LABELLA Associates, D.P.C.
Engineering
Architecture
Environmental
Planning

Remedial Action Work Plan
Former Corning Hospital and Related Parcels
NYSDEC BCP Site #C851049

Location:

176 Denison Parkway East and
201 East First Street
Corning, New York

Prepared for:

Corning Properties, Inc.
One Guthrie Square
Sayre, PA 18840

LaBella Project No. 2150606

November 2017
Revised February 2018

CERTIFICATIONS

I Daniel P. Noll certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

081996	2/16/2018	
NYS Professional Engineer #	Date	Signature

Table of Contents

Figures

Appendices

1.0 Introduction

LaBella Associates, D.P.C. (LaBella) is pleased to submit this Remedial Action Work Plan (RAWP), for the Former Corning Hospital and Related Parcels located at 176 Denison Parkway East and 201 East First Street, City of Corning, Steuben County, New York, herein after referred to as the "Site." The Site is designated New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site #C851049. Corning Hospital and The Guthrie Clinic entered into a Brownfield Cleanup Agreement (BCA) on October 13, 2015 as a participant, with Corning Properties Inc. (CPI) added to the BCA on November 19th, 2015, also as a participant. A Site Location Map is included as Figure 1. LaBella is submitting this RAWP on behalf of CPI.

LaBella conducted a Remedial Investigation (RI) at the Site in 2016 which identified the following four Remedial Areas of Concern (RAOCs):

1. RAOC #1 - TCE in Groundwater
2. RAOC #2 - Surface/ Shallow soil Impacts
3. RAOC #3 - Subsurface Historic Fill Material
4. RAOC #4 - Subsurface Ash and Glass Fill Material

Subsequently, a Remedial Alternatives Analysis (RAA) was developed to evaluate remedial options for each RAOC and the NYSDEC issued a Decision Document for the Site in February 2018. This RAWP provides the details for implementing the required remedy.

1.1 Site Description

The Site is comprised of two (2) non-contiguous parcels totaling approximately 4.77-acres (tax map IDs 318.09-01-018.00 and 318.09-01-013) in the City of Corning, Steuben County, New York. The Site is bounded by Chemung Street to the west, commercial offices to the east, Denison Parkway East to the north, and East First Street to the south. A driveway and parking area that was once part of Pearl Street separates the two (2) BCP parcels. 176 Denison Parkway East was improved with one (1) 166,292 square foot (ft^2) hospital and one (1) 5,172 ft^2 Powerhouse Building. The buildings were demolished in 2016-2017 and the Site is currently vacant.

1.2 Site History

176 Denison Parkway East

Residential structures occupied portions of this parcel from at least 1888 to at least 1968. Since approximately 1905, portions of this parcel operated as Corning Hospital with additions constructed in the 1920s, 1950s, 1960s, and 1990s. The hospital was in operation until 2014 at which time the facility was moved to a different location. Additional former uses include a railroad in the northeast portion of the parcel from approximately 1888 through the 1950s, Corning Machine Co. in at least 1908, a tin shop/plumber from at least the early 1920s through the late 1940s, and a gasoline filling station in the northeast corner of the parcel in at least 1930. In 1998, a 10,000 gallon fiberglass underground storage tank (UST) used to store fuel oil replaced a 15,000 gallon UST installed in the 1960s to the east of the Powerhouse Building (this was removed as part of the demolition). A 1,000 gallon above ground storage tank (AST) used to store fuel oil was located in the Powerhouse Building (this was removed during demolition). A drawing from 1949 indicated an abandoned dry well was located directly east of the hospital building during 1949 (i.e., beneath Building C which was constructed in the 1960s).

The former hospital had a groundwater extraction well (former supply well) for non-contact cooling water and a foundation drain system that dewatered groundwater around the building basement to a former central sump where it was pumped to the storm sewer. The former supply well and former sump were decommissioned as part of the building demolition in 2016. An injection well formerly located within the northern parking area was utilized as an additional outfall for the occasional discharge of non-contact cooling water. The injection well was installed in 1964 and was closed in place in 2001.

201 East First Street
Residential structures occupied this parcel from at least 1888 until the 1960s. A railroad transected this parcel from at least 1888 through the 1950s. A gasoline filling station occupied the southwest portion of this parcel in at least 1948. Permit records indicate structures at this parcel were demolished in 1968, and 2007. This parcel is currently vacant.

1.3 Environmental Reports

The following reports exist for the Site that have been utilized during the BCP work.

- *Soil Boring Report*, 1991 (Appendices only)
- *Phase I Environmental Hazard Audit* by The Sear-Brown Group dated September 17th, 1991
- *Soil Core Investigation* by The Sear-Brown Group dated September 24th, 1997 (appendices including laboratory data not available for review).
- *Underground Storage Tank Removal and Remediation* by the Sear-Brown Group dated October 30th, 1998 (appendices including laboratory data not available for review).
- *SPDES Permitting Review* by the Sear-Brown Group dated March 10th, 1998
- *Corning Hospital and Associated Parcels Phase I Environmental Site Assessment (ESA)* by Stantec Consulting Services Inc. dated March 27th, 2014
- *Corning Hospital and Associated Parcels Phase II ESA* by LaBella Associates, D.P.C. dated May 2015
- *Geotechnical Evaluation* by Foundation Design, P.C. dated November 2015
- *Interim Site Management Plan*, by LaBella dated June 2016
- *Remedial Investigation Report*, by LaBella dated February 2017
- *Remedial Alternatives Analysis*, by LaBella DRAFT dated February 2017
- Sewer Line Report, by LaBella dated November 17, 2017
- *Decision Document* by NYSDEC Dated February, 2018.

Pertinent information from the above reports are summarized below.

Phase I ESA
In 2014, Stantec Consulting Services (Stantec) conducted a Phase I ESA for Corning Hospital and several parcels which included the BCP Site. Several Recognized Environmental Conditions (RECs) were identified for 176 Denison Parkway East including the former use as a railroad, former gasoline filling station, historic uses as a machine shop, tin shop, plumber, presence of a fuel oil UST, dry well noted on 1949 and 1965 drawings, use as a laundry facility, and detection of benzene during UST removal in 1998. Two (2) RECs were identified for 201 East First Street including the former use as a railroad and former presence of a gasoline filling station.

Agency records included as an Appendix to the Phase I ESA indicate that TCE is present in portions of the aquifer throughout the City of Corning, and air strippers are in operation on backup public drinking water supply wells.

Phase II ESA
In April-May 2015, LaBella completed a Phase II ESA for Corning Hospital and several surrounding parcels, which included the BCP Site. The Phase II ESA was conducted to evaluate RECs identified during the Phase I ESA. The Phase II ESA consisted of the following at the two (2) parcels that comprise the BCP Site:

- Advancement of twenty-two (22) overburden soil borings
- Installation of nine (9) overburden groundwater monitoring wells
- Advancement of seven (7) test pits

The Phase II ESA identified TCE in groundwater at 176 Denison Parkway East and in the former Sump located within the basement of the former hospital. Specifically, TCE was detected in the former Sump, MW-07, and MW-13 and cis-1,2-dichloroethene, a breakdown product of TCE, was detected in MW-07 at concentrations above NYSDEC Part 703 Groundwater Quality Standards, with the greatest concentration of TCE detected in the former Sump at 24.4 parts per billion (ppb).

