DRAFT
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June 1, 2012

Mr. William Bennett, P.E.
Environmental Engineer 1
Remedial Bureau C-Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway, 11th Floor
Albany, New York 12233

Re: Revised Remedial Investigation Work Plan
Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York
Site # 622011

Dear Mr. Bennett:

Bradburne, Briller & Johnson, LLC (BB&J) is pleased to provide the New York State Department of Environmental Conservation (NYSDEC) with this *Revised Remedial Investigation Work Plan* (RIWP) for the former Union Fork & Hoe facility located at 253 East Main Street in Frankfort, New York (Subject Property). The original RIWP was submitted to the NYSDEC on October 24, 2011. This revision incorporates the comments provided to the original RIWP by the NYSDEC in a letter dated February 24, 2012.

If you have any questions or require additional information, please call Mr. Richard Garlitz at 412-882-4050.

Sincerely,

BRADBURNE, BRILLER & JOHNSON, LLC

J. Tim Bradburne, P.G.
Project Director

Andrew Bajorat, C.H.M.M.
Technical Quality Principal

Richard B. Garlitz, P.E.
Project Engineer

Mark Millspaugh
Senior Project Engineer
NY P.E. 59182

cc: *Mr. Steven Bates, NYSDOH*
Mr. Greg Rys, NYSDOH
Mr. David Crosby, NYSDEC
Mr. Michael Ryan, NYSDEC
Ms. Dena Putnick, NYSDEC
Mr. Dan Yurovich, Ames
Mr. Howard Epstein, SRZ
Mr. Larry Schnapf, SRZ

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REVISED REMEDIAL INVESTIGATION WORK PLAN

Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York
Site # 622011

Submitted to:
New York State Department of Environmental Conservation
Albany, New York

On Behalf of:
Ames True Temper
Camp Hill, Pennsylvania

Prepared by:
Bradburne, Briller & Johnson, LLC
Pittsburgh, Pennsylvania

June 1, 2012

TABLE OF CONTENTS

TABLE OF CONTENTS - continued

TABLES

FIGURES

TABLE OF CONTENTS - continued

Appendices

1.0 BACKGROUND

On August 15, 2011, Ames True Temper (Ames) entered into an *Order on Consent and Administrative Settlement* (Consent Order) with the New York State of Environmental Protection (NYSDEC) for the former Union Fork & Hoe facility located at 253 East Main Street in Frankfort, New York (Subject Property). Per the requirements of the Consent Order, Bradburne, Briller and Johnson, LLC (BB&J), on behalf of Ames, submitted a *Records Search Report* (RSR) dated September 26, 2011 that detailed known information about potential contamination at or emanating from the Subject Property. On October 24, 2011, per the requirements of the Consent Order, BB&J submitted a RIWP on behalf of Ames. BB&J produced the RIWP in accordance with *the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10)*. On February 12, 2012, NYSDEC issued a letter providing comments to the RIWP. Ames and NYSDEC engaged in further discussion about RIWP scope amendments during a conference call on March 9, 2012 and during an on-site meeting conducted on March 27, 2012. Following these meetings, Ames and NYSDEC agreed to include the following revisions to the RIWP:

Investigative Data Collection (See Section 6.0)

- Replacing the NYSDEC-proposed grid-based investigation of building interiors with a focused investigation targeting impacts associated with historic operations;
- Modifying the NYSDEC-proposed grids for external areas where no known operations occurred and limiting samples to surficial samples;
- Adding an investigation of a Small Building East of Building 16;
- Adding an investigation of an In-ground Dip Tank Located in Building 3;
- Soil gas samples along Subject Property perimeter adjacent to residential and commercial structures and along utility runs entering or leaving the Subject Property; and
- Incorporating minor modifications to the groundwater sampling program.

Decommissioning and Housekeeping (See Section 6.5)

- Removing an In-ground Dip Tank in Building 3; and
- Repairing impaired portions of the site fence.

Planning and Procedural

- Electronic Submittals of Reports and Data (See Sections 7.1 and 8.5);
- Certification of Reports (See Section 7.3);
- Incorporating a Community Air Monitoring Plan (See Section 8.3);
- Human Health Assessment (See Section 8.6);
- Updating NYSDEC Project Manager (See Section 4.10) ; and
- Updating the site boundary (See Section 7.2).

Consequently, Ames is now submitting a revised RIWP incorporating the substance of the February 12, 2012 letter, as modified by agreements made by the aforementioned meetings.

2.0 PURPOSE AND SCOPE

The purpose of the remedial investigation (RI) is to:

- Delineate the lateral and vertical extent of contaminants in environmental media at or emanating from the Subject Property;
- Evaluate the surface and subsurface characteristics of the Subject Property, including topography, geology, and hydrogeology, including depth to groundwater;
- Identify the sources of contamination, migration pathways, and actual or potential receptors of contaminants on or through air, soil, bedrock, sediment, groundwater, surface water, utilities, and structures at the Subject Property without regard to property boundaries;
- Collect and evaluate data necessary for a fish and wildlife resource impact analysis (FWRIA) pursuant to DER -10 Section 3.10, to determine all actual and potential adverse impact to fish and wildlife resources;
- Collect and evaluate data necessary to evaluate the actual and potential threats to public health and the environment. This would include evaluating all current and future potential public health exposure pathways, in accordance with DER-10 Appendix 3B, as well as potential impacts to biota; and
- Collect the data necessary to evaluate any release to an environmental medium and develop remedial alternative(s) to address the release.

Based on the results of the previous investigations, historical research, and discussions with the NYSDEC the following areas of concern (AOCs)[1] have been identified:

- AOC-1 Former Fuel Oil Storage Area Adjacent and West of Building 16;
- AOC-2 Former Railroad Operations Conducted West of Building 16 in the Current Parking Lot Area;
- AOC-3 Source of the Elevated Sub Slab Volatile Organic Compound (VOC) Concentrations beneath Building 30;
- AOC-4 Source of the Elevated Sub Slab VOC Concentrations beneath Building 305;
- AOC-5 Groundwater South and East of the 200-Series Buildings; and

[1] Section 1.3 of DER-10 defines an AOC as "any existing or former location at a site where contaminants are known or suspected to have been discharged which is considered a source area. These include locations where contaminants were generated, manufactured, refined, transported, stored, handled, treated, disposed or where they have or may have migrated.

- AOC-6 Open Spill No. 0007178 Located East of Building 16.

In addition Ames has identified several other areas that do not fit within the definition of AOC because they have not been determined to be source areas, but require additional investigation:

- Area 1 Soil and Groundwater at Building 209[1];
- Area 2 Soil and Groundwater at Building 210[2];
- Area 3 Site-wide Groundwater; and
- Area 4 Soil Gas Conditions at All Conduits Leading Off-site and along the Subject Property Perimeter[3].

In response to issues discussed with the NYSDEC during the March 27th site walkover or issues discovered by Ames personnel during a recent site visit, Ames will investigate the following additional areas:

- The Small Building East of Building 16;
- The Small Building East of Building 8;
- An In-ground Dip Tank Located in Building 3; and
- The Combined Gridded Areas.

In addition, to the aforementioned areas of investigation, Ames will provide for the following tasks to address data gaps in the previous investigations or to improve Subject Property housekeeping:

- Removal of the In-ground Dip Tank in Building 3.

Refer to Table 1a for a Summary of Soil Sampling Rationale for the aforementioned AOCs and other areas, Table 1b for a Summary of Groundwater Sampling Rationale for the aforementioned AOCs and other areas, and Table 1c for a Summary of Soil Gas Sampling Rationale for the aforementioned AOCs and other areas. Table 1d: Analytical Methods and Quality Assurance Summary and Table 1e: Analyte Reporting Limits summarize the laboratory and sample collection quality assurance protocol.

Figures 1-14 identify the proposed boring and groundwater monitoring locations at each of the AOCs and other areas to be investigated. Figures 15-20 are an organizational chart (Figure 15), a tentative schedule (Figure 16), a figure showing wetlands on and near the Subject Property (Figure 17), a figure showing sensitive receptors located near the Subject Property (Figure 18), a figure showing waterways and public water wells on or near the Subject Property (Figure19), and a figure showing nearby contaminated sites (Figure 20). When practical, BB&J has provided figures showing the proposed sampling points that are in accordance with the NYSDEC's guidance found in DER-10 for scaling figures, (i.e., scale to be no greater than one inch to forty feet). However, based on the size of the Subject Property and some of the areas targeted for investigation, it was not beneficial to the reader's

[2] Buildings 209 and 210 were not previously investigated due to the poor physical condition of the buildings.
[3] BB&J understands that this issue is of concern to both the New York State Department of Health (NYSDOH) and the NYSDEC.

understanding to use such a small scale. Consequently, BB&J has selected scales for Figures 2, 3, 6, 7, 10, 11, and 17 through 20 that depict the areas and the proposed sampling locations in a clear and practical manner.

The Work Plan proposes the following activities to further investigate the aforementioned AOCs and other areas:

- **Former Fuel Oil Storage Area Adjacent and West of Building 16** – Twenty-five soil borings were previously conducted in this area in an effort to delineate the impacted soil. Results indicate that further delineation is required north, south, and west of the initial delineation grid. Therefore, forty soil borings will be conducted in a grid pattern. Five will be converted to permanent groundwater monitoring wells.

- **Former Railroad Operations Conducted West of Building 16 in the Current Parking Lot Area** – Eight soil borings will be conducted in this area. Five of the soil borings will be converted to permanent groundwater monitoring wells.

- **Source of the Elevated Sub Slab VOC Concentrations beneath Building 30** – Eight soil borings will be conducted in this area in the vicinity of the eight sub-slab sampling locations installed in 2009. Two of the soil borings will be converted to permanent groundwater monitoring wells. In addition, one permanent groundwater monitoring well will be installed east and downgradient of Building 30.

- **The Source of the Elevated Sub Slab VOC Concentrations beneath Building 305** – Five soil borings will be conducted in this area in the vicinity of the five sub-slab sampling locations installed in 2009. Three of the soil borings will be converted to permanent groundwater monitoring wells.

- **Groundwater South and East of the 200-Series Buildings** – Viable, existing groundwater monitoring wells in this area will be sampled.

- **Open Spill No. 0007178 Located East of Building 16** – Viable groundwater monitoring wells in this area will be sampled.

- **Building 210** – Following demolition of this structure in accordance with IRM, five soil borings will be conducted in this area. One of the soil borings will be converted to a permanent groundwater monitoring well.

- **Building 211** – Following demolition of this structure in accordance with IRM, five soil borings will be conducted in this area. One of the soil borings will be converted to a permanent groundwater monitoring well.

- **Site-wide Groundwater** – Viable, existing groundwater monitoring wells across the Subject Property, not included in other portions of this investigation, will be sampled.

- **Soil Gas Conditions Along Conduits Leading Off-site and the Subject Property Perimeter** – Possible conduits for soil gas to migrate off-site will be identified. After identifying the conduits, Ames will collect soil gas samples within the conduits, where accessible, along the conduits and around the perimeter of the Subject Property. Wasn't this done in IRM?

- **Small Building East of Building 16** - Two borings will be advanced in this area. One boring will be converted to a permanent groundwater monitoring well.

- **Building 9** - Two borings will be advanced in this area. One boring will be converted to a permanent groundwater monitoring well.

- **Building 3** –Ames will oversee the removal of the existing in-ground dip tank. After the removal of the dip tank, Ames will collect confirmatory soil samples from the excavation sidewalls and bottom.

- **Combined Gridded Areas** – Ames will oversee collection of 1 or 2 near surface soil samples collected from each of the eight Combined Gridded Areas.

3.0 SITE HISTORY

A brief history of the Subject Property is presented below. The following subsections discuss (1) current and past uses of the Subject Property, (2) previous investigations at the Subject Property, (3) previous remedial activities at the Subject Property, and (4) previous approved remedies at the Subject Property. Sources used to develop the site history are cited in Section 2.1 of the *Records Search Report* dated September 25, 2011.

3.1 Current and Past Uses of the Subject Property

In 1868, the Subject Property was vacant land with a few residential dwellings located on the northeast portion. It was shortly thereafter, various industrial buildings were constructed onsite. These industrial buildings mainly consisted of several different companies manufacturing garden tools [the Continental Tool Company (Continental)], railroad and storage[4] facilities.

By 1886, the New York West Shore Railroad (NYWSR) operated at the Subject Property. NYWSR operations consisted of a turnaround, foundry, erecting shop, blacksmith shop (containing one boiler), storage building, boiler building and paint shop. The paint shop operations included oil as well as paint storage. By 1891, several more storage buildings and a Dynamos building had been constructed at the

[4] It is unclear from the research what types of materials were stored in these buildings.

Subject Property. The Dynamos building is believed to have housed a dynamo electric generator[5]. The blacksmith shop had added an area for polishing. By 1897, the West Shore R.R. Shops had been added as a new building located on the northwest portion of the Subject Property.

By 1902, the NYSWR added a sand shed adjacent to the northwest of the foundry, while several other NYWSR buildings were converted into different businesses. By this time, the former erecting building was operated by Continental with operations that included handle storage, finishing, polishing, forging, and machining. Around this time or before, a fuel oil underground storage tank (UST) appears to have been installed adjacent to and southwest of the Continental building. Two small oil and paint storage facilities were present to the south of the Continental building as well as an office building. A former storage building adjacent to the rail turnaround had been converted for use by the Utica Steam Gage Company, with operations consisting of a foundry, boiler, and machining associated with the production of gauges. The blacksmith shop was operated by the Pratt Chuck Company, a manufacturer of hoes and forks. The paint shop was now operated by the Michigan Condensed Milk Company, with operations consisting of four boilers, milk processing equipment, and including kerosene oil and gasoline storage.

By 1907, a large building on the Southeastern portion of the Subject Property had been built and identified as the "N.Y.C. Ice Ho." The Acme Machine Company (Acme) adjoined the Subject Property to the south. Acme's operations appear to have included wood working, a boiler, and storage[6]. The Acme facility had been completely destroyed by fire in 1907 and was in the process of being rebuilt. In about 1907, Continental merged with American Fork and Hoe to become Union Fork and Hoe.

By 1914, operations had significantly expanded. Union Fork and Hoe had added several buildings on the northeast portion of the Subject Property including: a finished goods store building, dry kiln building, stock storage building and finished goods storage building, transformer building and a building labeled "Oil Ho." Toward the northern edge of the Subject Property, a storage building and the foundation for an additional larger building had been added. The Continental office building had been expanded. The railroad turntable was no longer present and had instead been replaced by several permanent rail spurs. The capacity of the fuel oil UST underground storage tank, located adjacent to the Former Continental building was indicated to be 14,000 gallons. The Railroad Foundry had expanded to include a coke pile and a fuel oil tank, both located southwest of the Railroad Foundry Building.

The Pratt Chuck Company had also expanded by 1914. Four smaller storage buildings had been demolished with a larger building constructed in their place. The larger building housed a tumbler press room and a galvanizing, steel storage and japanning[7] room. Other improvements included a finished goods storage building with a portion for armored electric cable making. The Pratt Chuck Company had also established a fork and hoe department (Pratt Fork and Hoe Department) consisting of multiple buildings and processes. Processes conducted at the Pratt Fork and Hoe Department included hardwood storage, finishing handles, painting and packing, machining, and woodworking. A concrete

[5] http://en.wikipedia.org/wiki/Electric_generator#Dynamo

[6] It is unclear from the research what types of materials were stored in the buildings.

[7] http://en.wikipedia.org/wiki/Japanning

pad with two fuel oil aboveground storage tanks (ASTs) was located at the south edge of the Subject Property. The total capacity of the fuel oil storage ASTs was 17,000 gallons. To the north of the Pratt Fork and Hoe Department buildings, a transformer house and 75,000-gallon water tank were also present. The former Michigan Condensed Milk Company operations were now being operated by Borden's Condensed Milk Company (Borden); however, there were no apparent changes to its facility or operations.

By 1923, Union Fork and Hoe had expanded to the northern edge of the Subject Property including additional storage buildings, an aboveground crude oil storage tank of unknown capacity, a woodworking building, a boiler building and a Dynamo building.

By 1938, Borden operations were replaced by The Casein Company of America & The Western Condensing Company (Casein Company); however, the facilities and processes did not appear to have undergone substantive changes. The Union Fork and Hoe Company had also added two fuel oil ASTs (total capacity of 14,000 gallons) west of the Main Building. The western portion of the Pratt Chuck Company appeared as Liberty Works, a subsidiary of Union Fork and Hoe; however, no substantive changes to the buildings or processes were evident. The east portion of the original Pratt Chuck Company (east of the rail spur) continued to be operated by the Pratt Chuck Company. Operations at that time consisted of machining, tumbling, and shipping.

By 1959, the Casein Company buildings had been demolished. The former Pratt Chuck Company facilities were vacant buildings. The Liberty Works buildings were now the Frankfort Transit Warehouse Company, Inc. (a subsidiary of Union Fork and Hoe). Sometime after 1962 (and before 1974), the railroad foundry building had been demolished. The railroad office located on the western boundary of the Subject Property had also been demolished. Union Fork & Hoe acquired approximately 9 acres of land with buildings from the Frankfort Transit Warehouse Company in 1963. Union Fork & Hoe had previously leased this facility. The entirety of the Subject Property was operated as Union Fork & Hoe since 1963.

By 1972, the Subject Property consisted of approximately 40 buildings that occupied an approximately ½-mile stretch along the east side of Main Street. In 1973, a 50-foot by 100-foot building was constructed for storage of steel coils and bars, and equipment in the mill operations was improved with the addition of a two-unit sawdust collecting system. In 1974, a chipping machine was installed to reduce the size of the waste lumber and sell it for mulch or animal bedding. Previously scrap and waste wood from sawmill operations had been burned or hauled away. A powered assembly line was added to the shovel assembly operations in 1975.

Sometime after 1995 and before 2003, Building 30 was erected. There have been no substantive structural changes to the Subject Property since 2003. In April 2006, Ames bought Union Fork & Hoe. In December 2006, the Union Fork & Hoe facility was closed. The Union Fork & Hoe facility has remained closed since December 2006.

3.2 Previous Investigations at the Subject Property

The following is a list of all known investigations conducted at the Subject Property. For further details regarding these investigations please refer to the *Records Search Report* dated September 25, 2011.

- A soil and groundwater investigation performed in late 1984 and early 1985 and conducted by CRA, Inc. (*Hydrogeologic Investigation – Plant Site, Sudakow Landfill & Spill Area*[8]);

- A soil and groundwater investigation performed in November 1988 through October 1989 and conducted by the NYSDEC. (*Geotechnical Investigation*[9]);

- A soil and groundwater investigation performed in January 1990 and conducted by Stetson-Harza. (*Report of Monitoring Well Installation for Union Fork and Hoe Companies*[10]);

- A groundwater investigation performed in December 1991 and February 1992 and conducted by The Hydro Group. (*Groundwater Evaluation Report*[11]);

- A groundwater investigation performed in October 1993 and conducted by Barton and Loguidice, P.C. (B & L). (*Report of Groundwater Remediation Investigation*[12]*);*

- A soil gas investigation performed in October 1993 and conducted by Engineering-Science, Inc. (*Soil Gas Survey Report*[13]);

- A groundwater investigation performed in November 1995 through September 1996 and conducted by B & L. [*Letter Regarding Union Tools Building 13 Spill Investigation (Progress Report)* [14]];

- A groundwater investigation performed in June 1997 and conducted by B & L. (*Union Tools Building 13 Spill Investigation*[15]);

- A soil investigation performed in February 1998 and conducted by Alpha Geoscience, Inc. (Alpha). (*Soil Investigation Report*[16]);

[8] *Hydrogeologic Investigation – Plant Site, Sudakow Landfill & Spill Area* prepared by CRA and dated September 1986
[9] *Geotechnical Investigation* prepared by the NYSDEC and dated February 1990
[10] *Report of Monitoring Well Installation for Union Fork and Hoe Companies* prepared by Stetson-Harza and dated March 1990
[11] Groundwater Evaluation Report prepared by The Hydro Group and dated June 18, 1992
[12] *Report of Groundwater Remediation Investigation – Building 13 prepared by* Barton & Loguidice, P.C. and dated January 1994
[13] *Soil Gas Survey Report* prepared by Engineering-Science, Inc. and dated March 1994
[14] *Letter regarding Union Tools Building 13 Spill Investigation* prepared by B & L and dated October 17, 1996
[15] *Union Tools Building 13 Spill Investigation prepared by Union Tools and dated July 15, 1997;* The investigation was performed by B & L but the report was prepared by Union Tools on Union Tools letterhead
[16] *Soil Investigation Report* prepared by Alpha Geoscience, Inc. and dated February 20, 1008

- A soil and groundwater investigation performed in August and September 2000 and conducted by Ecology, and Environment Engineering, Inc.[17] (*Immediate Investigative Work Assignment Report*[18]);

- A soil investigation performed in March 2002 and conducted by Alpha. (*Soil Sampling Summary Report for Area 4*[19]);

- A soil investigation performed in November and December 2004 and conducted by Alpha. (*Site Investigation Report*[20]);

- A soil and groundwater investigation performed in June-August of 2007 and conducted by BB&J. (*Final Remedial Measures Work Plan*[21]);

- A sub-slab vapor intrusion investigation performed in March of 2009 and conducted by BB&J. (*Vapor Intrusion Results Transmittal Letter*[22]);

- A soil and groundwater remedial action performed in March 2009 through February 2010 and conducted by BB&J. (*Interim Remedial Measures Completion Report*[23]*);* and

- A soil investigation performed in November and December 2009 and conducted by BB&J. (*Delineation Data*[24]).

3.3 Previous Remedial Activities at the Subject Property

The following is a summary of all known remedial actions conducted at the Subject Property.

- **1985 Soil Remediation of Soil impacted with tetrachloroethene (PCE) located west of Building 215** – A remedial action to remove approximately 60 tons of impacted soil related to a release of a mixture of waste paint and used solvent east of Building 215. Refer to Documents 4 and 8 of the RSR for more details concerning the investigation and remediation of this release;

- **1992 Recovery Well System installed west of Building 16** – A groundwater recovery well system was installed west of Building 16. The system operated for approximately 2 to 3 years. Periodically, groundwater samples were collected and analyzed for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). When the concentrations of constituents of concern (COCs) in the groundwater dropped below the reporting limits, use of the recovery

[17] This work was conducted under the order of the NYSDEC.
[18] NYSDEC IIWA prepared by the NYSDEC and dated February 2001
[19] *Soil Sampling Summary Report for Area 4* prepared by Alpha Geosciences, Inc. and dated July 5, 2002
[20] *Site Investigation Report* prepared by Alpha and dated March 23, 2005
[21] *Final Remedial Measures Work Plan* prepared by BB&J and dated July 27, 2007
[22] *Vapor Intrusion Results Letter* prepared by BB&J and dated April 27, 2009
[23] IRM Completion Report prepared by BB&J and dated February 24, 2010
[24] *Delineation Data* prepared by BB&J and dated April 13, 2010

well system was discontinued. In the course of the Interim remedial measures (IRM) activities conducted in 2009/2010, the recovery well system was removed. Refer to reports 39, 41, and 42 of the RSR for more details of the recovery well system;

- **August 2002 Lead-impacted and polychlorinated biphenyls (PCB)-impacted soil removal activities** – Refer to documents 50 and 52 of the RSR for details of the investigation and remediation of this area;

- **April 2009 through February 2010 IRM "hot spot" Removal and Groundwater Extraction at Buildings 16, 203, and 213** – Refer to documents 58, 59, and 62 of the RSR for additional details concerning the investigation and remediation of these areas; and

- **Secondary Spills and Associated Remediation (various dates)** – Various spill cases were assigned to the Subject Property. Small-scale soil excavations were conducted at these locations. Refer to Table 21 of the RSR for a list of spills cases assigned to the Subject Property and their status.

3.4 Previous Approved Remedies at the Subject Property

Rototilling of Impacted Soil – From 1987 to 1989 Union Fork & Hoe participated in a remedial action of soil impacted with a mixture of waste paint and solvent that involved rototilling of the soil. Ames has not reviewed any documents that exclusively relate the rototilling process; however, the remedial activity is mentioned in other documents. Details of the program do not appear to be available, including where it was located, how much soil was involved or whether any analytical data was generated to assess the efficacy of the remedial program.

Air Stripper for the Village Well – In 1991 Union Fork & Hoe agreed to install an air stripper on the Village of Frankfort's municipal well. The air stripper was designed to remove VOCs in the water supply, which were detected in water samples collected from a Village of Frankfort's municipal well (well No. 2) in 1984. Union Fork & Hoe provided $50,000 dollars to the Village of Frankfort to for the operations and maintenance costs of the system. The air stripper system has been successful in removing VOCs from the groundwater.

2012 IRM (Approval pending) – BB&J, on behalf of Ames has submitted an IRM Work Plan to oversee the demolition of the on-site buildings. Approval of the IRM Work Plan is pending.

Based on Ames's knowledge of the Subject Property history and a review of the available documents, no other approved remedies have been implemented at the Subject Property.

4.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

A summary of key project personnel and their responsibilities is presented below. A project organization chart is provided as Figure 12.

4.1 Project Principal

Mr. J. Tim Bradburne, a Qualified Environmental Professional[25] and BB&J Principal, will serve as Project Director. Mr. Bradburne will have overall responsibility for the project. Mr. Bradburne will interface between BB&J's client, Ames, Ames' legal counsel, and the NYSDEC. Mr. Bradburne will have regular direct communication with the Project Engineer.

4.2 Project Engineer

Mr. Mark Millspaugh, P.E. (NY PE 59182) of Sterling Environmental Engineering, P.C. of Latham, New York, will serve as the Senior Project Engineer, and will be responsible for overall coordination of all phases of the project as well as final review responsibilities of all deliverables to the NYSDEC. Mr. Millspaugh will contract directly with Ames and will have "responsible charge" of the project.

4.3 Project Manager

Mr. Richard Garlitz will be responsible for the day-to-day coordination of field and reporting activities. His duties will include management of field personnel, data quality assurance, and communication with the NYSDEC. Mr. Garlitz will also have direct communication with the Project Director, Technical Quality Principal, Project Health and Safety Officer (HSO), Field HSO, and Field Manager.

4.4 Technical Quality Principal

Mr. Andrew Bajorat will serve as the Technical Quality Principal, and will be responsible for overall quality assurance on the project. Mr. Bajorat will review project deliverables and data to evaluate quality and usability. In addition, Mr. Bajorat will interface with the Project Engineer to address any technical issues and provide quality control for the entire project. As needed, Mr. Bajorat will communicate with the laboratory project manager or the QAO to address identified QA/QC concerns. Mr. Bajorat will also validate analytical data and prepare Data Usability Summary Reports (DUSR).

4.5 Project Health and Safety Officer

Ms. Amber Cicotte will serve as the Project Health and Safety Officer and will be responsible for overall health and safety issues on the project. Ms. Cicotte will review and approve the Health and Safety Plan. Ms. Cicotte will oversee a health and safety audit. In addition, Ms. Cicotte will interface with the Project Engineer to address any health and safety issues for the project.

[25] Per DER 10 Table 1.5 and Section 1.3

4.6 Field Health and Safety Officer

Ms. Lydia Wagner will serve as the Field Health and Safety Officer and will be responsible for on-site health and safety issues on the project. Ms. Wagner will review ensure that the Health and Safety Plan is adhered to on-site. In addition, Ms. Wagner will interface with the Project Engineer to address any on-site health and safety issues for the project.

4.7 Data Validator

Ms. Jessica Morrison will serve as Data Validator. In this role, the Data Validator will:

- Review the sampling procedures and certify that the data was collected and analyzed using appropriate procedures;
- Interface with the analytical laboratory to resolve problems; and
- Interface with Technical Quality Principal to resolve problems.

Data Validator and will be responsible for review of the analytical and field data collected during the project. Ms. Morrison will also be responsible for the data usability Summary Report. Ms. Morrison will be independent from any direct involvement in the project.

4.8 Field Manager

Ms. Lydia Wagner will serve as Field Manager and will be responsible for implementing the remedial investigation tasks at the site. Her duties will include sample collection, well development and directing on-site subcontractors and oversight of all other remedial investigation activities.

4.9 Community Relations Contact

Mr. Richard Garlitz will serve as the Community Relations Contact and will be responsible for community relations with respect to the on-going remedial investigation, and possible remedial action, activities conducted at the Subject Property. Mr. Garlitz will interface with the local community, (i.e., neighboring residents and businesses, local community groups, local and State government, and local media) providing responses to any questions they may have and sending out fact sheets when the NYSDEC deems it necessary.

4.10 NYSDEC Project Manager

Mr. William Bennett will serve as the NYSDEC Project Manager. The NYSDEC project manager is responsible for reviewing correspondence and reports on behalf of the NYSDEC in a timely manner, and will present the viewpoint of the NYSDEC during meetings, conversations, and correspondence. Similarly, correspondence from Ames or BB&J directed to the NYSDEC will be addressed to the NYSDEC Project Manager.

4.11 NYSDOH Project Manager

Greg Rys will serve as the New York State Department of Health (NYSDOH) Public Health Specialist. The NYSDOH Public Health Specialist is responsible for issues related to soil vapor.

5.0 DATA OBJECTIVES

Data Objectives for the project are summarized below, but will be discussed in greater detail in the QAPP. Specifically, the subsections below discuss acceptance/performance criteria and data evaluation procedures.

5.1 Acceptance or Performance Criteria

Sampling data will be used to evaluate whether or not remedial alternatives, if necessary, will meet the objectives. Two data confidence levels will be employed in the RI: screening level data and laboratory analysis level data. In general, screening level confidence will apply to field measurements, including photo-ionization detector (PID) measurements, groundwater elevation measurements, and field analyses (i.e., pH, temperature, specific conductivity, and turbidity). Definitive level confidence will apply to samples submitted to an independent laboratory for chemical analysis. Sampling and analytical acceptance and performance criteria such as precision, accuracy, representativeness, comparability, completeness, and sensitivity, are defined in the QAPP (refer to Appendix A).

5.2 Data Evaluation Procedures

The RI scope of work is focused on providing reliable data to identify areas of the Subject Property potentially requiring remediation, defining chemical constituent migration pathways, qualitatively assessing human health and ecological risks, and performing the remedial alternatives evaluation. The investigation will include the collection and analysis of soil, groundwater, and soil gas samples to support remedial action objectives. Definitive level data quality will be required for chemical analysis of soil, groundwater, and soil gas samples. BB&J field personnel will collect environmental samples in accordance with the rationale and protocols described in the QAPP. United States Environmental Protection Agency (USEPA) and NYSDEC-approved sample collection and handling techniques will be used. Soil and groundwater samples for chemical analysis will be analyzed in accordance with USEPA SW-846 methodology to meet the laboratory-level data requirements. The laboratory chemical analyses will be conducted by a NYSDOH Environmental Laboratory Accreditation Program (ELAP) Contract Laboratory Protocol (CLP)-certified laboratory. Soil gas will be analyzed using method TO-15 according to the NYSDOH guidance[26]. A full (Category B) deliverables package will be provided for all remedial investigation samples (i.e., excluding waste profile samples). Analytical results for remedial investigation samples will be evaluated by the QAO for evaluation of the accuracy and precision of the analytical results. A Data Usability Summary Report (DUSR) will be prepared to describe the compliance of the

[26] *Final Guidance for Evaluating Soil Vapor Intrusion* in the State of New York dated October 2006

analyses with the analytical method protocols detailed in the NYSDEC Analytical Services Protocol (ASP). The DUSR will provide a determination of whether the data meets the project-specific criteria for data quality and data use. The validation effort will be completed in accordance with NYSDEC Division of Environmental Remediation DUSR guidelines provided in Appendix 2B of DER-10. Specifically the DUSR will include a sample delivery group narrative, contract lab sample information sheets, NYSDEC data package summary forms, chain-of-custody forms, test analyses results, and the other components outlined in DER-10 Appendix 2B Section 1.0 (b) 1 i through x.

6.0 SCOPE OF WORK

The RI will focus on investigating the Subject Property for potential contaminants in soil, groundwater and soil gas. The RI investigation of the approximately 40-acre Subject Property will also supplement the previous investigations conducted at the Subject Property. The major components of the RI tasks are described in detail below. RI sample and groundwater monitoring well locations are illustrated on Figures 2 through 11. Tables 1a through 1c provide summaries of the samples and analyses to be collected/performed as part of the RI.

6.1 Investigative Data Collection

The following investigative activities will be conducted to further investigate the aforementioned AOCs and other areas:

- **Former Fuel Oil Storage Area Adjacent and West of Building 16** – Twenty-five soil borings were previously conducted in this area in an effort to delineate the impacted soil. Results of the initial delineation indicate that further delineation is required north, south, and west of the initial delineation grid. Therefore, an additional 38 soil borings be advanced along 25-foot centers to extend the original grid in the north, south, and west directions. Building 16 and the adjacent excavated area border the grid to the east and thus do not require additional delineation. The borings will be advanced to a depth of 35 feet below ground surface (bgs). Within each boring, soil samples will be collected every ten feet and at the termination depth and will be analyzed for VOCs by USEPA Method 8260B and for SVOCs by USEPA method 8270C[27]. One of the proposed soil borings will be converted to a permanent groundwater monitoring well. The groundwater sample collected from the well will be analyzed for VOCs by USEPA Method 8260B and SVOCs by USEPA Method 8270C. Proposed soil boring locations are provided on Figure 2, *Site Plan Showing Proposed Soil Boring and Groundwater Monitoring Well Locations – West of Building 16*;

- **Former Railroad Operations Conducted West of Building 16 in the Current Parking Lot Area** – Eight soil borings will be conducted in this area. The borings will be advanced to a depth of 20 feet below ground surface (bgs). One of the proposed soil borings will be converted to a

[27] Per Commissioner Policy on Soil Cleanup Guidance (CP-51)

permanent groundwater monitoring well. The soil boring to be converted to a monitoring will be selected based in field observations. Soil samples will be collected at the following intervals: (1) zero to 1feet bgs, (2) a "worst case" interval, defined by the highest field screening reading or in the absence of a reading above background, the sample exhibiting the most notable olfactory or visual indication of a potential impact, (3) the interval just above the groundwater table, and if multiple impacted intervals are encountered then (4) an additional soil sample will be collected from the second most impacted interval. If the "worst case" sample interval duplicates any other four sample intervals, no additional "worst case" sample will be collected from that location. Samples will be analyzed for Target Compound List +30 (TCL+30)[28] VOCs and SVOCs by USEPA Method 8260B/8270C and for Target Analyte List (TAL)[29] metals by USEPA Methods 6010B/7470/7471A. Groundwater samples collected from these wells will be analyzed using the aforementioned USEPA methods. Soil boring locations are provided on Figure 3, *Site Plan Showing Proposed Soil Boring Locations at Historic Railroad Operations – AOC 2*;

- **Source of the Elevated Sub Slab VOC Concentrations beneath Building 30** – Ames proposes that eight soil borings be installed in this area in the vicinity of the eight sub-slab sampling locations installed in 2009. The borings will be advance to a depth of 20 feet below ground surface (bgs). Soil samples will be collected at the following intervals: ((1) zero 1 feet bgs, (2) a "worst case" interval, defined by the highest field screening reading or in the absence of a reading above background, the sample exhibiting the most notable olfactory or visual indication of a potential impact, (3) the interval just above the groundwater table, and if multiple impacted intervals are encountered then (4) an additional soil sample will be collected from the second most impacted interval. If the "worst case" sample interval duplicates any other four sample intervals, no additional "worst case" sample will be collected from that location. Samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Method 8260B/8270C and for metals using the TAL by USEPA Methods 6010B/7470/7471A. One boring will be converted to a permanent groundwater monitoring well. The well will be installed in the most impacted boring or the boring located adjacent to the highest sub-slab concentration from 2009. In addition, one permanent groundwater monitoring well will be installed down gradient (east of Building 30). Groundwater samples collected from these wells will be analyzed using the aforementioned USEPA methods. Soil boring locations are provided on Figure 4, *Site Plan Showing Proposed Soil Boring Locations – Building 30 – AOC 3*;

- **Source of the Elevated Sub Slab Concentrations of VOCs beneath Building 305** – Five soil borings will be conducted in this area in the vicinity of the five sub-slab sampling locations installed in 2009. The borings will be advance to a depth of 20 feet below ground surface (bgs). Soil samples will be collected at the following intervals: (1) zero 1 feet bgs, (2) a "worst case" interval, defined by the highest field screening reading or in the absence of a reading above

[28] As defined by USEPA "Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration"
[29] As defined by USEPA "Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration"

background, the sample exhibiting the most notable olfactory or visual indication of a potential impact, (3) the interval just above the groundwater table, and if multiple impacted intervals are encountered then (4) an additional soil sample will be collected from the second most impacted interval. If the "worst case" sample interval duplicates any other four sample intervals, no additional "worst case" sample will be collected from that location. Samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Method 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. One of the soil borings will be converted to a permanent groundwater monitoring well. The well will be installed in the most impacted boring or the boring located adjacent to the highest sub-slab concentration from 2009. In addition, one permanent groundwater monitoring well will be installed down gradient (east of Building 305). Groundwater samples collected from these wells will be analyzed using the aforementioned USEPA methods. Soil boring locations are provided on Figure 5, *Site Plan Showing Proposed Soil Boring Locations – Building 305 – AOC 4*;

- **Groundwater South and East of the 200-Series Buildings** – All viable[30] groundwater monitoring wells in this area will be sampled. Samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. Groundwater monitoring well sampling locations are provided on Figure 6, *Site Plan Showing Proposed Groundwater Monitoring Well Sampling Locations – 200 Series Buildings – AOC 5*;

- **Open Spill No. 0007178 Located East of Building 16 –** All viable groundwater monitoring wells in this area will be sampled. Groundwater samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. Groundwater monitoring well sampling locations are provided on Fi*gure 7, Site Plan Showing Proposed Groundwater Monitoring Well Sampling Locations - Open Spill East of Building 16*;

- **Building 209 –** Five soil borings will be advanced in this area to a depth of 20 feet below ground surface (bgs). Soil samples will be collected at the following intervals: ((1) zero 1 feet bgs, (2) a "worst case" interval, defined by the highest field screening reading or in the absence of a reading above background, the sample exhibiting the most notable olfactory or visual indication of a potential impact, (3) the interval just above the groundwater table, and if multiple impacted intervals are encountered (4) an additional soil sample will be collected from the second most impacted interval. If the "worst case" sample interval duplicates any other four sample intervals, no additional "worst case" sample will be collected from that location. Samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. Based on field observations, one of the proposed soil borings will be converted to a permanent groundwater monitoring well. The groundwater sample collected from the well will be analyzed using the aforementioned USEPA methods.

[30] If a well cannot be located or damaged to the point where it cannot be sampled, BB&J will consult with the NYSDEC to determine if the well is in a position to provide valuable groundwater data. If it is determined that the well is in a position to provide valuable data, BB&J will oversee the re-installation of the well.

Proposed soil boring locations are provided on Figure 8, *Site Plan Showing Proposed Soil Boring Locations – Building 209*;

- **Building 210** – Five soil borings be advanced in this area to a depth of 20 feet below ground surface (bgs). Soil samples will be collected at the following intervals (1) zero 1 feet bgs, (2) a "worst case" interval, defined by the highest field screening reading or in the absence of a reading above background, the sample exhibiting the most notable olfactory or visual indication of a potential impact, (3) the interval just above the groundwater table, and if multiple impacted intervals are encountered (4) an additional soil sample will be collected from the second most impacted interval. If the "worst case" sample interval duplicates any other four sample intervals, no additional "worst case" sample will be collected from that location. Soil samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. Based on field observations, one boring will be converted to a permanent groundwater monitoring well. The groundwater sample collected from the well will be analyzed using the aforementioned USEPA methods. Proposed soil boring locations are provided on Figure 9, *Site Plan Showing Proposed Soil Boring and Groundwater Monitoring Well Locations – Building 210*;

- **Site-wide Groundwater** – Viable pre-existing groundwater monitoring wells, not included in the aforementioned areas, across the Subject Property will be sampled. Groundwater samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. Samples will be collected in two rounds during different times of the year. Groundwater monitoring well sampling locations are provided on Figure 10, *Site Plan Showing Groundwater Monitoring Well Locations to Be Sampled and Surveyed*; and

- **Soil Gas Conditions Along Conduits Leading Off-site and the Subject Property Perimeter** – Possible conduits for soil gas to migrate off-site will be identified. After identifying the conduits BB&J will collect soil gas samples along the conduits, where accessible, along the conduits, and around perimeter of the Subject Property. For buried sections of conduit samples will be collected at the point the conduit leaves or enters the Subject Property. In addition, BB&J will collect a soil gas sample every 200 feet along the perimeter of the Subject Property where there are residential or commercial buildings adjacent to the Subject Property Boundary. Soil gas samples will be analyzed for VOCs by Method TO-15. Proposed soil gas sampling locations are provided on Figure 11, *Site Plan Showing Known Utilities and Proposed Soil Gas Sampling Locations*.

- **Small Buildings East of Building 16** – Based on historical research, these buildings formerly were used for the storage of chemicals. To Ames' knowledge, no borings have previously been advanced in or near these buildings. One soil boring will be advanced in each of the buildings to a depth of 20 feet bgs. If based on field observations impacted soil is encountered in either soil boring, one of the soil borings will be converted to a permanent groundwater monitoring well. Soil samples will be collected at the following intervals (1) zero 1 feet bgs, (2) a "worst case" interval, defined by the highest field screening reading or in the absence of a reading above

background, the sample exhibiting the most notable olfactory or visual indication of a potential impact, (3) the interval just above the groundwater table, and if multiple impacted intervals are encountered (4) an additional soil sample will be collected from the second most impacted interval. If the "worst case" sample interval duplicates any other four sample intervals, no additional "worst case" sample will be collected from that location. Soil samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. Groundwater samples collected from the well, if installed, will be analyzed using the aforementioned USEPA methods. Proposed soil boring locations are provided on Figure 12, *Site Plan Showing Proposed Soil Boring Locations - Small Building East of Building 16*;

- **Building 3** – During a recent site reconnaissance with the NYSDEC, an in-ground dip tank was observed in Building 3. Ames will provide for removal of this in-ground dip tank. After the removal of the dip tank, confirmatory soil samples from the excavation sidewalls and bottom will be collected. Specifically, one soil sample from each of the sidewalls and one bottom sample will be collected. Samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. If the confirmatory soil samples do not exhibit concentrations of COCs above Soil Cleanup Objectives (SCOs) then the excavation will be backfilled to grade with clean fill. If the confirmatory samples exhibit concentrations of COCs above SCOs, Ames will incorporate this area into the Remedial Action Work Plan to be written following analysis of the results of the executed revised RIWP. Confirmatory soil sampling locations are provided on Figure 13, *Site Plan Showing Proposed Confirmatory Soil Sampling Locations- Building 3;*

- **Building 9** - Based on historical research, this building formerly were used for the coating handles. To Ames' knowledge, no borings have previously been advanced in or near these buildings. Two soil borings will be advanced in this area to a depth of 20 feet bgs. If based on field observations impacted soil is encountered in either soil boring, one of the soil borings will be converted to a permanent groundwater monitoring well. Soil samples will be collected at the following intervals (1) zero 1 feet bgs, (2) a "worst case" interval, defined by the highest field screening reading or in the absence of a reading above background, the sample exhibiting the most notable olfactory or visual indication of a potential impact, (3) the interval just above the groundwater table, and if multiple impacted intervals are encountered (4) an additional soil sample will be collected from the second most impacted interval. If the "worst case" sample interval duplicates any other four sample intervals, no additional "worst case" sample will be collected from that location. Soil samples will be analyzed for TCL+30 VOCs and SVOCs by USEPA Methods 8260B/8270C and for TAL metals by USEPA Method 6010B/7470/7471A. Groundwater samples collected from the well, if installed, will be analyzed using the aforementioned USEPA methods. Proposed soil boring locations are provided on Figure 15, *Site Plan Showing Proposed Soil Boring Locations - Building 9*;

- **Combined Gridded Areas** – In the NYSDEC February 24, 2012 response letter, the NYSDEC devised a grid plan across the Subject Property in order to help identify areas that the NYSDEC wished to have the near surface soil investigated for an expanded list of analytes including VOCs, SVOCs, TAL metals , polychlorinated biphenyls, and pesticides. Based on discussions with the NYSDEC, it was suggested that Ames could combine several grid boxes into a larger Combined Gridded Area. Therefore Ames combined the grid boxes into eight separate areas adjacent to the perimeter of the Subject Property. Refer to Figure 14 for a *Site Plan Showing the Proposed Soil Boring Locations – Combined Gridded Areas*. Ames will provide for the advancement of two near surface borings in each of the eight Combined Gridded Areas. Samples will be collected within the first foot of soil bgs. The samples will be analyzed for the following constituents: TCL+30 VOCs, SVOCs, TAL metals, polychlorinated biphenyls by US EPA Method 8082, and pesticides by US EPA Method 8081. Soil boring locations are provided on Figure 14, *Site Plan Showing Proposed Soil Boring Locations – Combined Gridded Areas*.

Refer to Appendix A – Field Procedures for additional details related to the following:

- Soil, groundwater, and soil gas sample collection;
- Soil classification;
- Monitoring well installation;
- Field screening procedures;
- Sample collection quality control/quality assurance procedures;
- Groundwater monitoring well purging and sampling procedures;
- Equipment calibration and decontamination;
- Soil gas sampling methodology including ambient air sampling and tracer gas use;
- Soil gas collection point installation details;
- Soil gas sample collection procedure;
- Soil boring location by GPS methodology; and
- The handling, storage, and disposal of investigative-derived waste (IDW).

6.2 Hydrogeological Data Collection

As part of RI Activities, Ames will collect data necessary to develop a better understanding of hydrological conditions at the Subject Property. Collection of the hydrological data will generally consist of two tasks: (1) collection of soil samples for physical soil characteristic analysis and (2) slug testing.

6.2.1 Physical Soil Characteristic Sampling

Using a three-foot long, and three-inch diameter steel Shelby tube, undisturbed soil samples from representative soil intervals will be collected to assess the physical characteristics of the Subject Property subsurface. After the Shelby tube is retrieved, both ends will be sealed with wax and the sample will be shipped to a geotechnical laboratory. Hydrogeological soil parameters to be tested include: porosity by American Society for Testing and Materials (ASTM) method 854, bulk density by ASTM method 2937-94, fraction of organic content by ASTM method D2974, grain size by ASTM D422,

sieve analysis by ASTM method C136, permeability by ASTM method 9100, and moisture content by ASTM method 2540B. These hydrogeological parameters will be used to assist fate and transport modeling and other calculations to better define the on-site impacts to soil and groundwater and/or help determine the efficacy of certain remedies such as monitored natural attenuation. Ames proposes to collect three Shelby tubes in the "smear zone", (i.e., the zone just above the water table encountered during drilling).

In addition, BB&J will oversee the advancement of 3 soil borings to bedrock to determine the depth to bedrock and the properties of the soil from surface to bedrock depth.

6.2.2 Slug Testing

Using a data logger, a solid polyvinyl chloride slug, and polypropylene rope, in-situ slug testing will be performed at three on-site wells. Specifically, slug test data will be obtained from two separate wells in the vicinity of the 200-Series buildings and one well in the vicinity of Building 16. These areas are selected because there has been impacted groundwater in these areas in the past. This slug test data will be used to generate hydraulic conductivity in these areas.

6.3 Geochemical Data Collection

Using a Horiba water quality instrument, on-site groundwater from each viable groundwater monitoring well will be analyzed for such geochemical parameters as dissolved oxygen, oxygen reduction potential, pH, temperature, salinity, total dissolved solids, and specific conductance. In addition, three separate groundwater samples will be collected and analyzed for parameters related to monitored natural attenuation such as: alkalinity USEPA Method 2320B, chloride by USEPA Method 9056, iron USEPA Method 6010B, reactive sulfide by USEPA Method 9030/9030B, manganese by USEPA Method 6010B, and nitrate by method 9056. These geochemical parameters will be used to assist fate and transport modeling and other calculations to better define the on-site impacts to soil and groundwater and/or help determine the efficacy of certain remedies such as natural attenuation. For additional details concerning the collection of geochemical data in groundwater, refer to Appendix A – Field Procedures.

6.4 Sample Location Survey

All new and existing monitoring wells at the Subject Property will be surveyed. In addition, Ames will identify and, assuming permission for off-site work is granted, will gauge and survey all off-site monitoring wells, observation wells, and production. At each location and using a level and rod, a New York-registered professional surveyor will measure and record (1) the ground surface, (2) top of protective casing and (3) the top of the solid polyvinyl chloride (PVC) well riser. The datum reference point for each will be the north side. In addition several relatively permanent landmarks, such as building corners, utility man holes, or road curbs will also be surveyed. The vertical elevation control will be the National Geodetic Vertical Datum (NGVD) as corrected in 1929 and recorded to 0.1 feet. This information coupled with the depth to groundwater information will be used to determine the direction of groundwater flow and the hydraulic gradient. According to the United States Geological Survey

database, there are no stream gauges located on the Mohawk River in Frankfort, New York. Therefore, Ames will be unable to survey the stream gauge point and correlate that information with the other survey data.

In addition, locations of the soil borings will be recorded using a hand-held global position survey (GPS) instrument[31]. The soil boring GPS data will be used for approximate vertical control when placing these locations on a site figure. GPS data will have a horizontal accuracy of within one foot. The Topcon GRS-1 uses the GNASS, satellite constellations, which is a combination of the North American GPS and the Russian GLONASS[32] technologies for the initial reading and uses the Wide Area Augmentation System (WAAS) for deviation correction.

6.5 Housekeeping and Decommissioning

Also, Ames will provide for the following tasks to address to further decommission the site

- **Removal of the In-ground Dip Tank in Building 3** – Ames will provide for removal of an in-ground dip tank located in Building 3. After removal, if no release is discovered, confirmatory samples from the excavation sidewalls and bottom will be collected for VOCs and SVOC analysis. Sample results will be included in the Remedial Investigation Completion Report.

- **Fence Repair** – At the request of the NYSDEC, in late March, Ames provided for the repair of the exterior fence by Rommel Fence of Poland, New York. Approximately 150 linear feet was repaired in five separate sections along Main Street and along the rear of the facility.

In addition, Ames will address the following items from the NYSDEC February 24, 2012 response letter.

