °C.*

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	192050133	0.8	IR	Wet	Y	Bagged	N

Samples Not Intact Details

Sample ID on Label	Bottle Code	Bottle Quantity	Container Salvageable?	Comments
Trip Blank	40 ml glass vial (GC/MS) - HCl	1	N	

2425 New Holland Pike
Lancaster, PA 17605-2425
T 717-656-2300
F 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Golder Associates Incorporated
200 Century Parkway
Suite C
Mt. Laurel NJ 08054

Report Date: November 19, 2019 10:14

Project: IBM Kingston, NY

Account #: 42322
Group Number: 2072941
SDG: IBL24
PO Number: 083-87071.08
State of Sample Origin: NY

Electronic Copy To	Golder Associates, Inc.	Attn: Christopher Hemingway
Electronic Copy To	Golder	Attn: Youki Sato

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

To view our laboratory's current scopes of accreditation please go to https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/ . Historical copies may be requested through your project manager.

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
B-10 (7-8) Grab Soil	11/05/2019 11:35	1193714

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **B-10 (7-8) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 11:35
SDG#: IBL24-01

Golder Associates Incorporated
ELLE Sample #: SW 1193714
ELLE Group #: 2072941
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**	**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	62 J	51	510	86.06
11995	Benzyl Chloride	100-44-7	N.D.	150	410	86.06
11995	Bromobenzene	108-86-1	N.D.	41	510	86.06
11995	Bromodichloromethane	75-27-4	N.D.	41	510	86.06
11995	Bromoform	75-25-2	N.D.	510	1,000	86.06
11995	Bromomethane	74-83-9	N.D.	71	510	86.06
11995	Carbon Tetrachloride	56-23-5	N.D.	51	510	86.06
11995	Chlorobenzene	108-90-7	N.D.	51	510	86.06
11995	Chloroethane	75-00-3	N.D.	100	510	86.06
11995	Chloroform	67-66-3	N.D.	61	510	86.06
11995	Chloromethane	74-87-3	N.D.	61	510	86.06
11995	2-Chlorotoluene	95-49-8	N.D.	41	510	86.06
11995	4-Chlorotoluene	106-43-4	N.D.	41	510	86.06
11995	Dibromochloromethane	124-48-1	N.D.	51	510	86.06
11995	Dibromomethane	74-95-3	N.D.	51	510	86.06
11995	1,2-Dichlorobenzene	95-50-1	N.D.	51	510	86.06
11995	1,3-Dichlorobenzene	541-73-1	N.D.	51	510	86.06
11995	1,4-Dichlorobenzene	106-46-7	N.D.	41	510	86.06
11995	Dichlorodifluoromethane	75-71-8	N.D.	61	510	86.06
11995	1,1-Dichloroethane	75-34-3	6,600	51	510	86.06
11995	1,2-Dichloroethane	107-06-2	260 J	61	510	86.06
11995	1,1-Dichloroethene	75-35-4	1,900	51	510	86.06
11995	1,2-Dichloroethene (Total)[1]	540-59-0	27,000	100	1,000	86.06
11995	1,2-Dichloropropane	78-87-5	N.D.	51	510	86.06
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	41	510	86.06
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	51	510	86.06
11995	Ethylbenzene	100-41-4	3,400	41	510	86.06
11995	Freon 113	76-13-1	N.D.	61	1,000	86.06
11995	Freon 123a[1]	354-23-4	N.D.	61	510	86.06
11995	Methylene Chloride	75-09-2	N.D.	200	510	86.06
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	51	510	86.06
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	41	510	86.06
11995	Tetrachloroethene	127-18-4	8,100	51	510	86.06
11995	Toluene	108-88-3	960	61	510	86.06
11995	1,1,1-Trichloroethane	71-55-6	130,000	610	5,100	860.59
11995	1,1,2-Trichloroethane	79-00-5	N.D.	51	510	86.06
11995	Trichloroethene	79-01-6	140,000	510	5,100	860.59
11995	Trichlorofluoromethane	75-69-4	N.D.	71	510	86.06
11995	1,2,3-Trichloropropane	96-18-4	N.D.	61	510	86.06
11995	Vinyl Chloride	75-01-4	99 J	61	510	86.06
11995	Xylene (Total)	1330-20-7	41,000	140	1,000	86.06

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-10 (7-8) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 11:35
SDG#: IBL24-01

Golder Associates Incorporated
ELLE Sample #: SW 1193714
ELLE Group #: 2072941
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
1,2-Dichloroethane.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: 1,2-Dichloroethane.

Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	11,200	118	355	1

The sample was analyzed in quadruplicate; the reported result is the average of the four trials.

	Raw Result(mg C)	Weight(mg)	Calculated Result(mg/kg)
Trial 1:	3.304	407.8	8100
Trial 2:	4.374	434.1	10100
Trial 3:	4.318	450.4	9590
Trial 4:	4.326	422.5	10200

Stand Deviation: 839

Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	15.4	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

*=This limit was used in the evaluation of the final result

Sample Description: **B-10 (7-8) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/06/2019 10:21
Collection Date/Time: 11/05/2019 11:35
SDG#: IBL24-01

Golder Associates Incorporated
ELLE Sample #: SW 1193714
ELLE Group #: 2072941
Matrix: Soil

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	Q193181AA	11/15/2019 03:55	Joel Trout	86.06
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	Q193181AA	11/15/2019 04:18	Joel Trout	860.59
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931155391	11/05/2019 11:35	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931155391	11/05/2019 11:35	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931155391	11/05/2019 11:35	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19311667631A	11/08/2019 10:04	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19315820001A	11/11/2019 11:48	William C Schwebel	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2072941
Reported: 11/19/2019 10:14

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Batch number: Q193181AA	Sample number(s): 1193714		
Benzene	N.D.	25	250
Benzyl Chloride	N.D.	75	200
Bromobenzene	N.D.	20	250
Bromodichloromethane	N.D.	20	250
Bromoform	N.D.	250	500
Bromomethane	N.D.	35	250
Carbon Tetrachloride	N.D.	25	250
Chlorobenzene	N.D.	25	250
Chloroethane	N.D.	50	250
Chloroform	N.D.	30	250
Chloromethane	N.D.	30	250
2-Chlorotoluene	N.D.	20	250
4-Chlorotoluene	N.D.	20	250
Dibromochloromethane	N.D.	25	250
Dibromomethane	N.D.	25	250
1,2-Dichlorobenzene	N.D.	25	250
1,3-Dichlorobenzene	N.D.	25	250
1,4-Dichlorobenzene	N.D.	20	250
Dichlorodifluoromethane	N.D.	30	250
1,1-Dichloroethane	N.D.	25	250
1,2-Dichloroethane	N.D.	30	250
1,1-Dichloroethene	N.D.	25	250
1,2-Dichloroethene (Total)	N.D.	50	500
1,2-Dichloropropane	N.D.	25	250
cis-1,3-Dichloropropene	N.D.	20	250
trans-1,3-Dichloropropene	N.D.	25	250
Ethylbenzene	N.D.	20	250
Freon 113	N.D.	30	500
Freon 123a	N.D.	30	250
Methylene Chloride	N.D.	100	250
1,1,1,2-Tetrachloroethane	N.D.	25	250
1,1,2,2-Tetrachloroethane	N.D.	20	250
Tetrachloroethene	N.D.	25	250
Toluene	N.D.	30	250
1,1,1-Trichloroethane	N.D.	30	250
1,1,2-Trichloroethane	N.D.	25	250
Trichloroethene	N.D.	25	250
Trichlorofluoromethane	N.D.	35	250
1,2,3-Trichloropropane	N.D.	30	250

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/19/2019 10:14

Group Number: 2072941

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Vinyl Chloride	N.D.	30	250
Xylene (Total)	N.D.	70	500
	mg/kg	mg/kg	mg/kg
Batch number: 19311667631A	Sample number(s): 1193714		
TOC by Lloyd Kahn	N.D.	100	300

LCS/LCSD

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: Q193181AA	Sample number(s): 1193714								
Benzene	1000	1103.24	1000	1087.15	110	109	80-120	1	30
Benzyl Chloride	1000	682.99	1000	724.8	68	72	48-134	6	30
Bromobenzene	1000	893.2	1000	1034.48	89	103	78-120	15	30
Bromodichloromethane	1000	1188.68	1000	1183.51	119	118	70-120	0	30
Bromoform	1000	1000.28	1000	1086.57	100	109	51-127	8	30
Bromomethane	1000	708.78	1000	797.35	71	80	45-140	12	30
Carbon Tetrachloride	1000	1122.92	1000	1148.46	112	115	64-134	2	30
Chlorobenzene	1000	965.81	1000	978.05	97	98	80-120	1	30
Chloroethane	1000	737.88	1000	811.6	74	81	43-135	10	30
Chloroform	1000	1197.83	1000	1179.43	120	118	80-120	2	30
Chloromethane	1000	762.14	1000	758.53	76	76	56-120	0	30
2-Chlorotoluene	1000	831.77	1000	921.02	83	92	75-120	10	30
4-Chlorotoluene	1000	858.05	1000	977.84	86	98	75-120	13	30
Dibromochloromethane	1000	981.54	1000	1102.11	98	110	69-125	12	30
Dibromomethane	1000	1174.94	1000	1125.47	117	113	80-120	4	30
1,2-Dichlorobenzene	1000	862.29	1000	978.03	86	98	76-120	13	30
1,3-Dichlorobenzene	1000	867.24	1000	980.8	87	98	75-120	12	30
1,4-Dichlorobenzene	1000	866.46	1000	971.82	87	97	80-120	11	30
Dichlorodifluoromethane	1000	467.95	1000	481.33	47	48	21-127	3	30
1,1-Dichloroethane	1000	1135.63	1000	1094.96	114	109	79-120	4	30
1,2-Dichloroethane	1000	1313.46	1000	1287.94	131*	129*	71-128	2	30
1,1-Dichloroethene	1000	1108.8	1000	1111.53	111	111	73-129	0	30
1,2-Dichloroethene (Total)	2000	2345.82	2000	2312.51	117	116	80-126	1	30
1,2-Dichloropropane	1000	1087.09	1000	1051.13	109	105	80-120	3	30
cis-1,3-Dichloropropene	1000	1101.99	1000	1078.76	110	108	66-120	2	30
trans-1,3-Dichloropropene	1000	974.87	1000	969.1	97	97	68-122	1	30
Ethylbenzene	1000	979.87	1000	963.55	98	96	78-120	2	30
Freon 113	1000	891.27	1000	917.19	89	92	64-135	3	30
Freon 123a	1000	1030.44	1000	1066.18	103	107	71-123	3	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/19/2019 10:14

Group Number: 2072941

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Methylene Chloride	1000	1152.92	1000	1154.03	115	115	76-122	0	30
1,1,1,2-Tetrachloroethane	1000	1004.89	1000	1072.23	100	107	73-120	6	30
1,1,2,2-Tetrachloroethane	1000	829.59	1000	959.81	83	96	69-125	15	30
Tetrachloroethene	1000	1076.61	1000	1092.46	108	109	73-120	1	30
Toluene	1000	961.6	1000	959.12	96	96	80-120	0	30
1,1,1-Trichloroethane	1000	1163.49	1000	1187.41	116	119	69-123	2	30
1,1,2-Trichloroethane	1000	1031.73	1000	1055.1	103	106	80-120	2	30
Trichloroethene	1000	1114	1000	1112.77	111	111	80-120	0	30
Trichlorofluoromethane	1000	935.18	1000	951.41	94	95	55-134	2	30
1,2,3-Trichloropropane	1000	930.5	1000	1049.4	93	105	75-125	12	30
Vinyl Chloride	1000	829.26	1000	838.99	83	84	52-120	1	30
Xylene (Total)	3000	2937.91	3000	2833.33	98	94	75-120	4	30
	mg/kg	**mg/kg**	**mg/kg**	**mg/kg**					
Batch number: 19311667631A	Sample number(s): 1193714								
TOC by Lloyd Kahn	5080	5315.99			105		47-143		
	%	**%**	**%**	**%**					
Batch number: 19315820001A	Sample number(s): 1193714								
Moisture	89.5	89.43			100		99-101		

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260C/D
Batch number: Q193181AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1193714	98	98	79	85
Blank	104	107	90	93
LCS	107	109	89	91
LCSD	106	105	89	88
Limits:	50-141	54-135	52-141	50-131

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

IBM Chain of Custody

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Acct. # 42322 For Eurofins Lancaster Laboratories Environmental use only Group # 2372941 Sample # 1193714
Instructions on reverse side correspond with circled numbers.

COC # 020640

Client Information

Client: Golder
Acct #:
Project Name/#: EBM- Kingston Summit
SSOW #:
IBM PM: Dean Chartrand
Project State:
P.O. #: 083-87071.08
Sampler: Hannah Elkinton, David Vella
For Compliance: ☐ Yes ☒ No

Check One:
☐ Routine Lab GW ☐ Routine GTF O&M
☒ Non-Routine Investigation ☐ Non-Routine Upgrades/Installs
OU: _____ (Endicott Non-Routine only)

For Lab Use Only

SCR#:

Preservation Codes

H = HCl T = Thiosulfate
N = HNO_3 B = NaOH
S = H_2SO_4 O = Other
F = Field Filtered

Remarks

* Samples on ice

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil	Matrix: Sediment	Matrix: Water	Matrix: Ground	Matrix: Potable	Matrix: Surface	Matrix: NPDES	Matrix: Oil	Matrix: Air	Total # of Containers	Analyses Requested: VOC 8260C (Preservation 0)	Analyses Requested: TOC (Preservation 1)	Remarks
B-10 (7-8)	11/6/19	1135	X		X									5	X	X	PID = 220 PPM

Turnaround Time Requested (TAT) (please circle)
Standard Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharges.)
Date results are needed:
E-mail: chemingway@golder.com, helkinton@golder.com
Is EDD Needed? Yes

Data Package Options (please circle if required)
Type I (Validation/NJ Reg) TX TRRP-13 NY ASP A
Type III (Reduced NJ) MA MCP NY ASP B
Type VI (Raw Data Only) CT RCP
SDG Complete? Yes No

Relinquished by	Date	Time	Received by	Date	Time
[signature]	11/5/19	1500	[signature]		
			[signature]	11/6/19	1021

Site-specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate volume.)

Temperature upon receipt 0.7 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 265382

Group Number(s): 2072941

Client: Golder

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Date:	11/06/2019
Number of Packages:	1	Number of Projects:	2
State/Province of Origin:	NY		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	Total Trip Blank Qty:	0
Samples Chilled:	Yes	Air Quality Samples Present:	No
Paperwork Enclosed:	Yes		
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Wesley Miller

Samples Chilled Details

Thermometer Types: *DT = Digital (Temp. Bottle)* *IR = Infrared (Surface Temp)* *All Temperatures in °C.*

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	192050133	0.8	IR	Wet	Y	Bagged	N

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Lancaster, PA 17605-2425

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Golder Associates Incorporated
200 Century Parkway
Suite C
Mt. Laurel NJ 08054

Report Date: November 27, 2019 10:41

Project: IBM-Kingston SWMU

Account #: 42322
Group Number: 2073915
SDG: IBL25
PO Number: 083-87071.08
State of Sample Origin: NY

Electronic Copy To	Golder Associates, Inc.	Attn: Christopher Hemingway
Electronic Copy To	Golder	Attn: Youki Sato

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

To view our laboratory's current scopes of accreditation please go to https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/ . Historical copies may be requested through your project manager.

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
B-20(27-28) Grab Soil	11/06/2019 08:40	1198445
B-18(7.5-8.5) Grab Soil	11/06/2019 11:05	1198446
B-17(22-23) Grab Soil	11/06/2019 12:35	1198447
B-7(7-9) Grab Groundwater	11/07/2019 12:25	1198448
TB19301 Water	11/06/2019	1198449

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **B-20(27-28) Grab Soil**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: **SW 1198445**
ELLE Group #: **2073915**
Matrix: Soil

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019 08:40
SDG#: IBL25-01

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**		**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	N.D.		25	250	40.19
11995	Benzyl Chloride	100-44-7	N.D.		76	200	40.19
11995	Bromobenzene	108-86-1	N.D.		20	250	40.19
11995	Bromodichloromethane	75-27-4	N.D.		20	250	40.19
11995	Bromoform	75-25-2	N.D.		250	510	40.19
11995	Bromomethane	74-83-9	N.D.		36	250	40.19
11995	Carbon Tetrachloride	56-23-5	N.D.		25	250	40.19
11995	Chlorobenzene	108-90-7	N.D.		25	250	40.19
11995	Chloroethane	75-00-3	N.D.		51	250	40.19
11995	Chloroform	67-66-3	N.D.		31	250	40.19
11995	Chloromethane	74-87-3	N.D.		31	250	40.19
11995	2-Chlorotoluene	95-49-8	N.D.		20	250	40.19
11995	4-Chlorotoluene	106-43-4	N.D.		20	250	40.19
11995	Dibromochloromethane	124-48-1	N.D.		25	250	40.19
11995	Dibromomethane	74-95-3	N.D.		25	250	40.19
11995	1,2-Dichlorobenzene	95-50-1	N.D.		25	250	40.19
11995	1,3-Dichlorobenzene	541-73-1	N.D.		25	250	40.19
11995	1,4-Dichlorobenzene	106-46-7	N.D.		20	250	40.19
11995	Dichlorodifluoromethane	75-71-8	N.D.		31	250	40.19
11995	1,1-Dichloroethane	75-34-3	N.D.		25	250	40.19
11995	1,2-Dichloroethane	107-06-2	N.D.		31	250	40.19
11995	1,1-Dichloroethene	75-35-4	N.D.		25	250	40.19
11995	1,2-Dichloroethene (Total)[1]	540-59-0	140	J	51	510	40.19
11995	1,2-Dichloropropane	78-87-5	N.D.		25	250	40.19
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.		20	250	40.19
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.		25	250	40.19
11995	Ethylbenzene	100-41-4	N.D.		20	250	40.19
11995	Freon 113	76-13-1	N.D.		31	510	40.19
11995	Freon 123a[1]	354-23-4	N.D.		31	250	40.19
11995	Methylene Chloride	75-09-2	N.D.		100	250	40.19
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.		25	250	40.19
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		20	250	40.19
11995	Tetrachloroethene	127-18-4	N.D.		25	250	40.19
11995	Toluene	108-88-3	N.D.		31	250	40.19
11995	1,1,1-Trichloroethane	71-55-6	N.D.		31	250	40.19
11995	1,1,2-Trichloroethane	79-00-5	N.D.		25	250	40.19
11995	Trichloroethene	79-01-6	65,000		250	2,500	401.93
11995	Trichlorofluoromethane	75-69-4	N.D.		36	250	40.19
11995	1,2,3-Trichloropropane	96-18-4	N.D.		31	250	40.19
11995	Vinyl Chloride	75-01-4	N.D.		31	250	40.19
11995	Xylene (Total)	1330-20-7	N.D.		71	510	40.19

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(27-28) Grab Soil**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: **SW 1198445**
ELLE Group #: **2073915**
Matrix: Soil

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019 08:40
SDG#: IBL25-01

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.					
Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	4,290	286	858	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	21.0	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	V193233AA	11/20/2019 02:45	Joel Trout	40.19
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	Q193241AA	11/20/2019 22:59	Joel Trout	401.93
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931655428	11/06/2019 08:40	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931655428	11/06/2019 08:40	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931655428	11/06/2019 08:40	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19322667631A	11/19/2019 01:11	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19316820002B	11/13/2019 12:19	William C Schwebel	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-18(7.5-8.5) Grab Soil**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: **SW 1198446**
ELLE Group #: **2073915**
Matrix: Soil

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019 11:05
SDG#: IBL25-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**	**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	N.D.	24	240	40.13
11995	Benzyl Chloride	100-44-7	500	71	190	40.13
11995	Bromobenzene	108-86-1	N.D.	19	240	40.13
11995	Bromodichloromethane	75-27-4	N.D.	19	240	40.13
11995	Bromoform	75-25-2	N.D.	240	470	40.13
11995	Bromomethane	74-83-9	N.D.	33	240	40.13
11995	Carbon Tetrachloride	56-23-5	N.D.	24	240	40.13
11995	Chlorobenzene	108-90-7	N.D.	24	240	40.13
11995	Chloroethane	75-00-3	N.D.	47	240	40.13
11995	Chloroform	67-66-3	N.D.	28	240	40.13
11995	Chloromethane	74-87-3	N.D.	28	240	40.13
11995	2-Chlorotoluene	95-49-8	N.D.	19	240	40.13
11995	4-Chlorotoluene	106-43-4	N.D.	19	240	40.13
11995	Dibromochloromethane	124-48-1	N.D.	24	240	40.13
11995	Dibromomethane	74-95-3	N.D.	24	240	40.13
11995	1,2-Dichlorobenzene	95-50-1	N.D.	24	240	40.13
11995	1,3-Dichlorobenzene	541-73-1	N.D.	24	240	40.13
11995	1,4-Dichlorobenzene	106-46-7	N.D.	19	240	40.13
11995	Dichlorodifluoromethane	75-71-8	N.D.	28	240	40.13
11995	1,1-Dichloroethane	75-34-3	360	24	240	40.13
11995	1,2-Dichloroethane	107-06-2	95 J	28	240	40.13
11995	1,1-Dichloroethene	75-35-4	280	24	240	40.13
11995	1,2-Dichloroethene (Total)[1]	540-59-0	31,000	470	4,700	401.28
11995	1,2-Dichloropropane	78-87-5	N.D.	24	240	40.13
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	19	240	40.13
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	24	240	40.13
11995	Ethylbenzene	100-41-4	100 J	19	240	40.13
11995	Freon 113	76-13-1	N.D.	28	470	40.13
11995	Freon 123a[1]	354-23-4	N.D.	28	240	40.13
11995	Methylene Chloride	75-09-2	N.D.	95	240	40.13
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	24	240	40.13
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	19	240	40.13
11995	Tetrachloroethene	127-18-4	N.D.	24	240	40.13
11995	Toluene	108-88-3	63 J	28	240	40.13
11995	1,1,1-Trichloroethane	71-55-6	150 J	28	240	40.13
11995	1,1,2-Trichloroethane	79-00-5	N.D.	24	240	40.13
11995	Trichloroethene	79-01-6	5,400	24	240	40.13
11995	Trichlorofluoromethane	75-69-4	N.D.	33	240	40.13
11995	1,2,3-Trichloropropane	96-18-4	N.D.	28	240	40.13
11995	Vinyl Chloride	75-01-4	N.D.	28	240	40.13
11995	Xylene (Total)	1330-20-7	1,600	66	470	40.13

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-18(7.5-8.5) Grab Soil**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: **SW 1198446**
ELLE Group #: **2073915**
Matrix: Soil

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019 11:05
SDG#: IBL25-02

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.					
Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	11,100	373	1,120	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	15.3	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	V193233AA	11/20/2019 03:07	Joel Trout	40.13
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	Q193241AA	11/20/2019 23:22	Joel Trout	401.28
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931655428	11/06/2019 11:05	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931655428	11/06/2019 11:05	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931655428	11/06/2019 11:05	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19322667631A	11/19/2019 01:24	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19316820002B	11/13/2019 12:19	William C Schwebel	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-17(22-23) Grab Soil**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: **SW 1198447**
ELLE Group #: **2073915**
Matrix: Soil

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019 12:35
SDG#: IBL25-03

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**	**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	N.D.	0.5	5	0.81
11995	Benzyl Chloride	100-44-7	N.D.	2	4	0.81
11995	Bromobenzene	108-86-1	N.D.	0.4	5	0.81
11995	Bromodichloromethane	75-27-4	N.D.	0.4	5	0.81
11995	Bromoform	75-25-2	N.D.	5	10	0.81
11995	Bromomethane	74-83-9	N.D.	0.7	5	0.81
11995	Carbon Tetrachloride	56-23-5	N.D.	0.5	5	0.81
11995	Chlorobenzene	108-90-7	N.D.	0.5	5	0.81
11995	Chloroethane	75-00-3	N.D.	1	5	0.81
11995	Chloroform	67-66-3	N.D.	0.6	5	0.81
11995	Chloromethane	74-87-3	N.D.	0.6	5	0.81
11995	2-Chlorotoluene	95-49-8	N.D.	0.4	5	0.81
11995	4-Chlorotoluene	106-43-4	N.D.	0.4	5	0.81
11995	Dibromochloromethane	124-48-1	N.D.	0.5	5	0.81
11995	Dibromomethane	74-95-3	N.D.	0.5	5	0.81
11995	1,2-Dichlorobenzene	95-50-1	N.D.	0.5	5	0.81
11995	1,3-Dichlorobenzene	541-73-1	N.D.	0.5	5	0.81
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.4	5	0.81
11995	Dichlorodifluoromethane	75-71-8	N.D.	0.6	5	0.81
11995	1,1-Dichloroethane	75-34-3	N.D.	0.5	5	0.81
11995	1,2-Dichloroethane	107-06-2	N.D.	0.6	5	0.81
11995	1,1-Dichloroethene	75-35-4	N.D.	0.5	5	0.81
11995	1,2-Dichloroethene (Total)[1]	540-59-0	1 J	1	10	0.81
11995	1,2-Dichloropropane	78-87-5	N.D.	0.5	5	0.81
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.4	5	0.81
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.5	5	0.81
11995	Ethylbenzene	100-41-4	N.D.	0.4	5	0.81
11995	Freon 113	76-13-1	6 J	0.6	10	0.81
11995	Freon 123a[1]	354-23-4	0.6 J	0.6	5	0.81
11995	Methylene Chloride	75-09-2	N.D.	2	5	0.81
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.5	5	0.81
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.4	5	0.81
11995	Tetrachloroethene	127-18-4	150	0.5	5	0.81
11995	Toluene	108-88-3	N.D.	0.6	5	0.81
11995	1,1,1-Trichloroethane	71-55-6	N.D.	0.6	5	0.81
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.5	5	0.81
11995	Trichloroethene	79-01-6	2,100	25	250	40.26
11995	Trichlorofluoromethane	75-69-4	N.D.	0.7	5	0.81
11995	1,2,3-Trichloropropane	96-18-4	N.D.	0.6	5	0.81
11995	Vinyl Chloride	75-01-4	N.D.	0.6	5	0.81
11995	Xylene (Total)	1330-20-7	N.D.	1	10	0.81

*=This limit was used in the evaluation of the final result

Sample Description: **B-17(22-23) Grab Soil**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: SW 1198447
ELLE Group #: 2073915
Matrix: Soil

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019 12:35
SDG#: IBL25-03

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	762	127	380	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	19.4	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A193233AA	11/19/2019 18:44	Stephen C Nolte	0.81
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	V193233AA	11/20/2019 02:23	Joel Trout	40.26
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931655428	11/06/2019 12:35	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931655428	11/06/2019 12:35	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931655428	11/06/2019 12:35	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19322667631A	11/19/2019 01:37	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19316820002B	11/13/2019 12:19	William C Schwebel	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-7(7-9) Grab Groundwater**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: GW 1198448
ELLE Group #: 2073915
Matrix: Groundwater

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/07/2019 12:25
SDG#: IBL25-04

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	0.9 J	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	0.6 J	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	2	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	1	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	0.9 J	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	19	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-7(7-9) Grab Groundwater**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: GW 1198448
ELLE Group #: 2073915
Matrix: Groundwater

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/07/2019 12:25
SDG#: IBL25-04

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 14:49	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 14:48	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Sample Description: **TB19301 Water**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: **GW 1198449**
ELLE Group #: **2073915**
Matrix: Water

