INVENTUM ENGINEERING, PC

June 2, 2020

Mr. Glenn May
Project Manager
Division of Environmental Remediation
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2915

RE: Tulip Molded Plastics Corporation Site
Site No. 932169
Inactive Hazardous Waste Disposal Site Determination Investigation

Dear Mr. May:

Inventum Engineering, PC ("Inventum"), on behalf of Ganson Alternative Energy, LLC (GAE), is responding to the letter dated December 11, 2018 from the New York State Department of Environmental Conservation ("NYSDEC") regarding potential listing of a portion of the Tulip Molded Plastics Corporation Facility (Figure 1) located at 3125 Highland Avenue, Niagara Falls, New York (the "Site") on the Registry of Inactive Hazardous Waste ("IHWS) Disposal Sites (the "Registry").

The NYSDEC's December 11, 2018 letter identified a general area on the site of "documented disposal of hazardous waste" as well as concentration(s) of lead in soil above 6 NYCRR Part 375 Soil Cleanup Objectives ("SCOs") in two areas along the eastern and southern boundary of the Site (Attachment A).

Site Background

GAE is the Site owner and leases the Site to the Tulip Corporation (Tulip). Tulip produces molded plastic products for the automotive industry and injection molded recycling containers and other specialized plastic containers. The Site is located in a commercial, industrial, and residential area and bounded to the south by the former Power City Warehouse (a.k.a. Tract I Site (Brownfield Cleanup Program [BCP] Site No. 932157), to the east by a narrow strip of land owned by National Grid[1] and beyond by the Tract II Site (BCP Site No. 932136), to the west by Highland Avenue, and to the north by Braun Horticulture (Figure 1).

[1] This is a utility right of way and is also known as the 15th Street ROW in the Tract II (BCP Site No. 932136) documentation.

The Tract I site to the south (Figure 1) has been remediated in accordance with a NYSDEC-approved remedial program which included the excavation, treatment (if necessary), and off-site disposal of construction materials, debris, and soil that exceeded Commercial Use Soil Cleanup Objectives (SCOs) under 6 NYCRR Part 375. Confirmation samples from the Tract I excavation are identified in the notification letter from the NYSDEC as containing concentration(s) of lead in soil above Part 375 SCOs along the southern boundary of the Site. The approximate location of these confirmation samples (T1-EA1-CS18 and T1-EA1-CS23) are shown on Figure 1. Data from the December 2014 Tract I Final Engineering Report[2] (FER) show these confirmation samples contained lead at concentrations above the either the Commercial SCO (1,000 milligrams per kilogram [mg/kg]) or Industrial SCO (3,900 mg/kg). The sample from T1-EA-1-CS18 contained lead at a concentration of 7,050[3] mg/kg and the sample from T1-EA1-CS23 contained lead at a concentration of 2,150 mg/kg.

The Tract II site to the east (Figure 1) has been remediated in accordance with a NYSDEC-approved remedial program. The components of that program relevant to the Site, and more specifically to the concentration(s) of lead in soil identified in the NYSDECs notification letter, are for the 15th Street ROW and Eastern Commercial Area[4].The 15th Street ROW was remediated to meet Commercial Use SCOs and backfilled with soil meeting the Allowable Constituent Levels for Imported Fill for Commercial Use. Confirmation samples from the Tract II excavation are identified in the notification letter as containing concentration(s) of lead in soil above Part 375 SCOs along the eastern boundary of the Site. The approximate location of these confirmation samples (T2-NG-SW5 and T2-NG-SW6) are shown on Figure 1. Data from the Tract II FER show the sample from T2-NG-SW5 contained lead at a concentration of 19,400 mg/kg and the sample from T2-NG-SW6 contained lead at a concentration of 1,030 mg/kg.

Scope of Work

GAE is electing to complete an initial site investigation to further characterize the potential nature and extent of potential contamination as described in the NYSDEC's notification letter. A proposed scope of work is provided below. The proposed work will be conducted in accordance with DER-10 *Technical Guidance for Site Investigation and Remediation* as well as the site-specific Health and Safety Plan (HASP) and accompanying Community Air Monitoring Plan (CAMP) [Attachment B].

[2] *Tract I Site, Final Engineering Report*. NYSDEC Site Number: C932157. AMEC Environment & Infrastructure, Inc. December 2014.
[3] There appears to be a transcription error for the sample result referenced in the aerial figure provided by the NYSDEC in their December 11, 2018 notification letter.
[4] Final Engineering Report, Tract II Site. 3001 Highland Avenue, Niagara Falls, Niagara County, New York. Site NO. 932136. Amec Foster Wheeler Environment & Infrastructure, Inc. March 2018.

Property Boundary Lead Exceedances

A minimum of six (6) test pits or direct push soil borings (Geoprobe® or equivalent) will be installed along the southern and eastern property boundary as shown in Figure 2. Test pits are preferred but may be limited by access, existing site features and utilities, interference with ongoing operations, or ability/approval to remove any existing railroad ties/tracks.

Test pits or soil borings will be extended to native soil, which is anticipated to be between 6 and 10 feet below ground surface (bgs). Actual depths may vary based on site access, proximity to structural features, existing site features and utilities, depth to groundwater, and ongoing operations. A minimum of three (3) soil samples will be collected at each location. One (1) shallow (0 to 1 feet) and two (2) subsurface (2 to 3 feet bgs and base of test pit) samples will be collected at each location and analyzed for Target Analyte List (TAL) metals via EPA Method 6010.

Field screening with a Photoionization Detector (PID) will also be conducted and additional samples will be collected for Volatile Organic Compounds (VOC) and Semi-Volatile Organic Compound (SVOC) analysis only if there is visual or olfactory evidence of impact or PID readings indicate evidence of organic contamination.

Area of Documented Disposal of Hazardous Waste

A minimum of five (5) direct push soil borings (Geoprobe® or equivalent) will be installed in the "area of documented disposal of hazardous waste" (Attachment A; Figure 2). Each boring will be extended to the depth that groundwater is encountered which is anticipated to be between 5 to 10-feet bgs. A minimum of three (3) soil samples will be collected at each location. One (1) shallow (0 to 1 feet) and two (2) subsurface (2 to 3 feet bgs and base of boring) samples will be collected at each location and analyzed for TAL metals via EPA Method 6010C.

Recovered soils will be field screened with a PID and additional samples will be collected for VOCs and SVOCs only if there is visual or olfactory evidence of impact or PID readings indicate evidence of organic contamination.

TCLP Lead Sampling

As described in the sections above, a total of thirty-three (33) soil samples have been proposed for TAL metals analysis. Inventum will also analyze six (6) of those samples for lead analysis using the Toxicity Characteristic Leaching Procedure (TCLP): three (3) samples from borings/test pits conducted along the property boundary and three (3) samples from borings conducted in the NYSDEC defined "area of documented disposal of hazardous waste". Samples collected for TCLP lead analysis will be placed on a laboratory hold pending the TAL metals results. The three samples with the highest total lead results from each area will be selected for the additional TCLP lead analysis; however, they will only be analyzed if the total lead results are greater than 100 mg/kg.

Groundwater Monitoring

Three (3) monitoring wells (MW-1, MW-2, and MW-3) are present on the Site installed in August 2011 as part of a Phase II Environmental Site Assessment (ESA) (Figure 2). Inventum understands these wells are screened in the fill material to monitor shallow groundwater, which was encountered at depths between 6.5 and 9 feet bgs during installation. This groundwater is likely perched, and flow is likely towards the southwest based on documentation from the adjacent Tract I and Tract II remediation sites. Inventum proposes to re-develop and sample the three existing wells to gauge existing conditions and notes that the collected data will be representative of both upgradient (MW-3) and downgradient (MW-1 and MW-2) Site conditions based on the assumed direction of groundwater flow. A table of inorganic and organic sampling data from these wells from the August 2011 Phase II ESA is provided in Attachment C. Boring and construction logs for each of these wells is provided for reference in Attachment D.

All three monitoring wells will be sampled with a peristaltic pump using low-flow sampling procedures. Wells will be redeveloped a minimum of 24-hours prior to sampling. All purge and redevelopment water will be containerized in DOT-compliant 55-gallon open topped steel drums, labeled as non-hazardous waste, and properly stored for future off-site disposal. Groundwater samples will be collected for Target Compound List (TCL) VOCs using EPA Method 8260C, TCL SVOCs using EPA Method 8270D, and TAL Metals using EPA Method 6010C.

Soil and groundwater samples will be analyzed by Paradigm Environmental Services, Inc. of Rochester, NY. Inventum will submit a Category A data deliverable and all supporting Quality Assurance/Quality Control documentation. Analytical results will be submitted to the NYSDEC in both Adobe Acrobat and Electric Data Deliverable (EDD) formats. The EDD will be formatted appropriately to upload to the NYSDEC's Environmental Information Management System (EIMS).

Reporting

Inventum will prepare an IHWS Investigation Report to provide the data analysis to the NYSDEC. The report will include a summary of the data collected as part of this initial investigation as well as a summary of historical investigation(s) and historical investigation data — as available to GAE — as it relates to the potential Registry listing.

Closing

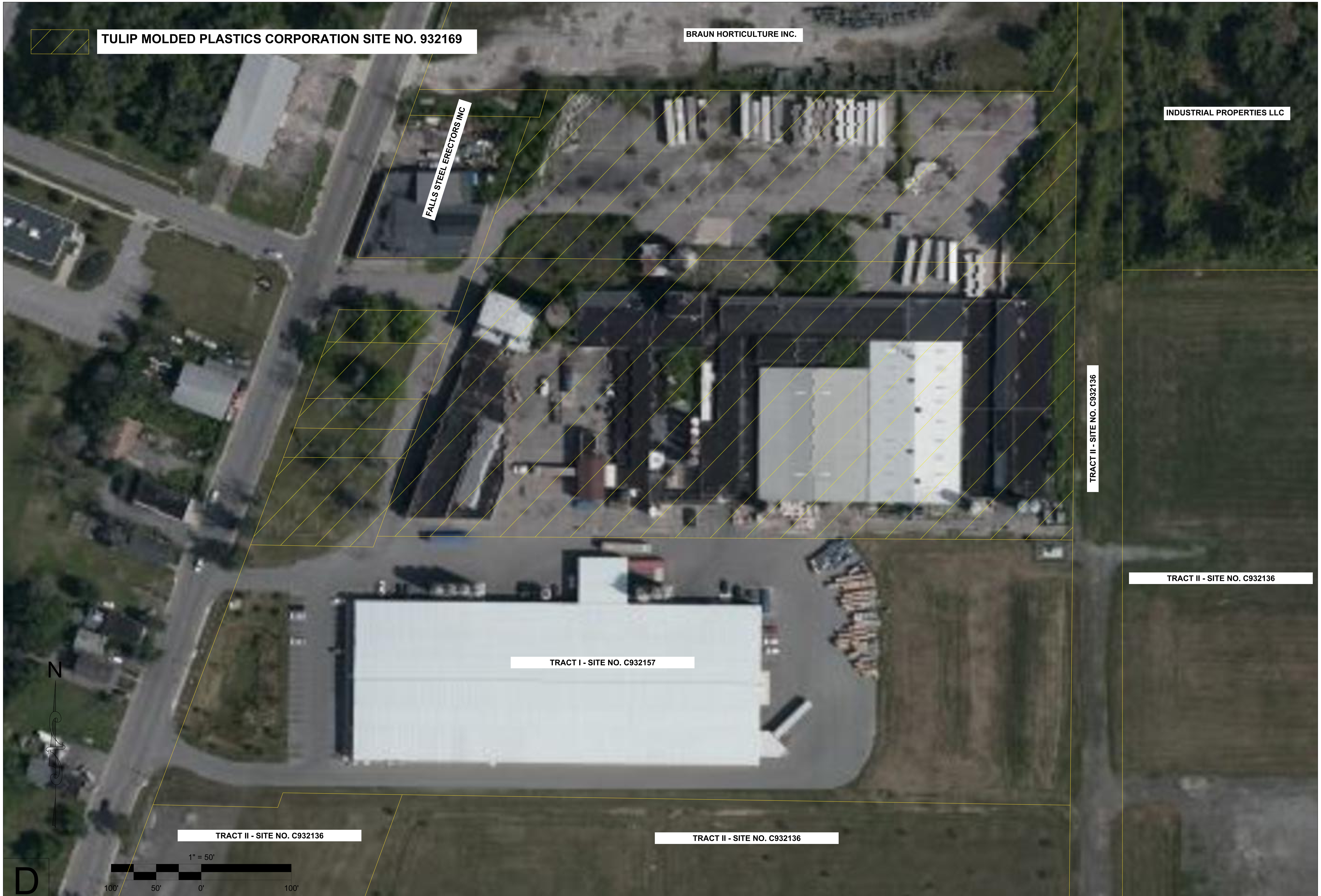
If you have any questions regarding the above, please feel free to contact me at 571.217.3627 or todd.waldrop@inventumeng.com.

Sincerely,

Todd Waldrop
Inventum Engineering, PC

Ecc: Jon Williams - Ganson Alternative Energy, LLC
John Yensan - OSC, Inc
John Kolaga - Rupp, Baase, Pfalzgraf, Cunningham LLC
David Pfalzgraf - Rupp, Baase, Pfalzgraf, Cunningham LLC
Wanda Smith Campbell - AIG Environmental & Mass Tort Claims Department
John Black, P.E. – Inventum Engineering

Figure



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APPROVED	XXX

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Ganson Alternative Energy LLC
Tulip Molded Plastics Corporation
Facility
3125 Highland Avenue
Niagara Falls, NY
Site No. 932169

FIGURE 01
SITE LOCATION

INVENTUM ENGINEERING
481 CARLISLE DRIVE
SUITE 202
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 1

- Proposed Soil Boring or Test Pit Location
- Existing Monitoring Well
- Tract I Remediation Confirmation Sample Location
- Tract II Remediation Confirmation Sample Location

Notes:

1. Existing monitoring well locations approximate as shown.
2. Tract I data and sample locations as described from the Tract I, Final Engineering Report. NYSDEC Site Number: C932157, Prepared for Brightfields, Inc. Prepared by AMEC Environment & Infrastructure, Inc. December 2014
3. Tract II data and sample locations as described from the Tract II, Final Engineering Report, Tract II Site, Site No. 932136, Prepared for Honeywell International Inc, Prepared by AMEC Environment & Infrastructure, Inc. March 2018

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Ganson Alternative Energy LLC
Tulip Molded Plastics Corporation
Facility
3125 Highland Avenue
Niagara Falls, NY
Site No. 932169

FIGURE 02
PROPOSED SAMPLE LOCATIONS

INVENTUM ENGINEERING
481 CARLISLE DRIVE
SUITE 202
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 2

Attachment A – December 11, 2018 Notification Letter - NYSDEC

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Office of the General Counsel
625 Broadway, 14th Floor, Albany, New York 12233-1500
P: (518) 402-9185 I F: (518) 402-9018
www.dec.ny.gov

December 11, 2018

Ganson Alternative Energy LLC
333 Ganson Street
Buffalo, NY 14203

RE: Potential Hazardous Waste Disposal Site Notification

Dear Sir or Madam:

As required by Environmental Conservation Law ("ECL") Section 27-1305(2)(a) (quoted below), the New York State Department of Environmental Conservation (the "Department") must investigate all known and suspected inactive hazardous waste disposal sites. The Department obtained information suggesting that hazardous waste, as defined at ECL § 27-1301(1), has been disposed of at the following location:

Site Name:	Tulip Molded Plastics Corporation
Site Address:	3125 Highland Avenue, Niagara Falls, New York
Site Number:	932169
Tax Map Nos:	130.18-2-4; 144.06-2-1; 144.23-1-2; 144.23-1-3; 144.23-1-4; 144.23-1-5; 144.23-1-6; and 144.23-1-7

This letter constitutes the Department's notification to you, as the identified property owner, that the Department considers this property to be a potential inactive hazardous waste disposal site. If the Department determines that hazardous waste has been disposed of on the property and that the hazardous waste constitutes a significant threat to public health or the environment, the Department will list the property on the Registry of Inactive Hazardous Waste Disposal Sites (the "Registry").