In addition, elevated photoionization (PID) readings of up to 138 parts per million (ppm) were identified in unsaturated soils at 201 East First Street in the location of the former gasoline filling station. Historic fill material consisting of ash, cinders, brick, concrete, metal, ceramic, glass and wood was identified across the Site and several samples containing fill material identified metals including mercury, lead, arsenic, and cadmium above the NYSDEC Restricted Residential Use Soil Cleanup Objectives (SCOs).

Interim Site Management Plan
The Interim Site Management Plan (ISMP) was developed to maintain any existing Institutional and Engineering Controls (ICs and ECs) as well as manage contamination at the Site during building demolition and Site regrading activities until a Site Remedy and Final SMP is developed and approved by the NYSDEC.

During the demolition activities of the Powerhouse Building, an area of petroleum impacted soils were encountered. The soil exhibited odors, staining and photo-ionization detector (PID) readings greater than background. The soil was removed, staged and disposed of; however, an area of staining/odors/PID readings was left in-place due to a retaining wall being present. The location of the material was documented and it was determined that the remaining material would be addressed during the remedy phase. It should be noted that a documentation sample was collected of the material left in-place and the analytical results did not indicate concentrations of constituents above the NYSDEC Part 375-6 Restricted Residential Use SCOs. However, the impacts did display nuisance characteristics.

Remedial Investigation Report
A Remedial Investigation Work Plan and three (3) subsequent addenda were submitted and approved by the NYSDEC. RI activities completed between April and August 2016 consisted of the following:

- Geophysical survey
- Collection of six (6) surface soil samples (defined as 0-2-inches bgs) from six (6) locations
- Collection of twelve (12) shallow soil samples (defined as 2-24-inches bgs) from six (6) locations
- Sub-slab soil vapor screening in the basement of the former hospital
- Scoping of the former Sump and associated piping
- Installation of four (4) shallow groundwater monitoring wells (20-25-ft.), two (2) deeper groundwater monitoring wells (40-ft. and 70-ft.), and five (5) basement wells to 5-ft. bgs.
- Advancement of twenty-one (21) soil borings
- Advancement of ten (10) test pits

The RI identified similar concentrations of VOCs in groundwater as the Phase II ESA. Specifically, TCE was detected above Groundwater Quality Standards in two (2) monitoring wells (MW-21 and MW-24) and the former supply well, with the greatest concentration detected in the former supply well at 29 ppb. It should be noted that although TCE was detected in MW-07 and MW-13 during the Phase II ESA at concentrations that exceed Groundwater Quality Standards, TCE was non-detected in these two (2) monitoring wells during the RI. In addition, concentrations of TCE in the former Sump decreased to below Groundwater Quality Standards during the RI.

Fill material was encountered across the Site. The fill material encountered is generally classified into two (2) distinctly different types; 1) historic fill containing black ash and cinders, wood, ceramic, glass fragments, and brick; and 2) glass and white ash fill material.

White ash and glass fill material was encountered at 201 East First Street and a sample of the fill material from RI-TP-8 analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals exceeded the Maximum Concentration for Toxicity Characteristics for arsenic, cadmium, and lead. Subsequently, RI Work Plan Addendum #3 was developed to further delineate the horizontal and vertical extent of the white ash and glass fill material at 201 East First Street. Two (2) additional samples analyzed for TCLP metals did not exceeded the Maximum Concentration for Toxicity Characteristics. Based on the delineation, it is apparent that this type of fill material containing white ash and glass was limited to an approximate 1,200ft^2 area at depths ranging from approximately 2-8-ft bgs. An estimated 270 cubic yards of ash/ glass fill material is present at 201 East First Street.

A total of eighteen (18) surface soil (0-2-in. bgs.) and shallow soil (2-24-in. bgs.) samples from six (6) locations were analyzed for full-suite parameters. Five (5) of the locations did not meet Restricted Residential Use SCOs for metals and/or semi-volatile organic compounds (SVOCs).

The following RAOCs were identified during the RI.

1. RAOC #1 - TCE in Groundwater
2. RAOC #2 - Surface/ Shallow soil Impacts
3. RAOC #3 - Subsurface Historic Fill Material
4. RAOC #4 - Subsurface Ash and Glass Fill Material

Figure 2 and 3 illustrate the areas of RAOC #s 2, 3, and 4.

Remedial Alternatives Analysis
A RAA was developed to evaluate remedial alternatives for the above-mentioned RAOCs. The following remedial actions were proposed:

- **RAOC #1 – TCE in Groundwater –** On-Site Management
- **RAOC #2- Surface/ Shallow Soil Impacts-** Relocation of impacts exceeding Restricted Residential Use SCOs to below 2-feet of cover or a cap
- **RAOC #3- Subsurface Historic Fill Material–** On-Site Management
- **RAOC #4- Subsurface Ash and Glass Fill Material–** Remedial excavation of ash and glass fill material that exceeds the Maximum Concentration for Toxicity Characteristics

On-Site management will require implementation of a Site Management Plan (SMP) which will define institutional controls (ICs) and engineering controls (ECs) for the Site. ICs and ECs will include maintenance of a cover system and evaluation or mitigation of SVI prior to building occupancy. ICs and ECs will be further defined in the SMP. Figure 4 illustrates the overall site cover remedy approach.

Decision Document

The NYSDEC issued a Decision Document for the Site on February, 2018. The Decision Document identified the remedial actions required for the Site.
The factors considered during the selection of the remedy are those listed in 6NYCRR 375-1.8.
The elements of the selected Excavation and Off-site Disposal with Cover Systems remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. A site cover will be required to allow for restricted residential use of the site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

3. Excavation and off-site disposal of contaminant source areas, including**:**

- Approximately 1200 sq ft area and 270 cy of soil exceeding the 6 NYCRR Part 371 hazardous criteria for arsenic, cadmium and lead at 201 East First Street; and
- Excavation and removal of a 10,000 gal petroleum underground storage tank (UST), fuel dispensers, underground piping or other structures associated with a source of contamination

and visual and olfactory impacted soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G

- Backfill - On-site soil which does not exceed the above excavation criteria may be used below the cover system described in remedy element 2 to the extent that a sufficient volume of on-site soil is available and / or **c**lean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete the backfilling of the excavation and establish the designed grades at the site.

4. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property restricted residential use as defined by Part 375-1.8(g), all local approvals (e.g., zoning) in support of the anticipated restricted residential use must be secured in advance of remedy completion;
- although land use is subject to local zoning laws, single family housing is not consistent with restricted residential use as defined by Part 375-1.8(g);
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and,
  require compliance with the Department approved Site Management Plan.