- Human Health Assessment – Ames understands that the NYSDEC will require a Qualitative Human Health Exposure Assessment in accordance with DER-10, Appendix 3 B;
- Assessment and Demolition of Structures – Outside of the Consent Order, Ames is in the process of evaluating its options for demolition of the on-site buildings. If demolition, occurs the structural assessment will not be necessary, if demolition is not chosen by Ames, prior to the investigation, BB&J will oversee a structural assessment by a New York-certified structural engineer as well as the demolition of Buildings 209 and 210 as previously discussed with the NYSDEC. If performed, BB&J will report the results of the structural survey to the NYSDEC prior to the commencement of the investigation. IRM

[31] Topcon Model number GRS 1

[32] Global Navigation Satellite System

6.6 Fish and Wildlife Resource Impact Analysis (FWRIA)

In addition, BB&J will conduct a FWRIA Part 1 in accordance with DER-10 Section 3.10.1 (c). This will include the following:

- Identification of all fish and wildlife resources based on knowledge of the Subject Property and a search of NYSDEC records and/or other sources. If no resources are identified on the Subject Property, adjacent to, or downgradient of the Subject Property and the lack of resources is not due to impact from onsite COCs, no further work on the FWRIA will be required. Any resources identified will be identified on a figure. The base map for the figure will be derived from such sources as aerial photographs, ground-level photographs, United States Geological Survey (USGS) topographic maps, or soil maps. Maps will be drawn to a scale that allows features to be easily discerned;

- Description of the resources on the Subject Property and within a quarter-mile of the Subject Property. Much of the information required for the description of the resources may be based on existing knowledge of the Subject Property and the search of NYSDEC records (including the Division of Fish, Wildlife and Marine Resources), United States Fish and Wildlife Services (USFW), Natural Resource Conservation Services (NRSC[33]) or other sources. . If the Subject Property is determined to contain extensive resources, field verification may be necessary. However, none is anticipated at this time in this Work Plan. If the resources that may be affected by on-site COCs exist further than one-half mile from the Subject Property, this information will be also provided;

- Identification of COC migration pathways and any fish and wildlife exposure pathways;

- Identification of COCs of ecological concern; and

- Based on the resources and pathways identified and the toxicity of the COCs of ecological concern, the FWRIA Part 1 will draw conclusions regarding the actual or potential adverse impacts to fish and wildlife resources.

7.0 REPORTING

Upon completion of the RI field work, a comprehensive Remedial Investigation Report (RIR) will be submitted to the NYSDEC summarizing the tasks completed as described below.

The RIR will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation.

- Introduction and background;

[33] United States Department of Agriculture (USDA)

- A description of the site and the overall scope of the investigation;
- A description of the field procedures and methods performed during the RI;
- A discussion of the nature and rationale for any significant variances from the scope of work described in this Work Plan;
- The data obtained during the RI and historical data considered to be of useable quality;
- The results of an assessment of the achievement of RI acceptance/performance criteria as specified in the QAPP;
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Subject Property, and an evaluation of the lateral and vertical movement of groundwater;
- Conclusions regarding the extent and character of environmental impact in the media being investigated;
- The conclusions of the qualitative exposure assessment and fish and wildlife impact analysis, if applicable; and
- Supporting RI data including boring logs, monitoring well construction diagrams, laboratory analytical reports, field inspection forms, disposal documentation, etc.

7.1 Data Submittal and Validation

In addition, Ames will provide for third-party data review by a qualified, independent data validation expert. Specifically, a DUSR will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per Appendix 2B of the DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report.

7.2 Site Boundary

Ames generally understands and agrees with the NYSDEC's understanding of the boundaries of the Subject Property, with the exception of the southernmost parcel, 112.82-3-35.1. Specifically. according to Ames' understanding of the sale of the southernmost portion of the former Union Fork & Hoe property to the current owner, this parcel is no longer owned by Ames. Ames understands that the State Property database currently indicates that the parcel is owned by Ames. Ames will provide the sale documents to the NYSDEC and all other concerned agencies in order to remedy this error. Until that time, Ames understands that the NYSDEC will consider this parcel as part of the Subject Property.

7.3 Report Certification

Ames has contracted with Mr. Mark Millspaugh of Sterling Environmental Engineering, PC to serve as the New York–registered Professional Engineer for the project.

8.0 INVESTIGATION SUPPORT DOCUMENTS

8.1 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) has been prepared as a stand-alone document for the RI activities described herein. Refer to Appendix B for the QAPP. The QAPP dictates implementation of the investigation tasks delineated in this RIWP. The QAPP will assure the accuracy and precision of data collection during the site characterization and data interpretation periods. The QAPP identifies procedures for analytical requirements necessary to assure compliance with, in the case of soil and groundwater samples, USEPA SW-846 methodology, and, in the case of soil gas samples, NYSDOH guidance. The QAPP has considered the following:

- *USEPA's Requirements for Quality Assurance Project Plans* (EPA QA/G-5) dated December 2002;
- The Intergovernmental Data Quality Task Force's[34] *Uniform Federal Policy for QAPPs* dated March 2005;
- NYSDOH's Final Guidance for Soil Vapor Intrusion in the State of New York dated October 2006; and
- NYSDEC's *DER-10: Technical Guidance for Site Investigation and Remediation,* dated May 2010.

8.2 Health and Safety Plan

A Site Health and Safety Plan (HSP) has been prepared in accordance with 40 CFR 300.150 and 29 CFR 1910.120 for the proposed RI. A copy of the HSP is included as Appendix C of this RIWP. The HSP will be enacted by BB&J personnel engaged in RI field activities in accordance with the requirements of 29 CFR 1910.120. The HSP covers on-site investigation activities. Subcontractors will be required to develop and implement a HSP as stringent as or more stringent than BB&J's HSP to cover their own activities. BB&J will make subcontractors aware of its HSP and a copy will be provided to them for information purposes only (i.e. no reliance by subcontractors on the BB&J HSP).

A member of the field team will be designated to serve as the on-site Field Health and Safety Officer throughout the field program. This person will report directly to the Project Engineer and have a direct line of communication to the Project Health and Safety Officer.

The HSP will be subject to revision as necessary, based on new information that is discovered during the field investigation. The HSP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan (CAMP) that describes required particulate and vapor monitoring designed to protect the neighboring community during intrusive site investigation activities. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDOH's Generic Community Air Monitoring Plan (dated December 2002) and NYSDEC

[34] Consists of USEPA, the United States Department of Defense, and the US Department of Energy

Technical Assistance and Guidance Memorandum (TAGM) 4031: Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

8.3 Community Air Monitoring Program (CAMP)

Ames will prepare a CAMP in accordance with DER-10, Appendix 1A. Based on the nature of the constituents of concern, real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the work area will be necessary. The Community Air Monitoring Plan will include:

- VOCs will be monitored continuously at a downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 parts per million (ppm) above background levels, work activities will be halted and monitoring continued according to the Vapor Emission Response Plan. All readings will be recorded and will be available for State personnel review.
- Particulates will be continuously monitored upwind, downwind, and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 100 micrograms per cubic meter greater than the upwind particulate level, then dust suppression measures will be employed. All readings will be recorded and will be available for NYSDEC personnel review.

Vapor Emission Response Plan

If total organic vapor levels exceed 5 ppm above background levels, work activities will be halted and monitoring continued. If the organic vapor levels drop below 5 ppm above background levels, work activities can continue. If total organic vapor levels exceed 5 ppm above background levels but below 25 ppm above background levels at the perimeter of the work area, work can resume provided that the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, work must be shut down. When a work shutdown occurs, downwind monitoring as directed by the safety officer will be implemented to ensure that vapor emission does not impact the residential or commercial structure at levels exceeding those specified in the Major Emission Section.

Major Vapor Emission

If any organic vapors greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial structure, whichever is first, all work activities will be halted.

If, following the cessation of the work activities, or as a result of an emergency, organic vapor levels persist above 5 ppm above background 200 feet downwind or half the distance from the nearest residential or commercial structure from the work area, then the air quality must be monitored within 20 feet of the nearest residential or commercial structure (20-foot zone).

If efforts to abate the emission source are unsuccessful and if the following levels persist for more than thirty minutes in the 20-foot zone then the Major Vapor Emission Response Plan will automatically be placed into effect if organic vapor levels are approaching above 5 ppm above background.

However, the Major Vapor Emission Response Plan will be immediately placed in effect if the levels of organic vapors exceed 10 ppm above background.

8.4 Community Participation Plan

In accordance with the Consent Order, a Citizen Participation Plan (CPP) has been is submitted to the NYSDEC and NYSDOH for review. The CPP, included as Appendix D, meets the requirements of NYSDEC's DER-23 Citizen's Participation Handbook for Remedial Programs and NYSDEC's DER-10 guidance.

8.5 Electronic Submittals of Reports and Data

Based on discussion with the NYSDEC, the NYSDEC's electronic data submittal format, Electronic Data deliverable (EDD), may not be required for this project. Instead, NYSDEC is considering allowing use of a Computer-Aided Drawing (CAD)-based multi layered electronic interactive presentation, such as that previously prepared by BB&J for the March 9, 2012 meeting. Such a presentation would allow both the NYSDEC and Ames to share data in an efficient and effective manner. Ames understands that the NYSDEC is still evaluating BB&J's CAD-Based system. As such, if NYSDEC elects not to allow the CAD-based submittal, data may have to be converted the EDD format.

8.6 Human Health Assessment

BB&J will perform a Qualitative Human Health Exposure Assessment (Exposure Assessment) in accordance with DER-10, Appendix 3 B. At a minimum the Exposure Assessment will include the following:

- A description of the contaminant sources including the location of the contaminant release to the environment (any waste disposal area or point of discharge) or if the original source is unknown, the contaminated environmental medium (soil, indoor or outdoor air, biota, water) at the point of exposure;
- An explanation of the contaminant release and transport mechanisms to the exposed populations;
- Identification of all potential exposure points where actual or potential human contact with a contaminated medium may occur;
- A description of the routes of exposure (i.e., ingestion, inhalation, dermal absorption); and
- A characterization of the receptor populations who may be exposed to contaminants at a point of exposure.

In addition, BB&J will provide a table, as outlined on page 221 of the DER-10 Technical Guidance document.

9.0 PROJECT SCHEDULE AND SEQUENCE OF EVENTS

Figure 12 presents the tentative project schedule for planned remedial investigation. As noted, the start of field activities is dependent on NYSDEC approval of the RIWP.

10.0 REFERENCES

1. *Hydrogeologic Investigation – Plant Site, Sudakow Landfill, and Spill Area* dated September 1986 prepared by Conestoga-Rovers & Associates (CRA) on behalf of Union Tools, and prepared for Whiteman, Osterman, & Hanna (WO&H) of Albany, New York;

2. *Geotechnical Investigation* dated February 1990 prepared by NYSDEC and prepared for the Village of Frankfort;

3. *Report of Monitoring Well Installation* dated March 1990 prepared by Stetson-Harza and prepared for Union Tools;

4. *Laboratory Analytical Report Transmittal Letter* dated December 23, 1992, prepared by Union Fork and Hoe Companies, prepared for the NYSDEC;

5. *Report of Groundwater Remediation Investigation – Building 13* dated January 1994, prepared by Barton & Loguidice, P.C. (B & L) on behalf of Union Tools, and prepared for the NYSDEC;

6. *Soil Gas Survey Report* dated March 1994 prepared by Engineering-Science, Inc. of Liverpool, New York on behalf of Union Tools and prepared for the NYSDEC;

7. *OW-6 Progress Report* dated May 16, 1995 prepared by B & L of Syracuse, New York and prepared for Union Tools;

8. *Union Tools Building 13 Spill Investigation* dated July 15, 1997 prepared by Union Tools and prepared for the NYSDEC;

9. *Soil Investigation Report* dated February 20, 1998 prepared by Alpha Geoscience, Inc. (Alpha) and prepared for Union Tools;

10. *Union Tools History* dated January 15, 1998 prepared by Union Tools and prepared for Union Tools;

11. *Immediate Investigation Work Assignment – Union Tools Site*, dated February 2001, prepared by the NYSDEC and prepared for the NYSDEC;

12. *Soil Sampling Summary Report for Area 4* dated July 5, 2002 prepared by Alpha and prepared for the NYSDEC;

13. *Site Investigation Report* dated March 23, 2005 prepared by Alpha and prepared for Union Tools;

14. *Final Remedial Measures Work Plan* dated July 27, 2007 prepared by BB&J on behalf of Ames True Temper (Ames) and prepared for NYSDEC;

15. *Vapor Intrusion Results Transmittal Letter* dated April 27, 2009 prepared by BB&J on behalf of Ames and prepared for NYSDEC;

16. *Interim Remedial Measures Completion Report* dated February 24, 2010 prepared by BB&J on behalf of Ames and prepared for NYSDEC;

17. *Delineation Data* dated April 13, 2010 prepared by BB&J on behalf of Ames and prepared for NYSDEC;

18. *RSR* prepared by BB&J and dated September 26, 2011;

19. Site Plans - divided into two sections, 1965, amended 1984;

20. Existing Assembly Layout – divided into three sections, undated;

21. Underground Utilities Plan, 2000;

22. Sanitary and Storm Sewer Plans, 1994;

23. Existing and proposed Storm Sewer Junction Plans, 2002 and 2003.

24. Village of Frankfort Tax Assessor Information:

25. Sanborn Fire Insurance Maps;

26. MacRAE's Industrial Directory;

27. United States Geological Survey topographic maps;

28. National Wetland Inventory wetlands and flood maps;

29. City directories;

30. NYSDEC GIS on-line data http://www.dec.ny.gov/geodata/DiscoveryServlet; and

31. Aerial photographs dated 1886, 1891, 1987, 1902, 1907, 1914, 1923, 1938, and 1962.

11.0 CERTIFICATION

I, Mark Millspaugh, certify that I am a New York State registered professional engineer and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and is in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities will be performed in accordance with the DER-approved work plan and any DER-approved modifications.

_____

Mark Millspaugh, P.E.
NY PE XXXXXXX

TABLES

Table 1a: Summary and Sampling Rationale of Proposed Soil Borings

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Building 1	Storage of Finished Tools	None	None	The nature of the past processes do not warrant investigation	None
Building 2	Storage of Finished Agricultural Products	None	None	The nature of the past processes do not warrant investigation	None
Building 3 (See Figure 13 of the RIWP)	Storage of Paint and Dipping	VOCs, metals	Former Dip Room - Dip tank to be removed; if impacted soil is encountered, it will be excavated and five confirmatory samples will be collected; if no impacted soil encountered, five confirmatory samples will be collected from excavation sidewalls and bottom prior to back filling excavation; sample names will be UFH-BLDG3-DT-1 through 5	Due to presence of uninvestigated dip tank; subsurface investigation is warranted; soil samples will be collected, if there are soil impacts groundwater wells will be installed in this area.	VOCs, SVOCs, TAL metals
Building 4	Storage of Handles	None	None	The nature of the past processes do not warrant investigation	None
Building 5	Metal Storage, Offices, and Showroom	None	None	The nature of the past processes do not warrant investigation	None
Building 6	Offices	None	None	The nature of the past processes do not warrant investigation	None
Building 8	Storage of Agricultural Implements and Metal Parts	None	None	The nature of the past processes do not warrant investigation	None
Building 11	Switches	VOCs, SVOCs (related to Building 13/16 Fuel Oil Release	None	This area was previously investigated in the 2007 BB&J Investigation. In addition, this area was the target of remedial activities performed in 2009/2010.	None
Building 12	Machine Shop	VOCs, SVOCs (related to Building 13/16 Fuel Oil Release	None	This area was previously investigated in the 2007 BB&J Investigation. In addition, this area was the target of remedial activities performed in 2009/2010.	None
Building 13	Fuel Oil Storage	VOCs, SVOCs (related to Building 13/16 Fuel Oil Release	None	This area was previously investigated in the 2007 BB&J Investigation. In addition, this area was the target of remedial activities performed in 2009/2010.	None

Table 1a: Summary and Sampling Rationale of Proposed Soil Borings

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Building 14	Storage of Sawdust	VOCs, SVOCs (related to Building 13/16 Fuel Oil Release	None	This area was previously investigated in the 2007 BB&J Investigation. In addition, this area was the target of remedial activities performed in 2009/2010.	None
Building 15	Boilers	VOCs, SVOCs (related to Building 13/16 Fuel Oil Release	None	This area was previously investigated in the 2007 BB&J Investigation. In addition, this area was the target of remedial activities performed in 2009/2010.	None
Building 16 - AOC-1 (See Figure 2 of RIWP)	Forge	VOCs, SVOCs (related to Building 13/16 Fuel Oil Release	Thirty-eight delineation borings to 35 feet bgs, samples collected every ten feet and at the termination depth (152 samples) have been proposed to further delineate the fuel oil impacts west of this area; boring names will be UFH-AOC1-SB-1 through 38	Previous delineation borings advanced in October 2009, indicate the presence of several PAHs above SCOs	VOCs, SVOCs
Building 20	Storage Steel Stock	None	None	The nature of the past processes do not warrant investigation	None
Building 22	Ferrules Stamping and Storage	None	None	Previously investigated by BB&J in 2007	None
Building 23	Storage of Burlap Sacks, Cartons,	None	None	The nature of the past processes do not warrant investigation	None
Building 30 - AOC 3 (See Figure 4 of RIWP)	Assembly	VOCs	Six soil borings will be advanced to a depth of 20 feet bgs (18 - 24 samples); boring names will be UFH-AOC3-SB-1 through 6; samples will be collected from the following intervals: 0-1 foot bgs, at the water table, and at the most impacted interval; if multiple impacted intervals are encountered, a second most impacted sample will be collected	Based on the results of the 2009 sub-slab sampling results, a source area may exist beneath this building	VOCs, SVOCs, TAL metals
Building 102	Storage Used Machine Parts	None	None	The nature of the past processes do not warrant investigation	None
Buidling 103	Storage Dowels	None	None	The nature of the past processes do not warrant investigation	None
Building 104	Storage Dowels	None	None	The nature of the past processes do not warrant investigation	None
Building 105	Sawing and Dowel Making	None	None	The nature of the past processes do not warrant investigation	None
Building 107	Kilns	None	None	The nature of the past processes do not warrant investigation	None

Table 1a: Summary and Sampling Rationale of Proposed Soil Borings

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Building 108	Storage of Used Mill Equipment and Metal	None	None	The nature of the past processes do not warrant investigation	None
Building 109	Storage Dowels	None	None	The nature of the past processes do not warrant investigation	None
Building 201	Shovel Assembly	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 202	Spray Booth	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 203	Shovel Assembly	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; soil esceedances addressed through remedial action performed in 2009; groundwater impacts to be re-evaluated through additional sampling	None
Building 205	Switches	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 207	Shovel Staging and Shipping	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 208	Maintenance and Storage of Hand Tools	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 209 - Area 1 (see Figure 8 of the RIWP)	Storage Wood Dowels	VOCs, SVOCs, metals	Five borings to a depth of 20 feet bgs (15 - 20 samples); boring names will be UFH-BLDG209-SB-1 through 5; samples will be collected from the following intervals: 0-1 foot bgs, at the water table, and at the most impacted interval; if multiple impacted intervals are encountered, a second most impacted sample will be collected	Building condition did not allow access for interior investigation; building to be demolished to allow access	VOCs, SVOCs, and TAL metals

Table 1a: Summary and Sampling Rationale of Proposed Soil Borings

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Building 210 - Area 2 (See Figure 9 of the RIWP)	Sawdust Storage	VOCs, SVOCs, metals	Three borings to a depth of 20 feet bgs (9 - 12 samples) ; boring names will be UFH-BLDG210-SB-1 through 3; samples will be collected from the following intervals: 0-1 foot bgs, at the water table, and at the most impacted interval; if multiple impacted intervals are encountered, a second most impacted sample will be collected	Building condition did not allow access for interior investigation; building to be demolished to allow access	VOCs, SVOCs, and TAL metals
Building 212	Lacquer Handle Dip Room	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 213	Post Hole Dip Room	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; soil exceedances addressed through remedial action performed in 2009; groundwater impacts to be re-evaluated through additional sampling	None
Building 214	Miscellaneous Storage	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 215	Storage Finished Goods	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard was found in soil of groundwater	None
Building 216	Storage Finished Goods	VOCs, SVOCs, metals	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Building 302	Storage Shovels	None	None	Previously investigated during 2009 sub-slab sampling activities; no exccedances found	None
Building 303	Storage Shovels	None	None	Previously investigated during 2009 sub-slab sampling activities; no exccedances found	None
Building 304	Snow Tool Manufacturing	None	None	Previously investigated during 2009 sub-slab sampling activities; no exccedances found	None

Table 1a: Summary and Sampling Rationale of Proposed Soil Borings

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Building 305 - AOC 4 (See Figure 5 of the RIWP)	Storage Snow Tools	VOCs (related to 2010 sub-slab sampling results	Four soil borings to a depth of 20 feet bgs (12 - 16 samples); soil boring names UFH-AOC4-SB-1 through 4; samples will be collected from the following intervals: 0-1 foot bgs, at the water table, and at the most impacted interval; if multiple impacted intervals are encountered, a second most impacted sample will be collected	Based on the results of the 2009 sub-slab sampling results, a source area may exist beneath this building	VOCs, SVOCs, TAL metals
Building 308	Burn Off Oven	None	None	The nature of the past processes do not warrant investigation	None
Pump House	Pump for Water Well	None	None	Previously investigated during 2007 BB&J investigation; no exceedances of the Protection of Groundwater standard were found in soil or groundwater	None
Former Railroad Operations Foundry - AOC 2 (See Figure 3 of the RIWP)	Metal working	VOCs, SVOCs, metals	Five borings to a depth of 20 feet (15 - 20 samples); soil boring names will be UFH-AOC2-SB-1 through 5; samples will be collected from the following intervals: 0-1 foot bgs, at the water table, and at the most impacted interval; if multiple impacted intervals are encountered, a second most impacted sample will be collected	Portions of this AOC have not been adequately investigated	VOCs, SVOCs, TAL metals
Small Building East of Building 16 (refer to Figure 12 of the RIWP)	Chemical Storage	VOCs, SVOCs, metals	Two borings to a depth of 20 feet bgs (6 - 8 samples); soil boring names will be UFH-ECR-SB-1 through 2; samples will be collected from the following intervals: 0-1 foot bgs, at the water table, and at the most impacted interval; if multiple impacted intervals are encountered, a second most impacted sample will be collected	Historic research indicates this area was a former area of chemical storage.	VOCs, SVOCs, TAL metals
Combined Gridded Area 1 (Refer to Figure 14 of the RIWP)	Log Storage and Wetting, Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB- through 2	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides
Combined Gridded Area 2 (Refer to Figure 14 of the RIWP)	Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB-3 through 4	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides

Table 1a: Summary and Sampling Rationale of Proposed Soil Borings

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Combined Gridded Area 3 (Refer to Figure 14 of the RIWP)	Sawmill, Storage, Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB-5 through 6	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides
Combined Gridded Area 4 (Refer to Figure 14 of the RIWP)	Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB-7 through 8	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides
Combined Gridded Area 5 (Refer to Figure 14 of the RIWP)	Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB-9 through 10	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides
Combined Gridded Area 6 (Refer to Figure 18 of the RIWP)	Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB-11 through 12	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides
Combined Gridded Area 7 (Refer to Figure 14 of the RIWP)	Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB-14 through 13	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides

Table 1a: Summary and Sampling Rationale of Proposed Soil Borings

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Combined Gridded Area 8 (Refer to Figure 14 of the RIWP)	Undeveloped Industrial Property	None Known	Two near surface borings to a depth of one foot bgs (one sample each); soil borings will be names UFH-CGA-SB-15 through 16	NYSDEC has requested a number of near surface samples collected from areas throughout the site	VOCs, SVOCs, TAL metals, PCBs, pesticides

Acronyms:

RIWP - Remedial Investigation Work Plan

NY - New York

COCs - Constituents of Concern

VOCs - Volatile Organic Compounds by US EPA Method 8260B

SVOCs - Semivolatile Orgnaic Compounds by US EPA Method 8270C

Metals - TAL metals by US EPA Methods 6010B/7470A/7471A

NYSDEC - New York State Department of Environmental Protection

PCBs - Polychlorinated biphenyls by US EPA Method 8082

TAL - Target Analyte List

US EPA - United States Environmental Protection Agency

bgs - below ground surface

PAH - Polycyclic Aromatic Hydrocarbons

SCO - Soil Cleanip Oblective

AOC - Area of Concern

Prepared By: RBG / 04.27.2012

Checked By: AWB / 04.27.2012

Table 1b: Summary and Sampling Rationale of Proposed and Existing Groundwater Monitoring Wells

Area ID	Former Processes	COCs	Proposed Groundwater Sampling Locations	Boring Rationale	Analytes
200-Series Buildings - AOC 5 (Refer to Figure 6 of the RIWP)	Railroad, Manufacturing	VOCs, SVOCs, metals	All viable wells	Based on the results of the monitoring well survey, all viable wells will be sampled; if data gaps exist additional wells will be installed	VOCs, SVOCs, TAL metals
Spill No. 0007178 - AOC 6 (Refer to Figure 7 of the RIWP)	Railroad, Manufacturing	VOCs, SVOCs, metals	All viable wells	Based on the results of the monitoring well survey, all viable wells will be sampled; if data gaps exist additional wells will be installed	VOCs, SVOCs, TAL metals
Site-Wide Groundwater	Railroad, Manufacturing	VOCs, SVOCs, metals	All viable wells	Based on the results of the monitoring well survey, all viable wells will be sampled; if data gaps exist additional wells will be installed	VOCs, SVOCs, TAL metals
Building 30 - AOC 3 (See Figure 4 of RIWP)	Assembly	VOCs	One of the proposed soil borings will be converted to a permanent groundwater monitoring well; sample will be named UFH- AOC3	Based on the results of the 2009 sub-slab sampling results, a source area may exist beneath this building	VOCs, SVOCs, TAL metals
Building 209 - Area 1 (see Figure 8 of the RIWP)	Storage Wood Dowels	VOCs, SVOCs, metals	One of the proposed soil borings will be converted to a permanent a groundwater monitoring well; sample will be named UFH-BLDG 209	Building condition did not allow access for interior investigation; buildings to be demolished to allow access	VOCs, SVOCs, and TAL metals
Building 210 - Area 2 (See Figure 9 of the RIWP)	Sawdust Storage	VOCs, SVOCs, metals	One of the proposed soil borings will be converted to a permanent a groundwater monitoring well; sample will be named UFH-BLDG 210	Building condition did not allow access for interior investigation; buildings to be demolished to allow access	VOCs, SVOCs, and TAL metals
Building 305 - AOC 4 (See Figure 5 of the RIWP)	Storage Snow Tools	VOCs (related to 2010 sub-slab sampling results	One of the proposed soil borings will be converted to a permanent groundwater monitoring well; sample will be named UFH-AOC 4	Based on the results of the 2009 sub-slab sampling results, a source area may exist beneath this building	VOCs, SVOCs, TAL metals
Former Railroad Operations Foundry - AOC 2 (See Figure 3 of the RIWP)	Metal working	VOCs, SVOCs, metals	One of the proposed soil boring will be converted to a permanent groundwater monitoring well; sample will be named UFH-AOC 2	Areas of this AOC have not been adequately investigated	VOCs, SVOCs, TAL metals

Table 1b: Summary and Sampling Rationale of Proposed and Existing Groundwater Monitoring Wells

Area ID	Former Processes	COCs	Proposed Groundwater Sampling Locations	Boring Rationale	Analytes
Small Building East of Building 16 (refer to Figure 12 of the RIWP)	Chemical Storage	VOCs, SVOCs, metals	One of the proposed soil borings will be converted to a permanent a groundwater monitoring well; sample will be named UFH-ECR	Historic research indicates this area a a former area of chemical storage.	VOCs, SVOCs, TAL metals

Acronyms:

RIWP - Remedial Investigation Work Plan

NY - New York

COCs - Constituents of Concern

VOCs - Volatile Organic Compounds by US EPA Method 8260B

SVOCs - Semivolatile Organic Compounds by US EPA Method 8270C

Metals - TAL metals by US EPA Methods 6010B/7470A

NYSDEC - New York State Department of Environmental Protection

PCBs - Polychlorinated biphenyls by US EPA Method 8082

TAL - Target Analyte List

US EPA - United States Environmental Protection Agency

bgs - below ground surface

PAH - Polycyclic Aromatic Hydrocarbons

SCO - Soil Cleanip Oblective

AOC - Area of Concern

Prepared By: RBG / 04.27.2012

Checked By: AWB / 04.27.2012

Table 1c: Summary and Sampling Rationale of Soil Gas Samples

Area ID	Former Processes	COCs	Proposed Borings	Boring Rationale	Analytes
Known Utilities and Off-site Conduits - Site-Wide	Railroad, Manufacturing	VOCs, SVOCs, metals	One soil gas sample point approximately every 250 feet along the site boundary adjacent to residential or commercial structures and along utility runs on the site	Soil vapors from impacted soil and/or groundwater may emanate from the site through the soil or the utility conduits	VOCs

Acronyms:

COCs - Constituents of Concern

VOCs - Volatile Organic Compounds by US EPA Method TO-15

US EPA - United States Environmental Protection Agency

Prepared BY: RBG / 04.27.2012

Checked By: AWB / 04.27.2012

Table 1D: Analytical Methods and Quality Assurance Summary

Soil Matrix				
Analysis	VOCs	SVOCs	TCL + 30	TAL Metals
Methods	USEPA 8260B	USEPA 8270C	USEPA 8260B/8270C	USEPA 6010B/7471A
No. of Samples (maximum)	224	224	96	84
No. Field and Trip Blanks	One trip blank per each cooler	None	One trip blank per each cooler	None
Matrix Spikes and Duplicates	Lab Only; One MS/MSD per 20 samples			
Field Duplicates	None			
Equipment Rinsate	One equipment rinsate per 20 samples			
Sample Preservation per Method and Sample Matrix	$NaHSO_4$ and MeOH	None	$NaHSO_4$ and MeOH	None
Container Volume and Type	Three 40 mL Glass Vial and 2 oz Sample Glass Jar	4 oz Glass Jar	4 oz Glass Jar, One 2 oz Glass Jar, and Three 40 mL Glass Vial	4 oz Glass Jar
Sample Holding time after Extraction	14 Days	40 Days	14 days	6 months

Groundwater Samples				
Analysis	VOCs	SVOCs	TCL + 30	TAL Metals
Methods	USEPA 8260B	USEPA 8270C	USEPA 8260B/8270C	USEPA 6010B/7470A
No. of Samples (maximum)	5	5	48	21
No. Field and Trip Blanks	One trip blank per each cooler	None	One trip blank per each cooler	None
Matrix Spikes and Duplicates	Lab Only; One MS/MSD per 20 investigative samples			
Field Duplicates	One per 20 investigative samples or at least one per sampling event			
Equipment Rinsate	One equipment rinsate per 20 samples			
Sample Preservation per Method and Sample Matrix	HCL	None	HCL	HNO_3
Container Volume and Type	Two 40 mL Glass Vial	Two Amber 1 Liter Glass Jar	Two 40 mL Glass Vial and Two 1 Liter Glass Jar	500 mL Plastic Jar
Sample Holding time after Extraction	14 Days	40 Days	14 days	6 months

Table 1D: Analytical Methods and Quality Assurance Summary

Soil Gas	
Analysis	VOCs
Methods	USEPA TO-15
No. of Samples (maximum)	106
No. Field and Trip Blanks	Not applicable
Matrix Spikes and Duplicates	Lab Only; One MS/MSD per 20 samples
Field Duplicates	3 ambient air samples
Sample Preservation per Method and Sample Matrix	None
Container Volume and Type	6-liter Summa Canister
Sample Holding time after Extraction	30 Days

Acronyms:

VOCs - Volatile Organic Compounds

SVOCs - Semivolatile Organic Compounds

TCL + 30 - Target Analyte List plus 30 TICs

TAL - Target Analyte List

USEPA - United States Environmental Protection Agency

MeOH - Methanol

NaHSO4 - Sodium Bisulfate

TIC - Tentatively Identified Compound

MS - Matrix Spike

MSD - Matrix Spike Duplicate

oz - Ounces

mL - Milliliters

HCL - Hydrochloric Acid

HNO_3 - Nitric Acid

Prepared by / Date: LJW / 10.13.2011

Checked by / Date: RBG / 10.13.2011

Table 1D: Analytical Methods and Quality Assurance Summary

Hydrogeolocical Parameters - Soil							
Analysis	Porosity	Bulk Density	Fraction of Organic Carbon	Grain Size	Sieve Analysis	Permeability	Moisture Content
Methods	ASTM 854	ASTM 2937-94	ASTM D2974	ASTM D422	ASTM C136	USEPA 9100	SM2540B
No. of Samples (maximum)	3	3	3	3	3	3	3
No. Field and Trip Blanks	Not Applicable						
Matrix Spikes and Duplicates	Not Applicable						
Field Duplicates	Not Applicable						
Equipment Rinsate	Not Applicable						
Sample Preservation per Method and Sample Matrix	None						
Container Volume and Type	3 foot long, 3-inch diameter steel Shelby tube			1 liter clear glass jar	3 foot long, 3-inch diameter steel Shelby tube		
Sample Holding time after Extraction	None	None	None	None	None	None	None

Acronyms:

USEPA - United States Environmental Protection Agency

ASTM - American Society of Testing and Materials

Prepared by / Date: LJW / 10.13.2011

Checked by / Date: RBG / 10.13.2011

Table 1D: Analytical Methods and Quality Assurance Summary

Geochemical Parameters - Groundwater									
Analysis	Alkalinity	Chloride	Iron	Manganese	Sulfate	Nitrate	Methane Content	Dissolved Oxygen	Oxidation Reduction Potential
Methods	ASTM 854	ASTM 2937-94	ASTM D2974	ASTM D422	ASTM C136	USEPA 9100	SM 3810	SM4600	SM 2580
No. of Samples (maximum)	3	3	3	3	3	3	3	3	3
No. Field and Trip Blanks	Not Applicable								
Matrix Spikes and Duplicates	Not Applicable								
Field Duplicates	Not Applicable								
Equipment Rinsate	Not Applicable								
Sample Preservation per Method and Sample Matrix	None	None	HNO_3	HNO_3	None	None	None	Field test, not applicable	Field test, not applicable
Container Volume and Type	500 ml plastic jar	125 ml plastic jar	500 ml plastic jar	500 ml plastic jar	125 ml plastic jar	125 ml plastic jar	2 40 ml gall vials	Field test, not applicable	Field test, not applicable
Sample Holding time after Extraction	40 days	48 hours	6 months	6 months	48 hours	48 hours	40 days	Field test, not applicable	Field test, not applicable

Acronyms:

USEPA - United States Environmental Protection Agency

ASTM - American Society of Testing and Materials

SM - Standard methods of examining water and waste water

ml - milliliter

Prepared by / Date: LJW / 10.13.2011

Checked by / Date: RBG / 10.13.2011

Table 1E: Analyte Reporting Limits

CAS #	Paramter	Method	Reporting Limit (mg/L)[1]	Method Detection Limit (mg/L)[2]	Contract Required Reporting Limits (mg/L)	Protection of Groundwater (mg/kg)[3]
Target Analyte List - Metals - Water						
7429-90-5	Aluminum	6010B	0.1	0.313	0.200	NS
7440-36-0	Antimony	6010B	0.02	0.0066	.06	NS
7440-38-2	Arsenic	6010B	0.02	0.0066	.01	16
7440-39-3	Barium	6010B	0.005	0.0018	0.200	820
7440-41-7	Beryllium	6010B	0.002	0.0006	0.005	47
7440-43-9	Cadmium	6010B	0.005	0.0014	0.005	7.5
7440-70-2	Calcium	6010B	0.50	0.086	5.000	NS
7440-47-3	Chromium	6010B	0.01	0.004	0.010	NS[4]
7440-48-4	Cobalt	6010B	0.01	0.0023	0.050	NS
7440-50-8	Copper	6010B	0.02	0.0016	0.025	1720
7439-89-6	Iron	6010B	0.10	0.0263	0.100	NS
7439-92-1	Lead	6010B	0.005	0.0017	0.010	450
7439-95-4	Magnesium	6010B	0.10	0.0237	5.000	NS
7439-96-5	Manganese	6010B	0.01	0.0015	0.015	2000
7440-02-0	Nickel	6010B	0.02	0.0052	0.040	130
7440-09-7	Potassium	6010B	0.50	0.1156	5.000	NS
7782-49-2	Selenium	6010B	0.02	0.0065	0.035	4
7440-22-4	Silver	6010B	0.01	0.0038	0.010	8.3
7440-23-5	Sodium	6010B	0.50	0.1163	5.000	NS
7440-28-0	Thallium	6010B	0.02	0.0069	0.025	NS
7440-62-2	Vanadium	6010B	0.01	0.0023	0.050	NS
7440-66-6	Zinc	6010B	0.03	0.0104	0.060	2480
7439-97-6	Mercury	7470A	0.0002	0.000023	.0002	0.73

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)	Contract Required Reporting Limits (mg/kg)	Protection of Groundwater (mg/kg)[1]
Target Analyte List - Metals - Soil Matrix						
7429-90-5	Aluminum	6010B	5	1.68	20	NA[3]
7440-36-0	Antimony	6010B	1	0.33	6	NS
7440-38-2	Arsenic	6010B	1	0.3250	1	16
7440-39-3	Barium	6010B	0.25	0.05	20	820
7440-41-7	Beryllium	6010B	0.10	0.0150	0.5	47
7440-43-9	Cadmium	6010B	0.25	0.04	0.5	7.5
7440-70-2	Calcium	6010B	25	5.43	500	NS
7440-47-3	Chromium	6010B	0.50	0.0850	1	NS[2]
7440-48-4	Cobalt	6010B	0.50	0.0850	5	NS
7440-50-8	Copper	6010B	1	0.21	2.5	1720
7439-89-6	Iron	6010B	5	0.9650	10	NS
7439-92-1	Lead	6010B	0.25	0.09	1	450
7439-95-4	Magnesium	6010B	5	0.9	500	NS
7439-96-5	Manganese	6010B	0.50	0.0550	1.5	2000
7440-02-0	Nickel	6010B	1	0.2650	4	130
7440-09-7	Potassium	6010B	25	7.2450	500	NS
7782-49-2	Selenium	6010B	1	0.3150	3.5	4
7440-22-4	Silver	6010B	0.50	0.1650	1	8.3
7440-23-5	Sodium	6010B	25	5.8350	500	NS
7440-28-0	Thallium	6010B	1	0.40	2.5	NS
7440-62-2	Vanadium	6010B	0.5	0.11	5	NS
7440-66-6	Zinc	6010B	1.50	0.34	6	2480
7439-97-6	Mercury	7470A	0.02	0.0015	0.1	0.73

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/L)	Method Detection Limit (mg/L)	Contract Required Reporting Limits (mg/L)	Protection of Groundwater (mg/kg)[1]
Target Compound List - VOC parameters - Water						
67-64-1	Acetone	8260B	0.05	0.017	0.010	0.05
71-43-2	Benzene	8260B	0.001	0.000312	0.005	0.06
74-97-5	Bromochloromethane	8260B	0.001	0.001233	0.005	NS
75-27-4	Bromodichloromethane	8260B	0.001	0.000371	0.005	NS
75-25-2	Bromoform	8260B	0.001	0.000433	0.005	NS
74-83-9	Bromomethane	8260B	0.005	0.000889	0.005	NS
75-15-0	Carbon disulfide	8260B	0.001	0.000555	0.005	2.7
56-23-5	Carbon tetrachloride	8260B	0.001	0.00036	0.005	0.76
108-90-7	Chlorobenzene	8260B	0.001	0.000307	0.005	1.1
124-48-1	Chlorodibromomethane	8260B	0.001	0.000308	0.005	NS
75-00-3	Chloroethane	8260B	0.001	0.00046	0.005	NS
67-66-3	Chloroform	8260B	0.005	0.00054	0.005	0.37
74-87-3	Chloromethane	8260B	0.001	0.000646	0.005	NS
110-82-7	Cyclohexane	8260B	0.001	0.0003	0.005	NS
96-12-8	1,2-Dibromo-3-Chloropropane	8260B	0.005	0.000894	0.005	NS
106-93-4	1,2-Dibromoethane	8260B	0.001	0.000363	0.005	NS
95-50-1	1,2-Dichlorobenzene	8260B	0.001	0.000303	0.005	1.1
541-73-1	1,3-Dichlorobenzene	8260B	0.001	0.000276	0.005	2.4
106-46-7	1,4-Dichlorobenzene	8260B	0.001	0.000301	0.005	1.8
75-71-8	Dichlorodifluoromethane	8260B	0.001	0.000403	0.005	NS
75-34-3	1,1-Dichloroethane	8260B	0.001	0.000316	0.005	0.27
107-06-2	1,2-Dichloroethane	8260B	0.001	0.000342	0.005	0.02
75-35-4	1,1-Dichloroethene	8260B	0.001	0.000438	0.005	0.33
156-59-2	cis-1,2-Dichloroethene	8260B	0.001	0.000439	0.005	0.25
156-60-5	trans-1,2-Dichloroethene	8260B	0.001	0.000327	0.005	0.19
78-87-5	1,2-Dichloropropane	8260B	0.001	0.000535	0.005	NS
10061-01-5	cis-1,3-Dichloropropene	8260B	0.001	0.000262	0.005	NS
10061-02-6	trans-1,3-Dichloropropene	8260B	0.001	0.000319	0.005	NS
123-91-1	1,4-Dioxane	8260B	0.1	0.033	0.100	0.1
100-41-4	Ethylbenzene	8260B	0.001	0.000256	0.005	1
591-78-6	2-Hexanone	8260B	0.01	0.00188	0.010	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/L)	Method Detection Limit (mg/L)	Contract Required Reporting Limits (mg/L)	Protection of Groundwater (mg/kg)[1]
Target Compound List - VOC parameters - Water, continued						
98-82-8	Isopropylbenzene	8260B	0.001	0.000308	0.005	2.3
78-93-3	2-Butanone (MEK)	8260B	0.01	0.002687	0.010	0.3
79-20-9	Methyl Acetate	8260B	0.02	0.0067	0.005	NS
108-87-2	Methyl Cyclohexane	8260B	0.001	0.003	0.005	NS
75-09-2	Methylene Chloride	8260B	0.005	0.000382	0.005	0.05
108-10-1	4-Methyl-2-pentanone (MIBK)	8260B	0.01	0.002	0.010	1
1634-04-4	Methyl tert-butyl ether	8260B	0.001	0.000316	0.005	0.93
100-42-5	Styrene	8260B	0.001	0.000268	0.005	NS
79-34-5	1,1,2,2-Tetrachloroethane	8260B	0.001	0.000431	0.005	NS
127-18-4	Tetrachloroethene	8260B	0.001	0.000427	0.005	1.3
108-88-3	Toluene	8260B	0.005	0.00032	0.005	0.7
87-61-6	1,2,3-Trichlorobenzene	8260B	0.001	0.00037	0.005	NS
120-82-1	1,2,4-Trichlorobenzene	8260B	0.001	0.00032	0.005	NS
71-55-6	1,1,1-Trichloroethane	8260B	0.001	0.000375	0.005	0.68
79-00-5	1,1,2-Trichloroethane	8260B	0.001	0.0004	0.005	NS
79-01-6	Trichloroethene	8260B	0.001	0.000263	0.005	0.47
75-69-4	Trichlorofluoromethane	8260B	0.001	0.000286	0.005	NS
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8260B	0.001	0.000335	0.005	NS
75-01-4	Vinyl chloride	8260B	0.001	0.000307	0.005	0.02
1330-20-7	Xylenes, Total	8260B	0.003	0.000728	0.005	1.6

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/L)	Method Detection Limit (mg/L)	Contract Required Reporting Limits (mg/L)	Protection of Groundwater (mg/kg)[1]
Target Compound List - SVOC parameters - Water, continued						
83-32-9	Acenaphthene	8270C	0.001	0.00018	0.005	98
208-96-8	Acenaphthylene	8270C	0.001	0.000206	0.005	107
98-86-2	Acetophenone	8270C	0.01	0.00247	0.005	NS
120-12-7	Anthracene	8270C	0.001	0.000166	0.005	1000
1912-24-9	Atrazine	8270C	0.01	0.00153	0.005	NS
100-52-7	Benzaldehyde	8270C	0.01	0.0014	0.005	NS
56-55-3	Benzo(a)anthracene	8270C	0.001	0.000186	0.005	1
205-99-2	Benzo(b)fluoranthene	8270C	0.001	0.000379	0.005	1.7
207-08-9	Benzo(k)fluoranthene	8270C	0.001	0.000265	0.005	1.7
191-24-2	Benzo(g,h,i)perylene	8270C	0.001	0.000371	0.005	1000
50-32-8	Benzo(a)pyrene	8270C	0.001	0.000269	0.005	22
92-52-4	Biphenyl	8270C	0.01	0.000206	0.005	NS
111-91-1	Bis(2-chlorethoxy)methane	8270C	0.01	0.000214	0.005	NS
111-44-4	Bis(2-chloroethyl)ether	8270C	0.01	0.000214	0.005	NS
108-60-1	Bis(2-chloroisopropyl)ether	8270C	0.01	0.000308	0.005	NS
101-55-3	4-Bromophenyl-phenylether	8270C	0.01	0.00018	0.005	NS
105-60-2	Caprolactam	8270C	0.01	0.000583	0.005	NS
86-74-8	Carbazole	8270C	0.01	0.000162	0.005	NS
106-47-8	4-Chloroaniline	8270C	0.01	0.000261	0.005	NS
91-58-7	2-Chloronaphthalene	8270C	0.001	0.000204	0.005	NS
7005-72-3	4-Chlorophenyl-phenylether	8270C	0.01	0.00017	0.005	NS
218-01-9	Chrysene	8270C	0.001	0.000133	0.005	1
53-70-3	Dibenz(a,h)anthracene	8270C	0.001	0.000251	0.005	1000
132-64-9	Dibenzofuran	8270C	0.01	0.000172	0.005	NS
91-94-1	3,3-Dichlorobenzidine	8270C	0.01	0.00169	0.005	NS
121-14-2	2,4-Dinitrotoluene	8270C	0.01	0.000219	0.005	NS
606-20-2	2,6-Dinitrotoluene	8270C	0.01	0.00143	0.005	NS
206-44-0	Fluoranthene	8270C	0.001	0.000342	0.005	1000
86-73-7	Fluorene	8270C	0.001	0.000177	0.005	386
118-74-1	Hexachlorobenzene	8270C	0.001	0.000227	0.005	NS
87-68-3	Hexachloro-1,3-butadiene	8270C	0.01	0.00264	0.005	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/L)	Method Detection Limit (mg/L)	Contract Required Reporting Limits (mg/L)	Protection of Groundwater (mg/kg)[1]
Target Compound List - SVOC parameters - Water, continued						
77-47-4	Hexachlorocyclopentadiene	8270C	0.01	0.0018	0.005	NS
67-72-1	Hexachloroethane	8270C	0.01	0.00313	0.005	NS
193-39-5	Indeno(1,2,3-cd)pyrene	8270C	0.001	0.000333	0.005	8.2
78-59-1	Isophorone	8270C	0.01	0.000238	0.005	NS
91-57-6	2-Methylnaphthalene	8270C	0.001	0.000438	0.005	NS
91-20-3	Naphthalene	8270C	0.001	0.000413	0.005	12
88-74-4	2-Nitroaniline	8270C	0.01	0.000223	0.010	NS
99-09-2	3-Nitroaniline	8270C	0.01	0.000175	0.010	NS
100-01-6	4-Nitroaniline	8270C	0.01	0.000282	0.010	NS
98-95-3	Nitrobenzene	8270C	0.01	0.0002	0.005	NS
86-30-6	n-Nitrosodiphenylamine	8270C	0.01	0.000137	0.005	NS
621-64-7	n-Nitrosodi-n-propylamine	8270C	0.01	0.000311	0.005	NS
85-01-8	Phenanthrene	8270C	0.001	0.000205	0.005	NS
85-68-7	Benzylbutyl phthalate	8270C	0.001	0.000395	0.005	NS
117-81-7	Bis(2-ethylhexyl)phthalate	8270C	0.001	0.000496	0.005	NS
84-74-2	Di-n-butyl phthalate	8270C	0.001	0.000275	0.005	NS
84-66-2	Diethyl phthalate	8270C	0.001	0.000356	0.005	NS
131-11-3	Dimethyl phthalate	8270C	0.001	0.000338	0.005	NS
117-84-0	Di-n-octyl phthalate	8270C	0.001	0.000277	0.005	NS
129-00-0	Pyrene	8270C	0.001	0.000295	0.005	1000
95-94-3	1,2,4,5-Tetrachlorobenzene	8270C	0.01	0.00213	0.005	NS
59-50-7	4-Chloro-3-methylphenol	8270C	0.01	0.000229	0.005	NS
95-57-8	2-Chlorophenol	8270C	0.01	0.00019	0.005	NS
95-48-7	2-Methylphenol	8270C	0.01	0.00149	0.005	NS
106-44-5	3&4-Methyl Phenol	8270C	0.01	0.00116	0.005	NS
120-83-2	2,4-Dichlorophenol	8270C	0.01	0.000972	0.005	NS
105-67-9	2,4-Dimethylphenol	8270C	0.01	0.00134	0.005	NS
534-52-1	4,6-Dinitro-2-methylphenol	8270C	0.01	0.0026	0.010	NS
51-28-5	2,4-Dinitrophenol	8270C	0.01	0.0023	0.010	NS
88-75-5	2-Nitrophenol	8270C	0.01	0.000279	0.005	NS
100-02-7	4-Nitrophenol	8270C	0.01	0.00273	0.010	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/L)	Method Detection Limit (mg/L)	Contract Required Reporting Limits (mg/L)	Protection of Groundwater (mg/kg)[1]
Target Compound List - SVOC parameters - Water, continued						
87-86-5	Pentachlorophenol	8270C	0.01	0.000407	0.010	0.8
108-95-2	Phenol	8270C	0.01	0.00113	0.005	0.33
58-90-2	2,3,4,6 Tetrachlorophenol	8270C	0.01	0.00243	0.005	NS
95-95-4	2,4,5-Trichlorophenol	8270C	0.01	0.000216	0.005	NS
88-06-2	2,4,6-Trichlorophenol	8270C	0.01	0.000278	0.005	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)	Contract Required Reporting Limits		Protection of Groundwater (mg/kg)[1]
					Low Soil (mg/kg)	Med. Soil (mg/kg)	
Target Compound List - VOC parameters - Soil Matrix							
67-64-1	Acetone	8260B	0.05	0.017	0.010	0.500	0.05
71-43-2	Benzene	8260B	0.001	0.000325	0.005	0.250	0.06
74-97-5	Bromochloromethane	8260B	0.001	0.000447	0.005	0.250	NS
75-27-4	Bromodichloromethane	8260B	0.001	0.000387	0.005	0.250	NS
75-25-2	Bromoform	8260B	0.001	0.000577	0.005	0.250	NS
74-83-9	Bromomethane	8260B	0.005	0.001284	0.005	0.250	NS
75-15-0	Carbon disulfide	8260B	0.001	0.001785	0.005	0.250	2.7
56-23-5	Carbon tetrachloride	8260B	0.001	0.00032	0.005	0.250	0.76
108-90-7	Chlorobenzene	8260B	0.001	0.00025	0.005	0.250	1.1
124-48-1	Chlorodibromomethane	8260B	0.001	0.000231	0.005	0.250	NS
75-00-3	Chloroethane	8260B	0.001	0.000586	0.005	0.250	NS
67-66-3	Chloroform	8260B	0.005	0.000411	0.005	0.250	0.37
74-87-3	Chloromethane	8260B	0.001	0.000562	0.005	0.250	NS
110-82-7	Cyclohexane	8260B	0.001	0.001	0.005	0.250	NS
96-12-8	1,2-Dibromo-3-Chloropropane	8260B	0.005	0.001157	0.005	0.250	NS
106-93-4	1,2-Dibromoethane	8260B	0.001	0.000315	0.005	0.250	NS
75-71-8	Dichlorodifluoromethane	8260B	0.001	0.00032	0.005	0.250	1.1
75-34-3	1,1-Dichloroethane	8260B	0.001	0.000259	0.005	0.250	2.4
107-06-2	1,2-Dichloroethane	8260B	0.001	0.000531	0.005	0.250	1.8
95-50-1	1,2-Dichlorobenzene	8260B	0.001	0.000237	0.005	0.250	NS
541-73-1	1,3-Dichlorobenzene	8260B	0.001	0.000379	0.005	0.250	0.27
106-46-7	1,4-Dichlorobenzene	8260B	0.001	0.000218	0.005	0.250	0.02
75-35-4	1,1-Dichloroethene	8260B	0.001	0.000742	0.005	0.250	0.33
156-59-2	cis-1,2-Dichloroethene	8260B	0.001	0.000723	0.005	0.250	0.25
156-60-5	trans-1,2-Dichloroethene	8260B	0.001	0.000678	0.005	0.250	0.19
78-87-5	1,2-Dichloropropane	8260B	0.001	0.000751	0.005	0.250	NS
10061-01-5	cis-1,3-Dichloropropene	8260B	0.001	0.000262	0.005	0.250	NS
10061-02-6	trans-1,3-Dichloropropene	8260B	0.001	0.00036	0.005	0.250	NS
123-91-1	1,4-Dioxane	8260B	0.1	0.033	0.100	5.000	0.1
100-41-4	Ethylbenzene	8260B	0.001	0.000226	0.005	0.250	1
591-78-6	2-Hexanone	8260B	0.01	0.001953	0.010	0.500	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)	Contract Required Reporting Limits		Protection of Groundwater (mg/kg)[1]
					Low Soil (mg/kg)	Med. Soil (mg/kg)	
Target Compound List - VOC parameters - Soil Matrix, continued							
98-82-8	Isopropylbenzene	8260B	0.01	0.000211	0.005	0.250	2.3
78-93-3	2-Butanone (MEK)	8260B	0.01	0.002679	0.010	0.500	0.3
79-20-9	Methyl Acetate	8260B	0.02	0.02	0.005	0.250	NS
108-87-2	Methyl Cyclohexane	8260B	0.001	0.001	0.005	0.250	NS
75-09-2	Methylene Chloride	8260B	0.005	0.0006	0.005	0.250	0.05
108-10-1	4-Methyl-2-pentanone (MIBK)	8260B	0.01	0.001397	0.010	0.500	1
1634-04-4	Methyl tert-butyl ether	8260B	0.001	0.000278	0.005	0.250	0.93
100-42-5	Styrene	8260B	0.001	0.000203	0.005	0.250	NS
79-34-5	1,1,2,2-Tetrachloroethane	8260B	0.001	0.000329	0.005	0.250	NS
127-18-4	Tetrachloroethene	8260B	0.001	0.000231	0.005	0.250	1.3
108-88-3	Toluene	8260B	0.005	0.001214	0.005	0.250	0.7
87-61-6	1,2,3-Trichlorobenzene	8260B	0.001	0.000231	0.005	0.250	NS
120-82-1	1,2,4-Trichlorobenzene	8260B	0.001	0.000249	0.005	0.250	NS
71-55-6	1,1,1-Trichloroethane	8260B	0.001	0.000516	0.005	0.250	0.68
79-00-5	1,1,2-Trichloroethane	8260B	0.001	0.000456	0.005	0.250	NS
79-01-6	Trichloroethene	8260B	0.001	0.000336	0.005	0.250	0.47
75-69-4	Trichlorofluoromethane	8260B	0.001	0.000273	0.005	0.250	NS
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8260B	0.001	0.000247	0.005	0.250	NS
75-01-4	Vinyl chloride	8260B	0.001	0.000287	0.005	0.250	0.02
1330-20-7	Xylenes, Total	8260B	0.003	0.00046	0.005	0.250	1.6