If you have any information that may be relevant to our investigation and pending determination, please forward it to me or the Department's Project Manager as soon as possible. If you prefer to perform the investigation yourself, you may do so under a legal agreement with the Department and in accordance with the Department's technical requirements. Please contact the Department's Project Manager (see below) within ten (10) business days if you wish to discuss this option. Otherwise, the Department will carry out any needed field investigation. If the property is determined to be an inactive hazardous waste disposal site and the Department incurs response costs to investigate and/or remediate the site, the Department will seek to recover all response costs from any responsible person.

A brief summary of the information currently available to the Department about the site is enclosed for your reference. This information is also available on the Department's public website via the "Environmental Site Remediation Database Search" tool at:

https://www.dec.ny.gov/cfmx/extapps/derexternal/index.cfm?pageid=3

If you have any questions or would like to discuss the possibility of undertaking the investigation of the site yourself, please feel free to contact the Project Manager for this site, Mr. Glenn May, at glenn.may@dec.ny.gov or (716) 851-7220. If you have retained legal counsel in regards to this matter, please have your counsel contact me at (518) 402-8564 with any questions or concerns.

Sincerely,

Michael C. Murphy, Esq.
Office of General Counsel

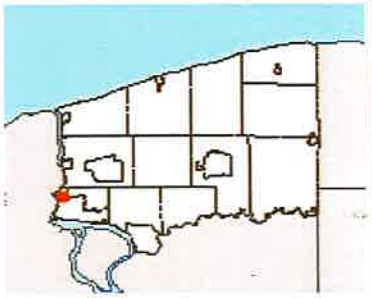
Enclosures

ec: G. May, Region 9, Buffalo
A. Zwack, Region 9, Buffalo
M. Cruden, DER

Environmental Conservation Law
Section 27-1305(2)(a)

"The department shall conduct investigations of the sites listed in the registry and shall investigate areas or sites which it has reason to believe should be included in the registry. The purpose of these investigations shall be to develop the information required by subdivision one of this section to be included in the registry."

Niagara County On-Line Mapping Application



Legend

Parcels

Tulip Molded Plastics

Tulip Molded Plastics

3219

Tract 1 C932157

Tract II 932136

0 376.08 752.2 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere

THIS MAP IS NOT TO BE USED FOR NAVIGATION

NIAGARA COUNTY
DEPARTMENT OF REAL PROPERTY SERVICES

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

1: 4,513

Google Earth

feet 1000
meters 400

Table 8
Tract I Power City Warehouse Excavation Area 1 Confirmatory Samples
Detections Only

			Sample ID	T1-EA1-CS13		T1-EA1-CS14		T1-EA1-CS15		T1-EA1-CS16		T1-EA1-CS17		T1-EA1-CS18	
			Sampled Depth Range (ft)	0 - 2		0 - 2		0 - 2		0 - 2		0 - 2		0-3.5	
			Sample Date	7/17/2013		7/17/2013		7/29/2013		7/29/2013		7/29/2013		8/28/2013	
			Sample Type	Sidewall Confirmatory		Sidewall Confirmatory		Sidewall Confirmatory		Sidewall Confirmatory		Sidewall Confirmatory		Record Sidewall	
Parameter	Units	Restricted Use Soil Cleanup Objectives - Restricted Commercial Standard[1]	Unrestricted Use Soil Cleanup Objectives[1]	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Semivolatile Organic Compounds															
Benzo(a)anthracene	µg/Kg[2]	5,600	1,000											1,100	
Benzo(a)pyrene	µg/Kg	1,000	1,000											1,000	
Benzo(b)fluoranthene	µg/Kg	5,600	1,000											1,300	
Dibenz(a,h)anthracene	µg/Kg	560	330											240	
Indeno(1,2,3-C,D)pyrene	µg/Kg	5,600	500											790	
TCL PCBs															
PCB-1242 (AROCLOR 1242)	µg/Kg	1,000	100												
PCB-1254 (AROCLOR 1254)	µg/Kg	1,000	100												
PCB-1260 (AROCLOR 1260)	µg/Kg	1,000	100												
Target Analyte List (TAL) Metals (Total)															
Arsenic	mg/Kg[9]	16	13												
Barium	mg/Kg	400	350												
Copper	mg/Kg	270	50												
Lead	mg/Kg	1,000	63	1,280		1,010		78.8	J	295		41.8		7,050	

Notes:
(1)-Standards taken from New York Code of Rules and Regulations (NYCRR) Part 375.
(2)-"µg/Kg"-micrograms per kilogram.
(3)-**Bold**-indicates laboratory detection.
(4)-Yellow Shading indicates that concentration exceeds the Restricted Commercial SCO.
(5)-Green Shading indicates that concentration exceeds the Unrestricted SCO.
(6)-"U" indicates that parameter was not detected above laboratory reporting limit.
(7)-Blank space denotes parameter was not analyzed.
(8)-"J"-indicates estimated value.
(9)-"mg/Kg"-milligrams per kilogram.

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Checked By: JK

Table 8
Tract I Power City Warehouse Excavation Area 1 Confirmatory Samples
Detections Only

Parameter	Units	Restricted Use Soil Cleanup Objectives - Restricted Commercial Standard[1]	Unrestricted Use Soil Cleanup Objectives[1]	Sample ID	T1-EA1-CS19		T1-EA1-CS20		T1-EA1-CS21		T1-EA1-CS22		T1-EA1-CS23		T1-EA1-CS24	
				Sampled Depth Range (ft)	3.5 - 3.8		2 - 2.3		6 - 6.3		0 - 6		0 - 6		0 - 5	
				Sample Date	8/28/2013		8/29/2013		8/29/2013		8/29/2013		8/29/2013		8/29/2013	
				Sample Type	Base Confirmatory		Base Confirmatory		Base Confirmatory		Sidewall Confirmatory		Record Sidewall		Sidewall Confirmatory	
					Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Semivolatile Organic Compounds																
Benzo(a)anthracene	µg/Kg[2]	5,600	1,000		99	J[8]	280		210	U	620		1,100	J	3,300	
Benzo(a)pyrene	µg/Kg	1,000	1,000		81	J	230		210	U	530		820	J	2,700	
Benzo(b)fluoranthene	µg/Kg	5,600	1,000		110	J	330		210	U	720		1,000	J	4,200	
Dibenz(a,h)anthracene	µg/Kg	560	330		210	U	47	J	210	U	120	J	260	J	450	J
Indeno(1,2,3-C,D)pyrene	µg/Kg	5,600	500		61	J	180	J	210	U	360		620	J	1,400	
TCL PCBs																
PCB-1242 (AROCLOR 1242)	µg/Kg	1,000	100													
PCB-1254 (AROCLOR 1254)	µg/Kg	1,000	100													
PCB-1260 (AROCLOR 1260)	µg/Kg	1,000	100													
Target Analyte List (TAL) Metals (Total)																
Arsenic	mg/Kg[9]	16	13													
Barium	mg/Kg	400	350													
Copper	mg/Kg	270	50													
Lead	mg/Kg	1,000	63		22.5		18.5		9.5		1,420		2,150		940	

Notes:
(1)-Standards taken from New York Code of Rules and Regulations (NYCRR) Part 375.
(2)-"µg/Kg"-micrograms per kilogram.
(3)-Bold-indicates laboratory detection.
(4)-Yellow Shading indicates that concentration exceeds the Restricted Commercial SCO.
(5)-Green Shading indicates that concentration exceeds the Unrestricted SCO.
(6)-"U" indicates that parameter was not detected above laboratory reporting limit.
(7)-Blank space denotes parameter was not analyzed.
(8)-"J"-indicates estimated value.
(9)-"mg/Kg"-milligrams per kilogram.

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Table 3
Confirmatory Samples Eastern Portion of Site
Detections Only

Parameter	Units	Unrestricted Use Soil Cleanup Objectives[1]	Restricted Use Soil Cleanup Objectives - Restricted Residential Standard[2]	Restricted Use Soil Cleanup Objectives - Commercial Standard[3]	NG-4 Result	NG-4 Qualifier	T2-NG-CB1 Result	T2-NG-CB1 Qualifier	T2-NG-CB2 Result	T2-NG-CB2 Qualifier	T2-NG-CB3 Result	T2-NG-CB3 Qualifier	T2-NG-CB4 Result	T2-NG-CB4 Qualifier	T2-NG-SW3 Result	T2-NG-SW3 Qualifier	T2-NG-SW4 Result	T2-NG-SW4 Qualifier
Sample Depth (feet):																		
Sample Date:					11/25/2014		10/10/2014		10/10/2014		10/10/2014		10/10/2014		10/10/2014		10/10/2014	
Volatile Organic Compounds																		
Acetone	µg/Kg[4]	50	100,000	500,000	NA		NA		NA		NA		NA		NA		NA	
Dichlorodifluoromethane	µg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Isopropylbenzene (Cumene)	µg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	µg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	µg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	µg/Kg	50	100,000	500,000	NA		NA		NA		NA		NA		NA		NA	
Semivolatile Organic Compounds (SVOCs)																		
1,1-Biphenyl	µg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
2,4-Dimethylphenol	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
2,4-Dinitrotoluene	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
2,6-Dinitrotoluene	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
2-Methylnaphthalene	µg/Kg	NS	NS	NS	82	U	390	U	400	U	4,100	U	410	U	400	U	380	U
2-Methylphenol (O-Cresol)	µg/Kg	330	100,000	500,000	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
3&4-Methylphenol (m+p Cresol)	µg/Kg	330	100,000	500,000	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
4-Methylphenol (p-Cresol)	µg/Kg	330	100,000	500,000	NA		NA		NA		NA		NA		NA		NA	
Acenaphthene	µg/Kg	20,000	100,000	500,000	82	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Acenaphthylene	µg/Kg	100,000	100,000	500,000	82	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Anthracene	µg/Kg	100,000	100,000	500,000	82	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Benzaldehyde	µg/Kg	NS	NS	NS	2,000	R	390	UJ	400	UJ	4,100	UJ	410	UJ	400	UJ	380	UJ
Benzo(a)anthracene	µg/Kg	1,000	1,000	5,600	82	U	390	U	400	U	1,300	J	410	U	400	U	380	U
Benzo(a)pyrene	µg/Kg	1,000	1,000	1,000	82	U	390	U	400	U	960	J	410	U	400	U	380	U
Benzo(b)fluoranthene	µg/Kg	1,000	1,000	5,600	82	U	390	U	400	U	830	J	410	U	400	U	380	U
Benzo(g,h,i)perylene	µg/Kg	100,000	100,000	500,000	82	U	390	U	400	U	310	J	410	U	400	U	380	U
Benzo(k)fluoranthene	µg/Kg	800	3,900	56,000	82	U	390	U	400	U	840	J	410	U	400	U	380	U
Benzyl Butyl Phthalate	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Biphenyl (Diphenyl, 1,1'-Biphenyl)	µg/Kg	NS	NS	NS	410	U	2,000	U	2,100	U	21,000	U	2,100	U	2,000	U	2,000	U
Bis(2-ethylhexyl) Phthalate	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Caprolactam	µg/Kg	NS	NS	NS	410	U	390	UJ	400	U	4,100	U	410	U	400	U	380	U
Carbazole	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Chrysene	µg/Kg	1,000	3,900	56,000	82	U	390	U	400	U	1,300	J	410	U	400	U	380	U
Dibenz(a,h)anthracene	µg/Kg	330	330	560	82	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Dibenzofuran	µg/Kg	7,000	59,000	350,000	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Diethyl Phthalate	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Dimethyl Phthalate	µg/Kg	NS	NS	NS	2,000	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Di-n-Butyl Phthalate	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Fluoranthene	µg/Kg	100,000	100,000	500,000	82	U	390	U	400	U	1,800	J	410	U	400	U	380	U
Fluorene	µg/Kg	30,000	100,000	500,000	82	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Indeno(1,2,3-cd)pyrene	µg/Kg	500	500	5,600	82	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Isophorone	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Naphthalene	µg/Kg	12,000	100,000	500,000	82	U	390	U	400	U	370	J	410	U	400	U	380	U
N-Nitrosodiphenylamine	µg/Kg	NS	NS	NS	410	U	390	U	400	U	4,100	U	410	U	400	U	380	U
Phenanthrene	µg/Kg	100,000	100,000	500,000	82	U	390	U	400	U	1,000	J	410	U	400	U	380	U
Phenol	µg/Kg	330	100,000	500,000	70	J	390	U	400	U	4,100	U	410	U	400	U	380	U
Pyrene	µg/Kg	100,000	100,000	500,000	82	U	390	U	400	U	1,700	J	410	U	400	U	380	U
Target Compound List (TCL) Pesticides																		
alpha-BHC (alpha Hexachlorocyclohexane)	µg/Kg	20	480	3,400	NA		NA		NA		NA		NA		NA		NA	
beta-BHC (beta Hexachlorocyclohexane)	µg/Kg	36	360	3,000	NA		NA		NA		NA		NA		NA		NA	
delta-BHC (delta Hexachlorocyclohexane)	µg/Kg	40	100,000	500,000	NA		NA		NA		NA		NA		NA		NA	
Dieldrin	µg/Kg	5	200	1,400	NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	µg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Gamma BHC (Lindane)	µg/Kg	100	1,300	9,200	NA		NA		NA		NA		NA		NA		NA	
Methoxychlor	µg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
4,4'-DDD (p,p'-DDD)	µg/Kg	3.3	13,000	92,000	NA		NA		NA		NA		NA		NA		NA	
4,4'-DDE (p,p'-DDE)	µg/Kg	3.3	8,900	62,000	NA		NA		NA		NA		NA		NA		NA	
4,4'-DDT (p,p'-DDT)	µg/Kg	3.3	7,900	47,000	NA		NA		NA		NA		NA		NA		NA	
Target Compound List (TCL) Polychlorinated Biphenyls (PCBs)																		
Target Analyte List (TAL) Metals (Total)																		
Aluminum	mg/Kg[10]	NS	NS	NS	NA		NA		NA		NA		NA		7,120		8,680	
Antimony	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		1.1	UJ	1.1	U
Arsenic	mg/Kg	13	16	16	4.0		3.9		2.0		4.5		3.9		3.8		3.8	
Barium	mg/Kg	350	400	400	NA		NA		NA		NA		NA		65.4		40.3	
Beryllium	mg/Kg	7.2	72	590	NA		NA		NA		NA		NA		0.43	U	0.44	
Cadmium	mg/Kg	2.5	4.3	9.3	NA		NA		NA		NA		NA		0.54	U	0.53	U
Calcium	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		38,200		34,300	
Chromium	mg/Kg	1	110	400	NA		NA		NA		NA		NA		11.1		13.6	
Chromium (trivalent)[11]	mg/Kg	30	180	1,500	NA		NA		NA		NA		NA		NA		NA	
Hexavalent Chromium	mg/Kg	1	110	400	NA		NA		NA		NA		NA		NA		NA	
Cobalt	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		8.1		8.1	
Copper	mg/Kg	50	270	270	NA		NA		NA		NA		NA		15.1		16.6	
Iron	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		15,600		17,500	
Lead	mg/Kg	63	400	1,000	6.1		NA		8.5		642		17.4		4.7		7.6	
Magnesium	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		7,580		7,160	
Manganese	mg/Kg	1,600	2,000	10,000	NA		NA		NA		NA		NA		505		486	
Nickel	mg/Kg	30	310	310	NA		NA		NA		NA		NA		17.8		19.5	
Potassium	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		1,090		1,390	
Selenium	mg/Kg	3.9	180	1,500	NA		NA		NA		NA		NA		1.1	U	1.1	U
Silver	mg/Kg	2	180	1,500	NA		NA		NA		NA		NA		0.54	U	0.53	U
Sodium	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		537	U	534	U
Thallium	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		2.1	U	2.1	U
Tin	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Vanadium	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		17.6		20.1	
Zinc	mg/Kg	109	10,000	10,000	NA		NA		NA		NA		NA		30.8	J	34.3	
Mercury	mg/Kg	0.18	0.81	2.8	0.040	U	NA		NA		NA		NA		NA		NA	
General Chemistry																		
Sulfate	mg/Kg	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Toxicity Characteristic Leaching Procedure (TCLP) Metals																		
Lead	mg/L[12]	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	
Physical Parameters																		
Percent Solids	Percent	NS	NS	NS	NA		NA		NA		NA		NA		NA		NA	