5. Site Management Plan

A Site Management Plan is required, which includes the following:

a.) an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 4 above.

Engineering Controls: The soil cover discussed in Paragraph 2 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- a provision should redevelopment occur to ensure no soil exceeding protection of groundwater concentrations will remain below storm water retention basin or infiltration structures.
- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any buildings on the site, including provision for implementing actions recommended to address

exposures related to soil vapor;

- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 2 above will be placed in any areas where the upper two feet of exposed surface soil exceed the applicable soil cleanup objectives (SCOs);
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b.) a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

2.0 Standards, Criteria and Guidelines

This section identifies the SCGs for the Site. To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. Applicable SCGs are listed below.

Soil SCGs

The following SCGs for soil are applicable for the Site:

- NYCRR Subpart 375-6 Remedial Program SCOs for the Protection of Public Health; Restricted Residential Use.

Groundwater SCGs:

The following SCGs for groundwater are applicable for the Site:

- NYSDEC Part 703 Groundwater Standards
- Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values

Soil Gas SCGs: Currently, no state regulatory (NYSDEC or NYSDOH) guidance values exist for soil gas.

3.0 Description of the Selected Remedy

3.1 Remedial Action Objectives

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) were identified for this site.

Soil RAOs

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in surface water or sediment contamination.

Groundwater RAOs

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Prevent the discharge of contaminants to surface water.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

3.2 Summary of Selected Remedy

To accomplish the above Remedial Action Objectives, the following actions are included in the remedy:

- Remove and dispose of off-Site at an appropriate facility the approximately 1200 sq ft area and 270 cy of white ash/glass fill material at 201 East 1st Street that exceed the 6 NYCRR Part 371 hazardous criteria for arsenic, cadmium and lead and contains elevated concentrations of metals which exceed United States Environmental Protection Agency (USEPA) Maximum Concentration for Toxicity Characteristics. This material is considered source area material and confirmatory soil sampling will be completed to ensure compliance with applicable SCOs. This portion of the remedy is detailed in Section 4.1.
- Remove the 10,000 gallon UST and associated residual petroleum impacts encountered during demolition of the Powerhouse Building. This portion of the remedy is detailed in Section 4.2.
- Develop a cover system with a minimum 2-feet of material that meets Site SCGs (i.e., Restricted Residential Use SCOs). This portion of the remedy is detailed in Section 4.3.
- Place institutional controls (Environmental Easement and Site Management Plan) to manage fill materials/constituents of concern over the long-term, to address soil vapor intrusion concerns, and to restrict groundwater use. This portion of the remedy is detailed in Section 10.0.

Additional site work will be completed during the RAWP. This non-remedial work will include removal of: (1) inactive utilities from the Site; (2) former foundations and any other former infrastructure located up to a maximum of six feet below the future site grade of the Site within the area of the future developer's proposed building pads plus a 20 feet buffer around those building pads; and (3) remaining surface features such as asphalt and concrete pads. Details on the utility work are provided in Section 6.0. Details on removal of

surface features, certain former foundations and any other infrastructure that may be encountered in the relevant areas of future development are provided in Section 4.3.
The following items should be noted:

1 A design investigation is not necessary prior to implementing remedial activities.

2 Based on the relatively basic remedial work consisting of excavation and construction of a Site cover, a Remedial Action Monitoring Plan (RAMP) does not appear warranted for this RAWP. It should be noted that areas of monitoring in this plan are included in:

- Section 4.1 (confirmatory sampling for White Ash and Glass Fill Material)
- Section 4.2 (confirmatory sampling for UST and petroleum impacted materials)
- Section 4.3 (soil cover system materials)
- Section 5.0 (Community Air Monitoring)

Impacts to the surrounding community as a result of the implementation of this Work Plan are not anticipated and thus a Community Environmental Response Plan does not appear appropriate for this RAWP. However, during the implementation of this Work Plan, CAMP will be in place along with a worker HASP to ensure that the surrounding community is not negatively impacted by the site remedy.

4.0 Detailed Description of Remedial Action

4.1 Subsurface White Ash and Glass Fill Material

This section details the remedial actions that will be completed for the area of subsurface white ash and glass fill material at 201 East 1st Street. Three (3) samples of white ash and glass fill material at 201 East First Street were analyzed for TCLP metals during the RI. One (1) sample, RI-TP-8 collected from approximately 4-ft bgs, contained white ash and glass. Arsenic, cadmium, and lead were detected in this sample at concentrations that exceed the maximum concentration of contaminants for toxicity characteristic. This material is considered source material and although TCLP testing (mg/L unit) is not directly comparable to SCOs (mg/Kg unit), this material would likely exceed applicable use based and protection of groundwater SCOs however groundwater in this area is not impacted with arsenic, cadmium or lead. White ash and glass fill material was delineated and an approximate 1,200 ft^2 area of white ash and glass fill material is present at depths of approximately 2 to 8-ft bgs in the location shown on Figure 3. An estimated 270 cubic yards (CY) of white ash and glass fill material is present. Although samples from SB-56 and SB-58 that contained white ash and glass fill material did not exceed the maximum concentration of contaminants for toxicity characteristics, any material consisting of white ash and glass will be removed.

Excavation Area

Approximately 270 CY of white ash and glass fill material will be excavated. The excavation limits shown on Figure 3 will be located using a GPS. The excavation limits will be dependent on visual observation of white ash and glass and confirmatory soil sample results. White ash and glass fill material will be excavated and either temporarily staged on poly sheeting and covered prior to off-Site disposal or pre-characterized and direct-loaded into trucks for disposal at an appropriately permitted landfill. Groundwater is not anticipated to be encountered during the remedial excavation. In the event that groundwater is encountered or precipitation occurs that requires removing from the excavation (e.g., to support backfilling operations), the water will be managed as defined in Section

9.0. The excavation limits will be located with a GPS and documented on as-built drawings included in the Final Engineering Report (FER).

It should be noted that the southern limit of the excavation area is bordered by two active underground utilities. Specifically, a fiber optic line and telephone line are located on the southern edge of the excavation area, including a junction box that is related to these utilities. These active utilities may limit the ability to completely removal white ash/glass fill material. In this event, documentation samples will be collected from impacts left in-place (see below).

Soil Reuse

Soils that do not exhibit evidence of white ash or glass (assumed to be the top 2-ft.), will be excavated and temporarily staged on poly sheeting for use as potential backfill in other areas of the Site (below the top 2-ft/cover material). The stockpiled soils will be sampled for reuse at a frequency as defined in DER-10 Table 5.4(e)10. Based on the estimated extent of excavation and a lack of white ash/glass material in the top 2-ft., it is anticipated that approximately 90 CY of soil will be generated that will be staged and sampled for reuse. Based on the RI findings, the only constituents of concern in the top 2-ft. of soil (and in soil/fill across the Site below the top 2-ft) are SVOCs and heavy metals (specifically Resource Conservation and Recovery Act (RCRA) Metals and Copper). Based on this, the reuse sampling will be limited to analyzing for:

- CP-51 & TCL List SVOCs including TICs using USEPA Method 8270, and
- TAL Metals using USEPA Methods 6010/7471.
- VOCs if PID screening indicates presence of VOCs

Reuse of soils will require NYSDEC approval prior to backfill.