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019
SDG#: IBL25-05TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **TB19301 Water**

Project Name: **IBM-Kingston SWMU**

Golder Associates Incorporated
ELLE Sample #: GW 1198449
ELLE Group #: 2073915
Matrix: Water

Submittal Date/Time: 11/08/2019 11:46
Collection Date/Time: 11/06/2019
SDG#: IBL25-05TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 11:52	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 11:51	Linda C Pape	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2073915
Reported: 11/27/2019 10:41

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Batch number: A193233AA	Sample number(s): 1198447		
Benzene	N.D.	0.5	5
Benzyl Chloride	N.D.	2	4
Bromobenzene	N.D.	0.4	5
Bromodichloromethane	N.D.	0.4	5
Bromoform	N.D.	5	10
Bromomethane	N.D.	0.7	5
Carbon Tetrachloride	N.D.	0.5	5
Chlorobenzene	N.D.	0.5	5
Chloroethane	N.D.	1	5
Chloroform	N.D.	0.6	5
Chloromethane	N.D.	0.6	5
2-Chlorotoluene	N.D.	0.4	5
4-Chlorotoluene	N.D.	0.4	5
Dibromochloromethane	N.D.	0.5	5
Dibromomethane	N.D.	0.5	5
1,2-Dichlorobenzene	N.D.	0.5	5
1,3-Dichlorobenzene	N.D.	0.5	5
1,4-Dichlorobenzene	N.D.	0.4	5
Dichlorodifluoromethane	N.D.	0.6	5
1,1-Dichloroethane	N.D.	0.5	5
1,2-Dichloroethane	N.D.	0.6	5
1,1-Dichloroethene	N.D.	0.5	5
1,2-Dichloroethene (Total)	N.D.	1	10
1,2-Dichloropropane	N.D.	0.5	5
cis-1,3-Dichloropropene	N.D.	0.4	5
trans-1,3-Dichloropropene	N.D.	0.5	5
Ethylbenzene	N.D.	0.4	5
Freon 113	N.D.	0.6	10
Freon 123a	N.D.	0.6	5
Methylene Chloride	N.D.	2	5
1,1,1,2-Tetrachloroethane	N.D.	0.5	5
1,1,2,2-Tetrachloroethane	N.D.	0.4	5
Tetrachloroethene	N.D.	0.5	5
Toluene	N.D.	0.6	5
1,1,1-Trichloroethane	N.D.	0.6	5
1,1,2-Trichloroethane	N.D.	0.5	5
Trichlorofluoromethane	N.D.	0.7	5
1,2,3-Trichloropropane	N.D.	0.6	5
Vinyl Chloride	N.D.	0.6	5

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2073915
Reported: 11/27/2019 10:41

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Xylene (Total)	N.D.	1	10
Batch number: Q193241AA	Sample number(s): 1198445-1198446		
1,2-Dichloroethene (Total)	N.D.	50	500
Trichloroethene	N.D.	25	250
Batch number: V193233AA	Sample number(s): 1198445-1198447		
Benzene	N.D.	25	250
Benzyl Chloride	N.D.	75	200
Bromobenzene	N.D.	20	250
Bromodichloromethane	N.D.	20	250
Bromoform	N.D.	250	500
Bromomethane	N.D.	35	250
Carbon Tetrachloride	N.D.	25	250
Chlorobenzene	N.D.	25	250
Chloroethane	N.D.	50	250
Chloroform	N.D.	30	250
Chloromethane	N.D.	30	250
2-Chlorotoluene	N.D.	20	250
4-Chlorotoluene	N.D.	20	250
Dibromochloromethane	N.D.	25	250
Dibromomethane	N.D.	25	250
1,2-Dichlorobenzene	N.D.	25	250
1,3-Dichlorobenzene	N.D.	25	250
1,4-Dichlorobenzene	N.D.	20	250
Dichlorodifluoromethane	N.D.	30	250
1,1-Dichloroethane	N.D.	25	250
1,2-Dichloroethane	N.D.	30	250
1,1-Dichloroethene	N.D.	25	250
1,2-Dichloroethene (Total)	N.D.	50	500
1,2-Dichloropropane	N.D.	25	250
cis-1,3-Dichloropropene	N.D.	20	250
trans-1,3-Dichloropropene	N.D.	25	250
Ethylbenzene	N.D.	20	250
Freon 113	N.D.	30	500
Freon 123a	N.D.	30	250
Methylene Chloride	N.D.	100	250
1,1,1,2-Tetrachloroethane	N.D.	25	250
1,1,2,2-Tetrachloroethane	N.D.	20	250
Tetrachloroethene	N.D.	25	250
Toluene	N.D.	30	250
1,1,1-Trichloroethane	N.D.	30	250
1,1,2-Trichloroethane	N.D.	25	250
Trichloroethene	N.D.	25	250
Trichlorofluoromethane	N.D.	35	250
1,2,3-Trichloropropane	N.D.	30	250

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2073915
Reported: 11/27/2019 10:41

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Vinyl Chloride	N.D.	30	250
Xylene (Total)	N.D.	70	500
	ug/l	ug/l	ug/l
Batch number: Y193221AA	Sample number(s): 1198448-1198449		
Benzene	N.D.	0.2	1
Benzyl Chloride	N.D.	1	5
Bromobenzene	N.D.	0.2	5
Bromodichloromethane	N.D.	0.2	1
Bromoform	N.D.	1	4
Bromomethane	N.D.	0.3	1
Carbon Tetrachloride	N.D.	0.2	1
Chlorobenzene	N.D.	0.2	1
Chloroethane	N.D.	0.2	1
Chloroform	N.D.	0.2	1
Chloromethane	N.D.	0.2	1
2-Chlorotoluene	N.D.	0.2	5
4-Chlorotoluene	N.D.	0.2	5
Dibromochloromethane	N.D.	0.2	1
Dibromomethane	N.D.	0.2	1
1,2-Dichlorobenzene	N.D.	0.2	5
1,3-Dichlorobenzene	N.D.	0.2	5
1,4-Dichlorobenzene	N.D.	0.2	5
Dichlorodifluoromethane	N.D.	0.2	1
1,1-Dichloroethane	N.D.	0.2	1
1,2-Dichloroethane	N.D.	0.3	1
1,1-Dichloroethene	N.D.	0.2	1
1,2-Dichloroethene (Total)	N.D.	0.4	2
1,2-Dichloropropane	N.D.	0.2	1
cis-1,3-Dichloropropene	N.D.	0.2	1
trans-1,3-Dichloropropene	N.D.	0.2	1
Ethylbenzene	N.D.	0.4	1
Freon 113	N.D.	0.2	10
Freon 123a	N.D.	0.4	5
Methylene Chloride	N.D.	0.3	1
1,1,1,2-Tetrachloroethane	N.D.	0.2	1
1,1,2,2-Tetrachloroethane	N.D.	0.2	1
Tetrachloroethene	N.D.	0.2	1
Toluene	N.D.	0.2	1
1,1,1-Trichloroethane	N.D.	0.3	1
1,1,2-Trichloroethane	N.D.	0.2	1
Trichloroethene	N.D.	0.2	1
Trichlorofluoromethane	N.D.	0.2	1
1,2,3-Trichloropropane	N.D.	0.2	5
Vinyl Chloride	N.D.	0.2	1

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/27/2019 10:41

Group Number: 2073915

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Xylene (Total)	N.D.	1	6
	mg/kg	mg/kg	mg/kg
Batch number: 19322667631A	Sample number(s): 1198445-1198447		
TOC by Lloyd Kahn	N.D.	100	300

LCS/LCSD

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: A193233AA	Sample number(s): 1198447								
Benzene	20	19.75	20	19.76	99	99	80-120	0	30
Benzyl Chloride	20	17.48	20	19.46	87	97	48-134	11	30
Bromobenzene	20	19.41	20	19.61	97	98	78-120	1	30
Bromodichloromethane	20	19.63	20	19.9	98	100	70-120	1	30
Bromoform	20	18.57	20	19.73	93	99	51-127	6	30
Bromomethane	20	16.69	20	16.66	83	83	45-140	0	30
Carbon Tetrachloride	20	20.85	20	20.82	104	104	64-134	0	30
Chlorobenzene	20	21.1	20	21.19	106	106	80-120	0	30
Chloroethane	20	17.05	20	17.17	85	86	43-135	1	30
Chloroform	20	20.19	20	20.28	101	101	80-120	0	30
Chloromethane	20	16.09	20	16.03	80	80	56-120	0	30
2-Chlorotoluene	20	20.37	20	20.42	102	102	75-120	0	30
4-Chlorotoluene	20	20.44	20	20.37	102	102	75-120	0	30
Dibromochloromethane	20	20.47	20	21.21	102	106	69-125	4	30
Dibromomethane	20	20.94	20	22.05	105	110	80-120	5	30
1,2-Dichlorobenzene	20	20.48	20	20.6	102	103	76-120	1	30
1,3-Dichlorobenzene	20	19.81	20	19.87	99	99	75-120	0	30
1,4-Dichlorobenzene	20	20.31	20	20.1	102	101	80-120	1	30
Dichlorodifluoromethane	20	13.18	20	13.03	66	65	21-127	1	30
1,1-Dichloroethane	20	18.98	20	18.82	95	94	79-120	1	30
1,2-Dichloroethane	20	19.53	20	20.38	98	102	71-128	4	30
1,1-Dichloroethene	20	21.65	20	21.83	108	109	73-129	1	30
1,2-Dichloroethene (Total)	40	43.6	40	43.51	109	109	80-126	0	30
1,2-Dichloropropane	20	18.65	20	19.12	93	96	80-120	3	30
cis-1,3-Dichloropropene	20	17.78	20	17.91	89	90	66-120	1	30
trans-1,3-Dichloropropene	20	17.72	20	18.58	89	93	68-122	5	30
Ethylbenzene	20	19	20	19.06	95	95	78-120	0	30
Freon 113	20	19.85	20	20.09	99	100	64-135	1	30
Freon 123a	20	19.78	20	19.54	99	98	71-123	1	30
Methylene Chloride	20	20.38	20	20.6	102	103	76-122	1	30

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2073915
Reported: 11/27/2019 10:41

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,1,1,2-Tetrachloroethane	20	20.56	20	21.17	103	106	73-120	3	30
1,1,2,2-Tetrachloroethane	20	19.08	20	20.54	95	103	69-125	7	30
Tetrachloroethene	20	20.29	20	20.09	101	100	73-120	1	30
Toluene	20	19.42	20	19.72	97	99	80-120	2	30
1,1,1-Trichloroethane	20	20.12	20	20.13	101	101	69-123	0	30
1,1,2-Trichloroethane	20	21.09	20	22.26	105	111	80-120	5	30
Trichlorofluoromethane	20	18	20	17.44	90	87	55-134	3	30
1,2,3-Trichloropropane	20	21.31	20	22.24	107	111	75-125	4	30
Vinyl Chloride	20	17.93	20	17.47	90	87	52-120	3	30
Xylene (Total)	60	60.1	60	60.54	100	101	75-120	1	30
Batch number: Q193241AA	Sample number(s): 1198445-1198446								
1,2-Dichloroethene (Total)	2000	1967.99	2000	1990.53	98	100	80-126	1	30
Trichloroethene	1000	956.56	1000	953.33	96	95	80-120	0	30
Batch number: V193233AA	Sample number(s): 1198445-1198447								
Benzene	1000	1039.74	1000	1045.71	104	105	80-120	1	30
Benzyl Chloride	1000	810.21	1000	829.73	81	83	48-134	2	30
Bromobenzene	1000	988.75	1000	990.97	99	99	78-120	0	30
Bromodichloromethane	1000	1099.94	1000	1097.96	110	110	70-120	0	30
Bromoform	1000	968.26	1000	982.22	97	98	51-127	1	30
Bromomethane	1000	1212.19	1000	1016.41	121	102	45-140	18	30
Carbon Tetrachloride	1000	1027.11	1000	1026.34	103	103	64-134	0	30
Chlorobenzene	1000	964.98	1000	967.64	96	97	80-120	0	30
Chloroethane	1000	1061.69	1000	872.6	106	87	43-135	20	30
Chloroform	1000	1074.22	1000	1077.45	107	108	80-120	0	30
Chloromethane	1000	784.61	1000	787.57	78	79	56-120	0	30
2-Chlorotoluene	1000	948	1000	952.6	95	95	75-120	0	30
4-Chlorotoluene	1000	938.43	1000	956.84	94	96	75-120	2	30
Dibromochloromethane	1000	1023.7	1000	1019.23	102	102	69-125	0	30
Dibromomethane	1000	1071.69	1000	1078.33	107	108	80-120	1	30
1,2-Dichlorobenzene	1000	959.99	1000	966.26	96	97	76-120	1	30
1,3-Dichlorobenzene	1000	967.9	1000	967.5	97	97	75-120	0	30
1,4-Dichlorobenzene	1000	981.04	1000	978.97	98	98	80-120	0	30
Dichlorodifluoromethane	1000	536.25	1000	500.51	54	50	21-127	7	30
1,1-Dichloroethane	1000	1008.83	1000	1006.88	101	101	79-120	0	30
1,2-Dichloroethane	1000	1061.99	1000	1073.85	106	107	71-128	1	30
1,1-Dichloroethene	1000	1084.15	1000	1089.12	108	109	73-129	0	30
1,2-Dichloroethene (Total)	2000	2250.42	2000	2252.39	113	113	80-126	0	30
1,2-Dichloropropane	1000	1023.09	1000	1031.3	102	103	80-120	1	30
cis-1,3-Dichloropropene	1000	1062.89	1000	1067.92	106	107	66-120	0	30
trans-1,3-Dichloropropene	1000	984.91	1000	975.39	98	98	68-122	1	30
Ethylbenzene	1000	978.49	1000	973.94	98	97	78-120	0	30
Freon 113	1000	883.92	1000	816.31	88	82	64-135	8	30
Freon 123a	1000	989.15	1000	976.98	99	98	71-123	1	30

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2073915
Reported: 11/27/2019 10:41

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Methylene Chloride	1000	1095.89	1000	1083.82	110	108	76-122	1	30
1,1,1,2-Tetrachloroethane	1000	1020.69	1000	1026.26	102	103	73-120	1	30
1,1,2,2-Tetrachloroethane	1000	894.6	1000	906.99	89	91	69-125	1	30
Tetrachloroethene	1000	1064.73	1000	1064.23	106	106	73-120	0	30
Toluene	1000	985.75	1000	988.02	99	99	80-120	0	30
1,1,1-Trichloroethane	1000	1051.43	1000	1042.41	105	104	69-123	1	30
1,1,2-Trichloroethane	1000	1026.97	1000	1033.31	103	103	80-120	1	30
Trichloroethene	1000	1063.24	1000	1070.02	106	107	80-120	1	30
Trichlorofluoromethane	1000	813.63	1000	794.19	81	79	55-134	2	30
1,2,3-Trichloropropane	1000	909.62	1000	923.85	91	92	75-125	2	30
Vinyl Chloride	1000	856.8	1000	855.27	86	86	52-120	0	30
Xylene (Total)	3000	2978.65	3000	2959.65	99	99	75-120	1	30
	ug/l	ug/l	ug/l	ug/l					
Batch number: Y193221AA	Sample number(s): 1198448-1198449								
Benzene	20	22.03	20	23.2	110	116	80-120	5	30
Benzyl Chloride	20	19.59	20	20.15	98	101	52-120	3	30
Bromobenzene	20	22.25	20	23.27	111	116	80-120	4	30
Bromodichloromethane	20	20.46	20	21.17	102	106	71-120	3	30
Bromoform	20	19.31	20	19.62	97	98	51-120	2	30
Bromomethane	20	13.22	20	14	66	70	53-128	6	30
Carbon Tetrachloride	20	17.95	20	18.93	90	95	64-134	5	30
Chlorobenzene	20	21.63	20	22.4	108	112	80-120	4	30
Chloroethane	20	14.52	20	15.12	73	76	55-123	4	30
Chloroform	20	20.74	20	21.74	104	109	80-120	5	30
Chloromethane	20	15.08	20	16.08	75	80	56-121	6	30
2-Chlorotoluene	20	21.49	20	22.85	107	114	80-120	6	30
4-Chlorotoluene	20	21.87	20	22.92	109	115	80-120	5	30
Dibromochloromethane	20	20.48	20	21.09	102	105	71-120	3	30
Dibromomethane	20	20.73	20	21.43	104	107	80-120	3	30
1,2-Dichlorobenzene	20	21.92	20	22.83	110	114	80-120	4	30
1,3-Dichlorobenzene	20	21.78	20	22.97	109	115	80-120	5	30
1,4-Dichlorobenzene	20	22.19	20	23.34	111	117	80-120	5	30
Dichlorodifluoromethane	20	11.09	20	11.78	55	59	41-127	6	30
1,1-Dichloroethane	20	21.58	20	22.7	108	114	80-120	5	30
1,2-Dichloroethane	20	19.89	20	20.56	99	103	73-124	3	30
1,1-Dichloroethene	20	21.58	20	22.66	108	113	80-131	5	30
1,2-Dichloroethene (Total)	40	43.75	40	46.44	109	116	80-125	6	30
1,2-Dichloropropane	20	23.51	20	24.33	118	122*	80-120	3	30
cis-1,3-Dichloropropene	20	21.33	20	22.24	107	111	75-120	4	30
trans-1,3-Dichloropropene	20	20.88	20	21.57	104	108	67-120	3	30
Ethylbenzene	20	21.96	20	23.02	110	115	80-120	5	30
Freon 113	20	18.45	20	19.39	92	97	73-139	5	30
Freon 123a	20	20.93	20	22.23	105	111	76-129	6	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2073915
Reported: 11/27/2019 10:41

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Methylene Chloride	20	22.58	20	23.63	113	118	80-120	5	30
1,1,1,2-Tetrachloroethane	20	20.47	20	21.33	102	107	78-120	4	30
1,1,2,2-Tetrachloroethane	20	23.18	20	24.18	116	121*	72-120	4	30
Tetrachloroethene	20	20.22	20	21.19	101	106	80-120	5	30
Toluene	20	22.01	20	22.96	110	115	80-120	4	30
1,1,1-Trichloroethane	20	18.67	20	19.71	93	99	67-126	5	30
1,1,2-Trichloroethane	20	23.27	20	23.96	116	120	80-120	3	30
Trichloroethene	20	20.45	20	21.47	102	107	80-120	5	30
Trichlorofluoromethane	20	13.1	20	13.83	65	69	55-135	5	30
1,2,3-Trichloropropane	20	21.72	20	22.35	109	112	75-124	3	30
Vinyl Chloride	20	14.85	20	15.75	74	79	56-120	6	30
Xylene (Total)	60	65.32	60	68.41	109	114	80-120	5	30
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 19322667631A	Sample number(s): 1198445-1198447								
TOC by Lloyd Kahn	5080	6326.81			125		47-143		
	%	%	%	%					
Batch number: 19316820002B	Sample number(s): 1198445-1198447								
Moisture	89.5	89.46			100		99-101		

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc	DUP Conc	DUP RPD	DUP RPD Max
	%	%		
Batch number: 19316820002B	Sample number(s): 1198445-1198447 BKG: 1198446			
Moisture	15.33	14.6	5	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260C/D
Batch number: A193233AA

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/27/2019 10:41

Group Number: 2073915

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260C/D
Batch number: A193233AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1198447	111	114	100	81
Blank	107	109	96	91
LCS	105	105	100	98
LCSD	105	107	100	98
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260C/D
Batch number: V193233AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1198445	63	65	56	62
1198446	83	85	74	91
Blank	101	104	91	94
LCS	103	103	90	91
LCSD	104	102	90	91
Limits:	50-141	54-135	52-141	50-131

Analysis Name: Volatiles 8260C
Batch number: Y193221AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1198448	92	99	100	95
1198449	92	98	100	95
Blank	91	98	100	94
LCS	92	98	100	96
LCSD	93	98	100	96
Limits:	80-120	80-120	80-120	80-120

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

IBM Chain of Custody

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Acct. # 42322 For Eurofins Lancaster Laboratories Environmental use only Group # 2073915 Sample # 1198445-49
Instructions on reverse side correspond with circled numbers.

COC # 020639

Client Information

Client: Golder
Acct #:
Project Name/#: IBM - Kingston SWMU M
SSOW #:
IBM PM: Dean Chartrand
Project State:
P.O. #: 083-87071.08
Sampler: David Vella
For Compliance: ☐ Yes ☒ No
Check One:
☐ Routine Lab GW ☐ Routine GTF O&M
☒ Non-Routine Investigation ☐ Non-Routine Upgrades/Installs
OU: _____ (Endicott Non-Routine only)

Matrix

Sediment ☐ | Ground ☒ | Surface ☐ | Soil ☒ | Potable Water ☐ | NPDES ☐ | Air ☐ | Oil ☐

Analyses Requested

Preservation and Filtration Codes

For Lab Use Only

SCR# 25/452

Preservation Codes

H = HCl T = Thiosulfate
N = HNO_3 B = NaOH
S = H_2SO_4 O = Other
F = Field Filtered

Remarks

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	VOC 8260C	TOC
B-20 (27-28)	11/6/19	0840	X		5	X	X
B-18 (7.5-8.5)	11/6/19	1105	X		5	X	X
B-17 (22-23)	11/6/19	1235	X		5	X	X
B-7 (7-9)	11/7/19	1225	X		3	X	
TB 19301							

Turnaround Time Requested (TAT) (please circle)
(Standard) Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharges.)
Date results are needed: _____
E-mail: chemingway@golder.com helkinton@golder.com
Is EDD Needed?: YES

Data Package Options (please circle if required)
Type I (Validation/NJ Reg) TX TRRP-13 NY ASP A
Type III (Reduced NJ) MA MCP NY ASP B
Type VI (Raw Data Only) CT RCP
SDG Complete? Yes (No)

Relinquished by	Date	Time	Received by	Date	Time
[signature]	10/31/19	14:40	[signature]	11/4/19	0800
[signature]	11/7/19	1530			
			[signature]	11/8/19	1146

Site-specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate volume.)

Temperature upon receipt 4.4 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 265953

265 953

Group Number(s): 2073915

Client: IBM c/o Golder

IBM-Kingston SWMU

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Date:	11/08/2019
Number of Packages:	1	Number of Projects:	1

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	Total Trip Blank Qty:	1
Samples Chilled:	Yes	Trip Blank Type:	HCl
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Nicole Reiff

Samples Chilled Details: IBM-Kingston SWMU

Thermometer Types: *DT = Digital (Temp. Bottle)* *IR = Infrared (Surface Temp)* *All Temperatures in °C.*

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	192050133	4.4	IR	Wet	Y	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Golder Associates Incorporated
200 Century Parkway
Suite C
Mt. Laurel NJ 08054

Report Date: November 26, 2019 13:07

Project: IBM Kingston, NY

Account #: 42322
Group Number: 2074109
SDG: IBL26
PO Number: 083-87071.08
State of Sample Origin: NY

Electronic Copy To	Golder Associates, Inc.	Attn: Christopher Hemingway
Electronic Copy To	Golder	Attn: Youki Sato

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

To view our laboratory's current scopes of accreditation please go to https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/ . Historical copies may be requested through your project manager.

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
B-12(11-13) Grab Groundwater	11/08/2019 09:55	1199596
B-12(26-28) Grab Groundwater	11/08/2019 10:40	1199597
B-5(11-13) Grab Groundwater	11/08/2019 12:00	1199598
B-3(12-14) Grab Groundwater	11/08/2019 14:10	1199599
B-9(12-14) Grab Groundwater	11/08/2019 13:40	1199600
B-14(10-12) Grab Groundwater	11/11/2019 10:23	1199601
B-15(10-12) Grab Groundwater	11/11/2019 11:00	1199602
B-16(25-27) Grab Groundwater	11/11/2019 12:00	1199603
B-16(11-13) Grab Groundwater	11/11/2019 12:40	1199604
B-16(11-13) Filtered Grab Groundwater	11/11/2019 12:40	1199605
B-20(28-30) Grab Groundwater	11/11/2019 13:55	1199606
B-20(28-30) Filtered Grab Groundwater	11/11/2019 13:55	1199607
Trip Blank Water	11/08/2019	1199608

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **B-12(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 09:55
SDG#: IBL26-01

Golder Associates Incorporated
ELLE Sample #: GW 1199596
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	0.5 J	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	0.9 J	0.2	1	1
11997	Toluene	108-88-3	0.3 J	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	2	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	0.2 J	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-12(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 09:55
SDG#: IBL26-01

Golder Associates Incorporated
ELLE Sample #: GW 1199596
ELLE Group #: 2074109
Matrix: Groundwater

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	W193231AA	11/19/2019 13:12	Kevin A Sposito	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	W193231AA	11/19/2019 13:11	Kevin A Sposito	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-12(26-28) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 10:40
SDG#: IBL26-02

Golder Associates Incorporated
ELLE Sample #: GW 1199597
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-12(26-28) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 10:40
SDG#: IBL26-02

Golder Associates Incorporated
ELLE Sample #: GW 1199597
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 15:11	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 15:10	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-5(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 12:00
SDG#: IBL26-03

Golder Associates Incorporated
ELLE Sample #: GW 1199598
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	0.3 J	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	0.5 J	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	1	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	0.3 J	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	3	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	0.3 J	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-5(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 12:00
SDG#: IBL26-03

Golder Associates Incorporated
ELLE Sample #: GW 1199598
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Vinyl Chloride

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 15:33	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 15:32	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-3(12-14) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 14:10
SDG#: IBL26-04

Golder Associates Incorporated
ELLE Sample #: GW 1199599
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	1	5	5
11997	Benzyl Chloride	100-44-7	N.D.	5	25	5
11997	Bromobenzene	108-86-1	N.D.	1	25	5
11997	Bromodichloromethane	75-27-4	N.D.	1	5	5
11997	Bromoform	75-25-2	N.D.	5	20	5
11997	Bromomethane	74-83-9	N.D.	2	5	5
11997	Carbon Tetrachloride	56-23-5	N.D.	1	5	5
11997	Chlorobenzene	108-90-7	N.D.	1	5	5
11997	Chloroethane	75-00-3	N.D.	1	5	5
11997	Chloroform	67-66-3	2 J	1	5	5
11997	Chloromethane	74-87-3	N.D.	1	5	5
11997	2-Chlorotoluene	95-49-8	N.D.	1	25	5
11997	4-Chlorotoluene	106-43-4	N.D.	1	25	5
11997	Dibromochloromethane	124-48-1	N.D.	1	5	5
11997	Dibromomethane	74-95-3	N.D.	1	5	5
11997	1,2-Dichlorobenzene	95-50-1	N.D.	1	25	5
11997	1,3-Dichlorobenzene	541-73-1	N.D.	1	25	5
11997	1,4-Dichlorobenzene	106-46-7	N.D.	1	25	5
11997	Dichlorodifluoromethane	75-71-8	N.D.	1	5	5
11997	1,1-Dichloroethane	75-34-3	390	1	5	5
11997	1,2-Dichloroethane	107-06-2	35	2	5	5
11997	1,1-Dichloroethene	75-35-4	37	1	5	5
11997	1,2-Dichloroethene (Total)[1]	540-59-0	2,400	20	100	50
11997	1,2-Dichloropropane	78-87-5	N.D.	1	5	5
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	1	5	5
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	1	5	5
11997	Ethylbenzene	100-41-4	N.D.	2	5	5
11997	Freon 113	76-13-1	N.D.	1	50	5
11997	Freon 123a[1]	354-23-4	N.D.	2	25	5
11997	Methylene Chloride	75-09-2	N.D.	2	5	5
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	1	5	5
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	1	5	5
11997	Tetrachloroethene	127-18-4	18	1	5	5
11997	Toluene	108-88-3	N.D.	1	5	5
11997	1,1,1-Trichloroethane	71-55-6	210	2	5	5
11997	1,1,2-Trichloroethane	79-00-5	N.D.	1	5	5
11997	Trichloroethene	79-01-6	290	1	5	5
11997	Trichlorofluoromethane	75-69-4	N.D.	1	5	5
11997	1,2,3-Trichloropropane	96-18-4	N.D.	1	25	5
11997	Vinyl Chloride	75-01-4	13	1	5	5
11997	Xylene (Total)	1330-20-7	N.D.	7	30	5

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-3(12-14) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 14:10
SDG#: IBL26-04

Golder Associates Incorporated
ELLE Sample #: GW 1199599
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Vinyl Chloride.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 18:52	Linda C Pape	5
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 19:14	Linda C Pape	50
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 18:51	Linda C Pape	5
01163	GC/MS VOA Water Prep	SW-846 5030C	2	Y193221AA	11/18/2019 19:13	Linda C Pape	50

*=This limit was used in the evaluation of the final result

Sample Description: **B-9(12-14) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 13:40
SDG#: IBL26-05

Golder Associates Incorporated
ELLE Sample #: GW 1199600
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	0.2 J	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	69	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	2	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	8	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	310 E	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	0.2 J	0.2	10	1
11997	Freon 123a[1]	354-23-4	1 J	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	3	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	6	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	51	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	21	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-9(12-14) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019 13:40
SDG#: IBL26-05

Golder Associates Incorporated
ELLE Sample #: GW 1199600
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Vinyl Chloride.