Parameter	T2-NG-SW5 Result	T2-NG-SW5 Qualifier	T2-NG-SW6 Result	T2-NG-SW6 Qualifier	3003-CB1 Result	3003-CB1 Qualifier	3003-SW1 Result	3003-SW1 Qualifier	3007-CB1 Result	3007-CB1 Qualifier	3007-SW1 Result	3007-SW1 Qualifier	3011-CB1 Result	3011-CB1 Qualifier	3011-SW1 Result	3011-SW1 Qualifier	3017-CB1 Result	3017-CB1 Qualifier
Sample Depth (feet):																		
Sample Date:	12/18/2014		12/18/2014		10/29/2014		10/29/2014		10/24/2014		10/24/2014		10/22/2014		10/22/2014		10/22/2014	
Volatile Organic Compounds																		
Acetone	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dichlorodifluoromethane	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Isopropylbenzene (Cumene)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methyl Acetate	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylcyclohexane	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methylene Chloride	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Semivolatile Organic Compounds (SVOCs)																		
1,1-Biphenyl	NA		NA		NA		NA		NA		NA		NA		NA		NA	
2,4-Dimethylphenol	2,400	U	210	U	410	U	510	U	4700	U	4300	U	4,300	U	4,700	U	3,900	U
2,4-Dinitrotoluene	3,100	U	280	U	84	U	100	U	4700	U	4300	U	4,300	U	4,700	U	3,900	U
2,6-Dinitrotoluene	3,100	U	280	U	84	U	100	U	4700	U	4300	U	4,300	U	4,700	U	3,900	U
2-Methylnaphthalene	290		28		410	U	24	J	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
2-Methylphenol (O-Cresol)	3,100	U	280	U	410	U	510	U	4700	U	4,300	U	4,300	U	4,700	U	3,900	U
3&4-Methylphenol (m+p Cresol)	6300	U	560	U	NA		NA		4700	U	4300	U	4,300	U	4,700	U	3,900	U
4-Methylphenol (p-Cresol)	NA		NA		410	U	510	U	NA		NA		NA		NA		NA	
Acenaphthene	610	J	34		410	U	87	J	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Acenaphthylene	170		31		410	U	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Anthracene	1,300	J	89		410	U	110	J	4,700	U	380	J	4,300	U	4,700	U	3,900	U
Benzaldehyde	1,600	UJ	140	UJ	410	U	510	U	4,700	UJ	4,300	UJ	4,300	UJ	1,800	J	3,900	UJ
Benzo(a)anthracene	4,800		460		41	U	430		4,700	U	1,300	J	4,300	U	430	J	3,900	U
Benzo(a)pyrene	4,700		440		15	J	460		4,700	U	930	J	4,300	U	4,700	U	3,900	U
Benzo(b)fluoranthene	6,800		640		18	J	620		4,700	U	810	J	4,300	U	600	J	3,900	U
Benzo(g,h,i)perylene	1,600	J	180		410	U	290	J	4,700	U	560	J	4,300	U	370	J	3,900	U
Benzo(k)fluoranthene	2,000	J	300		41	U	290		4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Benzyl Butyl Phthalate	1,100	U	98	U	410	U	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Biphenyl (Diphenyl, 1,1'-Biphenyl)	87	J	70	U	410	U	510	U	24,000	U	22,000	U	22,000	U	24,000	U	20,000	U
Bis(2-ethylhexyl) Phthalate	1,100	U	30	J	410	U	510	U	4,700	U	4,300	U	660	J	4,700	U	3,900	U
Caprolactam	5,200	U	460	U	410	UJ	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Carbazole	720	J	62	J	410	U	110	J	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Chrysene	4,600		460		14	J	660		4,700	U	1,400	J	4,300	U	450	J	3,900	U
Dibenz(a,h)anthracene	480	J	52		41	U	130		4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Dibenzofuran	410	J	34	J	410	U	46	J	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Diethyl Phthalate	1,100	U	98	U	410	U	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Dimethyl Phthalate	1,100	U	98	U	410	U	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Di-n-Butyl Phthalate	920	J	98	U	410	U	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Fluoranthene	8,900		910		34	J	1,000		4,700	U	2,800	J	4,300	U	1,200	J	3,900	U
Fluorene	560	J	29		410	U	68	J	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Indeno(1,2,3-cd)pyrene	1,600	J	160		41	U	400		4,700	U	460	J	4,300	U	4,700	U	3,900	U
Isophorone	790	U	70	U	170	U	60	J	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Naphthalene	380	J	36		410	U	39	J	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
N-Nitrosodiphenylamine	790	U	70	U	410	U	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Phenanthrene	5,500		410		17	J	880		4,700	U	1,800	J	4,300	U	960	J	3,900	U
Phenol	790	U	70	U	410	U	510	U	4,700	U	4,300	U	4,300	U	4,700	U	3,900	U
Pyrene	8,000		850		34	J	820		4,700	U	2,100	J	4,300	U	900	J	3,900	U
Target Compound List (TCL) Pesticides																		
alpha-BHC (alpha Hexachlorocyclohexane)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
beta-BHC (beta Hexachlorocyclohexane)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
delta-BHC (delta Hexachlorocyclohexane)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Dieldrin	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Endrin Ketone	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Gamma BHC (Lindane)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Methoxychlor	NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDD (p,p'-DDD)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDE (p,p'-DDE)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDT (p,p'-DDT)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Target Compound List (TCL) Polychlorinated Biphenyls (PCBs)																		
Target Analyte List (TAL) Metals (Total)																		
Aluminum	6,670		8,600		18,300		18,000		17,200		13,500		18,000		15,300		16,700	
Antimony	289	J	5.1		1.2	U	2.2		1.5	U	1.4	U	1.1	U	2.4		10.8	
Arsenic	22.3		10.6		5.3		6.4		6.0		5.2		4.6		4.9		4.5	
Barium	376		90.3		63.0		91.1		166		104		61.4		84.3		83.6	
Beryllium	0.88		0.84		0.77		0.87		0.66		0.54	U	0.74		0.60		0.61	
Cadmium	2.0		0.57	U	0.62	U	0.65	U	0.77	U	0.68	J	0.57	U	1.8		0.60	U
Calcium	18,900		42,100		1,820		4,100		1,870		9,640		1,600		6,610		4,610	
Chromium	47.2		16.3		21.4		26.8		26.7		26.1		21.3		22.3		18.3	
Chromium (trivalent)[11]	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Hexavalent Chromium	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Cobalt	7.5	U	8.8		18.8		8.7		12.6		8.8		14.3		9.6		8.1	
Copper	292		49.3		18.8		16.1		16.7		20.1		18.9		21.7		68.0	
Iron	27,600		34,400		26,300		21,300		24,000		19,500		25,300		30,500		20,600	
Lead	19,400		1,030		13.7		80.4		14.3		62.2		19.7		166		643	
Magnesium	4,070		10,600		6,350		4,030		4,330		4,880		6,120		4,390		5,310	
Manganese	678		649		423		331		581		611		611		396		364	
Nickel	33.3		21.9		23.7		18.8		21.5		20.4		23.4		21.5		18.3	
Potassium	754	U	1,260		1,520		1,300		1,430		1,020		1,610		1,060		911	
Selenium	1.6		1.1	U	1.2	U	1.3	U	1.5	U	1.4	U	1.1	U	1.2	U	1.2	U
Silver	1.1		0.87	U	0.62	U	0.65	U	0.77	U	0.68	U	0.57	U	0.60	U	0.60	U
Sodium	754	U	575	U	624	U	652	U	774	U	677	U	572	U	601	U	597	U
Thallium	3.0	U	2.3	U	2.5	U	2.6	U	3.1	U	2.7	U	2.3	U	2.4	U	2.4	U
Tin	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Vanadium	21.2		28.4		31.1		30.8		31.9		27.3		33.3		29.8		29.1	
Zinc	616		733		67.8		91.5		66.1		89.4		68.1		160		274	
Mercury	3.2		0.33		0.045		0.49		0.062		0.26		0.042	U	0.28		0.17	
General Chemistry																		
Sulfate	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Toxicity Characteristic Leaching Procedure (TCLP) Metals																		
Lead	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Physical Parameters																		
Percent Solids	NA		NA		NA		NA		NA		NA		NA		NA		NA	

Attachment B – Health and Safety Plan/Community Air Monitoring Plan

Inventum Engineering
Site-Specific Health and Safety Plan (HASP)

(Required for all Type 2 and 3 projects.)

1. General Information

Client Name: Ganson Alternative Energy, LLC

Project #:

Project Name: Tulip Molded Plastics Corporation Site

Project Manager: John Black, PE

Street Address:

3125 Highland Avenue

Niagara Falls, New York 14305

Prepared By: Todd Waldrop Date: June 1, 2020

Approved By: John Black, P.E. Date: June 2, 2020

Proposed Date(s) of Work: Q3/Q4 2020

Proposed Scope of Work:

Inventum Engineering, P.C. (Inventum) will be the owner's representative, investigation team and engineer supporting the site investigation(s) for the Tulip Molded Plastics Corporation Site (Site No. 932169)The general scope of work is provided below, and tasks will be updated with additional details/specifications as the project progresses.

COVID-19 Work Practices

The following COVID-19 work practices are applicable to all Inventum under this HASP. These specific work practice requirements are applicable through August 2020 and possibly beyond dependent on local, state, and federal COVID-19 guidance. Specific site procedures are outlined below:

Consult the Centers for Disease Control (CDC) (https://www.cdc.gov/coronavirus/2019-nCoV/index.html) and the State of New York's COVID-19 guidelines (https://coronavirus.health.ny.gov/home). If employees have symptoms of respiratory illness from COVID-19 (fever, cough, elevated temperature, shortness of breath), they must stay home and not report to the Site. Personnel must promptly notify their manager if they become sick and stay home due to COVID-19 symptoms or testing positive for COVID-19 to help reduce the exposure to other Site personnel.

Additional Site Procedures:

Inventum onsite personnel will implement these procedures and will be reviewed at each onsite Tailgate meeting:

1. **Social Distancing**
    a. Avoid handshakes.
    b. Maintain a 6-feet work distance from all site visitors and onsite personnel.
    c. Limit onsite meetings and replace with phone/online meetings when practicable.

d. Limit any necessary onsite field meetings to no more than 10 people and practice social distancing of 6-feet during the meeting.
e. One person should complete any necessary sign-in logs or develop an electronic sign-in method via email to avoid direct contact.
f. Avoid sharing of pens, paper, or electronic devices (i.e. electronic tablets or laptops).
g. Configure onsite field offices to create over 6-feet of separation between workspaces.

2. Sanitation and Cleanliness

a. Wash hands frequently and thoroughly with soap and water for at least 20 seconds. When available, use hand sanitizer when hand washing facilities aren't available.
b. Refrain from touching the face. Wash hands often, especially before eating, smoking, or drinking, and after blowing your nose, coughing, or sneezing.
c. Site shall have hand washing locations readily available for all personnel.
d. Disinfect frequently commonly touched surfaces such as doorknobs, keyboards, desks, and eating surfaces within the field office multiple times a day using a household disinfectant cleaner. Site personnel should use disposable gloves when performing this cleaning.
e. Reusable field personnel protective equipment (PPE) such as hardhats, safety glasses, and hi-visibility vest should be wiped clean with an appropriate disinfectant cleaner at the end of each use.
f. Any household type trash generated in the office should be emptied and the end of each workday.

3. Cleaning for Receiving and Returning Supplies and Equipment

All onsite personnel should follow these guidelines when receiving supplies or field sampling equipment to the Site.

a. Site personnel should don disposable gloves and wipe clean any received supplies including the exterior of supplies and field equipment with an appropriate household disinfectant cleaner or soap and water.
b. Site personnel should don disposable gloves when packing field supplies and equipment for return. The exterior of all packaging shall be wiped clean with an appropriate household disinfectant cleaner or soap and water.

4. Cleaning for Receiving and Packing Environmental Samples

All onsite personnel should follow these guidelines when receiving laboratory bottle ware and packaging collected samples for shipment or courier service to the laboratory.

a. Site personnel should don disposable gloves and wipe clean the exterior of the sample coolers with an appropriate disinfectant cleaner or an Alconox detergent prior to opening.
b. **Sample bottles should not be cleaned with any disinfectants**. Site Personnel should don disposable gloves at all time when handling bottle ware.
c. Appropriate and routine sample collection procedures should be followed when collecting environmental samples.
d. Collected samples shall be labeled in accordance with standard practice and then bagged in appropriately sized Ziploc containers. The exterior of the bag shall be wiped clean with an Alconox detergent.
e. Collected samples shall be placed in the cooler on ice in accordance with standard practice. The exterior of the ice bag(s) shall be wiped clean with Alconox detergent.
f. The exterior of the cooler shall be wiped clean with an appropriate disinfectant cleaner or soap and water after packaging.
g. If applicable, Site personnel shall don disposable gloves when transferring custody of the cooler via a laboratory courier service.

Task 1 - Site Meetings and Oversight

Inventum will conduct periodic site visits and general contractor and subcontractor oversight related to the site investigation. This task includes site visits related to the site investigation, but specifically excludes Inventum personnel directly performing any intrusive site work or oversight of contractors/subcontractors performing intrusive site work. Direct intrusive site work and/or intrusive site work oversight is covered under Tasks 2 through 7 below.

Task 2 –Soil Sampling

Soils samples will be collected from various locations of the Site to establish current conditions. Depending on the depth of sample, subsurface samples may be collected using a hand-auger, shovel, trowel, light or heavy excavating equipment, direct-push equipment, or rotary drilling equipment. Material will be recovered for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. . Samples may be collected for various constituents including Metals, SVOCs, VOCs, PCBs, cyanide, mercury 1,4-Dioxane, and PFAS; however, the primary contaminant-of-concern (COC) at the site is lead.

Task 3 – Test Pit Excavations

Test pits will may be conducted as part of the Site investigation work. Test pits will be excavated using an excavator to a maximum anticipated depth of 10-feet below ground surface (bgs). Excavated soils will be temporarily stockpiled a minimum of 2-feet away from the edge of the pit. Excavated soils will be recovered and presented to Inventum for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including Metals, SVOCs, VOCs, PCBs, cyanide, mercury 1,4-Dioxane, and PFAS.

Task 4 – Groundwater Monitoring and Sampling

Inspections will be conducted prior to sampling and will include visual observations of the well head, seal, and cover. Measurements of the depth to liquid (if LNAPL is present), depth to water, and the overall total depth of the well will be collected using an oil/water interface probe and recorded in the field notebook for comparison to construction dimensions and previous records.

Monitoring wells will be sampled using a bailer or peristaltic pump. Field parameters (temperature, pH, conductivity, ORP, turbidity) will be measured and logged in the field notebook at periodic intervals using a hand-held water quality monitor. All purge water will be containerized and stored in appropriately labeled drums or totes and either disposed of in accordance with applicable local, state, and federal regulations.

Samples may be collected for various constituents including Metals, SVOCs, VOCs, PCBs, 1,4-Dioxane, and PFAS; however, the primary COC is lead.

Inventum Engineering
Site-Specific Health and Safety Plan (HASP)

(Required for all Type 2 and 3 projects.)