Section 12 provides additional details on Quality Assurance/Quality Control (QA/QC) measures/deliverables that will be completed as part of the sampling.

Confirmatory & Documentation Sampling

An x-ray fluorescence (XRF) meter will be used to field screen the excavation bottom and sidewalls to get an indication of whether or not the material left in place contains elevated metals. The excavation may be expanded based on XRF readings or visual evidence of ash/glass materials. Subsequent to completing initial excavation activities, confirmatory soil samples will be collected from the bottom and sidewalls of the excavation in accordance with NYSDEC's *DER*-10 (i.e., one (1) sidewall sample every 30 linear feet of the perimeter and one (1) sample from the excavation bottom for every 900 square feet

In accordance with NYSDEC DER-10, the following confirmatory sampling is anticipated:

Anticipated Confirmatory Sampling

PERIMETER (FEET)	# SIDEWALL SAMPLES	AREA (SQUARE FEET)	# BOTTOM SAMPLES
130	5	1,200	2

The actual number of samples required will be based on the actual perimeter and area of excavation. Based on the constituents of concern for this area, the following analytical testing will be completed for the confirmatory soil samples.

- RCRA Metals via USEPA Method 6010/7471 subsequent to a USEPA TCLP extraction via USEPA Method 1311;
- TAL Metals using USEPA Methods 6010/7471.

Section 12 provides additional details on QA/QC measures/deliverables that will be completed as part of the sampling.

Sample locations will be located with a GPS and included in the as-builts in the FER.

Backfilling

Pending confirmatory samples that do not exceed the Maximum Concentration of Contaminants for Toxicity Characteristic or NYSDEC Part 375 Restricted Residential Use SCOs (for the top 2-ft), the excavation will be backfilled with one or more of the following materials:

- Imported Material – This may include imported crushed stone exempt from testing per DER-10 Section 5.4 or imported clean material that has been tested per DER-10 Section 5.4. The appropriate notification for import will be provided to NYSDEC and approval for the import will be obtained prior to importing to the Site.
- Crushed Masonry – As noted below in Section 4.3, on-site crushed masonry is present on the 176 Denison Parkway parcel. This material may be utilized as backfill or cover material in this area.
- Excavated Clean Material – Native material may be used below the top 2-ft. (i.e., not part of the cover material); however, any material utilized in the top 2-ft. will be characterized per DER-10 Section 5.4 to confirm it meets Restricted Residential SCOs.

The excavation will be compacted. Backfilling limits and material type will be located with a GPS, documented and included in the as-built drawings with the FER.

Materials and soils used for backfill must be approved by NYSDEC.

4.2 UST Removal and Petroleum Impacted Soil Removal

As noted in Section 1.3, petroleum impacts were identified and removed during demolition of the Powerhouse Building. Impacts are anticipated to be associated with the former fuel oil UST that was historically located in the same location as the current UST on the eastern exterior of the Powerhouse Building. Refer to Figure 6 for locations of petroleum impacts previously identified and location of the UST.

Petroleum impacts identified and removed during demolition of the Powerhouse Building were excavated and disposed of off-Site. Work was conducted in accordance with the ISMP. An area of impacts displaying nuisance characteristics (odors and PID readings up to 100 ppm) was left in place, refer to Figure 6. Confirmatory soil samples collected following impacted soil removal did not exceed SCGs including a sample from the impacts left in place. Any additional impacts encountered during UST removal will be excavated, characterized, and transported off-Site for disposal. The following details the work that may be implemented. It should also be noted that this portion of the Site is within a planned future building area. Additional information is provided in Section 4.3 related to the relocation and backfilling/cover system for this area.

UST Removal

The UST removal will be completed in accordance with Section 5.5 of DER-10. It should be noted that the contents of the UST were previously removed during the demolition project. Furthermore,

the UST is relatively new (installed in 1998) and it is not anticipated that the UST has leaked. As noted above, the petroleum impacts in the soil in proximity to the UST are anticipated to be due to the former UST that was located in the same area. As part of the removal work, the following will be completed:

- Updating the Petroleum Bulk Storage form.
- Removal of any ancillary equipment (e.g., piping).
- Documenting any evidence of a leak.
- Photographic documentation of the tank and piping conditions.
- Examining excavation floors and sidewalls for evidence of impairment (odors, staining, PID readings). Such field screening will be done at distances of no more than 5-ft. apart on a grid pattern.
- Collection of confirmation samples. It should be noted that this will be based on the UST length as defined in DER-10 Section 5.5; however, in the event that impacts are encountered and soil is removed that extends to the area of petroleum impacts noted below, confirmation sampling will be completed as defined below.

Excavation Area

The RI did not identify petroleum impacts in this area; however, soil boring and monitoring wells were north or east of this area due to active utilities and the UST. Based on the RI data, the impacts appear to be limited in extent. The excavation limits will be dependent on visual observations and PID readings. Petroleum impacts exhibiting nuisance characteristics (odors and staining) will be excavated and either temporarily staged on poly sheeting prior to off-Site disposal or pre-characterized and direct-loaded into trucks for disposal at a NYSDEC Part 360 permitted landfill. Groundwater is not anticipated to be encountered during the remedial excavation. In the event that groundwater is encountered or precipitation occurs that requires removing from the excavation (e.g., to support backfilling operations), the water will be managed as defined in Section 9.0. The excavation limits will be located with a GPS and documented on as-built drawings included in the FER.

Soil Reuse

Soils that do not exhibit nuisance characteristics will be excavated and temporarily staged on poly sheeting for use as potential backfill in other areas of the Site (below the top 2-ft). The stockpiled soils will be sampled for reuse at a frequency as defined in DER-10 Table 5.4(e)10. Based on the work during the RI and ISMP, petroleum related VOCs and SVOCs are the constituents of concern. Based on this, the reuse sampling will be limited to analyzing for:

- CP-51 & TCL List VOCs including TICs using USEPA Method 8260, and
- CP-51 & TCL List SVOCs including TICs using USEPA Method 8270.

Reuse of soils will require NYSDEC approval prior to backfill.

Section 12 provides additional details on QA/QC measures/deliverables that will be completed as part of the sampling.

Confirmatory & Documentation Sampling

Visual and olfactory observations and PID readings will be used to field screen the excavation bottom and sidewalls to get an indication of whether or not the material left in place contains contaminants. The excavation may be expanded based on these observations. Subsequent to

completing initial excavation activities, confirmatory soil samples will be collected from the bottom and sidewalls of the excavation in accordance with NYSDEC's *DER*-10 (i.e., one (1) sidewall sample every 30 linear feet of the perimeter and one (1) sample from the excavation bottom for every 900 square feet).