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)	Contract Required Reporting Limits		Protection of Groundwater (mg/kg)[1]
					Low Soil (mg/kg)	Med. Soil (mg/kg)	
Target Compound List - SVOC parameters - Soil Matrix							
83-32-9	Acenaphthene	8270C	0.33	0.02368	0.170	5.000	98
208-96-8	Acenaphthylene	8270C	0.33	0.02844	0.170	5.000	107
98-86-2	Acetophenone	8270C	0.33	0.33	0.170	5.000	NS
120-12-7	Anthracene	8270C	0.33	0.023	0.170	5.000	1000
1912-24-9	Atrazine	8270C	0.33	0.33	0.170	5.000	NS
100-52-7	Benzaldehyde	8270C	0.33	0.33	0.170	5.000	NS
56-55-3	Benzo(a)anthracene	8270C	0.33	0.03212	0.170	5.000	1
205-99-2	Benzo(b)fluoranthene	8270C	0.33	0.03015	0.170	5.000	1.7
207-08-9	Benzo(k)fluoranthene	8270C	0.33	0.03117	0.170	5.000	1.7
191-24-2	Benzo(g,h,i)perylene	8270C	0.33	0.02885	0.170	5.000	1000
50-32-8	Benzo(a)pyrene	8270C	0.33	0.02678	0.170	5.000	22
92-52-4	Biphenyl	8270C	0.33	0.33	0.170	5.000	NS
111-91-1	Bis(2-chlorethoxy)methane	8270C	0.33	0.03208	0.170	5.000	NS
111-44-4	Bis(2-chloroethyl)ether	8270C	0.33	0.0285	0.170	5.000	NS
108-60-1	Bis(2-chloroisopropyl)ether	8270C	0.33	0.03286	0.170	5.000	NS
101-55-3	4-Bromophenyl-phenylether	8270C	0.33	0.02218	0.170	5.000	NS
105-60-2	Caprolactam	8270C	0.33	0.33	0.170	5.000	NS
86-74-8	Carbazole	8270C	0.33	0.02861	0.170	5.000	NS
106-47-8	4-Chloroaniline	8270C	0.33	0.03626	0.170	5.000	NS
91-58-7	2-Chloronaphthalene	8270C	0.33	0.02552	0.170	5.000	NS
7005-72-3	4-Chlorophenyl-phenylether	8270C	0.33	0.02526	0.170	5.000	NS
218-01-9	Chrysene	8270C	0.33	0.03531	0.170	5.000	1
53-70-3	Dibenz(a,h)anthracene	8270C	0.33	0.02807	0.170	5.000	1000
132-64-9	Dibenzofuran	8270C	0.33	0.02172	0.170	5.000	NS
91-94-1	3,3-Dichlorobenzidine	8270C	0.33	0.03062	0.170	5.000	NS
121-14-2	2,4-Dinitrotoluene	8270C	0.33	0.02472	0.170	5.000	NS
606-20-2	2,6-Dinitrotoluene	8270C	0.33	0.02291	0.170	5.000	NS
206-44-0	Fluoranthene	8270C	0.33	0.02404	0.170	5.000	1000
86-73-7	Fluorene	8270C	0.33	0.0226	0.170	5.000	386
118-74-1	Hexachlorobenzene	8270C	0.33	0.0247	0.170	5.000	NS
87-68-3	Hexachloro-1,3-butadiene	8270C	0.33	0.03257	0.170	5.000	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)	Contract Required Reporting Limits		Protection of Groundwater (mg/kg)[1]
					Low Soil (mg/kg)	Med. Soil (mg/kg)	
Target Compound List - SVOC parameters - Soil Matrix, continued							
77-47-4	Hexachlorocyclopentadiene	8270C	0.33	0.03489	0.170	5.000	NS
67-72-1	Hexachloroethane	8270C	0.33	0.03302	0.170	5.000	NS
193-39-5	Indeno(1,2,3-cd)pyrene	8270C	0.33	0.02949	0.170	5.000	8.2
78-59-1	Isophorone	8270C	0.33	0.03804	0.170	5.000	NS
91-57-6	2-Methylnaphthalene	8270C	0.33	0.02595	0.170	5.000	NS
91-20-3	Naphthalene	8270C	0.33	0.02604	0.170	5.000	12
88-74-4	2-Nitroaniline	8270C	0.33	0.0207	0.330	10.000	NS
99-09-2	3-Nitroaniline	8270C	0.33	0.06465	0.330	10.000	NS
100-01-6	4-Nitroaniline	8270C	0.33	0.0381	0.330	10.000	NS
98-95-3	Nitrobenzene	8270C	0.33	0.02756	0.170	5.000	NS
86-30-6	n-Nitrosodiphenylamine	8270C	0.33	0.03447	0.170	5.000	NS
621-64-7	n-Nitrosodi-n-propylamine	8270C	0.33	0.033	0.170	5.000	NS
85-01-8	Phenanthrene	8270C	0.33	0.02475	0.170	5.000	NS
85-68-7	Benzylbutyl phthalate	8270C	0.33	0.03829	0.170	5.000	NS
117-81-7	Bis(2-ethylhexyl)phthalate	8270C	0.33	0.06007	0.170	5.000	NS
84-74-2	Di-n-butyl phthalate	8270C	0.33	0.02729	0.170	5.000	NS
84-66-2	Diethyl phthalate	8270C	0.33	0.04057	0.170	5.000	NS
131-11-3	Dimethyl phthalate	8270C	0.33	0.02628	0.170	5.000	NS
117-84-0	Di-n-octyl phthalate	8270C	0.33	0.03606	0.170	5.000	NS
129-00-0	Pyrene	8270C	0.33	0.03562	0.170	5.000	1000
95-94-3	1,2,4,5-Tetrachlorobenzene	8270C	0.33	0.33	0.170	5.000	NS
59-50-7	4-Chloro-3-methylphenol	8270C	0.33	0.03364	0.170	5.000	NS
95-57-8	2-Chlorophenol	8270C	0.33	0.031	0.170	5.000	NS
95-48-7	2-Methylphenol	8270C	0.33	0.03302	0.170	5.000	NS
106-44-5	3&4-methyl phenol	8270C	0.33	0.03287	0.170	5.000	NS
120-83-2	2,4-Dichlorophenol	8270C	0.33	0.02442	0.170	5.000	NS
105-67-9	2,4-Dimethylphenol	8270C	0.33	0.0381	0.170	5.000	NS
534-52-1	4,6-Dinitro-2-methylphenol	8270C	0.33	0.03971	0.330	10.000	NS
51-28-5	2,4-Dinitrophenol	8270C	0.33	0.04084	0.33	10	NS
88-75-5	2-Nitrophenol	8270C	0.33	0.02748	0.170	5.000	NS
100-02-7	4-Nitrophenol	8270C	0.33	0.02672	0.330	10.000	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)	Contract Required Reporting Limits		Protection of Groundwater (mg/kg)[1]
					Low Soil (mg/kg)	Med. Soil (mg/kg)	
Target Compound List - SVOC parameters - Soil Matrix, continued							
87-86-5	Pentachlorophenol	8270C	0.33	0.03114	0.330	10.000	0.8
108-95-2	Phenol	8270C	0.33	0.02879	0.170	5.000	0.33
58-90-2	2,3,4,6 Tetrachlorophenol	8270C	0.33	0.33	0.170	5.000	NS
95-95-4	2,4,5-Trichlorophenol	8270C	0.33	0.03019	0.170	5.000	NS
88-06-2	2,4,6-Trichlorophenol	8270C	0.33	0.0278	0.170	5.000	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (ppbv)	Method Detection Limit (ppbv)	Contract Required Reporting Limits (ppbv)	Protection of Worker Health (ppbv)[5]
TO-15 - VOCs - Soil Gas Matrix						
67-64-1	Acetone	TO-15	1.25	0.0738	0.5	NS
107-05-1	Allyl chloride	TO-15	0.2	0.0762	NS	NS
71-43-2	Benzene	TO-15	0.2	0.057	0.5	NS
100-44-7	Benzyl Chloride	TO-15	0.2	0.0754	0.5	NS
75-27-4	Bromodichloromethane	TO-15	0.2	0.0621	0.5	NS
75-25-2	Bromoform	TO-15	0.6	0.0685	0.5	NS
74-83-9	Bromomethane	TO-15	0.2	0.0379	0.5	NS
106-99-0	1,3-Butadiene	TO-15	2	0.0434	0.5	NS
75-15-0	Carbon disulfide	TO-15	0.2	0.0348	0.5	NS
56-23-5	Carbon tetrachloride	TO-15	0.2	0.0433	0.5	NS
108-90-7	Chlorobenzene	TO-15	0.2	0.0752	0.5	NS
75-00-3	Chloroethane	TO-15	0.2	0.0502	0.5	NS
67-66-3	Chloroform	TO-15	0.2	0.0507	0.5	NS
74-87-3	Chloromethane	TO-15	0.2	0.0274	0.5	NS
95-49-8	2-Chlorotoluene	TO-15	0.2	0.0736	NS	NS
110-82-7	Cyclohexane	TO-15	0.2	0.0415	0.5	NS
124-48-1	Dibromochloromethane	TO-15	0.2	0.0654	0.5	NS
106-93-4	1,2-Dibromoethane	TO-15	0.2	0.0798	0.5	NS
95-50-1	1,2-Dichlorobenzene	TO-15	0.2	0.0776	0.5	NS
541-73-1	1,3-Dichlorobenzene	TO-15	0.2	0.0797	0.5	NS
106-46-7	1,4-Dichlorobenzene	TO-15	0.2	0.076	0.5	NS
107-06-2	1,2-Dichloroethane	TO-15	0.2	0.0624	0.5	NS
75-34-3	1,1-Dichloroethane	TO-15	0.2	0.0506	0.5	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (ppbv)	Method Detection Limit (ppbv)	Contract Required Reporting Limits (ppbv)	Protection of Worker Health (ppbv)[3]
TO-15 - VOCs - Soil Gas Matrix, continued						
75-35-4	1,1-Dichloroethene	TO-15	0.2	0.0385	0.5	NS
156-59-2	cis-1,2-Dichloroethene	TO-15	0.2	0.0477	0.5	NS
156-60-5	trans-1,2-Dichloroethene	TO-15	0.2	0.0438	0.5	NS
78-87-5	1,2-Dichloropropane	TO-15	0.2	0.0679	0.5	NS
10061-01-5	cis-1,3-Dichloropropene	TO-15	0.2	0.08	0.5	NS
10061-02-6	trans-1,3-Dichloropropene	TO-15	0.2	0.101	0.5	NS
123-91-1	1,4-Dioxane	TO-15	0.2	0.0671	0.5	NS
64-17-5	Ethanol	TO-15	0.63	0.164	0.5	NS
100-41-4	Ethylbenzene	TO-15	0.2	0.0789	0.5	NS
622-96-8	4-Ethyltoluene	TO-15	0.2	0.0789	0.5	NS
75-69-4	Trichlorofluoromethane	TO-15	0.2	0.0357	0.5	NS
75-71-8	Dichlorodifluoromethane	TO-15	0.2	0.0336	0.5	NS
76-13-1	1,1,2-Trichlorotrifluoroethane	TO-15	0.2	0.0493	0.5	NS
76-14-2	1,2-Dichlorotetrafluoroethane	TO-15	0.2	0.0274	0.5	NS
142-82-5	Heptane	TO-15	0.2	0.0532	0.5	NS
87-68-3	Hexachloro-1,3-butadiene	TO-15	0.63	0.0764	0.5	NS
110-54-3	n-Hexane	TO-15	0.2	0.0433	0.5	NS
98-82-8	Isopropylbenzene	TO-15	0.2	0.0751	NS	NS
75-35-4	1,1-Dichloroethene	TO-15	0.2	0.0385	0.5	NS
156-59-2	cis-1,2-Dichloroethene	TO-15	0.2	0.0477	0.5	NS
156-60-5	trans-1,2-Dichloroethene	TO-15	0.2	0.0438	0.5	NS
78-87-5	1,2-Dichloropropane	TO-15	0.2	0.0679	0.5	NS
10061-01-5	cis-1,3-Dichloropropene	TO-15	0.2	0.08	0.5	NS

Table 1E: Analyte Reporting Limits

CAS #	Parameter	Method	Reporting Limit (ppbv)	Method Detection Limit (ppbv)	Contract Required Reporting Limits (ppbv)	Protection of Worker Health (ppbv)[3]
TO-15 - VOCs - Soil Gas Matrix, continued						
10061-02-6	trans-1,3-Dichloropropene	TO-15	0.2	0.101	0.5	NS
91-20-3	Naphthalene	TO-15	0.63	0.0705	NS	NS
67-63-0	2-Propanol	TO-15	1.25	0.0671	0.5	NS
115-07-1	Propene	TO-15	0.4	0.0538	NS	NS
100-42-5	Styrene	TO-15	0.2	0.0757	0.5	NS
79-34-5	1,1,2,2-Tetrachloroethane	TO-15	0.2	0.0792	0.5	NS
127-18-4	Tetrachloroethylene	TO-15	0.2	0.0508	0.5	NS
109-99-9	Tetrahydrofuran	TO-15	0.2	0.0869	0.5	NS
108-88-3	Toluene	TO-15	0.2	0.0705	0.5	NS
120-82-1	1,2,4-Trichlorobenzene	TO-15	0.63	0.0518	0.5	NS
71-55-6	1,1,1-Trichloroethane	TO-15	0.2	0.0507	0.5	NS
79-00-5	1,1,2-Trichloroethane	TO-15	0.2	0.0735	0.5	NS
79-01-6	Trichloroethylene	TO-15	0.2	0.0591	NS	NS
95-63-6	1,2,4-Trimethylbenzene	TO-15	0.2	0.0829	0.5	NS
108-67-8	1,3,5-Trimethylbenzene	TO-15	0.2	0.0721	0.5	NS
540-84-1	2,2,4-Trimethylpentane	TO-15	0.2	0.0496	NS	NS
75-01-4	Vinyl chloride	TO-15	0.2	0.0309	0.5	NS
593-60-2	Vinyl Bromide	TO-15	0.2	0.0320	NS	NS
108-05-4	Vinyl acetate	TO-15	0.2	0.0823	0.5	NS
1330-20-7	m&p-Xylene	TO-15	0.4	0.1520	0.5	NS
95-47-6	o-Xylene	TO-15	0.2	0.0738	0.5	NS

Table 1E: Analyte Reporting Limits

Notes:

[1] Reporting Limit values provided by ESC Lab Science, Mount Juliet, Tennessee.

[2] Method Detection Limit values provided by ESC Lab Science, Mount Juliet, Tennessee.

[3] Table 375-6.8(b) Restricted Use Cleanup Objectives (mg/kg) from 6 NYCRR 375.

[4] New York Department of Environmental Protection Restricted Use Cleanup Objectives for Protection of Groundwater soil cleanup objective concentration for trivalent chromium was used.

[5] New York State currently does not have set standards, criteria or guidance values for concentrations of compounds in soil vapor; therefore, BB&J will sample for inside/outside ambient air concentrations to compare with any elevated concentrations found in soil vapor.

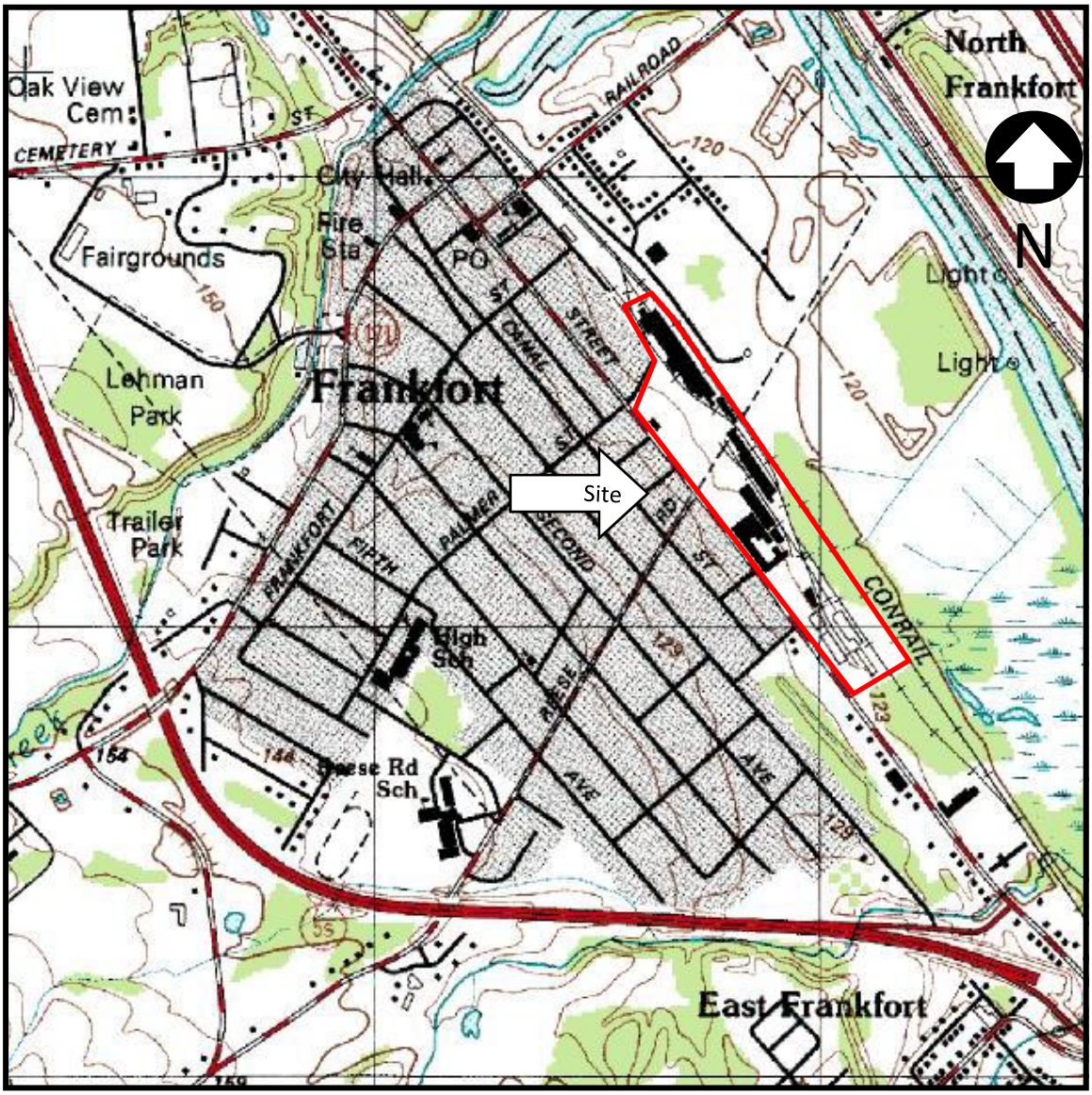
Acronyms:

mg/L- milligrams per liter
mg/kg- milligrams per kilogram
ppbv- parts per billion by volume
NS- No Standard
VOCs- Volatile Organic Compounds
SVOCs- Semivolatile Organic Compounds

Prepared by / Date: LJW / 10.18.2011
Checked by / Date: RBG /10.18.2011

FIGURES

Source: United States Geological Survey Frankfort, NY Quadrangles
7.5 Minute Series (Topographic), Dated 7/1/1982.



0 0.25 0.50 1.00

APPROXIMATE SCALE IN MILES (1 inch = 0.25 miles)

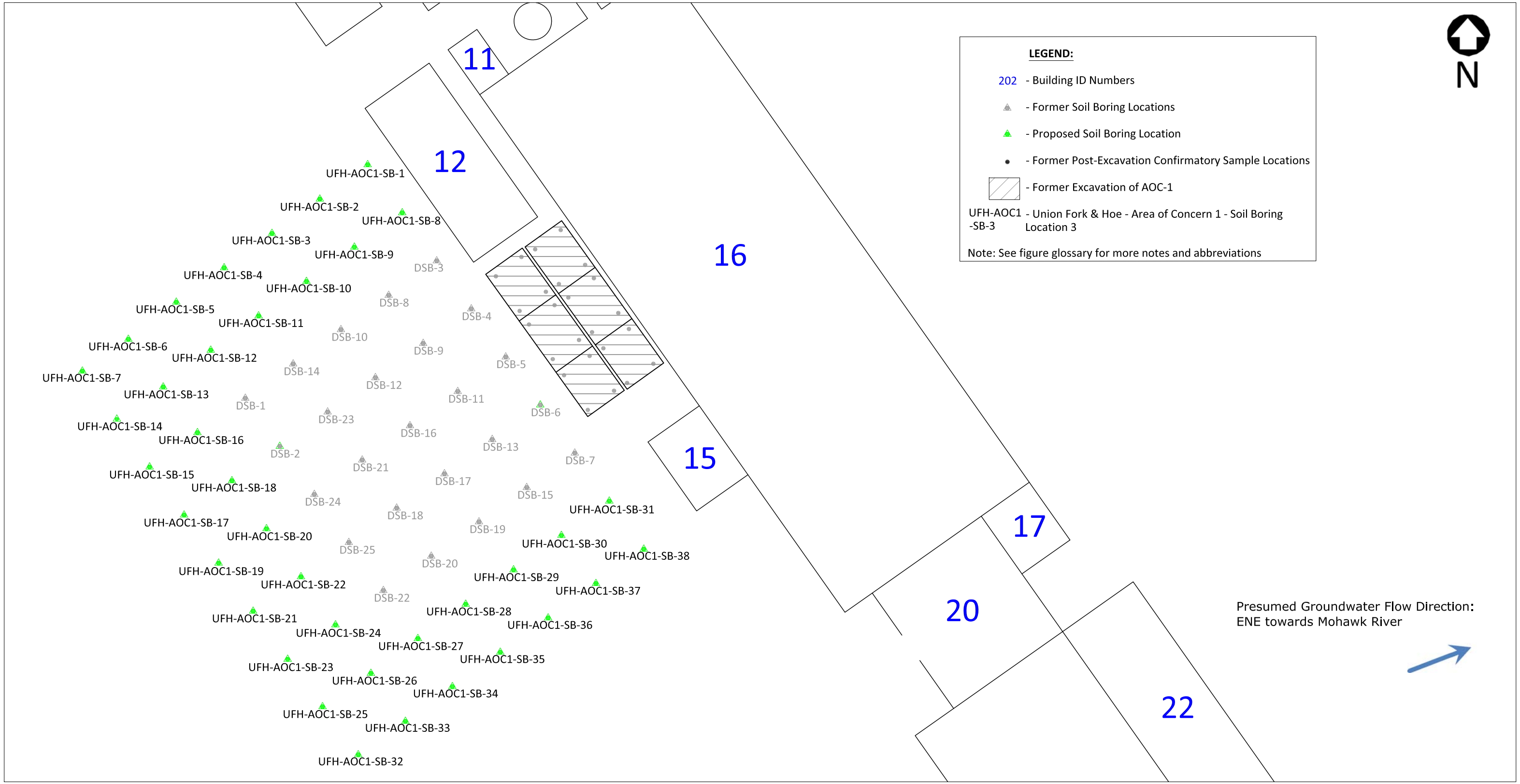
LEGEND

- Subject Property Boundary

Quadrangle Location

Prepared by/Date: CAM/ 04-18-2012
Checked by/Date: LJW /04-18-2012

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Location Map Project No. R1106075 Figure 1



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Checked by / Date: RBG / 04-23-2012

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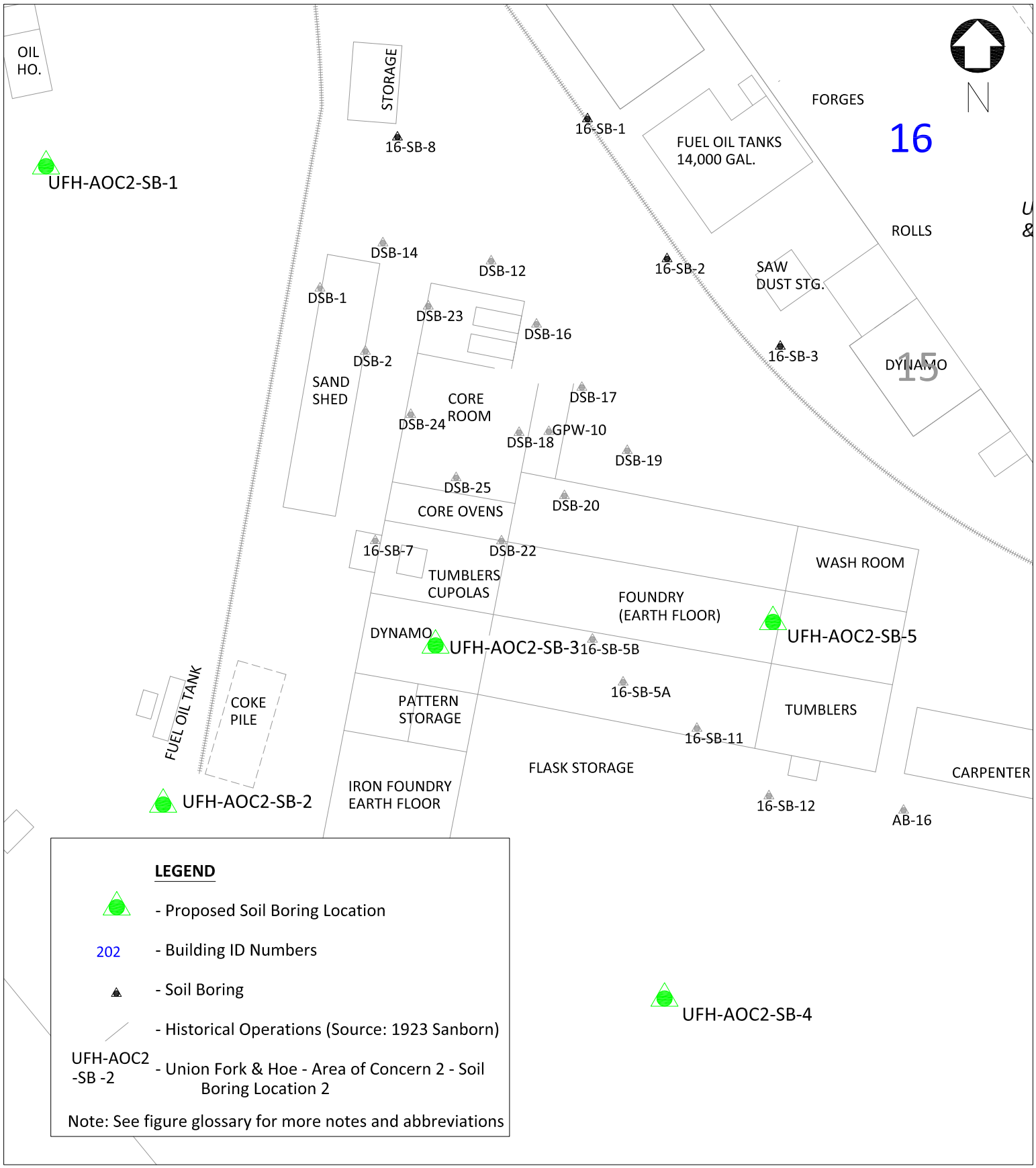
Site Plan Showing Proposed Soil Boring Locations - Former Fuel Oil Storage Area West of Building 16 - AOC 1

Project No. R1106075

Figure 2

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



LEGEND

- Proposed Soil Boring Location
202 - Building ID Numbers
- Soil Boring
- Historical Operations (Source: 1923 Sanborn)
UFH-AOC2-SB-2 - Union Fork & Hoe - Area of Concern 2 - Soil Boring Location 2

Note: See figure glossary for more notes and abbreviations

0 10 20 40

Approximate Scale in Feet

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Checked by/Date: RBG/05-14-12

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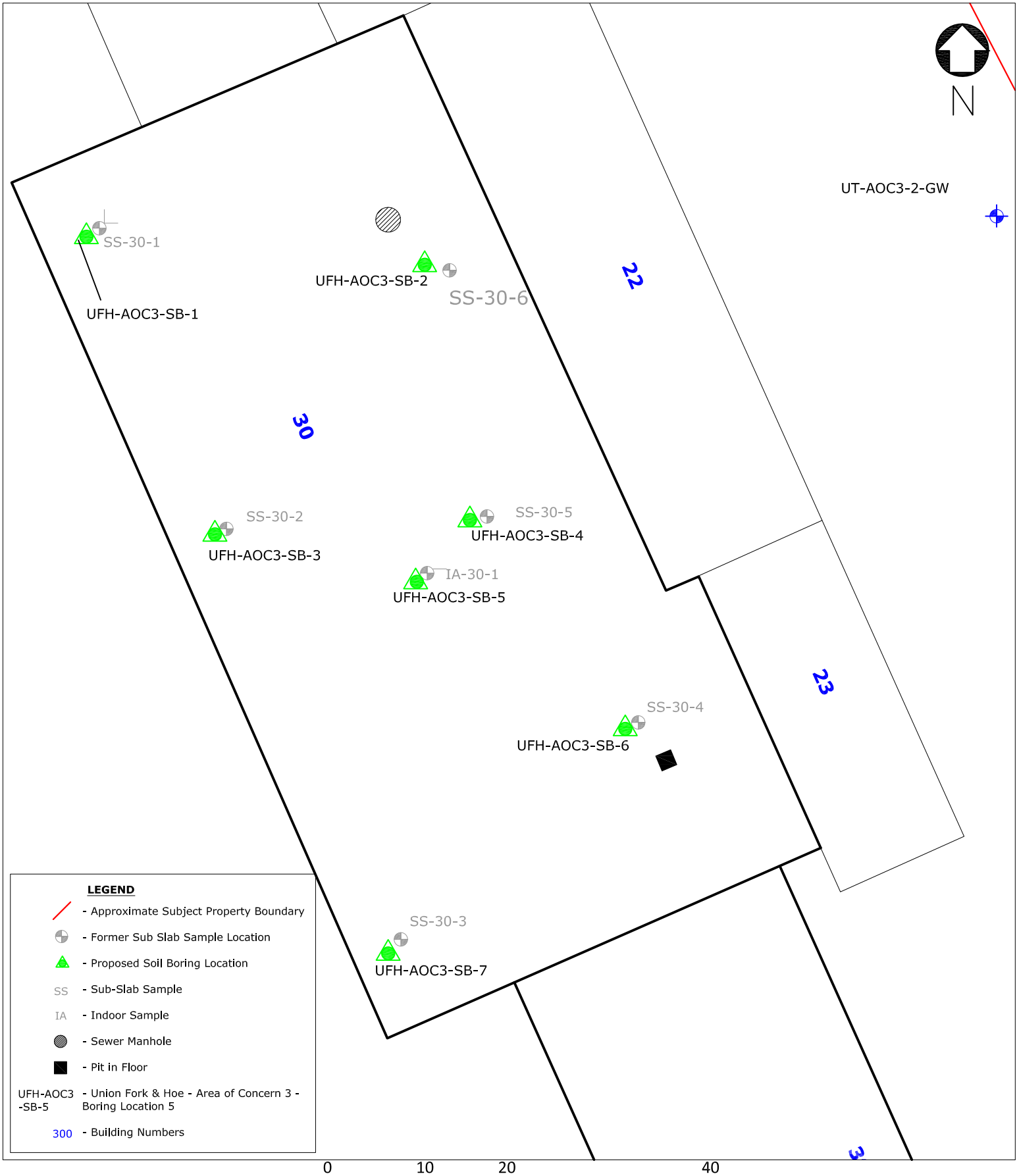
Site Plan Showing Proposed Soil Boring Locations at Historic Railroad operations - AOC-2

Project No. R1106075

Figure 3

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on July 22, 2011.



Prepared by/Date: LJW/05-14-12
Checked by/Date: RBG/05-14-12

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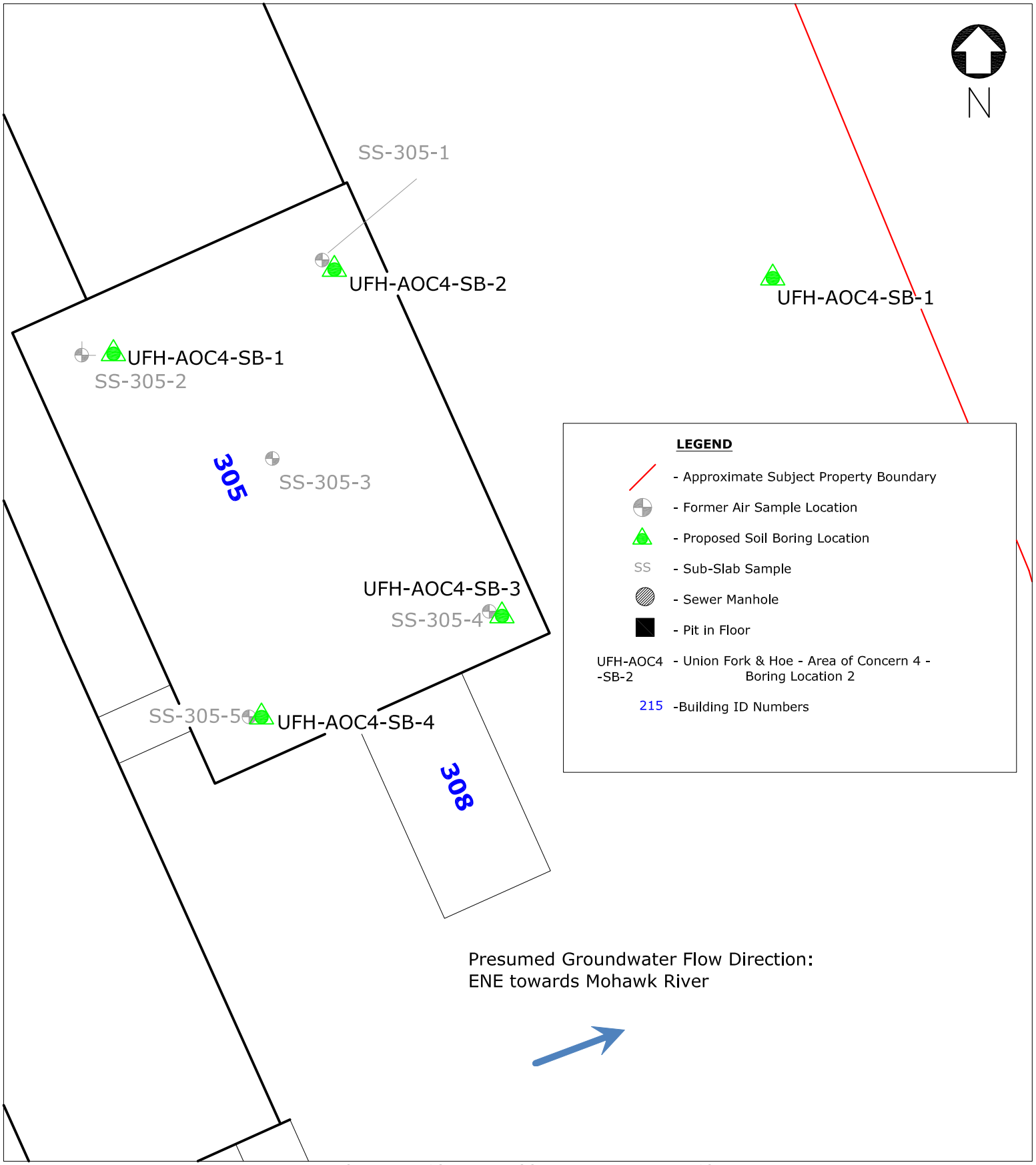
Site Plan Showing Proposed Soil Boring Locations - Building 30 - AOC-3

Project No. R1106075

Figure 4

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



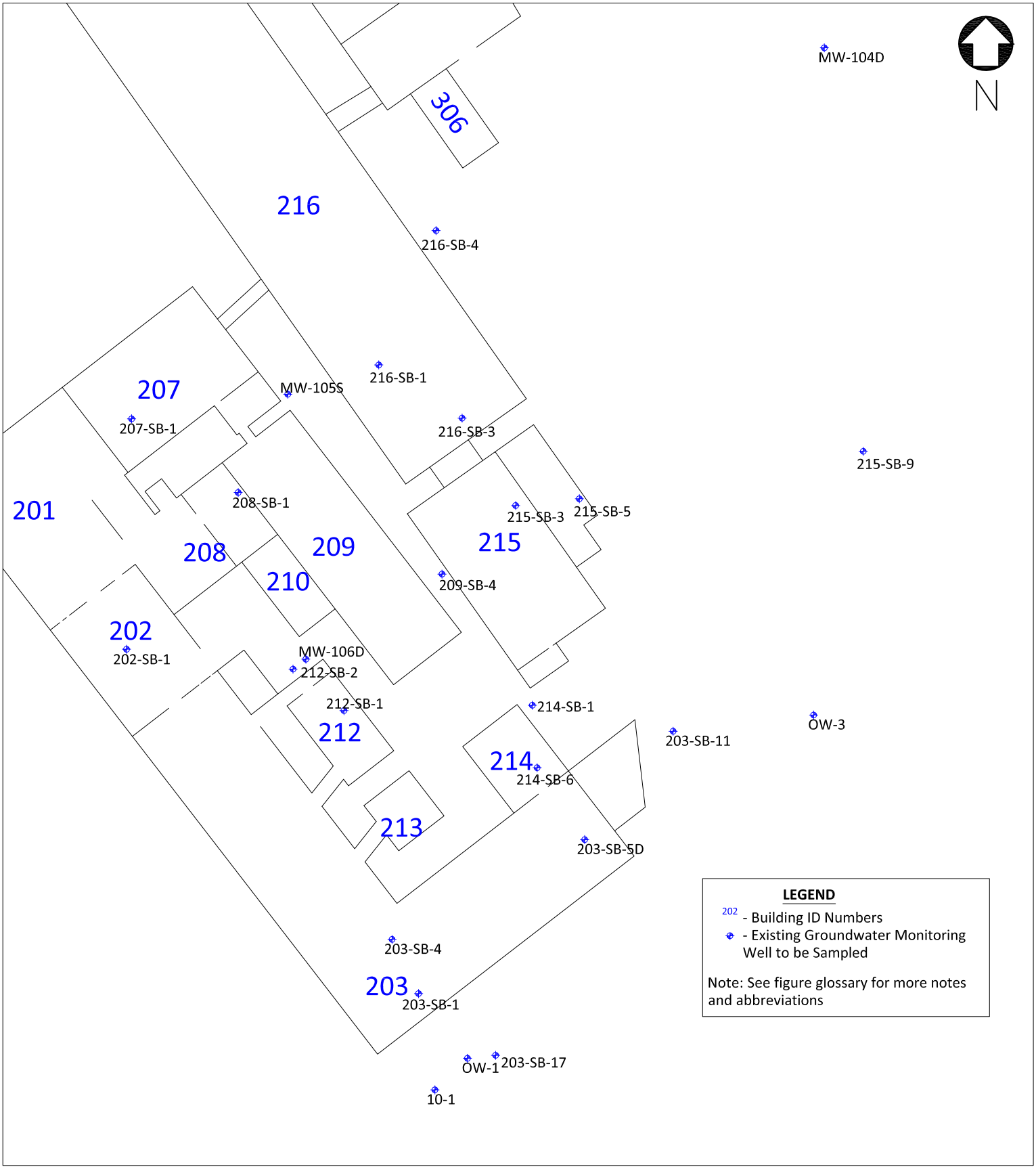
Prepared by/Date: LJW/04-20-12
Checked by/Date: RBG/04-20-12

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Proposed Soil Boring Locations - Building 305 - AOC 4 Project No. R1106075 Figure 5

APPENDIX A

FIELD PROCEDURES

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



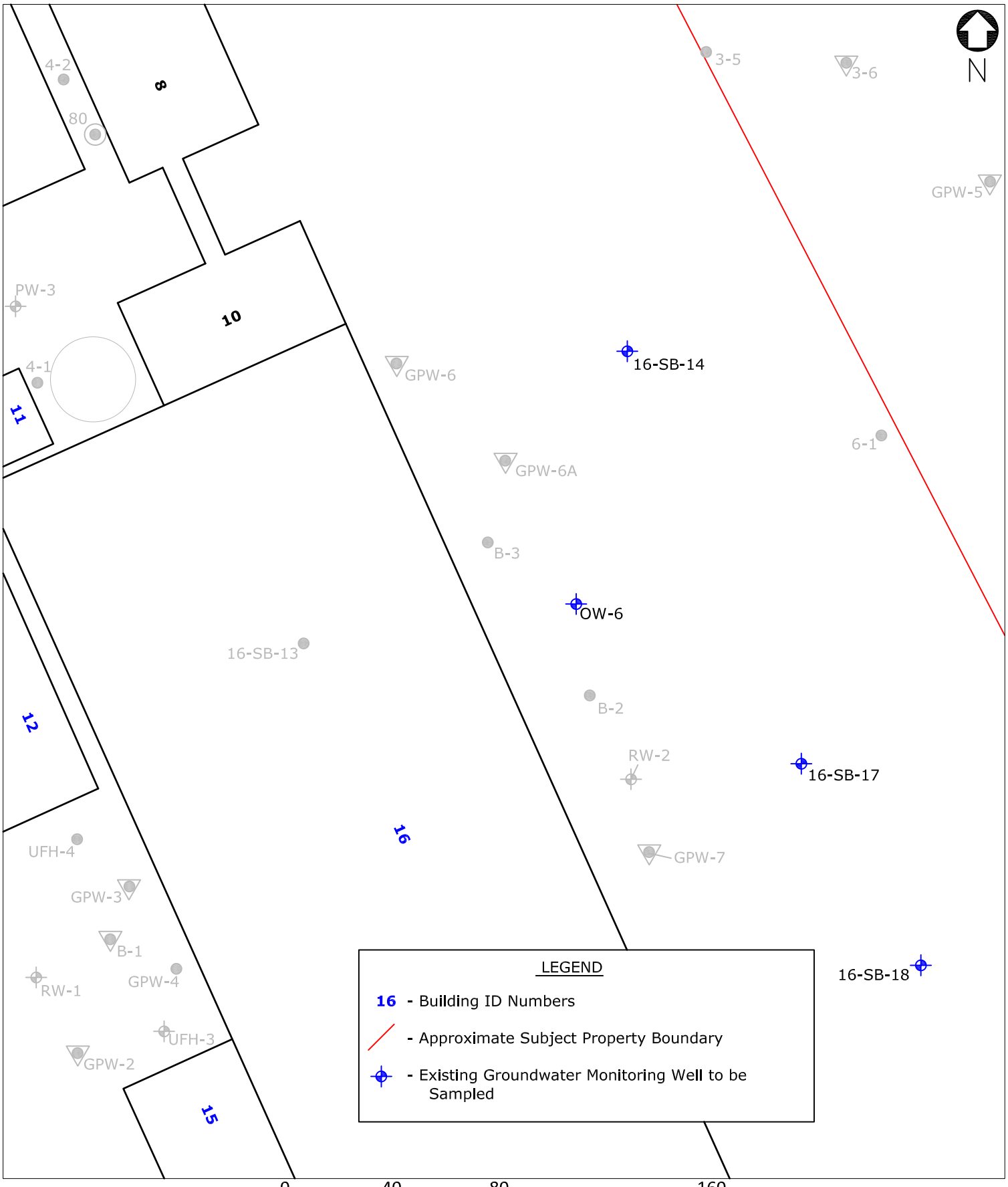
0 10 20 40

Approximate Scale in Feet

Prepared by/Date: LJW/05-14-12
Checked by/Date: RBG/05-14-12

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Existing Groundwater Monitoring Well Locations to be Sampled - 200-Series Buildings - AOC-5 Project No. R1106075 Figure 6

Sources: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr.Richard Garlitz on March 27, 2012.



Prepared by / Date: LJW / 04-20-2012
Checked by / Date: RBG / 04-20-2012

Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York

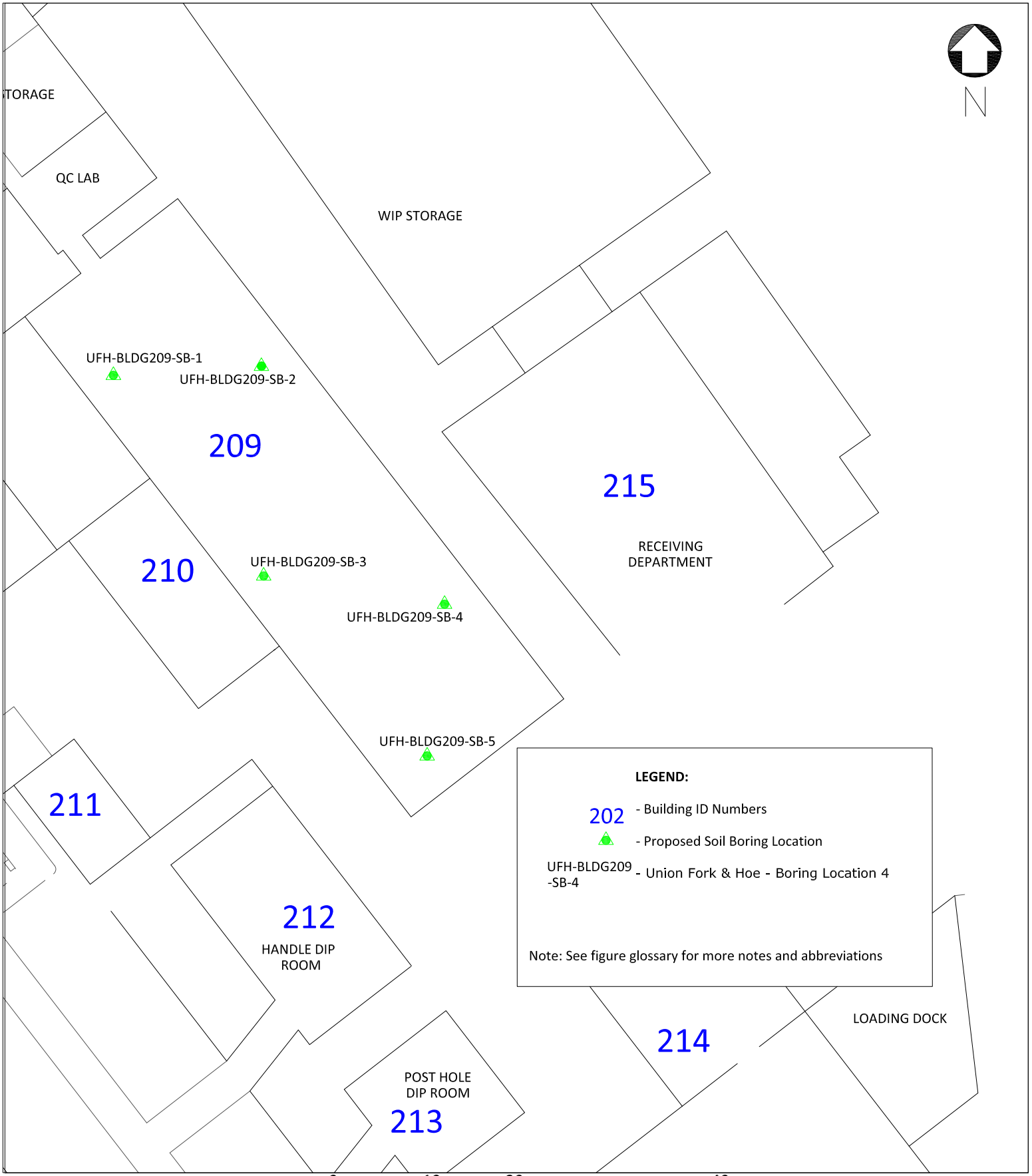
Bradburne, Briller & Johnson, LLC
www.bbjgroup.com

Site Plan Showing Existing Groundwater Monitoring Well Locations to be Sampled - Spill Number 0007178 Area

Project No. R1106075

Figure 7

Source: Aerial photograph reviewed on NYGIS (http://www.nysgis.state.ny.us/gisdata/), dated 2008; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



Prepared by/Date: LJW/5-14-12
Checked by/Date: RBG/5-14-12

Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York

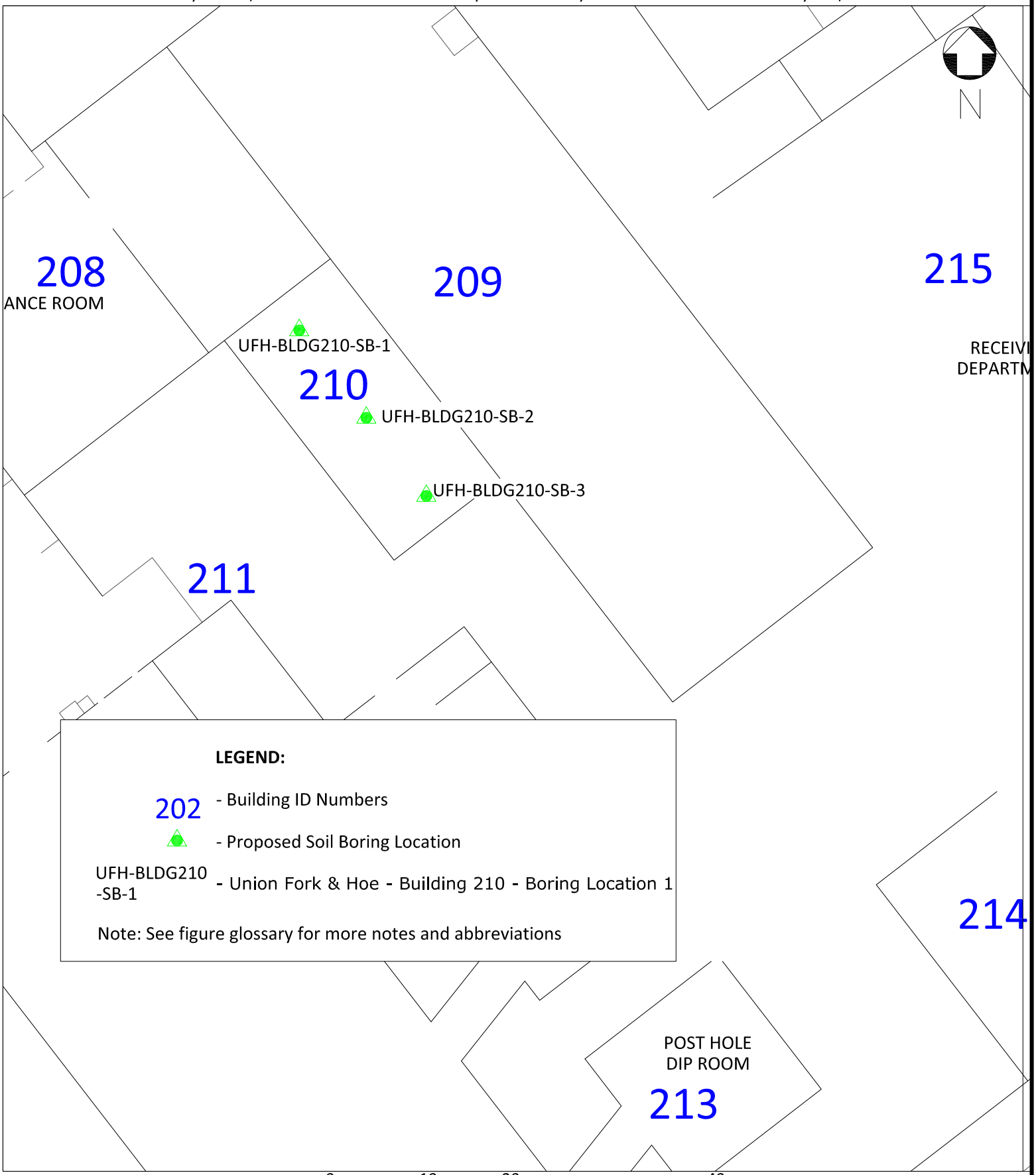
Bradburne, Briller & Johnson, LLC
www.bbjgroup.com

Site Plan Showing Proposed Soil Boring Locations at Building 209

Project No. 1106075

Figure 8

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on July 22, 2011.