The concentration reported for 1,2-Dichloroethene (total) is estimated since it exceeds the calibration range of the instrument. A further diluted analysis was performed from a previously opened container with headspace.
The result for 1,2-Dichloroethene (total) was 270 ug/l.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 15:55	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 15:54	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-14(10-12) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 10:23
SDG#: IBL26-06

Golder Associates Incorporated
ELLE Sample #: GW 1199601
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	2	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	3	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	19	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	3	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	1	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	120	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-14(10-12) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 10:23
SDG#: IBL26-06

Golder Associates Incorporated
ELLE Sample #: GW 1199601
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 16:17	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 16:16	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-15(10-12) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 11:00
SDG#: IBL26-07

Golder Associates Incorporated
ELLE Sample #: GW 1199602
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	0.5 J	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	2	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	14	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	0.3 J	0.2	1	1
11997	Toluene	108-88-3	0.3 J	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	0.8 J	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	43	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-15(10-12) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 11:00
SDG#: IBL26-07

Golder Associates Incorporated
ELLE Sample #: GW 1199602
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 16:39	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 16:38	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-16(25-27) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:00
SDG#: IBL26-08

Golder Associates Incorporated
ELLE Sample #: GW 1199603
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		ug/l	ug/l	ug/l	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-16(25-27) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:00
SDG#: IBL26-08

Golder Associates Incorporated
ELLE Sample #: GW 1199603
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 17:02	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 17:01	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-16(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:40
SDG#: IBL26-09

Golder Associates Incorporated
ELLE Sample #: GW 1199604
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	1	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	43	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	2	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	7	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	530 E	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	1 J	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	12	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	0.7 J	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	0.3 J	0.2	1	1
11997	Trichloroethene	79-01-6	120	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	19	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **B-16(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:40
SDG#: IBL26-09

Golder Associates Incorporated
ELLE Sample #: GW 1199604
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

The referenced method allows a maximum of 20% of the analytes in the calibration to exceed the 20% Drift continuing calibration verification criteria. The reported concentration in the associated sample(s) is considered to be estimated. Therefore the result for the following analyte(s) is estimated:
Vinyl Chloride.

The concentration reported for 1,2-Dichloroethene (total) is estimated since it exceeds the calibration range of the instrument. A further diluted analysis was performed from a previously opened container with headspace.
The result for 1,2-Dichloroethene (total) was 500 ug/l.

GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Acenaphthene	83-32-9	N.D.	0.1	0.5	1
14242	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
14242	Acetophenone	98-86-2	N.D.	4	10	1
14242	Anthracene	120-12-7	N.D.	0.1	0.5	1
14242	Atrazine	1912-24-9	N.D.	2	5	1
14242	Benzaldehyde	100-52-7	N.D.	3	10	1
14242	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.5	1
14242	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.5	1
14242	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
14242	Benzo(g,h,i)perylene	191-24-2	N.D.	0.1	0.5	1
14242	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
14242	1,1'-Biphenyl	92-52-4	N.D.	3	10	1
14242	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
14242	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
14242	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
14242	Caprolactam	105-60-2	N.D.	5	11	1
14242	Carbazole	86-74-8	N.D.	0.5	2	1
14242	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
14242	4-Chloroaniline	106-47-8	N.D.	4	10	1
14242	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
14242	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
14242	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
14242	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
14242	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
14242	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.5	2	1

Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.

*=This limit was used in the evaluation of the final result

Sample Description: B-16(11-13) Grab Groundwater
IBM-Kingston SWMU M

Project Name: IBM Kingston, NY

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:40
SDG#: IBL26-09

Golder Associates Incorporated
ELLE Sample #: GW 1199604
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Chrysene	218-01-9	N.D.	0.1	0.5	1
14242	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.5	1
14242	Dibenzofuran	132-64-9	N.D.	0.5	2	1
14242	3,3'-Dichlorobenzidine	91-94-1	N.D.	3	10	1
14242	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
14242	Diethylphthalate	84-66-2	N.D.	2	5	1
14242	2,4-Dimethylphenol	105-67-9	N.D.	3	10	1
14242	Dimethylphthalate	131-11-3	N.D.	2	5	1
14242	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	8	21	1
14242	2,4-Dinitrophenol	51-28-5	N.D.	14	30	1
14242	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
14242	2,6-Dinitrotoluene	606-20-2	N.D.	0.5	2	1
14242	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	5	11	1
14242	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
14242	Fluorene	86-73-7	N.D.	0.1	0.5	1
14242	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
14242	Hexachlorobutadiene	87-68-3	N.D.	0.5	2	1
14242	Hexachlorocyclopentadiene	77-47-4	N.D.	5	11	1
14242	Hexachloroethane	67-72-1	N.D.	1	5	1
14242	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
14242	Isophorone	78-59-1	N.D.	0.5	2	1
14242	2-Methylnaphthalene	91-57-6	0.2 J	0.1	0.5	1
14242	2-Methylphenol	95-48-7	N.D.	0.5	2	1
14242	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
14242	Naphthalene	91-20-3	0.4 J	0.1	0.5	1
14242	2-Nitroaniline	88-74-4	N.D.	2	7	1
14242	3-Nitroaniline	99-09-2	N.D.	3	7	1
14242	4-Nitroaniline	100-01-6	N.D.	0.9	3	1
14242	Nitrobenzene	98-95-3	N.D.	0.5	2	1
14242	2-Nitrophenol	88-75-5	N.D.	3	10	1
14242	4-Nitrophenol	100-02-7	N.D.	10	30	1
14242	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.7	3	1
14242	N-Nitrosodiphenylamine	86-30-6	N.D.	0.7	3	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
14242	Di-n-octylphthalate	117-84-0	N.D.	5	11	1
14242	Pentachlorophenol	87-86-5	N.D.	1	5	1
14242	Phenanthrene	85-01-8	N.D.	0.1	0.5	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-16(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:40
SDG#: IBL26-09

Golder Associates Incorporated
ELLE Sample #: GW 1199604
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Phenol	108-95-2	N.D.	0.5	2	1
14242	Pyrene	129-00-0	N.D.	0.1	0.5	1
14242	2,4,5-Trichlorophenol	95-95-4	N.D.	0.5	2	1
14242	2,4,6-Trichlorophenol	88-06-2	N.D.	0.5	2	1
GC Miscellaneous	**SW-846 8015C**		**ug/l**	**ug/l**	**ug/l**	
10602	Ethane[1]	74-84-0	1.2 J	1.0	5.0	1
10602	Ethene[1]	74-85-1	2.8 J	1.0	5.0	1
10602	Methane[1]	74-82-8	110	3.0	5.0	1
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	16.0	0.0400	0.200	1
07058	Manganese	7439-96-5	1.98	0.0030	0.0100	1
Wet Chemistry	**EPA 300.0**		**mg/l**	**mg/l**	**mg/l**	
00224	Chloride	16887-00-6	9.8	1.0	2.0	5
00228	Sulfate	14808-79-8	79.4	15.0	50.0	50
	EPA 350.1		**mg/l**	**mg/l**	**mg/l**	
12892	Ammonia Nitrogen	7664-41-7	0.45	0.050	0.10	1
	EPA 353.2		**mg/l**	**mg/l**	**mg/l**	
00220	Nitrate Nitrogen	14797-55-8	N.D.	0.040	0.10	1
00219	Nitrite Nitrogen	14797-65-0	N.D.	0.015	0.050	1
	EPA 365.1		**mg/l**	**mg/l**	**mg/l**	
00345	Total Phosphorus as PO4 water[1]	14265-44-2	1.8	0.25	0.31	1
	SM 5310 C-2011		**mg/l**	**mg/l**	**mg/l**	
00273	Total Organic Carbon	n.a.	2.2	0.50	1.0	1
	SM 2320 B-2011		**mg/l as CaCO3**	**mg/l as CaCO3**	**mg/l as CaCO3**	
12150	Total Alkalinity to pH 4.5	n.a.	120	2.6	8.0	1
	SM 4500-S2 F-2011		**mg/l**	**mg/l**	**mg/l**	
01333	Sulfide	18496-25-8	N.D.	0.70	2.0	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-16(11-13) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:40
SDG#: IBL26-09

Golder Associates Incorporated
ELLE Sample #: GW 1199604
ELLE Group #: 2074109
Matrix: Groundwater

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 17:24	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 17:23	Linda C Pape	1
14242	SVOAs by 8270D in Water	SW-846 8270D	1	19316WAM026	11/15/2019 16:27	Ashley R Transue	1
00813	BNA Water Extraction	SW-846 3510C	1	19316WAM026	11/13/2019 09:00	Joshua S Ruth	1
10602	Volatile Headspace Hydrocarbon	SW-846 8015C	1	193190031A	11/16/2019 05:29	Johanna C Kennedy	1
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193171404407	11/14/2019 19:20	Elaine F Stoltzfus	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193171404407	11/14/2019 19:20	Elaine F Stoltzfus	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193171404407	11/14/2019 05:00	Annamaria Kuhns	1
00224	Chloride	EPA 300.0	1	19317135109B	11/14/2019 10:58	Niyati Desai	5
00228	Sulfate	EPA 300.0	1	19317135109B	11/14/2019 11:16	Niyati Desai	50
12892	Ammonia Nitrogen	EPA 350.1	1	19325107101B	11/21/2019 12:36	Jonathan Saul	1
00220	Nitrate Nitrogen	EPA 353.2	1	19329106101B	11/25/2019 09:56	Ashlynn M Cornelius	1
00219	Nitrite Nitrogen	EPA 353.2	1	19317105101A	11/13/2019 09:26	Ashlynn M Cornelius	1
00345	Total Phosphorus as PO4 water	EPA 365.1	1	19318110101A	11/15/2019 11:43	Jonathan Saul	1
00273	Total Organic Carbon	SM 5310 C-2011	1	19325304503B	11/22/2019 07:08	Bethany Sandone	1
08264	Total Phos as PO4 Prep (water)	EPA 365.1	1	19318110101A	11/14/2019 21:00	Barbara A Washington	1
12150	Total Alkalinity to pH 4.5	SM 2320 B-2011	1	19317003102A	11/13/2019 19:33	Jeremy L Bolf	1
01333	Sulfide	SM 4500-S2 F-2011	1	19319133301A	11/15/2019 12:31	Nicole Munsell	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-16(11-13) Filtered Grab Groundwater IBM-Kingston SWMU M**

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 12:40
SDG#: IBL26-10

Golder Associates Incorporated
ELLE Sample #: GW 1199605
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals Dissolved	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	N.D.	0.0400	0.200	1
07058	Manganese	7439-96-5	1.80	0.0030	0.0100	1

03277 Lab Filtration - Metals

The holding time was not met for dissolved sample filtration. The filtration time for dissolved metals is to be within 15 minutes from collection. Since the filtration occurred after receipt in the laboratory, the 15 minute criteria was exceeded. This sample was not collected per applicable Clean Water Act (40CFR136) or SW-846 regulations.

Sample Comments

State of New York Certification No. 10670
This sample was filtered in the lab for dissolved metals.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193171404407	11/14/2019 19:23	Elaine F Stoltzfus	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193171404407	11/14/2019 19:23	Elaine F Stoltzfus	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193171404407	11/14/2019 05:00	Annamaria Kuhns	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(28-30) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL26-11

Golder Associates Incorporated
ELLE Sample #: GW 1199606
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	0.7 J	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	11	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(28-30) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL26-11

Golder Associates Incorporated
ELLE Sample #: GW 1199606
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Acenaphthene	83-32-9	N.D.	0.1	0.5	1
14242	Acenaphthylene	208-96-8	N.D.	0.1	0.5	1
14242	Acetophenone	98-86-2	N.D.	4	10	1
14242	Anthracene	120-12-7	N.D.	0.1	0.5	1
14242	Atrazine	1912-24-9	N.D.	2	5	1
14242	Benzaldehyde	100-52-7	N.D.	3	10	1
14242	Benzo(a)anthracene	56-55-3	N.D.	0.1	0.5	1
14242	Benzo(a)pyrene	50-32-8	N.D.	0.1	0.5	1
14242	Benzo(b)fluoranthene	205-99-2	N.D.	0.1	0.5	1
14242	Benzo(g,h,i)perylene	191-24-2	N.D.	0.1	0.5	1
14242	Benzo(k)fluoranthene	207-08-9	N.D.	0.1	0.5	1
14242	1,1'-Biphenyl	92-52-4	N.D.	3	10	1
14242	4-Bromophenyl-phenylether	101-55-3	N.D.	0.5	2	1
14242	Butylbenzylphthalate	85-68-7	N.D.	2	5	1
14242	Di-n-butylphthalate	84-74-2	N.D.	2	5	1
14242	Caprolactam	105-60-2	N.D.	5	11	1
14242	Carbazole	86-74-8	N.D.	0.5	2	1
14242	4-Chloro-3-methylphenol	59-50-7	N.D.	0.5	2	1
14242	4-Chloroaniline	106-47-8	N.D.	4	10	1
14242	bis(2-Chloroethoxy)methane	111-91-1	N.D.	0.5	2	1
14242	bis(2-Chloroethyl)ether	111-44-4	N.D.	0.5	2	1
14242	2-Chloronaphthalene	91-58-7	N.D.	0.4	1	1
14242	2-Chlorophenol	95-57-8	N.D.	0.5	2	1
14242	4-Chlorophenyl-phenylether	7005-72-3	N.D.	0.5	2	1
14242	2,2'-oxybis(1-Chloropropane)	108-60-1	N.D.	0.5	2	1
	Bis(2-chloroisopropyl) ether CAS #39638-32-9 and 2,2'-Oxybis(1-chloropropane) CAS #108-60-1 cannot be separated chromatographically. The reported result represents the combined total of both compounds.					
14242	Chrysene	218-01-9	N.D.	0.1	0.5	1
14242	Dibenz(a,h)anthracene	53-70-3	N.D.	0.1	0.5	1
14242	Dibenzofuran	132-64-9	N.D.	0.5	2	1
14242	3,3'-Dichlorobenzidine	91-94-1	N.D.	3	10	1
14242	2,4-Dichlorophenol	120-83-2	N.D.	0.5	2	1
14242	Diethylphthalate	84-66-2	N.D.	2	5	1
14242	2,4-Dimethylphenol	105-67-9	N.D.	3	10	1
14242	Dimethylphthalate	131-11-3	N.D.	2	5	1
14242	4,6-Dinitro-2-methylphenol	534-52-1	N.D.	8	22	1
14242	2,4-Dinitrophenol	51-28-5	N.D.	15	31	1
14242	2,4-Dinitrotoluene	121-14-2	N.D.	1	5	1
14242	2,6-Dinitrotoluene	606-20-2	N.D.	0.5	2	1
14242	bis(2-Ethylhexyl)phthalate	117-81-7	N.D.	5	11	1

*=This limit was used in the evaluation of the final result

Sample Description: B-20(28-30) Grab Groundwater
IBM-Kingston SWMU M

Project Name: IBM Kingston, NY

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL26-11

Golder Associates Incorporated
ELLE Sample #: GW 1199606
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270D**		**ug/l**	**ug/l**	**ug/l**	
14242	Fluoranthene	206-44-0	N.D.	0.1	0.5	1
14242	Fluorene	86-73-7	N.D.	0.1	0.5	1
14242	Hexachlorobenzene	118-74-1	N.D.	0.1	0.5	1
14242	Hexachlorobutadiene	87-68-3	N.D.	0.5	2	1
14242	Hexachlorocyclopentadiene	77-47-4	N.D.	5	11	1
14242	Hexachloroethane	67-72-1	N.D.	1	5	1
14242	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.1	0.5	1
14242	Isophorone	78-59-1	N.D.	0.5	2	1
14242	2-Methylnaphthalene	91-57-6	0.2 J	0.1	0.5	1
14242	2-Methylphenol	95-48-7	N.D.	0.5	2	1
14242	4-Methylphenol	106-44-5	N.D.	0.5	2	1
	3-Methylphenol and 4-methylphenol cannot be resolved under the chromatographic conditions used for sample analysis. The result reported for 4-methylphenol represents the combined total of both compounds.					
14242	Naphthalene	91-20-3	N.D.	0.1	0.5	1
14242	2-Nitroaniline	88-74-4	N.D.	2	7	1
14242	3-Nitroaniline	99-09-2	N.D.	3	7	1
14242	4-Nitroaniline	100-01-6	N.D.	0.9	3	1
14242	Nitrobenzene	98-95-3	N.D.	0.5	2	1
14242	2-Nitrophenol	88-75-5	N.D.	3	10	1
14242	4-Nitrophenol	100-02-7	N.D.	10	31	1
14242	N-Nitroso-di-n-propylamine	621-64-7	N.D.	0.7	3	1
14242	N-Nitrosodiphenylamine	86-30-6	N.D.	0.7	3	1
	N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total of both compounds.					
14242	Di-n-octylphthalate	117-84-0	N.D.	5	11	1
14242	Pentachlorophenol	87-86-5	N.D.	1	5	1
14242	Phenanthrene	85-01-8	N.D.	0.1	0.5	1
14242	Phenol	108-95-2	N.D.	0.5	2	1
14242	Pyrene	129-00-0	N.D.	0.1	0.5	1
14242	2,4,5-Trichlorophenol	95-95-4	N.D.	0.5	2	1
14242	2,4,6-Trichlorophenol	88-06-2	N.D.	0.5	2	1
	The recovery for the sample surrogate(s) is outside the QC acceptance limits as noted on the QC Summary. The following action was taken: The sample was re-extracted outside the method required holding time and the QC is compliant. All results are reported from the first trial.					
GC Miscellaneous	**SW-846 8015C**		**ug/l**	**ug/l**	**ug/l**	
10602	Ethane[1]	74-84-0	N.D.	1.0	5.0	1
10602	Ethene[1]	74-85-1	N.D.	1.0	5.0	1
10602	Methane[1]	74-82-8	11	3.0	5.0	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(28-30) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL26-11

Golder Associates Incorporated
ELLE Sample #: GW 1199606
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	52.3	0.0400	0.200	1
07058	Manganese	7439-96-5	6.54	0.0030	0.0100	1
Wet Chemistry	**EPA 300.0**		**mg/l**	**mg/l**	**mg/l**	
00224	Chloride	16887-00-6	136	10.0	20.0	50
00228	Sulfate	14808-79-8	127	15.0	50.0	50
	EPA 350.1		**mg/l**	**mg/l**	**mg/l**	
12892	Ammonia Nitrogen	7664-41-7	0.23	0.050	0.10	1
	EPA 353.2		**mg/l**	**mg/l**	**mg/l**	
00220	Nitrate Nitrogen	14797-55-8	N.D.	0.040	0.10	1
00219	Nitrite Nitrogen	14797-65-0	N.D.	0.015	0.050	1
	EPA 365.1		**mg/l**	**mg/l**	**mg/l**	
00345	Total Phosphorus as PO4 water[1]	14265-44-2	7.4	0.25	0.31	1
	SM 5310 C-2011		**mg/l**	**mg/l**	**mg/l**	
00273	Total Organic Carbon	n.a.	0.70 J	0.50	1.0	1
	SM 2320 B-2011		**mg/l as CaCO3**	**mg/l as CaCO3**	**mg/l as CaCO3**	
12150	Total Alkalinity to pH 4.5	n.a.	139	2.6	8.0	1
	SM 4500-S2 F-2011		**mg/l**	**mg/l**	**mg/l**	
01333	Sulfide	18496-25-8	N.D.	0.70	2.0	1

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	W193231AA	11/19/2019 13:36	Kevin A Sposito	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	W193231AA	11/19/2019 13:35	Kevin A Sposito	1
14242	SVOAs by 8270D in Water	SW-846 8270D	1	19316WAM026	11/15/2019 16:56	Ashley R Transue	1
00813	BNA Water Extraction	SW-846 3510C	1	19316WAM026	11/13/2019 09:00	Joshua S Ruth	1
10602	Volatile Headspace Hydrocarbon	SW-846 8015C	1	193190031A	11/16/2019 05:47	Johanna C Kennedy	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(28-30) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL26-11

Golder Associates Incorporated
ELLE Sample #: GW 1199606
ELLE Group #: 2074109
Matrix: Groundwater

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193171404409	11/18/2019 17:25	Cindy M Gehman	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193171404409	11/18/2019 17:25	Cindy M Gehman	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193171404409	11/18/2019 02:11	James L Mertz	1
00224	Chloride	EPA 300.0	1	19318135112A	11/14/2019 19:56	Clinton M Wilson	50
00228	Sulfate	EPA 300.0	1	19318135112A	11/14/2019 19:56	Clinton M Wilson	50
12892	Ammonia Nitrogen	EPA 350.1	1	19325107101B	11/21/2019 12:38	Jonathan Saul	1
00220	Nitrate Nitrogen	EPA 353.2	1	19329106101B	11/25/2019 09:58	Ashlynn M Cornelius	1
00219	Nitrite Nitrogen	EPA 353.2	1	19317105101A	11/13/2019 07:56	Ashlynn M Cornelius	1
00345	Total Phosphorus as PO4 water	EPA 365.1	1	19318110101A	11/15/2019 11:43	Jonathan Saul	1
00273	Total Organic Carbon	SM 5310 C-2011	2	19325304503B	11/24/2019 07:20	Bethany Sandone	1
08264	Total Phos as PO4 Prep (water)	EPA 365.1	1	19318110101A	11/14/2019 21:00	Barbara A Washington	1
12150	Total Alkalinity to pH 4.5	SM 2320 B-2011	1	19317003102A	11/13/2019 19:26	Jeremy L Bolf	1
01333	Sulfide	SM 4500-S2 F-2011	1	19319133301A	11/15/2019 12:31	Nicole Munsell	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(28-30) Filtered Grab Groundwater IBM-Kingston SWMU M**

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL26-12

Golder Associates Incorporated
ELLE Sample #: GW 1199607
ELLE Group #: 2074109
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals Dissolved	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	N.D.	0.0400	0.200	1
07058	Manganese	7439-96-5	2.49	0.0030	0.0100	1

03277 Lab Filtration - Metals

The holding time was not met for dissolved sample filtration. The filtration time for dissolved metals is to be within 15 minutes from collection. Since the filtration occurred after receipt in the laboratory, the 15 minute criteria was exceeded. This sample was not collected per applicable Clean Water Act (40CFR136) or SW-846 regulations.