The number of samples required will be based on the perimeter and area of excavation. Based on the constituents of concern for this area, the following analytical testing will be completed for the confirmatory soil samples.

- CP-51 & TCL List VOCs including TICs using USEPA Method 8260, and
- CP-51 & TCL List SVOCs including TICs using USEPA Method 8270.

Section 12 provides additional details on QA/QC measures/deliverables that will be completed as part of the sampling.

Sample locations will be located with a GPS and included in the as-builts in the FER.

Backfilling

Pending confirmatory samples that do not exceed the NYSDEC Part 375 Restricted Residential Use SCOs (for the top 2-ft), the excavation will be backfilled with one or more of the following materials:

- Imported Material – This may include (i.e., imported crushed stone exempt from testing per DER-10 Section 5.4 or imported clean material that has been tested per DER-10 Section 5.4. The appropriate notification for import will be provided to NYSDEC and approval for the import will be obtained prior to importing to the Site.
- On-Site Crushed Masonry – The ISMP allowed for the on-site crushing and reuse of crushed masonry. Currently there are several piles of crushed masonry on-site that can be utilized for backfilling purposes.

Because the excavation is located in an area proposed for a future building pad plus a 20 feet buffer area, the excavation will be compacted in 1-ft. lifts to 95% compaction. A geotechnical engineer and compaction testing firm may be present during the compaction work to document the compaction. Backfilling limits and material type will be located with a GPS, documented and included in the as-built drawings with the FER.

4.3 Soil Cover System

This section details the construction of the Site cover system. The RI testing included the following soil/fill sampling:

- Six (6) surface soil samples for full-suite parameters
- Twelve (12) shallow soil samples for full-suite parameters
- Fifteen (15) subsurface soil samples for full-suite parameters
- Eleven (11) subsurface soil samples for metals only
- Three (3) subsurface soil samples for TCLP metals
- One (1) subsurface soil sample for VOCs only

This testing identified heavy metals (RCRA Metals and Copper) and SVOCs in surface soil and cover samples at concentrations above the NYSDEC Part 375-6 Restricted Residential SCOs. In addition fill

materials were identified in numerous borings and test pits throughout the Site. Based on these findings, a cover system is required to address these impacts. The source of SVOCs and metals in surface/ shallow soil is attributed to runoff from adjacent roads and/or sidewalks or historic fill material. It should be noted that at the time of sampling, a majority of the Site was covered with the former buildings, asphalt pavement, and concrete sidewalks and curbing; as such, only grass-covered areas were sampled during the RI. This RAWP includes covering the entire Site with a cover system as described below.

Cover System Materials

All site soil cover systems, 2 ft minimum thickness, must meet chemical quality standards in accordance with DER-10 Section 5.4 for Restricted Residential use or exemption from chemical testing criteria. The re-use or import of all materials and those used to construct the site cover system must be approved by the NYSDEC prior to placement. The cover system will consist of one of the following materials:

1. Recycled Masonry: The ISMP included allowing for the on-site crushing of former buildings (with the exception of certain areas identified in the ISMP that were segregated and disposed of off-site) and re-use of that material on-site. The recycled masonry will be obtained from up to three (3) locations at the Site:

    a) Currently stockpiled materials - there are several piles of crushed masonry (approximately 3,500 CY) that are currently stockpiled on-site. The current stockpiled materials are shown on Figure 7.

    b) Materials placed in the former hospital basement – the previous demolition work included placing crushed masonry in the basements of the former hospital building. This material will be utilized as necessary to obtain additional crushed masonry for use as cover materials. It is estimated that approximately 5,000 CY of crushed masonry may be utilized from crushed masonry placed in former basement areas. To limit the risk of removing crushed masonry that may have commingled with historic fill materials adjacent to the former hospital basement, a 5-ft buffer from each edge of the former hospital footprint will be left in place during excavation for cover materials (See Figure 5). This buffer will ensure commingled fill and masonry material will not be excavated, and in the event that the excavation wall collapses, historic fill materials outside of the marked hospital footprint will not be exposed. Additionally, a 1-ft buffer of crushed masonry material will be used for the bottom of the excavation to prevent commingling. In the event that any crushed masonry needs to be used for cover material from these described buffer zones, the material will be assessed for visual or olfactory indications of impairment and fill materials. In the event that any indications of impairment or fill materials are present, the material will staged on-Site and sampled for re-use at the site in accordance with DER-10 Section 5.4 for Metals, VOCs, and SVOCs. These parameters were selected based on the RI sampling previously completed (See Section 4.3 above). Based on the results of the sampling, Department approval for on-site re-use of the materials as cover or below cover systems will be requested or the material will be disposed off-Site at an appropriate facility. The former basement areas where crushed masonry would be obtained are shown on Figure 5.

    c) Existing concrete structures – The demolition work did not include complete removal of all structures. Specifically a footer wall for a former ‘sound wall’ on the north and east side of the former Powerhouse Building is still in-place. In addition, there are several former

apparent residential building slabs that have been identified at the Site within areas proposed for future building pads plus a 20 feet buffer and there are some surface features (sidewalks, slab for former back flow preventer, etc.) that are on-site. During removal of these structures, a hazardous materials evaluation will be completed on all materials. This will consist of evaluating for any staining or odors on the masonry. In addition, the masonry will be observed for any fill or soil that may be adhered to the masonry. Any fill/soil will be removed from the masonry and if free of impairment the masonry can be reused on-site or sent off-site for recycling. In the event any soil/fill with evidence of impairment is adhered to the masonry or the masonry exhibits staining or odors, the masonry will be sent off-site for disposal at an appropriately permitted landfill. In the event that crushing and on-site use is not deemed economical, these materials will be transported off-site for recycling. The areas of subsurface concrete that exist are shown on Figure 5 and the areas of surface concrete are shown on Figure 7.

2. Imported Materials: As required per DER-10, any imported material will be approved by NYSDEC prior to import. The imported material will consist of aggregate material exempt from chemical testing per DER-10 Section 5.4 or soil chemically tested per DER-10 Section 5.4

3. On-Site Native Material: Fill materials are present in many areas of the Site; however, beneath the fill material native materials are present that have been identified by representatives of a future developer as satisfactory backfill materials for geotechnical/structural purposes. As such, some on-site native material may be excavated from beneath fill materials for use as cover material. In this event, the material will be excavated, field screened, segregated, stockpiled and sampled for chemical quality per DER-10 Section 5.4.

Cover System Areas

The cover system for the Site is divided into two distinct areas:

1. Future Building Area – The future development currently consists of two buildings. These buildings and a buffer of 20-ft, herein after designated as "Future Building Area", are shown on Figure 5. The buffer included in the Future Building Area was developed to account for over-excavation to allow for site work during footer excavation and potential minor modifications to the development plans. The cover within the Future Building Area will be a minimum of 2.5 ft. deep or deeper in some areas. Details on the cover system construction are provided below.