Prepared by/Date: LJW/05-14-12
Checked by/Date: RBG/05-14-12

Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York

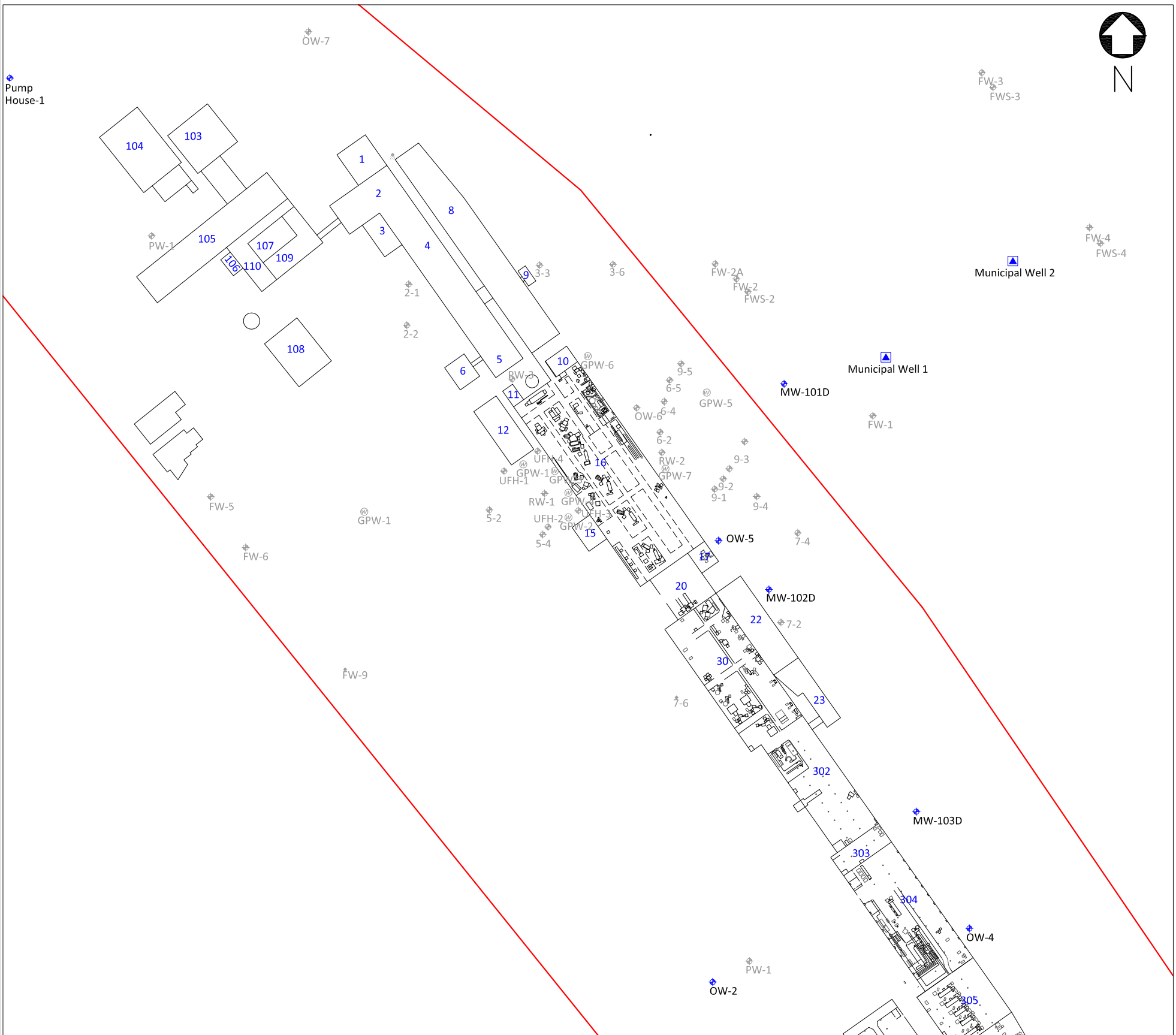
Bradburne, Briller & Johnson, LLC
www.bbjgroup.com

Site Plan Showing Proposed Soil Boring and Monitoring Well Locations at Building 210

Project No. 1106075

Figure 9

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



LEGEND

- Approximate Subject Property Boundary
- Existing Groundwater Monitoring Well to be Sampled and Surveyed
- 203 - Building Number

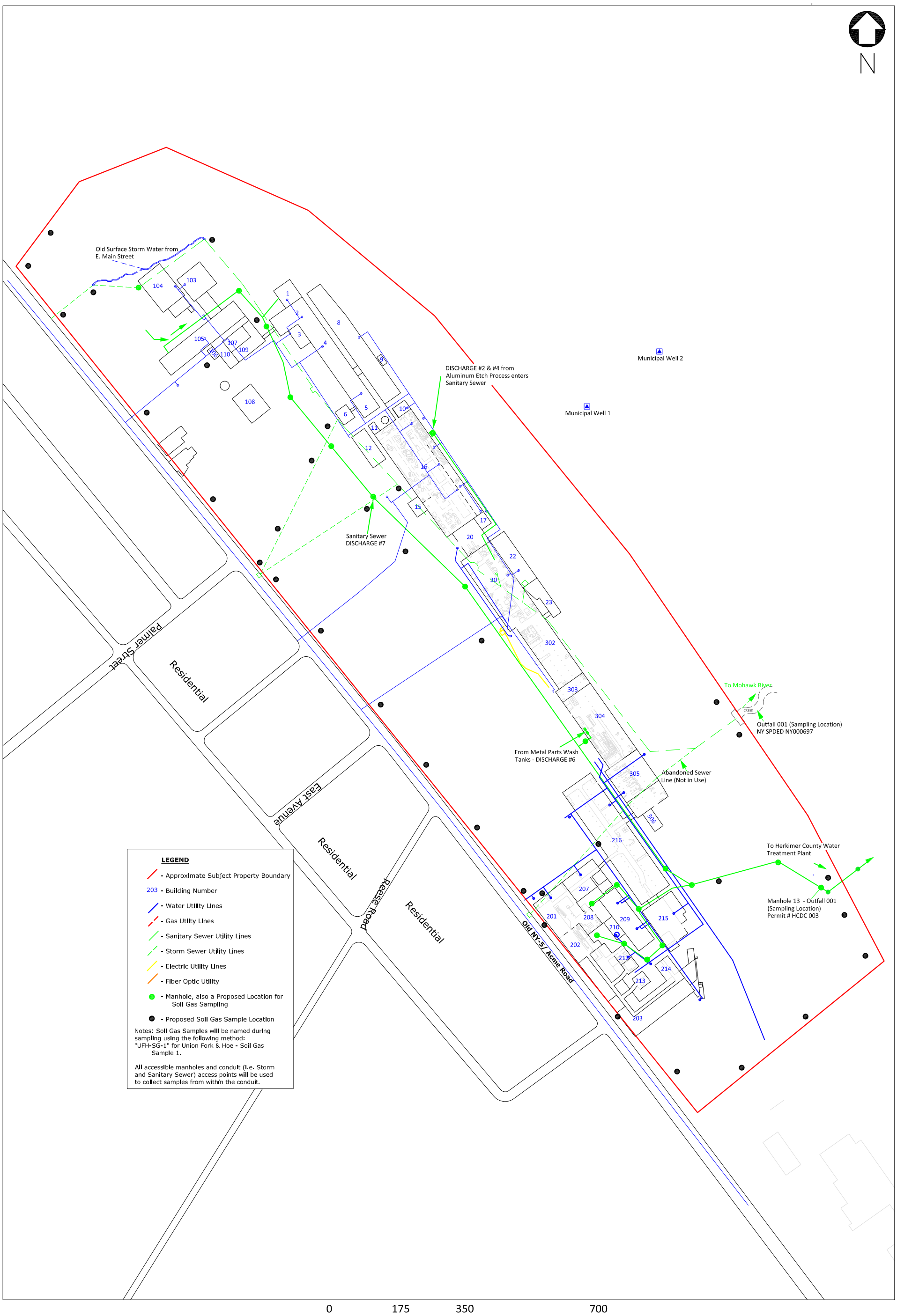
0 150 300 600

Approximate Scale in Feet

Prepared by/Date: LJW/05-14-12
Checked by/Date: RBG/05-14-12

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Existing Groundwater Monitoring Wells to be Sampled and Surveyed Project No. 1106075 Figure 10

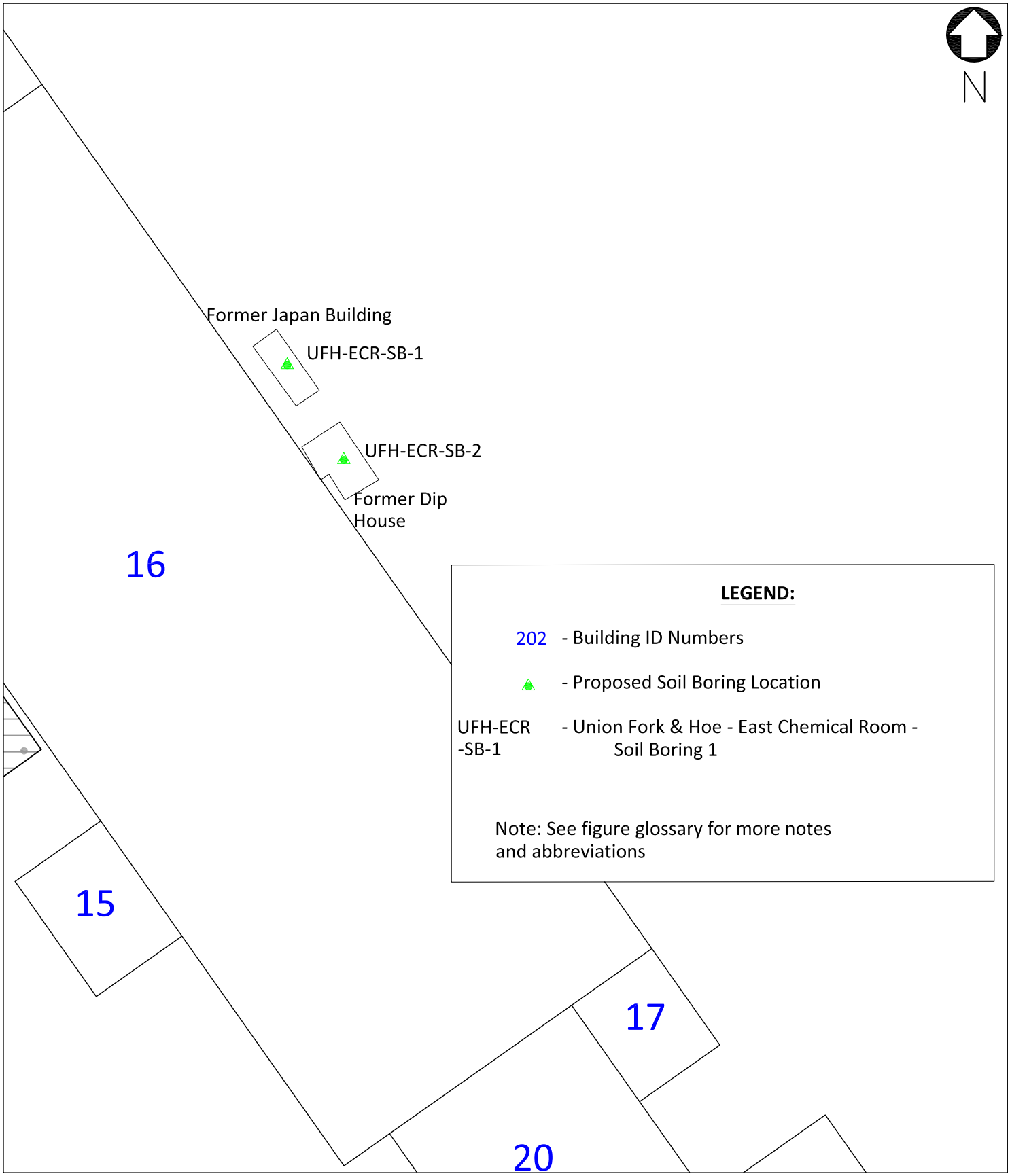
Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; Union Tools Utility Maps dated 1984 and 1994; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



Prepared by/Date: LJW/10-18-11
Checked by/Date: RBG/10-18-11

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Known Utilities and Proposed Soil Gas Sampling Locations Project No. R1106075 Figure 11

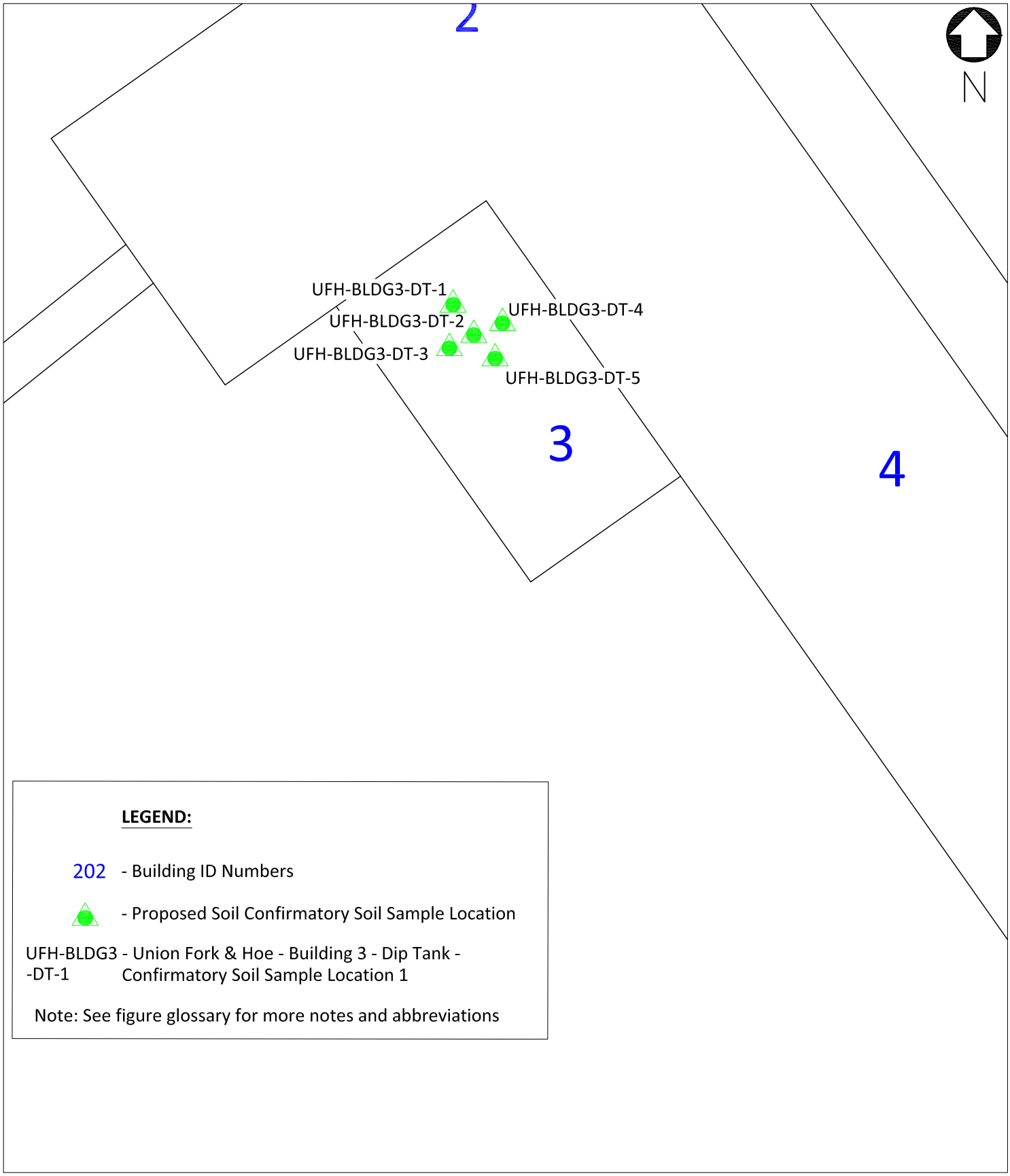
Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on July 22, 2011.



Prepared by/Date: LJW/04-23-12
Checked by/Date: RBG/04-23-12

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Proposed Soil Boring and Monitoring Well Locations - Small Building East of Building 16 Project No. 1106075 Figure 12

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



LEGEND:

202 - Building ID Numbers

- Proposed Soil Confirmatory Soil Sample Location

UFH-BLDG3-DT-1 - Union Fork & Hoe - Building 3 - Dip Tank - Confirmatory Soil Sample Location 1

Note: See figure glossary for more notes and abbreviations

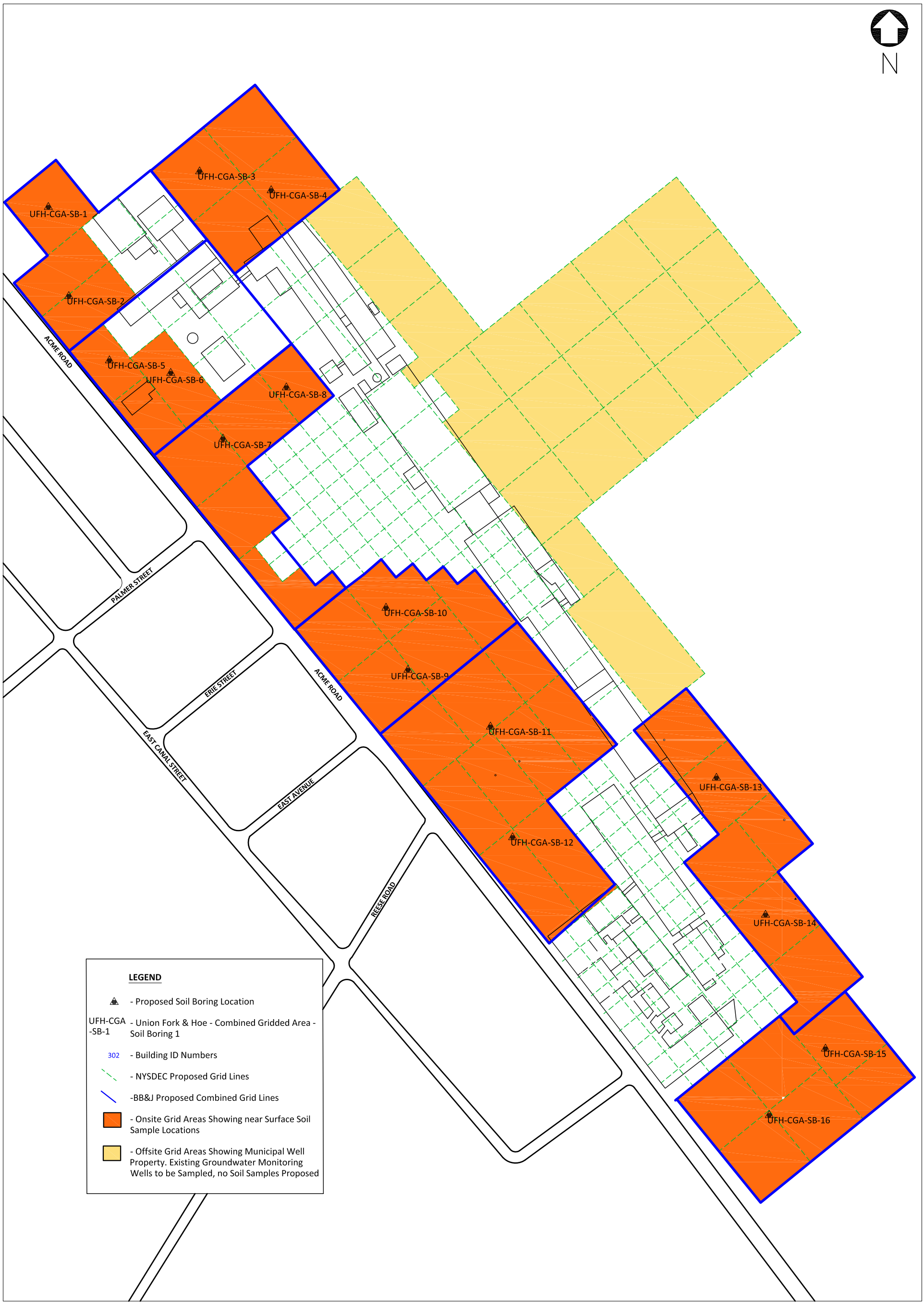
0 25 50 100

Approximate Scale in Feet

Prepared by/Date: LJW/04-23-12
Checked by/Date: RBG/04-23-12

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Proposed Confirmatory Soil Sample Locations - Building 3 Project No. 1106075 Figure 13

Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on March 27, 2012.



Prepared by / Date: LJW / 04.24.2012
Checked by / Date: RBG / 04.24.2012

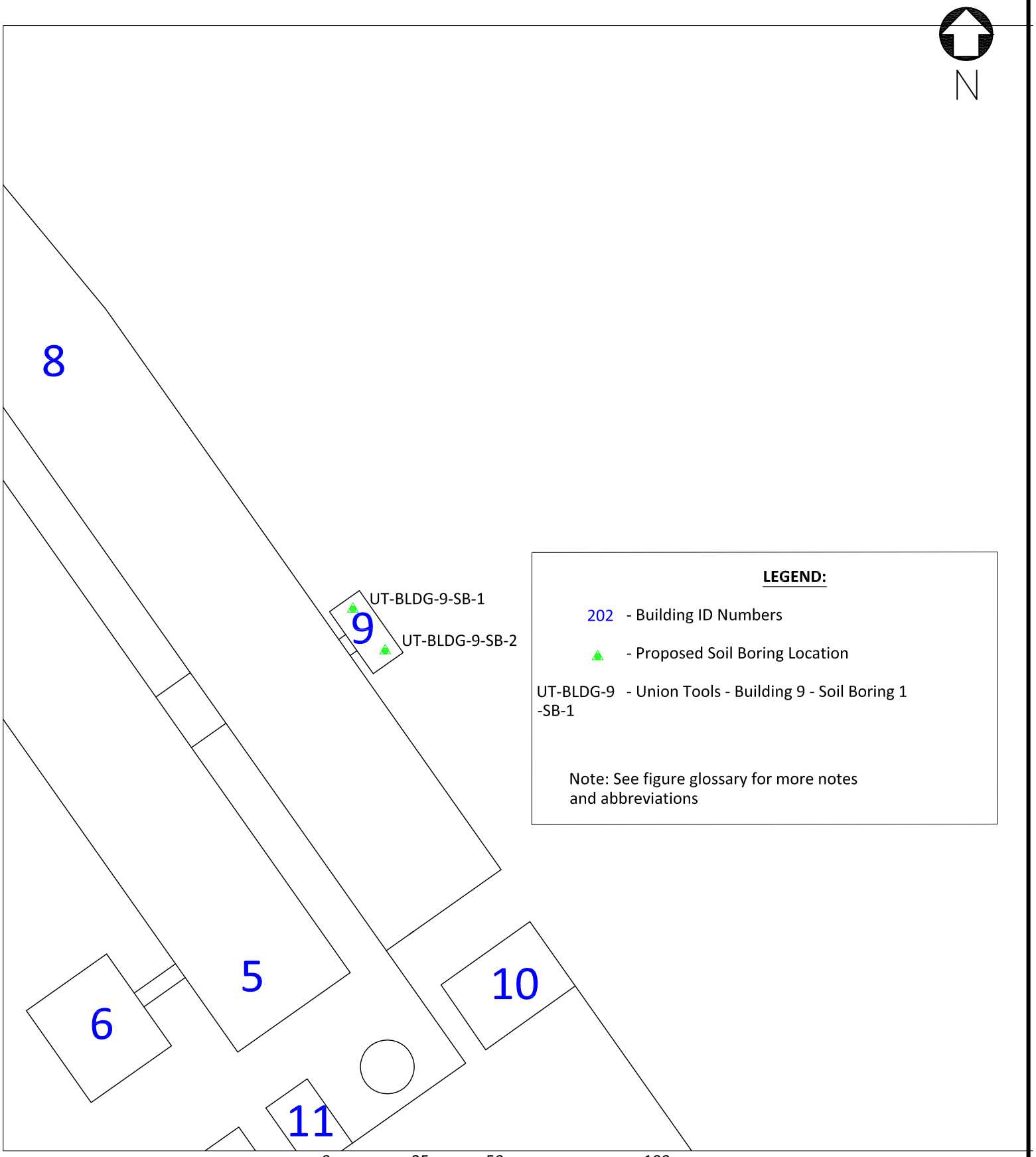
Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York

Bradburne, Briller & Johnson, LLC
www.bbjgroup.com

Site Plan Showing Proposed Soil Boring Locations - Combined Gridded Areas

Project No. R1106075 Figure 14

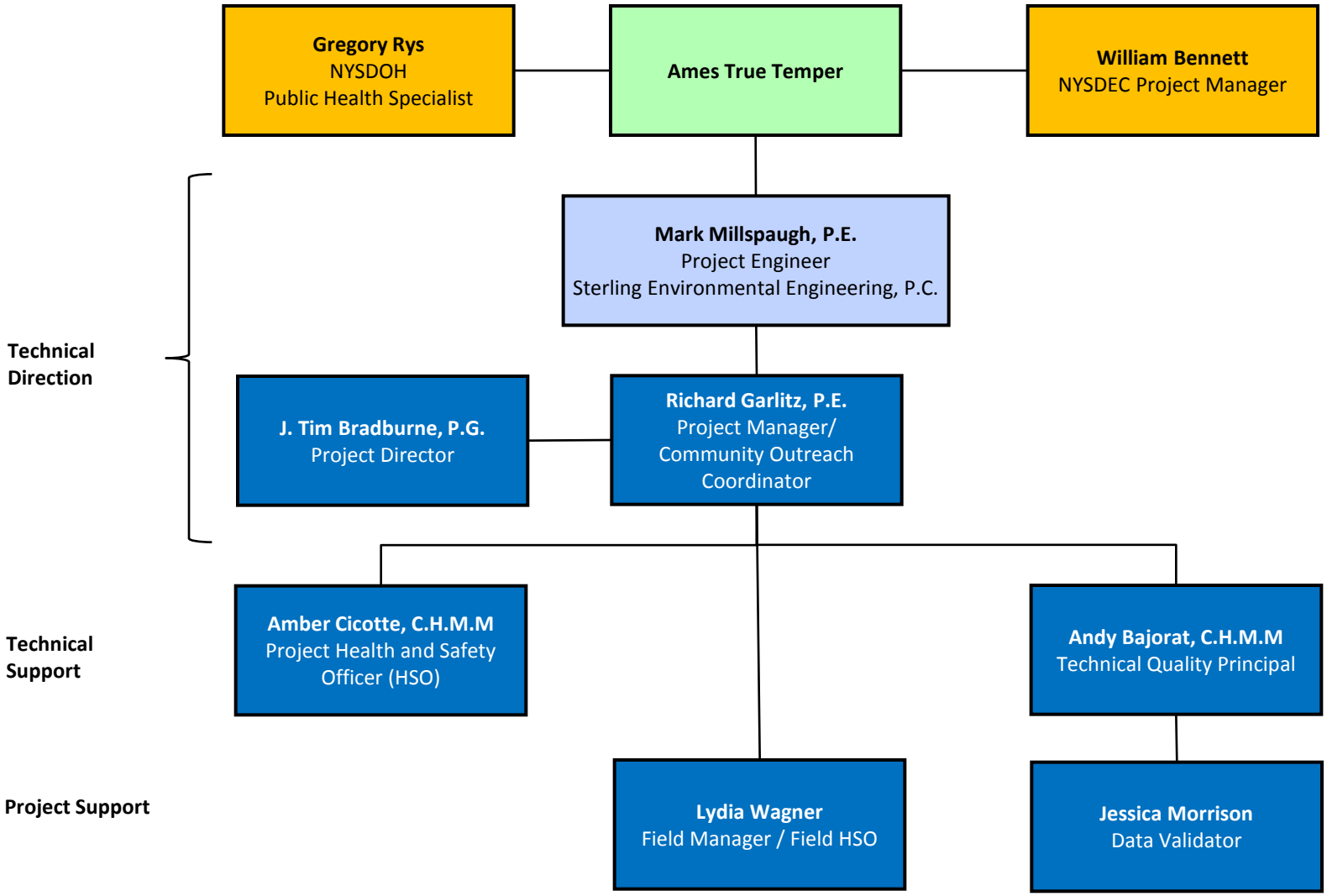
Source: Alpha Geoscience Interim Remedial Measures Work Plan, Union Tools, Inc. Frankfort, New York dated January 2006; and Site Reconnaissance performed by Mr. Richard Garlitz on July 22, 2011.



Prepared by/Date: LJW/04-23-12
Checked by/Date: RBG/04-23-12

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Proposed Soil Boring Locations - Building 9 Project No. 1106075 Figure 15

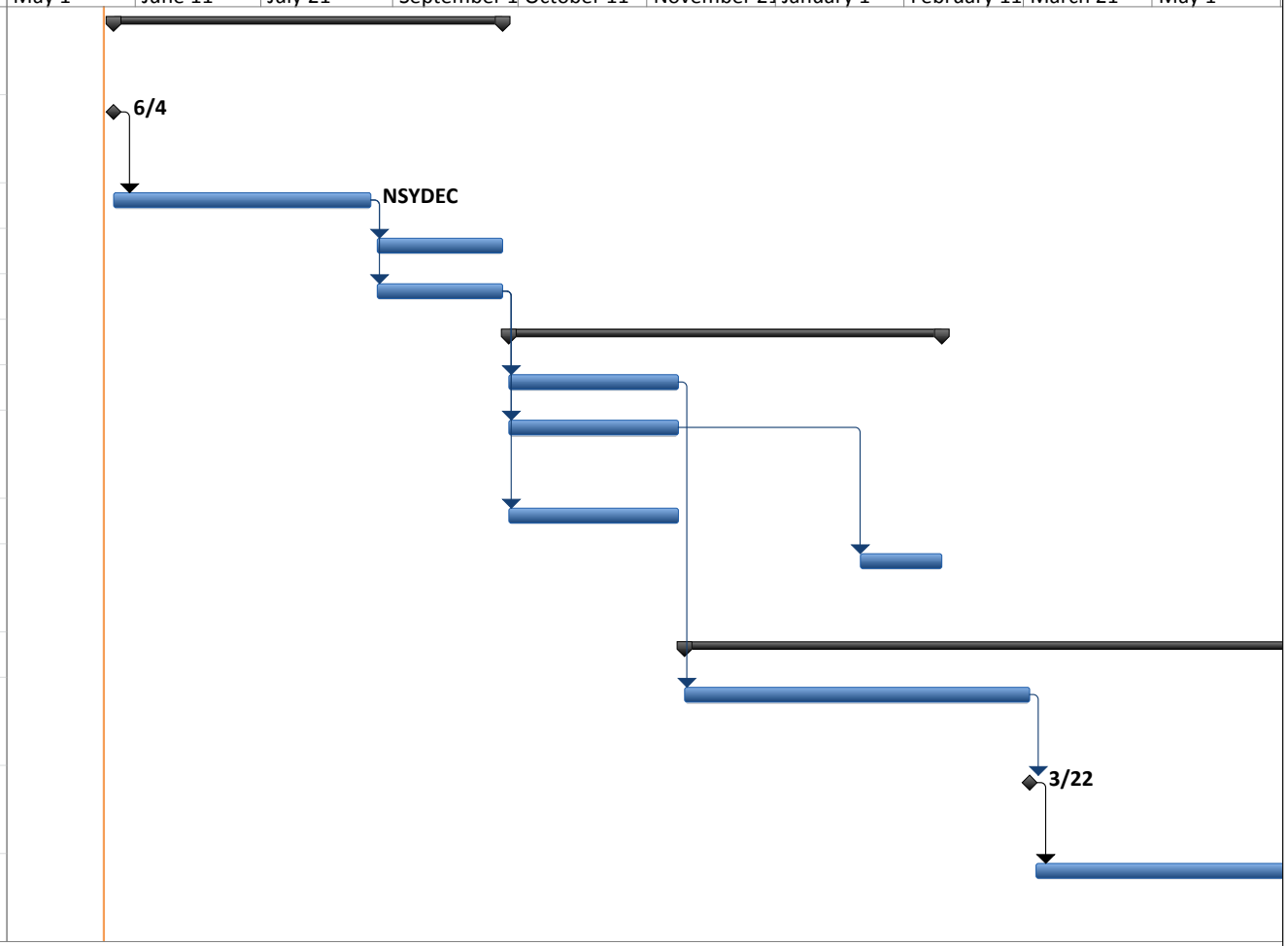
Project Organization Chart



Former Union Fork & Hoe Site 253 East Main Street Frankfort, New York	B&J	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Project Organization Chart Project No. R1106075 Figure 16

Figure 17: Schedule for Remedial Investigation

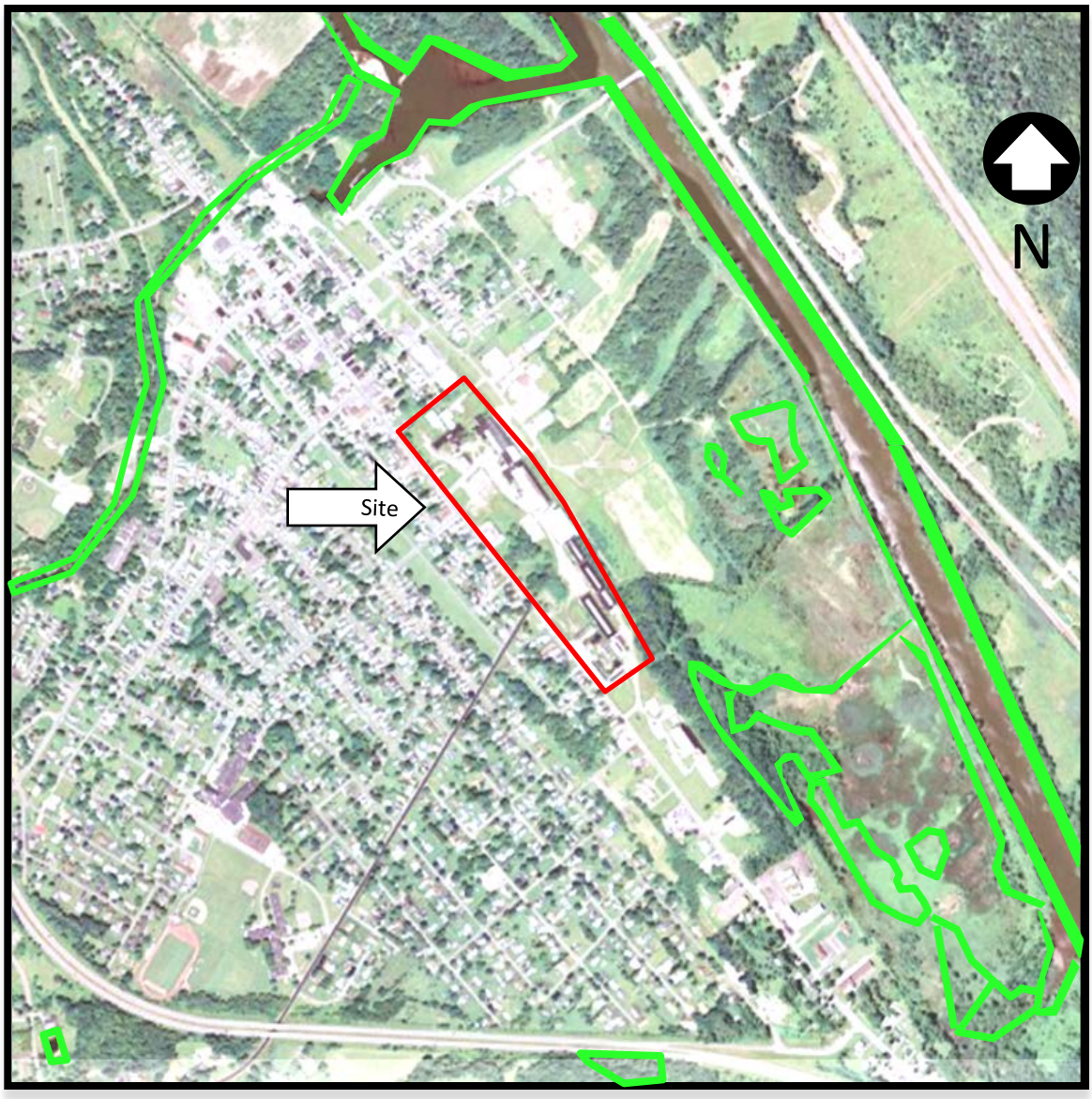
ID	Task Name	Duration
1	**Pre-Remedial Investigation Activites**	**90 days?**
2	Remdial Investigation Work Plan (RIWP) Submittal	0 days
3	NYSDEC Approval of RIWP	60 days?
4	Health and Safety Plan	30 days
5	Utility Location	30 days
6	**Remedial Activites**	**100 days**
7	Soil Investigation	2 mons
8	Groundwater Investigation - Round 1	2 mons
9	Soil Gas Investigation	2 mons
10	Groundwater Investigation - Round 2	1 mon
11	**Reporting**	**140 days**
12	Data Evaluation and Report Writing	4 mons
13	Submittal of RI Completion Report	0 days
14	NYSDEC Review of Completion Report	60 days



Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York

Task		External Milestone		Manual Summary Rollup	
Split		Inactive Task		Manual Summary	
Milestone		Inactive Milestone		Start-only	
Summary		Inactive Summary		Finish-only	
Project Summary		Manual Task		Deadline	
External Tasks		Duration-only		Progress	

Source: United States Geological Survey Frankfort, NY Quadrangle 7.5 Minute Series (Topographic), dated July 1, 1982, and United State Fish and Wildlife Service, National Wetlands Inventory Mapper, last updated October 6, 2011.



0 1,500 3,000 6,000

APPROXIMATE SCALE IN FEET (1 inch = 1500 feet)

LEGEND

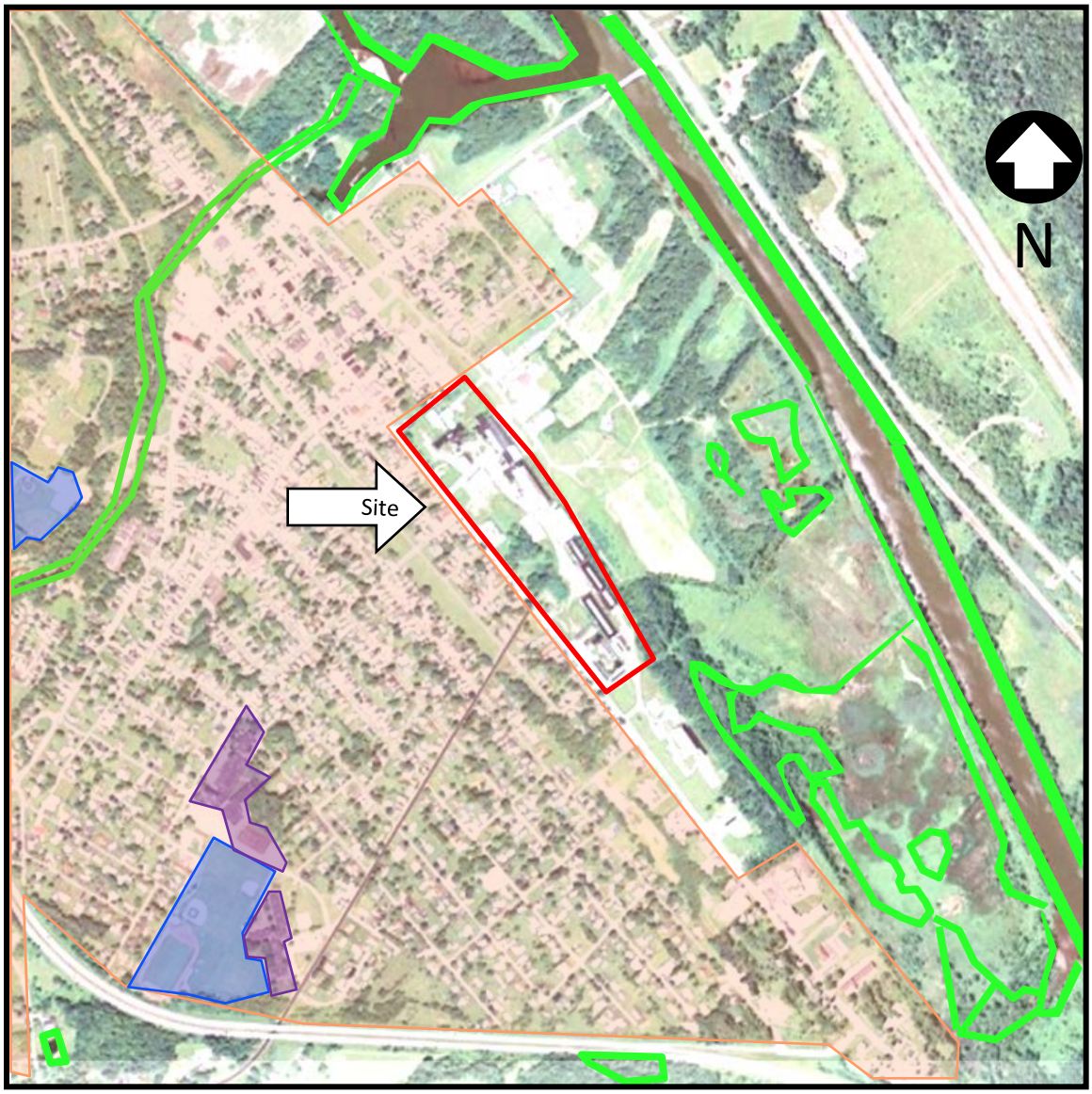
- Subject Property Boundary
- Wetlands, National Wetland Inventory

Quadrangle Location

Prepared by/Date: CAM/ 10-17-2011
Checked by/Date: LJW/ 04-20-2012

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Wetlands On or Near the Subject Property Project No. R1106075 Figure 18

Source: United States Geological Survey Frankfort, NY Quadrangle 7.5 Minute Series (Topographic), dated July 1, 1982, and United State Fish and Wildlife Service, National Wetlands Inventory Mapper, last updated October 6, 2011.



0 1,500 3,000 6,000

APPROXIMATE SCALE IN FEET (1 inch = 1500 feet)

LEGEND

- Subject Property Boundary
- Wetlands
- Residential Properties
- Schools
- Parks

Quadrangle Location

Prepared by/Date: CAM/10-17-2011
Checked by/Date: LJW/10-18-2011

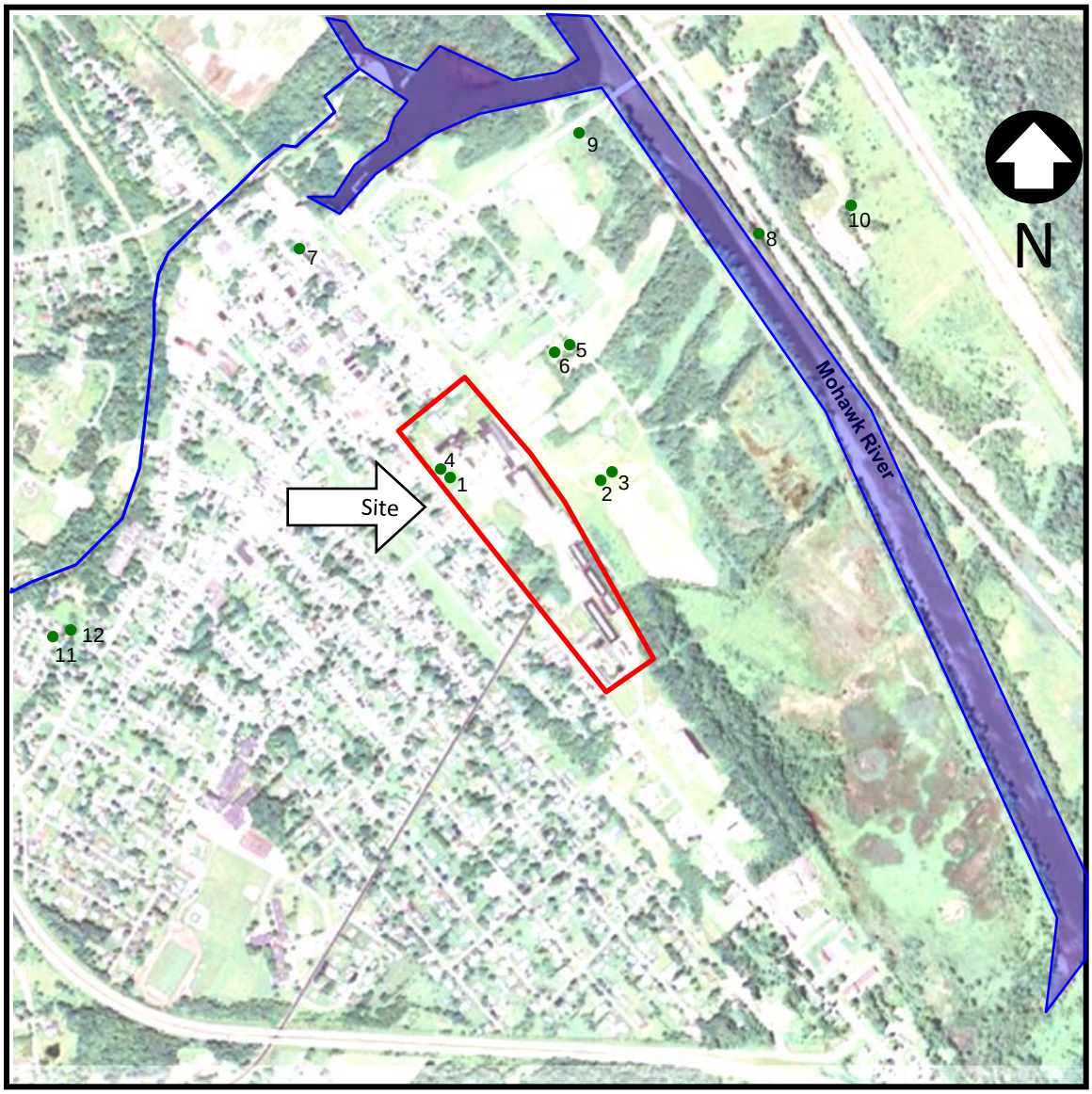
Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York

Bradburne, Briller & Johnson, LLC
www.bbjgroup.com

Site Plan Showing Sensitive Receptors On and Near the Subject Property

Project No. R1106075 Figure 19

Sources: United States Geological Survey Frankfort, NY Quadrangle 7.5 Minute Series (Topographic), dated July 1, 1982, and United States Fish and Wildlife Service, National Wetlands Inventory Mapper, last updated October 6, 2011.



0 1,500 3,000 6,000

APPROXIMATE SCALE IN FEET (1 inch = 1500 feet)

LEGEND

- Subject Property Boundary
- Surface Water
- Public Water Well Location

Note: See key, page 2 of this figure, for translation of numbers to Site name, address and regulatory listings.