Sample Comments

State of New York Certification No. 10670
This sample was filtered in the lab for dissolved metals.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193171404407	11/14/2019 19:26	Elaine F Stoltzfus	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193171404407	11/14/2019 19:26	Elaine F Stoltzfus	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193171404407	11/14/2019 05:00	Annamaria Kuhns	1

*=This limit was used in the evaluation of the final result

Sample Description: **Trip Blank Water**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019
SDG#: IBL26-13TB

Golder Associates Incorporated
ELLE Sample #: GW 1199608
ELLE Group #: 2074109
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: **Trip Blank Water**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:54
Collection Date/Time: 11/08/2019
SDG#: IBL26-13TB

Golder Associates Incorporated
ELLE Sample #: GW 1199608
ELLE Group #: 2074109
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor

sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	Y193221AA	11/18/2019 12:14	Linda C Pape	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	Y193221AA	11/18/2019 12:13	Linda C Pape	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2074109
Reported: 11/26/2019 13:07

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Batch number: W193231AA	Sample number(s): 1199596,1199606		
Benzene	N.D.	0.2	1
Benzyl Chloride	N.D.	1	5
Bromobenzene	N.D.	0.2	5
Bromodichloromethane	N.D.	0.2	1
Bromoform	N.D.	1	4
Bromomethane	N.D.	0.3	1
Carbon Tetrachloride	N.D.	0.2	1
Chlorobenzene	N.D.	0.2	1
Chloroethane	N.D.	0.2	1
Chloroform	N.D.	0.2	1
Chloromethane	N.D.	0.2	1
2-Chlorotoluene	N.D.	0.2	5
4-Chlorotoluene	N.D.	0.2	5
Dibromochloromethane	N.D.	0.2	1
Dibromomethane	N.D.	0.2	1
1,2-Dichlorobenzene	N.D.	0.2	5
1,3-Dichlorobenzene	N.D.	0.2	5
1,4-Dichlorobenzene	N.D.	0.2	5
Dichlorodifluoromethane	N.D.	0.2	1
1,1-Dichloroethane	N.D.	0.2	1
1,2-Dichloroethane	N.D.	0.3	1
1,1-Dichloroethene	N.D.	0.2	1
1,2-Dichloroethene (Total)	N.D.	0.4	2
1,2-Dichloropropane	N.D.	0.2	1
cis-1,3-Dichloropropene	N.D.	0.2	1
trans-1,3-Dichloropropene	N.D.	0.2	1
Ethylbenzene	N.D.	0.4	1
Freon 113	N.D.	0.2	10
Freon 123a	N.D.	0.4	5
Methylene Chloride	N.D.	0.3	1
1,1,1,2-Tetrachloroethane	N.D.	0.2	1
1,1,2,2-Tetrachloroethane	N.D.	0.2	1
Tetrachloroethene	N.D.	0.2	1
Toluene	N.D.	0.2	1
1,1,1-Trichloroethane	N.D.	0.3	1
1,1,2-Trichloroethane	N.D.	0.2	1
Trichloroethene	N.D.	0.2	1
Trichlorofluoromethane	N.D.	0.2	1
1,2,3-Trichloropropane	N.D.	0.2	5

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2074109
Reported: 11/26/2019 13:07

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Vinyl Chloride	N.D.	0.2	1
Xylene (Total)	N.D.	1	6
Batch number: Y193221AA	Sample number(s): 1199597-1199604,1199608		
Benzene	N.D.	0.2	1
Benzyl Chloride	N.D.	1	5
Bromobenzene	N.D.	0.2	5
Bromodichloromethane	N.D.	0.2	1
Bromoform	N.D.	1	4
Bromomethane	N.D.	0.3	1
Carbon Tetrachloride	N.D.	0.2	1
Chlorobenzene	N.D.	0.2	1
Chloroethane	N.D.	0.2	1
Chloroform	N.D.	0.2	1
Chloromethane	N.D.	0.2	1
2-Chlorotoluene	N.D.	0.2	5
4-Chlorotoluene	N.D.	0.2	5
Dibromochloromethane	N.D.	0.2	1
Dibromomethane	N.D.	0.2	1
1,2-Dichlorobenzene	N.D.	0.2	5
1,3-Dichlorobenzene	N.D.	0.2	5
1,4-Dichlorobenzene	N.D.	0.2	5
Dichlorodifluoromethane	N.D.	0.2	1
1,1-Dichloroethane	N.D.	0.2	1
1,2-Dichloroethane	N.D.	0.3	1
1,1-Dichloroethene	N.D.	0.2	1
1,2-Dichloroethene (Total)	N.D.	0.4	2
1,2-Dichloropropane	N.D.	0.2	1
cis-1,3-Dichloropropene	N.D.	0.2	1
trans-1,3-Dichloropropene	N.D.	0.2	1
Ethylbenzene	N.D.	0.4	1
Freon 113	N.D.	0.2	10
Freon 123a	N.D.	0.4	5
Methylene Chloride	N.D.	0.3	1
1,1,1,2-Tetrachloroethane	N.D.	0.2	1
1,1,2,2-Tetrachloroethane	N.D.	0.2	1
Tetrachloroethene	N.D.	0.2	1
Toluene	N.D.	0.2	1
1,1,1-Trichloroethane	N.D.	0.3	1
1,1,2-Trichloroethane	N.D.	0.2	1
Trichloroethene	N.D.	0.2	1
Trichlorofluoromethane	N.D.	0.2	1
1,2,3-Trichloropropane	N.D.	0.2	5
Vinyl Chloride	N.D.	0.2	1
Xylene (Total)	N.D.	1	6

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074109
Reported: 11/26/2019 13:07

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Batch number: 19316WAM026	Sample number(s): 1199604,1199606		
Acenaphthene	N.D.	0.1	0.5
Acenaphthylene	N.D.	0.1	0.5
Acetophenone	N.D.	4	10
Anthracene	N.D.	0.1	0.5
Atrazine	N.D.	2	5
Benzaldehyde	N.D.	3	10
Benzo(a)anthracene	N.D.	0.1	0.5
Benzo(a)pyrene	N.D.	0.1	0.5
Benzo(b)fluoranthene	N.D.	0.1	0.5
Benzo(g,h,i)perylene	N.D.	0.1	0.5
Benzo(k)fluoranthene	N.D.	0.1	0.5
1,1'-Biphenyl	N.D.	3	10
4-Bromophenyl-phenylether	N.D.	0.5	2
Butylbenzylphthalate	N.D.	2	5
Di-n-butylphthalate	N.D.	2	5
Caprolactam	N.D.	5	11
Carbazole	N.D.	0.5	2
4-Chloro-3-methylphenol	N.D.	0.5	2
4-Chloroaniline	N.D.	4	10
bis(2-Chloroethoxy)methane	N.D.	0.5	2
bis(2-Chloroethyl)ether	N.D.	0.5	2
2-Chloronaphthalene	N.D.	0.4	1
2-Chlorophenol	N.D.	0.5	2
4-Chlorophenyl-phenylether	N.D.	0.5	2
2,2'-oxybis(1-Chloropropane)	N.D.	0.5	2
Chrysene	N.D.	0.1	0.5
Dibenz(a,h)anthracene	N.D.	0.1	0.5
Dibenzofuran	N.D.	0.5	2
3,3'-Dichlorobenzidine	N.D.	3	10
2,4-Dichlorophenol	N.D.	0.5	2
Diethylphthalate	N.D.	2	5
2,4-Dimethylphenol	N.D.	3	10
Dimethylphthalate	N.D.	2	5
4,6-Dinitro-2-methylphenol	N.D.	8	21
2,4-Dinitrophenol	N.D.	14	30
2,4-Dinitrotoluene	N.D.	1	5
2,6-Dinitrotoluene	N.D.	0.5	2
bis(2-Ethylhexyl)phthalate	N.D.	5	11
Fluoranthene	N.D.	0.1	0.5
Fluorene	N.D.	0.1	0.5
Hexachlorobenzene	N.D.	0.1	0.5
Hexachlorobutadiene	N.D.	0.5	2
Hexachlorocyclopentadiene	N.D.	5	11
Hexachloroethane	N.D.	1	5

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074109
Reported: 11/26/2019 13:07

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Indeno(1,2,3-cd)pyrene	N.D.	0.1	0.5
Isophorone	N.D.	0.5	2
2-Methylnaphthalene	N.D.	0.1	0.5
2-Methylphenol	N.D.	0.5	2
4-Methylphenol	N.D.	0.5	2
Naphthalene	N.D.	0.1	0.5
2-Nitroaniline	N.D.	2	7
3-Nitroaniline	N.D.	3	7
4-Nitroaniline	N.D.	0.9	3
Nitrobenzene	N.D.	0.5	2
2-Nitrophenol	N.D.	3	10
4-Nitrophenol	N.D.	10	30
N-Nitroso-di-n-propylamine	N.D.	0.7	3
N-Nitrosodiphenylamine	N.D.	0.7	3
Di-n-octylphthalate	N.D.	5	11
Pentachlorophenol	N.D.	1	5
Phenanthrene	N.D.	0.1	0.5
Phenol	N.D.	0.5	2
Pyrene	N.D.	0.1	0.5
2,4,5-Trichlorophenol	N.D.	0.5	2
2,4,6-Trichlorophenol	N.D.	0.5	2
Batch number: 193190031A	Sample number(s): 1199604,1199606		
Ethane	N.D.	1.0	5.0
Ethene	N.D.	1.0	5.0
Methane	N.D.	3.0	5.0
	mg/l	mg/l	mg/l
Batch number: 193171404407	Sample number(s): 1199604-1199605,1199607		
Iron	N.D.	0.0400	0.200
Manganese	N.D.	0.0030	0.0100
Batch number: 193171404409	Sample number(s): 1199606		
Iron	N.D.	0.0400	0.200
Manganese	N.D.	0.0030	0.0100
Batch number: 19317105101A	Sample number(s): 1199604,1199606		
Nitrite Nitrogen	N.D.	0.015	0.050
Batch number: 19317135109B	Sample number(s): 1199604		
Chloride	N.D.	0.20	0.40
Sulfate	N.D.	0.30	1.0
Batch number: 19318110101A	Sample number(s): 1199604,1199606		
Total Phosphorus as PO4 water	N.D.	0.25	0.31
Batch number: 19318135112A	Sample number(s): 1199606		
Chloride	N.D.	0.20	0.40

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074109
Reported: 11/26/2019 13:07

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/l	mg/l	mg/l
Sulfate	N.D.	0.30	1.0
Batch number: 19325107101B	Sample number(s): 1199604,1199606		
Ammonia Nitrogen	N.D.	0.050	0.10
Batch number: 19325304503B	Sample number(s): 1199604,1199606		
Total Organic Carbon	N.D.	0.50	1.0
Batch number: 19329106101B	Sample number(s): 1199604,1199606		
Nitrate Nitrogen	N.D.	0.040	0.10
Batch number: 19319133301A	Sample number(s): 1199604,1199606		
Sulfide	N.D.	0.70	2.0
	mg/l as CaCO3	mg/l as CaCO3	mg/l as CaCO3
Batch number: 19317003102A	Sample number(s): 1199604,1199606		
Total Alkalinity to pH 4.5	N.D.	2.6	8.0

LCS/LCSD

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: W193231AA	Sample number(s): 1199596,1199606								
Benzene	20	20.77	20	21.16	104	106	80-120	2	30
Benzyl Chloride	20	16.02	20	15.91	80	80	52-120	1	30
Bromobenzene	20	20.95	20	20.76	105	104	80-120	1	30
Bromodichloromethane	20	19.82	20	19.61	99	98	71-120	1	30
Bromoform	20	16.1	20	15.74	80	79	51-120	2	30
Bromomethane	20	22.95	20	21.97	115	110	53-128	4	30
Carbon Tetrachloride	20	21.52	20	21.36	108	107	64-134	1	30
Chlorobenzene	20	20.98	20	21.11	105	106	80-120	1	30
Chloroethane	20	22.39	20	22.26	112	111	55-123	1	30
Chloroform	20	20.83	20	20.64	104	103	80-120	1	30
Chloromethane	20	18.78	20	19	94	95	56-121	1	30
2-Chlorotoluene	20	21.4	20	21.15	107	106	80-120	1	30
4-Chlorotoluene	20	20.97	20	20.62	105	103	80-120	2	30
Dibromochloromethane	20	19.41	20	19.38	97	97	71-120	0	30
Dibromomethane	20	20.65	20	20.33	103	102	80-120	2	30
1,2-Dichlorobenzene	20	21.2	20	20.82	106	104	80-120	2	30
1,3-Dichlorobenzene	20	21.06	20	20.79	105	104	80-120	1	30
1,4-Dichlorobenzene	20	21.17	20	21.11	106	106	80-120	0	30
Dichlorodifluoromethane	20	20.5	20	20.86	103	104	41-127	2	30

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/26/2019 13:07

Group Number: 2074109

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,1-Dichloroethane	20	20.88	20	20.64	104	103	80-120	1	30
1,2-Dichloroethane	20	20.72	20	20.33	104	102	73-124	2	30
1,1-Dichloroethene	20	23.01	20	23.33	115	117	80-131	1	30
1,2-Dichloroethene (Total)	40	43.76	40	42.7	109	107	80-125	2	30
1,2-Dichloropropane	20	20.68	20	20.86	103	104	80-120	1	30
cis-1,3-Dichloropropene	20	19.38	20	19.31	97	97	75-120	0	30
trans-1,3-Dichloropropene	20	18.24	20	18.35	91	92	67-120	1	30
Ethylbenzene	20	21.14	20	20.94	106	105	80-120	1	30
Freon 113	20	22.47	20	22.38	112	112	73-139	0	30
Freon 123a	20	23.74	20	22.67	119	113	76-129	5	30
Methylene Chloride	20	21.29	20	21.43	106	107	80-120	1	30
1,1,1,2-Tetrachloroethane	20	20.03	20	19.7	100	99	78-120	2	30
1,1,2,2-Tetrachloroethane	20	20.57	20	20.19	103	101	72-120	2	30
Tetrachloroethene	20	21.07	20	20.92	105	105	80-120	1	30
Toluene	20	21.07	20	20.87	105	104	80-120	1	30
1,1,1-Trichloroethane	20	21.51	20	21.87	108	109	67-126	2	30
1,1,2-Trichloroethane	20	21.93	20	21.67	110	108	80-120	1	30
Trichloroethene	20	21.09	20	20.51	105	103	80-120	3	30
Trichlorofluoromethane	20	24.97	20	24.84	125	124	55-135	1	30
1,2,3-Trichloropropane	20	21.52	20	21.11	108	106	75-124	2	30
Vinyl Chloride	20	20.7	20	20.42	103	102	56-120	1	30
Xylene (Total)	60	63.05	60	62.65	105	104	80-120	1	30
Batch number: Y193221AA	Sample number(s): 1199597-1199604,1199608								
Benzene	20	22.03	20	23.2	110	116	80-120	5	30
Benzyl Chloride	20	19.59	20	20.15	98	101	52-120	3	30
Bromobenzene	20	22.25	20	23.27	111	116	80-120	4	30
Bromodichloromethane	20	20.46	20	21.17	102	106	71-120	3	30
Bromoform	20	19.31	20	19.62	97	98	51-120	2	30
Bromomethane	20	13.22	20	14	66	70	53-128	6	30
Carbon Tetrachloride	20	17.95	20	18.93	90	95	64-134	5	30
Chlorobenzene	20	21.63	20	22.4	108	112	80-120	4	30
Chloroethane	20	14.52	20	15.12	73	76	55-123	4	30
Chloroform	20	20.74	20	21.74	104	109	80-120	5	30
Chloromethane	20	15.08	20	16.08	75	80	56-121	6	30
2-Chlorotoluene	20	21.49	20	22.85	107	114	80-120	6	30
4-Chlorotoluene	20	21.87	20	22.92	109	115	80-120	5	30
Dibromochloromethane	20	20.48	20	21.09	102	105	71-120	3	30
Dibromomethane	20	20.73	20	21.43	104	107	80-120	3	30
1,2-Dichlorobenzene	20	21.92	20	22.83	110	114	80-120	4	30
1,3-Dichlorobenzene	20	21.78	20	22.97	109	115	80-120	5	30
1,4-Dichlorobenzene	20	22.19	20	23.34	111	117	80-120	5	30
Dichlorodifluoromethane	20	11.09	20	11.78	55	59	41-127	6	30
1,1-Dichloroethane	20	21.58	20	22.7	108	114	80-120	5	30

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Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/26/2019 13:07

Group Number: 2074109

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,2-Dichloroethane	20	19.89	20	20.56	99	103	73-124	3	30
1,1-Dichloroethene	20	21.58	20	22.66	108	113	80-131	5	30
1,2-Dichloroethene (Total)	40	43.75	40	46.44	109	116	80-125	6	30
1,2-Dichloropropane	20	23.51	20	24.33	118	122*	80-120	3	30
cis-1,3-Dichloropropene	20	21.33	20	22.24	107	111	75-120	4	30
trans-1,3-Dichloropropene	20	20.88	20	21.57	104	108	67-120	3	30
Ethylbenzene	20	21.96	20	23.02	110	115	80-120	5	30
Freon 113	20	18.45	20	19.39	92	97	73-139	5	30
Freon 123a	20	20.93	20	22.23	105	111	76-129	6	30
Methylene Chloride	20	22.58	20	23.63	113	118	80-120	5	30
1,1,1,2-Tetrachloroethane	20	20.47	20	21.33	102	107	78-120	4	30
1,1,2,2-Tetrachloroethane	20	23.18	20	24.18	116	121*	72-120	4	30
Tetrachloroethene	20	20.22	20	21.19	101	106	80-120	5	30
Toluene	20	22.01	20	22.96	110	115	80-120	4	30
1,1,1-Trichloroethane	20	18.67	20	19.71	93	99	67-126	5	30
1,1,2-Trichloroethane	20	23.27	20	23.96	116	120	80-120	3	30
Trichloroethene	20	20.45	20	21.47	102	107	80-120	5	30
Trichlorofluoromethane	20	13.1	20	13.83	65	69	55-135	5	30
1,2,3-Trichloropropane	20	21.72	20	22.35	109	112	75-124	3	30
Vinyl Chloride	20	14.85	20	15.75	74	79	56-120	6	30
Xylene (Total)	60	65.32	60	68.41	109	114	80-120	5	30
	ug/l	**ug/l**	**ug/l**	**ug/l**					
Batch number: 19316WAM026	Sample number(s): 1199604,1199606								
Acenaphthene	50	41.93	50	39.5	84	79	52-114	6	30
Acenaphthylene	50	42.6	50	40.26	85	81	57-121	6	30
Acetophenone	50	42.67	50	39.42	85	79	61-114	8	30
Anthracene	50	46.33	50	43.54	93	87	62-116	6	30
Atrazine	50	50.81	50	53.99	102	108	71-133	6	30
Benzaldehyde	50	47.08	50	47.05	94	94	48-118	0	30
Benzo(a)anthracene	50	48	50	44.02	96	88	70-118	9	30
Benzo(a)pyrene	50	45.58	50	43.49	91	87	71-117	5	30
Benzo(b)fluoranthene	50	46.97	50	44.45	94	89	71-115	6	30
Benzo(g,h,i)perylene	50	45.2	50	41.97	90	84	60-119	7	30
Benzo(k)fluoranthene	50	44.74	50	42.04	89	84	71-116	6	30
1,1'-Biphenyl	50	40.8	50	38.94	82	78	51-112	5	30
4-Bromophenyl-phenylether	50	42.93	50	42.48	86	85	53-117	1	30
Butylbenzylphthalate	50	44.3	50	40	89	80	44-124	10	30
Di-n-butylphthalate	50	45.12	50	42.83	90	86	62-118	5	30
Caprolactam	50	14.76	50	15.54	30	31	10-57	5	30
Carbazole	50	46.57	50	46.12	93	92	64-127	1	30
4-Chloro-3-methylphenol	50	44.34	50	41.57	89	83	60-118	6	30
4-Chloroaniline	50	30.48	50	29.64	61	59	35-108	3	30
bis(2-Chloroethoxy)methane	50	44.46	50	41.33	89	83	53-119	7	30

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Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/26/2019 13:07

Group Number: 2074109

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
bis(2-Chloroethyl)ether	50	40.94	50	37.03	82	74	49-110	10	30
2-Chloronaphthalene	50	37.51	50	36.56	75	73	42-111	3	30
2-Chlorophenol	50	40.19	50	37.56	80	75	52-109	7	30
4-Chlorophenyl-phenylether	50	42.44	50	39.73	85	79	46-113	7	30
2,2'-oxybis(1-Chloropropane)	50	40.76	50	37.18	82	74	40-110	9	30
Chrysene	50	45.74	50	42.12	91	84	69-116	8	30
Dibenz(a,h)anthracene	50	46.95	50	43.4	94	87	68-121	8	30
Dibenzofuran	50	42.31	50	40.25	85	81	53-114	5	30
3,3'-Dichlorobenzidine	50	25.37	50	23.69	51	47	42-107	7	30
2,4-Dichlorophenol	50	42.86	50	40.03	86	80	58-114	7	30
Diethylphthalate	50	42.07	50	39.41	84	79	48-113	7	30
2,4-Dimethylphenol	50	35.96	50	33.37	72	67	48-91	7	30
Dimethylphthalate	50	39.4	50	35.08	79	70	14-123	12	30
4,6-Dinitro-2-methylphenol	50	43.45	50	42.3	87	85	63-129	3	30
2,4-Dinitrophenol	100	77.64	100	80.22	78	80	44-134	3	30
2,4-Dinitrotoluene	50	44.06	50	40.92	88	82	69-117	7	30
2,6-Dinitrotoluene	50	43.5	50	41.81	87	84	63-122	4	30
bis(2-Ethylhexyl)phthalate	50	45.77	50	41.68	92	83	68-120	9	30
Fluoranthene	50	46.09	50	43.81	92	88	63-122	5	30
Fluorene	50	43.75	50	40.15	87	80	56-115	9	30
Hexachlorobenzene	50	42.71	50	39.28	85	79	60-117	8	30
Hexachlorobutadiene	50	32.58	50	29.46	65	59	20-108	10	30
Hexachlorocyclopentadiene	100	47.51	100	43.7	48	44	10-91	8	30
Hexachloroethane	50	31.93	50	27.75	64	56	23-95	14	30
Indeno(1,2,3-cd)pyrene	50	55.27	50	51.28	111	103	63-114	7	30
Isophorone	50	44.51	50	41.17	89	82	56-120	8	30
2-Methylnaphthalene	50	40.49	50	36.92	81	74	44-111	9	30
2-Methylphenol	50	40.2	50	37.04	80	74	53-107	8	30
4-Methylphenol	50	39.5	50	34.44	79	69	49-108	14	30
Naphthalene	50	39.1	50	36.13	78	72	45-105	8	30
2-Nitroaniline	50	44.42	50	43.02	89	86	66-126	3	30
3-Nitroaniline	50	37.09	50	35.46	74	71	47-119	4	30
4-Nitroaniline	50	37.41	50	36.28	75	73	45-107	3	30
Nitrobenzene	50	42.08	50	38.74	84	77	49-113	8	30
2-Nitrophenol	50	42.02	50	39.83	84	80	57-116	5	30
4-Nitrophenol	50	26.28	50	24.14	53	48	23-89	8	30
N-Nitroso-di-n-propylamine	50	42.74	50	38.73	85	77	51-122	10	30
N-Nitrosodiphenylamine	50	43.69	50	41.58	87	83	63-119	5	30
Di-n-octylphthalate	50	45.86	50	42.56	92	85	67-120	7	30
Pentachlorophenol	50	46.32	50	45.59	93	91	54-131	2	30
Phenanthrene	50	46.06	50	42.84	92	86	65-113	7	30
Phenol	50	24.88	50	22.18	50	44	19-79	11	30
Pyrene	50	45.3	50	41.66	91	83	65-115	8	30
2,4,5-Trichlorophenol	50	43.51	50	41.87	87	84	66-118	4	30

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074109
Reported: 11/26/2019 13:07

LCS/LCSD (continued)

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	ug/l	ug/l	ug/l	ug/l					
2,4,6-Trichlorophenol	50	43.97	50	41.2	88	82	69-122	6	30
	ug/l	**ug/l**	**ug/l**	**ug/l**					
Batch number: 193190031A	Sample number(s): 1199604,1199606								
Ethane	58.44	55.27	58.44	55.85	95	96	85-115	1	20
Ethene	60.85	57.54	60.85	57.68	95	95	83-115	0	20
Methane	59.83	58.18	59.83	57.63	97	96	85-115	1	20
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 193171404407	Sample number(s): 1199604-1199605,1199607								
Iron	0.400	0.415			104		80-120		
Manganese	0.0200	0.0215			108		80-120		
Batch number: 193171404409	Sample number(s): 1199606								
Iron	0.400	0.409			102		80-120		
Manganese	0.0200	0.0209			105		80-120		
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 19317105101A	Sample number(s): 1199604,1199606								
Nitrite Nitrogen	0.700	0.669			96		90-110		
Batch number: 19317135109B	Sample number(s): 1199604								
Chloride	3.00	2.88			96		90-110		
Sulfate	7.50	7.15			95		90-110		
Batch number: 19318110101A	Sample number(s): 1199604,1199606								
Total Phosphorus as PO4 water	13.92	13.56			97		90-110		
Batch number: 19318135112A	Sample number(s): 1199606								
Chloride	3.00	2.82			94		90-110		
Sulfate	7.50	7.41			99		90-110		
Batch number: 19325107101B	Sample number(s): 1199604,1199606								
Ammonia Nitrogen	1.50	1.46			97		90-110		
Batch number: 19325304503B	Sample number(s): 1199604,1199606								
Total Organic Carbon	25	24.56			98		91-113		
Batch number: 19329106101B	Sample number(s): 1199604,1199606								
Nitrate Nitrogen	2.50	2.56			102		90-110		
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 19319133301A	Sample number(s): 1199604,1199606								
Sulfide	20	18.93	20	18.73	95	94	80-120	1	5

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Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/26/2019 13:07

Group Number: 2074109

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/l as CaCO3	LCS Conc mg/l as CaCO3	LCSD Spike Added mg/l as CaCO3	LCSD Conc mg/l as CaCO3	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 19317003102A	Sample number(s): 1199604,1199606								
Total Alkalinity to pH 4.5	188	167.3			89		82-106		

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc mg/l	MS Spike Added mg/l	MS Conc mg/l	MSD Spike Added mg/l	MSD Conc mg/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 19318135112A	Sample number(s): 1199606 UNSPK: 1199606									
Chloride	135.71	100	225.02			89*		90-110		
Sulfate	126.64	250	389.26			105		90-110		

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc mg/l	DUP Conc mg/l	DUP RPD	DUP RPD Max
Batch number: 19318135112A	Sample number(s): 1199606 BKG: 1199606			
Chloride	135.71	133.6	2	15
Sulfate	126.64	127.27	0 (1)	15

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Volatiles 8260C
Batch number: W193231AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1199596	95	99	100	91
1199606	96	99	100	90
Blank	97	100	100	91
LCS	99	99	102	97

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Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074109
Reported: 11/26/2019 13:07

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Volatiles 8260C
Batch number: W193231AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
LCSD	98	101	102	97
Limits:	80-120	80-120	80-120	80-120

Analysis Name: Volatiles 8260C
Batch number: Y193221AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1199597	92	99	100	95
1199598	93	99	100	95
1199599	95	98	100	93
1199600	94	98	100	94
1199601	94	99	100	94
1199602	93	100	100	94
1199603	94	98	100	94
1199604	94	98	100	96
1199608	92	98	99	94
Blank	91	98	100	94
LCS	92	98	100	96
LCSD	93	98	100	96
Limits:	80-120	80-120	80-120	80-120

Analysis Name: SVOAs by 8270D in Water
Batch number: 19316WAM026

	Phenol-d6	2-Fluorophenol	2,4,6-Tribromophenol	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
1199604	28	40	63	79	79	70
1199606	8*	11	31	82	85	66
Blank	34	49	81	75	73	91
LCS	43	60	86	83	80	89
LCSD	42	58	88	83	84	89
Limits:	10-67	10-84	23-135	33-113	44-102	39-125

Analysis Name: Volatile Headspace Hydrocarbon
Batch number: 193190031A

	Propene
1199604	69
1199606	68
Blank	104
LCS	92
LCSD	94

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Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2074109
Reported: 11/26/2019 13:07

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Volatile Headspace Hydrocarbon
Batch number: 193190031A

Limits: 46-135

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IBM Chain of Custody

eurofins | Lancaster Laboratories Environmental

Acct. # 42322 For Eurofins Lancaster Laboratories Environmental use only Group # 2024109 Sample # 199596-608

Instructions on reverse side correspond with circled numbers.

COC # 020656

Client Information

Client: Golder | Acct #:

Project Name/#: IBM-Kingston SWMU M | SSOW #:

IBM PM: Dean Chartrand | Project State: NY

P.O. #: 083-87071.08 | Sampler: David Vella

For Compliance: ☐ Yes ☒ No

Check One:

☐ Routine Lab GW ☐ Routine GTF O&M

☒ Non-Routine Investigation ☐ Non-Routine Upgrades/Installs

OU: _____ (Endicott Non-Routine only)

For Lab Use Only

SCR# 251685

Preservation Codes

H = HCl T = Thiosulfate
N = HNO_3 B = NaOH
S = H_2SO_4 O = Other
F = Field Filtered

Remarks

*Lab Filtered dissolved METALS

*All samples on ICE

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil	Water: Ground	Water: Surface	Water: Potable	Water: NPDES	Air	Oil	Total # of Containers	Analyses Requested: VOC 8260C (H)	SVOC (8270D) (N)	Total Mn + Fe (N)	Dissolved Mn + Fe (S)	Nitrate, Phosphate, Ammonia (S)	Total Sulfide (B)	Sulfate, Chloride, Nitrate, Total Alk (N)	TOC (O)	Methane, Ethane, Ethene (H)	
B-12 (11-13)	11/8/19	0955	X			X						3	X									TB received at entry. NUM2005 11/18/19
B-12 (26-28)	11/8/19	1040	X			X						3	X									
B-5 (11-13)	11/8/19	1200	X			X						3	X									
B-3 (12-14)	11/8/19	1410	X			X						3	X									
B-9 (12-14)	11/8/19	1340	X			X						3	X									
B-14 (10-12)	11/11/19	1023	X			X						3	X									
B-15 (10-12)	11/11/19	1100	X			X						3	X									
B-16 (25-27)	11/11/19	1200	X			X						3	X									
B-16 (11-13)	11/11/19	1240	X			X						18	X	X	X	X	X	X	X	X	X	
B-20 (25-30)	11/11/19	1355	X			X						18	X	X	X	X	X	X	X	X	X	

Turnaround Time Requested (TAT) (please circle)

(Standard) Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharges.)