2. Areas Outside Future Building Area - Cover for all areas outside the Future Building Area will consist of a minimum of 2-ft. of clean materials.

It should be noted that prior to constructing the cover system, areas of existing asphalt will be removed and transported off-site for recycling. The extent of asphalt is shown on Figure 7.

Cover System Construction

In part to meet requirements of the future developer, the construction of the cover system is intended to remove all above ground improvements which are not related to active utilities servicing other properties and include subterranean removal of all fill material and infrastructure (other than active utilities servicing other properties) within the Future Building Area to a maximum depth of six (6) feet below future site grade. It should be noted that this includes but is not limited to foundations (inclusive of

footers and slabs, if any),any other infrastructure that may be encountered, and non-native fill material. The details are provided below.

The construction of the cover system is summarized for the three distinct cover system areas.

- Future Building Area (176 Denison Parkway East) – As noted above, the Future Building Area will have a minimum cover of 2.5-ft. in depth (i.e., thickness). This minimum depth was developed in order to allow the future site development work in the Future Building Area to proceed without breaching the cover. This depth is based on providing a clean cover with a bottom depth 4-ft. below the future finished floor elevation (finished floor elevations are shown on the Grading Plan in Appendix 4). Based on discussions with the developer, the buildings will be constructed as slab on grade buildings with typical perimeter and interior footers that extend approximately 42-inches below final grade. The discussion with the development team included finishing the remedial work with the Site approximately 1.5-ft. below the future grade in order to account for surface finishes (sub-base, asphalt, concrete slab, etc.) that would be constructed at a later date. The Grading Plan for the future development is included as Appendix 4 for reference. Based on the development design, a 2.5-ft. minimum cover will allow construction work to proceed up to 4-ft. below the future site grade without breaching the cover system. It should be noted that due to geotechnical considerations, all fill material beneath the Future Building Area will be removed and as such, the actual cover thickness will be greater than 2.5-ft. in depth for significant portions of the Future Building Area. Figure 5 illustrates the elevations that excavation are estimated to extend to in the Future Building Area in order to establish the minimum cover thickness of 2.5 ft. and to remove all fill materials in the Future Building Area. In addition, Figure 8 illustrates the approximate cover depths (thicknesses) in the Future Building Area. It should be noted that the cover depths illustrated on Figure 8 are the cover depths that will be established after the remedial work. As noted above, the future development work will add approximately 1.5-ft. of additional materials (a majority will be sub-base and concrete). These modifications will need to be identified and documented in a revised SMP after the Certificate of Completion is issued. The cover system will also include a demarcation layer being placed prior to placement of the cover material in all areas excavated as part of this remedial action work plan, see below.
- Areas Outside of Future Building Area (176 Denison Parkway East and 201 East First Street) - As noted above, the Site remedial work has been coordinated with the proposed development work and the remedy will leave the Site at 1.5-ft. below the future site grade. As such, the areas outside of the Future Building Area will be excavated to a minimum of 3.5-ft. below the future site grade and then the 2-ft. minimum cover will be constructed (i.e., leaving the Site 1.5-ft. below the future grade). Figure 8 illustrates the cover thickness for the areas outside the Future Building Area. Prior to placing the cover, a demarcation layer will be placed. It should be noted that due to the current site grade vs. the future site grade the actual amount of excavation depth across the areas outside the Future Building Area will vary. Some locations will require minimum excavation and will generally be ‘filled’ with clean cover and others will require greater excavation to achieve the planned grades. Furthermore, since a significant portion of the area outside the Future Building Area is located in the former hospital footprint where crushed masonry exists, these areas will be excavated prior to filling/cover to provide for clean structural fill under the Future Building Area. Additional detail on management of materials is provided below.

- The area along Denison Parkway that has soil between the current asphalt area and the sidewalk contains numerous trees. The future development plans to keep these trees in place. As such, hand-digging or air knife excavation will be required proximate the trees on the northern Site boundary along Denison Parkway East to establish the required 2' thick cover system. This area will be left at the future site grade since this area will not undergo construction.

Anticipated bottom elevations of the excavation work within the Future Building Area are shown on Figure 5 and are based on cumulative data collected to date (i.e., depth of fill). Actual excavation depths are to be determined in the field based on actual depths of fill material. It should be noted that portions of the Future Building Area have already been backfilled with crushed masonry. These areas are where the former Hospital footprint overlapped with Future Building Area and as such, these areas will remain as-is unless material needs to be added or removed in order to meet proposed grades. These areas will not contain a demarcation layer. However, the thickness of clean fill in these areas far exceed the depth of excavation needed for the proposed development and the crushed masonry provides its own visual demarcation from any fill or native material that exists beneath these crushed masonry fill areas. Refer to Figure 5 for a representation of the relocation plan and Figures 5A and 5B for cross sections showing current and planned subsurface and cover elevations.

Materials Management

Non-native material from the Future Building Area will be relocated outside this area. Excavations will continue vertically within the Future Building Area until native material is encountered or up to 6-ft. below the future site grade, whichever is encountered first. In addition to relocation of the above non-native materials/fill from the Future Building Area, it should be noted that approximately 3.5-ft. of soil/fill will be excavated from the entire 201 East 1st St. parcel in order to provide a 2-ft. cover and leave that parcel approximately 1.5-ft. below the future grade. This material is planned to be relocated to the areas outside the Future Building Area. It should be noted that the relocation of fill from 201 East 1st St. to 176 Dennison Parkway will require crossing the former Pearl Street parcel, which is not part of the BCP. Since this parcel is predominantly asphalt, the asphalt in this area will remain to protect this area from construction traffic. The area will be cleaned subsequent to completing work on 201 East 1st Street parcel by removing any soil/fill tracked onto the former Pearl Street Parcel. Any removed material will be placed beneath the cover on the 176 Dennison Parkway parcel. All re-use of site materials must be approved by NYSDEC.

The total amounts of fill materials from the 201 East 1st Street parcel and from the Future Building Area on the 176 Denison Parkway parcel that will be relocated to the areas outside the Future Building Area on the 176 Denison Parkway parcel are estimated to be approximately 12,500 CY.

In addition to the above, the following additional subsurface materials will be managed:

- Building footers/ foundations identified during the March 2017 test pitting activities that are within Future Building Areas will also be removed (refer to Figure 5).
- Footer walls left in place in the former Powerhouse Building proximate the UST that are within the Future Building Areas will be removed (refer to Figure 7).

A representation of the fill relocation and grading is shown on Figures 5, 5A, and 5B.

Based on the RI work, the following classes of material have been defined in an effort to guide management of materials during the excavation work.