Quadrangle Location

Prepared by/Date: CAM/10-17-2011
Checked by/Date: LJW/05-14-2012

Former Union Fork & Hoe Facility
253 East Main St
Frankfort, New York

Bradburne, Briller & Johnson, LLC
www.bbjgroup.com

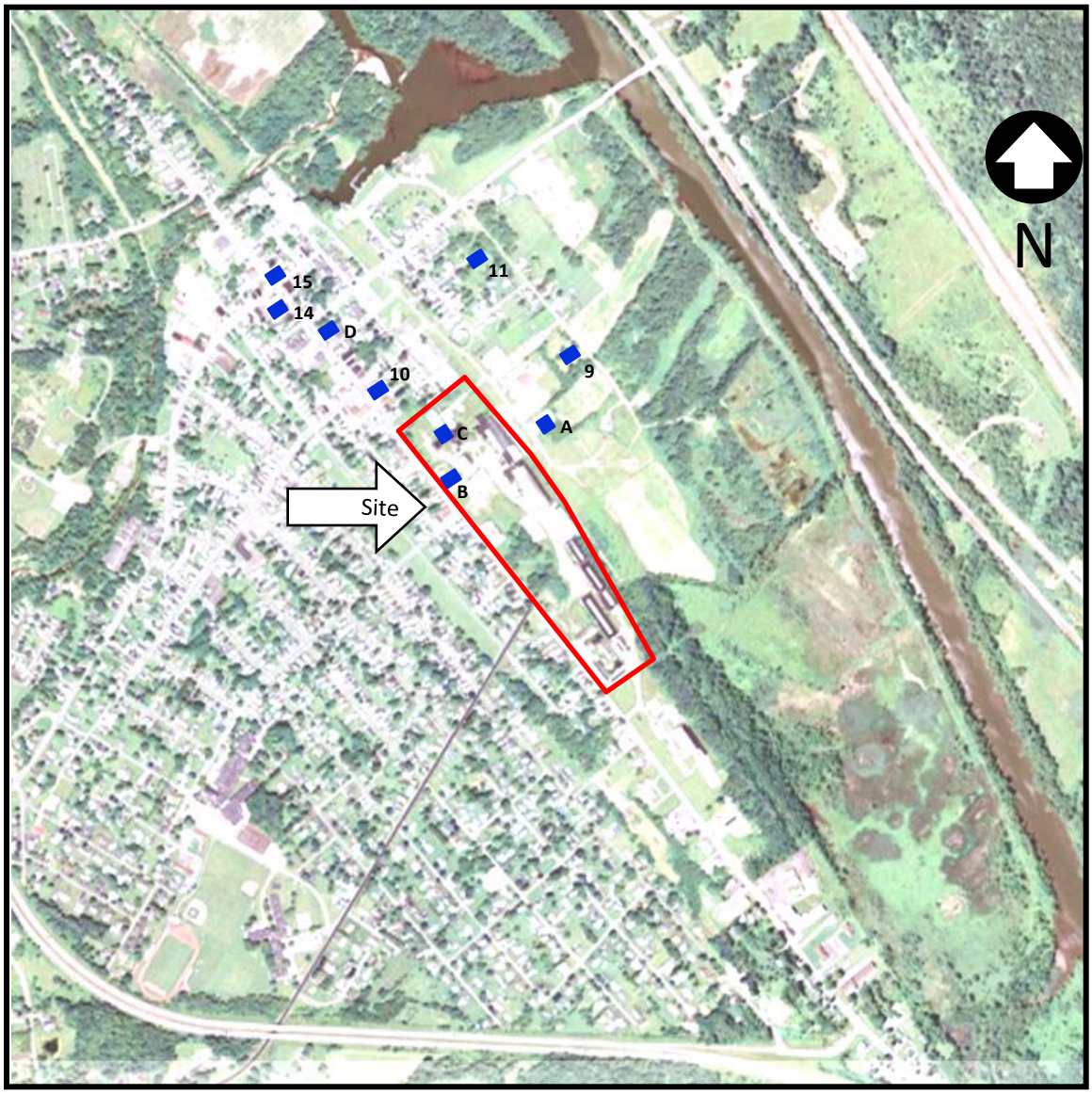
Site Plan Showing Waterways and Public Water Wells On and Near the Subject Property

Project No. R1106075 Figure 20

Key to Figure 20 – Site Plan Showing Waterways and Public Wells on and Near the Subject Property

Key Number	Well ID	Distance from SP
1	USGS2174909	0 - 1/8 Mile WNW
2	USGS2174912	0 - 1/8 Mile NE
3	NY0002301	0 - 1/8 Mile ENE
4	USGS2174914	1/8 - 1/4 Mile NW
5	USGS2174918	1/8 - 1/4 Mile NNE
6	USGS217492	1/8 - 1/4 Mile NNE
7	USGS2174928	1/4 - 1/2 Mile NW
8	USGS2174923	1/4 - 1/2 Mile NE
9	USGS2174941	1/4 - 1/2 Mile NNE
10	USGS2174926	1/2 - 1 Mile ENE
11	NYWS001151	1/2 - 1 Mile WSW
12	NYWS001150	1/2 - 1 Mile WSW
13	USGS2174949	1/2 - 1 Mile North
14	USGS2174948	1/2 - 1 Mile NNE
15	USGS2174964	1/2 - 1 Mile North
16	USGS2174869	1/2 - 1 Mile SE

Sources: United States Geological Survey Frankfort, NY Quadrangle 7.5 Minute Series (Topographic), dated July 1, 1982, and Environmental Data Resources (EDR) Package, Milford, CT dated September 22, 2009.



0 1,500 3,000 6,000

APPROXIMATE SCALE IN FEET (1 inch = 1500 feet)

LEGEND

- Subject Property Boundary
- Recognized Areas of Contamination

Note: See key, page 2 of this figure, for translation of numbers to well identification and proximity to Subject Property

Quadrangle Location

Prepared by/Date: CAM /10-17-2011
Checked by/Date: RBG /05-14-2012

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Plan Showing Known Contaminated Sites Nearby the Subject Property Project No. R1106075 Figure 21

Key to Figure 21: Site Plan Showing Nearby Contaminated Sites

Key Number	Site Name	Site Address	Site Regulatory Listing
A1	Frankfort Department of Public Works (DPW)	Municipal Plant Drive, Frankfort NY 13340	Historic Underground Storage Tank (Historic UST), and Historic aboveground Storage Tank (HIST AST)
A2	Frankfort DPW	DPW Drive, Frankfort, NY	Historic Leaking Tanks (HIST LTANKS), and Leaking Storage Tank Listing Reports (LTANKS)
A3	Frankfort Water Treatment Plant	Industrial Drive, Frankfort NY 13350	Chemical Bulk Storage Database (CBS AST), and CBS
B4	Union Fork & Hoe	253 East Main St, Frankfort NY 13340	Underground Storage Tank (UST)
5	Union Fork & Hoe	253 East Main Street, Frankfort NY 13340	State Hazardous Waste Site (SHWS), Aboveground Storage Tank (AST), HIST UST, HIST AST, and Vapor Reopened
B6	Mohawk Metals	Main Street, Frankfort NY	New York Spills (NY Spills), and New York Historic Spills (NY HIST Spills)
C7	Union Tools	- 253 East Main St, Frankfort NY	NY Spills, NY Hist Spills, and CBS
C8	Union Fork and Hoe	253 East Main St, Frankfort NY	L Tanks, NY Spills, NY Hist Spills, and Hist LTanks
9	Union Fork and Hoe	217 William St, Frankfort NY 13340	Facility and Manifest Data (Manifest)
11	Sudakow Dump	- Williams St, Frankfort NY 13340	Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS), Facility Index System/Facility Registry System (FINDS), Facility and Manifest Data (Manifest), and RCRA non generators (RCRA-NonGen)
D12	Ron's Citgo	132 East Main St, Frankfort NY 13340	UST, LTanks, HIST UST, and Hist LTanks
D13	Frankfort Sunoco	132 East Main St, Frankfort NY 13340	UST, LTanks, HIST UST, and Hist LTanks
14	Frankfort Sunoco	Main St, Frankfort NY	LTanks and Hist LTanks
15	Commercial Property	100 North Litchfield St, Frankfort NY 13340	LTanks

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

DRAFT
Privileged and Confidential

QUALITY ASSURANCE PROJECT PLAN

Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York
NYSDEC Site # 622011

Submitted to:
New York State Department of Environmental Conservation
Albany, New York

On Behalf of:
Ames True Temper
Camp Hill, Pennsylvania

Prepared by:
Bradburne, Briller & Johnson, LLC
Pittsburgh, Pennsylvania

June 4, 2012

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

On August 15, 2011, Ames True Temper (Ames) entered into an *Order on Consent and Administrative Settlement* (Consent Order) with the New York State of Environmental Protection (NYSDEC) for the former Union Tools facility located at 4617 Acme Road in Frankfort, New York (Subject Property). Previously, per the requirements of the Consent Order, Bradburne, Briller and Johnson, LLC (BB&J), on behalf of Ames, submitted a *Records Search Report* (RSR) that detailed known information about potential contamination at or emanating from the Subject Property. The RSR identified several areas requiring investigation; this investigation is described in a Remedial Investigation Work Plan (RIWP)

The *Quality Assurance Project* Plan (QAPP) details the protocols and procedures that will be followed during the proposed Remedial Investigation as outlined in the RIWP. The purpose of the following protocols and procedures is to ensure that all project activities will be performed in a manner consistent with the data quality objectives established for the project and all data collected during the RI are precise, accurate, representative, comparable and complete. BB&J has considered the following documents in preparing this QAPP:

- DER-10 / Technical Guidance for Site Investigation and Remediation (DER-10), dated May 3, 2010;
- USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5);
- EPA Region II Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Quality Assurance Manual; and,
- Guidance for Quality Assurance Project Plans (Guidance), by the USEPA, dated December 2002.

Project Description and Scope

Based on the results of the previous investigations, historical research, and discussions with the NYSDEC the following areas of concern (AOCs) have been identified:

- Former Fuel Oil Storage Area Adjacent and West of Building 16;
- Former Railroad Operations Conducted West of Building 16 in the Current Parking Lot Area;
- Source of the Elevated Sub Slab Volatile Organic Compound (VOC) Concentrations beneath Building 30;
- Source of the Elevated Sub Slab VOC Concentrations beneath Building 305;
- Groundwater South and East of the 200-Series Buildings; and
- Open Spill No. 0007178 Located East of Building 16.

In addition BB&J identified several other areas, while not fitting the definition of AOC, require additional investigation:

- Soil and groundwater at Building 210[1];
- Soil and groundwater at Building 211[1];
- Site-wide Groundwater; and
- Soil Gas at All Conduits Leading Off-site and along the Subject Property Perimeter[2].

The purpose of the remedial investigation (RI) is to:

- Delineate the lateral and vertical extent of contaminants in environmental media at or emanating from the Subject Property;

- Evaluate the surface and subsurface characteristics of the Subject Property, including topography, geology, and hydrogeology, including depth to groundwater;

- Identify the sources of contamination, migration pathways, and actual or potential receptors of contaminants on or through air, soil, bedrock, sediment, groundwater, surface water, utilities, and structures at the Subject Property without regard to property boundaries;
- Collect and evaluate data necessary to evaluate the actual and potential threats to public health and the environment. This would include evaluating all current and future potential public health exposure pathways, in accordance with DER-10 Appendix 3B, as well as potential impacts to biota; and

- Collect the data necessary to evaluate any release to an environmental medium and develop remedial alternative(s) to address the release.

1.1 Project Organization

This section identifies individuals or organizations participating in the project and discusses their specific roles and responsibilities. The principal data users, the decision-makers, the project Quality Assurance Manager and persons responsible for implementation are identified herein.

1.1.1 Technical Consultant

Key personnel for the Technical Consultant, BB&J, are presented below.

Project Principal	J. Tim Bradburne, P.G. 500 N. State Street Suite 712 Chicago, Illinois (312) 644-8556

Mr. J. Tim Bradburne, a Qualified Environmental Professional[3] and BB&J Principal, will serve as Project Director on the project. Mr. Bradburne will have overall responsibility for the project. Mr. Bradburne

[1] Buildings 210 and 211 were not previously investigated due to the poor physical condition of the buildings.
[2] BB&J understands that this issue is of concern to both the New York State Department of Health (NYSDOH) and the NYSDEC.
[3] Per DER 10 Table 1.5 and Section 1.3

will interface between BB&J's client, Ames, Ames' legal counsel, and the NYSDEC. Mr. Bradburne will have regular direct communication with the Project Engineer.

Project Engineer/ Community Relations Contact	Richard B. Garlitz, P.E. 1641 Saw Mill Run Boulevard Pittsburgh, Pennsylvania (412) 882-4050, ext 10

Mr. Richard B. Garlitz, P.E., will serve as the Project Engineer, and will be responsible for overall coordination of all phases of the project. His duties will include management of field personnel, data quality assurance, and communication with the NYSDEC. Mr. Garlitz will also have direct communication with the Project Principal, Project Health and Safety Officer (HSO), Field HSO, and Field Manager.

In addition, Mr. Richard Garlitz will serve as the Community Relations Contact and will be responsible for community relations with respect to the on-going remedial investigation, and possible remedial action, activities conducted at the Subject Property. Mr. Garlitz will interface with the local community, (i.e., neighboring residents and businesses, local community groups, local and State government, and local media) providing responses to any questions they may have and sending out fact sheets when the NYSDEC deems it necessary.

Technical Quality Principal	Andrew W. Bajorat, C.H.M.M. 500 N. Dearborn Street, Suite 712 Chicago, Illinois 60654 (312) 644 – 8556

Mr. Andrew Bajorat will serve as the Technical Quality Principal, and will be responsible for overall quality assurance on the project. Mr. Bajorat will review project deliverables and data to evaluate quality and usability. In addition, Mr. Bajorat will interface with the Project Engineer to address any technical issues and provide quality control for the entire project. As needed, Mr. Bajorat will communicate with the laboratory project manager or the QAO to address identified QA/QC concerns. Mr. Bajorat will also validate analytical data and prepare Data Usability Summary Reports (DUSR).

Project Health and Safety Officer (HSO)	Amber Cicotte 500 N. Dearborn Street, Suite 712 Chicago, Illinois 60654 (312) 644 – 8556

Ms. Amber Cicotte will serve as the Project Health and Safety Officer and will be responsible for overall health and safety issues on the project. Ms. Cicotte will review and approve the Health and Safety Plan. Ms. Cicotte will oversee a health and safety audit. In addition, Ms. Cicotte will interface with the Project Engineer to address any health and safety issues for the project.

Data Validator	Jessica Morrison 5 Market Square Suite 202 Amesbury, Massachusetts 01913 (978)-834-0798

Ms. Jessica Morrison will serve as Data Validator. In this role, the Data Validator will:

- Review the sampling procedures and certify that the data was collected and analyzed using appropriate procedures
- Interface with the analytical laboratory to resolve problems
- Interface with Technical Quality Principal to resolve problems.

The Data Validator and will be responsible for review of the analytical and field data collected during the project. Ms. Morrison will also be responsible for the data usability Summary Report. Ms Morrison will be independent from any direct involvement in the project.

Field Manager/ Field HSO	Lydia Wagner 1640 Saw Mill Run Blvd Pittsburgh, Pennsylvania 15210 (412) 882- 4050, ext. 11

Ms. Lydia Wagner will serve as Field Manager and will be responsible for implementing the remedial investigation tasks at the site. Her duties will include sample collection, well development and directing on-site subcontractors and oversight of all other remedial investigation activities.

In addition, Ms. Lydia Wagner will serve as the Field Health and Safety Officer and will be responsible for on-site health and safety issues on the project. Ms. Wagner will review ensure that the Health and Safety Plan is adhered to on-site. In addition, Ms. Wagner will interface with the Project Engineer to address any on-site health and safety issues for the project.

Resumes for the above individuals are found as Attachment A (Key Personnel Resumes) of the QAPP.

1.1.2 NYSDEC/NYSDOH Case Managers

Mr. Salvatore Priore will serve as the NYSDEC Case Manager, and will be responsible for providing guidance to the Project Engineer regarding NYSDEC's concerns as they pertain to project objectives. Mr. Priore will work with the Technical Consultant to ensure that project objectives are being achieved to the satisfaction of the NYSDEC.

Mr. Greg Rys will serve as the NYSDOH Case Manager, and will be responsible for providing guidance to the Project Engineer regarding NYSDEC's concerns as they pertain to project objectives. Mr. Rys will work with the Project Engineer to ensure that project objectives are being achieved to the satisfaction of the NYSDOH.

1.1.3 Analytical Laboratory – Environmental Samples

ESC Lab Sciences (ESC) located at 12065 Lebanon Road in Mt. Julie, Tennessee has been identified for this project. ESC is certified under New York certification number 11742. Ms. Leslie Newton will be the Laboratory Project Manager who will be responsible for the inspection and verification of laboratory quality control (QC) records and directing of sample processing.

Leslie Newton
12065 Lebanon Road
Mt. Julie, Tennessee
(615) 773-9670

1.1.4 Analytical Laboratory – Hydrogeological Samples

ESC Lab Sciences (ESC) located at 12065 Lebanon Road in Mt. Julie, Tennessee has been identified for this project. ESC is certified under New York certification number 11742. Ms. Leslie Newton will be the Laboratory Project Manager who will be responsible for the inspection and verification of laboratory quality control (QC) records and directing of sample processing.

Leslie Newton
12065 Lebanon Road
Mt. Julie, Tennessee
(615) 773-9670

1.1.5 Quality Assurance (QA) Responsibilities

The QAPP will be relied upon by the Technical Consultant and will have been reviewed and approved in its final form by a representative of the NYSDEC, the Technical Consultant, and the Analytical Laboratory. Data validation will be conducted by a designee of the Laboratory Project Manager, and data assessment will be conducted by the Technical Consultant in coordination with the NYSDEC. As previously stated, the Technical Consultant will provide internal and external performance and system audits. The NYSDEC, at their discretion, may provide oversight of the field activities.

Data generated in the field will be reviewed by a technically qualified professional for sampling procedures, sample documentation, equipment calibration, chain-of-custody and field documentation. Once field data has been checked for accuracy and completeness, the data will be placed in the project file. Prior to inclusion in draft or final reports, all data will again be checked for accuracy and completeness by a second professional member of the Technical Consultant. All draft and final reports will be reviewed by the Technical Consultant prior to submittal to the NYSDEC.

1.1.6 Field Responsibilities

Field responsibilities are presented are discussed in further detail in the NYSDEC-approved Field Sampling Procedures.

1.1.7 Laboratory Responsibilities

The laboratories will be responsible for performing Quality Analysis/Quality Control (QA/QC) on samples submitted, as well as calibration of necessary laboratory equipment. See Sections 2.3 and 2.4 for further information regarding laboratory QA/QC and calibration requirements.

1.2 Quality Objectives and Criteria for Measurement Data

This section presents data quality objectives (DQO) and performance criteria for the project.

1.2.1 DQO Process

The overall DQO process provides a logical framework for project decision-making. Each step of the process is evaluated as they pertain to the confirmation sampling and waste sampling activities.

1.2.2 Measurement Performance Criteria

Data quality and quantity are measured by comparison of resulting data with established acceptable limits for data precision, accuracy, representativeness, comparability and completeness (PARCC) and sensitivity. Data outside PARCC/sensitivity QA objectives will be evaluated, according to criteria contained in the specified analytical methods, to determine what, if any, aspects of the data can be defensibly used to meet the project objectives.

1.2.2.1 Precision

Precision measures the reproducibility of data or measurements under specific conditions. Precision is a quantitative measure of the variability of a group of data compared to their average value. Precision is usually stated in terms of relative percent difference (RPD) or percent relative standard deviation (%RSD). Measurement of precision depends upon sampling technique and analytical method.

Field duplicate and laboratory duplicate samples will be used to measure precision for project samples. Both sampling and analysis will be as consistent as possible. For a pair of measurements, RPD will be used in this project. For a series of measurements, %RSD will be used. The total precision of a series of measurements can be related by the additive nature of the variances.

1.2.2.2 Accuracy

Accuracy measures the bias in a measurement system that may result from sampling or analytical error. Sources of error that may contribute to poor accuracy are:

- Laboratory error;
- Sampling inconsistency;
- Field and/or laboratory contamination;
- Handling;
- Matrix interference; and

- Preservation.

Matrix spike QC samples and Laboratory Control Spikes (LCSs), will be used to measure accuracy for project samples. Accuracy is calculated using the following equation:

%Recovery = (A-B)/T*100%

Where:

A = concentration of analyte in the spike sample aliquot
B = background concentration of compound or analyte in the unspiked sample aliquot
T = known true value of the spike concentration.

1.2.2.3 Representativeness

Representativeness expresses the degree to which sample data represent the characteristics of the media or matrix from which they are collected. Samples that are considered representative are properly collected to accurately characterize the nature and extent of contamination at a general sample location. Representativeness will be measured by using standardized collection methods (e.g., sampling, handling, and preserving) and laboratory analytical methods.

1.2.2.4 Comparability

Comparability expresses the confidence with which one data set can be compared with another data set from a different phase or from a different program. Comparability involves a composite of the above parameters as well as design factors such as sampling and analytical protocols. An acceptable level of comparability will be accomplished through the consistent use of accepted analytical and sampling methods.

1.2.2.5 Completeness

Completeness is defined as the percentage of data that is judged to be valid to achieve the objectives of the investigation compared to the total amount of data. Deficiencies in the data may be due to sampling techniques, poor accuracy, precision, or laboratory error. While the deficiencies may affect certain aspects of the data, usable data may still be extracted from applicable samples. An evaluation of completeness necessarily involves an evaluation of the impact of missing data on the ability of the project to achieve its goals. The goal for completeness is 90%. The equation used for completeness is presented below:

C (%) = D/(P x n) x 100

Where:

D = number of confident quantifications
P = number of analytical parameters per sample requested for analysis
n = number of samples requested for analysis

1.2.2.6 Sensitivity

Sensitivity is the ability of the method or instrument to detect the contaminant of concern and other target compounds at the level of interest. Method and instrument sensitivity may be evaluated by preparing and analyzing a Laboratory Fortified Blank (LFB). A LFB is a blank matrix that is spiked at the Quantitation Limit with the contaminants of concern. Sensitivity will be measured by calculating the percent recovery of the analytes at the quantitation limit.

1.3 Special Training and Certification Requirements

All persons in the work area will be required to have up-to-date hazardous waste operations (HAZWOPER) training in accordance with Title 29 of the Code of Federal Regulations Section 1910.120 (29 CFR 1910.120). Before entering the work area, each person entering the work area will present documentation to the Technical Consultant that HAZWOPER training has been received. Further, all persons working at the Subject Property will adhere to the provisions of the site-specific Health and Safety Plan (HASP) found in Attachment c of the RIWP. Additionally, a copy of the HASP will be kept on-site.

Personnel who are responsible for performing laboratory analyses will be properly trained by the laboratory director or her/his designee to conduct the various laboratory analyses described in this QAPP. Laboratories used will have training programs that are equivalent to those requirements in the National Environmental Laboratory Accreditation Conference (NELAC) and NYSDEC's Analytical Services Protocol (ASP) standards, Section 5.0 Quality Systems. The laboratory shall have sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned functions. Data verification and validation will be under the direction of the Laboratory Project Manager who is experienced with the production, reporting, verification and validation of analytical data.

1.4 Documentation and Records

This section identifies the documents and reports to be generated throughout the investigation and the information to be included in these documents and reports. Analytical data for this project will be reported in a hard copy analytical data package and an Electronic Data Deliverable (EDD) Adobe Acrobat .pdf electronic format for all analyses. The following at minimum will be included in the laboratories data package:

- Case narrative;
- Calibration (initial/continuing) summary and raw data;
- Mass spectrometer tuning data (if appropriate);
- Gas chromatogram (if appropriate);
- Mass spectra (if appropriate);
- Quality control summary forms and raw data;
- ICP, AA and graphite furnace data outputs (if appropriate);
- Inter-element correction data (if appropriate);
- Blank data results; and

- Method and instrumental detection limit results.

Additionally, the data package will describe the information given and any assumptions made in obtaining the data.

Results between the laboratory method detection limit (MDL) and the reporting limit (RL) will be reported by the laboratories as quantitative estimates ("J" qualifier code). Data retained in the project database may be converted to units other than those reported by the laboratories. Sample results will not be corrected for contamination found in laboratory blanks.

Appropriate records will be maintained to provide adequate documentation of the entire data generation process, including field sampling and laboratory analysis. Field sampling records will include maintaining field logs and sample chain-of-custody documentation. Field QA/QC samples will be identified by a unique identifier in the field log and Chain-of-Custody forms. These records will be kept for the duration of the groundwater monitoring at the Subject Property.

The final evidence file will be the central repository for documents that constitute evidence relevant to sampling and analysis activities as described in this QAPP. The Technical Consultant will be the custodian of and will maintain the contents of the evidence files for the sampling and analysis program, including all relevant records, correspondence, reports, logs, data, field records, pictures, subcontractor reports, analytical data, and data reviews. The final evidence file will include where generated:

- Field records;
- Field data and data deliverables;
- Photographs;
- Drawings;
- Boring logs and well diagrams;
- Laboratory data deliverables;
- Data validation reports;
- Field and laboratory audit reports,
- Progress reports,
- QA reports; and
- Custody documentation.

The Technical Consultant's Project Principal will review draft and final reports prior to submittal to the NYSDEC.

A copy of the QAPP will be filed at BB&J's Chicago Branch, with copies also sent to each representative listed in Section 1.1.

2.0 MEASUREMENT AND DATA ACQUISITION

This section outlines the sampling method requirements, measurements and means for data acquisition for the Subject Property.

2.1 Investigative Sample Collection

Please refer to the Figures section of the RIWP for a site map showing sample locations. BB&J field procedures, including specific sampling methods and field procedures, can be found in Appendix A of the RIWP.

2.2 Laboratory Activities

Soil, soil gas, hydrogeological, geochemical, and groundwater samples will be submitted to ESC for one or more of the following analyses:

- Target Analyte List metals using United States Environmental Protection Agency (USEPA) Method 6010B and 7470/7471A[4];
- Target Compound List (TCL) +30 list of VOCs using USEPA Method 8260B[5];
- TCL+30 list of SVOCs using USEPA Method 8270C[5]; and
- TO-15 for VOCs in soil gas.

Personnel who are responsible for performing laboratory analyses will be properly trained by the laboratory director or her/his designee to conduct the various laboratory analyses described in this QAPP. The laboratory shall have sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned functions. Data verification and validation will be under the direction of the Laboratory Project Manager who is experienced with the production, reporting, verification and validation of analytical data.

2.2.1 Analytical Methods/Quality Assurance Summary Table

Please refer to Tables 1d and 1e of the RIWP for a summary of analytical methods/quality assurance criteria.

2.3 Calibration and Preventative Maintenance Procedures

Calibration and preventative maintenance for all field analytical instruments will be conducted prior to the start of each field day in accordance with manufacturer's instructions. If instrument malfunction is suspected during field activities, the instrument will be recalibrated and/or trouble shooting procedures will be implemented in accordance with the manufacturer's specifications. A Horiba water quality device will be used to collect geochemical parameters. Additional details concerning the calibration and maintenance of the Horiba can be found in Attachment B - Horiba Standard Operating Procedures of the QAPP.

2.4 QA Samples

BB&J proposes to collect the following QA samples during the completion of this project[6]:

[4] Target Analyte List metals (inorganics) will be analyzed using US EPA Methods 6010B and 7470/7471A for mercury.
[5] Target Compound List of VOCs and SVOCs (organics) will be analyzed using US EPA Methods 8260B and 8270C.
[6] QA samples will not be collected for hydrogeological or geochemical samples.

Trip Blanks: One per shipment containing samples targeted for analysis of VOCs. Trip Blanks will be analyzed for VOCs only.

Field Duplicates: One per 20 samples per medium. Field duplicates will be analyzed for the same constituents as the soil and/or groundwater samples collected at that time.

Equipment Blanks: One per day per sampling device. Equipment blanks will be analyzed for the same constituents as the soil and/or groundwater samples collected at that time.

BB&J does not anticipate collecting split samples. However, NYSDEC, at their discretion, may provide oversight of the field activities. The NYSDEC representative will be provided with a split sample, if requested.

2.5 Project Documentation

Project Documentation procedures, including Chain of Custody Procedures, Field Documentation, and the laboratory deliverable requirements are presented in the subsections below.

2.5.1 Chain of Custody Procedures

Sample Chain of Custody procedures begin when the laboratory releases bottleware and are followed through sample collection, transfer, analysis and disposal. At the time of sample collection, the labeled samples will be placed into an iced cooler. A line-item Chain of Custody form will then be completed by the sampler. Chain of Custody allows the samples to be traced from the time of collection to receipt in the laboratory. Upon completion of all line items, the sampler will sign, date, list the time, and check the completeness of all descriptive information contained on the form. One copy of the completed Chain of Custody will be retained by the sampler. Each individual who subsequently assumes responsibility for the samples will also sign the Chain of Custody. The following items will be included on the Chain of Custody:

- Sample identification;
- Signature of sampler;
- Date and time of collection;
- Sample type (i.e., aqueous or soil);
- Sample location;
- Number, size and type of containers;
- Analytical parameters requested;
- Preservative;
- Signatures of personnel involved in the Chain of Custody; and,
- Dates and times of relinquishment and receipt.

Sample containers for soil and groundwater samples will be provided by the laboratory. Shelby tubes will be provided by BB&J's drilling subcontractor. Each container will be commercially prepared by the laboratory. Preservation techniques and holding times for constituents of interest will be maintained as outlined in SW-846 for soil and groundwater samples and NYSDOH guidance for the soil gas samples.

All samples and Chain of Custody(s) will be either shipped via overnight delivery to the selected laboratory by a commercial carrier, or picked up on-site by a courier from the laboratory.

The laboratory will follow its own internal custody procedures in accordance with its QAPP once the samples arrive at the laboratory.

2.5.2 Field Logbooks/Documentation

Pertinent details of the field activities will be documented in a bound, water-resistant field notebook. The information will include: procedures used; observations made; results obtained; and, pertinent logistic information. Standardized forms will be used for the field activities. For each sampling location, information will be recorded on a Field Sampling Report and include the following:

- Date and time of entry;
- Location of activity;
- Initials or name of collector;
- Date and time of collection;
- Types of sample containers used and sample identification numbers;
- Preservative(s) used;
- Parameters requested for analysis;
- Field screening method(s) and results;
- Climatic conditions; and,
- Field observations and comments.

A centralized project file of data records pertaining to this project will be maintained by BB&J. This file will include original data including but not limited to: chain-of-custody records; correspondence records; final reports; maps; drawings; calculations; and, QA data pertaining to the project. The Project Manager will be responsible for maintenance of the project file.

2.5.3 Laboratory Data Deliverable Format

BB&J anticipates receiving a .pdf electronic data deliverable only. However, BB&J will summarize this data into data tables in accordance with DER-10 Section 2.2 2 (b) and (c).

2.6 Laboratory Sample Storage Procedures

As previously indicated, BB&J will use a laboratory certified by the State of New York. Samples will be stored at the laboratory in accordance with the laboratory's QAPP.

3.0 ASSESSMENT AND OVERSIGHT

This section addresses the activities for accessing the effectiveness of project implementation and associated QA/QC activities, including assessments, audits and oversight.

3.1 Assessments and Response Actions

This section identifies planned assessment activities to verify that sampling and analysis activities are performed in accordance with the procedures established in the QAPP and Field Sampling Procedures, as well as corrective action responses.

3.1.1 Internal Audits of Field Activity

Activities performed in the field may be reviewed by a technically qualified professional (e.g.. Project Engineer) for sampling procedures, sample documentation, equipment calibration, chain-of-custody and field documentation. Once field data has been checked for accuracy and completeness, the data will be placed in the project file. Additionally, the Senior Scientist will oversee sampling on an as-needed basis to ensure that field Sampling Procedures and QAPP sampling procedures are followed.

3.1.2 Internal Laboratory Audit

Laboratory performance and system audits will be conducted as outlined in the Analytical Laboratory's Quality Management Plan and may cover the following:

- Sample custody;
- Sample storage and preservation;
- Sample preparation;
- Analytical methodology;
- Data management;
- Preventive maintenance; and
- Personnel qualifications.

BB&J will request copies of laboratory audits and visit the laboratory to observe procedures on an as-needed basis to ensure the aforementioned activities are occurring as specified in the Analytical Laboratory's Quality Management Plan.

3.1.3 External Field Audit

If needed, activities performed in the field will be reviewed by a technically qualified professional completeness of records, field boring logs, field books, drawings and calculations. Once field data have been checked for accuracy and completeness, the data will be placed in the project file. Additionally, the technically qualified professional may oversee sampling on an as-needed basis to ensure that Field Sampling Procedures and QAPP field sampling procedures are followed.

3.1.4 Corrective Action

Corrective action is the process of recommending, approving, and implementing measures to counter unacceptable procedures or poor QC performance that can affect data quality identified during audit procedures. Corrective action can occur during field activities, laboratory analyses, data validation, or data assessment. All corrective action proposed and implemented will be documented in the regular quality assurance portions of the annual groundwater reports (Section 3.2). Corrective action will only be implemented after approval by the NYSDEC. If immediate corrective action is required, approvals secured by telephone from the NYSDEC will be documented in a memorandum to the project file.

Any nonconformance with the established QC procedures in the QAPP will be identified and corrected in accordance with the QAPP.

3.1.4.1 Field Corrective Action

Corrective action in the field may be initiated when the sample network or rationale is changed (i.e., more or fewer samples, modified sampling locations, etc.), or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. When appropriate, the Technical Consultant will identify the need for corrective action and ensure that the corrective action acceptable to NYSDEC has been implemented.

If the corrective action will supplement the existing sampling plan using existing and approved procedures in the QAPP, corrective action approved by the Technical Consultant will be documented. If corrective actions resulting in fewer samples (or analytical fractions), or alternate locations keep project quality assurance objectives from being achieved, it will be necessary that all levels of project management, including the Ames True Temper and the NYSDEC, concur with the proposed action.

3.1.4.2 Laboratory Corrective Action

Corrective action in the laboratory may occur before, during, or after initial analyses, as discussed in the laboratory's corrective action procedures SOPs. These SOPs specify the majority of the conditions during or after analysis that automatically trigger corrective action or optional procedures. These conditions may include dilution of samples, additional sample extract cleanup, or automatic reinjection/reanalysis when certain QC criteria are not met. Furthermore, aberrant conditions such as broken sample containers, multiple phases, low/high pH readings, and potentially high concentration samples, will be identified during sample log-in or just prior to analysis.

Following consultation with laboratory analysts, it may be necessary for the laboratory QA Officer to approve the implementation of corrective action. A member of the laboratory technical staff will identify the need for corrective action. The laboratory QA Officer, in consultation with members of the technical staff, will approve the required corrective action to be implemented by designated members of the laboratory technical staff. The laboratory QA Officer will also ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be

achieved, it will be necessary to inform the Technical Consultant who must concur with the corrective action.

Corrective actions that are performed prior to release of the data from the laboratory will be documented in a laboratory corrective action log and in the narrative data report sent from the laboratory to the Technical Consultant. If corrective action does not rectify the situation, the laboratory will contact the Technical Consultant prior to release of the data.

3.1.4.3 Corrective Action during Data Validation and Data Assessment

The need for corrective action may be identified during the data verification, data validation or data assessment process. Potential types of corrective action may include re-sampling by the Technical Consultant or re-injection/re-analysis of samples by the laboratory. The percent completeness will be used to determine whether the data quality meets the objectives for the project. If the completeness objectives are not met for individual parameters, the Technical Consultant will review the reasons for the invalid data. Depending on the ability to mobilize the field team, the reasons for the incomplete data (e.g., holding time exceeded), and the effect of the incomplete data on the accomplishment of the project objectives, additional samples may be collected and analyzed.

An evaluation will also be conducted if a sample does not generate data for a parameter category. Such a data gap could result from sample container breakage or sample loss during analysis. If the Technical Consultant determines that the missing results are critical to accomplishing the work plan objectives, additional sampling will be conducted to obtain the missing data. The Technical Consultant will be responsible for approving the implementation of corrective action, including re-sampling, during data assessment. The Technical Consultant will document all corrective actions of this type.

3.2 Reports to Management

Planned reporting of QA issues will be included within the annual groundwater monitoring reports to ensure that management is periodically updated on the project status and results of QA assessments, including results and applicable audit information and data quality assessments. Efficient communication of project status and problems allows management to implement timely, effective corrective actions so that quality objectives can be met. Additionally, the Technical Consultant will update the NYSDEC regarding any unforeseen issues via telephone, email or reporting.

4.0 DATA VALIDATION AND USABILITY

This section addresses the QA/QC activities that occur after the data collection phase of the project has been completed to determine if the data satisfies project objectives.

4.1 Data Review, Validation and Verification

The field, laboratory, and data management activities described in this QAPP will be reviewed to assess whether these activities were performed in a manner that is appropriate for accomplishing the project

objectives. This assessment will include electronic verification of the data, followed by data validation. Verification of the data will be performed to determine whether the data have been generated in accordance with the procedures identified in the Field Sampling Procedures and QAPP. Data validation, including project specific calculations, will confirm the utility of technical data for making decisions pertaining to satisfying the project objectives.

4.1.1 Review of Sampling Data

The Technical Consultant will review the collected samples to conform that they meet the sampling design specifications. Those samples that deviate from the sampling design and the impact to project objectives, if any, will be discussed in the annual groundwater sampling reports.

4.1.2 Review of Sample Collection Procedures

The Technical Consultant will review the sample collection procedures as-needed to confirm that samples have been collected in accordance with the Field Sampling Procedures. This review will note unacceptable departures, if any, from sample collection procedures in the QAPP and identify sample data (analytical or field) that should be excluded from incorporation into the data evaluation process. The external field audits will necessarily enable the data quality to be assessed with regard to the sample collection and field operations. In addition, the Technical Consultant will review project logbooks or records on a routine basis during field activities.

To assure that all field data are collected properly and recorded correctly, field audit(s) as described in Section 3.1 will be performed during sample collection. These audits will document that appropriate procedures have been followed with respect to sample (and QC sample) collection. The audits will include a thorough review of the field books and standard data collection forms used by the project personnel to ensure that tasks are performed as specified in the QAPP. Additionally, field procedures will be observed by the Technical Consultant to document whether appropriate procedures are being used during sample collection.

The evaluation of equipment rinse blanks and other field QC samples will provide definitive indications of the data quality. Errors that occur due to sample collection procedures, if any, will be isolated by following the complete sample tracking and documentation procedures that will be performed. If such errors occur, corrective action will be instituted and documented. If data are compromised due to a problem, appropriate data qualifications will be used to identify the data.

The labeling and identification of samples will also be reviewed for accuracy. It is expected that labeling errors will be minimal due to use of standardized labeling schemes.

4.1.3 Review of Sample Handling Procedures

The handling, preservation and storage of samples collected during the sampling program will be monitored on an on-going basis. The field audits described in Section 3.1 will document proper sample handling during collection and processing at the field processing laboratory facility. These audits will be

reviewed by the Technical Consultant to determine if sample representativeness was maintained during collection and processing.

Additionally, the project laboratories will document sample receipt including proper containers and preservation at the time samples are logged into their individual laboratory. The sample receipt records (a required data package deliverable) as well as Chain-of-custody documentation will be routinely assessed during data validation. Sample handling, storage, or preservation problems identified during data validation will result in appropriate qualification of data to warn the data user to data quality deficiencies. This review process will apply to every sampling event and will be included in the data discussion section of each groundwater monitoring report.

4.1.4 Review of Analytical Procedures

The use of the proper analytical procedures will be reviewed primarily through the data verification and data validation methods discussed in Section 4.2 of this QAPP. Qualification of data that does not conform to criteria is also discussed in Section 4.2 of this QAPP. Confirmation that samples were analyzed for the proper analyses will be performed by the Technical Consultant. If scheduled analyses were not actually performed (due to loss of sample or improper log in at the laboratory, etc.), then a determination will be made at the time the missing data was discovered and appropriate corrective action documented (i.e.- re-sample the well or analyze for specific parameter during next sampling event). The Technical Consultant will review the impact of incomplete analyses and identify impacts to the project objectives, if any, in the final project report.

4.1.5 Review of Quality Control

The review of quality control checks will be reviewed primarily through the data verification and data validation methods discussed in Section 4.2 of this QAPP. Qualification of data that does not conform to criteria is also discussed in Section 4.2 of this QAPP.

4.1.6 Review of Calibration

The review of calibration of instruments and equipment described in the Field Sampling Procedures will be reviewed primarily through the data verification and data validation methods discussed in Section 4.2 of this QAPP. Qualification of data that does not conform to criteria is also discussed in Section 4.2 of this QAPP. The Technical Consultant will review records of field equipment calibration and identify any impacts to non-analytical data that may exist.

4.1.7 Data Reduction and Processing

Data generated through field activities or by laboratory operations shall be reduced and validated before it is incorporated in technical reports. The field contractor or laboratory shall not disseminate data until it has been subjected to these reduction and internal validation procedures that are summarized in subsections below.

4.1.7.1 Data Reduction

Data reduction will generate qualitative and quantitative sample information through observations, field procedures, analytical measurements, and calculations. Data reduction occurs with:

- The QAPP and Field Sampling Procedures through sample locations and naming conventions;
- The field sampling process through use of field logs and field measurements;
- Communications with the laboratory in sample analysis requests;
- Field operations with collection, preservation, and Chain-of-custody documentation;
- Laboratory operations with sample receipt and handling, sample preparation and analysis, collation of raw data, and generation of laboratory results; and
- Post-laboratory operations with collation of analytical results in a format suitable for documents such as reports.

Data reduction steps include field operations, laboratory operations, and report preparation operations. Specific QC measures developed to ensure accuracy throughout the data reduction process is described throughout this QAPP.

4.1.7.2 Field Data Reduction Procedures

Field data will be recorded manually on a field log sheet at the time of sample collection. These data will include:

- Date;
- Time;
- Sample I.D.; and
- Sample location.

If errors are made on the field logs, results will be legibly crossed out (single line), initialed and dated by the field member, and corrected in a space adjacent to the original (erroneous) entry.

4.1.7.3 Laboratory Data Reduction Procedures

Laboratory data reduction procedures will be followed according to the following protocol. Raw analytical data will be recorded in the individual laboratory's Laboratory Information Management System (LIMS) (or equivalent) and tabular summary tables will be generated. Other pertinent information, such as the sample identification number, the analytical method used, the name of the analyst, the date of analysis, and matrix sampled will also be recorded in LIMS. At a minimum, reagent concentrations, instrument settings, and raw data will be retained by hard copy and laboratory notebooks, which shall be signed and dated by the analyst. Copies of any instrument printouts (such as gas chromatograms) will be maintained on file at the laboratory. Periodic review of raw data and of the computerized records by the laboratory personnel will occur prior to final data reporting according to the laboratory's Quality Manual.

For this project, the equations that will be employed in reducing data are presented in the laboratory SOPs. The laboratory technical staff will check all calculations, deviations and errors will be noted, and corrections will be made. The original notations will be crossed out legibly. Quality control data will be compared to the acceptance criteria, and data that is considered to be acceptable will be entered into the laboratory computer system. Data summaries will be sent to the laboratory Quality Assurance Officer for review. Unacceptable data shall be identified and qualified in the project report. Case narratives pertaining to such data will describe how and why data failed to meet acceptance criteria, and anomalous conditions encountered during sample analysis. After the laboratory Quality Assurance Officer approves these data, the data are considered ready for release to the Technical Consultant.

4.1.7.4 Identification and Treatment of Outliers

Outliers are unusually large or unusually small values in a population of observations. Outliers may be the result of a variety of circumstances (field or laboratory related), including any of the following:

- Sampling artifact;
- Sample integrity problem;
- Sample identification incorrectly transcribed in the field or laboratory;
- Unique conditions;
- Faulty or defective instruments;
- Inaccurate reading of meters;
- Errors in recording of data;
- Calculation errors; or
- Analytical errors.

Procedures for the identification of outliers will be followed at both the analytical stage and at the ensuing data reduction stage.

Outliers in laboratory data can arise from errors in analysis or from site-specific conditions that are out of the control of the laboratory. Errors in the laboratory are most often detected in the data review and validation process. If quality control processes detect a suspected outlier not identified during data verification or validation, the suspect data will be subjected to appropriate statistical outlier testing. Outliers will be reported, but will not be used in evaluation.

The Technical Consultant will identify outliers at the data reduction stage. When any particular value is suspected to be an outlier, the following steps will be taken:

- Other data from the same sample will be checked to see if they are also anomalous.

- The QA Program Manager will seek input from any individuals involved in generating the anomalous value as to possible causes, which will include questioning the field crew and the laboratory analyst(s).

Only the Technical Consultant and the NYSDEC will have the authority to reject suspect data or outliers.

4.1.7.5 Data Processing

Data will be processed from verified or validated data for use in making final decisions. It is expected that summary tables, maps, and charts of verified and validated data will be prepared by various project team members. Data that is processed will be checked by an individual knowledgeable about the data type being compiled who will perform a reasonable (minimum of 30%) check of the final tabulated information to ensure transcription errors have not occurred. Further checks of the tabulated data will occur if problems are encountered or if a systematic problem is detected in the process. Systematic problems will be identified and corrected prior to processing the data again.

4.2 Validation and Verification Methods

Electronic data verification and data validation (where necessary) are conducted after samples have been taken and analyzed. Verification and validation provide an understanding of the data quality at the end of data collection and analysis. The response to data verification and data validation is critical. If correctable data quality issues are discovered, the findings will immediately provided to the appropriate data generator, such as the Technical Consultant or laboratory, so that appropriate corrective action can be taken to prevent the problem from recurring.

Sample analysis and batch quality control results will be delivered in an EDD (if applicable), or hard copy format.

Data will undergo validation by the laboratory, and the Technical Consultant will further validate 10% of the data for confirmation samples. The specific measures evaluated during verification and the associated criteria include:

- Holding times;
- Accuracy (by evaluating laboratory control sample (LCS) recovery, and matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Precision;
- Field duplicate sample precision;
- Blank contamination (laboratory method blanks and field generated blanks); and
- Surrogate compound recoveries.

4.2.1 Data Validation

Data validation is the process of verifying that qualitative and quantitative information generated relative to a given sample is complete and accurate. Data validation procedures shall be performed for both field and laboratory operations as described below:

4.2.1.1 Procedures Used to Validate Field Data

Procedures to evaluate field data for this program primarily include reviewing field logbooks to check for transcription errors by the field personnel. These procedures are performed to ensure that field measurements and various quality control analyses were properly performed and documented. The field data documented includes data generated during measurement of field parameters, observations, results of any quality control sample analyses, and field instrument calibrations. This task will be the responsibility of Senior Scientist who will otherwise not participate in making any of the field measurements or in adding notes, data, or other information to the logbook or record form.

4.2.1.2 Procedures Used to Validate Laboratory Data

The validation of the laboratory data will be performed with guidance from "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," (October 1999), and the "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," (February 1994). These documents which provide most of the criteria by which data are accepted or rejected were used as a basis in developing the Analytical Laboratory's data validation SOPs.

These data validation SOPs will provide the specific criteria used to validate the data for each analytical parameter for the project. Full validation will include an evaluation of documented QA/QC measures through a review of tabulated QC summary forms and raw instrument data. Based on the results of the validation, full validation may be performed for additional data if deemed necessary by the Technical Consultant in conjunction with the NYSDEC.

A preliminary review will be performed to verify that necessary paperwork (e.g., Chain-of-custody records, analytical reports, and laboratory personnel signatures) and deliverables (as specified in the Field Sampling Procedures and QAPP) for the analyses are present. At a minimum, deliverables will include sample Chain-of-custody records, a detailed case narrative, analytical results, QC summaries, and supporting raw data from instrument printouts, if applicable. The QA Program Manager will contact a project laboratory to request the correction of certain deficiencies prior to the submittal of the Quality Assurance Review, if such corrections are necessary for a full evaluation of the usability of the data. Such correctable deficiencies may include missing data deliverables or calculation errors that would take a significant amount of the staff reviewer's time to correct. In addition, the QA Program Manager may contact the project laboratory to request the correction of all correctable deficiencies prior to the submittal of the Quality Assurance Review, if time allows. Any laboratory re-submittals as a result of such requests will be discussed in the appropriate "Comments" section of the Quality Assurance Review.

The Laboratory QA Manager or staff reviewer will perform a detailed review to independently verify compliance to the required analytical protocols and to determine the qualitative and quantitative reliability of the data. Full validation will include a detailed review and interpretation of data generated by the laboratory. The primary tools that will be used by experienced data review chemists will be guidance documents, established (contractual) criteria, the data validation, and professional judgment.

Based upon the review of the analytical data, specific codes will be placed next to results in the database to provide an indication of the quantitative and qualitative reliability of the results. The data qualifier codes and definitions will be as follows:

- U – The compound/analyte was analyzed for, but was not detected above the reported sample quantitation/detection limit;
- U* – This compound/analyte should be considered "not detected" since it was detected in a blank at a similar level;
- J – Quantitation is approximate (estimated) due to limitations identified during the quality assurance review (data validation);
- R – Unusable (rejected) result; compound/analyte may or may not be present in this sample;
- UR – Unusable "not-detected" result; compound may or may not be present in this sample; and
- UJ – This compound/analyte was not detected, but the quantitation/detection limit is probably higher than reported due to a low bias identified during the quality assurance review.

Once the review has been completed, the Laboratory QA Manager will submit the report and data tables to the Technical Consultant. The approved quality assurance review will be signed and dated by the Laboratory QA Manager.

4.2.2 Procedures for Data Verification

Data verification by the Technical Consultant will be performed on 10% of the confirmation samples The quantitative criteria (limits) used for data verification will be consistent with the data validation quantitative criteria (limits) for the same evaluation processes. To accomplish the data verification process, the Technical Consultant will review the following information:

- Method blank evaluations will be used to determine whether the source of positive results in the field sample is attributable to laboratory processing or field contamination.
- Holding time evaluations will be used to check whether holding times have been met, slightly exceeded, or grossly exceeded acceptance criteria.
- LCSs will be used to determine the percent recovery.
- Laboratory duplicate evaluation is the relative percent differences between MS and MSD recoveries or precision between a field sample and its laboratory duplicate (if performed). This data is then compared to the acceptance criteria.
- Field duplicate evaluations will be used to check whether the precision between a field sample and its field duplicate meet project criteria.
- Surrogate evaluation (organics only) determines surrogate recoveries are compared to the acceptance criteria ranges.

The following evaluation procedures account for potential data verification out-of-criteria situations:

- Samples analyzed outside of holding time criteria will be qualified as estimated or rejected (in the event of gross exceedance);
- Samples with surrogate recoveries greater than or less than the project acceptance criteria ranges will have values greater than the sample reporting limit qualified as estimated;
- Samples with surrogate recoveries below the project control limits but greater than or equal to 10% will have all non-detected values qualified as estimated;
- Samples with surrogate recoveries below 10% will have non-detected results qualified unusable;
- LCS samples with recoveries outside of criteria will have all samples in the same preparation batch qualified following the same rules as for surrogates;
- Inorganic MS samples with recoveries outside of criteria will have samples of the same matrix in the associated batch qualified following the same rules as for surrogates;
- Laboratory duplicates with inorganic analytes out of RPD criteria will have the analyte values greater than the sample reporting limit qualified as estimated in similar matrix samples in the associated batch; and
- Field duplicate analytes with out-of-criteria RPDs will have the analyte values greater than the sample reporting limit estimated in only the field duplicate and its associated sample.

The annual groundwater monitoring reports will detail the out-of-control criteria and the associated sample data that are qualified is generated at the end of the data verification process. Qualifier codes will be identical to those identified above in Section 4.2.1.2. Data will move from an "unverified" to "verified" state at the conclusion of the data verification process. Sample data that is selected for full validation will have the verification process report evaluated to provide a check on the data verification process logic.