Date results are needed: _____

E-mail: Chemingway@golder.com helkinton@golder.com

Is EDD Needed?: YES

Data Package Options (please circle if required)

Type I (Validation/NJ Reg) TX TRRP-13 NY ASP A

Type III (Reduced NJ) MA MCP NY ASP B

Type VI (Raw Data Only) CT RCP

SDG Complete? Yes (No)

Relinquished by	Date	Time	Received by	Date	Time
[signature]	11/5/19	3:50	[signature]	11/5/19	1550
[signature]	11/11/19	1600			
			[signature]	11/12/19	1154

Site-specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate volume.)

Temperature upon receipt 0.3 °C

eurofins | Lancaster Laboratories Environmental

Sample Administration Receipt Documentation Log

Doc Log ID: 266124

Group Number(s): 2074109

Client: GOLDER

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Date:	11/12/2019
Number of Packages:	2	Number of Projects:	2
State/Province of Origin:	NY		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	Total Trip Blank Qty:	3
Samples Chilled:	Yes	Trip Blank Type:	HCl
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	No		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Julissa Rivera-Santa

Samples Chilled Details

Thermometer Types: *DT = Digital (Temp. Bottle)* *IR = Infrared (Surface Temp)* *All Temperatures in °C.*

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	192050133	4.7	IR	Wet	Y	Bagged	N
2	192050133	0.3	IR	Wet	Y	Bagged	N

Samples Not Intact Details

Sample ID on Label	Bottle Code	Bottle Quantity	Container Salvageable?	Comments
B-3(12-14)	40 ml glass vial - HCl	1	N	
B-9(12-14)	40 ml glass vial - HCl	1	N	

General Comments: 1 HCl vial of B-16(11-13) received empty

2425 New Holland Pike
Lancaster, PA 17605-2425

T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Golder Associates Incorporated
200 Century Parkway
Suite C
Mt. Laurel NJ 08054

Report Date: November 22, 2019 19:17

Project: IBM Kingston, NY

Account #: 42322
Group Number: 2074111
SDG: IBL27
PO Number: 083-87071.08
State of Sample Origin: NY

Electronic Copy To	Golder Associates, Inc.	Attn: Christopher Hemingway
Electronic Copy To	Golder	Attn: Youki Sato

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

To view our laboratory's current scopes of accreditation please go to https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/ . Historical copies may be requested through your project manager.

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
B-14(10-12) Grab Soil	11/11/2019 10:00	1199613
B-20(28-30) Grab Soil	11/11/2019 13:55	1199614
B-19(28-30) Grab Groundwater	11/11/2019 15:30	1199615

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: B-14(10-12) Grab Soil
IBM-Kingston SWMU M

Project Name: IBM Kingston, NY

Submittal Date/Time: 11/12/2019 11:52
Collection Date/Time: 11/11/2019 10:00
SDG#: IBL27-01

Golder Associates Incorporated
ELLE Sample #: SW 1199613
ELLE Group #: 2074111
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**	**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	N.D.	0.5	5	0.74
11995	Benzyl Chloride	100-44-7	N.D.	1	4	0.74
11995	Bromobenzene	108-86-1	N.D.	0.4	5	0.74
11995	Bromodichloromethane	75-27-4	N.D.	0.4	5	0.74
11995	Bromoform	75-25-2	N.D.	5	9	0.74
11995	Bromomethane	74-83-9	N.D.	0.6	5	0.74
11995	Carbon Tetrachloride	56-23-5	N.D.	0.5	5	0.74
11995	Chlorobenzene	108-90-7	N.D.	0.5	5	0.74
11995	Chloroethane	75-00-3	N.D.	0.9	5	0.74
11995	Chloroform	67-66-3	N.D.	0.5	5	0.74
11995	Chloromethane	74-87-3	N.D.	0.5	5	0.74
11995	2-Chlorotoluene	95-49-8	N.D.	0.4	5	0.74
11995	4-Chlorotoluene	106-43-4	N.D.	0.4	5	0.74
11995	Dibromochloromethane	124-48-1	N.D.	0.5	5	0.74
11995	Dibromomethane	74-95-3	N.D.	0.5	5	0.74
11995	1,2-Dichlorobenzene	95-50-1	N.D.	0.5	5	0.74
11995	1,3-Dichlorobenzene	541-73-1	N.D.	0.5	5	0.74
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.4	5	0.74
11995	Dichlorodifluoromethane	75-71-8	N.D.	0.5	5	0.74
11995	1,1-Dichloroethane	75-34-3	N.D.	0.5	5	0.74
11995	1,2-Dichloroethane	107-06-2	N.D.	0.5	5	0.74
11995	1,1-Dichloroethene	75-35-4	N.D.	0.5	5	0.74
11995	1,2-Dichloroethene (Total)[1]	540-59-0	3 J	0.9	9	0.74
11995	1,2-Dichloropropane	78-87-5	N.D.	0.5	5	0.74
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.4	5	0.74
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.5	5	0.74
11995	Ethylbenzene	100-41-4	N.D.	0.4	5	0.74
11995	Freon 113	76-13-1	N.D.	0.5	9	0.74
11995	Freon 123a[1]	354-23-4	N.D.	0.5	5	0.74
11995	Methylene Chloride	75-09-2	N.D.	2	5	0.74
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.5	5	0.74
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.4	5	0.74
11995	Tetrachloroethene	127-18-4	2 J	0.5	5	0.74
11995	Toluene	108-88-3	N.D.	0.5	5	0.74
11995	1,1,1-Trichloroethane	71-55-6	N.D.	0.5	5	0.74
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.5	5	0.74
11995	Trichloroethene	79-01-6	19	0.5	5	0.74
11995	Trichlorofluoromethane	75-69-4	N.D.	0.6	5	0.74
11995	1,2,3-Trichloropropane	96-18-4	N.D.	0.5	5	0.74
11995	Vinyl Chloride	75-01-4	N.D.	0.5	5	0.74
11995	Xylene (Total)	1330-20-7	N.D.	1	9	0.74

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: B-14(10-12) Grab Soil
IBM-Kingston SWMU M

Project Name: IBM Kingston, NY

Submittal Date/Time: 11/12/2019 11:52
Collection Date/Time: 11/11/2019 10:00
SDG#: IBL27-01

Golder Associates Incorporated
ELLE Sample #: SW 1199613
ELLE Group #: 2074111
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	1,170	376	1,130	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	17.6	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A193251AA	11/21/2019 11:13	Stephen C Nolte	0.74
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931755447	11/11/2019 10:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931755447	11/11/2019 10:00	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931755447	11/11/2019 10:00	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19322667632A	11/19/2019 05:43	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19318820009A	11/15/2019 11:44	William C Schwebel	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(28-30) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:52
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL27-02

Golder Associates Incorporated
ELLE Sample #: SW 1199614
ELLE Group #: 2074111
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**	**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	N.D.	0.5	5	0.78
11995	Benzyl Chloride	100-44-7	N.D.	1	4	0.78
11995	Bromobenzene	108-86-1	N.D.	0.4	5	0.78
11995	Bromodichloromethane	75-27-4	N.D.	0.4	5	0.78
11995	Bromoform	75-25-2	N.D.	5	10	0.78
11995	Bromomethane	74-83-9	N.D.	0.7	5	0.78
11995	Carbon Tetrachloride	56-23-5	N.D.	0.5	5	0.78
11995	Chlorobenzene	108-90-7	N.D.	0.5	5	0.78
11995	Chloroethane	75-00-3	N.D.	1	5	0.78
11995	Chloroform	67-66-3	N.D.	0.6	5	0.78
11995	Chloromethane	74-87-3	N.D.	0.6	5	0.78
11995	2-Chlorotoluene	95-49-8	N.D.	0.4	5	0.78
11995	4-Chlorotoluene	106-43-4	N.D.	0.4	5	0.78
11995	Dibromochloromethane	124-48-1	N.D.	0.5	5	0.78
11995	Dibromomethane	74-95-3	N.D.	0.5	5	0.78
11995	1,2-Dichlorobenzene	95-50-1	N.D.	0.5	5	0.78
11995	1,3-Dichlorobenzene	541-73-1	N.D.	0.5	5	0.78
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.4	5	0.78
11995	Dichlorodifluoromethane	75-71-8	N.D.	0.6	5	0.78
11995	1,1-Dichloroethane	75-34-3	N.D.	0.5	5	0.78
11995	1,2-Dichloroethane	107-06-2	N.D.	0.6	5	0.78
11995	1,1-Dichloroethene	75-35-4	N.D.	0.5	5	0.78
11995	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	1	10	0.78
11995	1,2-Dichloropropane	78-87-5	N.D.	0.5	5	0.78
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.4	5	0.78
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.5	5	0.78
11995	Ethylbenzene	100-41-4	N.D.	0.4	5	0.78
11995	Freon 113	76-13-1	N.D.	0.6	10	0.78
11995	Freon 123a[1]	354-23-4	N.D.	0.6	5	0.78
11995	Methylene Chloride	75-09-2	N.D.	2	5	0.78
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.5	5	0.78
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.4	5	0.78
11995	Tetrachloroethene	127-18-4	N.D.	0.5	5	0.78
11995	Toluene	108-88-3	N.D.	0.6	5	0.78
11995	1,1,1-Trichloroethane	71-55-6	N.D.	0.6	5	0.78
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.5	5	0.78
11995	Trichloroethene	79-01-6	0.7 J	0.5	5	0.78
11995	Trichlorofluoromethane	75-69-4	N.D.	0.7	5	0.78
11995	1,2,3-Trichloropropane	96-18-4	N.D.	0.6	5	0.78
11995	Vinyl Chloride	75-01-4	N.D.	0.6	5	0.78
11995	Xylene (Total)	1330-20-7	N.D.	1	10	0.78

The recovery for the sample internal standard is outside the QC acceptance

*=This limit was used in the evaluation of the final result

Sample Description: **B-20(28-30) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:52
Collection Date/Time: 11/11/2019 13:55
SDG#: IBL27-02

Golder Associates Incorporated
ELLE Sample #: SW 1199614
ELLE Group #: 2074111
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	limits. The following action was taken: The sample was re-analyzed and the QC is again outside of the acceptance limits, indicating a matrix effect. The data is reported from the initial trial.					
Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	1,590	221	663	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	20.8	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A193251AA	11/21/2019 11:35	Stephen C Nolte	0.78
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931755447	11/11/2019 13:55	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931755447	11/11/2019 13:55	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931755447	11/11/2019 13:55	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19322667632A	11/19/2019 05:56	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19318820009A	11/15/2019 11:44	William C Schwebel	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-19(28-30) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:52
Collection Date/Time: 11/11/2019 15:30
SDG#: IBL27-03

Golder Associates Incorporated
ELLE Sample #: GW 1199615
ELLE Group #: 2074111
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-19(28-30) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/12/2019 11:52
Collection Date/Time: 11/11/2019 15:30
SDG#: IBL27-03

Golder Associates Incorporated
ELLE Sample #: GW 1199615
ELLE Group #: 2074111
Matrix: Groundwater

Sample Comments

State of New York Certification No. 10670
Trip blank vials were not received by the laboratory for this sample group.

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	W193231AA	11/19/2019 16:22	Kevin A Sposito	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	W193231AA	11/19/2019 16:21	Kevin A Sposito	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2074111
Reported: 11/22/2019 19:17

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Batch number: A193251AA	Sample number(s): 1199613-1199614		
Benzene	N.D.	0.5	5
Benzyl Chloride	N.D.	2	4
Bromobenzene	N.D.	0.4	5
Bromodichloromethane	N.D.	0.4	5
Bromoform	N.D.	5	10
Bromomethane	N.D.	0.7	5
Carbon Tetrachloride	N.D.	0.5	5
Chlorobenzene	N.D.	0.5	5
Chloroethane	N.D.	1	5
Chloroform	N.D.	0.6	5
Chloromethane	N.D.	0.6	5
2-Chlorotoluene	N.D.	0.4	5
4-Chlorotoluene	N.D.	0.4	5
Dibromochloromethane	N.D.	0.5	5
Dibromomethane	N.D.	0.5	5
1,2-Dichlorobenzene	N.D.	0.5	5
1,3-Dichlorobenzene	N.D.	0.5	5
1,4-Dichlorobenzene	N.D.	0.4	5
Dichlorodifluoromethane	N.D.	0.6	5
1,1-Dichloroethane	N.D.	0.5	5
1,2-Dichloroethane	N.D.	0.6	5
1,1-Dichloroethene	N.D.	0.5	5
1,2-Dichloroethene (Total)	N.D.	1	10
1,2-Dichloropropane	N.D.	0.5	5
cis-1,3-Dichloropropene	N.D.	0.4	5
trans-1,3-Dichloropropene	N.D.	0.5	5
Ethylbenzene	N.D.	0.4	5
Freon 113	N.D.	0.6	10
Freon 123a	N.D.	0.6	5
Methylene Chloride	N.D.	2	5
1,1,1,2-Tetrachloroethane	N.D.	0.5	5
1,1,2,2-Tetrachloroethane	N.D.	0.4	5
Tetrachloroethene	N.D.	0.5	5
Toluene	N.D.	0.6	5
1,1,1-Trichloroethane	N.D.	0.6	5
1,1,2-Trichloroethane	N.D.	0.5	5
Trichloroethene	N.D.	0.5	5
Trichlorofluoromethane	N.D.	0.7	5
1,2,3-Trichloropropane	N.D.	0.6	5

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074111
Reported: 11/22/2019 19:17

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Vinyl Chloride	N.D.	0.6	5
Xylene (Total)	N.D.	1	10
	ug/l	ug/l	ug/l
Batch number: W193231AA	Sample number(s): 1199615		
Benzene	N.D.	0.2	1
Benzyl Chloride	N.D.	1	5
Bromobenzene	N.D.	0.2	5
Bromodichloromethane	N.D.	0.2	1
Bromoform	N.D.	1	4
Bromomethane	N.D.	0.3	1
Carbon Tetrachloride	N.D.	0.2	1
Chlorobenzene	N.D.	0.2	1
Chloroethane	N.D.	0.2	1
Chloroform	N.D.	0.2	1
Chloromethane	N.D.	0.2	1
2-Chlorotoluene	N.D.	0.2	5
4-Chlorotoluene	N.D.	0.2	5
Dibromochloromethane	N.D.	0.2	1
Dibromomethane	N.D.	0.2	1
1,2-Dichlorobenzene	N.D.	0.2	5
1,3-Dichlorobenzene	N.D.	0.2	5
1,4-Dichlorobenzene	N.D.	0.2	5
Dichlorodifluoromethane	N.D.	0.2	1
1,1-Dichloroethane	N.D.	0.2	1
1,2-Dichloroethane	N.D.	0.3	1
1,1-Dichloroethene	N.D.	0.2	1
1,2-Dichloroethene (Total)	N.D.	0.4	2
1,2-Dichloropropane	N.D.	0.2	1
cis-1,3-Dichloropropene	N.D.	0.2	1
trans-1,3-Dichloropropene	N.D.	0.2	1
Ethylbenzene	N.D.	0.4	1
Freon 113	N.D.	0.2	10
Freon 123a	N.D.	0.4	5
Methylene Chloride	N.D.	0.3	1
1,1,1,2-Tetrachloroethane	N.D.	0.2	1
1,1,2,2-Tetrachloroethane	N.D.	0.2	1
Tetrachloroethene	N.D.	0.2	1
Toluene	N.D.	0.2	1
1,1,1-Trichloroethane	N.D.	0.3	1
1,1,2-Trichloroethane	N.D.	0.2	1
Trichloroethene	N.D.	0.2	1
Trichlorofluoromethane	N.D.	0.2	1
1,2,3-Trichloropropane	N.D.	0.2	5
Vinyl Chloride	N.D.	0.2	1

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/22/2019 19:17

Group Number: 2074111

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Xylene (Total)	N.D.	1	6
	mg/kg	mg/kg	mg/kg
Batch number: 19322667632A	Sample number(s): 1199613-1199614		
TOC by Lloyd Kahn	N.D.	100	300

LCS/LCSD

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: A193251AA	Sample number(s): 1199613-1199614								
Benzene	20	19.35	20	18.95	97	95	80-120	2	30
Benzyl Chloride	20	14.11	20	15.28	71	76	48-134	8	30
Bromobenzene	20	19.36	20	19.18	97	96	78-120	1	30
Bromodichloromethane	20	19.35	20	19.49	97	97	70-120	1	30
Bromoform	20	18.13	20	18.72	91	94	51-127	3	30
Bromomethane	20	15.11	20	14.02	76	70	45-140	8	30
Carbon Tetrachloride	20	19.69	20	19.23	98	96	64-134	2	30
Chlorobenzene	20	20.94	20	20.44	105	102	80-120	2	30
Chloroethane	20	17.58	20	16.24	88	81	43-135	8	30
Chloroform	20	19.78	20	19.4	99	97	80-120	2	30
Chloromethane	20	16.7	20	15.91	84	80	56-120	5	30
2-Chlorotoluene	20	20.72	20	19.71	104	99	75-120	5	30
4-Chlorotoluene	20	20.63	20	20.22	103	101	75-120	2	30
Dibromochloromethane	20	20.15	20	20.47	101	102	69-125	2	30
Dibromomethane	20	20.79	20	21.78	104	109	80-120	5	30
1,2-Dichlorobenzene	20	20.36	20	20.24	102	101	76-120	1	30
1,3-Dichlorobenzene	20	19.86	20	19.47	99	97	75-120	2	30
1,4-Dichlorobenzene	20	20.37	20	19.95	102	100	80-120	2	30
Dichlorodifluoromethane	20	15.73	20	14.45	79	72	21-127	9	30
1,1-Dichloroethane	20	18.73	20	17.92	94	90	79-120	4	30
1,2-Dichloroethane	20	19.14	20	19.35	96	97	71-128	1	30
1,1-Dichloroethene	20	21.05	20	19.48	105	97	73-129	8	30
1,2-Dichloroethene (Total)	40	42.42	40	41.37	106	103	80-126	2	30
1,2-Dichloropropane	20	18.77	20	18.95	94	95	80-120	1	30
cis-1,3-Dichloropropene	20	17.77	20	18.12	89	91	66-120	2	30
trans-1,3-Dichloropropene	20	17.27	20	17.68	86	88	68-122	2	30
Ethylbenzene	20	18.92	20	18.19	95	91	78-120	4	30
Freon 113	20	19.22	20	17.62	96	88	64-135	9	30
Freon 123a	20	18.24	20	16.94	91	85	71-123	7	30
Methylene Chloride	20	19.99	20	19.72	100	99	76-122	1	30

*- Outside of specification
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Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074111
Reported: 11/22/2019 19:17

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,1,1,2-Tetrachloroethane	20	20.35	20	20.4	102	102	73-120	0	30
1,1,2,2-Tetrachloroethane	20	19.47	20	20.77	97	104	69-125	6	30
Tetrachloroethene	20	20.14	20	18.92	101	95	73-120	6	30
Toluene	20	19.5	20	18.8	98	94	80-120	4	30
1,1,1-Trichloroethane	20	19.14	20	18.22	96	91	69-123	5	30
1,1,2-Trichloroethane	20	20.95	20	21.32	105	107	80-120	2	30
Trichloroethene	20	19.68	20	19.28	98	96	80-120	2	30
Trichlorofluoromethane	20	17.69	20	16.08	88	80	55-134	9	30
1,2,3-Trichloropropane	20	20.7	20	21.73	104	109	75-125	5	30
Vinyl Chloride	20	17.94	20	16.53	90	83	52-120	8	30
Xylene (Total)	60	60.26	60	58.18	100	97	75-120	4	30
	ug/l	**ug/l**	**ug/l**	**ug/l**					
Batch number: W193231AA	Sample number(s): 1199615								
Benzene	20	20.77	20	21.16	104	106	80-120	2	30
Benzyl Chloride	20	16.02	20	15.91	80	80	52-120	1	30
Bromobenzene	20	20.95	20	20.76	105	104	80-120	1	30
Bromodichloromethane	20	19.82	20	19.61	99	98	71-120	1	30
Bromoform	20	16.1	20	15.74	80	79	51-120	2	30
Bromomethane	20	22.95	20	21.97	115	110	53-128	4	30
Carbon Tetrachloride	20	21.52	20	21.36	108	107	64-134	1	30
Chlorobenzene	20	20.98	20	21.11	105	106	80-120	1	30
Chloroethane	20	22.39	20	22.26	112	111	55-123	1	30
Chloroform	20	20.83	20	20.64	104	103	80-120	1	30
Chloromethane	20	18.78	20	19	94	95	56-121	1	30
2-Chlorotoluene	20	21.4	20	21.15	107	106	80-120	1	30
4-Chlorotoluene	20	20.97	20	20.62	105	103	80-120	2	30
Dibromochloromethane	20	19.41	20	19.38	97	97	71-120	0	30
Dibromomethane	20	20.65	20	20.33	103	102	80-120	2	30
1,2-Dichlorobenzene	20	21.2	20	20.82	106	104	80-120	2	30
1,3-Dichlorobenzene	20	21.06	20	20.79	105	104	80-120	1	30
1,4-Dichlorobenzene	20	21.17	20	21.11	106	106	80-120	0	30
Dichlorodifluoromethane	20	20.5	20	20.86	103	104	41-127	2	30
1,1-Dichloroethane	20	20.88	20	20.64	104	103	80-120	1	30
1,2-Dichloroethane	20	20.72	20	20.33	104	102	73-124	2	30
1,1-Dichloroethene	20	23.01	20	23.33	115	117	80-131	1	30
1,2-Dichloroethene (Total)	40	43.76	40	42.7	109	107	80-125	2	30
1,2-Dichloropropane	20	20.68	20	20.86	103	104	80-120	1	30
cis-1,3-Dichloropropene	20	19.38	20	19.31	97	97	75-120	0	30
trans-1,3-Dichloropropene	20	18.24	20	18.35	91	92	67-120	1	30
Ethylbenzene	20	21.14	20	20.94	106	105	80-120	1	30
Freon 113	20	22.47	20	22.38	112	112	73-139	0	30
Freon 123a	20	23.74	20	22.67	119	113	76-129	5	30
Methylene Chloride	20	21.29	20	21.43	106	107	80-120	1	30

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Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/22/2019 19:17

Group Number: 2074111

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,1,1,2-Tetrachloroethane	20	20.03	20	19.7	100	99	78-120	2	30
1,1,2,2-Tetrachloroethane	20	20.57	20	20.19	103	101	72-120	2	30
Tetrachloroethene	20	21.07	20	20.92	105	105	80-120	1	30
Toluene	20	21.07	20	20.87	105	104	80-120	1	30
1,1,1-Trichloroethane	20	21.51	20	21.87	108	109	67-126	2	30
1,1,2-Trichloroethane	20	21.93	20	21.67	110	108	80-120	1	30
Trichloroethene	20	21.09	20	20.51	105	103	80-120	3	30
Trichlorofluoromethane	20	24.97	20	24.84	125	124	55-135	1	30
1,2,3-Trichloropropane	20	21.52	20	21.11	108	106	75-124	2	30
Vinyl Chloride	20	20.7	20	20.42	103	102	56-120	1	30
Xylene (Total)	60	63.05	60	62.65	105	104	80-120	1	30
	mg/kg	**mg/kg**	**mg/kg**	**mg/kg**					
Batch number: 19322667632A	Sample number(s): 1199613-1199614								
TOC by Lloyd Kahn	5080	5905.22			116		47-143		
	%	**%**	**%**	**%**					
Batch number: 19318820009A	Sample number(s): 1199613-1199614								
Moisture	89.5	89.44			100		99-101		

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc %	DUP Conc %	DUP RPD	DUP RPD Max
Batch number: 19318820009A	Sample number(s): 1199613-1199614 BKG: 1199614			
Moisture	20.75	20.12	3	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260C/D
Batch number: A193251AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1199613	105	110	97	92
1199614	106	110	108	78

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Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074111
Reported: 11/22/2019 19:17

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260C/D
Batch number: A193251AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
Blank	106	110	96	93
LCS	102	105	100	97
LCSD	107	106	99	98
Limits:	50-141	54-135	52-141	50-131

Analysis Name: Volatiles 8260C
Batch number: W193231AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1199615	95	98	100	90
Blank	97	100	100	91
LCS	99	99	102	97
LCSD	98	101	102	97
Limits:	80-120	80-120	80-120	80-120

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(2) The unspiked result was more than four times the spike added.

IBM Chain of Custody

eurofins | Lancaster Laboratories Environmental

Acct. # 42322 For Eurofins Lancaster Laboratories Environmental use only Group # 607411 Sample # 119963-15

Instructions on reverse side correspond with circled numbers.

COC # 020642

Client Information

Client: Golder | Acct #:

Project Name/#: IBM-Kingston SWMU M | SSOW #:

IBM PM: Dean Chartrand | Project State:

P.O. #: 083-87071.08 | Sampler: David Velk

For Compliance: ☐ Yes ☒ No

Check One:

☐ Routine Lab GW ☐ Routine GTF O&M

☐ Non-Routine Investigation ☐ Non-Routine Upgrades/Installs

OU: _____ (Endicott Non-Routine only)

For Lab Use Only

SCR#:

Preservation Codes

H = HCl T = Thiosulfate

N = HNO_3 B = NaOH

S = H_2SO_4 O = Other

F = Field Filtered

Remarks

Sample Identification	Collected Date	Collected Time	Grab	Composite	Matrix: Soil	Matrix: Water	Matrix: Oil	Total # of Containers	Analyses Requested: VOC 8260C	Analyses Requested: TOC
B-14(10-12)	11/11/19	1000	X		X			5	X	X
B-20(28-30)	11/11/19	1355	X		X			5	X	X
B-19(28-30)	11/11/19	1530	X			X		3	X	

Matrix: Sediment ☐ | Ground ☒ | Surface ☐ | Potable ☐ | NPDES ☐ | Air ☐ | Soil ☒

Turnaround Time Requested (TAT) (please circle)

Standard Rush

(Rush TAT is subject to Lancaster Laboratories approval and surcharges.)

Date results are needed: _____

E-mail: CHemingway@Golder.com HElkinton@golder.com

Is EDD Needed?: YES

Data Package Options (please circle if required)

Type I (Validation/NJ Reg) TX TRRP-13 NY ASP A

Type III (Reduced NJ) MA MCP NY ASP B

Type VI (Raw Data Only) CT RCP

SDG Complete? Yes (No)

Relinquished by	Date	Time	Received by	Date	Time
David Velk	11/11/19	1600			
			Chris Wells	11/13/19	11:52

Site-specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate volume.)

Temperature upon receipt 4.7 °C

Client: GOLDER

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Date:	11/12/2019
Number of Packages:	2	Number of Projects:	2

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	No
Custody Seal Intact:	Yes	Total Trip Blank Qty:	0
Samples Chilled:	Yes	Air Quality Samples Present:	No
Paperwork Enclosed:	Yes		
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Julissa Rivera-Santa

Samples Chilled Details

Thermometer Types: *DT = Digital (Temp. Bottle)* *IR = Infrared (Surface Temp)* *All Temperatures in °C.*

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	192050133	4.7	IR	Wet	Y	Bagged	N
2	192050133	0.3	IR	Wet	Y	Bagged	N

Sample Date/Time Discrepancy Details

Sample ID on COC	Date/Time on Label	Comments
B-20(28-30)	11/11/2019 13:45	

2425 New Holland Pike
Lancaster, PA 17605-2425

T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Golder Associates Incorporated
200 Century Parkway
Suite C
Mt. Laurel NJ 08054

Report Date: November 26, 2019 17:20

Project: IBM Kingston, NY

Account #: 42322
Group Number: 2074333
SDG: IBL28
PO Number: 083-87071.08
State of Sample Origin: NY

Electronic Copy To	Golder Associates, Inc.	Attn: Christopher Hemingway
Electronic Copy To	Golder	Attn: Youki Sato

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

To view our laboratory's current scopes of accreditation please go to https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/ . Historical copies may be requested through your project manager.