Inventum Role(s) On Site:

☐ Inventum Staff Will Not Be On Site (HASP and Risk Analysis is for subcontractor information only)

☒ Resident Project Representative (*e.g.,* "Observe and Document")

☐ Construction Manager (*e.g.,* CM, Managing/General Contractor)

☒ Representative for Client (*e.g.,* "Agent for Owner")

☒ General On-site Consulting/Engineering Services

☒ Other

☒ Soil Sampling	☒ Solid Waste Sampling	☐ Liquid Waste Sampling
☒ Groundwater Sampling	☐ Surface Water Sampling	☐ Wastewater Sampling
☐ Sediment Sampling	☐ Surveying	☐ Confined Space Entry

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Major Project Tasks	Inventum Task	Subcontractor Task	Minimum PPE Level Required see HASP for details (suggested levels for Subcontractor work)
1. Site Meetings and Oversight	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A
2. Soil Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
3. Test Pit Excavations	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
4. Groundwater Monitoring and Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
5. Groundwater monitoring and Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A

2. Contingency Planning

LOCAL EMERGENCY RESOURCES:	
Ambulance: 911	Emergency Room: 716.278.4395
Police: 911	Fire Department: 911
NYSDEC Contact: Glenn May, Project Manager, 716.851.7220	Poison Control Center: 1-800-222-1222 ☐ Specify:
Other (client services offered, etc.):	

SITE RESOURCES:			
Drinking Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Wash Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Telephone – Land Line		☐ Subcontractor	☒ Client
Telephone - Cellular	☒ Inventum	☒ Subcontractor	
First Aid Kit	☒ Inventum	☒ Subcontractor	
Fire Extinguisher	☐ Inventum	☒ Subcontractor	☒ Client
Emergency Shower N/A	☐ Inventum	☐ Subcontractor	☐ Client
Eye Wash N/A	☐ Inventum	☐ Subcontractor	☐ Client
Other: Confined space retrieval device N/A	☐ Inventum	☐ Subcontractor	☐ Client

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

EMERGENCY/SAFETY CONTACTS:	
Inventum Technical Contacts	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Project Manager (PM): Todd Waldrop	571.217.3627
Inventum Office Safety Coordinator (OSC)	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Field Contact:	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048); Keith Adderley (716.335.2045)
Contractor Contact (To Vary – Main Remedial Contractor provided):	Ontario Specialty Contracting; 716.856.3333
Client Contact:	Jon Williams: 716.856.3333; John Yensan (716.856.3333)

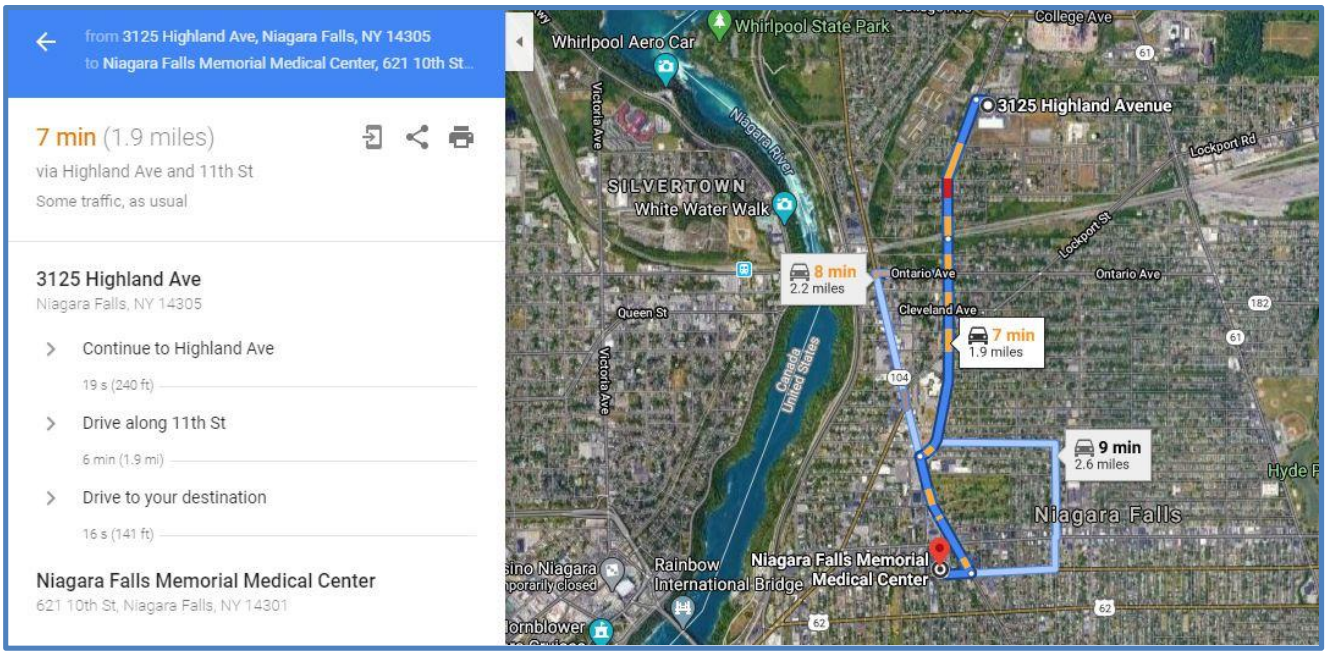
Emergency Route:

Hospitals or clinics identified for emergency medical care should be contacted, to verify that emergency care is provided at that location. Verify the exact location of the medical facility during this call. See directions and map of route to Kenmore Mercy Hospital on the following page:

Hospital: **Niagara Falls Memorial Medical center**
621 Tenth Street
Niagara Falls, NY 14302
716.278.4000

Other: NA

Map to Hospital



Directions to Hospital:

- **Turn left onto Highland Avenue**
- **Continue onto 11th St.**
- **Use any lane to turn left onto Portage Road**
- **Turn right onto Walnut Ave.**
- **Turn right at Memorial Pkwy**
- **Hospital will be on the left**

Emergency Procedures:

If an emergency develops at the site, the first responder should take the following course of action:

- Notify the proper emergency services for assistance.
- Notify other personnel at the site.
- As soon as possible, contact the Inventum Project Manager to inform them of the incident.
- Complete the Inventum Incident Report Form (see Appendices) within 24 hours of the incident and client notifications, as required.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Investigation of Near Miss Incident and Initial Report of Incident/Exposure:

Inventum employees are required to report any incident, near miss, or injury, as soon as possible, by contacting the following:

☒ Inventum Managing Partner ☒ Notify supervisor ☒ Notify project manager

☐ Notify Site Manager () ☐ Complete client report: as required

(name):

(phone number):

Emergency Equipment Required On Site:

☒ First Aid Kit

☐ Emergency Eye Wash

☐ Emergency Shower

☐ Fire Extinguisher

☐ Spill Control Media

☐ Tripod/Hoist/Harness for non-entry confined space rescue

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Site Classification

	Identification of Potential Hazards	YES	NO	SITE TYPE(1)
1.	Is the work a Phase I ESA (i.e., supervised plant walk-through, etc.)?	☐	☒	1
2.	Is the work being performed solely by a subcontractor (i.e., INVENTUM not on site)?	☐	☒	1
3.	Is the work just a supervised inspection for process evaluation, other inspections, meetings, records review, or a tour?	☐	☒	1
4.[1]	Is the work completely absent any chemical, physical, biological, or radiological hazards which would require a site-specific health and safety plan?	☐	☒	1
5.	Does the work include any mandatory client H&S requirements?	☒	☐	1, 2, or 3
6.	Does the project include on-site work other than office type areas?	☒	☐	2 or 3
7.	Does the proposed work scope involve any of the following:			
	Known and controlled chemical or biological hazards	☒	☐	2
	Unprotected work at elevation (fall protection required)	☐	☒	2
	Invasive activities (*i.e.,* Phase II ESA, UST Removal, sampling, etc.)	☒	☐	2 or 3
	Exposure to ionizing radiation (i.e., using nuclear gauges, etc.)	☐	☒	2 or 3
	Open excavations/trenches (Competent Person may be required on site)	☒	☐	2 or 3
	Confined space entry (permit may be required)	☐	☒	2 or 3
	The use of scaffolding (qualified inspections are required)	☐	☒	2 or 3
	Heavy equipment	☒	☐	2 or 3
	Facility maintenance (O&M, piping, electrical, lockout/tagout, etc.)	☐	☒	2 or 3
	Underground utilities may be encountered	☒	☐	2 or 3
	Overhead utilities may be encountered	☒	☐	2 or 3
	Stack testing	☐	☒	2 or 3
	Geotechnical drilling	☒	☐	2 or 3
	Demolition Activities with known or suspected contamination	☒	☐	2 or 3
	Unknown or uncontrolled chemical or biological hazards	☐	☒	3
	Known and uncontrolled chemical or biological hazards	☒	☐	3
	Waste sampling	☒	☐	3
	Construction activities with known or suspected contamination	☒	☐	3
	Remedial activities (RCRA, CERCLA, EnviroBlend®, Oxigent, etc.)	☒	☐	3
8.	Is the work regulated by 29 CFR 1910.120 (OSHA) or 30 CFR (MSHA)?	☒	☐	3
9.	Is the work regulated by NPL, CERCLA, RCRA, TSD, or SARA?	☒	☐	3

(1) Denotes typical site level (based on activities).

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Site Type Designation:

☐ Type 1 Known and controlled hazards associated with consulting/engineering services.

☐ Type 2 Known and controlled hazards, but with invasive, hazardous activities and/or civil/mechanical construction related services, or sampling.

☒ Type 3 Unknown and/or uncontrolled hazards associated with corrective action clean-up, and/or remediation of hazardous substances.

4. Site Characterization

Client Requirement(s)[1]:	☒ None	☐ Site Orientation	☐ H&S Orientation
	☐ Permits or Other Requirements (specify and attach, if available):		
Site Information:	☒ Map/Diagram (attach)	☐ Map/Diagram Unavailable	
	☐ Inactive Site	☒ Active Site (specify below)	
General Environmental Concerns:	☒ Contaminated Water	☐ Wastewater	☒ Dust
	☒ Contaminated Soil	☒ Solid Waste	☐ Noise
	☐ Contaminated Air	☐ Waterways	☐ Asbestos
Site Security/Access Control:	☐ None	☒ On Site	
	☐ Other (explain):		
Amenities Available for Work:	☐ None	☒ Waste Storage	☒ Restrooms
	☒ Tools/Equipment Storage	☒ Office/Trailer Space	☒ Supplies Storage
Utilities Available For Work:	☐ None	☒ As Listed: Water, electric	
Medical Services Available:	☐ None On Site	☒ As Listed: First aid	
Facility Alarms/Signals:	☒ None	☐ As Listed:	
Traffic/Parking/Railway Issues:	☐ None	☒ As Listed (On-Site/Off-Site): On-site parking	
☒ Permits Required (specify)[2]:	☐ Confined Space Entry	☐ Local: POTW	☐ State:
	☐ Federal:	☐ Other:	☒ N/A
☒ Utility Locate Service(s):	☒ On Site	☐ Client	☐ Other:
	☐ Off Site	☐	☒ One Call
		☐	☐ N/A

[1] If relying on the client for any specific hazard identification and control, implemented control and effectiveness should be documented prior to beginning any work activities. This is recommended for all field projects.

[2] Permit examples: Utilities (electrical, water, gas, etc.); Excavations; Explosives; Cranes; Burning; Fuel storage; Traffic control; Hoists; Cutting; Welding; Demolition; Confined space; Restricted access areas; etc.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Detailed Physical Description of Site/Facility: ☒ Map/Diagram Attached

GAE is the Site owner and leases the Site to the Tulip Corporation (Tulip). Tulip produces molded plastic products for the automotive industry and injection molded recycling containers and other specialized plastic containers. The Site is located in a commercial, industrial, and residential area and bounded to the south by the former Power City Warehouse (a.k.a. Tract I Site (Brownfield Cleanup Program [BCP] Site No. 932157), to the east by a narrow strip of land owned by National Grid[1] and beyond by the Tract II Site (BCP Site No. 932136), to the west by Highland Avenue, and to the north by Braun Horticulture.

Historically, elevated concentration of metals (primarily lead) have been detected in soil and groundwater at the Site. Some VOCs have also been detected in groundwater at concentrations above applicable standards, criteria, and guidance values.

The Site is bordered to the south by the Tract I site (Brownfield Cleanup Program [BCP] Site No. 932157) and to the east by the Tract II Site (BCP site No. 932136). These sites have been remediated in accordance with a NYSDEC-approved remedial program. Concentrations of lead remain (Max, 7,050 milligrams per kilogram [mg/kg]) in soil at these sites above Part 375 Soil Cleanup Objectives (SCOs) at the Tulip site property boundary.

[1] This is a utility right of way and is also known as the 15th Street ROW in the Tract II (BCP Site No. 932136) documentation.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Figure 1; Site Location

Site Activities/Current Operations: ☐ None ☒ As Specified: Mfg operations

Other Concurrent Site Activities, Work, and/or Other Adjacent Hazards or Concerns:

☐ None

As Specified:

☐ Schools	☐ Daycare	☐ Hospital	☐ Airport
☐ Residential	☒ Offices	☐ Shopping	☒ Active parking lot in work space

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Hazard Evaluation

Complete (1) Substance Name (be specific)	Specific Applicable OSHA Standard (if any)	Physical State (2) (S, L, G, Aq, Vap, F, P)	Max. (3) Conc. Level Per Physical State	General (4) Control Measures (Eng., Admin., PPE)
Lead	0.050 mg/m3	S	7,050 mg/kg	Eng., PPE
cis-1,2-Dichloroethene		L	19 µg/L	Eng., PPE
Trichloroethene		L	120 µg/L	Eng., PPE
Vinyl Chloride		L	2.4 µg/L	Eng., PPE

(1) Use OSHA regulated name, not elemental forms. If available, attach SDS. Identify any sample preservative or O&M chemicals or subcontractor chemicals in this table also.

(2) S = Solids, L = Liquid, G = Gas, Aq = Aqueous, Vap = Vapor, F = Fume, P = Airborne Particulate.

(3) If available, attach laboratory results or summary tables.

(4) See the following sections for detailed control measures: personal protection equipment (PPE), Air Monitoring (Admin), or Site Control (Admin and Eng.).

(6) IP = Ionization Potential, VP = Vapor Pressure, LEL = Lower Explosive Limit, UEL = Upper Explosive Limit, N/A = Not Applicable, N.D. = Not Determined

(7) IDLH = Immediately Dangerous to Life and Health. NEVER enter IDLH conditions on site without proper respiratory protection.