4.3 Reconciliation with User Requirements

The Technical Consultant, in conjunction with the NYSDEC, will determine whether field and analytical data or data sets meet or do not met the requirements necessary for decision making. The results of measurements will be compared to the DQO requirements set forth in this QAPP. As data are evaluated, anomalies in the data or data gaps may become apparent to the data users.

Data that do not meet the needs of data users will be identified and appropriately noted in the project database so the decision-makers are aware of its limitation.

ATTACHMENT A

KEY PERSONNEL RESUMES

J. TIM BRADBURNE, P.G.
Principal

EDUCATION AND PROFESSIONAL REGISTRATION

B.S., Geology, Virginia Polytechnic Institute and State University, 1983
Contaminant Hydrogeology - Domenico, Freeze, Schwartz and Smith, 1989
Professional Geologist in Georgia and Missouri

PROFESSIONAL MEMBERSHIPS & ASSOCIATIONS

Association of Ground-Water Scientists and Engineers
Associated Industries of Missouri
National Water Well Association

CAREER SUMMARY

Mr. Bradburne has been providing environmental consulting services and working in the geologic sciences for more than 25 years. In 1982, he was responsible for conducting field geologic mapping in the Appalachian Mountains at Virginia Polytechnic Institute and State University's (VPI & SU) Saltville, Virginia Field Camp. Shortly thereafter, he began working with Law Engineering and Environmental Services, Inc. (LAW) providing clients with environmental and geological engineering consulting services. Mr. Bradburne, along with several colleagues, resigned from LAW in February 1997 and formed Bradburne, Briller & Johnson, LLC (BB&J), an information management, environmental and engineering consulting firm where he currently serves as a Project Director in its Chicago branch.

Typical Client Markets

Clients for which Mr. Bradburne has provided services represent a diverse group of businesses. Some of the client markets with which he has significant experience include:

- Agricultural
- Airlines
- Airports
- Architect Firms
- Asset Management
- Automotive
- Brownfield Redevelopment
- Chemicals
- Communications
- Construction
- Containers
- Dry Cleaning
- Electronics
- Fabrication
- Federal Governments
- Financial
- Food and Beverages
- Glass Production
- Health Care
- Hospitality
- Information Services
- Institutional
- Insurance
- Law Firms
- Lead Production
- Local Governments
- Manufacturing and Assembly
- Marinas
- Medical Products
- Mining
- Ordnance
- Paints and Coatings
- Petroleum Retail Marketing
- Pharmaceuticals
- Pollution Control
- Printing
- Pulp and Paper
- Refining/Petrochemicals
- Retail
- Semiconductors
- State Governments
- Steel Production
- Transportation and Shipping
- Utilities
- Wood Preserving

J. TIM BRADBURNE, P.G.
Principal

Geographical Areas of Expertise

Mr. Bradburne has provided his services to clients with sites across the United States and abroad. His experience includes work in the following locations:

- Alabama
- Arizona
- Arkansas
- California
- Canada
- Colorado
- Connecticut
- Florida
- Georgia
- Idaho
- Illinois
- Indonesia
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Mexico
- Puerto Rico
- Mississippi
- Missouri
- Nebraska
- Nevada
- New Jersey
- New Mexico
- New York
- North Carolina
- Ohio
- Oklahoma
- British Virgin Islands
- Oregon
- Pennsylvania
- South Carolina
- South Dakota
- Tennessee
- Texas
- Virginia
- Washington
- West Virginia
- Wisconsin
- U.S. Virgin Islands

Technical Experience Overview

Over the course of his career, Mr. Bradburne has provided clients with a broad range of environmental and geologic consulting services. His technical responsibilities have included numerous staff, project and senior level positions for clients in the following areas:

- Assessments (Sampling and Analyses)
- Brownfield Investigations and Cleanup
- Building Decommissioning/Bid Specifications
- CERCLA Emergency Response Action
- Commercial Property Redevelopment
- Community Right To Know/EPCRA
- Compliance Audits
- Due Diligence (Phase Is, IIs, and IIIs)
- Environmental Management Systems
- Federal Superfund Site RIs/FSs
- Hazardous Waste Management
- Hydrogeology
- Industrial and Commercial Facility Siting
- Industrial Property Redevelopment
- Nonpoint Source Pollution Control
- Opinions of Costs
- Permitting (Air, Land, Water, and Waste)
- Planning (Air, Land, Water, and Waste)
- Pollution Prevention/Waste Minimization
- Pumped Hydro Storage Facility Siting
- RCRA Facility Closures
- Regulatory Strategy and Negotiations
- Relational Database Development
- Remedial Action Design and Implementation
- Risk Assessments/Risk-Based Closure
- Solid Waste
- State Superfund Investigation/Remedial Action
- Stormwater
- Training
- TSCA (Asbestos and PCBs)
- USTs, ASTs and Pipelines
- Voluntary Cleanup
- Water Quality
- Water Supply

J. TIM BRADBURNE, P.G.
Principal

CAREER HISTORY

The career history of Mr. Bradburne includes numerous technical and management positions. A summary is provided as follows:

2/97 to Present –	Bradburne, Briller & Johnson, LLC Chicago, IL	• Project Director • Environmental and Engineering Group Leader • National Account Manager (i.e., accounts $1M or more) • Board of Advisors
10/94 to 02/97 –	LAW Itasca, IL	• Principal • Midwest Region Industrial Environmental Mgr • National Account Manager (i.e., accounts $2M or more)
01/92 to 10/94 –	LAW St. Louis, MO	• Principal • Branch Manager • National Account Manager (i.e., accounts $2M or more)
01/90 to 01/92 –	LAW Jackson, MS	• Principal • Senior Geologist • Program Manager • National Account Manager (i.e., accounts $2M or more)
01/89 to 01/90 –	LAW Kennesaw, GA	• Senior Geologist • Special Projects Department Manager • National Account Manager (i.e., accounts $2M or more)
01/88 to 01/89 –	LAW Kennesaw, GA	• Project Manager • Hydrogeologic Assessments Department Mgr • National Account Mgr (i.e., accounts $1M or more)
01/87 to 01/88 –	LAW Kennesaw, GA	• Project Geologist • UST Assessments Department Manager • National Account Manager (i.e., accounts $1M or more)
06/84 to 01/87 –	LAW Marietta, GA	• Staff Hydrogeologist • Staff Geologist
06/82 to 08/82 –	VPI & SU Saltville, VA	• Field Geologist • Field Camp Student

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RICHARD GARLITZ, P.E.
Senior Engineer

EDUCATION AND PROFESSIONAL REGISTRATION

B.S., Geo-Environmental Engineering, Penn State University, 1998
Engineer in Training (EIT) certification, 1998
International Fire Code Institute (IFCI) Certification as UST Decommissioning Site Assessor, 1999
Remediation by Natural Attenuation, 1999
Accelerated Bioremediation Using Slow Release Compounds, 2001

CAREER SUMMARY

Mr. Garlitz served in the Peace Corps in Honduras, Central America from 1989 -1990 where he worked as an agricultural extensionist and a water system delivery specialist. In this role he worked on many small and large-scale projects, to help promote the idea of soil conservation among small farmers and communities. Also, he assisted in the design and implementation of small community-based water delivery systems for agricultural and domestic uses. Formerly, Mr. Garlitz was employed by PSI, Inc. (PSI) an environmental and geotechnical company, as a driller's helper, in Columbus, Ohio. Mr. Garlitz had extensive experience in the identification, classification and logging of soil and rock types in many different parts of the country, as well as performing many field tests on soil and rock samples. Furthermore, Mr. Garlitz also was able to work in the in-house laboratory at PSI where he assisted the geologists in performing tests such as compaction tests, porosity and permeability tests and fracture tests. After completing his degree in Geo-Environmental Engineering at Penn State University, Mr. Garlitz joined Bradburne, Briller & Johnson, LLC (BB&J), an environmental and engineering consulting firm where he currently serves as a Senior Engineer and Branch Manager of BB&J's Pittsburgh office. Mr. Garlitz is also fluent in Spanish and has a working knowledge of German.

Typical Client Markets

Clients for whom Mr. Garlitz has provided services represent a diverse group of businesses. Some of the client markets with which he has significant experience include:

- Archaeological/Architectural Surveys
- Asbestos Surveys
- Assessments (Sampling and Analyses)
- Brownfield Investigations and Cleanup
- Building Decommissioning/Bid Specifications
- Commercial Property Redevelopment
- Due Diligence (Phase Is, IIs, and IIIs)
- Federal Superfund Site RIs/FSs
- Hazardous Waste Management
- Hydrogeology
- Indoor Air Quality Modeling
- Industrial Property Redevelopment
- Laboratory Audits
- Lead-based Paint Surveys
- NEPA Compliance
- Permitting (Air, Land, Water, and Waste)
- Planning (Air, Land, Water, and Waste)
- RCRA Facility Closures
- Regulatory Strategy and Negotiations
- Remedial Action Design and Implementation
- Risk Assessments/Risk-Based Closure
- State Superfund Investigation/Remedial Action
- TSCA (Asbestos and PCBs)
- USTs, ASTs and Pipelines
- Voluntary Cleanup
- Water Quality
- Wetlands / Wildlife Habitat Delineation

Geographical Areas of Expertise

Mr. Garlitz has provided his services to clients with sites across the United States and international. His experience includes work in the following locations:

- Canada
- Illinois
- Indiana
- Iowa
- Kentucky
- Mexico
- Michigan
- Minnesota
- Missouri
- Ohio
- Pennsylvania
- South Dakota
- Texas
- West Virginia
- Wisconsin

Technical Experience Overview

Over the course of his career, Mr. Garlitz has provided clients with a broad range of environmental and geologic consulting services. His technical responsibilities have included a variety of positions for clients in the following areas:

- Asbestos Identification
- Assessments (Sampling and Analyses)
- Budgets and Proposals
- Building Demolition Oversight
- Corrective Action Plans
- Due Diligence (Phase Is and IIs)
- Emergency Response
- Geotechnical Investigation
- Opinions of Costs
- Remediation Systems Operation and Maintenance
- Septic System Abandonment
- UST Investigation
- UST Removal and AST Decommissioning
- Universal Waste Removal Oversight
- Water Well Installation and Abandonment
- Wetlands Delineation

CAREER HISTORY

The career history of Mr. Garlitz is provided as follows:

10/98 to Present – Bradburne, Briller & Johnson, LLC
Chicago, IL
- Senior Engineer

01/91 to 12/91 – PSI, Inc.
Columbus, OH
- Driller's Helper
- Laboratory Assistant

03/89 to 02/90 – Peace Corps
Honduras
- Agricultural Extensionist
- Water Delivery System Specialist

REPRESENTATIVE CLIENT MARKET EXPERIENCE

Mr. Garlitz has provided numerous telecommunication companies with his services, Mr. Garlitz has provided the project management and field investigation services necessary to complete due diligence investigations, at over 75 sites throughout the United States and Canada.

These due diligence services have included:

- Conducting Phase I and II ESAs in accordance American Society for Testing and Materials (ASTM) guidance;
- Conducting research of historical records to determine past property use;
- Evaluating the potential for lead-based paint and asbestos at existing facilities;
- Assessing whether a project will have a significant environmental impact as described in Title 47 of the Federal Code of Regulations §1.1307;
- Evaluating the potential effects of proposed antenna construction on existing on-site threatened and endangered species (or their habitat);
- Providing for wetland and floodplain delineation;
- Disposing of universal wastes and asbestos abatement prior to demolition and managing subcontractors tasked with disposing or abating the same;
- Conducting Health and Safety Oversight during construction activities at environmentally impaired properties;
- Providing for Phase I archaeological surveys at the request of State Historic Preservation Officers (SHPO); and,
- Preparing NEPA Environmental Assessments.

In addition, through his work with telecommunication facilities, Mr. Garlitz has extensive experience working and negotiating with various SHPOs and State Fish and Wildlife Agencies on behalf of his telecommunications clients.

ANDREW W. BAJORAT, CHMM
Principal

EDUCATION AND PROFESSIONAL REGISTRATION

M.S., Environmental Science, Indiana University, 1998
B.A., Chemistry, Augustana College, 1996
Certified Hazardous Materials Manager
OSHA 40-hour Hazwoper Training

CAREER SUMMARY

Mr. Bajorat has worked in various aspects of the environmental industry for more than 13 years. In 1995, Mr. Bajorat served as an intern to the Illinois Riverwatch Network and was responsible for evaluating the health of tributaries to the Mississippi River by collecting and identifying macroinvertebrate larvae found in the tributaries. In 1997, Mr. Bajorat managed household hazardous waste and septic system management informational campaigns for the McHenry County Defenders, a non-profit organization. Mr. Bajorat has provided a wide range of environmental consulting services to clients since 1997 while working with J.M Stratta and Associates in 1997 and 1998; Tetra Tech EM, Inc. in 1998 through 2000; and Bradburne, Briller & Johnson, LLC (BB&J) from August 2000 to the present where he currently serves as Chief Operating Officer and Principal.

Typical Client Markets

Clients for whom Mr. Bajorat has provided services represent a diverse group of businesses. Some of the client markets with which he has significant experience include:

- Agricultural
- Automotive
- Brownfield Redevelopment
- Chemicals
- Communications
- Construction
- Electronics
- Fabrication
- Federal Governments
- Financial
- Food and Beverages
- Information Services
- Institutional
- Insurance
- Law Firms
- Local Governments
- Manufacturing and Assembly
- Marinas
- Military
- Non-profit
- Petroleum Retail Marketing
- Pollution Control
- Refining/Petrochemicals
- State Governments
- Steel Production
- Transportation and Shipping
- Tribal Governments
- Utilities

Geographical Areas of Expertise

Mr. Bajorat has provided his services to clients with sites across the United States and internationally. His experience domestically includes work in the following locations:

- Alabama
- Arizona
- California
- Colorado
- Florida
- Georgia
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Maryland
- Michigan
- Minnesota
- Mississippi
- Missouri

- Montana
- Nebraska
- New Jersey
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Pennsylvania
- Tennessee
- Texas
- Utah
- Washington
- West Virginia
- Wyoming

Mr. Bajorat's international experience includes work in the following locations:

- Brazil
- Canada
- China
- Costa Rica
- Italy
- Lithuania
- Mexico
- The Netherlands
- Puerto Rico

Technical Experience Overview

Over the course of his career, Mr. Bajorat has provided clients with a broad range of environmental, information management and geologic consulting services. His technical responsibilities have included staff and project management level positions for clients in the following areas:

- Assessments (Sampling and Analyses)
- Brownfield Investigations and Cleanup
- Building Decommissioning/Bid Specifications
- CERCLA Emergency Response Action
- Chemical Fate and Transport Studies
- Commercial Property Redevelopment
- Community Right To Know/EPCRA
- Data Validation
- Due Diligence (Phase Is, IIs, and IIIs)
- Federal Superfund Remediation
- Federal Superfund Site RIs/FSs
- Hazardous Waste Management
- Hydrogeology
- Industrial Property Redevelopment
- Laboratory Audits
- NEPA Compliance
- Permitting (Air, Land, Water, and Waste)
- Planning (Air, Land, Water, and Waste)
- RCRA Facility Closures
- RCRA Enforcement
- Regulatory Strategy and Negotiations
- Remedial Action Design and Implementation
- Risk Assessments/Risk-Based Closure
- State Superfund Investigation/Remedial Action
- TSCA (Asbestos and PCBs)
- USTs, ASTs, and Pipelines
- Voluntary Cleanup
- Water Quality

CAREER HISTORY

The career history of Mr. Bajorat includes numerous technical and management positions. A summary is provided as follows:

08/00 to Present – Bradburne, Briller & Johnson, LLC
Chicago, IL
- Principal
- Project Manager

06/98 to 08/00 – Tetra Tech, EM Inc.
Chicago, IL
- Staff Chemist
- Project Manager

11/97 to 05/98 –	J.M. Stratta and Associates Columbus, IN	• Intern / Researcher
05/97 to 08/97 –	McHenry County Defenders Woodstock, IL	• Intern

AMBER D. CICOTTE, CHMM
Senior Scientist

EDUCATION AND PROFESSIONAL REGISTRATION

B.S., Biology – Ecology, Evolution, and Population Genetics, Purdue University, 2001
Certified Hazardous Materials Manager
OSHA 40-hour Hazwoper Training

CAREER SUMMARY

Ms. Cicotte has worked in various aspects of the environmental industry for more than 10 years. In 1999 and 2000, Ms. Cicotte served as an intern to the Ohio Environmental Protection Agency and was responsible for evaluating the health of streams and rivers in the State of Ohio by collecting and identifying fish species found therein. In 2002 Ms. Cicotte served as a naturalist for the International Center for the Preservation of Wild Animals ("The Wilds"), a not-for-profit organization, providing environmental education programs and performing ecological restorations. From 2003 to 2006, Ms. Cicotte was employed by Pollution Control Industries, a hazardous waste disposal facility, where she was responsible for a wide range of activities including processing hazardous chemicals, advising clientele on the best available recycling and disposal methods, and maintaining client compliance with federal and state hazardous waste regulations. Ms. Cicotte has provided a wide range of environmental consulting services to clients since July 2006 when coming to Bradburne, Briller & Johnson, LLC (BB&J), where she currently serves as Senior Scientist.

Typical Client Markets

Clients for whom Ms. Cicotte has provided services represent a diverse group of businesses. Some of the client markets with which she has significant experience include:

- Agricultural
- Automotive
- Chemicals
- Communications
- Construction
- Dry Cleaning
- Electronics
- Federal Governments
- Food and Beverages
- Glass Production
- Health Care
- Institutional
- Insurance
- Law Firms
- Local Governments
- Manufacturing and Assembly
- Non-profit
- Paints and Coatings
- Pollution Control
- State Governments
- Steel Production
- Transportation and Shipping

Geographical Areas of Expertise
Ms. Cicotte has provided his services to clients with sites across the United States and internationally. Her experience includes work in the following locations:

- Arkansas
- Bahamas
- California
- Delaware
- Illinois
- Indiana
- Iowa
- Kentucky
- Louisiana
- Massachusetts
- Michigan
- Minnesota
- Missouri
- Nebraska
- New Jersey
- New York
- Ohio
- Pennsylvania
- South Carolina
- Texas
- Tennessee
- Wisconsin

AMBER D. CICOTTE, CHMM
Senior Scientist

Technical Experience Overview

Over the course of her career, Ms. Cicotte has provided clients with a broad range of environmental, information management, health and safety, and scientific consulting services. Her technical responsibilities have included staff and project management level positions for clients in the following areas:

- Assessments (Sampling and Analyses)
- Building Decommissioning/Bid Specifications
- Chemical Stabilization, Fate, and Transport
- Data Validation
- Due Diligence (Phase Is and IIs)
- Federal Superfund Remediation
- Federal Superfund Site RIs/FSs
- Hazardous Waste Management
- OSHA Compliance and Training
- Laboratory Audits
- Permitting (Air, Land, Water, and Waste)
- RCRA Enforcement
- Remedial Action Design and Implementation
- State Superfund Investigation/Remedial Action
- TSCA (Asbestos and PCBs)
- Voluntary Cleanup
- Water Quality

CAREER HISTORY

The career history of Ms. Cicotte includes numerous technical and management positions. A summary is provided as follows:

07/06 to Present –	Bradburne, Briller & Johnson, LLC Chicago, IL	• Project Scientist • Project Manager
03/03 to 07/06 –	Pollution Control Industries East Chicago, IN	• Labpack / Field Chemist • Project Management • Regional Operations Supervisor
03/02 to 12/02 –	The International Center for the Preservation of Wild Animals ("The Wilds") Cumberland, OH	• Naturalist / Environmental Educator
05/99 to 08/00 –	Ohio EPA Columbus, OH	• Intern / Field Biologist

JESSICA H. MORRISON
Project Scientist

EDUCATION AND CERTIFICATIONS

B.S., Environmental Science, University of Massachusetts at Amherst, 2003
OSHA 40-Hour HAZWOPER Training; 8-Hour Refresher

CAREER SUMMARY

Ms. Morrison has worked in various aspects of the environmental industry since 2001. In 2001 and 2002, she served as an intern to the Ipswich River Watershed Association, a non-profit organization, and was responsible for the RiverWatch program, a volunteer program devoted to evaluating the biological health of the Ipswich River. After graduating from the University of Massachusetts at Amherst in 2003, Ms. Morrison began providing environmental consulting services to clients while working with her current employer, Bradburne, Briller & Johnson, LLC (BB&J). During her time with BB&J, Ms. Morrison has provided a wide range of environmental consulting services to clients in the heavy and light industry, retail automotive, telecommunications, and legal services sector. She has gained valuable experience in client and project management in the areas of site assessment and remediation. Additionally, Ms. Morrison has provided internal and external training on the Oil Pollution Prevention (40 CFR 112) and All Appropriate Inquiry (40 CFR 312) regulations.

Typical Client Markets

Clients for which Ms. Morrison has provided services represent a diverse group of industries. Some of the client markets with which she has experience include:

- Automotive
- Commercial/Industrial
- Communications
- Distribution
- Dry Cleaning
- Financial
- Law Firms
- Local Government
- Manufacturing and Assembly
- Non-profit
- Pollution Control
- Printing
- Private Individuals
- Transportation and Shipping

Geographical Areas of Expertise

Ms. Morrison has provided her services to clients with sites across the United States and Puerto Rico. Her experience includes work in the following locations:

- Alabama
- Arizona
- California
- Connecticut
- Florida
- Georgia
- Illinois
- Indiana
- Kansas
- Kentucky
- Massachusetts
- Minnesota
- Missouri
- New Hampshire
- New Jersey
- New Mexico
- New York
- Ohio
- Oregon
- Pennsylvania
- Puerto Rico
- Rhode Island
- South Dakota
- Tennessee
- Texas
- Virginia
- Washington

JESSICA H. MORRISON
Project Scientist

Technical Experience Overview

Over the course of her career, Ms. Morrison has provided clients with various consulting services. Her technical responsibilities have included staff and project level positions for clients in the following areas:

- Air Permitting and Compliance
- Assessments (Sampling and Analyses)
- Community Right To Know/EPCRA
- Compliance Audits
- Data Validation
- Due Diligence (Phase Is and IIs)
- Environmental Reserve Estimation
- Emergency Plans
- Hazardous Waste Management and Reporting
- Natural Resource Damage Assessment
- NEPA and SHPO Compliance
- Remediation
- Risk Assessments / Risk Based Closure
- Site Characterizations
- Site Investigations
- SPCC Plans and Training
- Surveying
- USTs and ASTs
- Voluntary Cleanup
- Water Quality
- Wetlands / Wildlife Habitat Delineation

CAREER HISTORY

The career history of Ms. Morrison is provided as follows:

10/05 to Present –	Bradburne, Briller & Johnson, LLC Amesbury, MA	• Project Scientist
9/03 to 10/05 –	Bradburne, Briller & Johnson, LLC Amesbury, MA	• Staff Scientist
6/01 to 2/02 –	Ipswich River Watershed Association Ipswich, MA	• Intern / Researcher

LYDIA WAGNER
Project Manager

EDUCATION AND PROFESSIONAL REGISTRATION

B.S., Chemistry, University of Georgia, Athens, GA, 2008
OSHA 40-hour HAZWOPER Training
OSHA 8-hour HAZWOPER Supervisor Training
Red Cross First Aid Training
OSHA 30-hour Construction Safety Outreach Course

CAREER SUMMARY

Ms. Wagner has worked in the environmental industry since joining Bradburne, Briller & Johnson, LLC (BB&J) in July 2008 and has provided environmental consulting services to a variety of clients.

Typical Client Markets

Clients for whom Ms. Wagner has provided services represent a diverse group of businesses. Some of the client markets with which she has significant experience include:

- Agricultural
- Asset Management
- Automotive
- Chemicals
- Communications
- Construction
- Information Services
- Law Firms
- Local Governments
- Manufacturing and Assembly
- Petrochemical
- Retail
- State Governments
- Steel Production

Geographical Areas of Expertise

Ms. Wagner has provided her services to clients with sites across the United States. Her experience includes work in the following locations:

- Georgia
- Michigan
- New Jersey
- New York
- Ohio
- Pennsylvania
- Virginia
- West Virginia

Technical Experience Overview

Over the course of her career, Ms. Wagner has provided clients with environmental and health and safety consulting services. Her technical responsibilities as a staff level associate include services for clients in the following areas:

- Assessments (Sampling and Analyses)
- Brownfield Investigations and Cleanup
- Construction Oversight
- Due Diligence (Phase Is and IIs)
- Groundwater Protection Plan
- Hazardous Waste Management
- Hydrogeology
- Industrial and Commercial Facility Siting

LYDIA WAGNER
Project Manager

- Federal Superfund Sites
- Geotechnical
- Permitting (Air, Land, Zoning)
- Spill Prevention Containment and Control Plans
- State Superfund Investigation/Remedial Action
- Industrial Property Redevelopment
- National Pollutant Discharge Elimination
- System Permitting
- TSCA (Asbestos and PCBs)
- USTs and ASTs

CAREER HISTORY

The career history of Ms. Wagner includes a technical position. A summary is provided as follows:

03/11 to Present –	Bradburne, Briller & Johnson, LLC Pittsburgh, PA	• Project Manager
09/09 to 03/11 –	Bradburne, Briller & Johnson, LLC Pittsburgh, PA	• Staff Scientist II
06/08 to 08/09 –	Bradburne, Briller & Johnson, LLC Pittsburgh, PA	• Staff Scientist I

ATTACHMENT B

HORIBA STANDARD OPERTING PROCEDURES

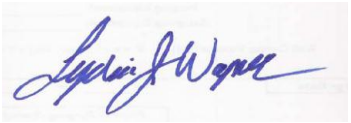
BRADBURNE, BRILLER & JOHNSON, LLC

STANDARD OPERTATING PROCEDURE

HORIBA – U53

Revision No. 2
January 23, 2009

Prepared by:



Lydia Wagner, Staff Scientist Date: 1/23/2009

Approved by:

Richard B. Garlitz, P.E. PE078141 Date: 1/23/2009

1641 Saw Mill Run Boulevard Pittsburgh, Pennsylvania 15210
Phone 412.882.4050 Fax 412.882.0650
www.bbjgroup.com

TABLE OF CONTENTS

1.0 INTRODUCTION

Bradburne, Briller & Johnson, LLC (BB&J) has purchased a Horiba U-53 to perform "analyze immediately" testing in the field per the requirements of New Jersey Administrative Code (NJAC) 7:18. BB&J will clean, maintain, and manually calibrate the Horiba U-53 instrument per the requirements of NJAC 7:18. BB&J will generate updated copies of the following documents related to the calibration and maintenance of the Horiba U-53 unit:

- A National Institute of Standards and Technology (NIST) Certificate of Calibration for a specific glass thermometer;
- A copy of the calibration sheet;
- A cell constant;
- A standard for conductivity;
- Documentation of quarterly comparison with NIST thermometer;
- A certificate of analysis of standards used (specs for calibration solutions);
- Copy of maintenance log; and
- Information on buffers used (4, 7, and 10).

2.0 CERTIFICATION

Mr. Richard Garlitz of BB&J is the New Jersey-certified (PA054) field technician in charge of all aspects of the New Jersey Environmental Laboratory/Measurement Certification Program for BB&J. No person representing BB&J will perform testing of the following "analyze immediately" parameters without the direct supervision or the previous training of Mr. Garlitz:

- Temperature by Department Sanctioned Analytical Method (DSAM) [SM 2550 B];
- Specific Conductance by DSAM [SM 2510 B];
- Turbidity by DSAM [SM 2130 B];
- Oxygen (dissolved) by DSAM [SM 4500-O G]; and
- pH by DSAM [SM 4500-H B].

3.0 HORIBA U-53 SPECIFICATIONS

3.1 Identification of the instrument

Horiba U-53 Multi-Parameter Water Quality Checker

3.2 Application matrix or matrices

This instrument can be used for river water, ground water and waste water.

3.3 Detection limit

The operating ranges for this instrument are:

- Temperature, -5° to 55° Celsius (°C);
- Conductivity, 0 to 10.0 Siemens per meter (S/m);

- Dissolved Oxygen (DO), 0 to 50.0 milligrams per Liter (mg/L);
- pH, 0 to 14;
- Turbidity, 0 to 800 Nephelometric Turbidity Units (NTU); and
- Total dissolved solids (TDS), 0 to 100.0 grams per liter.

3.4 Scope of the test method

This procedure will be used as a field reference guide for the collection of water quality physical parameters. Water temperature, conductivity, pH, DO and turbidity can be recorded using the Horiba U-53 Water Quality Checker.

3.5 Summary of test method

3.5.1 Temperature

The Horiba U-53 Water Quality Checker uses a platinum temperature sensor (thermistor) to measure temperature. The thermistor also measures the change in electrical resistance accompanying changes in temperature. The U-53 uses the temperature data in compensation, and pH temperature compensation. Temperature influences the conductivity of water. As the temperature increases, conductivity increases, due to the increased movement of ions in the solution. Temperature changes in water can have extreme biological effects. In general, as the temperature of water increases, the amount of oxygen dissolved in the water decreases and there is a tendency for the amount of pollutants to increase. The unit of measurement for temperature is °C.

3.5.2 Conductivity

Conductivity is a measure of the ability of an aqueous solution to carry an electric current. The conductivity of water depends upon the presence of ions (their total concentration, mobility, valence, and relative concentrations) and on the temperature of the solution. Adding electrolytes such as salts, acid, or bases to pure water increases conductance. To increase accuracy for conductivity, the U-53 uses the 4-electrode method that reduces the amount of polarization that occurs on the electrode plates. The U-53 uses an automatic temperature conversion function to calculate conductivity at 25°C at a temperature coefficient of 2%/°C, based on the measured value of the temperature. See equation 1.

Equation 1: $L_{25} = Lt / \{1 + 0.02(t-25)\}$

Where: L_{25} = Conductivity of solution converted to 25°C (value displayed on monitor),
t = Temperature of solution at time of measurement (°C), and
L_t = Conductivity of solution at t (°C)

The conductivity of water is determined by measuring the resistance of ion flow in between charged plates because conductivity is inversely proportional to resistance. The Horiba U-53 reports conductivity as S/m (Siemens per meter). Multiply this value by 10,000 to report the conductivity value as µS/cm.

3.5.3 Dissolved Oxygen (DO)

Dissolved Oxygen is a measure of the amount of oxygen contained in water. The Horiba U-53 uses the membrane-electrode method for DO. A reduction reaction in the cathode is caused by oxygen diffusing through the membrane of the sensor to create a current. This current is proportional to the concentration of oxygen dissolved in water. DO is reported as mg/L.

3.5.4 Potential of Hydrogen (pH)

Potential of Hydrogen (pH) is a unit used to show the degree of acidity on a scale of 0 to 14. The pH is a measure of the hydrogen ion (H+) activity in a solution. Activity of the hydrogen ion (as moles/L) can be calculated as pH = -log10 [H+]. Or, [H+] = 1/10 pH. The pH scale is logarithmic, so that a decrease of 1 pH unit is equivalent to a tenfold increase in the hydrogen ion activity. For example, a solution that has a pH of 4.0 is ten times more acidic than a solution with a pH of 5.0. The neutral point for pH is temperature dependent; at 25°C pH 7.0 is neutral, at 0°C the neutral point is pH 7.5 and pH 6.5 is the neutral point at 60°C (Standards Methods, 2005). The glass-electrode method is used by the Horiba U-53. The known pH of a reference solution is determined by using two electrodes, a glass electrode and a reference electrode, and measuring the voltage (difference in potential) generated between the two electrodes. The difference in pH between solutions inside and outside the thin glass membrane creates electromotive force in proportion to this difference in pH. The reporting unit is the standard unit of pH (for example, 7.00 pH units).

3.5.5 Turbidity[1]

Turbidity in water is caused by suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, and plankton and other microscopic organisms. Turbidity is measured in the Horiba U-53 using the 90° Tungsten lamp penetration and scattering method as approved by SM 2130-B. A Tungsten lamp is used as the source to pass light through the sample. The passed light is detected as transmitted light directly across from the source and then as scattered light 90° from the source. Wipers are employed inside the device to prevent air bubbles. Turbidity is calculated as the ratio of scattered light to transmitted light. The unit for turbidity is NTU.

4.0 INTERFERENCES

An improperly calibrated instrument can lead to erroneous results. Proper calibration procedures are discussed in Section 11 herein. The Horiba U-53 probes should be cleaned prior to use to avoid cross-contamination or artifact contamination for any of the target analytes (Refer to Section 12.3 for cleaning procedures).

5.0 HEALTH & SAFETY

The following presents general health and safety guidelines when using the Horiba U-53.

[1] Never perform turbidity measurement in the air as the wipers may become damaged.

5.1 Streams/Water Bodies

When wading in streams or water bodies where water depths may be 1 meter deep or more, wear a life preserver and/or remove hip boots or chest waders. Currents can force wading field workers into deep water and water-filled boots can make swimming difficult.

5.2 Vegetated Areas

When walking through densely vegetated areas along streams, be sure to look for and avoid toxic plants like poison ivy. Be sure to wear appropriate insect repellent and protective clothing for protection from mosquitoes, chiggers, and ticks. In addition, probe areas in your path with a walking stick to warn and disperse venomous snakes, which may inhabit riparian areas. The northern copperhead and/or timber rattlesnake and are the only two venomous snakes known to inhabit New Jersey[2].

5.3 Sanitizing

Be sure to clean up with bacteria disinfectant soap and water after wading in streams. This particularly important for streams that drain livestock areas, sewage treatment plant effluents, and other obvious pollution sources. Under no circumstances should you drink the water from any stream.

5.4 Clothing

Protect from water borne illness by wearing protective gloves, avoid touching eyes, nose and mouth and washing hands frequently with soap and water.

6.0 PERSONNEL QUALIFICATIONS

Water parameters will be collected by BB&J field personnel who have received appropriate training from experienced personnel, prior coursework, and field experience regarding the collection of water parameter data, and who are familiar with all of BB&J's sample handling and labeling procedures and appropriate SOPs. Training documentation will be maintained for each BB&J employee.

7.0 EQUIPMENT AND SUPPLIES

- Model U-53 Water Quality Checker. The manufacturer's address is Horiba Instruments Inc., Armstrong, Irvine Industrial Center, Irvine, California, 92614, Telephone: 949-250-4811, Fax: 949-250-0924, http://www.horiba.com.

- Water Quality Field Book, Water proof marker (e.g., Sharpie®)

[2] Online Field Guide for Reptiles and Amphibians. NJDEP Division of Fish & Wildlife (2007-01-24).

8.0 REAGENTS AND STANDARDS

All reagents and standards are stored according to manufacturer's specifications, at room temperature (15-25°C) and away from direct sunlight. All reagents must be labeled with the date received and the date opened. The following reagents and standards are used and maintained by BB&J:

- pH 4 Standard solution
- pH 7 Standard solution
- pH 9 Standard solution
- pH internal reference solution
- DO sensor internal solution
- Sodium Sulfite (powder) for zero DO solution
- Sodium Thiosulfate, 0.025N
- Turbidity Standard (NIST-traceable), 100 NTU: AmcoClear from GFS Chemicals
- Turbidity Standard (NIST-traceable), 800 NTU: AmcoClear from GFS Chemicals
- Turbidity Stock Solution I (1% Hydrazine Sulfate)
- Turbidity Stock Solution II (10% Hexamine)
- Conductivity Solution, 0.0717 S/m (0.717 mS/cm)
- Conductivity Solution, 0.500 S/m (5.000 mS/cm)
- Conductivity Solution, 1.000 S/m (10.000 mS/cm)
- Oxidation-Reduction Potential (ORP) powder, 89 mV, for ORP solution
- Deionized (DI) water

9.0 SAMPLE COLLECTION, PRESERVATION, SHIPMENT AND STORAGE

No water samples are collected using the Horiba U-53. The Horiba U-53 is used to test for *in situ* parameters and the data is collected and stored in the instrument and/or documented in a field log book.

10.0 QUALITY CONTROL

10.1 Definitions

Method detection limit (MDL): The lowest level at which an analyte can be detected with 99 percent confidence that the analyte concentration is greater than zero. The MDL is defined by the instrument manufacturer and is the lowest value of the instrument's detection range.

10.2 Procedures

10.2.1 Laboratory Reagent Blank (LRB)

Before performing any field analyses, one measurement of deionized or distilled water should be performed in order to ensure proper calibration and that the unit is reading blanks properly.

10.2.2 Field Duplicates (FD)

Two measurements will be taken of the same sampling every ten samples or once per batch, whichever is greater. The results will be recorded in the logbook and compared to each other to ensure precision of the unit.

10.2.3 pH Control

After calibration, pH measurement will be performed using a NIST traceable quality control standard. Additionally, every three hours the unit is in use a calibration check standard will be performed and the results recorded in the logbook. The unit measurement must be within ±0.2 pH units from the calibration check standard. If the unit measures more than ±0.2 pH units from the calibration check standard, then initial calibrations must be performed again.

10.2.4 DO Control

The dissolved oxygen meter will be calibrated every day the unit is in use using air or air saturate water and zero DO calibration solutions. These results will be recorded in the logbook. With every use or weekly (whichever is longer), the DO calibration will be compared to a manual oxygen analysis method, such as the Winkler Method (see Standard Methods, 4500-O). The results of the DO meter and the approved manual DO analysis method will be recorded in the logbook and must agree within ±0.3 mg/L.

10.2.5 Thermistor Control

Quarterly, the thermistor will be compared to a NIST certified thermometer; the certificate of the thermometer is to be kept in the Horiba Field Manual. The results are recorded in a Horiba instrument log book. A correction factor is noted and applied to data.

10.2.6 Turbidity

Quarterly, a concentration curve will be prepared for the turbidity sensor at multiple concentrations of turbidity. At least five different solutions of known turbidity levels will be used to create a concentration curve in Excel and a correlation coefficient (R-squared value) will be calculated. The correlation coefficient must be 0.995 or greater. The turbidity solutions will be prepared from the dilution of NIST traceable standard turbidity solutions. All calculations for standard solution preparation and the correlation coefficient will be recorded in the instrument log book. Additionally, immediately following daily calibration the turbidity sensor must be checked with a second source turbidity check standard. The calibration check standard results will be recorded in the logbook.

10.2.7 Instrument Log Book

All calibration and quality control measures will be recorded and the instrument log book.

11.0 CALIBRATION

11.1 Manual calibration

Specification for the U-53 are listed below in Table 1:

Table 1. Specifications for Horiba U-53

Parameter	Principle	Range	Repeatability
Temperature	Thermistor	0° – 55°C	± 0.3°C
Conductivity	4-AC-electrode	0 – 10 S/m	± 1% / F.S.
Dissolved Oxygen	Polarographic	0 – 20 mg/L	± 0.2 mg/L
		20 – 50 mg/L	± 0.5 mg/L
pH	Glass electrode	0 – 14 pH units	± 0.1 units
Turbidity	Penetration and Scattering	0 – 10 NTU	± 0.5 NTU
		10 – 1000 NTU	± 3% or 1 NTU[3]
Depth	Pressure method	0 – 10 m	± 0.3 m
Total Dissolved Solids	Conductivity conversion	0 – 100 g/L	± 2 g/L
Salinity	Conductivity conversion	0 – 70 ppt	± 3 ppt
Oxidation-Reduction Potential	Platinum electrode	± 2000 mV	± 15 mV
Seawater specific gravity	Conductivity conversion	0 – 50 σ_t	± 5 σ_t

To begin operations on the Horiba U-53 multi-parameter water quality Checker (Horiba), power on the equipment with the POWER key. If the sensor probe is not attached correctly, a "TYPE ERR" will appear. Wait at least 20 minutes after turning the system on before calibrating the DO sensor. Make the DO and COND compensation settings before calibration since these settings are applied during calibration.

[3] Whichever value is larger is the turbidity error for range 10 – 1000 NTU.

Temperature calibration: Temperature calibration is to be performed quarterly, using a glass thermometer with a NIST traceable certificate of calibration. (pp. 40 Horiba operations manual)

Place the sensor probe into a container of water of known temperature and allow at least five minutes for the temperature probe to stabilize. Press the control unit's CAL key to set calibration mode. Press the down (▼) key to move the cursor to "Manual calibration," then press the ENTER key. In the parameter selection screen, move the cursor to "Temp," then press the ENTER key. Using the up and down (▲▼) keys, adjust the current value on the Horiba display to the temperature of the water as determined by the NIST traceable thermometer.

Check that "Current measurement value" has stabilized, then press the ENTER key to start calibration. Calibration is finished when the message "Cal complete. CNT to measure." appears Press the MEAS key to return to measurement mode.

The results of the quarterly temperature calibration will be recorded in the logbook. Results will include: actual temperature of water, measured temperature of water, date, initials of lab technician, serial numbers of thermometer and Horiba unit, and correction factors applied to the Horiba temperature sensor.

Manual potential of Hydrogen (pH) Calibration: pH should be span calibrated to a pH of 4 and 9 (pp. 41 of the Horiba operations manual). New Jersey Department of Environmental Protection parameter approved method – [SM 4500-H B]

To begin manual calibration to the Horiba unit to a pH of 4 and 9, rinse the sensor probe and transparent calibration cup thoroughly with distilled water. Fill the transparent calibration beaker to the designated volume with pH 4 standard solution, and immerse the sensor probe into the beaker.

Press the control unit's CAL key to set calibration mode. Press the down (▼) key to move the cursor to "Manual calibration," then press the ENTER key. In the parameter selection screen, move the cursor to "pH," then press the ENTER key. Set the number of calibration points to "2," then press ENTER.

Use the displayed temperature and Table 2 as shown below to establish what standard pH should be detected by the Horiba at a given temperature. Using the up and down (▲▼) keys, adjust the current value on the Horiba display to the value for the pH 4 standard solution at the given temperature.

Table 2. Calibration of pH at various temperatures[4].

Temp (°C)	pH 4 standard solution Phthalate	pH 7 standard solution Neutral phosphate	pH 9 standard solution Borate
0	4.01	6.98	9.46
5	4.01	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.27
20	4.00	6.88	9.22
25	4.01	6.86	9.18
30	4.01	6.85	9.31
35	4.02	6.84	9.10
40	4.03	6.84	9.07
45	4.04	6.84	9.04

Check that "Current measurement value" has stabilized, then press the ENTER key to start calibration. Calibration is finished when the message "Cal complete. Press ENT to Span cal." appears.

Repeat manual "pH 4 calibration" for standard solution of pH 9.

When complete, press the MEAS key to return to the measurement mode. Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press ENTER key to return to calibration parameter screen.

Immediately following calibration and after every three hours of use, perform a calibration check standard of the unit using the pH 7 standard solution. The pH value must read within ±0.05 pH units of the check standard immediately after calibration and then ±0.1 pH units after every three hours of use.

The results of the daily pH calibration and three-hour calibration checks will be recorded in the logbook. Results will include: actual pH, measured pH, date, initials of lab technician, lot numbers of standards, and correction factors applied to the Horiba temperature sensor.

Manual Oxidation-Reduction Potential (ORP) Calibration: The ORP calibration must be done within one hour of preparing the ORP standard solution. Add one bag of Horiba 89 mV ORP powder to a clean 250 mL volumetric flask. Add distilled water to the 250 mL line on the flask and agitate the solution thoroughly. There will be some excess quinhydrone (black powder) in the solution.

Rinse the sensor probe and transparent calibration cup thoroughly with distilled water. Fill the transparent calibration beaker to the designated volume with ORP standard solution, and immerse the sensor probe into the beaker. With the sensor probe still in the transparent calibration cup, place the transparent cup into the black calibration cup and start calibration.

[4] Values obtained from Horiba U-50 series manual.

Press the control unit's CAL key to set calibration mode. Press the down (▼) key to move the cursor to "Manual calibration," then press the ENTER key. In the parameter selection screen, move the cursor to "ORP," then press the ENTER key.

Use the displayed temperature and Table 3 as shown below to establish the ORP standard solution potential at a given temperature. Using the up and down (▲▼) keys, adjust the current value on the Horiba display to the value for the ORP standard solution at the given temperature.

Table 3. Calibration of ORP at various temperatures[5].

Temp (°C)	**ORP (mV)**
5	+112
10	+101
15	+101
20	+95
25	+89
30	+83
35	+76
40	+69

Check that "Current measurement value" has stabilized, then press the ENTER key to start calibration. Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press ENTER key to return to calibration parameter screen.

Manual Conductivity (COND) Calibration[6]: Use commercially available prepared potassium chloride (KCl) conductivity standards as follows (10 mS/cm, 5 mS/cm, and 0.717 µS/cm). New Jersey Department of Environmental Protection parameter approved method – [SM 2510 B]

Rinse the sensor probe thoroughly with distilled water. Remove the instrument from the water, air dry and proceed with zero calibration in the atmosphere. Press the control unit's CAL key to set calibration mode. Press the down (▼) key to move the cursor to "Manual calibration," then press the ENTER key. In the parameter selection screen, move the cursor to "Cond," then press the ENTER key. Set the number of calibration points to "3" and press ENTER. Using the up and down (▲▼) keys, adjust the current value on the Horiba display to 0.0 and press the ENT key. When the message "Cal complete, ENT to manual cal menu." appears, press the ENTER key to start the first span calibration procedure.

Rinse the sensor probe and transparent calibration cup thoroughly with distilled water. Fill the transparent calibration beaker to the designated volume with 0.717 mS/cm, standard solution, and immerse the sensor probe into the beaker. Using the up and down (▲▼) keys, adjust the current value on the Horiba display to 0.717 mS/cm. Check that "current measurement value" has

[5] Values obtained from Horiba U-50 series manual.
[6] For manual conductivity calibration, preparation of materials is recommended prior to leaving for the field. Preparation of the KCl solutions requires lab conditions.

stabilized, then press the ENTER key to start calibration. When the message "Cal complete. Press ENT to Span cal." appears, press the ENTER key to start the next calibration process.

Repeat manual ORP "71.8 mS/cm calibration" for standard solutions of remaining 6.67 mS/cm and 58.7 mS/cm.

Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press ENTER key to return to calibration parameter screen.

A conductivity curve will be generated during initial set-up of the unit. The conductivity curve will include 5 measurements of varying conductivity and must have a correlation coefficient of 0.95 or greater. Additionally, the cell constant of the conductivity sensor must be calculated annually. The results of the conductivity curve and cell constant are to be manitained in the Field Manual.

The results of the daily conductivity calibration will be recorded in the logbook. Results will include: actual conductivity, measured conductivity, date, initials of lab technician, lot numbers of conductivity standards, and correction factors applied to the Horiba conductivity sensor.

Manual Turbidity Calibration: Use deionized water for zero calibration. Use commercially available turbidity standard (800 NTU and 100 NTU) for span calibration (pp. 50 of Horiba operations manual). New Jersey Department of Environmental Protection parameter approved method – [SM 2130 B].

Press the control unit's CAL key to set calibration mode. Press the down (▼) key to move the cursor to "Manual calibration," then press the ENTER key. In the parameter selection screen, move the cursor to "Turb," then press the ENTER key. Set the number of calibration points to "3" and press ENTER.

To begin manual Turbidity zero calibration, rinse the sensor probe and transparent calibration cup thoroughly with deionized water. Fill the transparent calibration beaker to the designated volume with deionized water and submerge sensor probe. Using the up and down (▲▼) keys, adjust the current value on the Horiba display to 0.0 and press the ENT key. Check that the "Current measurement value" has stabilized, then press the ENTER key to star calibration. When the message "Cal complete, Press ENT to Span cal." appears, press the ENTER key to start the first span calibration procedure.

Repeat manual Turbidity "zero calibration" for standard solutions of remaining 100 NTU and 800 NTU.

Calibration is finished when the message "Cal complete. ENT to manual cal menu." appears. Press ENTER key to return to calibration parameter screen.

The results of the daily turbidity calibration will be recorded in the logbook. Results will include: actual turbidity, measured turbidity, date, initials of lab technician, lot numbers of turbidity standards, and correction factors applied to the Horiba turbidity sensor.

Dissolved Oxygen (DO) calibration: Use 50 g of sodium sulfite ($NaSO_3$) to 1000 mL of tap or distilled water for zero calibration. It is necessary to prepare a new calibration solution before each

calibration session (pp. 54 Horiba operations manual). New Jersey Department of Environmental Protection parameter approved method – [SM 4500 –O G]. Prepare a DO zero calibration solution by stirring or shaking 50 g $NaSO_3$ in 1000 mL of tap or distilled water until $NaSO_3$ is dissolved. The saturated solution is prepared by placing a pneumatic pump into 1-2 liters of water and aerate for 5-10 minutes until oxygen is saturated.

Press the control unit's CAL key to set calibration mode. Press the down (▼) key to move the cursor to "Manual calibration," then press the ENTER key. In the parameter selection screen, move the cursor to "DO," then press the ENTER key. Set the number of calibration points to "2" and press ENTER.

To begin manual DO zero calibration, rinse the Horiba sensor probe and calibration cup thoroughly. Fill the black calibration beaker to the designated volume with the $NaSO_3$ solution and submerge sensor probe. Using the up and down (▲▼) keys, adjust the current value on the Horiba display to 0.0 and check that the "Current measurement value" has stabilized, then press the ENTER key to star calibration. When the message reads "Cal complete, Press ENT to Span cal." Appears, press the ENTER key to start the first span calibration procedure.

To begin manual DO span calibration, pour 1 to 2 liters of water (tap or deionized water) into a container. Saturate the water with air using a system that feeds air into the water (such as a pneumatic pump). Rinse the Horiba sensor probe and submerge in the oxygen saturated water. Use the up and down (▲▼) keys to set the value of saturated dissolved oxygen in water at a given temperature (according to table 4 as seen below) and check that the "Current measurement value" has stabilized, then press the ENTER key to star calibration. When the message "Cal complete. ENT to manual cal menu." Appears, press the ENTER key to return to the calibration parameter selection screen.

Table 4. Calibration of DO at various temperatures[7].

Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)
0	14.62				
1	14.22	11	11.03	21	8.91
2	13.83	12	10.78	22	8.74
3	13.46	13	10.54	23	8.58
4	13.11	14	10.31	24	8.42
5	12.77	15	10.08	25	8.26
6	12.45	16	9.87	26	8.11
7	12.45	17	9.66	27	7.97
8	11.84	18	9.47	28	7.93
9	11.56	19	9.28	29	7.69
10	11.29	20	9.09	30	7.56

[7] Values obtained from Horiba U-50 series manual using the International Organization for Standardization (ISO) 5814 table.

The results of the daily DO calibration will be recorded in the logbook. Results will include: actual DO, measured DO, date, initials of lab technician, and correction factors applied to the Horiba DO sensor.

11.2 Auto Calibration

To begin operations on the Horiba U-53 multi-parameter water quality Checker (Horiba U-53), power on the equipment with the POWER key. If the sensor probe is not attached correctly, a "TYPE ERR" will appear. Assuming the equipment is as received from the distributor, the display will begin in the measurement mode (MODE) of pH. The MODE key can be used to change the measurement mode.