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
B-4(8-10) Grab Soil	11/12/2019 08:10	1200463
B-4(15-18) Grab Soil	11/12/2019 09:45	1200464
B-4(8-10) Grab Groundwater	11/12/2019 11:45	1200465
B-4(8-10) Filtered Grab Groundwater	11/12/2019 11:45	1200466
Trip Blank Water	11/12/2019	1200467

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **B-4(8-10) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 08:10
SDG#: IBL28-01

Golder Associates Incorporated
ELLE Sample #: SW 1200463
ELLE Group #: 2074333
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**	**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	2 J	0.4	4	0.77
11995	Benzyl Chloride	100-44-7	N.D.	1	3	0.77
11995	Bromobenzene	108-86-1	N.D.	0.3	4	0.77
11995	Bromodichloromethane	75-27-4	N.D.	0.3	4	0.77
11995	Bromoform	75-25-2	N.D.	4	9	0.77
11995	Bromomethane	74-83-9	N.D.	0.6	4	0.77
11995	Carbon Tetrachloride	56-23-5	N.D.	0.4	4	0.77
11995	Chlorobenzene	108-90-7	N.D.	0.4	4	0.77
11995	Chloroethane	75-00-3	1 J	0.9	4	0.77
11995	Chloroform	67-66-3	1 J	0.5	4	0.77
11995	Chloromethane	74-87-3	N.D.	0.5	4	0.77
11995	2-Chlorotoluene	95-49-8	N.D.	0.3	4	0.77
11995	4-Chlorotoluene	106-43-4	N.D.	0.3	4	0.77
11995	Dibromochloromethane	124-48-1	N.D.	0.4	4	0.77
11995	Dibromomethane	74-95-3	N.D.	0.4	4	0.77
11995	1,2-Dichlorobenzene	95-50-1	N.D.	0.4	4	0.77
11995	1,3-Dichlorobenzene	541-73-1	N.D.	0.4	4	0.77
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.3	4	0.77
11995	Dichlorodifluoromethane	75-71-8	N.D.	0.5	4	0.77
11995	1,1-Dichloroethane	75-34-3	810	22	220	39.68
11995	1,2-Dichloroethane	107-06-2	56	0.5	4	0.77
11995	1,1-Dichloroethene	75-35-4	62	0.4	4	0.77
11995	1,2-Dichloroethene (Total)[1]	540-59-0	3,700	45	450	39.68
11995	1,2-Dichloropropane	78-87-5	N.D.	0.4	4	0.77
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.3	4	0.77
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.4	4	0.77
11995	Ethylbenzene	100-41-4	12	0.3	4	0.77
11995	Freon 113	76-13-1	N.D.	0.5	9	0.77
11995	Freon 123a[1]	354-23-4	N.D.	0.5	4	0.77
11995	Methylene Chloride	75-09-2	N.D.	2	4	0.77
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.4	4	0.77
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.3	4	0.77
11995	Tetrachloroethene	127-18-4	6	0.4	4	0.77
11995	Toluene	108-88-3	9	0.5	4	0.77
11995	1,1,1-Trichloroethane	71-55-6	960	27	220	39.68
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.4	4	0.77
11995	Trichloroethene	79-01-6	93	0.4	4	0.77
11995	Trichlorofluoromethane	75-69-4	N.D.	0.6	4	0.77
11995	1,2,3-Trichloropropane	96-18-4	N.D.	0.5	4	0.77
11995	Vinyl Chloride	75-01-4	3 J	0.5	4	0.77
11995	Xylene (Total)	1330-20-7	160	1	9	0.77

A Report Limit Verification (RLV) standard is analyzed to confirm

*=This limit was used in the evaluation of the final result

Sample Description: B-4(8-10) Grab Soil
IBM-Kingston SWMU M

Project Name: IBM Kingston, NY

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 08:10
SDG#: IBL28-01

Golder Associates Incorporated
ELLE Sample #: SW 1200463
ELLE Group #: 2074333
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	sensitivity of the instrument for samples with non-detect analytes associated with a continuing calibration verification standard exhibiting low response (outside the 20%D criteria). The RLV standard shows adequate sensitivity at or below the reporting limit.					
Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	9,680	423	1,270	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	11.6	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A193253AA	11/21/2019 23:30	Laura Green	0.77
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	V193262AA	11/22/2019 14:59	Joel Trout	39.68
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931855460	11/12/2019 08:10	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931855460	11/12/2019 08:10	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931855460	11/12/2019 08:10	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19322667632A	11/19/2019 06:09	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19319820005B	11/16/2019 00:00	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-4(15-18) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 09:45
SDG#: IBL28-02

Golder Associates Incorporated
ELLE Sample #: SW 1200464
ELLE Group #: 2074333
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/kg**	**ug/kg**	**ug/kg**	
11995	Benzene	71-43-2	N.D.	0.5	5	0.76
11995	Benzyl Chloride	100-44-7	N.D.	1	4	0.76
11995	Bromobenzene	108-86-1	N.D.	0.4	5	0.76
11995	Bromodichloromethane	75-27-4	N.D.	0.4	5	0.76
11995	Bromoform	75-25-2	N.D.	5	9	0.76
11995	Bromomethane	74-83-9	N.D.	0.7	5	0.76
11995	Carbon Tetrachloride	56-23-5	N.D.	0.5	5	0.76
11995	Chlorobenzene	108-90-7	N.D.	0.5	5	0.76
11995	Chloroethane	75-00-3	N.D.	0.9	5	0.76
11995	Chloroform	67-66-3	N.D.	0.6	5	0.76
11995	Chloromethane	74-87-3	N.D.	0.6	5	0.76
11995	2-Chlorotoluene	95-49-8	N.D.	0.4	5	0.76
11995	4-Chlorotoluene	106-43-4	N.D.	0.4	5	0.76
11995	Dibromochloromethane	124-48-1	N.D.	0.5	5	0.76
11995	Dibromomethane	74-95-3	N.D.	0.5	5	0.76
11995	1,2-Dichlorobenzene	95-50-1	N.D.	0.5	5	0.76
11995	1,3-Dichlorobenzene	541-73-1	N.D.	0.5	5	0.76
11995	1,4-Dichlorobenzene	106-46-7	N.D.	0.4	5	0.76
11995	Dichlorodifluoromethane	75-71-8	N.D.	0.6	5	0.76
11995	1,1-Dichloroethane	75-34-3	3 J	0.5	5	0.76
11995	1,2-Dichloroethane	107-06-2	N.D.	0.6	5	0.76
11995	1,1-Dichloroethene	75-35-4	N.D.	0.5	5	0.76
11995	1,2-Dichloroethene (Total)[1]	540-59-0	32	0.9	9	0.76
11995	1,2-Dichloropropane	78-87-5	N.D.	0.5	5	0.76
11995	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.4	5	0.76
11995	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.5	5	0.76
11995	Ethylbenzene	100-41-4	N.D.	0.4	5	0.76
11995	Freon 113	76-13-1	N.D.	0.6	9	0.76
11995	Freon 123a[1]	354-23-4	N.D.	0.6	5	0.76
11995	Methylene Chloride	75-09-2	N.D.	2	5	0.76
11995	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.5	5	0.76
11995	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.4	5	0.76
11995	Tetrachloroethene	127-18-4	47	0.5	5	0.76
11995	Toluene	108-88-3	0.6 J	0.6	5	0.76
11995	1,1,1-Trichloroethane	71-55-6	3 J	0.6	5	0.76
11995	1,1,2-Trichloroethane	79-00-5	N.D.	0.5	5	0.76
11995	Trichloroethene	79-01-6	30	0.5	5	0.76
11995	Trichlorofluoromethane	75-69-4	N.D.	0.7	5	0.76
11995	1,2,3-Trichloropropane	96-18-4	N.D.	0.6	5	0.76
11995	Vinyl Chloride	75-01-4	N.D.	0.6	5	0.76
11995	Xylene (Total)	1330-20-7	N.D.	1	9	0.76

*=This limit was used in the evaluation of the final result

Sample Description: **B-4(15-18) Grab Soil**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 09:45
SDG#: IBL28-02

Golder Associates Incorporated
ELLE Sample #: SW 1200464
ELLE Group #: 2074333
Matrix: Soil

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**Lloyd Kahn**		**mg/kg**	**mg/kg**	**mg/kg**	
00383	TOC by Lloyd Kahn	n.a.	541	126	379	1
Wet Chemistry	**SM 2540 G-2011 %Moisture Calc**		**%**	**%**	**%**	
00111	Moisture[1]	n.a.	19.2	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Eurofins Lancaster Laboratories Environmental, LLC is responsible only for the certified testing of samples. We are not directly responsible for the integrity of the sample prior to laboratory receipt. Any reported concentrations less than 200 ug/kg may be biased low if they were not collected according to EPA 5035/5035A specifications.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11995	VOCs- Solid by 8260C/D	SW-846 8260C	1	A193251AA	11/21/2019 12:20	Stephen C Nolte	0.76
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201931855460	11/12/2019 09:45	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201931855460	11/12/2019 09:45	Client Supplied	1
07579	GC/MS-5g Field Preserv.MeOH-NC	SW-846 5035A	1	201931855460	11/12/2019 09:45	Client Supplied	1
00383	TOC by Lloyd Kahn	Lloyd Kahn	1	19322667632A	11/19/2019 23:05	Drew M Gerhart	1
00111	Moisture	SM 2540 G-2011 %Moisture Calc	1	19319820005B	11/16/2019 00:00	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-4(8-10) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 11:45
SDG#: IBL28-03

Golder Associates Incorporated
ELLE Sample #: GW 1200465
ELLE Group #: 2074333
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	11	1	5	5
11997	Benzyl Chloride	100-44-7	N.D.	5	25	5
11997	Bromobenzene	108-86-1	N.D.	1	25	5
11997	Bromodichloromethane	75-27-4	N.D.	1	5	5
11997	Bromoform	75-25-2	N.D.	5	20	5
11997	Bromomethane	74-83-9	N.D.	2	5	5
11997	Carbon Tetrachloride	56-23-5	N.D.	1	5	5
11997	Chlorobenzene	108-90-7	N.D.	1	5	5
11997	Chloroethane	75-00-3	49	1	5	5
11997	Chloroform	67-66-3	N.D.	1	5	5
11997	Chloromethane	74-87-3	N.D.	1	5	5
11997	2-Chlorotoluene	95-49-8	N.D.	1	25	5
11997	4-Chlorotoluene	106-43-4	N.D.	1	25	5
11997	Dibromochloromethane	124-48-1	N.D.	1	5	5
11997	Dibromomethane	74-95-3	N.D.	1	5	5
11997	1,2-Dichlorobenzene	95-50-1	N.D.	1	25	5
11997	1,3-Dichlorobenzene	541-73-1	N.D.	1	25	5
11997	1,4-Dichlorobenzene	106-46-7	N.D.	1	25	5
11997	Dichlorodifluoromethane	75-71-8	N.D.	1	5	5
11997	1,1-Dichloroethane	75-34-3	6,200	10	50	50
11997	1,2-Dichloroethane	107-06-2	1,400	2	5	5
11997	1,1-Dichloroethene	75-35-4	270	1	5	5
11997	1,2-Dichloroethene (Total)[1]	540-59-0	11,000	80	400	200
11997	1,2-Dichloropropane	78-87-5	N.D.	1	5	5
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	1	5	5
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	1	5	5
11997	Ethylbenzene	100-41-4	15	2	5	5
11997	Freon 113	76-13-1	N.D.	1	50	5
11997	Freon 123a[1]	354-23-4	N.D.	2	25	5
11997	Methylene Chloride	75-09-2	N.D.	2	5	5
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	1	5	5
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	1	5	5
11997	Tetrachloroethene	127-18-4	2 J	1	5	5
11997	Toluene	108-88-3	30	1	5	5
11997	1,1,1-Trichloroethane	71-55-6	210	2	5	5
11997	1,1,2-Trichloroethane	79-00-5	N.D.	1	5	5
11997	Trichloroethene	79-01-6	35	1	5	5
11997	Trichlorofluoromethane	75-69-4	N.D.	1	5	5
11997	1,2,3-Trichloropropane	96-18-4	N.D.	1	25	5
11997	Vinyl Chloride	75-01-4	21	1	5	5
11997	Xylene (Total)	1330-20-7	190	7	30	5

*=This limit was used in the evaluation of the final result

Sample Description: **B-4(8-10) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 11:45
SDG#: IBL28-03

Golder Associates Incorporated
ELLE Sample #: GW 1200465
ELLE Group #: 2074333
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC Miscellaneous	**SW-846 8015C**		**ug/l**	**ug/l**	**ug/l**	
10602	Ethane[1]	74-84-0	1.5 J	1.0	5.0	1
10602	Ethene[1]	74-85-1	9.6	1.0	5.0	1
10602	Methane[1]	74-82-8	7,900	150	250	50
Metals	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	114	0.0400	0.200	1
07058	Manganese	7439-96-5	5.99	0.0030	0.0100	1
Wet Chemistry	**EPA 300.0**		**mg/l**	**mg/l**	**mg/l**	
00224	Chloride	16887-00-6	694	100	200	500
00228	Sulfate	14808-79-8	12.6	1.5	5.0	5
	EPA 353.2		**mg/l**	**mg/l**	**mg/l**	
00220	Nitrate Nitrogen	14797-55-8	2.1	0.040	0.10	1
00219	Nitrite Nitrogen	14797-65-0	N.D.	0.015	0.050	1
	SM 5310 C-2011		**mg/l**	**mg/l**	**mg/l**	
00273	Total Organic Carbon	n.a.	56.2	0.50	1.0	1
	SM 2320 B-2011		**mg/l as CaCO3**	**mg/l as CaCO3**	**mg/l as CaCO3**	
12150	Total Alkalinity to pH 4.5	n.a.	233	2.6	8.0	1

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	W193241AA	11/21/2019 01:13	Roy R Mellott Jr	5
11997	Volatiles 8260C	SW-846 8260C	1	W193241AA	11/21/2019 01:37	Roy R Mellott Jr	50
11997	Volatiles 8260C	SW-846 8260C	1	W193252AA	11/21/2019 21:48	Don V Viray	200
01163	GC/MS VOA Water Prep	SW-846 5030C	1	W193241AA	11/21/2019 01:12	Roy R Mellott Jr	5
01163	GC/MS VOA Water Prep	SW-846 5030C	2	W193241AA	11/21/2019 01:36	Roy R Mellott Jr	50
01163	GC/MS VOA Water Prep	SW-846 5030C	3	W193252AA	11/21/2019 21:47	Don V Viray	200
10602	Volatile Headspace Hydrocarbon	SW-846 8015C	1	193260008A	11/23/2019 01:11	Johanna C Kennedy	1
10602	Volatile Headspace Hydrocarbon	SW-846 8015C	1	193260008A	11/25/2019 09:06	Johanna C Kennedy	50

*=This limit was used in the evaluation of the final result

Sample Description: **B-4(8-10) Grab Groundwater**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 11:45
SDG#: IBL28-03

Golder Associates Incorporated
ELLE Sample #: GW 1200465
ELLE Group #: 2074333
Matrix: Groundwater

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193181404402	11/19/2019 22:15	Elaine F Stoltzfus	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193181404402	11/19/2019 22:15	Elaine F Stoltzfus	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193181404402	11/19/2019 03:01	James L Mertz	1
00224	Chloride	EPA 300.0	1	19318135112B	11/17/2019 12:12	Samantha Faverio	500
00228	Sulfate	EPA 300.0	1	19318135112B	11/15/2019 03:27	Clinton M Wilson	5
00220	Nitrate Nitrogen	EPA 353.2	1	19329106102B	11/25/2019 13:06	Ashlynn M Cornelius	1
00219	Nitrite Nitrogen	EPA 353.2	1	19317105104A	11/13/2019 21:16	Gregory Baldree	1
00273	Total Organic Carbon	SM 5310 C-2011	1	19325304504B	11/21/2019 21:16	Bethany Sandone	1
12150	Total Alkalinity to pH 4.5	SM 2320 B-2011	1	19322002106A	11/19/2019 09:08	Jeremy L Bolf	1

*=This limit was used in the evaluation of the final result

Sample Description: **B-4(8-10) Filtered Grab Groundwater IBM-Kingston SWMU M**

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019 11:45
SDG#: IBL28-04

Golder Associates Incorporated
ELLE Sample #: GW 1200466
ELLE Group #: 2074333
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Metals Dissolved	**SW-846 6010D Rev.4, July 2014**		**mg/l**	**mg/l**	**mg/l**	
01754	Iron	7439-89-6	N.D.	0.0400	0.200	1
07058	Manganese	7439-96-5	4.99	0.0030	0.0100	1

03277 Lab Filtration - Metals

The holding time was not met for dissolved sample filtration. The filtration time for dissolved metals is to be within 15 minutes from collection. Since the filtration occurred after receipt in the laboratory, the 15 minute criteria was exceeded. This sample was not collected per applicable Clean Water Act (40CFR136) or SW-846 regulations.

Sample Comments

State of New York Certification No. 10670
This sample was filtered in the lab for dissolved metals.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
01754	Iron	SW-846 6010D Rev.4, July 2014	1	193231404402	11/19/2019 12:00	Patrick J Engle	1
07058	Manganese	SW-846 6010D Rev.4, July 2014	1	193231404402	11/19/2019 12:00	Patrick J Engle	1
14044	ICP-WW, 3005A (tot rec) - U345	SW-846 3005A	1	193231404402	11/19/2019 03:01	James L Mertz	1

*=This limit was used in the evaluation of the final result

Sample Description: **Trip Blank Water**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019
SDG#: IBL28-05TB

Golder Associates Incorporated
ELLE Sample #: GW 1200467
ELLE Group #: 2074333
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260C**		**ug/l**	**ug/l**	**ug/l**	
11997	Benzene	71-43-2	N.D.	0.2	1	1
11997	Benzyl Chloride	100-44-7	N.D.	1	5	1
11997	Bromobenzene	108-86-1	N.D.	0.2	5	1
11997	Bromodichloromethane	75-27-4	N.D.	0.2	1	1
11997	Bromoform	75-25-2	N.D.	1	4	1
11997	Bromomethane	74-83-9	N.D.	0.3	1	1
11997	Carbon Tetrachloride	56-23-5	N.D.	0.2	1	1
11997	Chlorobenzene	108-90-7	N.D.	0.2	1	1
11997	Chloroethane	75-00-3	N.D.	0.2	1	1
11997	Chloroform	67-66-3	N.D.	0.2	1	1
11997	Chloromethane	74-87-3	N.D.	0.2	1	1
11997	2-Chlorotoluene	95-49-8	N.D.	0.2	5	1
11997	4-Chlorotoluene	106-43-4	N.D.	0.2	5	1
11997	Dibromochloromethane	124-48-1	N.D.	0.2	1	1
11997	Dibromomethane	74-95-3	N.D.	0.2	1	1
11997	1,2-Dichlorobenzene	95-50-1	N.D.	0.2	5	1
11997	1,3-Dichlorobenzene	541-73-1	N.D.	0.2	5	1
11997	1,4-Dichlorobenzene	106-46-7	N.D.	0.2	5	1
11997	Dichlorodifluoromethane	75-71-8	N.D.	0.2	1	1
11997	1,1-Dichloroethane	75-34-3	N.D.	0.2	1	1
11997	1,2-Dichloroethane	107-06-2	N.D.	0.3	1	1
11997	1,1-Dichloroethene	75-35-4	N.D.	0.2	1	1
11997	1,2-Dichloroethene (Total)[1]	540-59-0	N.D.	0.4	2	1
11997	1,2-Dichloropropane	78-87-5	N.D.	0.2	1	1
11997	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.2	1	1
11997	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.2	1	1
11997	Ethylbenzene	100-41-4	N.D.	0.4	1	1
11997	Freon 113	76-13-1	N.D.	0.2	10	1
11997	Freon 123a[1]	354-23-4	N.D.	0.4	5	1
11997	Methylene Chloride	75-09-2	N.D.	0.3	1	1
11997	1,1,1,2-Tetrachloroethane	630-20-6	N.D.	0.2	1	1
11997	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.2	1	1
11997	Tetrachloroethene	127-18-4	N.D.	0.2	1	1
11997	Toluene	108-88-3	N.D.	0.2	1	1
11997	1,1,1-Trichloroethane	71-55-6	N.D.	0.3	1	1
11997	1,1,2-Trichloroethane	79-00-5	N.D.	0.2	1	1
11997	Trichloroethene	79-01-6	N.D.	0.2	1	1
11997	Trichlorofluoromethane	75-69-4	N.D.	0.2	1	1
11997	1,2,3-Trichloropropane	96-18-4	N.D.	0.2	5	1
11997	Vinyl Chloride	75-01-4	N.D.	0.2	1	1
11997	Xylene (Total)	1330-20-7	N.D.	1	6	1

*=This limit was used in the evaluation of the final result

Sample Description: **Trip Blank Water**
IBM-Kingston SWMU M

Project Name: **IBM Kingston, NY**

Submittal Date/Time: 11/13/2019 12:03
Collection Date/Time: 11/12/2019
SDG#: IBL28-05TB

Golder Associates Incorporated
ELLE Sample #: GW 1200467
ELLE Group #: 2074333
Matrix: Water

Sample Comments

State of New York Certification No. 10670

[1] = This analyte was not on the laboratory's NYSDOH Scope of Accreditation at the time of analysis.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
11997	Volatiles 8260C	SW-846 8260C	1	W193233AA	11/19/2019 23:05	Kathrine K Muramatsu	1
01163	GC/MS VOA Water Prep	SW-846 5030C	1	W193233AA	11/19/2019 23:04	Kathrine K Muramatsu	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2074333
Reported: 11/26/2019 17:20

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Batch number: A193251AA	Sample number(s): 1200464		
Benzene	N.D.	0.5	5
Benzyl Chloride	N.D.	2	4
Bromobenzene	N.D.	0.4	5
Bromodichloromethane	N.D.	0.4	5
Bromoform	N.D.	5	10
Bromomethane	N.D.	0.7	5
Carbon Tetrachloride	N.D.	0.5	5
Chlorobenzene	N.D.	0.5	5
Chloroethane	N.D.	1	5
Chloroform	N.D.	0.6	5
Chloromethane	N.D.	0.6	5
2-Chlorotoluene	N.D.	0.4	5
4-Chlorotoluene	N.D.	0.4	5
Dibromochloromethane	N.D.	0.5	5
Dibromomethane	N.D.	0.5	5
1,2-Dichlorobenzene	N.D.	0.5	5
1,3-Dichlorobenzene	N.D.	0.5	5
1,4-Dichlorobenzene	N.D.	0.4	5
Dichlorodifluoromethane	N.D.	0.6	5
1,1-Dichloroethane	N.D.	0.5	5
1,2-Dichloroethane	N.D.	0.6	5
1,1-Dichloroethene	N.D.	0.5	5
1,2-Dichloroethene (Total)	N.D.	1	10
1,2-Dichloropropane	N.D.	0.5	5
cis-1,3-Dichloropropene	N.D.	0.4	5
trans-1,3-Dichloropropene	N.D.	0.5	5
Ethylbenzene	N.D.	0.4	5
Freon 113	N.D.	0.6	10
Freon 123a	N.D.	0.6	5
Methylene Chloride	N.D.	2	5
1,1,1,2-Tetrachloroethane	N.D.	0.5	5
1,1,2,2-Tetrachloroethane	N.D.	0.4	5
Tetrachloroethene	N.D.	0.5	5
Toluene	N.D.	0.6	5
1,1,1-Trichloroethane	N.D.	0.6	5
1,1,2-Trichloroethane	N.D.	0.5	5
Trichloroethene	N.D.	0.5	5
Trichlorofluoromethane	N.D.	0.7	5
1,2,3-Trichloropropane	N.D.	0.6	5

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2074333
Reported: 11/26/2019 17:20

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
Vinyl Chloride	N.D.	0.6	5
Xylene (Total)	N.D.	1	10
Batch number: A193253AA	Sample number(s): 1200463		
Benzene	N.D.	0.5	5
Benzyl Chloride	N.D.	2	4
Bromobenzene	N.D.	0.4	5
Bromodichloromethane	N.D.	0.4	5
Bromoform	N.D.	5	10
Bromomethane	N.D.	0.7	5
Carbon Tetrachloride	N.D.	0.5	5
Chlorobenzene	N.D.	0.5	5
Chloroethane	N.D.	1	5
Chloroform	N.D.	0.6	5
Chloromethane	N.D.	0.6	5
2-Chlorotoluene	N.D.	0.4	5
4-Chlorotoluene	N.D.	0.4	5
Dibromochloromethane	N.D.	0.5	5
Dibromomethane	N.D.	0.5	5
1,2-Dichlorobenzene	N.D.	0.5	5
1,3-Dichlorobenzene	N.D.	0.5	5
1,4-Dichlorobenzene	N.D.	0.4	5
Dichlorodifluoromethane	N.D.	0.6	5
1,2-Dichloroethane	N.D.	0.6	5
1,1-Dichloroethene	N.D.	0.5	5
1,2-Dichloropropane	N.D.	0.5	5
cis-1,3-Dichloropropene	N.D.	0.4	5
trans-1,3-Dichloropropene	N.D.	0.5	5
Ethylbenzene	N.D.	0.4	5
Freon 113	N.D.	0.6	10
Freon 123a	N.D.	0.6	5
Methylene Chloride	N.D.	2	5
1,1,1,2-Tetrachloroethane	N.D.	0.5	5
1,1,2,2-Tetrachloroethane	N.D.	0.4	5
Tetrachloroethene	N.D.	0.5	5
Toluene	N.D.	0.6	5
1,1,2-Trichloroethane	N.D.	0.5	5
Trichloroethene	N.D.	0.5	5
Trichlorofluoromethane	N.D.	0.7	5
1,2,3-Trichloropropane	N.D.	0.6	5
Vinyl Chloride	N.D.	0.6	5
Xylene (Total)	N.D.	1	10
Batch number: V193262AA	Sample number(s): 1200463		
1,1-Dichloroethane	N.D.	25	250
1,2-Dichloroethene (Total)	N.D.	50	500

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated Group Number: 2074333
Reported: 11/26/2019 17:20