Material Classification for Fill Relocation and Grading

Class	Description	Action	Testing Required
1	Clean material defined as: • Recycled masonry per the ISMP (estimate 8,500 CY); • Imported stone exempt from testing per DER-10 Section 5.4; or • Imported clean fill tested per DER-10 Section 5.4 that meets DER-10 Appendix 5 import criteria.	Stockpile as needed or place immediately as cover (top 2-ft).	• Imported fill must be tested per DER-10 Section 5.4 if it is not exempt from testing (e.g., crushed stone). • Crushed masonry exempt per DER-10 Section 5.4.
2	Apparent clean native material defined as: • Native soils with no evidence of impairment (no odors, no staining, PID readings less than or equal to background)	Stockpile for testing.	Testing per DER-10 Section 5.4 is required. NYSDEC approval required for re-use.
3	Historic fill material consistent with RI observations/findings (est. 12,500 CY) and: • No elevated PID readings • No staining • No odors • No sign of ash/glass materials similar to those observed at 201 East 1st St.	Stockpile as necessary or immediately place in areas outside Future Building Area and beneath cover. NYSDEC approval required for re-use. Must be covered with minimum 2-ft of cover material and must not be used in the Future Building Area	Testing per DER-10 Section 5.4 is not required. (see discussion below) NYSDEC approval required for re-use.
4	Historic fill material inconsistent with RI observations/findings	Stockpile for testing. Material may be used outside Future Building Area and beneath cover if approved by NYSDEC. If utilized, material must be covered with minimum 2-ft of cover material and must not be used in the Future Building Area	Testing per DER-10 Section 5.4 is required. NYSDEC approval required for re-use.

Additional chemical testing of the Class 3 material above is not proposed based on the following:

1. The fill material will not be utilized within the cover material.

2. The fill material has been previously characterized for chemical quality consistent with DER-10 Section 5.4. A request for site re-use beneath the cover material will be based on the RI data which included:

    a. Ten (10) Test Pits
    b. Forty-Five (45) Soil Borings
    c. Nineteen (19) Full Suite Soil Samples of the soil/fill were collected/analyzed during the RI of the material that would be excavated and relocated.

3. The chemical quality of the material is not source and will be managed as remaining contamination through engineering and institutional controls.

    Stock Pile Management Plan

    A Stock Pile Management plan is included as Figure 9. This plan illustrates locations where the different material classes will be managed. The will include a narrative section describing the staging methods, cover systems, erosion control berms, etc. Figures will also be provided by the contractor showing the proposed locations for the stock piles, as well as any other control specifications described previously.

5.0 Air Monitoring & Dust Suppression

The NYSDOH Generic Community Air Monitoring Plan (CAMP), included as Appendix 2, will be implemented during all subsurface work. A water truck will be utilized as necessary in order to minimize dust issues during mass grading efforts. Engineering controls to abate VOC or Dust emissions sources will immediately be put into effect if the action levels identified in the CAMP are exceeded. These engineering controls may include one or more of the following:

- Apply water on exposed materials.
- Wetting equipment and excavation faces.
- Reducing the size of excavated areas.
- Immediately placing sub-base or covering with plastic sheeting.
- Covering emission sources with stockpiled materials.
- Applying Non PFOA containing foam vapor suppressants (suppressants must be approved by the NYSDEC).

6.0 Utilities

The existing conditions at the Site are identified on Figure 7. In addition to the elevation contours and stockpiled materials, Figure 7 includes utilities that were located during several surveys of the Site. Utilities that are no longer in use will be removed. Active utilities have been identified and these will remain at the Site and are listed below:

- Sanitary sewer – This utility bisects the site through central portion of the Site. This utility may be removed during the redevelopment work by a future developer but will remain in place during the remedial work.
- Natural gas line – This utility is located along the southern portion of the property.
- Fiber optic line – This utility is located along the southern portion of the property.
- Telephone line – This utility is located along the southern portion of the property.

Refer to Figure 7 for locations of utilities to be removed and the above active utilities. It is the responsibility of the contractor to identify, locate and protect any active utility. The contractor will be responsible for conducting a Dig Safely NY utility stakeout prior to conducting ground intrusive work.

7.0 Site Security

Access to the site will be restricted until all protective cover systems are in place. A fence is currently located around the 176 Denison Parkway parcel and a portion of the 201 East 1st Street parcel. A fence will be extended around the remaining portion of the 201 East 1st Street parcel to increase site security during the remedial work.

8.0 Stormwater & Excavation Water Management

Stormwater

As previously noted, the Site will be generally 1.5-ft. below the final site grade which matches the grade at the property lines. As such, the site will be lower than the surrounding properties. Based on this, storm water will be retained on the Site. During construction, the following will be implemented:

Barriers (e.g., silt fencing) and hay bale checks will be installed as determined by the engineer in accordance with standard stormwater pollution prevention measures. It should be noted that the 176 Denison Parkway parcel slopes inward and thus run-off from the Site is contained within this parcel. Furthermore, the Stockpile Management Plan (Figure 9) requires that all stockpiles must be placed on and covered by polysheeting and maintained throughout the temporary stockpiling of such materials. As such, run-off is not anticipated; however, where necessary barriers (e.g., silt fencing) and other such measures will be used wherever there is the potential for off-site run-off. The stockpile management plan will serve as the Storm Water Pollution Prevention Plan (SWPPP) for the site.

Any storm water measures installed will be inspected once a week and after every storm event by the engineer. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately. These features will be maintained as needed with any accumulated sediments removed as required to keep the barrier and hay bale check functional. In the event of undercutting or erosion of silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Excavation Water

The Site is well drained and accumulation of water is anticipated to be minimal; however, in the event that it is necessary to dewater any areas to facilitate the remedial work, the following identifies proper handling, treatment and discharge procedures for groundwater and/or rainwater that may enter the excavation area. The specific steps are identified below:

1. Initially, the local municipality (City of Corning) will be contacted in order to obtain a sewer use permit for discharging (subsequent to testing and treatment, if necessary) groundwater and/or rainwater that may collect in the excavation. Alternatively, and subsequent to subsequent to chemical testing and treatment an application may be made to the NYSDEC to discharge to surface or ground water.

2. In the event that groundwater or rainwater require removal from an excavation, containment tank(s) of adequate size will be mobilized to the Site and staged at a location close to the area. The appropriate number and size of trash pumps to dewater the excavation will be mobilized. The pumps will be able to generate enough head to pump the water to the containment tanks.

   Water Management:

   - When a containment tank with water becomes full, one sample of water from the tank will be collected and submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory. The groundwater samples will be sampled for parameters required by the local municipality for sewer use (anticipated to be VOCs, SVOCs, and metals).
   - The laboratory test results will be compared to the applicable sanitary sewer discharge requirements. In the event that contaminant concentrations exceed the discharge requirements established with the local municipality, the water in the containment tank will be treated using an appropriate system (e.g., carbon, air stripper, etc.) to remove contaminants and discharged to a second containment tank (or pumped in a loop through the treatment system and back into the same tank), at which time a second sample of the water will be collected in order to confirm that contaminants were removed to concentrations below the appropriate criteria. This process will be repeated if necessary.
   - Subsequent to obtaining samples of the containerized water that are below the applicable criteria, the water will be discharged in accordance with the sewer use permit to the nearest sanitary sewer discharge location (there are several such on-site). If a discharge permit cannot be obtained, the wastewater will be held on-site until an appropriately permitted disposal location is determined.
   - In the event that discharge criteria cannot be met, the water will be sent off-site for disposal at an approved facility.