While the instrument is manually calibrated by BB&J between uses, auto calibration must also be performed prior to use in the field. Document the time of calibration in the job-specific field book. (Note: if the instrument is to be used outside and if the temperature is below 40 degrees F, please allow the instrument to sit outside of the vehicle/building for approximately one hour in order to bring the instrument down to ambient air temperatures.) Remove the sensor guard and wash the sensor probe in deionized water several times. Pour the pH 4 standard calibration solution into the transparent calibration cup to the TURB fill line. Immerse the sensor probe into the transparent calibration cup and check that there are no air bubbles on the sensor. With the sensor probe still in the transparent calibration cup, place the transparent cup into the black calibration cup and start calibration. Press the CAL key on the control unit. Press the down (▼) key to move the cursor to "Auto Calibration," then press the ENTER key. Check that the pH sensor, ORP sensor. COND sensor, TURB sensor and temperature sensor are submerged in the pH 4 standard solution, then press ENTER. When all the sensor values have stabilized, press the ENTER key to start calibration. Calibration is finished when the message "Cal complete. MEAS to measure." appears. Press the MEAS key to set the measurement screen. Wash the sensor with distilled water. The instrument is now ready for use.

12.0 PROCEDURE

12.1 Measuring Water Parameters

a. Check that each sensor and sensor guard is properly mounted. Also check that "SINGLE MEASUREMENT" has been selected in the measurement screen.

b. Turn the power on and gently place the probe into the monitoring well or water to be sampled. Never drop or throw the probe into the monitoring well or water to be sampled. Each of the probes is sensitive to extremes. This includes impact and heat (do not leave the probe inside a vehicle with the windows closed or in prolonged direct sunlight).

c. Gently shake the sensor probe in the sample to remove any bubbles. If the sample is non-flowing, move the sensor probe up and down in the sample approximately every 30 seconds to ensure a fresh sample is supplied to the DO sensor.

d. When the non-turbidity meter measurements have stabilized, press the MEAS key to begin the turbidity measurement. This step takes approximately 30 seconds to complete.

e. When the turbidity sequence is finished, "Press ENT to store data" will be displayed. Press the ENTER key to store the held measurement values, or press the ESC key to cancel the operation.

f. When ready to take another measurement, press the MEAS key.

g. Sampling and analysis occur simultaneously when using the Horiba.

h. All measurements must be recorded in the logbook.

12.2 Data Storage

a. The U-53 can store up to 10,000 sets of data of the values measured for each of the parameters: pH, COND, TURB, DO, and TEMP.

b. W hen the turbidity sequence is finished, "Press ENT to store data" will be displayed. Press the ENTER key to store the held measurement values.

c. When "Store data complete" is displayed, data has been saved on the unit.

d. The unit can be turned off between sites to preserve battery strength. Fill the storage cup with stream water if necessary to keep the probes wet between sites. Deionized or distilled water can be used to clean the probes between sites.

12.3 Cleaning and Decontamination

a. Obtain two spray bottles; one containing distilled water and one containing Alconox solution.

b. Spray down the Horiba U-53 and its sensors with the Alconox solution. Be careful to dislodge any and all debris from the Horiba U-53. A brush may be used to gently remove debris not removed by spraying. Be careful to ensure the sensors are not bumped or scratched.

c. Rinse the Horiba U-53 and its sensors by spraying with the distilled water. If debris remains on the Horiba U-53 or its sensors after the rinse step, the Alconox step may be repeated as necessary. Be careful to remove any and all traces of Alconox solution and debris by spraying with distilled water. (Note: Dedicated buckets of water and Alconox solution may be used as well.)

d. After the Horiba U-53 and its sensors are completely rinsed, the Horiba U-53 and its sensors are to be air-dried before use in another well.

12.4 Maintenance

a. Turn OFF the power

b. Wash the probe thoroughly with tap water. Be sure to thoroughly rinse the probe of sample solution.

c. When storing the U-53 for brief periods of a week or less, fill the protective rubber cap with distilled water and fit the probe over it.

d. The pH sensor must always be kept moist. For short-term storage, fill the black calibration cup with water (deionized, distilled or tap) and submerge the sensor probe in it. For longer storage, remove the sensor from the sensor probe and check that the internal solution replenishment port is closed. Then attach a seal to the liquid junction and attach rubber caps. Also remove the DO sensor and set the sort socket and store in a cool, dark place. Recharge the reference sensor with reference solution about once every 2 months.

   I. Remove the liquid-junction rubber cap from the reference sensor and pour out the old solution.

   II. Polish the silver electrode part of the sensor using sandpaper (#500) and then wash with water.

   III. If necessary, polish the gold electrode of the sensor using sandpaper (blue) and then wash with water.

   IV. Fill the reference sensor completely with new reference solution. Make sure that there are no air bubbles.

   V. Replace the liquid-junction rubber cap.

   VI. Carefully wash off all excess reference solution from the probe.

   VII. Record the date of the reference sensor recharge in the instrument log book.

e. See Horiba U-50 series manual for maintenance procedures for DO sensor diaphragm replacement (page 79).

f. See Horiba U-50 series manual for maintenance procedures for the turbidity sensor replacement (page 81).

12.5 Automatic Data Storage

a. Measured values may also be stored automatically at constant time intervals.

b. See the Horiba U-50 series instruction manual for detail on how to use this function.

c. A minimum of 30-second time intervals is used for automatic data storage.

d. Data retrieval is by the same process as listed below (Section 13.1 and 13.2 of this manual) for manual data storage.

13.0 DATA ACQUISITION, CALCULATIONS, AND REPORTING

The following sections present procedures as to how the data is acquired calculated and reported.

13.1 Horiba U-53 Data Download Procedure:

Note: The download cable and interface software are installed on the BB&J-Pittsburgh Server in G:/Horiba. To access the U-50 series software, navigate to C:/Horiba and double-click on U-50Win.exe to start program at step "d." below.

a. Install data link unit on back of Horiba U-53. Attach a standard USB cable (type A-B) to port on data link unit.

c. Open Horiba U-50 program (use above procedure if necessary).

d. Choose "Data" > "Import measured data" to access all data files saved on unit.

e. When data has finished loading to screen (may take several minutes), select desired records by holding shift key and clicking data numbers. Press SELECT on download window.

f. Data will appear in Data Screen. Individual records may be examined in this screen if desired. Click DATA > CLOSE to return to Main Screen.

g. On Main Screen, click FILE>SAVE AS and choose a file name and destination. Filename should include project name and date. Destination could be Desktop, floppy disk, zip disk or flash drive. If you save on the desktop and you will have many Horiba U-53 files, please make a folder for your files.

h. After saving data, close Horiba U-53 program, turn off Horiba U-53 unit and disengage data cable. If necessary follow Horiba U-53 cleanup procedures.

13.2 Horiba U-53 Data Handling:

Note: The Horiba U-53 data files are saved as a .csv file. Be sure to set Excel to look for "All Files" to find it.

a. Open data file in Excel. Note that Horiba U-53 numbers are not included as a field and the only identifiers, other than record order, are DATE and TIME.

b. Some fields are blank and filled with "----------", delete these. Other fields are not pertinent (DEP, SAL, σt) and others may not be important for your uses: delete these also.

c. Add fields for SITE, and any other information you need to associate with the water quality data.

d. Save As an Excel (.xls) file. (Make sure that the filename includes project and date or some other unique identifier: a desktop cluttered with Horiba U-53 .xls files will become confusing very quickly). This will result in two files: the original .csv file and the new updated .xls file. If necessary, send (e-mail) the file to a computer to be saved.

14.0 DOCUMENTATION

Per NJAC 7:18, the following documentation and quality control protocol is required during "analyze immediately" testing:

- Sample name;
- The name and signature of the field technician collecting the "analyze immediately" samples;
- The name of the field technician analyzing the "analyze immediately" sample;
- The type of analysis performed and the DSAM;
- The results of sampling and analysis;
- The time of the manual calibration;
- The time of daily calibration;
- The time of sampling and analysis; and
- The instrument serial number.

This information should be recorded in the job-specific field book.

- Duplicates should be performed on 5% of all samples or at a minimum one per batch; and
- Daily standard checks, including 3-hour check standards for pH and daily calibration for DO against air.

15.0 COMPUTER HARDWARE AND SOFTWARE

The Horiba U-53 has internal software and also software for data transfer to a PC.

Microsoft Excel is used for recording and reviewing the final data from the Horiba U-53.

This document is created using Microsoft Word. The Word file name for this SOP is: SOP Horiba U-53.doc

16.0 METHOD PERFORMANCE

There is no published method performance data for this method.

17.0 POLLUTION PREVENTION

Wastes from these procedures shall be collected and disposed of according to existing waste policies within the BB&J Proposal/Work Plan and/or Health and Safety document.

18.0 DATA ASSESSMENT AND ACCEPTABLE CRITERIA FOR QUALITY CONTROL MEASURES

- The analyst should review all data for correctness.
- Precision values are calculated for pairs of duplicate analyses.
- The desired precision is + 20%.
- The completed Excel spreadsheet is reviewed by the analyst's chain of supervision.

19.0 CORRECTIVE ACTIONS FOR OUT-OF-CONTROL OR UNACCEPTABLE DATA

The results for precision and blank data are compared to the acceptable values for this analysis; + 20% and 0 for all analytes, respectively. If data are unacceptable for any reason, the analyst should review their analytical technique prior to conducting this analysis again.

The instrumental may require trouble shooting techniques if the data are unacceptable.

a. Clean the probes

b. Perform maintenance procedures as outlined in manual

c. Replace defective sensors

d. Send the instruments to the manufacturer for repair

20.0 WASTE MANAGEMENT

The wastes generated in this method are generally not hazardous. In addition, the quantities are very small and can be discarded in the same manner as the purge water generated from the ground-water sampling activities.

21.0 REFERENCES

Instruction Manual, Horiba Multi-parameter Water Quality Checker, U-50 series. September 2008. Horiba, Ltd., 2 Miyanohigashi, Kisshoin Minami-ku, Kyoto 601-8510 Japan.

Standard Methods for the Examination of Water and Wastewater. 2005. 21st Edition. APHA, AWWA, WEF Publishers.

Data Collection Software Instruction Manual, U-50PC. September 2008. Horiba, Ltd., 2 Miyanohigashi, Kisshoin Minami-ku, Kyoto 601-8510 Japan.

APPENDIX C

HEALTH AND SAFETY PLAN

DRAFT

HEALTH AND SAFETY PLAN

Prepared For:

Former Union Fork & Hoe Facility
253 East Main Street
Frankfort, New York

Prepared On:

June 4, 2012

Prepared By:

BRADBURNE, BRILLER & JOHNSON, LLC
BB&J Project No. R1106075
HSP Log No. 11-100-3

Expected Duration of Scope of Work To Be Determined

EMERGENCY CONTACTS AND PHONE NUMBERS

HOSPITAL: Emergency Department at St. Luke's
1656 Champlin Ave., Utica, NY (**see *attached MAP***)
General No. **315-624-6000**
Emergency No. 315-624-6112 ext. 2

FIRE: 911
POLICE: 911

Health and Safety Officer:	James Lucci	Work:	978-834-0798
		Cell:	978-853-3526
		Home:	978-463-3090
Principal:	**J. Tim Bradburne**	**Work:**	312-644-8556
		Cell:	**312-961-5617**

Reviewed by:

_____
Lydia Wagner
Field Safety Coordinator

_____
Richard Garlitz
Project Manager

_____
J. Tim Bradburne, PG
Principal

_____
James Lucci
Health & Safety Officer

TABLE OF CONTENTS

APPENDICIES

1.0 INTRODUCTION

On April 28, 1971, The United States Congress passed into law the Occupational Safety and Health Act (The Act). The purpose of The Act is to encourage safe and healthful working conditions for all employees. Bradburne, Briller & Johnson, LLC (BB&J) has prepared this Health and Safety Plan (HSP) in general accordance with the requirements outlined in the Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulations (CFR) 1910.120.

Project specific information is outlined in Appendix A and includes the following:

- Background:
  Provides a brief overview of the Subject Property, including a site and vicinity description; historical and current property operations; historical and recent environmental activities conducted at the Subject Property

- Potential Recognized Environmental Conditions:
  Identifies the potential recognized environmental conditions (RECs)

- Sources of Hazardous/Toxic Materials and Chemical Hazards:
  Identifies potential and/or actual sources of hazardous/toxic materials and chemical hazards

- Media of Concern:
  Identifies the potential and/or actual media impacted with constituents of concern (COCs)

- Scope of Work:
  Provides a brief overview of the field activities proposed for the Subject Property

- Personnel Monitoring
  A description of the personnel monitoring that will be employed during the field work at the Subject Property

- Personnel Protective Equipment (PPE)
  A list of the recommend PPE that should be worn while conducting field work at the Subject Property

The following Sections outline BB&J's standard health and safety procedures.

2.0 PERSONNEL REQUIREMENTS

The following sections provide general requirements of BB&J's Health and Safety Officer (HSO), the project-specific Field Safety Coordinator (FSC) and the on-site field personnel.

2.1 Health and Safety Officer

The primary responsibilities for the HSO include the following:

- Develop and implement health and safety policy for BB&J;
- Conduct Health and Safety Audits, including field audits;
- Provide continued health and safety support as needed;
- Project contact for health and safety issues;
- Review and enforce the site-specific HSP; and,
- Review results of Job Hazard Analysis Report (Appendix B) and site-specific Health and Safety Summary Report (Appendix C).

2.2 Field Safety Coordinator

The primary responsibilities for the FSC include the following:

- Develop and enforce site-specific HSP;
- On-site supervisor and contact for health and safety during field activities;
- Before initiating field work, ensure route to Hospital is correct and accessible (verify route is free from construction activities and/or roads are not shut down);
- Before initiating field work, conduct brief site reconnaissance and become familiar with site conditions, boundaries, and physical hazards;
- Before initiating field work, complete Job Hazard Analysis Report (See Appendix B);
- Before initiating field work, determine and designate applicable Work Zones (see Section 3.7);
- Before initiating field work, conduct Site Safety Meeting, which will include:
    - A verification to ensure workers have appropriate medical and hazardous waste training;
    - A brief introduction to on-site personnel and on the contents of this HSP;
    - A determination of a meeting spot, located upwind, in case of an emergency evacuation;

- A review of the Job Hazard Analysis Report;
- A discussion period for personnel to review the HSP, and ask questions about the planned work or potential hazards; and,
- An explanation of the required personal protective equipment (PPE), and procedures to alter the level of PPE (i.e., only the FSC is authorized to allow changes in the PPE which is outlined in this HSP).

- Oversee field health and safety procedures and operations for BB&J personnel;
- Ensure that proper first aid and safety equipment are available;
- Perform (or oversee) health and safety monitoring (i.e., site and personnel monitoring);
- Determine if conditions are hazardous to on-site personnel or the public and to terminate work if necessary;
- Oversee personnel and equipment decontamination procedures to ensure proper procedures are being adhered to; and,
- Upon completion of the field work, complete the Health and Safety Summary Report (Appendix C) and inform HSO of any health and safety related activities/incidents at the site.

2.3 On-Site Personnel

Primary responsibilities of the on-site personnel shall be:

- Perform a brief site reconnaissance to familiarize themselves with site conditions, boundaries and physical hazards;
- Attend Site Safety Meeting conducted by the FSC prior to beginning work each day;
- Review the HSP and ask questions about the planned work and/or hazards *(NOTE: By BB&J voluntarily sharing information contained in this HSP, subcontractors are not relieved of the responsibility to provide their personnel with adequate and proper supervision, safety information, instruction and equipment)*;
- Adhere to the instruction of the FSC and procedures in the HSP;
- Wear the appropriate PPE as specified in the HSP and as directed by the FSC;
- Report potential or existing hazards on the work site to the FSC immediately upon discovery; and,
- Sign this HSP acknowledging that this HSP reviewed by them. A Personnel Acknowledgement Form is included as Appendix D.

2.4 Hazardous Waste Worker Training

BB&J field-personnel, at a minimum, have completed the following training as applicable and required by OSHA 29 CFR 1910.120(e):

- OSHA-approved 40-hour health and safety course "*Health and Safety for Hazardous Waste Operations*";
- OHSA-approved "*8-Hour Annual Health and Safety Refresher Training for Hazardous Waste Operations*"; and,
- One day of actual field experience under the direct supervision of a trained experienced supervisor.

BB&J site-supervisors have also completed an additional 8-hours of training designed for managers (i.e., OSHA-approved "*8-Hour Site Supervisor*" course).

Training and OSHA certificates are kept on file with BB&J's HSO.

2.5 Medical Surveillance

BB&J field personnel participate in the company's medical monitoring program.

2.6 Audits

Audits of the project file and field audits will be performed randomly at the judgment of the HSO to determine compliance of the HSP. Discrepancies, deviations and/or violations will be documented and issued to the project file, along with copies to the project personnel (i.e., principal, project manager and FSC).

3.0 SITE INFORMATION

The following information is based on BB&J's knowledge of the Subject Property's history and current conditions.

3.1 Background

Refer to Appendix A for a brief overview of the Subject Property, including a site and vicinity description; historical and current property operations; historical and recent environmental activities conducted at the Subject Property.

3.2 Operational Hazards and Site Safety Meeting

Before field activities, the FSC will conduct a site reconnaissance to identify any actual and/or potential visible hazards existing on-site or created from work activities. The FSC will then complete the Job Hazard Analysis Report (JHAR) contained in Appendix B. Following the site reconnaissance and completion of the JHAR, and Before the commencement of work activities, the FSC will conduct a daily Site Safety Meeting in which the result of the site reconnaissance and JHAR will be reviewed with the on-site workers. The FSC will also field any questions related to the planned scope of work for that day.

Typical operationally hazards that may be encountered include:

- Trip and fall hazards;
- Noise hazards;
- Overhead hazards; and/or,
- Moving vehicles or machinery hazards.

3.3 Sources of Hazardous/Toxic Materials and Chemical Hazards

Based on BB&J's understanding of the Subject Property's historical and current conditions, the information in Appendix A identifies the potential RECs and potential and/or actual sources of hazardous/toxic materials and chemical hazards.

3.4 Constituents of Concern [COCs (i.e., Chemical Hazards)]

A list of known or suspected COCs associated with the aforementioned potential and/or actual sources of hazardous/toxic materials and chemical hazards is presented in Table 1. In addition, Table 1 includes the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits (RELs) and OSHA permissible exposure limits (PELs). The RELs and PELs are based on time-weighted-average (TWA) concentrations for up to a 10-hour and 8-hour workday during a 40-hour workweek, respectively.

Additional chemical-specific health and safety information can be found on specific Material Safety Data Sheet(s) (MSDS), which can be requested from BB&J's corporate headquarters in Chicago.

3.5 Media of Concern

The known or suspected media impacted with COCs is listed in Appendix A.

3.6 Tools and Equipment

Tools and equipment used shall be inspected daily and before use by the operator and maintained to be safe and adequate for their designated use.

3.7 Work Zones

Before field activities, the FSC shall determine the applicable Work Zones depending on the extent of work activities to be conducted. Personnel shall be briefed on the use and requirements of each area during the Site Safety Meeting.

Up to three zones will be established within each work area. The zones are the:

- Exclusion Zone;
- Decontamination Zone; and
- Support Zone.

The inner boundary of the Support Zone will delineate the safe perimeter. The specific zone areas will change according to the specific task being performed and the location of that task.

Exclusion Zones

The Exclusion Zone will be defined as the area where a potential for harm to personnel exists due to the known or likely presence of potential hazards (e.g., chemical hazards, physical hazards, etc.). Activity such as subsurface drilling, sampling, and/or installations will occur in the Exclusion Zone.

Decontamination Zone

The Decontamination Zone will be the area where personnel conduct personal and equipment decontamination. It is essentially a buffer zone between the exclusion zone and the support zone. If necessary, there will be one or more central decontamination zones for operational equipment. PPE will be decontaminated at the local decontamination zone for each work site. If necessary, decontaminated clothing will be temporarily contained in a 55-gallon drum and decontamination fluids will be temporarily containerized in separate 55-gallon drums pending disposal *(Consult the site-specific Proposal or Work Plan for specific decontamination procedures)*.

If necessary, a safe perimeter will be established for work areas to protect against physical and chemical hazards. The safe perimeter delineates where the chemical and physical hazards associated with on-site activities are reduced. For active subsurface assessment sites, the safe perimeter will be marked (if possible pending site obstructions and operations) by traffic cones and/or caution tape. No persons will be allowed inside the perimeter without proper protective equipment. Equipment within a work area (e.g., auger sections, steel casings, barrels, etc.) will be stored in an orderly fashion so as to minimize physical hazards.

Support Zone

The Support Zone will be located outside the safe perimeter, where the chance to encounter hazardous materials or conditions is minimal. Personal protective equipment is therefore not required. PPE will be stored there, as will first aid equipment.

4.0 WORK PROCEDURES

The following sections outline BB&J general work guidelines.

4.1 Overview of Scope of Work

A brief summary of the field activities proposed for the Subject Property is presented in Appendix A.

4.2 Site Monitoring Procedures

The FSC shall perform a visual inspection of the work area and surrounding areas to verify that they are free from work hazards and/or that the proper safety precautions have been taken. If the work area is located in an area where the general public are nearby (i.e., public area, sidewalk, etc.), the site will be marked off and barricaded with yellow caution tape and/or other means to prohibit entry by unauthorized personnel. The FSC will perform visual inspections periodically throughout the project. Any work hazards or safety concerns should be noted on the JHAR (in Appendix B).

4.3 Personnel Monitoring Procedures

Depending on the known and/or suspected COCs present at the Subject Property (refer to Table 1), personnel monitoring procedures will vary. Refer to Appendix A for the site-specific monitoring procedures.

4.4 Clothing and Protective Equipment Required

OSHA requires that PPE be used to protect individuals from exposure to physical, chemical and biological hazards within a work area. The U.S. EPA has developed different levels, A, B, C, and D, of protection to help determine site-specific requirements for protective clothing and equipment. The following describes the different levels:

<u>LEVEL A:</u>

Level A is the highest level of protection that can be worn by a site worker. Level A is required when:

- The hazardous substance has been identified and requires the highest level of protection for the skin, eyes and respiratory system;
- There is a potential for splash, immersion, or exposure to unexpected vapors, particulates, or gases that are harmful to the skin or may be absorbed through the skin;
- Confined space entry may be involved, and the need for Level A cannot be ruled out (but explosion hazard has been ruled out); and
- The skin absorption hazard may likely result in immediate death, serious illness or injury, or impair the ability to escape.

LEVEL B:

Level B is used when maximum respiratory protection is desired, but the skin/eye hazards do not require Level A. Level B is required when:

- The highest level of respiratory protection is needed, but a lower level of skin protection is acceptable;
- The type of substances have been identified;
- A self-contained breathing apparatus (SCBA) is required; and
- Less skin protection is need (i.e., vapor and gases are not believed to contain high levels of chemicals harmful to skin or capable of being absorbed through intact skin).

LEVEL C:

Level C provides less skin and respiratory protection. Level C is required when:

- The concentration(s) and type(s) of airborne substance(s) are known and the criteria for using an air-purifying respirator are met;
- Direct contact with the hazardous substance will not harm the skin, or the substance will not be absorbed through exposed skin;
- Air contaminants have been identified, concentrations measured, and an air purifying respirator (APR) is available that can remove the contaminants; and,
- An adequate level of oxygen (>19.5%) is available, and all other criteria for the use of APRs are met.

LEVEL D:

Level D offers no respiratory protection and low protection against skin contact. Level D is required when:

- Minimal protection from chemical exposure is needed. It is worn to prevent nuisance contamination only when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of or contact with hazardous levels of any chemicals.

The level of PPE required for the scope of work outlined herein is indicated in Appendix A.

4.5 Confined Space Entry

Not applicable for this project unless noted in Appendix A.

4.6 Decontamination/Cleaning Procedures

Decontamination/cleaning of equipment is an important method of controlling the spread of hazardous substances and preventing deterioration of the equipment. Equipment will be decontaminated/cleaned before coming in contact with the suspected media of concern and/or subsurface, and following contact with the suspected media of concern. Specific decontamination/cleaning procedures will vary depending on the equipment used, suspected or know COCs.

Cleaning involves scrubbing equipment with a brush in a solution of non-phosphate detergent (e.g., Liquinox) and potable water, followed by a triple rinse of distilled or de-ionized water. For equipment that require more detailed cleaning procedures, refer to the Field Procedures Section in the Proposal or Work Plan prepared for the Subject Project.

Contaminated wash and rinse solutions must be containerized by using step-in containers to hold spent solutions or by other method(s) of containment. Tools that were used in the Exclusion Zone must not be removed without proper decontamination.

Contaminated materials and equipment used for decontamination (e.g., clothing, tools, buckets, brushes, etc.) must be secured in an appropriate container (e.g., drum, sealable bucket) and properly labeled. The spent decontamination solutions must be transferred to drums, which are appropriately labeled and disposed of in accordance with local, State, and federal regulations. (*Refer to the project specific Proposal or Work Plan for a more detailed procedure*).

4.7 Work Precautions/Procedures

The following activities are prohibited in any of the work zones throughout the duration of the project (unless authorized by the FSC):

- Eating, drinking or using tobacco products;
- Removing PPE while in the exclusion zone;
- Exiting the work area without going through the decontamination process;
- Removing exposed equipment from the work area without going through the decontamination process; and
- Disposing of any material or equipment that comes in contact with COC-impacted materials (e.g., soil, water, etc.) in a manner that is not in accordance with the procedures outlined herein.

5.0 EMERGENCY PROCEDURES

Emergency contacts and phone numbers are presented on the first page of this HSP. A map to the nearest hospital is provided in Appendix E.

A first aid kit will be readily available (i.e., located the Support Zone) in the case of an injury and all workers will be informed of its location before beginning work. In addition, if potential fire hazards exist, a fire extinguisher will be on-site. The FSC will be responsible for ensuring that proper first aid and safety equipment are available.

In the event of an injury, the FSC will evaluate the nature of the injury, and if determined not to be life threatening, the injured person will be decontaminated to the extent possible. Appropriate first aid will be administered and/or the individual will be transported to a medical facility and/or an ambulance contacted to transport the injured person to the designated hospital, if necessary (see attached map).

In the event of overt personal exposure (i.e., skin contact, inhalation and/or ingestion), consult the MSDS (if available) and implement the response procedures as indicated in the following sections:

5.1 Skin Contact

Direct contact is one of the primary routes of exposure. Some chemicals may pass through the skin into the bloodstream where they are transported to organs. Absorption into the skin is enhanced by abrasions, cuts, heat, and moisture.

If skin contact does occur, remove any contaminated clothing and thoroughly wash the area with soap and water. Consult the specific chemical MSDS for additional first aid procedures and seek medical help if necessary.

5.2 Inhalation

Inhalation is one of the primary routes of exposure. Some chemicals, either in a vapor, gaseous or solid state (i.e., adhered to airborne particulates) may enter the body through breathing.

If inhalation of a COC(s) occurs, move person upwind from the source, and remove any respiratory protection equipment (if in use). Consult the specific chemical MSDS for additional first aid procedures and seek medical help if necessary.

5.3 Ingestion

Ingestion is one of the primary routes of exposure. Some chemicals may enter the body through the mouth. No equipment should ever be put in the mouth, and eating and drinking are prohibited in the work area.

Emergency procedures for the ingestion of specific chemicals vary from chemical to chemical. Consult the specific chemical MSDS for first aid procedures and seek medical help if necessary.

5.4 Eye Contact

If a substance comes in contact with the eyes, flush with water or eye wash solution for at least 15 minutes. Consult the specific chemical MSDS for additional first aid procedures and seek medical help if necessary.

5.5 Cold Stress

Field activities in cold climates create a potential for cold stress. The warning symptoms of cold stress include: reduced coordination; drowsiness; impaired judgment; fatigue; and, numbing of the toes, fingers, nose and ears. To prevent cold stress, personnel will wear appropriate clothing and maintain scheduled work/rest periods, with rest periods taken in a sheltered and heated location.

The following steps will be taken (by the FSC) to minimize the potential for cold stress:

- Adjust work and rest schedules for workers;
- Provide shelter or heated areas for workers, and heating devices if needed;
- Maintain a supply of fluids for workers; and,
- Brief workers on the symptoms and how to recognize and treat cold stress.

If a worker is experiencing cold stress, the FSC (or other first aid-trained personnel) should administer appropriate first aid, such as moving the person to a warmer environment, placing blankets on the person, and contacting an ambulance to transport the injured person to the designated hospital, if necessary (see attached map).

5.6 Heat Stress

Heat stress is one of the most common and potentially serious illnesses and warrants preventive measures. Heat stress is caused by a number of factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Depending on the conditions, heat stress can occur very rapidly – within as little as 15 minutes. The warning symptoms of heat stress include: reduced accuracy; comprehension and retention; fatigue; loss of strength; cramps; drowsiness, and rashes.
The following steps will be taken (by the FSC) to minimize the potential for heat stress:

- Adjust work and rest schedules for workers;
- Provide shelter/shaded areas for workers, and cooling devices to aid natural body heat exchange;
- Maintain a supply of fluids for workers; and,
- Brief workers on the symptoms and how to recognize and treat heat stress.

If a worker is experiencing heat stress, the FSC (or other first aid-trained personnel) should administer appropriate first aid, such as moving the person to a cooler area, administering fluids, placing cold towels on the person, and contacting an ambulance to transport the injured person to the designated hospital, if necessary (see attached map).

5.7 Potential or Actual Fire/Explosion

If necessary, on-site personnel will use available firefighting equipment to control or extinguish a fire, and remove or isolate materials, which may contribute to a fire. The local fire department will be contacted, along with the project manager, HSO, and/or client company officials as appropriate.

5.8 Spill or Release of Hazardous and Non-Hazardous Material

Hazardous Material: If a spill or release of hazardous material occurs, the situation is not life threatening and there are limited exposure risks, an effort should be made to clean up, isolate or contain the spill as appropriate. Contact emergency response personnel, project manager, and/or client company officials as appropriate. See the first page of this HSP for emergency phone numbers.

Non-Hazardous Material: If a spill or release of a non-hazardous material occurs, and the situation is not life threatening, an effort should be made to clean up, isolate or contain the spill as appropriate. Contact emergency response personnel, project manager, and/or client company officials as appropriate. See the first page of this HSP for emergency phone numbers.

5.9 Biological Hazards

The potential exists for unintended interaction with biological hazards [e.g., venomous or dangerous animals (e.g., venomous snakes, poisonous insects, alligators, etc.)] to exist while field activities are being conducted. The following precautionary measures should be taken to avoid unintended contact with these types of animals:

- Visually inspect the work area for potential biological hazards before beginning field work;
- Wear the appropriate clothing (e.g., steel-toed boots, long sleeve shirts, long pants, etc.); and,
- Avoid dense brush, tall grassy areas, and/or any other area that may reasonably contain biological hazards when feasible.

Please refer to the Job Hazard Analysis Report for more site-specific information regarding the foreseeable biological hazards associated with the scheduled field work.

5.10 Severe Weather

The potential exists for severe weather (e.g., blizzards, hurricanes, tornados, earthquakes, etc.) to occur while field activities are being conducted. In the event that a severe weather emergency occurs, the following preliminary emergency response procedures and/or precautions will be taken:

- Earthquakes: (1) If you are outdoors, find a clear spot away from buildings, trees, and power lines. Drop to the ground. (2) If you are in a car, slow down and drive to an open/clear area. Stay in the car until the danger subsides.

- Flash Flood: (1) Move to higher ground away from rivers, streams, creeks, and storm drains. Do not drive around barricades. (2) If your car stalls in rapidly rising waters, abandon it immediately and climb to higher ground.

- Hurricane: If you are not advised to evacuate, stay indoors, away from windows.

- Tornado: (1) If you are inside, go to a pre-determined location (i.e., safe room) to protect yourself from glass and/or other flying objects. (2) If you are outside, proceed to the nearest basement/shelter of a nearby sturdy building. or in the absence of adequate shelter, lie flat down in a ditch or low-lying area. (3) If you are in a car or mobile home, get out immediately and head for the nearest safe area.

Please refer to the Job Hazard Analysis Report for more specific information regarding the foreseeable severe weather hazards associated with the scheduled field work.

5.11 Evacuation Procedures

If an emergency requires evacuation of the site, verbal instruction will be given by the FSC to evacuate the area. Personnel will immediately exit the site to the previously designated upwind location. The FSC will account for all personnel and will advise personnel of further instructions if necessary. Personnel shall not re-enter the site until the emergency conditions have been corrected and the FSC has authorized re-entry.

TABLE 1

LIST OF KNOWN AND/OR SUSPECTED CONSTITUENTS OF CONCERN

TABLE 1
VOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs[1]	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
VOLATILES									
Acetone	250	NP	NP	2500	1000	NP	NP	9.69	Fragrant mint like odor
Acetonitrile	20	NP	NP	500	40	NP	NP	12.20	Colorless liquid; aromatic odor
Acrolein	0.1	0.3	NP	2	0.1	NP	NP	10.13	Piercing, disagreeable odor
Acrylonitrile	1	NP	10	85	2	NP	10	10.91	CA; unpleasant odor which can only be detected above PEL
Allyl Alcohol	2	4	NP	20	2	NP	NP	9.63	Colorless liquid; pungent, mustard-like odor
Allyl Chloride	1	2	NP	250	1	NP	NP	10.05	Pungent, unpleasant odor
Benzene	0.1	1	NP	500	1	5	NP	9.24	CA; aromatic odor
Benzyl Chloride	NP	NP	1	10	1	NP	NP	NP	Pungent, aromatic odor
Bromodichloromethane	NP	NP	NP	NP	NP	NP	NP	NP	Colorless liquid
Bromoform	0.5	NP	NP	850	0.5	NP	NP	10.48	Chloroform-like odor
Bromomethane (Methyl bromide)	NP	NP	NP	250	NP	NP	20	10.54	CA; chloroform-like odor at high concentrations.
2-Butanone (MEK)	200	300	NP	3000	200	NP	NP	9.54	Moderately sharp, fragrant, mint- or acetone-like odor.
n-Butyl Alcohol	NP	NP	50	1400	100	NP	NP	10.04	Colorless liquid; strong, characteristic, mildly alcoholic odor
t-Butyl Alcohol	100	150	NP	1600	100	NP	NP	9.70	Camphor-like odor
Carbon disulfide	1	10	NP	500	20	NP	30	10.08	Sweet ether-like odor

TABLE 1
VOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
Carbon tetrachloride	NP	2[4]	NP	200	10	NP	25	11.47	CA; Ether-like odor
Chlorobenzene	NP	NP	NP	NP	75[5]	NP	NP	9.07	Almond-like odor
Chlorobromomethane	200	NP	NP	2000	200	NP	NP	10.77	Chloroform-like odor; fire-extinguishing agent
Chloroethane (ethyl chloride)	NP[6]	NP	NP	3800	1000	NP	NP	10.97	Pungent, ether-like odor
Chloroform	NP	2[4]	NP	500	NP	NP	50	11.42	CA; Pleasant odor
Chloromethane (Methyl chloride)	NP	NP	NP	2000	100	NP	200	11.28	CA; faint, sweet odor which is not noticeable at dangerous concentrations.
Chloroprene (beta)	NP	NP	1[7]	300	25	NP	NP	8.79	CA; pungent, ether-like odor
Crotonaldehyde	2	NP	NP	50	2	NP	NP	9.73	Water-white liquid (turns yellow upon contact with air); suffocating odor
Cumene (Isopropylbenzene)	50	NP	NP	900	50	NP	NP	8.75	Sharp, penetrating, aromatic odor
Cyclohexane	300	NP	NP	1300	300	NP	NP	9.88	Colorless liquid with a sweet chloroform-like odor
1,2-Dibromo-3-chloropropane	NP	NP	NP	ND	0.001	NP	NP	NP	CA; Dense yellow or amber liquid; pungent odor at high concentrations
1,2-Dichlorobenzene	NP	NP	50	200	NP	NP	50	9.06	Colorless to pale-yellow liquid; pleasant aromatic odor [herbicide]
1,3-Dichlorobenzene	NP	NP	NP	NP	NP	NP	NP	NP	No information given
1,4-Dichlorobenzene	NP	NP	NP	150	75	NP	NP	8.98	CA; Colorless of white crystalline solid; mothball-like odor
Dichlorodifluoromethane	1000	NP	NP	15000	1000	NP	NP	11.75	Colorless gas; ether-like odor at extremely high concentrations

TABLE 1
VOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
1,1-Dichloroethane	100	NP	NP	NP	100	NP	NP	11.06	chloroform-like odor
1,1-Dichloroethene	NP	NP	NP	NP	NP	NP	NP	NP	No information given
1,2-Dichloroethene (cis+trans)	200	NP	NP	1000	200	NP	NP	9.65	Slightly acrid, chloroform-like odor
1,2-Dichloroethane (ethylene dichloride)	1	2	NP	50	50	NP	100	11.05	CA, pleasant, chloroform-like odor.
Dichloromethane (Methylene chloride)	NP	NP	NP	2300	25	125	NP	11.32	CA; chloroform-like odor
1,2-Dichlropropane	NP	NP	NP	400	75	NP	NP	10.87	Colorless liquid with a chloroform-like odor
1,3-Dichloropropene (cis+trans)	1	NP	NP	ND	NP	NP	NP	NP	CA: sharp, sweet, irritating, chloroform-like odor
1,4-Dioxane	NP	NP	1	500	100	NP	NP	9.13	CA; mild, ether-like odor
Epichlorohydrin	NP	NP	NP	75	5	NP	NP	10.60	CA; slightly irritating, chloroform-like odor
Ethyl Acetate	400	NP	NP	2000	400	NP	NP	10.01	Colorless liquid; ether-like, fruity odor
Ethyl Alcohol	1000	NP	NP	3300	1000	NP	NP	10.47	Weak, ethereal, vinous odor
Ethylbenzene	100	125	5	NP	100	NP	NP	8.76	Aromatic odor
Ethylene Chlorohydrin (2-Chloroethanol)	NP	NP	1	7	5	NP	NP	10.90	Faint, ether-like odor
Ethylene Dibromide (1,2-Dibromoethane)	0.045	NP	0.13[7]	100	20	NP	30	9.45	CA; Colorless liquid or solid; sweet odor
Ethylene Oxide	<0.1	NP	5[8]		1	NP	NP	10.56	CA; Colorless gas or liquid; ether-like odor

TABLE 1
VOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
Ethyl Ether (Diethyl Ether)	NP	NP		1900	400[5]	500	NP	9.53	Pungent, sweetish odor
Fluorotrichloromethane (Trichlorofluoromethane)	NP	NP	1000	2000	1000	NP	NP	11.77	Nearly odorless liquid or gas
Hexachlorobutadiene	0.02	NP		ND	NP	NP	NP	NP	CA; mild, turpentine-like odor
Hexachloroethane	1	NP	NP	300	1	NP	NP	11.22	CA; Colorless crystals; camphor-like odor
2-Hexanone	1	NP	NP	1600	100	NP	NP	9.34	Acetone-like odor.
Isobutyl Alcohol	50	NP	NP	1600	100	NP	NP	10.12	Colorless, oily liquid; sweet, musty odor
Malononitrile	3	NP	NP	ND	NP	NP	NP	12.88	White powder or colorless crystals; forms cyanides in the body
Methyl Acetate	200	NP	NP	3100	200	NP	NP	10.27	Colorless liquid with a fragrant, fruit odor
Methyl Alcohol	200	250	NP	6000	200	NP	NP	10.84	Characteristic, pungent odor
Methyl Cyclohexane	400	NP	NP	1200	500	NP	NP	9.85	Colorless liquid with a faint, benzene-like odor
Methyl Tertiary-Butyl Ether	NP	NP	NP	NP	NP	NP	NP	NP	IP range using argon for reference gas
Methyl Iodide (Iodomethane)	2	NP	NP	100	5	NP	NP	9.54	CA; Pungent, ether-like odor; colorless liquid which turns yellow, red or brown with exposure to light / moisture
Methyl methacrylate	100	NP	NP	1000	100	NP	NP	9.70	Colorless liquid; acrid, fruity odor
4-Methyl-2-pentanone (Methyl Isobutyl Ketone; Hexone)	50	75	NP	500	100	NP	NP	9.30	Colorless liquid; pleasant odor
Naphthalene	10	15	NP	250	10	NP	NP	8.12	Colorless to brown solid; mothball odor

TABLE 1
VOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
Nitrobenzene	1	NP	NP	200	1	NP	NP	9.92	Yellow, oily liquid; pungent odor like paste shoe polish
2-Nitropropane	NP	NP	NP	100	25	NP	NP	10.71	CA; pleasant, fruity odor
Pentachloroethane	NP[6]	NP	NP	ND	NP	NP	NP	11.28	Sweetish; chloroform-like odor
2-Pentanone	150	NP		1500	200	NP	NP	9.39	Characteristic, acetone-like odor
Propargyl Alcohol	1	NP	NP	ND	NP	NP	NP	10.51	Mild, geranium odor
Propiolactone (beta)	NP	NP	NP	ND	NP[9]	NP	NP	NP	CA; Colorless liquid; slightly sweet odor
Propionitrile	6	NP	NP	ND	NP	NP	NP	11.84	Pleasant, sweetish, ethereal odor; forms cyanides in the body
n-Propyl Alcohol (1-Propanol)	200	250	NP	800	200	NP	NP	10.15	Mild, alcohol-like odor
Pyridine	5	NP	NP	1000	5	NP	NP	9.27	Nauseating, fish-like odor
Styrene	50	100	NP	700	100	NP	200	8.40	Colorless to yellow, oily liquid; sweet, floral odor
1,1,1,2-Tetrachloroethane	NP[6]	NP	NP	ND	NP	NP	NP	NP	Yellowish-red liquid
1,1,2,2-Tetrachloroethane	1	NP	NP	100	5	NP	NP	11.10	CA, pungent, chloroform-like odor.
Tetrachloroethene	NP[10]	NP	NP	150	100	NP	200	9.32	CA: Mild, chloroform-like odor
Toluene	100	150	NP	500	200	NP	300	8.82	Sweet pungent odor
o-Toluidine	NP	NP	NP	50	5			7.44	CA; aromatic, aniline-like odor

TABLE 1
VOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
1,2,3-Trichlorobenzene	NP	NP	NP	NP	NP	NP	NP	NP	No information given
1,2,4-Trichlorobenzene	NP	NP	5	ND	NP	NP	NP	NP	Colorless liquid or crystalline solid; aromatic odor
1,1,1-Trichloroethane (Methyl Chloroform)	NP	NP	350[7]	700	350	NP	NP	11.00	Colorless liquid; mild, chloroform-like odor
1,1,2-Trichloroethane	10	NP	NP	100	10	NP	NP	11.00	CA; sweet, chloroform-like odor
Trichloroethene (TCE)	NP	NP	NP	1000	100	NP	200	9.45	CA; chloroform-like odor
Trichlorofluoromethane	1000	NP	NP	2000	1000	NP	NP	11.77	Colorless to water-white, nearly odorless liquid or gas
1,2,3-Trichloropropane	10	NP	NP	100	50	NP	NP	NP	CA; chloroform-like odor
1,1,2-Trichloro-1,2,2-trifluoroethane	1000	NP	NP	2000	1000	NP	NP	11.99	Colorless to water-white liquid with an odor like carbon tetrachloride at high concentrations
Vinyl Acetate	NP	NP	4[7]	ND	NP	NP	NP	9.19	Pleasant, fruity odor
Vinyl Chloride	NP	NP	NP	ND	1	NP	5[7]	9.99	CA; odor at high concentrations
Xylenes (o, m & p)[11]	100	150		900/ND[12]	100	NP	NP	8.56/8.44[13]	Aromatic odor

TABLE 1
SEMIVOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs[1]	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
SVOCs - BASE/NEUTRALS									
Acetophenone	NP	NP	NP	NP	NP	NP	NP	NP	Sweet pungent odor or orange blossom or jasmine.
Anthracene	0.1 mg/m^3	NP	NP	80 mg/m^3	0.2 mg/m^3	NP	NP	NP	CA; Coal tar pitch volatile.
Acenaphthylene	NP	NP	NP	NP	NP	NP	NP	NP	Soild, in the PAH group
Acenaphthene	NP	NP	NP	NP	NP	NP	NP	NP	White, crystal like soild
Atrazine	NP	NP	NP	NP	NP	NP	NP	NP	Used as a herbicide
Benzaldehyde	NP	NP	NP	NP	NP	NP	NP	NP	Pleasant almond-like odor.
Benzidene	NP	NP	NP	ND	NP[9]	NP	NP	NP	CA; grayish-yellow, reddish-gray, or white crystalline powder; darkens on exposure to air or light.
Benzo(a)anthracene	NP	NP	NP	NP	NP	NP	NP	NP	CA
Benzo(b)fluroanthene	0.1 mg/m^3	NP	NP	NP	0.2 mg/m^3	NP	NP	NP	CA; colorless needles
Benzo(k)fluoranthene	NP	NP	NP	NP	25	NP	NP	10.71	CA; pleasant, fruity odor.
Benzo(g,h,i)perylene	NP	NP	NP	NP	NP	NP	NP	NP	CA; Colorless crystal like solid
Benzo(a)pyrene	0.1 mg/m^3	NP	NP	80 mg/m^3	0.2 mg/m^3	NP	NP	NP	CA; Coal tar pitch volatile.
1,1'-Biphenyl	NP	NP	NP	NP	NP	NP	NP	NP	Colorless crystals with pleasant odor
Bis (2-chloroethyl) ether	5	10 [skin]	NP	NP	15 [skin]	NP	NP	NP	CA; Colorless liquid; Chlorinated solvent-like odor.
Bis (2-chloroethoxy) methane	NP	NP	NP	NP	NP	NP	NP	NP	Colorless liquid.

TABLE 1
SEMIVOLATILE ORGANIC COMPOUNDS
Health and Safety Information

Bis (2-ethylhexyl) phthalate (Di-sec octyl phthalate)	5 mg/m^3	10 mg/m^3	NP	5000 mg/m^3	5 mg/m^3	NP	NP	NP	CA; Colorless, oily liquid with a slight odor.
	Exposure Limit[2] (ppm)[3]								
	NIOSH				**OSHA**				
COCs[1]	**REL**	**STEL**	**C**	**IDLH**	**PEL**	**STEL**	**C**	**IP[2] (eV)**	**Characteristics / Health & Safety Comments**
4-Bromophenyl-phenylether	NP	NP	NP	NP	NP	NP	NP	NP	Liquid
Butyl benzyl phthalate	NP	NP	NP	NP	NP	NP	NP	NP	Clear, oily liquid; slight odor; combustible.
Carbazole	NP	NP	NP	NP	NP	NP	NP	NP	White crystals or light brown powder.
Caprolactam	0.22	NP	NP	NP	NP	NP	NP	NP	White crystalline solid or flakes with an unpleasant odor.
4-Chloroaniline	NP	NP	NP	NP	NP	NP	NP	NP	White or pale yellow solid- may be toxic.
2-Chloronaphthalene	NP	NP	NP	NP	NP	NP	NP	NP	Toxic by ingestion, inhalation, and skin absorption; strong irritant.
4-Chlorophenyl-phenyl-ether	NP	NP	NP	NP	NP	NP	NP	NP	Combustible
1-Chloropropane, Propyl Chloride	NP	NP	NP	NP	NP	NP	NP	NP	Highly flammable.
Dibenzo(a,h)anthracene	NP	NP	NP	NP	NP	NP	NP	NP	CA
Chrysene	0.1 mg/m^3	NP	NP	80 mg/m^3	0.2 mg/m^3	NP	NP	NP	CA; Coal tar pitch volatile.
Dibenzofuran (diphenylene oxide)	NP	NP	NP	NP	NP	NP	NP	NP	Crystalline solid; from coal tar [insecticide]
Di-n-butylphathalate	5 mg/m^3	NP	NP	4000 mg/m^3	5 mg/m^3	NP	NP	NP	Colorless to faint-yellow, oily liquid; slight aromatic odor
1,2-Dichlorobenzene	NP	NP	50	200	NP	NP	50	9.06	Colorless to pale-yellow liquid; pleasant, aromatic odor [herbicide]
1,3-Dichlorobenzene	NP	NP	NP	NP	NP	NP	NP	NP	Colorless liquid [fumigant; insecticide]

TABLE 1
SEMIVOLATILE ORGANIC COMPOUNDS
Health and Safety Information

1,4-Dichlorobenzene	NP	NP	NP	150	75	NP	50	8.98	CA; Colorless or white crystalline solid; mothball-like odor [insecticide]
COCs[1]	**Exposure Limit[2] (ppm)[3]**							**IP[2] (eV)**	**Characteristics / Health & Safety Comments**
	NIOSH				**OSHA**				
	REL	**STEL**	**C**	**IDLH**	**PEL**	**STEL**	**C**		
3,3'-Dichlorobenzidine	NP	NP	NP	ND	NP[9]	NP	NP	NP	CA; gray to purple, crystalline solid
Diethylphthalate	5 mg/m^3	NP	NP	ND	NP	NP	NP	NP	Colorless to water-white, oily liquid; very slight, aromatic odor [pesticide]
2,4-Dimethylphenol	NP	NP	NP	NP	NP	NP	NP	NP	White, crystalline solid [insecticide; fungicide]
Dimethylphthalate	5 mg/m^3	NP	NP	2000 mg/m^3	5 mg/m^3	NP	NP	9.64	Colorless, oily liquid; slight, aromatic odor.
2,4-Dinitrophenol	NP	NP	NP	NP	NP	NP	NP	NP	Yellow crystalline solid with musty odor
2,4-Dinitrotoluene; 2,6-Dinitrotoluene	1.5 mg/m^3	NP	NP	50 mg/m^3	1.5 mg/m^3	NP	NP	NP	CA; Orange-yellow crystalline solid; characteristic odor
4,6-Dinitro-2-metylphenol	0.2 mg/ m^3	NP	NP	NP	0.2 mg/ m^3	NP	NP	NP	Metabolic toxin, mutagen
Di-n-octylphthalate	5 mg/m^3	10 mg/m^3	NP	5000 mg/m^3	5 mg/m^3	NP	NP	NP	CA; Colorless, oily liquid; slight odor
Diphenylamine	10 mg/m^3			ND	NP			7.40	Colorless, tan, amber, or brown crystalline solid; pleasant, floral odor [fungicide]
Flourene	NP	NP	NP	NP	NP	NP	NP	NP	White crystalline solid
Fluoranthene	NP	NP	NP	NP	NP	NP	NP	NP	Suspected carcinogen.
Hexachlorobenzene (perchlorobenzene)	NP	NP	NP	NP	NP	NP	NP	NP	White needles; Combustible [fungicide; wood preservative]

TABLE 1
SEMIVOLATILE ORGANIC COMPOUNDS
Health and Safety Information

Hexachlorobutadiene	0.02	NP	NP	ND	NP	NP	NP	NP	CA; Clear, colorless liquid; mild, turpentine-like odor.