(8) C = Ceiling Value, ST = Short-Term Exposure Limit, TWA = Time-Weighted Average, None Est. = None Established

(9) R = Respirable Limit, T = Total Limit

(10) Warning Properties: Good (G), Poor (P), None (N)

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Hazard Evaluation (continued)

Site-Specific Physical Hazards

HAZARD	SPECIFIC CONTROL MEASURE
Slip/Trip/Fall Injury	— Use roads or trails whenever possible. — Occasionally reassess route to avoid dangerous terrain. — Maintain good housekeeping and keep work area clear of loose materials and equipment. — Use portable steps to mount and dismount sampling vehicle.
Ingestion of or contact with impacted soil	— Wear safety glasses. — Wear nitrile and appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when performing tasks. — Wash hands and arms thoroughly when daily work is completed. — No eating, drinking, or smoking while conducting monitoring or sampling activities.
Pinched fingers or toes	— Where appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when the potential for hand injury exists. — Where steel-toed safety shoes with steel shanks while on site.
COVID-19 exposure	— Follow the additional site procedures listed which include Social Distancing, increased Sanitation and Cleanness, and increased Cleaning for Receiving Supplies and Equipment
Strained muscles	— Use proper lifting posture, techniques, and equipment when handling heavy objects. — Use two people for loads >40 lbs. or awkward items. — Take rests as needed during and between carries.
Cutting activities	
Flying debris/eye injuries	— Wear ANSI-approved safety glasses when the potential for flying debris and eye injuries exists.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Aboveground Storage Tanks (AST)	Be aware of any aboveground storage tanks and the type of material being stored in them. Be aware of the potential of spills, fires, explosions, etc., while working near the tanks. Stay clear of tanks whenever possible, and be aware of any equipment operators near the tank(s).
☒	Animals (dogs, etc.)	Be aware of any animals on site or adjacent to the site. Appropriate care should be taken if any feral (wild) animals are encountered.
☐	Blasting/Explosives	INVENTUM personnel shall not handle any explosive devices or materials. INVENTUM personnel should understand the blasting procedures being used by the subcontractor, and all of the associated health & safety precautions. The subcontractor shall handle, store, and use the explosives in accordance with 29 CFR 1926.900, Subpart H and U.
☐	Boat or Barge	A boat or barge should be used that is adequately stable for the type of activity conducted. The boat or barge should have all of the appropriate and current licensing and registrations required by the applicable regulatory agencies. All applicable laws and regulations will be followed when launching the boat or barge, and when navigating to and from the work site. Personal floatation devices should always be worn while navigating the boat or barge. The boat must be equipped with the following approved United States Coast Guard (USCG) safety equipment: — A Type 1, 2, or 3 personal flotation device (PFD) for every person aboard (should be worn while navigating) The following equipment is recommended: — A Type 4 throwable PFD — Audible distress signal device (air horn, whistle) — Fire extinguisher (if engine-propelled) — Auxiliary propulsion (spare paddles, trolling motor) — Bow and stern lines — Anchor and anchor line — First aid kit — Visual distress signal device(s) (flares, dyes) — Additional PFDs Be familiar with local weather and tidal characteristics. Do not conduct sampling from a boat/barge when threatening weather is imminent, or poor visibility exists. Sampling from a boat is prohibited in water containing substances likely to cause injury upon short-term or prolonged contact. Sampling from a boat is prohibited when the temperature of the water is high or low enough to cause injury upon short-term or prolonged exposure. Avoid sampling from a boat when unsafe water turbulence (waves) exists. Avoid standing in a boat. Always use the buddy system when sampling from a boat or barge; one person should be on shore with visual contact of the barge and should be able to summon emergency assistance if needed. Be familiar with local weather and tidal characteristics. Work on a boat or barge will not be performed when threatening or severe weather is impending or present.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Briars or Thistles	Be aware of any briars or thistles on site. Wear appropriate clothing and gloves. Avoid contact with briars or thistles whenever possible.
☒	Business Traffic	Be aware of traffic patterns associated with local businesses near the work site. Allow traffic to enter and exit the businesses in such a manner to avoid creating traffic hazards, back-ups, delays, or potential accident situations.
☐	Cement Dust	Stay clear of mixing operations and avoid contact with or breathing of the dust.
☐	Chain Saws	Stay clear of any chain saw operations. Subcontractor is responsible for the safe use of chain saws on site.
☒	Cleaning Agents	Use caution when applying cleaning agent to equipment. Use gloves, safety glasses, splash shields, and protective clothing as needed.
☒	Client Activities	Be aware of client activities at or adjacent to the site. Work activities should be coordinated with other site activities to avoid conflicts. Contact Tulip and OSC offices prior to starting work.
☒	Cold Stress	Work schedules may be modified when temperatures are below 20° F as measured by the wind chill factor. Take frequent breaks to warm up. Drink plenty of fluids. Wear appropriate clothing, and monitor for cold stress symptoms (frostbite, hypothermia, etc.).
☒	Compressed Air or Gas Cylinders	Compressed air or gas cylinders should be clearly marked, and they should be stored, transported, and secured in an approved manner.
☒	Compressed Air/Gas or Pressurized Liquids Hoses, Lines & Fittings	Compressed air or gas, or pressurized liquid lines or hoses should be inspected at least daily, or in the event a leak develops, or if a line or hose is run over or crimped.
☐	Concrete/Masonry/ Foundations	No construction loads shall be placed on a concrete structure or portion of a concrete structure unless a person who is qualified in structural design has determined that the structure or portion of the structure is capable of supporting the loads. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement. No employee shall be permitted to work under concrete buckets while buckets are being elevated or lowered into position. To the extent practical, elevated concrete buckets shall be routed so that no employee, or the fewest number of employees, are exposed to the hazards associated with falling concrete buckets. A limited access zone shall be established whenever a masonry wall is being constructed. All masonry walls over eight feet in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place.
☐	Confined Spaces (tanks, vaults, vessels, trenches, manholes, some excavations, etc.)	The scope of this project does entail entry into confined spaces. Confined spaces will not be entered unless a confined space entry permit has been completed, signed, and approved, and all participating personnel are trained in confined space entry procedures, including safety, and rescue procedures. All potential hazards of confined space may not be addressed by this hazard assessment, and health and safety plan.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Cutting Tools	Stay clear of contractors' cutting tools, especially saws and torches. Be aware that cutting operations could create other hazards, such as falling objects, or shifting materials, etc. Safety glasses should be worn while using cutting tools. Spark-proof tools should be used when working in areas of potential explosive or flammable conditions. Fixed-open blade knives are prohibited.
☒	Demolition Activities	Stay clear of walls, ceilings, roofs, etc., as they are being demolished.
☒	Demolition Debris	Demolition material should only be handled by appropriate equipment because of sharp points, edges, etc. Demolition material may also pose a trip hazard, fall, or puncture hazard, so avoid walking or climbing on debris piles, etc.
☒	Drums	If drums are used on-site, they should be clearly labeled with the name of the contents and the appropriate label. Drums should only be handled with the appropriate equipment. Drums discovered during excavations, etc., shall not be opened or moved until appropriate identification can be performed. At a minimum, Level B protection is required for sampling any unlabeled drums discovered during remediation procedures.
☒	Dust/Particulates (Particulates Not Otherwise Regulated) (PNOR) (OSHA PEL = 15 mg./m^3, total) (OSHA PEL = 5 mg./m^3, respirable)	For general dust, work should be performed up-wind if possible. If conditions warrant it, monitoring should be done with a PM-10. Monitoring should occur at least 3 times per day, and every time re-entering the site. Readings should be taken downwind from the work area or inside the equipment as indicated by the conditions on site. If the OSHA PEL is exceeded, or is likely to be exceeded, engineering or administrative controls should be used, or a dust respirator must be worn. For hazardous dusts, a detailed air monitoring plan and a respiratory protection plan should be developed for the site activities.
☐	Elevated Work	For any construction work activities elevated 6 feet or more, or other non-construction activities elevated 4 feet or more, fall protection must be provided. Caution should be taken on catwalks and ladders because of potential slippery conditions, or the potential for footwear to catch on the surfaces.
☒	Energized Sources (electrical equipment or hookups, lines, etc.,) (Lockout/Tagout)	Contractors for all electrical activities, and any facility equipment with moving parts should follow proper lock-out/tag-out procedures, and only properly trained employees will perform the work. Employees will not perform any lock-out/tag-out activities unless personnel are properly trained in lockout/tagout procedures. Heed any caution signs or labels.
☒	Equipment Exhaust	Equipment exhaust should be ventilated away from the work area while drilling inside structures. Industrial fans can be used to move exhaust out of the area.
☒	Ergonomic Issues (job hazard analysis)	Ergonomic hazards will be addressed on a site-specific basis once mobilization to the field has occurred. Workstations will be evaluated on an individual basis.
☒	Evening Work	If work is performed during the evening hours, work shall be limited by the availability and the quality of artificial lighting. Care should also be taken to avoid slip, trip, and fall hazards that are not as easy to identify during low light conditions.
☒	Excavations	Stay clear of excavation walls. INVENTUM personnel will not enter an excavation, in accordance with 1926 Sub Part P. Subcontractor must provide a Competent Person on site, if one is required by the planned activities. Side cuts should conform to 1926 Subpart P requirements, or shoring should be used. All open excavations should be secured using traffic cones, barrier tape, or barricade signs stating "Do Not Enter Excavations", especially if left open overnight.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Explosives	Be aware of potential explosive materials and how to identify them. No smoking is allowed on-site or near where potential explosive materials may be present.
☒	Facility Conveyors (product or waste lines)	Stay clear of facility conveyors, product process lines, and waste disposal lines. Be aware of any client-specific health and safety requirements to work in these areas.
☒	Facility Equipment/Machinery	Be aware of active and moving client equipment on site.
☒	Facility Piping - aboveground	Stay clear of aboveground pipes. Client is responsible to identify all applicable aboveground facility pipes prior to any work activities in the area. Pipes can be overhead hazards, or trip hazards. Pipes can be hazardous because of the material flowing through them, such as steam, natural gas, toxic chemicals, etc. Some pipes are also coated with hazardous material such as asbestos.
☒	Facility Piping - belowground	Client is responsible to identify all applicable underground facility pipe locations prior to any subsurface activities.
☒	Fall Hazard	Proper tie-off, harnesses, railings, etc. should be used when performing work on ladders, scaffolding, man-lifts, or on the roof of buildings, etc. Stay clear of the edges of pits, trenches, quarries, etc.
☒	Falling Objects	Be aware of any potential falling objects or materials on site. Stay clear of any areas identified as potential falling object areas.
☒	Fences	Be aware of fences in disrepair that may be trip hazards or may have materials that could cause punctures or cuts. Use caution when crossing over or under fences.
☒	Field Equipment	If field equipment is heavy or awkward to carry, get assistance or use carts to help move around the site.
☒	Field Vehicle	Inventum personnel shall follow all applicable state and federal traffic laws while traveling to and from the site, and while working on the site. In particular, the following laws should be followed: speed limits, parking restrictions, use of wipers and lights during precipitation events, limiting cell phone use, etc. It is the responsibility of the driver to verify that all safety equipment on the vehicle is working properly before driving the vehicle. In particular, the following items should be checked: tire pressure, tire tread, windshield wipers, windshield washer, headlights, tail lights, brake lights, spare tire, fire extinguisher, first aid kit, etc.
☒	Fire Hazards	Eliminate sources of ignition in work areas that have ignitable materials. Provide an ABC fire extinguisher in close proximity to the support zone.
☒	Flooded Areas	Do not drive through flooded areas or standing water. Do not wade into moving water, or water deeper than 2 feet without adequate assistance.
☒	Flying Debris/ Eye Injuries	Be aware of any flying debris on site and wear protective eyewear when necessary.
☒	Fork Lifts	Be aware of forklift patterns and stay clear of those routes.
☒	Hand Tools	Use only the appropriate tool for the task at hand. Use the tool(s) as designed, described, and intended by the manufacturer.
☒	Heat Stress	The work schedule may be modified if the ambient temperature is more than 80° F. Take breaks as necessary, and drink plenty of fluids. If necessary, wear sunscreen and sunglasses on bright days. Monitor site personnel for signs of heat stress symptoms (heat rash, heat cramps, heat exhaustion, or heat stroke).