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/kg	ug/kg	ug/kg
1,1,1-Trichloroethane	N.D.	30	250
	ug/l	ug/l	ug/l
Batch number: W193233AA	Sample number(s): 1200467		
Benzene	N.D.	0.2	1
Benzyl Chloride	N.D.	1	5
Bromobenzene	N.D.	0.2	5
Bromodichloromethane	N.D.	0.2	1
Bromoform	N.D.	1	4
Bromomethane	N.D.	0.3	1
Carbon Tetrachloride	N.D.	0.2	1
Chlorobenzene	N.D.	0.2	1
Chloroethane	N.D.	0.2	1
Chloroform	N.D.	0.2	1
Chloromethane	N.D.	0.2	1
2-Chlorotoluene	N.D.	0.2	5
4-Chlorotoluene	N.D.	0.2	5
Dibromochloromethane	N.D.	0.2	1
Dibromomethane	N.D.	0.2	1
1,2-Dichlorobenzene	N.D.	0.2	5
1,3-Dichlorobenzene	N.D.	0.2	5
1,4-Dichlorobenzene	N.D.	0.2	5
Dichlorodifluoromethane	N.D.	0.2	1
1,1-Dichloroethane	N.D.	0.2	1
1,2-Dichloroethane	N.D.	0.3	1
1,1-Dichloroethene	N.D.	0.2	1
1,2-Dichloroethene (Total)	N.D.	0.4	2
1,2-Dichloropropane	N.D.	0.2	1
cis-1,3-Dichloropropene	N.D.	0.2	1
trans-1,3-Dichloropropene	N.D.	0.2	1
Ethylbenzene	N.D.	0.4	1
Freon 113	N.D.	0.2	10
Freon 123a	N.D.	0.4	5
Methylene Chloride	N.D.	0.3	1
1,1,1,2-Tetrachloroethane	N.D.	0.2	1
1,1,2,2-Tetrachloroethane	N.D.	0.2	1
Tetrachloroethene	N.D.	0.2	1
Toluene	N.D.	0.2	1
1,1,1-Trichloroethane	N.D.	0.3	1
1,1,2-Trichloroethane	N.D.	0.2	1
Trichloroethene	N.D.	0.2	1
Trichlorofluoromethane	N.D.	0.2	1
1,2,3-Trichloropropane	N.D.	0.2	5
Vinyl Chloride	N.D.	0.2	1
Xylene (Total)	N.D.	1	6

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074333
Reported: 11/26/2019 17:20

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Batch number: W193241AA	Sample number(s): 1200465		
Benzene	N.D.	0.2	1
Benzyl Chloride	N.D.	1	5
Bromobenzene	N.D.	0.2	5
Bromodichloromethane	N.D.	0.2	1
Bromoform	N.D.	1	4
Bromomethane	N.D.	0.3	1
Carbon Tetrachloride	N.D.	0.2	1
Chlorobenzene	N.D.	0.2	1
Chloroethane	N.D.	0.2	1
Chloroform	N.D.	0.2	1
Chloromethane	N.D.	0.2	1
2-Chlorotoluene	N.D.	0.2	5
4-Chlorotoluene	N.D.	0.2	5
Dibromochloromethane	N.D.	0.2	1
Dibromomethane	N.D.	0.2	1
1,2-Dichlorobenzene	N.D.	0.2	5
1,3-Dichlorobenzene	N.D.	0.2	5
1,4-Dichlorobenzene	N.D.	0.2	5
Dichlorodifluoromethane	N.D.	0.2	1
1,1-Dichloroethane	N.D.	0.2	1
1,2-Dichloroethane	N.D.	0.3	1
1,1-Dichloroethene	N.D.	0.2	1
1,2-Dichloropropane	N.D.	0.2	1
cis-1,3-Dichloropropene	N.D.	0.2	1
trans-1,3-Dichloropropene	N.D.	0.2	1
Ethylbenzene	N.D.	0.4	1
Freon 113	N.D.	0.2	10
Freon 123a	N.D.	0.4	5
Methylene Chloride	N.D.	0.3	1
1,1,1,2-Tetrachloroethane	N.D.	0.2	1
1,1,2,2-Tetrachloroethane	N.D.	0.2	1
Tetrachloroethene	N.D.	0.2	1
Toluene	N.D.	0.2	1
1,1,1-Trichloroethane	N.D.	0.3	1
1,1,2-Trichloroethane	N.D.	0.2	1
Trichloroethene	N.D.	0.2	1
Trichlorofluoromethane	N.D.	0.2	1
1,2,3-Trichloropropane	N.D.	0.2	5
Vinyl Chloride	N.D.	0.2	1
Xylene (Total)	N.D.	1	6
Batch number: W193252AA	Sample number(s): 1200465		
1,2-Dichloroethene (Total)	N.D.	0.4	2
Batch number: 193260008A	Sample number(s): 1200465		

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074333
Reported: 11/26/2019 17:20

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	ug/l	ug/l	ug/l
Ethane	N.D.	1.0	5.0
Ethene	N.D.	1.0	5.0
Methane	N.D.	3.0	5.0
	mg/l	mg/l	mg/l
Batch number: 193181404402	Sample number(s): 1200465		
Iron	N.D.	0.0400	0.200
Manganese	N.D.	0.0030	0.0100
Batch number: 193231404402	Sample number(s): 1200466		
Iron	N.D.	0.0400	0.200
Manganese	N.D.	0.0030	0.0100
	mg/kg	mg/kg	mg/kg
Batch number: 19322667632A	Sample number(s): 1200463-1200464		
TOC by Lloyd Kahn	N.D.	100	300
	mg/l	mg/l	mg/l
Batch number: 19317105104A	Sample number(s): 1200465		
Nitrite Nitrogen	N.D.	0.015	0.050
Batch number: 19318135112B	Sample number(s): 1200465		
Chloride	N.D.	0.20	0.40
Sulfate	N.D.	0.30	1.0
Batch number: 19325304504B	Sample number(s): 1200465		
Total Organic Carbon	N.D.	0.50	1.0
Batch number: 19329106102B	Sample number(s): 1200465		
Nitrate Nitrogen	N.D.	0.040	0.10
	mg/l as CaCO3	mg/l as CaCO3	mg/l as CaCO3
Batch number: 19322002106A	Sample number(s): 1200465		
Total Alkalinity to pH 4.5	N.D.	2.6	8.0

LCS/LCSD

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: A193251AA	Sample number(s): 1200464								
Benzene	20	19.35	20	18.95	97	95	80-120	2	30
Benzyl Chloride	20	14.11	20	15.28	71	76	48-134	8	30
Bromobenzene	20	19.36	20	19.18	97	96	78-120	1	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074333
Reported: 11/26/2019 17:20

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Bromodichloromethane	20	19.35	20	19.49	97	97	70-120	1	30
Bromoform	20	18.13	20	18.72	91	94	51-127	3	30
Bromomethane	20	15.11	20	14.02	76	70	45-140	8	30
Carbon Tetrachloride	20	19.69	20	19.23	98	96	64-134	2	30
Chlorobenzene	20	20.94	20	20.44	105	102	80-120	2	30
Chloroethane	20	17.58	20	16.24	88	81	43-135	8	30
Chloroform	20	19.78	20	19.4	99	97	80-120	2	30
Chloromethane	20	16.7	20	15.91	84	80	56-120	5	30
2-Chlorotoluene	20	20.72	20	19.71	104	99	75-120	5	30
4-Chlorotoluene	20	20.63	20	20.22	103	101	75-120	2	30
Dibromochloromethane	20	20.15	20	20.47	101	102	69-125	2	30
Dibromomethane	20	20.79	20	21.78	104	109	80-120	5	30
1,2-Dichlorobenzene	20	20.36	20	20.24	102	101	76-120	1	30
1,3-Dichlorobenzene	20	19.86	20	19.47	99	97	75-120	2	30
1,4-Dichlorobenzene	20	20.37	20	19.95	102	100	80-120	2	30
Dichlorodifluoromethane	20	15.73	20	14.45	79	72	21-127	9	30
1,1-Dichloroethane	20	18.73	20	17.92	94	90	79-120	4	30
1,2-Dichloroethane	20	19.14	20	19.35	96	97	71-128	1	30
1,1-Dichloroethene	20	21.05	20	19.48	105	97	73-129	8	30
1,2-Dichloroethene (Total)	40	42.42	40	41.37	106	103	80-126	2	30
1,2-Dichloropropane	20	18.77	20	18.95	94	95	80-120	1	30
cis-1,3-Dichloropropene	20	17.77	20	18.12	89	91	66-120	2	30
trans-1,3-Dichloropropene	20	17.27	20	17.68	86	88	68-122	2	30
Ethylbenzene	20	18.92	20	18.19	95	91	78-120	4	30
Freon 113	20	19.22	20	17.62	96	88	64-135	9	30
Freon 123a	20	18.24	20	16.94	91	85	71-123	7	30
Methylene Chloride	20	19.99	20	19.72	100	99	76-122	1	30
1,1,1,2-Tetrachloroethane	20	20.35	20	20.4	102	102	73-120	0	30
1,1,2,2-Tetrachloroethane	20	19.47	20	20.77	97	104	69-125	6	30
Tetrachloroethene	20	20.14	20	18.92	101	95	73-120	6	30
Toluene	20	19.5	20	18.8	98	94	80-120	4	30
1,1,1-Trichloroethane	20	19.14	20	18.22	96	91	69-123	5	30
1,1,2-Trichloroethane	20	20.95	20	21.32	105	107	80-120	2	30
Trichloroethene	20	19.68	20	19.28	98	96	80-120	2	30
Trichlorofluoromethane	20	17.69	20	16.08	88	80	55-134	9	30
1,2,3-Trichloropropane	20	20.7	20	21.73	104	109	75-125	5	30
Vinyl Chloride	20	17.94	20	16.53	90	83	52-120	8	30
Xylene (Total)	60	60.26	60	58.18	100	97	75-120	4	30
Batch number: A193253AA	Sample number(s): 1200463								
Benzene	20	19.15	20	19.03	96	95	80-120	1	30
Benzyl Chloride	20	16	20	15.68	80	78	48-134	2	30
Bromobenzene	20	19.78	20	19.77	99	99	78-120	0	30
Bromodichloromethane	20	19.78	20	19.73	99	99	70-120	0	30

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Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/26/2019 17:20

Group Number: 2074333

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/kg	LCS Conc ug/kg	LCSD Spike Added ug/kg	LCSD Conc ug/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Bromoform	20	20.66	20	19.54	103	98	51-127	6	30
Bromomethane	20	15.26	20	15.51	76	78	45-140	2	30
Carbon Tetrachloride	20	19.99	20	20.01	100	100	64-134	0	30
Chlorobenzene	20	21.12	20	21.07	106	105	80-120	0	30
Chloroethane	20	16.8	20	16.52	84	83	43-135	2	30
Chloroform	20	19.76	20	19.76	99	99	80-120	0	30
Chloromethane	20	15.19	20	19.93	76	100	56-120	27	30
2-Chlorotoluene	20	20.38	20	20.27	102	101	75-120	1	30
4-Chlorotoluene	20	20.37	20	20.66	102	103	75-120	1	30
Dibromochloromethane	20	21.75	20	21.78	109	109	69-125	0	30
Dibromomethane	20	22.49	20	22.08	112	110	80-120	2	30
1,2-Dichlorobenzene	20	20.63	20	20.91	103	105	76-120	1	30
1,3-Dichlorobenzene	20	19.87	20	19.7	99	99	75-120	1	30
1,4-Dichlorobenzene	20	20	20	20.05	100	100	80-120	0	30
Dichlorodifluoromethane	20	14.55	20	14.55	73	73	21-127	0	30
1,2-Dichloroethane	20	20.39	20	19.95	102	100	71-128	2	30
1,1-Dichloroethene	20	20.03	20	20.45	100	102	73-129	2	30
1,2-Dichloropropane	20	18.81	20	18.79	94	94	80-120	0	30
cis-1,3-Dichloropropene	20	18.12	20	17.96	91	90	66-120	1	30
trans-1,3-Dichloropropene	20	18.62	20	18.25	93	91	68-122	2	30
Ethylbenzene	20	18.69	20	18.75	93	94	78-120	0	30
Freon 113	20	19.74	20	19.66	99	98	64-135	0	30
Freon 123a	20	17.52	20	17.67	88	88	71-123	1	30
Methylene Chloride	20	19.98	20	19.98	100	100	76-122	0	30
1,1,1,2-Tetrachloroethane	20	20.81	20	20.69	104	103	73-120	1	30
1,1,2,2-Tetrachloroethane	20	22.52	20	21.48	113	107	69-125	5	30
Tetrachloroethene	20	19.65	20	19.84	98	99	73-120	1	30
Toluene	20	19.39	20	19.29	97	96	80-120	1	30
1,1,2-Trichloroethane	20	22.75	20	22.12	114	111	80-120	3	30
Trichloroethene	20	19.58	20	19.38	98	97	80-120	1	30
Trichlorofluoromethane	20	17.17	20	16.92	86	85	55-134	1	30
1,2,3-Trichloropropane	20	24.8	20	23.57	124	118	75-125	5	30
Vinyl Chloride	20	16.91	20	16.98	85	85	52-120	0	30
Xylene (Total)	60	60.12	60	59.9	100	100	75-120	0	30
Batch number: V193262AA	Sample number(s): 1200463								
1,1-Dichloroethane	1000	1030.12	1000	1043.61	103	104	79-120	1	30
1,2-Dichloroethene (Total)	2000	2277.94	2000	2306.76	114	115	80-126	1	30
1,1,1-Trichloroethane	1000	1080.71	1000	1074.78	108	107	69-123	1	30
	ug/l	ug/l	ug/l	ug/l					
Batch number: W193233AA	Sample number(s): 1200467								
Benzene	20	21.26			106		80-120		
Benzyl Chloride	20	14.16			71		52-120		

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Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074333
Reported: 11/26/2019 17:20

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Bromobenzene	20	20.67			103		80-120		
Bromodichloromethane	20	19.39			97		71-120		
Bromoform	20	14.19			71		51-120		
Bromomethane	20	21.4			107		53-128		
Carbon Tetrachloride	20	20.78			104		64-134		
Chlorobenzene	20	20.98			105		80-120		
Chloroethane	20	20.92			105		55-123		
Chloroform	20	21.29			106		80-120		
Chloromethane	20	14.77			74		56-121		
2-Chlorotoluene	20	20.37			102		80-120		
4-Chlorotoluene	20	19.53			98		80-120		
Dibromochloromethane	20	18.22			91		71-120		
Dibromomethane	20	20.97			105		80-120		
1,2-Dichlorobenzene	20	19.23			96		80-120		
1,3-Dichlorobenzene	20	19.31			97		80-120		
1,4-Dichlorobenzene	20	19.63			98		80-120		
Dichlorodifluoromethane	20	14.21			71		41-127		
1,1-Dichloroethane	20	21.2			106		80-120		
1,2-Dichloroethane	20	21.23			106		73-124		
1,1-Dichloroethene	20	22.71			114		80-131		
1,2-Dichloroethene (Total)	40	44.18			110		80-125		
1,2-Dichloropropane	20	21.23			106		80-120		
cis-1,3-Dichloropropene	20	18.96			95		75-120		
trans-1,3-Dichloropropene	20	17.07			85		67-120		
Ethylbenzene	20	20.5			102		80-120		
Freon 113	20	20.77			104		73-139		
Freon 123a	20	23.13			116		76-129		
Methylene Chloride	20	21.64			108		80-120		
1,1,1,2-Tetrachloroethane	20	19.32			97		78-120		
1,1,2,2-Tetrachloroethane	20	20.26			101		72-120		
Tetrachloroethene	20	19.47			97		80-120		
Toluene	20	21.31			107		80-120		
1,1,1-Trichloroethane	20	20.91			105		67-126		
1,1,2-Trichloroethane	20	21.71			109		80-120		
Trichloroethene	20	20.73			104		80-120		
Trichlorofluoromethane	20	21.86			109		55-135		
1,2,3-Trichloropropane	20	20.82			104		75-124		
Vinyl Chloride	20	17.09			85		56-120		
Xylene (Total)	60	60.71			101		80-120		
Batch number: W193241AA	Sample number(s): 1200465								
Benzene	20	20.85			104		80-120		
Benzyl Chloride	20	15.93			80		52-120		
Bromobenzene	20	21.15			106		80-120		

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Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074333
Reported: 11/26/2019 17:20

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Bromodichloromethane	20	19.68			98		71-120		
Bromoform	20	15.42			77		51-120		
Bromomethane	20	21.17			106		53-128		
Carbon Tetrachloride	20	19.99			100		64-134		
Chlorobenzene	20	21.21			106		80-120		
Chloroethane	20	21.11			106		55-123		
Chloroform	20	20.76			104		80-120		
Chloromethane	20	15.06			75		56-121		
2-Chlorotoluene	20	20.64			103		80-120		
4-Chlorotoluene	20	20.28			101		80-120		
Dibromochloromethane	20	19.34			97		71-120		
Dibromomethane	20	20.81			104		80-120		
1,2-Dichlorobenzene	20	20.78			104		80-120		
1,3-Dichlorobenzene	20	20.16			101		80-120		
1,4-Dichlorobenzene	20	20.68			103		80-120		
Dichlorodifluoromethane	20	13.62			68		41-127		
1,1-Dichloroethane	20	20.57			103		80-120		
1,2-Dichloroethane	20	20.77			104		73-124		
1,1-Dichloroethene	20	21.65			108		80-131		
1,2-Dichloropropane	20	21.01			105		80-120		
cis-1,3-Dichloropropene	20	19.32			97		75-120		
trans-1,3-Dichloropropene	20	18.34			92		67-120		
Ethylbenzene	20	20.63			103		80-120		
Freon 113	20	19.75			99		73-139		
Freon 123a	20	23.32			117		76-129		
Methylene Chloride	20	20.94			105		80-120		
1,1,1,2-Tetrachloroethane	20	20.1			100		78-120		
1,1,2,2-Tetrachloroethane	20	21.88			109		72-120		
Tetrachloroethene	20	19.29			96		80-120		
Toluene	20	20.65			103		80-120		
1,1,1-Trichloroethane	20	20.01			100		67-126		
1,1,2-Trichloroethane	20	22.44			112		80-120		
Trichloroethene	20	20.29			101		80-120		
Trichlorofluoromethane	20	22.22			111		55-135		
1,2,3-Trichloropropane	20	22.18			111		75-124		
Vinyl Chloride	20	16.58			83		56-120		
Xylene (Total)	60	60.73			101		80-120		
Batch number: W193252AA	Sample number(s): 1200465								
1,2-Dichloroethene (Total)	40	43.74	40	45.41	109	114	80-125	4	30
	ug/l	**ug/l**	**ug/l**	**ug/l**					
Batch number: 193260008A	Sample number(s): 1200465								
Ethane	59.03	51.97	59.03	53.41	88	90	85-115	3	20

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Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074333
Reported: 11/26/2019 17:20

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ug/l	LCS Conc ug/l	LCSD Spike Added ug/l	LCSD Conc ug/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Ethene	60.57	53.76	60.57	55.18	89	91	83-115	3	20
Methane	59.83	52.3	59.83	53.27	87	89	85-115	2	20
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 193181404402	Sample number(s): 1200465								
Iron	0.400	0.399			100		80-120		
Manganese	0.0200	0.0199			99		80-120		
Batch number: 193231404402	Sample number(s): 1200466								
Iron	0.400	0.378			95		80-120		
Manganese	0.0200	0.0211			106		80-120		
	mg/kg	**mg/kg**	**mg/kg**	**mg/kg**					
Batch number: 19322667632A	Sample number(s): 1200463-1200464								
TOC by Lloyd Kahn	5080	5905.22			116		47-143		
	mg/l	**mg/l**	**mg/l**	**mg/l**					
Batch number: 19317105104A	Sample number(s): 1200465								
Nitrite Nitrogen	0.700	0.648			93		90-110		
Batch number: 19318135112B	Sample number(s): 1200465								
Chloride	3.00	2.82			94		90-110		
Sulfate	7.50	7.41			99		90-110		
Batch number: 19325304504B	Sample number(s): 1200465								
Total Organic Carbon	25	25.11			100		91-113		
Batch number: 19329106102B	Sample number(s): 1200465								
Nitrate Nitrogen	2.50	2.60			104		90-110		
	mg/l as CaCO3	**mg/l as CaCO3**	**mg/l as CaCO3**	**mg/l as CaCO3**					
Batch number: 19322002106A	Sample number(s): 1200465								
Total Alkalinity to pH 4.5	188	170.83			91		82-106		
	%	**%**	**%**	**%**					
Batch number: 19319820005B	Sample number(s): 1200463-1200464								
Moisture	89.5	89.43			100		99-101		

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Quality Control Summary

Client Name: Golder Associates Incorporated
Reported: 11/26/2019 17:20

Group Number: 2074333

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: VOCs- Solid by 8260C/D
Batch number: A193251AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1200464	106	109	99	88
Blank	106	110	96	93
LCS	102	105	100	97
LCSD	107	106	99	98
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260C/D
Batch number: A193253AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1200463	108	114	99	95
Blank	106	109	97	91
LCS	105	106	100	98
LCSD	105	112	100	97
Limits:	50-141	54-135	52-141	50-131

Analysis Name: Volatiles 8260C
Batch number: W193233AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1200467	94	99	101	93
Blank	94	102	100	93
LCS	98	102	102	98
Limits:	80-120	80-120	80-120	80-120

Analysis Name: Volatiles 8260C
Batch number: W193241AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
1200465	100	97	102	94
Blank	95	100	100	89
LCS	97	98	103	98
Limits:	80-120	80-120	80-120	80-120

Analysis Name: Volatile Headspace Hydrocarbon
Batch number: 193260008A

	Propene
1200465	68
Blank	90

*- Outside of specification
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Quality Control Summary

Client Name: Golder Associates Incorporated
Group Number: 2074333
Reported: 11/26/2019 17:20

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Volatile Headspace Hydrocarbon
Batch number: 193260008A

	Propene
LCS	84
LCSD	89
Limits:	46-135

*- Outside of specification
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IBM Chain of Custody

eurofins | Lancaster Laboratories Environmental

Acct. # 42322 For Eurofins Lancaster Laboratories Environmental use only Group # 2074333 Sample # 120463-67
Instructions on reverse side correspond with circled numbers.

COC # 020643

Client Information

Client: Golder
Acct #:
Project Name/#: IBM-Kingston SWMU M
SSOW #:
IBM PM: Dean Chastrand
Project State: NY
P.O. #: 083-87071.08
Sampler: David Vella
For Compliance: ☐ Yes ☒ No

Check One:
☐ Routine Lab GW ☐ Routine GTF O&M
☒ Non-Routine Investigation ☐ Non-Routine Upgrades/Installs
OU: _____ (Endicott Non-Routine only)

Matrix

Sediment ☐ | Ground ☒ | Surface ☐ | Soil ☒ | Potable ☐ | NPDES ☐ | Air ☐ | Oil ☐

Analyses Requested

Preservation and Filtration Codes: H | I | N | I | I | O | H

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Water	Oil	Total # of Containers	VOCs (8260C)	SVOCs (8270D) NM2005 11/21/19	Total Mn + Fe	Dissolved Mn + Fe	Sulfate, Chloride, Nitrite, Air Tox	TOC	Methane, Ethane, Ethene				
B-4 (8-10)	11/12/19	0810	X		X			5	X					X					
B-4 (15-16)	11/12/19	0945	X		X			5	X					X					
B-4 (8-10)	11/12/19	1145	X			X		14	X	X	X	X	X	X	X				

For Lab Use Only

SCR#:

Preservation Codes
H = HCl T = Thiosulfate
N = HNO_3 B = NaOH
S = H_2SO_4 O = Other
F = Field Filtered

Remarks
SVOC bottle not received at ELLE. NM2005 11/21/19

Turnaround Time Requested (TAT) (please circle)

Standard Rush
(Rush TAT is subject to Lancaster Laboratories approval and surcharges.)
Date results are needed: _____
E-mail: Chemistry@golder.com HelKinton@golder.com
Is EDD Needed?: YES

Data Package Options (please circle if required)

Type I (Validation/NJ Reg) TX TRRP-13 NY ASP A
Type III (Reduced NJ) MA MCP NY ASP B
Type VI (Raw Data Only) CT RCP
SDG Complete? (Yes) No

Relinquished by	Date	Time	Received by	Date	Time
David Vella	11/12/19				
Relinquished by	Date	Time	Received by	Date	Time
Relinquished by	Date	Time	Received by	Date	Time
Relinquished by	Date	Time	Received by	11/13/19	1203

Site-specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate volume.)

Temperature upon receipt 0.0 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 266239

Group Number(s): 2074333

Client: Golder

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Date:	11/13/2019
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	NY		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	Total Trip Blank Qty:	2
Samples Chilled:	Yes	Trip Blank Type:	HCl
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Tamara Lugardo

Samples Chilled Details

Thermometer Types: *DT = Digital (Temp. Bottle)* *IR = Infrared (Surface Temp)* *All Temperatures in °C.*

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	192050133	0.0	IR	Wet	Y	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Terra Systems
INCORPORATED

December 9, 2019

Christopher D. Hemingway, PG, NJ-LSRP
Senior Consultant, Associate
Golder Associates Inc.
200 Century Parkway, Suite C, Mt. Laurel, NJ 08054

RE: Draft Report for Soil Oxidant Demand (SOD) Treatability Study for IBM, Kingston, NY Version 1

Dear Chris:

Terra Systems, Inc. (TSI) has conducted treatability studies at over 100 sites in support of in situ chemical oxidation (ISCO) using potassium and sodium permanganate, activated sodium persulfate, catalyzed hydrogen peroxide, or ozone, or in situ chemical reduction of volatile organics, semivolatiles organics, and metals. TSI does not perform ISCO or in situ reduction field projects, but works with environmental engineering consultants including ERM, AMEC, TRC, Moraine Environmental, URS, GZA, WSP, and others to evaluate chemical oxidant demand and effectiveness in the laboratory before the consultants go to pilot or full-scale implementation. The treatability work was directed by Michael D. Lee, Ph.D. He has over 30 years of experience in conducting treatability studies and in situ bioremediation of chlorinated solvents and hydrocarbons. He has published over 100 papers.

I have prepared this draft report for the soil oxidant demand (SOD) treatability study for the IBM Kingston, NY site. TSI measured the soil density and pH of the groundwater and determined the quantities of 25% sodium hydroxide needed to raise and maintain the pH to 10.5 of 289 g soil and 60 mL groundwater for the following treatments: control, Peroxychem product Klozur 10 g/L sodium persulfate, 20 g/L Klozur sodium persulfate, and 40 g/L Klozur sodium persulfate for soil samples from B-4 and 9-10' and from 14-15' and groundwaters from B-4 collected at 8-10' and 15-17'.

1.0 SUPPLY OF SAMPLES

Golder personnel sent representative soil and groundwater samples on ice and under standard Chain-of-Custody procedures directly to TSI at the following shipping address:

Michael D. Lee, Ph.D.
Terra Systems, Inc.
130 Hickman Road, Suite 1
Claymont DE 19703
Phone: 302-798-9553
E-mail: mlee@terrasystems.net.

The following samples were supplied for the treatability studies:

- 1.2 kg of groundwater from B-4 8-10'
- 1.2 kg of groundwater from B-4 15-17'
- 1.7 kg of contaminated soil from B-4 9-10'
- 1.7 kg of contaminated soil from B-4 15-17'

The samples were shipped on November 13, 2019 and received at TSI on November 14, 2019.

2.0 SCOPE OF WORK

The experimental design for the bench-scale treatability study consisted of three phases of work:

1 Initial compositing and characterization of the site soil and groundwater;

2 Soil Oxidant Demand testing for three loading of sodium hydroxide activated Klozur sodium persulfate, and an unamend control sampled over 17-18 days

3 Report.

Each phase of work is described in detail in the sections that follow.