TABLE 1
SEMIVOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (Ev)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
Hexachlorocyclopentadiene	0.01	NP	NP	ND	NP	NP	NP	NP	Pale-yellow to amber-colored liquid; pungent, unpleasant odor.
Hexachloroethane	1	NP	NP	300	1	NP	NP	11.22	CA; Colorless crystals; camphor-like odor.
Indeno(1,2,3-c,d)-pyrene	NP	NP	NP	NP	NP	NP	NP	NP	
Isophorone	4	NP	NP	200	25	NP	NP	9.07	Colorless to white liquid; peppermint-like odor.
2-Methylnaphthalene	NP	NP	NP	NP	NP	NP	NP	NP	Combustible solid [insecticide]
2-Methylphenol, 4-Methylphenol, o-Cresol	2.3	NP	NP	250	5	NP	NP	8.93	White crystals (liquid above 88°F); sweet, tarry or phenol-like odor.
Naphthalene	10	15	NP	250	10	NP	NP	8.12	Colorless to brown solid with an odor of mothballs.
Beta-Naphthylamine	NP	NP	NP	ND	NP[9]	NP	NP	9.71	CA; white to red crystals; faint aromatic odor [darkens to reddish-purple upon exposure to air]
4-Nitroaniline, p-Nitroaniline	3 mg/m^3	NP	NP	300 mg/m^3	6 mg/m^3	NP	NP	8.85	Bright yellow, crystalline powder with a slight ammonia-like odor.
2-Nitroaniline	NP	NP	NP	NP	NP	NP	NP	NP	Moderate fire risk; toxic when absorbed by skin.
3-Nitroaniline	NP	NP	NP	NP	NP	NP	NP	NP	Non-volatile stable soild
Nitrobenzene	1	NP	NP	200	1	NP	NP	9.92	Yellow, oily liquid; pungent odor like paste shoe polish.

TABLE 1
SEMIVOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
N-Nitrosodimethylamine	NP	NP	NP	ND	NP[9]	NP	NP	8.69	CA; Yellow, oily liquid; faint, characteristic odor
N-Nitroso-di-n-propylamine	NP	NP	NP	NP	NP	NP	NP	NP	
N-Nitrosodiphenylamine	NP	NP	NP	NP	NP	NP	NP	NP	Oily, yellow liquid; Toxic by inhalation and skin contact; combustible; present in fish meal.
Phenanthrene	0.1 mg/m^3	NP	NP	80 mg/m^3	0.2 mg/m^3	NP	NP	NP	CA; Coal tar pitch volatile.
Phenol	5	NP	15.6[7]	250	5	NP	NP	8.50	Colorless to light-pink, crystalline solid; sweet, acrid odor.
Pyrene	0.1 mg/m^3	NP	NP	80 mg/m^3	0.2 mg/m^3	NP	NP	NP	CA; In lab use: colorless to yellow solid; in solution a slight blue fluorescence; As coal tar pitch volatile: black or dark brown amorphous residue.
Styrene	50	100	NP	700	100	NP	200	8.40	Colorless to yellow oily liquid; sweet floral odor
1,2,4,5-Tetrachlorobenzene	NP	NP	NP	NP	NP	NP	NP	NP	Colorless crystal to white flaky or chunky solid
1,2,4-Trichlorobenzene	NP	NP	5	ND	NP	NP	NP	NP	Colorless liquid or crystalline solid (below 63°F); aromatic odor.
2,3,4,6-Tetrachlorophenol	NP	NP	NP	NP	NP	NP	NP	NP	Beige solid

TABLE 1
SEMIVOLATILE ORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	STEL	C	IDLH	PEL	STEL	C		
ACID EXTRACTABLES									
4-Chloro-3-methylphenol	NP	NP	NP	NP	NP	NP	NP	NP	White or slightly pink crystals; phenolic odor; Irritant to skin
2-Chlorophenol	NP	NP	NP	NP	NP	NP	NP	NP	Toxic by skind absorption, inhalation, or ingestion; odor similar to phenol
2,4-Dichlorophenol	NP	NP	NP	NP	NP	NP	NP	NP	White solid; toxic by ingestion
2,4-Dinitrophenol	NP	NP	NP	NP	NP	NP	NP	NP	Yellow crystals; explosion hazard when dry (used in picric acid)
2-Nitrophenol, 4-Nitrophenol	NP	NP	NP	NP	NP	NP	NP	NP	Yellow crystals; toxic by ingestion
Pentachlorophenol	0.5 mg/m^3	NP	NP	2.5 mg/m^3	0.5 mg/m^3	NP	NP	NP	Colorless to white, crystalline solid; benzene-like odor.
2,4,5-Trichlorophenol	NP	NP	NP	NP	NP	NP	NP	NP	Gray flakes in sublimed mass; strong phenolic odor; no flash point [fungicide, bactericide]
2,4,6-Trichlorophenol	NP	NP	NP	NP	NP	NP	NP	NP	Yellow flakes; strong phenolic odor; may cause skin irritation

TABLE 1
INORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	ST	C	IDLH	PEL	ST	C		
TAL METALS									
Arsenic (inorganic compounds)	NP	NP	0.002 mg/m^3	5 mg/m^3	0.010 mg/m^3	NP	NP	NP	CA; Silver-gray or tin-white, brittle, odorless solid.
Antimony	0.5mg/m^3	NP	NP	50 mg/m^3	0.5mg/m^3	NP	NP	NP	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder.
Barium	NP	NP	NP	NP	NP	NP	NP	NP	Silver-white, somewhat malleable solid.
Beryllium	NP	NP	0.0005 mg/m^3	4 mg/m^3	0.002mg/m^3	NP	0.005mg/m^3	NP	CA; Metal: A hard, brittle, gray-white solid.
Cadmium dust (and compounds)	NP	NP	NP	9 mg/m^3	0.005mg/m^3	NP	NP	NP	Metal: Silver-white, blue-tinged lustrous, odorless solid. compounds)
Calcium	NP	NP	NP	NP	NP	NP	NP	NP	Moderately soft, crystalline metal.
Chromium (total)	0.5 mg/m^3	NP	NP	250 mg/m^3	1.0 mg/m^3	NP	NP	NP	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.
Cobalt									
Copper	1 mg/m^3	NP	NP	100 mg/m^3	1 mg/m^3	NP	NP	NP	Reddish, lustrous, malleable, odorless solid.
Iron oxide (dust and fume)	5 mg/m^3	NP	NP	2500 mg/m^3	10 mg/m^3	NP	NP	NP	Reddish brown solid
Lead (compounds)	0.05 mg/m^3	NP	NP	100 mg/m^3	0.05 mg/m^3	NP	NP	NP	A heavy, ductile, soft, gray solid

TABLE 1
INORGANIC COMPOUNDS
Health and Safety Information

COCs	Exposure Limit[2] (ppm)[3]							IP[2] (eV)	Characteristics / Health & Safety Comments
	NIOSH				OSHA				
	REL	ST	C	IDLH	PEL	ST	C		
Magnesium	NP	NP	NP	NP	NP	NP	NP	NP	Silvery, moderately hard, alkaline-earth metal.
Manganese	1 mg/m^3	3 mg/m^3	NP	500 mg/m^3	NP	NP	5 mg/m^3	NP	A lustrous, brittle, silvery solid.
Nickel	0.015mg/m^3	NP	NP	10 mg/m^3	1 mg/m^3	NP	NP	NP	CA; Metal: Lustrous, silvery, odorless solid.
Potassium	NP	NP	NP	NP	NP	NP	NP	NP	Soft, silvery metal.
Selenium	0.2 mg/m^3	NP	NP	1 mg/m^3	0.2 mg/m^3	NP	NP	NP	Amorphous or crystalline, red to gray solid.
Silver	0.01 mg/m^3	NP	NP	10 mg/m^3	0.01 mg/m^3	NP	NP	NP	Metal: White, lustrous solid.
Sodium	NP	NP	NP	NP	NP	NP	NP	NP	Soft, silver-white solid.
Thallium	0.1 mg/m^3	NP	NP	15 mg/m^3	0.1	NP	NP	NP	Appearance and odor vary depending upon the specific soluble thallium compound.
Vanadium (Fume)	NP	NP	0.05 mg/m^3	35 mg/m^3	NP	NP	0.1 mg/m^3	NP	Finely divided particulate dispersed in air.
Vanadium (Dust)	NP	NP	0.05 mg/m^3	35 mg/m^3	NP	NP	0.5 mg/m^3	NP	Yellow-orange powder or dark-gray, odorless flakes dispersed in air.
Zinc	NP	NP	NP	NP	NP	NP	NP	NP	Shining white metal with bluish-gray luster.
Mercury (vapor)	0.05 mg/m^3	NP	0.1 mg/m^3	10 mg/m^3	NP	NP	0.1 mg/m^3	NP	No information given

TABLE 1
INORGANIC COMPOUNDS
Health and Safety Information

NOTES:

[1]: Known or suspected constituents of concern
[2]: Exposure limits and ionization potential were obtained from the NIOSH Pocket Guide to Chemical Hazards dated September 2007. Please refer to specific material safety data sheets for additional exposure and first aid information.
[3]: Exposure limits are listed in ppm, unless noted
[4]: STEL weighted for extended 60-minute exposure
[5]: Although no NIOSH REL is published for this compound, NIOSH questions the protectiveness of the OSHA PEL for this compound
[6]: Handle with caution in the workplace
[7]: Exposure at Ceiling Limit may not exceed 15 minutes
[8]: Exposure at Ceiling Limit may not exceed 10 minutes per day
[9]: Without establishing PELs, OSHA promulgated standards in 1974 to regulate this compound, identified as a potential occupational carcinogen. Exposure to this compound must be controlled through engineering controls, work practices, and PPE.
[10]: Minimize workplace exposure conditions
[11]: Exposure limits are the same for all isomers – ortho, meta and para
[12]: IDLH for ortho+para/meta isomers
[13]: Ionization potential for ortho+meta/para isomers

ACRONYMS:

C:	Ceiling for Exposure Limit. Should not be exceeded at any time.
CA:	Considered to be a potential occupational carcinogen by NIOSH
COC:	Constituent of Concern
eV:	Electron volts
IDLH:	Immediately Dangerous to Life and Health
IP:	Ionization Potential
$mg/m^{3:}$	Milligrams per meter cubed
ND:	Not Determined
NIOSH:	National Institute for Occupational Safety and Health
NP:	None published
OSHA:	Occupational Safety and Health Administration Permissible Exposure Limit
ppm:	Parts per million (Referencing benzene, 1 ppm = 3.19 mg/m^3 – each COC has different result in mg/m^3)
PEL:	OSHA Permissible Exposure Limit. Based on time-weighted average (TWA) concentrations for up to an 8-hour workshift during a 40-hour workweek.

TABLE 1
INORGANIC COMPOUNDS
Health and Safety Information

REL: NIOSH Recommended Exposure Limit. Based on time-weighted average (TWA) concentrations for up to a 10-hour workday during a 40-hour workweek.
STEL: Short Term Exposure Limit. Measured over a 15-minute TWA exposure that should not be exceeded at any time during a workday.
VOCs: Volatile organic compounds
SVOCs: Semi-volatile organic compounds

Prepared By/Date: LJW / 10.11.2011
Checked By/Date: RBG / 10.12.2011

APPENDIX A

PROJECT SPECIFIC INFORMATION

AMES TRUE TEMPER (AMES)

Former Union Tools Facility

4167 Acme Road
Frankfort, New York

BB&J Project No. R1106075
BB&J HSP LOG NO. 11-100-3

Background:

An approximate 40 acre property, currently owned by Ames True Temper (Ames), is located at 4167 Acme Road, Frankfort, New York (Subject Property). The Subject Property is located within a mixed use part of Frankfort and is surrounded by industrial, commercial and residential properties. The Subject Property was last occupied by the Union Tools (Union) garden tools manufacturing plant from 1963 to December 2006 (previous owners had operated at the site since at least 1868). Ames purchased Union in April of 2006. The Subject Property, which is currently vacant and surrounded by a security fence,consists of relatively flat land and various buildings, paved and unpaved roads, open/vacant land with minimal landscaped areas (grass).

Historical records indicated vacant land and a few residences occupied the Subject Property in 1868. Operations dating back to 1886 consisted of various industrial and manufacturing operations including, but not limited to: foundry; railroad activities; manufacturing of garden tools; manufacturing of gauges; manufacture of armored electric cables; various shops – wood working, painting, polishing, varnishing, and finishing; steel; erecting; blacksmith; milk processing; and others. Many buildings and underground and above-ground storage tanks containing various fuels have been installed and removed throughout the history of the property.

Various environmental investigations have been conducted at the Subject Property since 1984. A summary of previous investigations can be found in the Section 3.2 of the *Remedial Investigation Work Plan* (RIWP).

On August 15, 2011, Ames entered into an *Order on Consent and Administrative Settlement* (Consent Order) with the New York State Department of Environmental Conservation (NYSDEC) for the Subject Property. On September 24, 2011, per the requirements of the Consent Order, Bradburne, Briller and Johnson, LLC (BB&J), on behalf of Ames, submitted a *Records Search Report* (RSR) with the purpose of detailing the known information about potential contamination at, or emanating from, the Subject Property. In addition, per the requirements of the Consent Order and on behalf of Ames, BB&J is submitting a RIWP to the NYSDEC. This Health and Safety Plan is included as Attachment C of the RIWP.

Potential Areas of Concern (AOCs):

Based on the results of the previous investigations, historical research, and discussions with the NYSDEC the following AOCs, as reported in the BB&J RSR dated September 26, 2011, have been identified:

- The Former Fuel Oil Storage Area Adjacent and West of Building 16;
- The Former Railroad Operations Conducted West of Building 16;
- The Source of the Elevated Sub Slab Concentrations of Volatile Organic Compounds (VOCs) beneath Building 30;
- The Source of the Elevated Sub Slab Concentrations of volatile organic compounds (VOCs) beneath Building 305;
- The Groundwater South and East of the 200-Series Buildings; and
- The Open Spill No. 0007178 (petroleum) Located East of Building No. 16.

In addition BB&J identified several other areas, while not fitting the definition of AOC, require additional investigation:

- Former Operations at Building 210[1];
- Former Operations at Building 211[1];
- Site-wide Groundwater; and
- Soil Gas at those Conduits Leading Off-site, Conduits within the Subject Property, and on the Subject Property Perimeter[2]

Sources of Hazardous/Toxic Materials and Chemical Hazards

Based on BB&J's understanding of the Subject Property's historical and current conditions, the following list identifies the potential and/or actual sources of hazardous/toxic materials and chemical hazards at the Subject Property:

- Historical site operations (refer to Background Section) (e.g. former on-site garden tools manufacturing operations, former on-site railroad operations, and former on-site hotel operations) and chemicals associated with their operation/production including underground fuel oil tanks, aboveground fuel oil tanks, in-ground dip tanks, aboveground dip tanks, chemical storage areas, and various spills and other releases to the soil and groundwater; and,
- Chlorinated solvents used in the former degreasing operations; Lead associated with former railroad foundry operations;
- PCBs associated with former facility operations (i.e., transformers);
- Soil and groundwater impacted with chlorinated solvents, ethylbenzene xylenes, toluene, and possibly other constituents related to fuel oil is also a current source of contaminants.

---

[1] Buildings 210 and 211 were not previously investigated due to safety concerns/hazards associated with the poor physical condition of the buildings.

[2] BB&J understands that this issue is of concern to both the New York State Department of Health (NYSDOH) and the NYSDEC.

Media of Concern

The following media is known or suspected to be impacted with constituents of concern (COCs) (check all that apply) at the Subject Property:

Surface Soil:	☒		
Surface Water:	☐		
Subsurface Soil:	☒		
Ground Water:	☒		
Other:	☒	List:	Ambient Air (vapor intrusion - potential source is from soil gas)

Overview of Scope of Work

The following field activities are planned for the Subject Property:

- Notify New York One Call, the Village of Frankfort Department of Public Works, and the Subject Property owner at least 72 hours prior to field work to identify, locate, and mark underground utilities and/or structures at and adjacent to the Subject Property. According to Ames True Temper and the local utility representatives, BB&J understands the utilities at the site to be out of service (i.e., gas line has been disconnected and partionally removed; electrical lines have been shut down and disconnected; water and sewer lines have been disconnected). BB&J has copies of the in-place underground storm sewer, sanitary sewer, water lines, and natural gas lines.

- Oversee the advancement of approximately 60 soil borings utilizing Direct Push Technology (i.e., Geoprobe®) and when required, a conventional drill rig employing hollow stem augers. Soil borings wil be advanced to depths of down to 35 feet below ground surface;

- Oversee the installation of approximately 15 permanent 2-inch diameter, PVC ground-water monitoring wells;

- Collect soil samples at two-foot intervals for field screening with a photoionization detector with a 10.2 electron volt lamp;

- Characterize soil characterization in accordance with the Unified Soil Classification System;

- Select samples to be submitted to a NYSDEC approved and NY licensed analytical laboratory (e.g., ESC, Inc.) for analyses of VOCs by United States Environmental protection Agency (USEPA) Method 8260B SVOCs by USEPA Method 8270C and metals by USEPA Methods 6010B/7470/7471A;

- Develop new groundwater wells and purge existing groundwater wells using a peristaltic pump and dedicated polyethylene tubing;

- Gauge ground-water levels and bottom of well measurements using an in-situ water-level meter;

- Collect groundwater samples from the 34 existing and 15 newly installed ground-water monitoring wells using a dedicated two-inch diameter, disposable, polyethylene bailer;
- Survey all groundwater monitoring wells using a survey level and rod; and
- Perform hydraulic conductivity testing in at least three groundwater monitoring wells. Slug tests will be performed using a polyvinyl chloride slug of known volume and groundwater levels measured using an in-situ data logger.

Personnel Monitoring Procedures

The primary contaminants of concern that personnel are most likely to be exposed to is VOCs. Therefore, the site-specific monitoring procedures for this project will consist of the use of a photo-ionization detector (PID) equipped with a 10.2 electron-volt lamp will be used to monitor organic vapor levels in the breathing zone. If levels exceed 10 parts per million (ppm) in the breathing zone for longer than one minute, work will be temporarily halted, and the area will be allowed to ventilate until readings are below 10 ppm in the ambient air. If levels do not dissipate to below 10 ppm in the breathing zone, work will cease and the work area will be evacuated until appropriate PPE is donned or corrective measures are implemented to dissipate the organic vapors levels to below 10 ppm. If the work area is not deemed safe to re-enter, work will be terminated until appropriate Health and Safety measures are taken (e.g., the level of PPE is upgraded).

In addition, personnel should be cognizant of soil dust particles as they may be impacted with contaminatns such as metals and/or PCBs. Simple engineering controls can be implemented to minimize personal exposure to dust via wetting of the soils prior to, and during work. If this practice does not minize the visible dust levels, additional PPE may be donned at the direction of the Field Safety Coordinator, and a particulate meter used to monitor particulate levels in the ambient air.

Personal Protective Equipment

The recommended level of PPE for the scope of work described herein is:

CHECK ONE ☐ ☐ ☐ ☒

PPE	A	B	C	D
• Positive pressure, full-face piece SCBA, or supplied-air respirator with escape unit	☒	☒	☐	☐
• Totally encapsulating chemical-protective suit	☒	☐	☐	☐
• Full- or half-face APR	☐	☐	☒	☐
• Hooded chemical-resistant clothing	☐	☒	☒	☐
• Chemical-resistant boots with steel toe and shank	☒	☒	☒	☒

• Inner and outer chemical-resistant gloves	☒	☒	☒	☐
• Coveralls or work clothes (to be washed following use)	☐	☐	☐	☒
• Chemical-resistant gloves	☐	☐	☐	☒
• Hearing protection (e.g., ear plugs)	☐	☐	☐	☒
• Eye protection (e.g., face shield, safety goggles/glasses)	☐	☐	☐	☒
• Hard hat	☐	☐	☐	☒
• Leather gloves	☐	☐	☐	☒

NOTES:

X: Indicates the minimum items required for the PPE Level

☒ *Indicates additional PPE that will be donned for the scope of work outlined herein.*

If it is determined necessary/appropriate by the FSC, the level of PPE requirement may be upgraded or downgraded depending on site-specific circumstances (e.g., presence or absence of organic vapors in the breathing zone). ***NOTE****: Subcontractors are responsible for their own employees' PPE (including confined space safety equipment if applicable).*

APPENDIX B

JOB HAZARD ANALYSIS REPORT

JOB HAZARD ANALYSIS REPORT

***** To be completed by FSC before initiating field work *****

Client & Project Nos.: R1006075 HSP Log No.: 11-100-3

Client Name: Ames True Temper Project Name/Location: Former Union Fork & Hoe Facility - Frankfort, New York

Field Safety Coordinator (FSC): Lydia Wagner Dates of Field Work: _____

Job Site Description (describe specific area/conditions where work is being conducted):

Task Description (planned work activities):

Will subsurface work be conducted (e.g., drilling, probing, excavation, test pits, etc) ? YES____ NO_____

If YES, indicate the following:

Public underground utility locating company name: _____

Phone number: _____

Confirmation/Identification (e.g., DIG SAFE) number: _____

List Companies Contacted:		Markings Observed? *(indicate NO, OK or YES)*	Notes:
Phone 1:	_____	_____	_____
Phone 2:	_____	_____	_____
Cable:	_____	_____	_____
Electric:	_____	_____	_____
Gas:	_____	_____	_____
Water:	_____	_____	_____
Sewer:	_____	_____	_____
Other:	_____	_____	_____
Other:	_____	_____	_____
Other:	_____	_____	_____

Key: NO – No Markings Found: **STOP WORK AND CALL UTILTIY COMPANY DIRECTLY**
OK – No Markings Found, but company indicated no utilities on site - "all clear";
YES – Markings Present (*indicate location/layout on field drawing/site sketch*)

If private company contracted, indicate the following:

Private underground utility company name: _____

Phone number: _____

Confirmation/Identification number: _____

JOB HAZARD ANALYSIS REPORT

Hazard Descriptions (associated hazards with work area and scope of work):

Job Site Controls (to minimize potential hazards):

Meeting Place in Case of Emergency (e.g., upwind area, off-site building/shelter, etc.):

Applicable Level of PPE and other Safety Measures:

The FSC shall consider activities and conditions where actual or potential hazards exist, and provide recommendations to protect workers.

JOB HAZARD ANALYSIS REPORT

1. Are there any slip, trip or fall hazards? YES _____ or NO _____
If YES, then list, describe location, and present appropriate response to minimize or alleviate hazard:
_____
_____
_____
_____

2. Are there any overhead hazards? YES _____ or NO _____
If YES, then list, describe location, and present appropriate response to minimize or alleviate hazard:
_____
_____
_____
_____

3. Are there any electrical or explosive hazards? YES _____ or NO _____
If YES, then list, describe location, and present appropriate response to minimize or alleviate hazard:
_____
_____
_____
_____

4. Are there any noise hazards? YES _____ or NO _____
If YES, then list, describe location, and present appropriate response to minimize or alleviate hazard:
_____
_____
_____
_____

5. Are excavation hazards present and/or expected? YES _____ or NO _____
If YES, then list, describe location, and present appropriate response to minimize or alleviate hazard:
_____
_____
_____
_____

JOB HAZARD ANALYSIS REPORT

6. **Is heavy vehicle traffic expected (i.e., moving hazards)? YES _____ or NO _____**
If YES, then list, describe location, and present appropriate response to minimize or alleviate hazard:

_____

_____

_____

_____

7. **Is there heavy machine operations expected? YES _____ or NO _____**
If YES, then list, describe location, and present appropriate response to minimize or alleviate hazard:

_____

_____

_____

_____

8. **Are there fire extinguishers easily accessible? YES _____ or NO _____**
If YES, list and describe location:

_____

_____

_____

_____

9. **Is the work area inside? YES ____ or NO ____.**

10. **If YES, are routes to emergency exits easily accessible? YES _____ or NO _____**
If YES, list and describe location: If NO, describe evacuation route and procedure:

_____

_____

_____

_____

11. **Are there any other potential work hazards? YES _____ or NO _____**
If YES, list and describe location:

_____

_____

_____

_____

JOB HAZARD ANALYSIS REPORT

12. Field Safety Coordinator shall provide any additional safety measures or concerns as warranted:

_____

_____

_____

_____

The information presented on this Job Hazard Analysis Report shall be discussed before initiation of work with all site workers and visitors.

Print Name: _____

Signature: _____ Date: _____
Field Safety Coordinator

**** RETURN A COPY TO HEALTH AND SAFETY OFFICER UPON COMPLETION OF WORK**

HEALTH AND SAFETY SUMMARY REPORT

To be completed by Field Safety Coordinator (after completion of field work)

Project No.: R1106075 HSP Log No.: 11-100-3

Client Name: Ames True Temper Project Name/Location: Former Union Fork & Hoe Facility – Frankfort, New York

Field Safety Coordinator (FSC): Lydia Wagner Dates of Field Work: _____

1. Were there any violations of the HSP by BB&J Personnel? YES ___ or NO ___
   If Yes, Explain:
   _____
   _____

2. Were there any violations of the HSP by subcontractors? YES ___ or NO___
   If Yes, Explain:
   _____
   _____

3. Was there any obvious, significant exposure to COCs? YES ___ or NO ___
   If Yes, Explain:
   _____
   _____

4. Were there any OSHA reportable accidents or injuries? YES ___ or NO ___
   If Yes, Explain:
   _____
   _____

If Yes was answered in any of the aforementioned questions, provide a detailed explanation of the situation, including circumstances, personnel involved, causes, type of contamination (if applicable), and corrective action taken (i.e., first aid or medical assistance required).

Signature _____ Date _____
Field Safety Coordinator

**** RETURN A COPY TO HEALTH AND SAFETY OFFICER UPON COMPLETION OF WORK**

To be completed by Health & Safety Officer

Was an audit conducted? YES _____ or NO _____

Signature _____ Date _____
Health & Safety Officer

APPENDIX D

PERSONNEL ACKNOWLEDGEMENT FORM

PERSONNEL ACKNOWLEDGEMENT FORM

Project No.: _____ HSP Log No.: _____

Client Name: _____ Project Name/Location: _____

Field Safety Coordinator (FSC): _____ Dates of Field Work: _____

By initialing and dating this form, the listed individual acknowledges that he/she has read, understands and will comply with the requirements of this Health and Safety Plan.

1. Name: _____ Company: _____

   Signature: _____ Date: _____

2. Name: _____ Company: _____

   Signature: _____ Date: _____

3. Name: _____ Company: _____

   Signature: _____ Date: _____

4. Name: _____ Company: _____

   Signature: _____ Date: _____

5. Name: _____ Company: _____

   Signature: _____ Date: _____

6. Name: _____ Company: _____

   Signature: _____ Date: _____

7. Name: _____ Company: _____

   Signature: _____ Date: _____

APPENDIX E:

MAP TO NEAREST HOSPITAL

HOSPITAL MAP

Faxton St. Lukes Healthcare
1656 Champlin Avenue, Utica, New York
General Phone Number: 315-624-6000
Emergency Phone Number: 315-624-6112

BB&J Project No.R1106075
BB&J HSP LOG NO 11-100-3

MAP TO HOSPITAL:

Step by Step Directions from Subject Property to Hospital:

13.3 miles, approximately 23 minutes

1. Head NW on Acme Rd/NY 5S, go 0.8 mi
2. Turn left onto Cemetery St/ CR 96, go 0.5 mi
3. Merge onto NY 5S W, go 9.2 mi
4. Stay straight onto NY 5A W/Oriskany St. W, go 0.1 mi
5. Merge onto NY 12S/NY 5W/NY 8S toward New Hartford, go 1.8 mi
6. Take Burrstone Rd. ramp toward Utica College, go 0.2 mi
7. Turn left at Burrstone Rd, go 0.3 mi
8. Turn slight right on to Champlin Ave/ CR 28, go 0.1 mi
9. End at 1656 Champlin Ave.

APPENDIX D

CITIZENS PARTICIPATION PLAN

New York State Department of Environmental Conservation

State Superfund Program

Citizen Participation Plan

for

Former Union Fork & Hoe Site

253 East Main Street
Village of Frankfort
Herkimer County, New York

DOC ID-17404953.2

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Responsible Party: **Ames True Temper**
Site Name: **Former Union Tools Plant**
Site Address: **253 East Main Street**
Site County: **Herkimer County**
Site Number: **#6-22-011**

1. What is New York's State Superfund Program?

New York's State Superfund Program (SSF) identifies and characterizes suspected inactive hazardous waste disposal sites. Sites that pose a significant threat to public health or the environment, such as the site identified above, undergo a process of investigation, evaluation, cleanup, and monitoring.

The New York State Department of Environmental Conservation (NYSDEC) administers the SSF Program with assistance and input from the New York State Department of Health (NYSDOH). When the parties responsible for the contamination of the site are known, Ames True Temper (Ames), they often pay for or perform the investigation and evaluation of cleanup options under an enforceable consent order. At sites where responsible parties cannot be found or are unable or unwilling to fund an investigation, the State pays for the investigation and may try to recover costs from a responsible party after the investigation and cleanup are complete.

The SSF program contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. For more information about the SSF program, go online at: http://www.dec.ny.gov/chemical/8439.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interest in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's remedial process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the responsible party.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's remedial program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 4.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of remedial activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

The site identified above poses a significant threat to public health or the environment, so that a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being, or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

For more information about TAGs, go online at: http://www.dec.ny.gov/regulations/2590.html.

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Requirements (Activities)	Timing of CP Activity(ies)
Before Start of Remedial Investigation (RI):	
Prepare site contact list Establish document repository Prepare Citizen Participation (CP) Plan Place approved RI Work Plan in document repository Distribute fact sheet to site contact list that announces availability of RI Work Plan and describes upcoming RI field work	Before start of RI. Note: Draft CP Plan must be submitted to NYSDEC within 20 days of effective date of Consent Order. CP Plan must be approved by NYSDEC before distribution.
When NYSDEC Approves Remedial Investigation Report:	
Distribute fact sheet to site contact list that describes RI results Place approved RI Report in document repository	When NYSDEC approves RI Report
When NYSDEC Releases Proposed Remedial Action Plan (PRAP):	
Place PRAP in document repository Distribute fact sheet to site contact list that describes PRAP and announces 30-day comment period and public meeting Conduct 30-day public comment period Hold public meeting about PRAP	When NYSDEC releases PRAP. Comment period begins/ends as per dates identified in fact sheet. Public meeting is held during the comment period.
When NYSDEC Issues Record of Decision (ROD):	
Place ROD in document repository Distribute notice to site contact list that announces availability of ROD. ROD includes responsiveness summary of significant comments about PRAP	When NYSDEC issues ROD
Before Start of Remedial Action:	
Distribute fact sheet to site contact list that describes upcoming remedial action	Before the start of remedial action at the site.
When NYSDEC Issues Certificate of Completion (COC) or Similar Site Closure Document:	
Place COC in document repository Distribute fact sheet to site contact list that announces issuance of COC	Within 10 days after NYSDEC issues COC or other similar site closure document

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

Major issues of public concern are:

- Potential impacts to on-site and off-site soil and groundwater.
- Potential on site and off-site soil vapor impacts.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The site is approximately 40 acres in size and is located in an urban setting along the east side of Main Street at 253 East Main Street in Frankfort, Herkimer County, New York (Subject Property). The surrounding area is primarily Main Street and then residential properties to the east, with a mix of residential, commercial and industrial sites to the north and south and the Village of Frankfort municipal well field and then the Mohawk River to the east. The former Erie Canal was located one block south of the Subject Property and was situated in generally the same place as where Mann Street currently exists.

History of Site Use, Investigation, and Cleanup

Since at least the 1860s, the Subject Property and an area to the east-northeast were operated as a railroad locomotive repair and maintenance yard. The area to the east-northeast is currently occupied by the Village of Frankfort's municipal water well field. The New York Central and Hudson River Railway Corporation (NYC & HRR) owned and operated at the Subject Property since at least 1886. From about 1900 to sometime after 1907 various companies operated on portions of the site. Union Fork and Hoe (UFH) acquired the Frankfort operations in 1907. Through a series of mergers and acquisition UFH grew to the point that, by sometime between 1938 and 1962, the Subject Property was solely occupied by UFH. The former railroad buildings were all now occupied by UFH. Former UFH operations at the Subject Property included manufacturing hoes, shovels, forks and other hand tools. Manufacturing processes conducted at the Subject Property included forging, stamping,

painting, varnishing and milling. These processes were performed at the Subject Property under the name Union Fork and Hoe, and after 1993, under Union Tools, more or less uninterrupted from 1907 until 2006. In April 2006, Ames purchased Union Tools, formerly UFH, and continued similar operations. Facility operations were discontinued in December 2006.

Currently, access to the Subject Property is via Main Street located along the western boundary. The Subject Property is occupied by various buildings that were previously used to manufacture, store, and ship garden tools. These buildings were constructed in stages with some of the buildings being constructed in the 1860s, some in the early 1900s, some in the 1960s, and some constructed in the 1980s.

The Subject Property is currently listed as a Class 2 site on the NYSDEC's State Inactive Hazardous Waste Sites registry. Union Tools entered into a Consent Order (March 1985) and Consent Judgment (January 1991) with the DEC. Both agreements related to the on-site groundwater impacts and their potential to affect the adjacent municipal water well field. The Subject Property and surrounding areas have been extensively characterized by both Union Tools and the NYSDEC to assess the possibility that contaminants might be migrating from the Subject Property to the downgradient municipal water well field. In 1991, Union Tools successfully remediated contamination discovered in one of the Municipal Water Supply wells by installing an air stripper. The air stripper continues to be operated by the municipality.

In January 2006 Union Tools commenced an effort to reclassify the Subject Property from a Class 2 to a Class 4 on the State Inactive Hazardous Waste Sites registry. Alpha Geosciences, Inc. (Alpha) submitted an *Interim Remedial Measures Work Plan* on behalf of Union Tools in January 2006 (Alpha IRM Work Plan). Following the sale of the Union Tools to Ames in April 2006, Bradburne, Briller & Johnson, LLC (BB&J), submitted a revised Remedial Investigation Work Plan (RIWP) dated July 27, 2007 (BB&J RIWP) to the NYSDEC. The BB&J RIWP addressed tetrachloroethylene (PCE) -impacted groundwater in the area of the group of buildings located on the southernmost portion of the Subject Property (200 Series Buildings). The BB&J RIWP also selected soil excavation and offsite disposal as the remedial action remedy vs. the soil vapor extraction system (SVE) remedy included in the Alpha IRM Work Plan. The BB&J RIWP was approved by the NYSDEC on August 15, 2007.

In June through August 2007, BB&J performed a Comprehensive Site Characterization (CSC) at the Subject Property. The CSC included the collection and analyses of 157 soil and 34 groundwater samples. The CSC identified several areas where soil and groundwater were impacted with PCE, toluene, and/or xylenes at concentrations above applicable standards for soil and/or groundwater. The results of the CSC were reported to the NYSDEC in BB&J's IRM Work Plan dated January 6, 2009. Based on the results of the CSC, in February 2009, Ames entered into an Interim Remedial

Measures (IRM) agreement with the NYSDEC.

The IRM was performed from March 2, 2009 to February 6, 2010, and included the following:

- In-ground Dip Tank Area in Building 213 – Approximately 176 cubic yards (230 tons) of soil and approximately 65,000 gallons of groundwater were removed from the excavation;

- In-ground Dip Tank Area in Building 203 – Approximately 144 cubic yards (189 tons) of soil and approximately 65,000 gallons of groundwater were removed from the excavation; and

- Former Fuel Oil Storage Area Adjacent to Building 16 – Approximately 3,300 cubic yards (4,294 tons) of soil and 343,000 gallons of groundwater were removed.

Confirmatory soil samples were collected in all three of the excavations, and results indicated that all impacted soil was removed from the Building 203 and Building 213 Areas to below NYSDEC Protection of Groundwater Standards. Groundwater is still impacted with PCE in these Areas.

All impacted soil was removed extending to the bottom of the excavation in the Former Fuel Oil Storage Area adjacent to Building 16. Impacted soil may remain under Building 16; however, the impacted soils cannot be removed without affecting the structural integrity of the building. Confirmatory soil samples were collected from the bottom of the excavation in the Building 16 Area. Sidewall samples could not be collected in this Area due to the presence of shoring sheets used to stabilize the excavation during remediation. Groundwater may still be impacted with petroleum-related constituents in this Area.

During the remedial activities performed at Building 16, another area of petroleum-impacted soil was discovered to the west. Consequently, from November 13 through December 1, 2009, further delineation of this Area was performed. Additional vertical and horizontal delineation of petroleum-impacted soil west of Building 16 is necessary.

5. Investigation and Cleanup Process

Investigation

A detailed study of the site will be performed by Ames under an Order on Consent, with oversight by NYSDEC and NYSDOH. This detailed study is officially called a Remedial Investigation. The investigation work plan is officially called a Remedial Investigation Work Plan and will be available for public review at the document repository identified in Appendix A.

The site investigation has several goals:

1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) identify the source(s) of the contamination;
3) assess the impact of the contamination on public health and the environment; and
4) provide information to support the development of a proposed remedy to address the contamination.

NYSDOH reviews and recommends activities that will be performed during the investigation to ensure that a complete picture of potential health impacts is understood. Such activities include identifying the ways contamination can reach people, such as through direct contact, eating, drinking, or breathing.

The information collected during the site investigation will be summarized in a report.

Feasibility Study

After the site investigation has been completed, the next step is development of a Feasibility Study. This study uses information developed during the Remedial Investigation to develop and evaluate potential ways to clean up contamination related to the site. Another possibility is that the information collected during the Remedial Investigation may support the conclusion that no further action is required.

Proposed Remedy

The evaluation of possible remedies ends with a recommended proposal to eliminate the threat posed by contaminants at the site. NYSDEC approves or prepares this proposal, officially called a Proposed Remedial Action Plan (PRAP). The PRAP describes the remedy selected by NYSDEC. If no further action is required, the PRAP will recommend the no further action alternative. The PRAP summarizes the decision that led to the recommendation of the preferred remedy by discussing each alternative and the reasons for choosing or rejecting it. The goal of any cleanup plan is to protect public health and the environment. NYSDEC will present the PRAP to the public for its review and comment during a 30-day comment period and at a public meeting.

Selected Remedy

NYSDEC considers public comments as it selects the remedy to address contamination related to the site. The selected remedy will be described in a document officially called a Record of Decision (ROD). The ROD will explain why the remedy was selected and respond to public comments. This document will be placed in the location of reports and information. If the selected remedy is no action or no further action, NYSDEC may then take steps to reclassify the site or remove the site from its list of contaminated sites.

Cleanup Action

If the Record of Decision for the site calls for cleanup action, the project then moves to designing and performing the cleanup actions to address the site contamination. When cleanup actions have been completed, NYSDEC will approve or prepare a final engineering report that describes the cleanup actions undertaken and certifies that cleanup requirements have been achieved or will be achieved.

Certificate of Completion

Upon approval of the final engineering report, NYSDEC may issue a Certificate of Completion (COC). The COC would recognize the findings of the final engineering report. The COC would note that the cleanup program achieved a cleanup level consistent with specific categories of use for the site. The recipient of the COC would be entitled to limited liability as long as it complied with the terms of the COC, and other conditions.

A COC may be modified or revoked if, for example, the recipient does not comply with the terms of the COC, or if the recipient commits fraud regarding its certification that it has met cleanup levels.

Site Management

Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management may be conducted by NYSDEC, or by the responsible party under NYSDEC oversight, if contamination will remain in place. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An institutional control is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that is pumping and treating groundwater. Site management continues until NYSDEC determines that it is no longer needed.

During the Site Management phase, NYSDEC may also take steps to reclassify the site or remove the site from the Registry.

Appendix A
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Mr. William Bennett, P.E.
Environmental Engineer 1
NYSDEC **Region 6**
Division of Environmental Remediation
625 Broadway
Albany, New York, NY 12233-7014
518-402-9662

Stephen Litwhiler
Citizen Participation Specialist
NYSDEC Region 6 Headquarters
317 Washington Street
Watertown, NY 13601
Phone: (315) 785-2252

New York State Department of Health (NYSDOH):
Greg Rys
Project Manager
NYSDOH
Herkimer District Office
5665 State Route 5
Herkimer, NY 13350
315-866-6879

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Village of Frankfort Village Hall
Attn: Ms. Karlee Tamburro
110 Railroad Street
Frankfort, New York 13340
(315) 895-7651
Hours of operation: M – F: 9:00 AM - 5:00 PM

New York State Department of Environmental Conservation 625 Broadway 11th Floor
Albany, New York 12233-7014
Contact: Mr. Salvatore Priore
Phone: (516) 444-0241
Hours of Operation: 9 AM – 5 PM
Appointments required

Appendix B Site Contact List

Frankfort Valley Auto Sales
Owner
283 East Main Street
Frankfort, NY 13340

V-Ja's Lounge
Owner
307 East Main Street
Frankfort, NY 13340

Valley Performance
Owner
311 East Main Street
Frankfort, NY 13340

Turbo Machined Products, LLC
Owner
102 Industrial Drive
Frankfort, NY 13340

Custom Tool and Model Corporation
Owner
151 Industrial Drive
Frankfort, NY 13340

Village Laundry Center
Owner
198 Industrial Drive
Frankfort, NY 13340

245 East Main Street
Karrie Merryman
8501 Gaskin Road
Baldwinsville, NY 13027

223 East Main Street
Tomas Medina
233 East Main Street
Frankfort, NY 13340

Site Contact List – continued

219 East Main Street
Daniel P Lipiec
233 East Main Street
Frankfort, NY 13340

215 East Main Street
Denise Romeo A Luther
226 East Main Street
Frankfort, NY 13340

260 East Main Street
Alexander D Palumbo
109 Maple Drive
Frankfort, NY 13340

264 East Main Street
Alexander D Palumbo
109 Maple Drive
Frankfort, NY 13340

266 East Main Street
Alexander Palumbo
226 Sixth Avenue
Frankfort, NY 13340

311 East Main Street
James Hancock
311 East Main Street
Frankfort, NY 13340

250-254 East Main Street
Tamara King
250 East Main Street
Frankfort, NY 13340

256 East Main Street
Michelle Griffin
256 East Main Street
Frankfort, NY 13340

258 East Main Street
Paul F Loiacano
PO Box 102
Frankfort, NY 13340

228 East Main Street
Denise A Luther
226 East Main Street
Frankfort, NY 13340

230 East Main Street
James and Denise Luther
226 East Main Street
Frankfort, NY 13340

232-234 East Main Street
Rocco Lamana
PO Box 146
Frankfort, NY 13340

236 East Main Street
Rocco Lamana
PO Box 146
Frankfort, NY 13340

240 East Main Street
Suzanne Schafer
240 East Main Street
Frankfort, NY 13340

246 East Main Street
Walter and Gloria Skowron
111 Palmer Street
Frankfort, NY 13340

Site Contact List – continued

310 East Main Street
Walter C Wait
310 East Main Street
Frankfort, NY 13340

308 East Main Street
Robert and Joann Briggs
308 East Main Street
Frankfort, NY 13340

306 East Main Street
Carl Swiger
306 East Main Street
Frankfort, NY 13340

304 East Main Street
Salvatore Simonette, Jr.
304 East Main Street
Frankfort, NY 13340

302 East Main Street
William H Gray
302 East Main Street
Frankfort, NY 13340

300 East Main Street
Philip S Rolchigo
300 East Main Street
Frankfort, NY 13340

222-224 East Main Street
Denise Luther
226 East Main Street
Frankfort, NY 13340

4168 Acme Road
Keith Looman
4168 Acme Road
Frankfort, NY 13340

Site Contact List – continued

322 East Main Street
Stephen L Snyder
PO Box 65
Frankfort, NY 13340

320 East Main Street
Yupawadee Klubchom
320 East Main Street
Frankfort, NY 13340

318 East Main Street
John Hiram and Marilyn Ruth Schuyler
318 East Main Street
Frankfort, NY 13340

316 East Main Street
Ignazio P and Cynthia E Magro
316 East Main Street
Frankfort, NY 13340

314 East Main Street
Ignazio S and Cynthia E Magro
316 East Main Street
Frankfort, NY 13340

312 East Main Street
Paul and Stephanie Rauscher
312 East Main Street
Frankfort, NY 13340

4180 Acme Road
Michelle Crane
4180 Acme Road
Frankfort, NY 13340

4178 Acme Road
Frank and Christine Zogby
4178 Acme Road
Frankfort, NY 13340

Site Contact List – continued

4176 Acme Road
Joseph Butera
4176 Acme Road
Frankfort, NY 13340

4172 Acme Road
Joseph Butera
4176 Acme Road
Frankfort, NY 13340

4152 Acme Road
Joseph J Grippe
4164 Acme Road
Frankfort, NY 13340

4158 Acme Road
Lawrence D Gowett
4158 Acme Road
Frankfort, NY 13340

4160 Acme Road
J Grippe Industrial Supply Inc.
Joseph J Grippe
4160 Acme Road
Frankfort, NY 13340

4164 Acme Road
Joseph J Grippe
4164 Acme Road
Frankfort, NY 13340

4166 Acme Road
Wendy Button
4166 Acme Road
Frankfort, NY 13340

4204 Acme Road
Carole Jean Crimmins
4204 Acme Road
Frankfort, NY 13340

Site Contact List – continued

4196 Acme Road
Ernest Durse
4196 Acme Road
Frankfort, NY 13340

4192 Acme Road
Bridget Susan Foti
4192 Acme Road
Frankfort, NY 13340

4186-4188 Acme Road
Vincent S Casamento
406 Third Avenue East
Frankfort, NY 13340

422 East Main Street
Sonya Pavia
4186 Acme Road
Frankfort, NY 13340

4184 Acme Road
Muriel F Lasher
4184 Acme Road
Frankfort, NY 13340

318 East Main Street
John Hiram Schuyler
318 East Main Street
Frankfort, NY 13340

Village of Frankfort
110 Railroad Street
Frankfort, NY 13340
Attn: Mayor Frank Moracco

Site Contact List – continued

Village of Frankfort
Department of Water
110 Railroad Street
Frankfort, NY 13340
Attn: Ron Vivacqua

Greater Utica Rome Board of Realtors
41 Notre Dame Lane
Utica, NY 13502

Economic Development Board
c/o Herkimer County Chamber of Commerce
28 West Main Street
Mohawk, NY 13407

Herkimer County Board of Cooperative Educational Services
352 Gros Boulevard
Herkimer, NY 13350
Herkimer Evening Telegram
111-113 Green Street
Herkimer, NY 13350
(315) 866-2220
Fax 315-866-5913
news@herkimertelegram.com

Observer Dispatch
221 Oriskany Blvd
Utica, NY 13501
315-792-5017
fax - 315-792-5033
Email: infocenter@uticaod.com

WKTV - TV Channel 2
Smith Media LLC
P.O. Box 2
Utica, NY 13503
(315) 733-0404
Fax - (315)733-4893
newslink2@wktv.com

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Site Contact List – continued

NewsRadio 950 WIBX
9418 River Rd
Marcy, NY 13403
www.wibx950.com
news@wibx950.com
315-736-0780
315-768-9950 Fax

Galaxy Communications
39 Kellogg Rd
New Hartford, NY 13413-2849
Phone: (315) 797-1330
Fax: (315) 738-1073
community@wour.com

Utica Daily News
1900 Genesee Street
Utica, NY 13502
(315) 520-8741
Fax (315) 679-5549
news@uticadailynews.com

US Congressman
Richard Hanna
Utica Office
258 Genesee Street
Utica, New York 13502
607-756-2470

State Senator James Seward
235 N. Prospect Street
Herkimer, New York 13350
315-866-1632

State Assemblyman Mark Butler
235 N. Prospect Street
Herkimer, New York 13350
315-866-1632

DOC ID-17404953.2

Site Contact List – continued

County Legislator
Peter Manno
109 Mary Street
Suite 1310
Herkimer, New York 13350
315-867-1112

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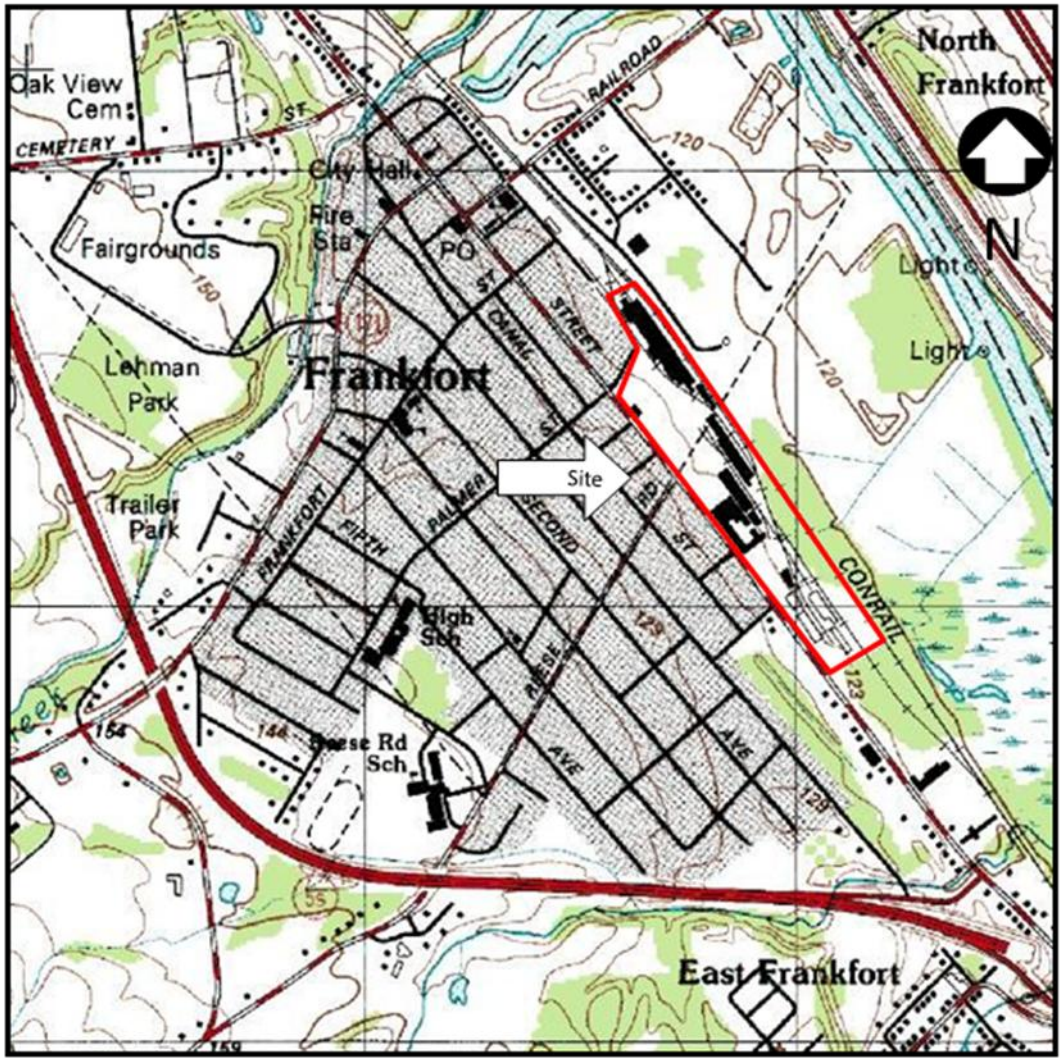
Appendix C Site Location Map

Source: United States Geological Survey Frankfort, NY Quadrangles
7.5 Minute Series (Topographic), Dated 7/1/1982.



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APPROXIMATE SCALE IN MILES (1 inch = 0.25 miles)

LEGEND

- Subject Property Boundary

Quadrangle Location

Prepared by/Date: CAM/ 04-18-2012
Checked by/Date: LJW/04-18-2012

Former Union Fork & Hoe Facility 253 East Main Street Frankfort, New York	Bradburne, Briller & Johnson, LLC www.bbjgroup.com	Site Location Map Project No. R1106075 Figure 1

DOC ID-17404953.2