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Heavy Equipment	Contractor is responsible for safe operation of equipment. All mobile heavy equipment must have a functioning backup alarm, and operators must comply with equipment manufacturer's instructions. Maintain proper distance and remain in line of sight of operator and out of reach of equipment. Isolate equipment swings, if possible. Make eye contact with the equipment operator before approaching the equipment. Understand and review hand signals, and wear orange safety vest, if necessary.
☒	Heavy Lifting	Use proper lifting procedures and equipment when handling heavy objects such as drums, manhole covers, tank covers, etc.
☒	High Pressure Gas Lines, etc.	Be aware of high-pressure gas lines and follow approved safety precautions when working with or around the lines.
☐	Highway Traffic	Traffic control within the right-of-way will be in accordance with the WDOT "Work Zone Safety – Guidelines for Construction, Maintenance, and Utility Operations" procedures. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times, and review planned activities with the WDOT, so that appropriate lane closures can be coordinated.
☒	Housekeeping	All field vehicles, job trailers, and field offices will be properly cleaned and organized to prevent cluttered work and storage areas.
☐	Hunters/Firing Range, etc.	Be aware of surrounding activities that may involve hunting, firearms, etc. that may not be in your immediate area, but could create an unsafe work environment.
☒	Ice (thin)	When project activities include either crossing ice or working directly on the ice, a detailed plan should be developed that will be used to continually evaluate the ice conditions, and to determine when work should be terminated due to unsafe conditions. All staff working on the ice will wear an appropriate and approved personal floatation device. Other emergency equipment such as ropes, a throwable floatation device, a means to warm a wet and cold worker, etc. must be available. A buddy system should also be used for this type of work, such that one person is always on shore or at least on previously determined safe ice.
☒	Insects (ticks, bees, spiders, etc.)	Site workers with known allergies to insect bites should carry their own medication. In case of emergencies, inform fellow workers of any severe allergies. Use insect repellant as necessary, and as specifically allowed on site. If possible, wear long-sleeved shirts and pants. If appropriate, check for ticks at the end of each day. Have other appropriate first aid supplies handy for bites.
☒	Stakeholders	Be aware of the potential for irate neighbors or outsiders that may interfere with work activities, or that may potentially damage equipment or on-site materials, etc.
☐	Ladders	Ladders should only be used if they are in good condition, conform to OSHA requirements, and if they will be used in an appropriate manner. Be especially cautious of slipping on ladders when the ladder or footwear is wet or dirty.
☐	Landfill Gas (Methane, CO2, Hydrogen Sulfide)	Avoid breathing gas, especially in low oxygen areas (simple asphyxiant). Potentially flammable and explosive, so keep ignition sources away from gas. Explosive conditions of LEL >5% in a work area should be ventilated as soon as possible, or the area should be evacuated.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Leachate (Municipal Solid Waste (MSW))	MSW leachate may contain hazardous biological substances, so avoid physical contact with leachate and, if possible, stay up-wind. If contact is made with leachate, wash affected areas thoroughly with soap and water. If boots contact leachate, they should be thoroughly washed with soap and water also.
☒	Lead	Wear gloves when in contact with lead contaminated soil, etc. Thoroughly wash hands and arms when daily work is completed.
☒	Long Hours/Fatigue	Long work hours can lead to fatigue, and fatigue can lead to the physical inability to perform the work in a safe manner, or travel to or from, a work site in a safe manner. If long work hours are scheduled, or if the scheduled work takes longer than planned, field staff should determine if fatigue is, or will be, an issue. Field staff should evaluate whether they are able to complete the work in a safe manner, or whether they are able to travel in a safe manner. If fatigue is an issue, appropriate breaks should be planned or taken, including overnight stays when necessary.
☒	Material Handling	Move containers and heavy material only with the proper equipment, and secure them to prevent dropping, falling, or loss of control during transport. Stay clear of material handling operations, especially near slopes. Do not stand down the slope from equipment, supplies or materials being moved above on the slope, or being deployed onto the slope.
☒	Material Storage	Stored material may be a falling hazard, or a crush hazard. Do not stand adjacent to materials stacked up, such as pipes, geosynthetic rolls, etc., or in the area of deployment.
☐	Methane Gas (Landfill Gas)	Explosive conditions (5% LEL) will be ventilated, if encountered, prior to working in an area. Methane is a simple asphyxiant.
☐	Mine or Quarry	No work shall be performed within 15 feet (or other designated client setback, whichever is greatest) of the mine or quarry walls. Be aware of the potential for falling rocks or slope failures.
☒	Municipal Solid Waste (MSW)	MSW may contain hazardous biological substances, so avoid physical contact, and if possible, stay up-wind. Wear appropriate PPE, such as gloves, safety shoes, and safety glasses. Wash hands, arms, and face after working near MSW. Reusable PPE and equipment should be thoroughly decontaminated after exposure to MSW. MSW may also contain sharp objects with the potential to puncture PPE.
☒	Natural Gas	Natural gas is flammable and explosive. Keep ignition sources away from gas sources. Use spark-proof tools when working with gas lines, etc.
☒	Noise	Hearing protection must be worn when noise levels exceed 85 dBA in the work area. If you need to raise your voice to be heard at the work site, then hearing protection should be worn. Hearing protection will be worn near drill rigs.
☒	Overhead Hazards	Pay attention to overhead equipment, piping, and structures. A hard hat must be worn at all times when overhead hazards are present on site including the operation of a drill rig.
☒	Pedestrian Traffic (public, client, workers)	Be aware of pedestrian traffic patterns and, route traffic around the exclusion zone(s), as necessary, to avoid distractions and the potential for exposures or accidents. Use appropriate barricades and caution tape to mark work areas.
☒	Poisonous Plants	Be able to identify any local poisonous plants and avoid them if possible or wear protective clothing as necessary. When removing potentially exposed clothing or PPE, the clothing or PPE should be carefully and thoroughly washed or decontaminated.
☒	Portable Heaters	Be aware of portable heater locations and stay a safe distance from them.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Power Washing Equipment	Stay clear of the power washing nozzles and equipment.
☒	Propane Tanks	Be aware of propane tank locations, and any gas lines leading to or from the tanks.
☐	Radiation (ionizing)	Exposure to ionizing radiation can be controlled by one of three methods: time, distance, or shielding. Limit your time near the radioactive source. Keep your distance from the radioactive source. Shield yourself from the radioactive source with appropriate shielding material. If the radioactive source(s) are from INVENTUM equipment, the INVENTUM employee using the equipment needs required training to use the equipment and must be monitored using a dosimeter badge.
☐	Rock Blasting	Contractor is responsible for following safe blasting protocol. Heed all contractor warnings at time of blasting and stay well clear until safe to return to area, as indicated by the contractor.
☒	Sample Preservative Chemicals:	Wear safety glasses and nitrile gloves when adding preservative chemicals to sample bottles or vials. Have clean wash water nearby.
☐	Scaffolding	Stay clear of scaffolding. Be aware of the OSHA safety requirements for using constructing and scaffolding.
☒	Severe Weather	Work may be suspended if dangerous weather conditions (lightning, tornadoes, high winds, heavy rain, freezing rain, etc.) occur. Be aware of changing weather conditions and be prepared to take shelter as necessary. Potential shelters should be identified prior to beginning work.
☒	Sharp Objects	Wear appropriate gloves when handling sharp objects or use appropriate equipment to move objects.
☒	Slippery Ground/Surfaces	Exercise caution, especially on slopes, field trailer floors and stairs, after a precipitation event. Use slip resistant boots or implement surface preparations to eliminate the slippery nature of the surface prior to accessing the area. Spill control measures and general housekeeping should be utilized to help prevent slipping on wet floors, wet pavement, and general work areas.
☒	Slips, Trips, and Falls:	Maintain clear walkways for work areas.
☒	Snakes	Be aware of the potential for snakes in the area and wear snake boots, snake chaps, gaiters, or leggings as needed.
☒	Steam Cleaning Equipment	Stay clear of the steam cleaning nozzles and equipment.
☐	Steel Erection	All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement. The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided. Employees engaged in steel erection activities on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.
☐	Steep Slopes or Banks	Pay attention to footing and walking. Stay a safe distance from unstable or extremely steep slopes. Wear appropriate footwear. Be aware of potential slope or bank failures. Heavy equipment should not be operated on or near unstable slopes or banks.
☒	Strong Nuisance Odors	Strong odors should be ventilated before entering a work area, or a respirator shall be worn as needed.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Sunburn	For extended periods of time outdoors on sunny days, sunglasses, long-sleeved shirts and long pants should be worn to help prevent sunburn and eye problems. Wear sunscreen as appropriate for the project.
☒	Surface Water	Working next to or on, bodies of water shall be done using the buddy system. Staff shall wear USCG-approved personal floatation devices when on or adjacent to bodies of water.
☒	Terrain	Uneven or steep terrain can cause hazardous conditions for walking and transporting equipment around the site. Site personnel should use caution when working on uneven surfaces, and they should avoid working down-slope from heavy equipment, or materials being moved or stored.
☒	Traffic (client, contractors, public, semi-trucks, forklifts, etc.)	Obey all posted speed limits. Park in designated areas only. Be aware of traffic patterns on site, and during access to the site. Use orange traffic cones and barrier warning tape, as needed, or if within 25 feet of the right-of-way. INVENTUM personnel must wear orange safety vests when working in or near traffic areas. Class 2 traffic vests are required with traffic speeds 25 mph or higher. Class 3 traffic vests are required with traffic speeds 50 mph or higher.
☐	Trains/Railroad Tracks	Be aware of any train activities on the site, entering or leaving the site, or immediately adjacent to the site. Do not walk between the rails or on the railroad ties. When driving, stop at all railroad crossings, even if they are unmarked, and look in both directions before proceeding across the tracks.
☒	Transporting Hazardous Materials	INVENTUM personnel who transport hazardous materials shall have the required DOT training prior to transporting materials, and will comply with all applicable DOT regulations and requirements for labeling, packaging, etc.
☐	Tree Cutting	Stay clear of tree cutting activities.
☒	Trenching	INVENTUM personnel will enter trenches in accordance with 1926 Sub Part P. Be aware that some trenching conditions may result in a confined space condition.
☒	Trip Hazards (wires, cords, hoses, debris, corn stubble, uneven surfaces, etc.)	Temporary wires, cords, hoses, etc., should be properly located, marked, and protected to help prevent tripping and disruption to work activities. Trip hazards are particularly a problem early in the morning, late in the day, or under other poor lighting conditions.
☒	Underground Storage Tanks (USTs) (Septic Tanks)	If any unknown USTs are encountered, drilling or excavations will be terminated in that location until a new scope of work, Risk Assessment and Health & Safety Plan can be developed.
☒	Uneven Surfaces	Be aware of uneven walking or driving surfaces and exercise caution when moving around the site.
☒	Utilities – Overhead (electrical, telephone, cable TV, etc.)	A subcontractor, the client, or INVENTUM will locate and identify all overhead utilities. The owner or client will be responsible for identifying all applicable overhead utilities, product lines, pipes, and aboveground tanks. A minimum clearance of 20 feet must be maintained between equipment and overhead utility lines.
☒	Utilities – Underground (electric, gas, telephone, water, storm sewer, sanitary sewer, cable TV, etc.)	A subcontractor, the client, or INVENTUM will call Digger's Hotline to locate all underground utilities. The owner or client will be responsible for marking all applicable on-site underground utilities, product lines, pipes, and tanks.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Waterways	Exercise caution near, around, or in waterways. Harnesses should be worn when working in, or within 4 feet of, the waterway, especially when attempting to sample from shore or a boat or barge. All applicable laws and regulations will be followed when navigating a boat or barge to and from a work site.
☒	Welding Tools	Stay clear of welding operations, and do not look directly at the welding process without appropriate eyewear and shield.
☐	Traffic Control	Traffic Control: Traffic control within the right-of-way will be in accordance with the local Public Right-of-Way Agency. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times and review planned activities with the local Public Right-of-Way Agency, so that appropriate lane closures can be coordinated.

Proposed Date(s) of Inventum Work: June 2020 through October 202

ON-SITE PROJECT TEAM MEMBER	ON-SITE PROJECT RESPONSIBILITIES
John Black	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
Todd Waldrop	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
James Edwards	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight

Any required construction/demolition activities: ☒ No ☐ Yes If Yes, complete Section 1

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

1. Construction Tasks: work tasks to be performed by Inventum staff or Inventum subcontractors

Civil

- ☐ Sewer (utility)
- ☐ Water (utility)
- ☐ Electric (utility)
- ☐ Communications (utility)
- ☐ Siding
- ☐ Roofing
- ☐ Drywall
- ☐ Flooring
- ☐ Ceilings
- ☐ Casework
- ☐ Masonry
- ☐ Escalator

- ☐ Steel (erection)
- ☐ Pre-cast (erection)
- ☐ Concrete (erection)
- ☐ Re-bar
- ☐ Elevator
- ☐ Fireproofing
- ☐ Windows
- ☐ Landscaping
- ☐ Painting
- ☐ Insulation
- ☐ Doors
- ☐ Finish Concrete

- ☐ Others
- ☐ Others
- ☐ Others

Mechanical

- ☐ Insulation
- ☐ Millwright
- ☐ Fire Protection
- ☐ Boiler
- ☐ Industrial Ventilation
- ☐ Steel Fabrication/Erection

Other

- ☐ Electrical
- ☐ Demolition (attach a detailed "Demolition Plan")

Estimated Direct-Hire Inventum Employees:

Home Office: ☐ Not Applicable ☐ Specify:

Craft Labor: ☐ Not Applicable ☐ Specify:

Craft	Quantity
Craft	Quantity

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

2. Applicable Safety Standards or Regulations:

☒ Federal OSHA ☐ State OSHA ☐ Owner/Client

Specific Standards:	29 CFR 1910 (OSHA)	29 CFR 1926 (Other Regulations)
☒ Medical Services and First Aid	1910.151	1926.50
☒ Hazard Communication (HAZCOM)	1910.1200	1926.59
☐ Lead Exposure	1910.1025	1926.62
☒ HAZWOPER	1910.120	1926.65
☒ Personal Protective Equipment (PPE)	1910.132-138	1926.95-107
☒ Respiratory Protection	1910.134	1926.103
☒ Ventilation	1910.94	1926.57
☒ Noise Exposure	1910.95	1926.52
☐ Illumination	N/A	1926.56
☐ Fire Protection	1910.157	1926.24 and 150-155
☐ Sanitation	1910.141	1926.51
☐ Materials Handling (rigging, etc.)	1910.176	1926.250-251
☐ Welding/Cutting	1910.251-255	1926.350-354
☐ Lockout/Tagout	1910.147	1926.417
☐ Electrical (flexible cords, etc.)	1910.305	1926.400-449
☐ Scaffolding	1910.28-29	1926.450-454
☐ Fall Protection (elevated work)	1910.23-29, 1910.66-68	1926.104-107; 500-503
☐ Ladders/Stairways	1910.25-27	1926.1050 and 1060
☐ Cranes, Derricks, Hoists, Elevators, etc.	1910.179-181	1926.550-555
☐ Aerial Lifts	1910.66-68	1926.556
☒ Earthmoving Equipment	N/A	1926.602
☐ Powered Industrial Trucks (forklifts)	1910.178	1926.602
☒ Excavations and Trenching	N/A	1926.650-652
☐ Concrete and Masonry	N/A	1926.700-706
☐ Steel Erection	N/A	1926.750-761
☐ Demolition	N/A	1926.850-860
☒ Asbestos	1910.1001	1926.1101
☐ Confined Space Entry	1910.146	1926.21

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

☐ Commercial Diving	1910.401-441	1926.1071-1092
☒ Compressed Gases	1910.101-105	N/A
☐ Ionizing Radiation	1910.1096	1926.53
☒ Benzene	1910.1028	1926.1128
☒ Cadmium	1910.1027	1926.1127
☒ Tools - Hand and Power	N/A	1926.300-307
☐ Blasting and Using Explosives	N/A	1926.900-914

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Training Required

(* required for all "Type 3" sites; but minimum recommended)

Check "A" if training required for everyone, and check "T" if training required for specific task.

A	T	SUBJECT	REFERENCE	
			29 CFR 1910	29 CFR 1926 or Other
☒	☐	HAZWOPER 40 hour*	1910.120	1926.65
☐	☐	3-Day HAZWOPER Supervised On-Site*	1910.120	1926.65
☒	☐	8-Hour HAZWOPER Refresher*	1910.120	1926.65
☐	☐	8-Hour Supervisor HAZWOPER*	1910.120	1926.65
☐	☒	First Aid, CPR*	1910.151	1926.23,.50
☐	☒	Respiratory Protection	1910.134	1926.103
☐	☐	Confined Space ☐ Permit attached	1910.146	1926.21
☐	☐	Mine Safety (MSHA)	N/A	30 CFR 48.8
☐	☐	Lockout/Tagout ☐ Permit attached	1910.147	1926.417
☒	☐	Bloodborne Pathogens	1910.1030	N/A
☒	☐	Noise Exposure	1910.95	1926.52
☐	☒	Competent Person	N/A	1926.32,.450,.650
☐	☐	Construction Health and Safety OSHA 10-Hour	N/A	1926.21
☐	☐	Demolition	N/A	1926.850
☐	☐	Excavations ☐ Permit attached	N/A	1926.650-652
☐	☐	Electrical Work	1910.332	1926.400-.449
☐	☐	Ladders/Stairways	N/A	1926.1050-1060
☐	☐	Scaffolding	1910.28	1926.450-454
☐	☐	Fall Protection	1910.23-29; 1910.66-68	1926.104,.501
☐	☐	Commercial Diving	1910.410	1926.1071-1092
☐	☐	Hot Work ☐ Permit attached	1910.251-255	1926.350
☐	☐	Lead Awareness	1910.1025	1926.62
☐	☐	Asbestos Awareness	1910.1001	1926.1101
☐	☐	Cadmium	1910.1027	1926.1127
☐	☐	Benzene	1910.1028	1926.1128
☐	☐	Ionizing Radiation	1910.1096	1926.53; 10 CFR 19.12
☐	☐	Troxler or NITON Gauge User	1910.1096	10 CFR 19.12
☐	☐	Radiation Safety Program	1910.1096	10 CFR 20.1101
☒	☐	Hazard Communication (HAZCOM)	1910.1200	1926.59
☐	☒	DOT Hazardous Materials Shipping	1910.1201	49 CFR 172.704

Client-specific training: ☒ Not Applicable ☐ Specify

Site-specific orientation: ☒ Not Applicable ☐ Specify

Competent person: ☒ Not Applicable ☐ Specify

Direct-hire employee training/certification: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

4. Medical Surveillance

Surveillance Required: * required for all "Type 3" sites; baseline is minimum recommended
** Specify frequency below

	29 CFR 1910	29 CFR 1926 or Other
☒ HAZWOPER Physical - Baseline*	1910.120	1926.65
☒ HAZWOPER Physical – Annual	1910.120	1926.65
☐ HAZWOPER Physical - Biennial*	1910.120	1926.65
☒ OSHA Respiratory Protection Questionnaire	1910.134	1926.103
☐ Respiratory Certification Exam	1910.134	1926.103
☒ Arsenic (urine) ** Annual	1910.1018	N/A
☐ Asbestos **	1910.1001	1926.1101
☒ Cadmium (blood) **Annual	1910.1027	1926.1127
☒ Lead/ZPP (blood) **Annual	1910.1025	1926.62
☒ Mercury (blood) **Annual	N/A	N/A
☒ PCB **Annual	N/A	N/A
☐ Vinyl Chloride **	1910.1017	1926.117
☐ Hepatitis B Vaccine (series) **	1910.1030	N/A
☐ Tetanus/Diphtheria	N/A	Stay Current
☐ Stress Test	N/A	Only as requested
☒ Visual Acuity Test	N/A	Only as requested
☒ Hearing Test (Audiometry)	N/A	Only as requested
☒ Pulmonary Function	N/A	Only as requested

Client-specific drug testing: ☒ Not Applicable ☐ Specify

Client-specific medical monitoring[1]: ☒ Not Applicable ☐ Specify

Site-specific medical monitoring: ☒ Not Applicable ☐ Specify

**Frequency of medical monitoring: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Personal Protective Equipment (PPE)

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work tasks:

Specific Inventum Job Task or Function	Minimum Level of Protection
Task 1 – Site Meetings and Oversight	☒ D
Level D: safety glasses (ANSI), safety shoes (ANSI),; safety vest (ANSI)	
Task 2 –Soil Sampling	☒ D ☐ C ☐ B ☐ A
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI), nitrile gloves,	
Task 3 – Test Pit Excavations	☒ D ☐ C ☐ B ☐ A
Level D: Hard hat, safety glasses (ANSI), safety shoes (ANSI), nitrile gloves	
Task 4 – Groundwater Monitoring and Sampling	☒ D ☐ C ☐ B ☐ A
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI), nitrile gloves,	

Criteria for changing protection levels are as follows:

EVACUATION[2] or PROTECTION LEVEL CHANGE[3] CRITERIA	APPROVALS REQUIRED [1]
	OSC
Site Evacuation Plan: ☒ Not Applicable ☐ Specify or Attach Plan:	
Change to Level D when: ☐ Not Applicable ☒	☒N/A All site work in Level D
Change to Level C when: ☒ Not Applicable ☐ dust levels exceed 2.5 mg/m^3 in the breathing zone continuously for 5 minutes.	☒ No work will be conducted in Level C. Site work will stop, controls reevaluated, and HASP updated as necessary
Change to Level B when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level B.
Change to Level A when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level A. ☒

(1) OSC: Office Safety Coordinator

(2) General Recommendations: Evacuate the area when LEL readings are >10% LEL in the atmosphere, or when PID readings are greater than the PEL in the breathing zone.

(3) General Recommendation: To Level C when PID readings are greater than the PEL in the breathing zone. To Level B or A only after detailed evaluation and planning.