2.1 Initial Characterization of Site Soils and Groundwater

Prior to beginning the actual treatability experiments, the soil and groundwater samples were composited separately. TSI measured the soil density, soil moisture, and soil field holding capacity. The soil density was determined by adding soil to a 50 mL centrifuge tube to 15 or 20 mL, packing it down with glass rod, and weighing the tube. The field holding capacity was determined by adding 10 mL of groundwater to the centrifuge tube with soil, thoroughly mixing the soil and groundwater, and allowing them to sit overnight. Groundwater on top of the soil was removed. During the SOD testing, the pH of the soil and groundwater was measured the and quantities of 25% sodium hydroxide needed to raise and maintain the pH to 10.5 of 289 g soil and 60 mL groundwater for the following treatments: control, Klozur 10 g/L sodium persulfate, 20 g/L Klozur persulfate, and 40 g/L Klozur persulfate from both soils and associated groundwaters. The groundwater from B-4 at 8-10' and the soil from B-4 at 9-10' were combined. The soil from B-4 at 15-17' and the soil from B-4 at 15-17' were combined. As the persulfate decomposes, it produces sulfuric acid and the pH drops. The pHs were monitored over a 17 to 18-day incubation period. When the pH drifted below 10.5, additional 25% sodium hydroxide was added. The residual persulfate concentration was determined at the end of the incubation period by the addition 10 mL of 25% sulfuric acid and 10 mL of 0.4 N ferrous ammonium sulfate, and titration with 0.5 M potassium permanganate. The ferrous ammonium sulfate consumes any residual persulfate. The volume of potassium permanganate versus a blank without persulfate is related to the concentration of persulfate in the sample.

2.2 Initial Characterization Results

The B-4 9-10' soil density was 1.81 g/cm^3 or the equivalent of 113 pounds per cubic foot and the field holding capacity was 12.9%. The B-4 14-15' soil density was 1.76 g/cm^3 or the equivalent of 110 pounds per cubic foot and the field holding capacity was 7.1%.

2.3 B-4 9-10' Soil and B-4 8-10' Groundwater Results

Table 1 shows the results of the 25% sodium hydroxide (NaOH) titrations for the B-4 at 9-10' soil and B-4 8-10' groundwater with 289 g soil, 60 g groundwater, and 10,000, 20,000, and 40,000 mg/L Klozur sodium persulfate. The initial pH of the Control was 5.7 and the pH drifted up 6.0 over the 17-day incubation.

The initial pH of the 10,000 mg/L persulfate treatment was 4.7. It took 1.7 mL 25% NaOH to raise the pH to 11.7 and pH dropped to 8.8 after one day; another aliquot of 1.0 mL 25% NaOH brought the pH to 11.2. The titrations were repeated until Day 17. It took a total of 3.4 mL of the 25% NaOH to maintain the pH above 11.0 for the remainder of the 17 days. The sodium hydroxide demand for the 10,000 mg/L persulfate treatment was 2.94 g NaOH/kg or the equivalent of 0.16 gallons of 25% sodium hydroxide per cubic foot of aquifer. There was no residual persulfate with a detection limit of 102 mg/L. The persulfate demand was >2,055 mg/kg.

The initial pH of the 20,000 mg/L persulfate treatment was 6.1. It took 3.8 mL of the 25% NaOH to raise and maintain the pH above 11.0 for 17 days. The sodium hydroxide demand for the 20,000 mg/L persulfate treatment was 3.29 NaOH/kg or the equivalent of 0.15 gallons of 25% sodium hydroxide per cubic foot of aquifer. There was no residual persulfate with persulfate demand of >4,131 mg/kg.

The initial pH of the 40,000 mg/L persulfate treatment was 4.8. It took 5.9 mL of 25% NaOH was added to maintain the pH above 11.0. The sodium hydroxide demand for the 40,000 mg/L persulfate treatment was 5.1 NaOH/kg or the equivalent of 0.24 gallons of 25% sodium hydroxide per cubic foot of aquifer. There was no residual persulfate with persulfate demand of >8,283 mg/kg. The persulfate demand was greater than 0.93 pounds per cubic foot of aquifer.

2.4 B-4 14-15' Soil and B-4 15-17' Groundwater Results

Table 2 shows the results of the 25% sodium hydroxide (NaOH) titrations for the B-4 at 14-15' soil and B-4 15-17' groundwater with 289 g soil, 60 g groundwater, and 10,000, 20,000, and 40,000 mg/L Klozur sodium persulfate. The initial pH of the Control with 385 g soil and 60 mL groundwater was 6.9 and the pH drifted up to as high as 7.2 over the 18-day incubation.

The initial pH of the 10,000 mg/L persulfate treatment was 6.3. It took 1.7 mL 25% NaOH to maintain the pH above 11.0 for the remainder of the 18 days. The sodium hydroxide demand for the 10,000 mg/L persulfate treatment was 1.47 g NaOH/kg or the equivalent of 0.078 gallons of 25% sodium hydroxide per cubic foot of aquifer. There was no residual persulfate. The persulfate demand was >2,055 mg/kg.

The initial pH of the 20,000 mg/L persulfate treatment was 6.6. It took 2.7 mL of the 25% NaOH to raise and maintain the pH above 11.0 for 18 days. The sodium hydroxide demand for the 20,000 mg/L persulfate treatment was 2.34 NaOH/kg or the equivalent of 0.12 gallons of 25% sodium hydroxide per cubic foot of aquifer. There was no residual persulfate with persulfate demand of >4,131 mg/kg.

The initial pH of the 40,000 mg/L persulfate treatment was 6.1. It took 4.8 mL of 25% NaOH was added to maintain the pH above 11.0. The sodium hydroxide demand for the 40,000 mg/L persulfate treatment was 4.15 g NaOH/kg or the equivalent of 0.22 gallons of 25% sodium hydroxide per cubic foot of aquifer. There was no residual persulfate with persulfate demand of >8,283 mg/kg. The persulfate demand was greater than 0.92 pounds per cubic foot of aquifer.

The alkaline conditions extracted humic acid or petroleum hydrocarbons from the 15-17' soils and a black layer was formed.

Table 1. B-4 7-10’ Soil and B-4 8-10’ Groundwater 25% Sodium Hydroxide Titrations

Control			**10 g/L PS**					**20 g/L PS**					**40 g/L PS**			
Soil g	289		289					289					289			
GW g	60		60					60					60			
Persulfate g			0.6					1.2					2.4			
Day	pH		Day	Vol 25% NaOH	pH	Persulfate		Day	Vol 25% NaOH	pH	Persulfate		Day	Vol 25% NaOH	pH	Persulfate
	SU			mL	SU	mg/L			mL	SU	mg/L			mL	SU	mg/L
0	5.7		0	0	4.7			0	0	6.1			0	0	4.8	
1	5.6			1	9.3				1.5	13.0				1.5	10.7	
3	5.8			1.5	10.8			1		11.3				1.8	11.8	
6	5.9			1.7	11.7			3		8.2			1		9.2	
8	5.9		1		8.8				3.0	12.0				2.5	10.6	
13	6.0			2.7	11.2			6		10.6				2.8		
15	6.0		3		11.3				3.2	11.0			3		8.6	
17	6.0		6		10.2			8		11.0				3.7	11.3	
				3.2	11.5			13		9.9			6		9.3	
			8		10.7				3.5	12.3				4.5	11.8	
				3.4	11.3			15		11.9			8		11.5	
			13		11.1			17		10.7			13		9.4	
			15		11.8				3.8	12.0	<102			5.4	11.8	
			17		11.0	<102							15		10.5	
														5.9	11.9	
													17		11.7	<102
NaOH Demand g/kg Soil					2.94					3.29					5.10	
Persulfate Demand g/kg Soil						>2,055					>4,131					>8,283

Table 2. B-4 14-15' Soil and B-4 15-17' Groundwater 25% Sodium Hydroxide Titrations

	Control		**10 g/L PS**					**20 g/L PS**					**40 g/L PS**			
Soil g	385		289					289					289			
GW g	60		60					60					60			
Persulfate g			0.6					1.2					2.4			
Day	pH		Day	Vol 25% NaOH	pH	Persulfate		Day	Vol 25% NaOH	pH	Persulfate		Day	Vol 25% NaOH	pH	Persulfate
	SU			mL	SU	mg/L			mL	SU	mg/L			mL	SU	mg/L
0	6.9		0		6.3			0		6.6			0		6.1	
1	7.1			0.3	9.9				1	12.3				1	12.00	
2	7.1			0.5	10.2			1		10.2			1		7.6	
4	7.1			1.0	12.5				1.5	12.1				1.7	9.4	
7	7.0		1		11.4			2		10.8				2.2	9.2	
9	7.2		2		10.6				1.7	11.6				2.7	12.1	
14	6.8			1.5	12.2			4		9.4			2		11.0	
16	6.9		4		11.9				2.2	11.6			4		6.4	
18	6.7		7		10.9			7		10.2				4.2	12.5	
				1.7	11.6				2.4	11.3			7		12.1	
			9		12.0			9		11.1				4.5	11.8	
			14		11.4			14		10.3			9		11.1	
			16		11.1				2.7	11.6			14		10.0	
			18		11.0	<102		16		11.8				4.8	12.0	
								18		11.7			16		12.2	
													18		12.2	<102
NaOH Demand g/kg Soil					1.47					2.34					4.15	
Persulfate Demand g/kg Soil						>2,055					>4,131					>8,283

3.0 CONCLUSIONS

The following conclusions can be reached from the treatability study:

- The alkaline activation required between 0.078 to 0.24 gallons of 25% sodium hydroxide solution per cubic foot of aquifer to be treated with 10 to 40 g/L of sodium persulfate to maintain the pH above 11. These sodium hydroxide loadings were sufficient to maintain alkaline conditions.
- The soils appeared to contain high concentrations of contaminants.
- All of the persulfate at loadings of 10 to 40 g/L was consumed in both soils over the 17 to 18-day incubation period. This suggests that persulfate levels higher than 0.94 pounds per cubic yard would be required. Sodium persulfate ISCO treatment may not be a cost-competitive remediation alternative.

Should you have any questions about the draft report or need additional information, please feel free to contact me.

Sincerely,
TERRA SYSTEMS, INC.

Michael D Lee, PhD.

Michael D. Lee, Ph.D.
Vice-President Research and Development

APPENDIX D

Data Usability Summary Report

Data Usability Summary Report
Former IBM Kingston Facility
Kingston, New York

This Data Usability Summary Report (DUSR) presents the findings of the data quality assessment performed on the analyses of certain groundwater and soil environmental samples collected at the Former IBM Kingston Facility, located at 300 Enterprise Drive, in Kingston, New York (Site). The chemical data were reviewed to verify:

- Data package completeness following New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) Category B deliverable requirements;
- Sample holding time and method compliance;
- Data summary sheets are supported by raw data; and,
- Quality control (QC) parameters, which could affect the use of the data for decision making purposes, are within required specifications.

The samples were collected from the Site from November 5, 2019 – November 12, 2019, as indicated in Table 1. The following primary and quality control (QC) samples were collected:

- Fifteen (15) primary groundwater samples;
- Eight (8) primary soil samples; and,
- Four (4) trip blank samples.

PROCEDURES

Eurofins Lancaster Laboratories, Inc. located in Lancaster, Pennsylvania, analyzed all samples using the following United States Environmental Protection Agency (USEPA) method guidelines:

- Volatile Organic Compounds (VOCs) by USEPA SW-846[1] Method 8260C Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 4, September 2014;
- Dissolved Gases by USEPA SW-846 Method 8015C Nonhalogenated Organics by Gas Chromatography, Revision 3, February 2007;
- Semivolatile Organic Compounds (SVOCs) by USEPA SW-846 Method 8270D Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 4, January 1998;

[1] USEPA, 1996, Test methods for evaluating solid waste, physical/chemical methods (SW-846): 3rd edition, Environmental Protection Agency, National Center for Environmental Publications, Cincinnati, Ohio, accessed at URL http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm

- Ammonia as Nitrogen by USEPA Method 350.1 Determination of Ammonia Nitrogen by Semi-Automated Colorimetry, Revision 2.0, August 1993;
- Chloride and Sulfate by USEPA Method 300.0 Determination of Inorganic Anions by Ion Chromatography, Revision 2.1, August 1993;
- Nitrate and Nitrate by USEPA Method 353.2 Determination of Nitrate-Nitrite Nitrogen by Automated Colorimetry, Revision 2.0, August 1993;
- Sulfide by Standard Method (SM) 21st Edition (2005), 4500-S2-F Sulfide by Iodometry;
- Alkalinity by SM 2320B Alkalinity by Titration;
- Total Organic Carbon (TOC) by SM 5310C Total organic carbon by Persulfate-UV or Heater Persulfate Oxidation;
- TOC by USEPA Method Lloyd Kahn – Determination of Total Organic Carbon in Sediment, July 1988;
- Total Phosphorus by USEPA Method 365.1 Determination of Phosphorus by Semi-Automated Colorimetry, Revision 2.0, August 1993;
- Total and Dissolved Iron and Manganese by USEPA SW-846 Method 6010D Inductively Coupled Plasma-Optical Emission Spectrometry, Revision 5, July 2018; and,
- Percent Moisture by SM 2540G Total, Fixed, and Volatile Solids in Solid and Semisolid Samples.

Information regarding laboratory sample delivery group (SDG) designations, sampling dates, sample identification, field duplicate samples, matrix, and analytical methods are summarized in Table 1.

The samples and associated QC data were evaluated following guidelines provided by the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 2B *Guidance for Data Deliverables and the Development of Data Usability Summary Reports*, May 2010. Data review was conducted in accordance with the project QAPP (Quality Assurance Project Plan – RCRA Facility Investigation Management Plans – Former IBM Kingston Facility (May 2009)). Where required, data qualification was performed following the USEPA Region II SOP HW-24 Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B, Revision 4, September 2014 (Guidelines); SOP HW-22 Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, Revision 5, December 2010; SOP HW-3b ISM02.2 ICP-MS Data Validation, Revision 1, September 2016; SOP HW-3c ISM02.2 Mercury and Cyanide Data Validation, Revision 0, July 2015, where applicable to the methods listed on Table 1 and in consideration of the New York State Department of Environmental Conservation DER-10 Technical Guidance for State Investigation and Remediation, issued May 3, 2010 (NYSDEC DER-10). The most recent versions of the above-cited guidance available at the time of data validation, rather than older versions of these guidance that may have been cited in the QAPP, were used for evaluation. If there was a conflict between the QAPP, Guidelines, or the analytical methodology, method-specific criteria and professional judgment were used. The data were specifically evaluated for sample preservation and holding times, method and field blanks, laboratory control samples, surrogate spikes, MS/MSDs, instrument tunings, and calibrations.

Sample results were qualified on the basis of outlying precision and accuracy parameters, or on the basis of professional judgment, as necessary. The following qualifiers were assigned to data during the data validation process:

J	The analyte was detected between the reporting detection limit (RDL) and the method detection limit (MDL), or qualified for QC reasons, and is considered an estimated value.
J+	The analyte was detected between the reporting detection limit (RDL) and the method detection limit (MDL), or qualified for QC reasons, and is considered an estimated value with a possible high bias.
J-	The analyte was detected between the reporting detection limit (RDL) and the method detection limit (MDL), or qualified for QC reasons, and is considered an estimated value with a possible low bias.
UJ	The analyte was analyzed for but was not detected. The RDL is approximate and may be inaccurate or imprecise.

DATA VALIDATION RESULTS

In general, the data generated during the sampling events met the QC criteria established in the respective USEPA, NYSDEC and NYSDOH guidelines. All data provided by the laboratory met the terms of NYSDEC ASP Category B deliverables requirements, the requested analytical methodology was completed, and sample holding times requirements were observed. The following qualifications were made to the data:

- All dissolved metals results were qualified as estimated (J for detect results, UJ for non-detect results) because the samples were filtered outside the recommended holding time.
- Certain nitrite and chloride results were qualified as estimated (J for detect results above the RL, J- for detect results greater than the RL, and UJ for non-detect results) when the associated MS recovery was below QC criteria.
- The initial total 1,2-dichloroethane result for samples B-9 (12-14) and B-16 (11-3) were deemed not reportable when the initial sample result exceeded the instrument calibration range. The samples were reanalyzed at further dilutions and the reanalysis results were deemed reportable. The reanalysis results were qualified as estimated (J) because the sample reanalysis was conducted using a container containing headspace.
- Certain VOC results were qualified as estimated (J for detect results, UJ for non-detect results) when the associated continuing calibration verification sample percent deviations were outside QC criteria.
- The 1,2-Dichloroethane result for sample B-10 (7-8) was qualified as estimated (J) when the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) recoveries were above QC criteria.
- Certain SVOC non-detect results were qualified as estimated (UJ) when the associated surrogate recovery was below QC criteria.

- Certain VOC non-detect results for sample B-20 (28-30) were qualified as estimated (UJ) when internal standard areas were outside QC criteria.

Table 2 presents a summary of all qualifications applied to the data with applicable qualifier comments.

Several samples were analyzed at dilutions in order to bring target analyte concentrations within the calibrated range of the analytical instruments. The detection limits of these samples are considered elevated when undiluted results were not provided.

Based on the data validation and data quality assessment performed, the analytical data for samples described in this data usability summary report were determined to be acceptable for their intended use. The data completeness (i.e., the ratio of the amount of valid data obtained to the amount expected, including estimated (J/UJ) data) was 100%.

Table 1
Sample Collection and Analysis Summary
Former IBM Kingston Facility
Kingston, New York

							Analyses													
SDG	**Field Identification**	**Collection Date**	**Location**	**Lab Identification**	**Matrix**	**QC Samples**	**VOCs (8260C/D)**	**MEE (8015C)**	**SVOCs (8270D)**	**Ammonia - Nitrogen (350.1)**	**Chloride/Sulfate (300.0)**	**Nitrate/Nitrite (353.2)**	**Sulfide (SM 4500)**	**Alkalinity (2320B)**	**TOC (5310C)**	**TOC (Lloyd Kahn)**	**Total Phosphorus (365.1)**	**Total Fe/Mn (6010D)**	**Dissolved Fe/Mn (6010D)**	**Percent Moisture**
IBL23	B-1 (13.5-15.5)	11/5/2019	B-1	1193709 / 1193710	GW	--	X	X	X	X	X	X	X	X	X	--	X	X	X	--
IBL23	B-10 (13-15)	11/5/2019	B-10	1193711 / 1193712	GW	--	X	X	X	X	X	X	X	X	X	--	X	X	X	--
IBL23	Trip Blank	11/5/2019	--	1193713	WQ	TB	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL24	B-10 (7-8)	11/5/2019	B-10	1193714	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL25	B-20(27-28)	11/6/2019	B-20	1198445	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL25	B-18(7.5-8.5)	11/6/2019	B-18	1198446	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL25	B-17(22-23)	11/6/2019	B-17	1198447	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL25	B-7(7-9)	11/7/2019	B-7	1198448	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL25	TB19301	11/6/2019	--	1198449	WQ	TB	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-12(11-13)	11/8/2019	B-12	1199596	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-12(26-28)	11/8/2019	B-12	1199597	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-5(11-13)	11/8/2019	B-5	1199598	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-3(12-14)	11/8/2019	B-3	1199599	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-9(12-14)	11/8/2019	B-9	1199600	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-14(10-12)	11/11/2019	B-14	1199601	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-15(10-12)	11/11/2019	B-15	1199602	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-16(25-27)	11/11/2019	B-16	1199603	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL26	B-16(11-13)	11/11/2019	B-16	1199604 / 1199605	GW	--	X	X	X	X	X	X	X	X	X	--	X	X	X	--
IBL26	B-20(28-30)	11/11/2019	B-20	1199606 / 119607	GW	--	X	X	X	X	X	X	X	X	X	--	X	X	X	--
IBL26	Trip Blank	11/8/2019	--	1199608	WQ	TB	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL27	B-14(10-12)	11/11/2019	B-14	1199613	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL27	B-20(28-30)	11/11/2019	B-20	1199614	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL27	B-19(28-30)	11/11/2019	B-19	1199615	GW	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--
IBL28	B-4(8-10)	11/12/2019	B-4	1200463	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL28	B-4(15-18)	11/12/2019	B-4	1200464	SO	--	X	--	--	--	--	--	--	--	--	X	--	--	--	X
IBL28	B-4(8-10)	11/12/2019	B-4	1200465 / 1200466	GW	--	X	X	X	X	X	X	X	X	X	--	X	X	X	--
IBL28	Trip Blank Water	11/12/2019	--	1200467	WQ	TB	X	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

All analyses were performed by Eurofins Lancaster Laboratories Environmental.

Abbreviations:

Fe - Iron
GW - Groundwater
MEE - Methane, Ethane, Ethene
Mn - Manganese
SDG - Sample Delivery Group
SVOCs - Semivolatile Organic Compounds
TB - Trip Blank
TOC - Total Organic Carbon
VOCs - Volatile Organic Compounds
WQ - Quality Control Water

Table 2
Summary of Validation Qualifiers
Former IBM Kingston Facility
Kingston, New York

SDG	Sample Name	Constituent	New Result	New MDL	New RL	Qualifier	Reason
IBL23	B-1 (13.5-15.5)	Dissolved Iron	--	--	--	UJ	Sample Filtered Outside of Hold Time
IBL23	B-1 (13.5-15.5)	Dissolved Manganese	--	--	--	J	Sample Filtered Outside of Hold Time
IBL23	B-10 (13-15)	Dissolved Iron	--	--	--	UJ	Sample Filtered Outside of Hold Time
IBL23	B-10 (13-15)	Dissolved Manganese	--	--	--	J	Sample Filtered Outside of Hold Time
IBL23	B-1 (13.5-15.5)	1,1,1-Trichloroethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL23	B-10 (13-15)	1,1,1-Trichloroethane	--	--	--	J	CCV %D Outside QC Criteria
IBL23	B-1 (13.5-15.5)	Carbon Tetrachloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL23	B-10 (13-15)	Carbon Tetrachloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL23	B-1 (13.5-15.5)	Nitrite as Nitrogen	--	--	--	UJ	MS Recovery Below QC Criteria
IBL23	B-10 (13-15)	Nitrite as Nitrogen	--	--	--	J	MS Recovery Below QC Criteria
IBL24	B-10 (7-8)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL24	B-10 (7-8)	1,2-Dichloroethane	--	--	--	J	CCV %D Outside QC Criteria
IBL24	B-10 (7-8)	Benzyl Chloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-20 (27-28)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-20 (27-28)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-20 (27-28)	Freon 113	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-18(7.5-8.5)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-18(7.5-8.5)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-18(7.5-8.5)	Freon 113	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-7 (7-9)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-7 (7-9)	Vinyl Chloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-7 (7-9)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL25	B-7 (7-9)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL24	B-10 (7-8)	1,2-Dichloroethane	--	--	--	J+	LCS/LCSD Recoveries Above QC Criteria
IBL26	B-16 (11-13)	Dissolved Iron	--	--	--	UJ	Sample Filtered Outside of Hold Time
IBL26	B-16 (11-13)	Dissolved Manganese	--	--	--	J	Sample Filtered Outside of Hold Time
IBL26	B-20 (28-30)	Dissolved Iron	--	--	--	UJ	Sample Filtered Outside of Hold Time
IBL26	B-20 (28-30)	Dissolved Manganese	--	--	--	J	Sample Filtered Outside of Hold Time
IBL26	B-9(12-14)	1,2-Dichloroethene (Total) [Initial Analysis]	--	--	--	--	Not reportable; reanalysis results are reportable
IBL26	B-16(11-13)	1,2-Dichloroethene (Total) [Initial Analysis]	--	--	--	--	Not reportable; reanalysis results are reportable
IBL26	B-9(12-14)	1,2-Dichloroethene (Total) [Dilution Analysis]	270	--	--	J	Sample Reanlalysis Conducted with Headspace
IBL26	B-16(11-13)	1,2-Dichloroethene (Total) [Dilution Analysis]	500	--	--	J	Sample Reanlalysis Conducted with Headspace
IBL26	B-12(11-13)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-12(26-28)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-5(11-13)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-3(12-14)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-9(12-14)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-14(10-12)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-15(10-12)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(25-27)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(11-13)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-20(28-30)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-12(11-13)	Vinyl Chloride	--	--	--	J	CCV %D Outside QC Criteria
IBL26	B-12(26-28)	Vinyl Chloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-5(11-13)	Vinyl Chloride	--	--	--	J	CCV %D Outside QC Criteria

Table 2
Summary of Validation Qualifiers
Former IBM Kingston Facility
Kingston, New York

SDG	Sample Name	Constituent	New Result	New MDL	New RL	Qualifier	Reason
IBL26	B-3(12-14)	Vinyl Chloride	--	--	--	J	CCV %D Outside QC Criteria
IBL26	B-9(12-14)	Vinyl Chloride	--	--	--	J	CCV %D Outside QC Criteria
IBL26	B-14(10-12)	Vinyl Chloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-15(10-12)	Vinyl Chloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(25-27)	Vinyl Chloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(11-13)	Vinyl Chloride	--	--	--	J	CCV %D Outside QC Criteria
IBL26	B-20(28-30)	Vinyl Chloride	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-12(11-13)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-12(26-28)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-5(11-13)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-3(12-14)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-9(12-14)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-14(10-12)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-15(10-12)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(25-27)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(11-13)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-20(28-30)	Bromomethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-12(11-13)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-12(26-28)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-5(11-13)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-3(12-14)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-9(12-14)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-14(10-12)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-15(10-12)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(25-27)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-16(11-13)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-20(28-30)	Trichlorofluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL26	B-20(28-30)	4-Methylphenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2,4,5-Trichlorophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2-Chlorophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	Phenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2-Nitrophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2,4-Dimethylphenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2,4-Dichlorophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	4-Chloro-3-methylphenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2,4,6-Trichlorophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2,4-Dinitrophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	4-Nitrophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	4,6-Dinitro-2-methylphenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	Pentachlorophenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	2-Methylphenol	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-20(28-30)	1,1'-Biphenyl	--	--	--	UJ	Surrogate Recovery Below QC Criteria
IBL26	B-16(11-13)	Chloride	--	--	--	J-	MS Recovery Below QC Criteria
IBL26	B-20(28-30)	Chloride	--	--	--	J-	MS Recovery Below QC Criteria
IBL27	B-14(10-12)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria

Table 2
Summary of Validation Qualifiers
Former IBM Kingston Facility
Kingston, New York

SDG	Sample Name	Constituent	New Result	New MDL	New RL	Qualifier	Reason
IBL27	B-20(28-30)	Dichlorodifluoromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL27	B-14(10-12)	Chloromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL27	B-20(28-30)	Chloromethane	--	--	--	UJ	CCV %D Outside QC Criteria
IBL27	B-20(28-30)	1,1,2,2-Tetrachloroethane	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	Bromobenzene	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	1,2,3-Trichloropropane	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	2-Chlorotoluene	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	4-Chlorotoluene	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	1,3-Dichlorobenzene	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	1,4-Dichlorobenzene	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	Benzyl Chloride	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL27	B-20(28-30)	1,2-Dichlorobenzene	--	--	--	UJ	Internal Standard RRF Below QC Criteria
IBL28	B-4 (8-10)	Dissolved Iron	--	--	--	UJ	Sample Filtered Outside of Hold Time
IBL28	B-4 (8-10)	Dissolved Manganese	--	--	--	J	Sample Filtered Outside of Hold Time
All SDGs	All samples	All results	-	-	--	-	Laboratory applied U-qualifiers indicating non-detect results and J-qualifiers indicating results below the reporting limit are retained unless other qualifications are indicated in this table. All other laboratory qualifiers are removed.

Abbreviations
%D - Percent Difference
CCV - Continuing Calibration Verification
MDL - Method Detection Limit
MS - Matrix Spike
QC - Quality Control
RL - Reporting Limit
SDG - Sample Delivery Group

Qualifier Definitions
J - Estimated Result
J+ - Estimated Result; High Bias
J- - Estimated Result; Low Bias
UJ - Non-Detect Result; RL is Estimated

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