Note: Changes to the level of protection shall be made only after the required approvals are obtained. All changes shall be recorded in the field log and reported to the Project Manager as soon as possible. Inventum's goal is to avoid using respiratory protection unless it is

absolutely necessary or required. Administrative controls or engineering controls should always be considered as a means to reduce potential exposures, before PPE is required or considered.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

6. Air Monitoring [1]

The following monitoring instruments shall be used on site to measure airborne contaminant concentrations in either the breathing zone, or as part of the overall site Air Monitoring Plan (attach detailed plan):

MONITORING EQUIPMENT	LOCATION OF MONITORING	FREQUENCY OF MONITORING	ACTION LEVELS
☐ Combustible Gas Indicator	☐ N/A ☐ Monitoring Plan Attached ☐ Confined Space ☐ Manhole	☐ Continuously when potential combustible gases or lack of oxygen are suspected. ☐ Specify	5-10% LEL: continue with caution > 10 % LEL: evacuate the area ☐ Specify
☐ O2 Monitor ☐ CO Monitor ☐ H_2S Monitor	☐ N/A ☐ Confined Space ☐ Manhole – monitor oxygen, carbon monoxide, hydrogen sulfide , and lower explosive limit	☐ Continuously when excess oxygen (>22.5%) or lack of oxygen (<19.5%) are suspected. ☐ Test atmosphere prior to entry and continuous during confined space entry.	< 19.5% Oxygen: evacuate the area; supplied air may be needed. > 22.5% Oxygen: evacuate the area; potential fire hazard. ☐ Specify
☐ Colorimetric Tubes Type: Type: Type:	☐ N/A ☐ Specify ☐ Sample Container ☐ Confined Space ☐ Specify	☐ Periodically during sampling for analytical purposes only. ☐ Whenever noticeable odor is present. ☐ Specify	☐ Specify
☒ PID Lamp Needed: ☐ 9.8 eV ☒ 10.6 eV ☐ 11.7 eV Calibration Gas: Isobutylene Correction Factor:	☒ Personal Monitoring ☒ Sample Container ☐ Confined Space ☐ Specify	☒ Periodically during sampling for analytical purposes only. ☒ Continuously within the employee breathing zone. ☐ Specify ☐ Specify	☒ None. ☒ >5 ppm above background in breathing zone for 5+ min. Stop work and reevaluate potential sources and controls.
☐ FID	☐ N/A ☐ Specify	☐ Specify	☐ Specify
☒ Personal Dust Monitor	☐ N/A ☒ Personal Monitoring in Breathing Zone (Task 2 - 4 only)	☒ Continuously within the employee breathing zone	☒ >2.5 mg/m3 at work perimeter for 15 min sustained. Stop work and apply dust controls

☒Other: Perimeter Monitoring	☒ Perimeter Air Monitoring in accordance with the CAMP	☐ Specify	☐ Specify
☐Laboratory Supported ☐Personal ☐Area ☒Perimeter	☐ N/A ☐ Specify Employee breathing zone	☐ Specify continuous	☒ When visible dust is present apply dust control measures (water spray) until abated.

(1) Whenever air monitoring is required to be performed, a detailed Air-Monitoring Plan should be developed and attached to the HASP. The plan should include Monitoring Locations, Frequency of Readings, and any Action Levels being used to control the work site.

Air Monitoring Plan

Field monitoring of dust production is anticipated only during soil sampling (Task 2) and test pit. A visual assessment of dust levels will be used continuously during the work along with personal employee monitoring and perimeter air monitoring in accordance with an approved CAMP (Attachment A).

Dust production during monitoring well abandoned, monitoring well installation, and surficial soil sampling is not anticipated due to the typical moisture content of the soil.

This level of nuisance dust is visually observable. If dust is observable continuously in the breathing zone for 5 minutes, dust control methods will be used (*e.g.*, water spray will be applied) until dust is abated. Work will be temporarily discontinued until dust is reduced to acceptable levels within the breathing zone. Should particulate levels above the action level be a continual problem, relevant field personnel will reassess the situation with the project manager.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

7. Site Controls and Work Zones (describe in detail)

Facility Alarms or Signals: ☒ Not Applicable ☐ Specify

Work Permits Required: ☒ Not Applicable ☐ Specify

Work Traffic Issues: ☒ Not Applicable ☐ Specify

Parking Issues: ☒ Not Applicable ☐ Specify

Railway Traffic Issues: ☒ Not Applicable ☐

Support Zone(s):

☒ Field vehicle ☒ Job Trailer On Site ☐ Other:

Contamination Reduction Zone(s):

☒ Field vehicle ☐ Facility restroom/utility room ☐ Other:

Exclusion Zone(s):

☒ Area immediately surrounding work area ☐ Other:

Site Entry Procedures:

☒ Notify Site Safety Contact Representative.

☒ Read HASP Plan and sign Acknowledgment Statement.

☒ Check in with the facility contact person. ☒ Check in with owners site representatives.

☐ Check in with facility security guard. ☐ All visitors must check in and sign visitor logbook in guard house.

☒ Wear proper personal protective equipment.

☐ Attend facility orientation. ☐

☒ Conduct daily safety meeting (document).

☐ Other: Confined space – do not enter the confined space if LEL >10%, oxygen <21% or >23.5%, carbon monoxide >35 ppm, or hydrogen sulfide >7 ppm. Exit the confined space if the atmospheric conditions become hazards as noted.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Decontamination Procedures:

Personnel: (specify)	Work will be performed in Level D or Modified Level D, and minimal contamination is expected. Follow standard decontamination procedures, and good personal hygiene. Disposable PPE should be removed, contained, and disposed in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Site workers should plan and stage for wash water and soap at the site, prior to beginning the work. Site workers should wash hands and any exposed skin extremely well with soap and water, prior to leaving the contamination reduction zone, eating, drinking, driving, or leaving the site. Any soiled or contaminated clothing should be removed and handled appropriately, by either washing as soon as possible, or if necessary, disposing. Soiled or contaminated clothing should be carefully bagged prior to disposal or washing, to reduce potential exposure.
Equipment: (specify)	Site workers should plan and stage for the appropriate decontamination method at the site prior to beginning the work. Any contaminated single-use disposable equipment or PPE should be appropriately containerized and disposed as soon as possible in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Contaminated equipment or PPE that will be re-used should be handled and cleaned while wearing the appropriate PPE. Typically, equipment is decontaminated using Alconox soap and deionized water.

Disposal of Investigation-derived Material:

☒ Leave on site for disposal. Location TBD ☐ Other:

Work Limitations (time of day, buddy system, etc.):

☒ Buddy system required for some tasks.

☒ Work will be performed during daylight hours only.

☐ Work will be performed using artificial light.

Describe or attach a lighting plan: A lighting plan is attached.

☒ No eating, drinking, or smoking in contamination reduction zone(s) or exclusion zone(s).

☒ When temperatures are either above 80°F or below 20°F, work schedules may be modified.

☒ Other site-specific limitations: Do not enter battery building. Do not enter any former process buildings unaccompanied.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Radiation Safety:

- ☒ Radiation information is not applicable to this project.
- ☐ Notify RSO.
- ☐ Wear dosimeter badge when handling gauge.
- ☐ Post applicable radiation signs and documents.
- ☐ Post emergency numbers.
- ☐ Provide at least two lock systems for overnight storage.
- ☐ Maintain storage at least 15 feet from full-time workstations.
- ☐ Block, brace, and securely lock the gauge during “all” transportation.
- ☐ Limit “public” exposure to gauge while in use.
- ☐ Provide sketch of gauge storage to RSO.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Acknowledgment Statement:

As an employee of Inventum, I have reviewed the Hazard Assessment (HA)/Health & Safety Plan (HASP). I hereby acknowledge that I have received the required level of training and medical surveillance as necessary, that I am knowledgeable about the contents of this site-specific RA/HSP, and that I will use personal protective equipment (PPE) and follow procedures specified in the HASP.

Signatures of Inventum Site Personnel:

	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Location/Project Name:		**Date:**	
Observer Name:			
Observee Name:		**Time:**	

Task Observed

Description of Task Observed and Background Information

Positive Comments

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Conclusions / Why the Questionable Items Occurred?

Feedback Session Conducted By: _____ **Date:** _____

Name of Observee's Supervisor: _____ **Time:** _____

At-Risk Observations/Root Cause Analysis

Personal Factor:
(1) Lack of skill or knowledge
(2) Correct way takes more time/requires more effort
(3) Shortcutting standard procedures is rewarded or appreciated
(4) In past, did not follow procedures or acceptable practices and no incident occurred

Job Factor:
(5) Lack of or inadequate operational procedures or work standards
(6) Inadequate communication of expectations or work standards
(7) Inadequate tools or equipment

At-Risk Observation #	Root Cause Analysis #	Solution(s) To Prevent Potential Incident from Occurring	Person Responsible	Agreed Due Date	Date Completed

Results of Verification (were solutions done?) and Validation (were solutions effective?)

Reviewed by (PM/Supervisor): _____ **Date:** _____

Approved by (Practice Safety Leader): _____ **Date:** _____

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

PERSONAL PROTECTIVE EQUIPMENT	Safe	At-Risk	Comments
1. Hearing Protection (e.g., Ear Plugs)			
2. Head Protection (e.g., Hard Hat)			
3. ANSI Rated Eye Protection (e.g., Safety Glasses)			
4. Hand Protection (e.g., Kevlar Gloves)			
5. Foot Protection (e.g., Safety Shoes)			
6. Respiratory Protection			
7. Fall Protection Inspected (e.g., Harness)			
8. ANSI Rated Reflective Vest/High Visibility Clothing			
9. Other (Specify)			
BODY USE AND POSITIONING	**Safe**	**At-Risk**	**Comments**
10. Correct Body Use and Positioning When Lifting/Pushing/Pulling			
11. Pinch Points/Moving Equipment - Hands/Body Clear			
12. Mounts/Dismounts Using 3-Points of Contact			
13. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

WORK ENVIRONMENT	Safe	At-Risk	Comments
14. Work/Walk Surface Free of Obstructions (e.g., Tripping Hazards)			
15. Housekeeping/Storage			
16. Defined and Secured (e.g., warning devices, barricades, cones, flags)			
17. Suspended Load, Swing Radius & Lift Area is Barricaded			
18. Safety Shutdown Devices			
19. Proper Storage & Labeling /Disposal of Sample & Waste Materials			
20. Cylinders Stored Upright, Secured, & Caps in Place			
21. Manhole/vault Inspected for Hazards			
22. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

OPERATING PROCEDURES	Safe	At-Risk	Comments
23. Job Planning (HASP reviewed, JSAs, etc.)			
24. Fire Extinguishers Accessible and Inspections Current			
25. Work Permit/Authorization to Work (Hot, Cold, LOTO, Confined Space)			
26. JSA Reviewed & Followed			
27. Hazard Assessment - Hazard Hunt			
28. Interfaces with Other Functions (awareness with other personnel on site)			
29. Operators Looking Behind Prior to Backing Up			
30. Operators Wearing Seat Belts While Operating Equipment			
31. Subsurface Structures Identified			
32. Proper Trench Protective Equipment in Place			
33. Adequate Egress Is Available for Excavation & Trench (within 25 ft. if depth is <4 ft.)			
34. All Materials Set Back at Least 2 Feet From Edge of Trench/Excavation			
35. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

TOOLS/EQUIPMENT	Safe	At-Risk	Comments
36. Hand Tools (Proper Equipment Selection, Condition, and Use)			
37. Power Tools (Proper Equipment Selection, Condition, and Use)			
38. Equipment, Including Heavy (Proper Equipment Selection, Condition, and Use)			
39. Hoses Inspected			
40. Required Monitoring Equipment Calibrated & Used			
41. Ladders Set up Correctly & Inspected			
42. Right Tools for the Job are Available and in Good Condition - No Fixed Open Blade Knives (FOBKs)			
43. Other (Specify)			
Total #	0	0	

Daily Hazard Review Topic and Sign-In:

Daily Review Topic	Date

Acknowledgment Statement:

As an affected employee of Inventum Engineering, I hereby acknowledge that I have reviewed the contents of this site-specific HSP and the daily safety meeting topic, and that I will use the applicable personal protective equipment (PPE) and follow the procedures specified in the HASP.

Signatures of all onsite Inventum Personnel, including Direct-Hires (Required):

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Attachment C – Phase II ESA Groundwater Sampling Results

Table 2A

Groundwater VOC Results
Tulip Corporation - Phase II Report
Niagara Falls, New York

Sample Designation	August 2011				NYSDEC Groundwater Guidance or Standard Value[1]
	Overburden				
	MW-1	MW-2	MW-3	TRIP BLANK	
Sample Date	8/19/2011	8/19/2011	8/19/2011	8/19/2011	
VOCs (ug/l)					
1,1-Dichloroethene	<1	1.3	<1	<1	5 s
Acetone	3.6 J	3.1 J	<10	<10	50 g
Benzene	<1	<1	0.55 J	<1	1 s
Carbon disulfide	2.1	1.9	0.61 J	<1	60 g
cis-1,2-Dichloroethene	<1	**19**	<1	<1	5 s
Toluene	<1	<1	0.56 J	<1	5 s
trans-1,2-Dichloroethene	<1	3.9	<1	<1	5 s
Trichloroethene	<1	**120**	<1	<1	5 s
Vinyl chloride	<1	**2.4**	<1	<1	2 s

Notes:
1. Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1)
NA = Not analyzed, not applicable
NL = Not listed
U = the substance was analyzed for but not
detected. The associated numerical value is
J = the associated numerical value is an estimated quantity. The value is greater than the detection limit but less than the quantitation (reporting) limit.
Bold and outlined value - Compound detected in a
s = Standard Value
g = Guidance Value
ug/l = micrograms per liter.

Table 2B

Groundwater Metals Results
Tulip Corporation - Phase II Investigation Report
Niagara Falls, New York

Sample Designation Date Sampled	August 2011 Overburden MW-1 8/19/2011	 MW-2 8/19/2011	 MW-3 8/19/2011	NYSDEC Groundwater Guidance or Standard Value[1]
Metals (ug/l)				
Arsenic	<10	<10	<10	25 s
Barium	66	21	22	1,000 s
Cadmium	<1	0.39 J	<1	5 s
Chromium	2.7 J	1.5 J	0.87 J	50 s
Lead	<5	<5	4.8 J	25 s
Selenium	<15	<15	<15	10 s
Silver	<3	<3	<3	50 s
Total Mercury	<0.2	<0.2	<0.2	0.7 s

Notes:

1. Guidance or Standard Values - NYSDEC, Division of Water, TOGS (1.1.1) [NYSDEC, 1998, with addenda through 2004].

NA = Not analyzed, not applicable

NL = Not listed

U = the substance was analyzed for but not detected. The associated numerical value is the sample detection limit.

J = the associated numerical value is an estimated quantity. The value is greater than the detection limit but less than the quantitation (reporting) limit.

Shaded value - Compound detected at a concentration greater than the standard or guidance value.

s = Standard Value

g = Guidance Value

ug/l = Micrograms per liter

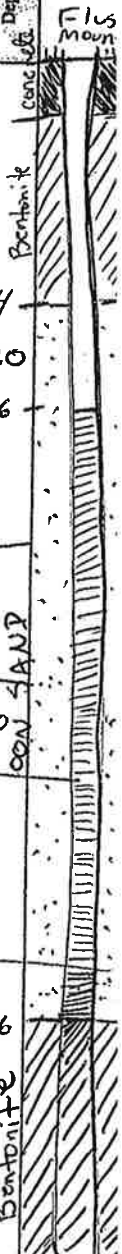
Attachment D – Phase II Monitoring Well Boring/Construction Logs

AECOM

Client: Tulip Corporation		**Boring ID:** MW-1
Project Number: 60220285		
Site Location: Niagara Falls NY		
Coordinates:	**Elevation:**	**Sheet:** 1 of 1
Drilling Method: HSA		**Monitoring Well Installed:**
Sample Type(s): SS	**Boring Diameter:** 4 1/4	**Screened Interval:** 6-16'
Weather: sunny 75°F	**Logged By:** Emily Laity **Date/Time Started:** 8/16/11 15:00	**Depth of Boring:** 22
Drilling Contractor: Earth Dimensions	**Ground Elevation:** **Date/Time Finished:** 8/17/11 9:45	**Water Level:**

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
1–5						@	Concrete 0 - 6" 6" - DK Brown f-c SAND & f-m gravel, little silt (angular to sub rounded) 1.3' bgs 1.3 Red silty clay / clayey silt, little f. sand little f-m gravel sub rounded Native or Reworked native moist		1 4
5–10		5-7	1 2 2 4	17" or 22" w/ 5" void	52 ppm		0 - 9" (0 - 1" slough from above) Then Red brown clay, moist, plastic 9 - 14" VOID 14 - 22" Black organic material (0.8 ppm) w/ SILTY SAND and clay, no plasticity Dry to moist, loose 22" - 24" Mottled olive green to grey clay, ~~dense~~ med. stiff, slightly plastic, Dry to moist. ODOR Jarred 5-7' black material and olive clay	ODOR	0.0 6
10–12		10-12	4 8 10 12	24"	4.5		PINKISH BROWN SILTY CLAY w/ TANISH Brown mottling, medium stiff to stiff, moist Native		0.0
13–15									
15–20		15-17	9 12 11 15	24"	2.5		TILL Red brown silt, some clay little f-c gravel sub angular to sub rounded weathered shist noted, wet or moist to wet		16 20
20–22		20-22	13 25 35 52	24"	1.3		Fine Red brown silt w/ f. sand or f sand w/ silt dry to moist angular gravel in bottom 3" top, med. dense top 8" has clay content (little)		

Jarred 2oz for VOCs



NOTES:

22'

Date	Time	Depth to groundwater while drilling

Checked by ________________ Date:

8/17/11 7:30 water @ 10' bgs

AECOM

Client:	Tulip Corp.
Project Number:	6022 0285
Site Location:	Niagara Falls, NY
Coordinates:	Elevation:
Drilling Method:	HSA
Sample Type(s):	HSA
Boring Diameter:	4 1/4 ID
Weather:	Sunny, 75°F
Logged By:	E. Laity
Date/Time Started:	8/16/11 9:45
Drilling Contractor:	Earth Dimensions
Ground Elevation:	
Date/Time Finished:	Abandoned

Boring ID: MW-2
Sheet: 1 of 1
Monitoring Well Installed:
Screened Interval: N/A
Depth of Boring: 2'
Water Level: N/A

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	USCS	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (ft)
1			NA	NA	NA	NA	Standard sampling. Asphalt 0-0.15ft Concrete 0.15'-0.7' bgs		0.1
2		0.7-1.7	100/5	5"	0.1		0-1" ltr brownish SAND (f-m), some clay, moist tr. fine gravel, subrounded, piece dk grey slag. (FILL) 1"-5" Red brown silt, some clay low plasticity, little f. gravel, tr. brick subrounded, moist, trace black slag (coal?) @ 1.5' possibly hit more concrete.		0.1
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Hit void ~2' bgs w/ pipe at bottom ~3' down pull out stop move over.

PID Background (ppm)

NOTES:

Date	Time	Depth to groundwater while drilling

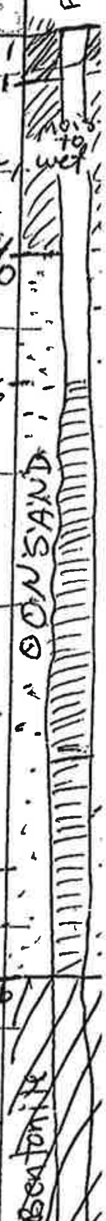
Checked by _____ Date: _____

AECOM

Client:	Tulip Corp.
Project Number:	60220285
Site Location:	Niagara falls NY
Coordinates:	
Elevation:	
Drilling Method:	HSA
Sample Type(s):	SS
Boring Diameter:	4¼" ID
Weather:	Sunny 80°F
Logged By:	Emily Laity
Date/Time Started:	8/16/11 11:15
Drilling Contractor:	Earth Dimensions
Ground Elevation:	
Date/Time Finished:	8/17/11 12:00

Boring ID:	MW-2
Sheet:	1 of 1
Monitoring Well Installed:	
Screened Interval:	6-16
Depth of Boring:	22'
Water Level:	~9' bgs

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (ft)
0–1							Asphalt 0-0.15'. Concrete 0.15'-0.7' bgs.		0.1
1–2.7		0.7 to 1.7'	1, 1, 2, 2	12	0.1	SM / CL	0-6" = FILL - Grey to brown (f-c) SAND, little silt w/ cinders, ~~trace~~ little f. gravel moist. 6-12" - CLAY Red brown, little silt, little f. gravel subangular, moist to wet		0.1
2.7–3	NA	NA	3 NA	NA	NA	NA	NA	NA	NA
3–5		3-5	2, 1, 2	6"	0.7	SM / CL	0-1" - SLOUGH - GREY BROWN SAND. 1-6" - CLAY Red brown - SAA, (Reworked?)		0.0
5–7		5-7	2, 2, 3, 6	20"	2.2	CL / CH / CL	0-9" - Grey Brown CLAY, little silt, soft, moist to wet, little f. gravel angular, plastic. 9"-16" - Pinkish grey clay, little f-c sand to f. gravel, stiff, moist, moderate plasticity. 16-20" - Red Brown CLAY, little silt, med. stiff, moist, low plasticity - NATIVE?		0.0
7–9		7-9	5, 6, 7, 7	24"	2.6	CL	0-24" - RED Brown CLAY, SAA - little f. sand and silt, moist to wet, last 4" wet.		0.0
9–11		9-11	4, 3, 3, 4	24"	2.6	CL	0-24" SAA Red Brown CLAY, little silt, trace ~~clay~~ f. sand, moderate plasticity, 4-24" wet 0-4" moist. NATIVE		0.0
11–13 (12:28)		11-13	15, 20, 15, 11	16"	2.4	SC-CL	0-7" Red brown CLAY w/ ~~some~~ little olive green CLAY mottles, little silt, some f. sand to f. gravel subangular to angular, wet. 7"-16" SAA but w/ Larger Angular cobbles and f-c gravel angular to subrounded, TILL?		0.0
13–15		13-15	19, 12, 12, 21	5"	5.6	SC-CL / GM-SM	SAA TILL?		0.0
15–17		15-17	9, 16, 21, 32	20"	3.1	GM-SM	0-10" SAA but Brown instead of Red brown, wet med. stiff. 10"-20" Brown silt with little f. sand, little clay, little f. gravel and cobbles, moist. med. dense TILL		0.0
17–19		17-19	34, 26, 31, 29	24	0.8	GM-SM	SAA TILL 0-24" moist.		0.0
19–20		19-21	100/4						0.0



NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: ______________ Date: ______________

AECOM

Client: Tulip Corp
Project Number: 60220285
Site Location: Niagara Falls NY
Coordinates: Elevation:
Drilling Method: HSA
Sample Type(s): SS
Boring Diameter: 4¼" ID
Weather: Sunny 80°F
Logged By: Emily Laidy
Drilling Contractor: Earth Dimensions
Ground Elevation:
Date/Time Started: 8/16/11 11:15
Date/Time Finished: 8/17/11 13:00

Boring ID: MW-2
Sheet: 1 of 1
Monitoring Well Installed:
Screened Interval: 6-16'
Depth of Boring: 22'
Water Level: ~9' bgs

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	USCS	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (ft)
21		20-22	29 35 40 36	24"			TILL - SAA		
22									
23									
24									
25									
26									
27									
28									
29									
30									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by _____ Date: _____

AECOM

Client: Tulip Corp.
Project Number: 60220285
Site Location: Niagara Falls NY
Coordinates: Elevation:
Drilling Method: HSA / Core
Sample Type(s): SS
Boring Diameter: 4 1/4" ID

Boring ID: MW-3.
Sheet: 1 of 1
Monitoring Well Installed:
Screened Interval: (4-14) new location
Depth of Boring: 40.7' bgs
Water Level: ~6' bgs

Weather: Cloudy, 80°F
Logged By: E. Laity
Date/Time Started: 8/15/11 9:00hrs
Drilling Contractor: Earth Dimensions
Ground Elevation:
Date/Time Finished: 8/15/11 16:00

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (ft)
1		0-2'	4 11 18	5"	0.0	SP	0"-3" Red brown f-c SAND w/ f-m gravel trace brick loose, dry Trace organics. FILL		0.0
2									
3		2-4'	9 8 7	3"	0.0	SP	0-3" Red brown f-c sand, some f. gravel, dry to moist little grey & white sand f. gravel Angular FILL		0.0
4									
5		4-6'	7 5 1	6"	0.0	PT	0-1" Pk Grey m. SAND and silt, trace clay, wet Fill 1"-6" COAL SLAG Black Angular, wet		0.0
6	▽	WATER TABLE	1						
7		6'-8'	1 1 1/12	4"	0.0	PT	0-4" SAA f-c gravel sized coal slag, wet.		0.1
8									
9		8-10'	1 59 4 6	1.3'	0.0	PT SW ML-CL	0-3" SAA COAL Slag, wet. 3"-5" Light white to lgrey SAND w/ Trace gravel, wet. (potash??) 5"-13" L. brown to tan f-c sand and silt w/ some coarse gravel (Angular) loose		0.1
10									
11		10-12	7 10 12 14	0	NA	NA	- Red clay, med. stiff, little silt moist to wet low plasticity (NATIVE) NO Recovery		0.2
12									
13		12-14	8 8 11 11	24" (21)	0.2	CL	0-2" Sloughed med. 2"-24" Red clay, stiff, little silt, low plasticity moist to wet (NATIVE)		0.2
14									
15									
16		14-16'	7 10 8 9	24"	0.2	CL	0-24" SAA. Red clay, slightly mottled w/ Red brown & med brown mottling. wet.		0.1
17									
18		16-18'	2 2 2 2	24"	0.1	CH	0-2" SAA Red clay 2"-24" transitions to olive grey CLAY to SILT very plastic, soft/wet		0.1
19		18-20'	1 2 3 2	24"	0.1	CH	0-24" SAA color changing from olive grey to brownish grey, soft, wet		
20									

PID Background

9:20 Add Auger Flight

9:44 Add Auger Flight

10:05 Add Auger

1:30 Add Auger

NOTES: NO Auger spoils Returned Augered to 20' bgs

Date	Time	Depth to groundwater while drilling

Checked by _____ Date: _____

AECOM

Client: Tulip corn			Boring ID: MW-3
Project Number: 60220285			
Site Location: Niagara Falls NY			
Coordinates:		Elevation:	Sheet: 1 of 1
Drilling Method: HSA / core barrel Rotary			Monitoring Well Installed:
Sample Type(s): SS		Boring Diameter: 4 1/4" 10	Screened Interval: 4-14
Weather: P. cloudy 75 °F	Logged By: E. Laity	Date/Time Started: 8/15/11 9:00AM	Depth of Boring: 40.7'
Drilling Contractor: Earth Dimensions	Ground Elevation:	Date/Time Finished: 8/15/11 16:00	Water Level: 6' bgs

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	~~Lab Sample~~ ~~Depth (ft)~~ PID Bckg ground (ppm)
21–22		20-22'	1, 1, 2, 2	24"	0.1	CH	SAA ~~CLAY~~ Brownish, grey, soft wet. (new) tr. f. - m. angular gravel, in last few inches & in shoe.		0.1
23–24 (10:42)		22-24'	1, 3, 3, 3	24"	0.2	CH	SAA color change back to Red (24)" 5% increase in silt content, ~~sm~~ med. plasticity lower than above, wet. * no spoils from Augers.		0.2
25–26		24-26'	1, 2, 3, 3	24"	0.2	CH	SAA		0.2
27–28 (added 11:00 Auger 25-30')		26-28	9, 17, 16, 19	24	0.2	CH / SC	0-16" SAA 16-24" TILL; Red Brown SILT, little gravel (f-c angular) tr. f. cobbles angular, little f-c sand, little clay, wet. very stiff		0.2
29–30		28-30	23, 31, 25, 27	19"	0.1	SC	0-19" TILL SAA		0.1
31–32 (12:05 30-35 Auger)		30-32	25, 28, 29, 35	24"	0.1	SC	0-24" SAA TILL but lower ~~clay~~ only tr. clay compared to above.		0.1
33–34		32-34'	17, 24, 34, 34	24"	0.1	SC / SP-SM	0-12" SAA TILL 12"-24" Red Brown ~~Fine Sand, little~~ f. SAND little silt ~~little Sand~~ no more f. gravel or cobbles in 12-24" portion		0.1
35–36 (12:35 Add 35-40' Auger)		34-	7, 10, 10, 13	24"	0.2	SP	0-24" f. SAND Red-brown, medium dense, wet.		0.2
37–40							Augered to 40' bgs — harder material		

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by ______ Date: ______

AECOM

Client:	Tulip Corp.
Project Number:	60220285
Site Location:	Niagara Falls, NY
Coordinates:	
Elevation:	
Drilling Method:	HSA
Sample Type(s):	SS
Boring Diameter:	4 1/4" ID
Weather:	P. Cloudy 75°F
Logged By:	E. Loity
Date/Time Started:	8/15/11 9:00am
Drilling Contractor:	Earth Dimensions
Ground Elevation:	
Date/Time Finished:	8/15/11 16:00
Boring ID:	MW-3
Sheet:	1 of 1
Monitoring Well Installed:	
Screened Interval:	4-14
Depth of Boring:	(6' bgs) 40.7'
Water Level:	

SS Refusal

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
41			34 100/2	3"	0.2		Split spoon Refusal @ 40.7' bgs. Rock chips Dolostone		0.2
42									
43							B.O.B @ 40.7' bgs SS Refusal		
44									
45									
46							Grouted hole		
47							moved over to the west ~4'		
48							will install well in overburden		
49							Screened 4'-14' bgs.		
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

NOTES:

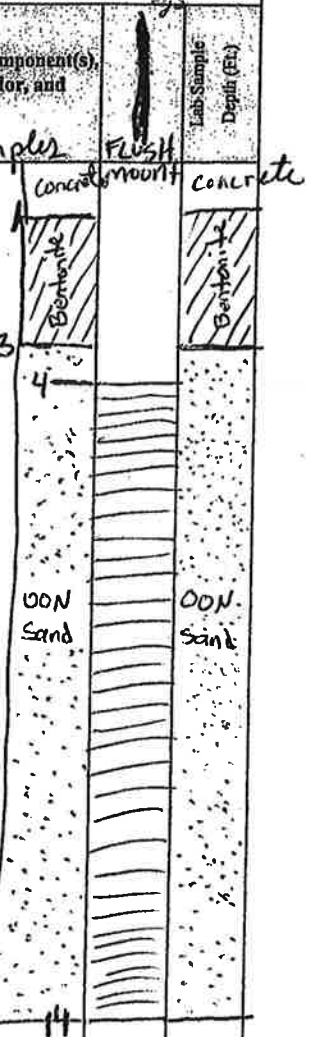
Date	Time	Depth to groundwater while drilling

Checked by ____________ Date: ____________

AECOM

Client: Tulip Corp.			Boring ID: MW-3
Project Number: 60220285			Sheet: 1 of 1
Site Location: Niagara Falls, NY			Monitoring Well Installed:
Coordinates:	Elevation:		Screened Interval: 4-14
Drilling Method: HSA		Boring Diameter: 4¼" ID	Depth of Boring: 14'
Sample Type(s):		Date/Time Started: 8/16/11 7:30	Water Level: ~6' bgs
Weather: Sunny 75°F	Logged By: E. Laity	Date/Time Finished: 8/16/11 9:30	
Drilling Contractor: Earth Dimensions	Ground Elevation:		

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	USCS	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)
							Reinstall for MW-3 no samples
							see previous pgs for description
							Auger to 14' bgs
							set well
							2" PVC 10slot screen
							B.O.B. @ 14' bgs



NOTES:	Date	Time	Depth to groundwater while drilling

Checked by _____ Date: _____