9.0 Interim Site Management Plan

The removal of subsurface utilities and structures described in this plan are not required remedial actions however these activities will be in accordance with the Interim Site Management Plan.

10.0 Health and Safety

A general site Health and Safety Plan (HASP) for this project is included as Appendix 1. The NYSDOH Generic CAMP will be utilized and is included as Appendix 2. The owner/engineer is responsible to provide the NYSDEC with any contractor specific HASPs and ensure that work at the BCP Site proceeds in accordance with the HASP or is immediately suspended until deficiencies are rectified.

11.0 Quality Assurance/ Quality Control

Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in Appendix 3. Laboratory QA/QC sampling will include analysis of one (1) duplicate sample for each matrix type at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater. Additionally, one (1) matrix spike/ matrix spike duplicate (MS/MSD) will be collected and analyzed for each twenty samples collected for each parameter group, or one per shipment, whichever is greater. The MS/MSD will be analyzed for the same parameters as that of the field samples. The samples will be delivered under Chain of Custody procedures to an ELAP-certified laboratory. The laboratory will provide a NYSDEC Analytical Service Protocol (ASP) Category B Deliverable and Electronic Data Deliverable (EDD). A Data Usability Summary Report (DUSR) will be completed for all ASP Category B format laboratory data packages per DER-10. The DUSRs will include the laboratory data summary pages showing corrections made by the data validator. ASP Category B deliverables and DUSRs will not be generated for waste characterization samples.

12.0 Schedule and Deliverables

Implementation of the RAWP is anticipated to begin within 60 days of NYSDEC approval. A Final Engineering Report will be completed with as-built drawings detailing the work completed. The FER will be provided in an electronic format in accordance with DER-10 Section 1.15. The estimated schedule is provided below:

Milestone	**Estimated Date**
NYSDEC RAWP Review	February 2018
Contractor Bidding	February 2018
NYSDEC Approval of RAWP	February 20th, 2018
Contractor Award	February 20th, 2018
Remedial Action Construction Implementation	February – May 2018
Site Development Commencement (estimated)	May 2018
Site Management Plan (SMP) Submission	May 2018
Final Engineering Report (FER) Submission	June 2018
NYSDEC SMP & FER Review/Revisions	June 2018
SMP and FER Approval & Easement Filing	June 2018
Certificate of Completion	July 2018

LaBella Associates, D.P.C.
300 State Street

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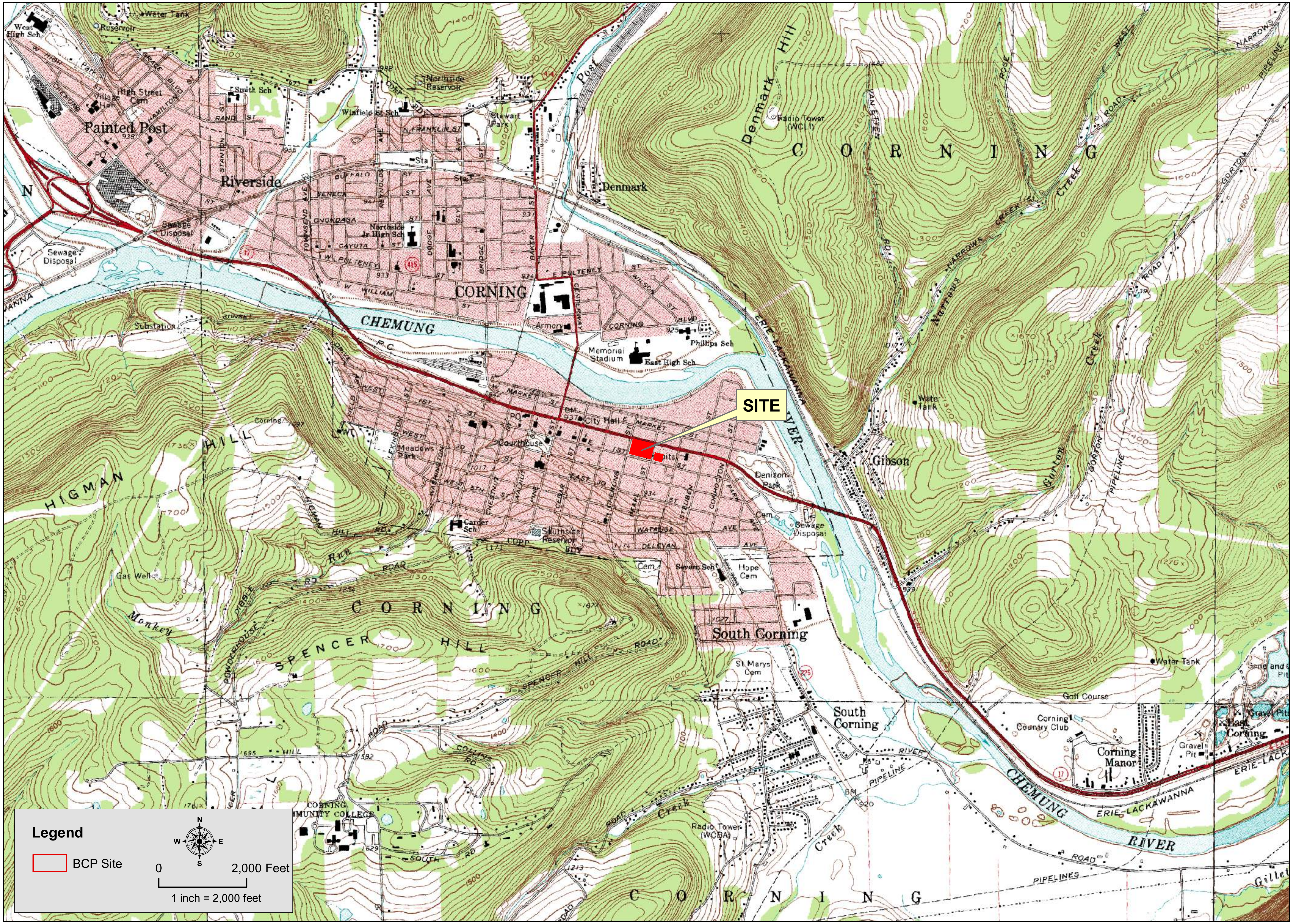
Figures



Document Path: I:\Corning Hospital\2150606 - Phase II ESA\Drawings\RAWP\Figure 1- Site location.mxd

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PROJECT/CLIENT

REMEDIAL ACTION WORK PLAN

FORMER CORNING HOSPITAL
AND RELATED PARCELS
CORNING, NEW YORK
C85049

DRAWING TITLE

SITE LOCATION MAP

USGS TOPOGRAPHIC MAP

ISSUED FOR: FINAL

DATE: 8/23/2017

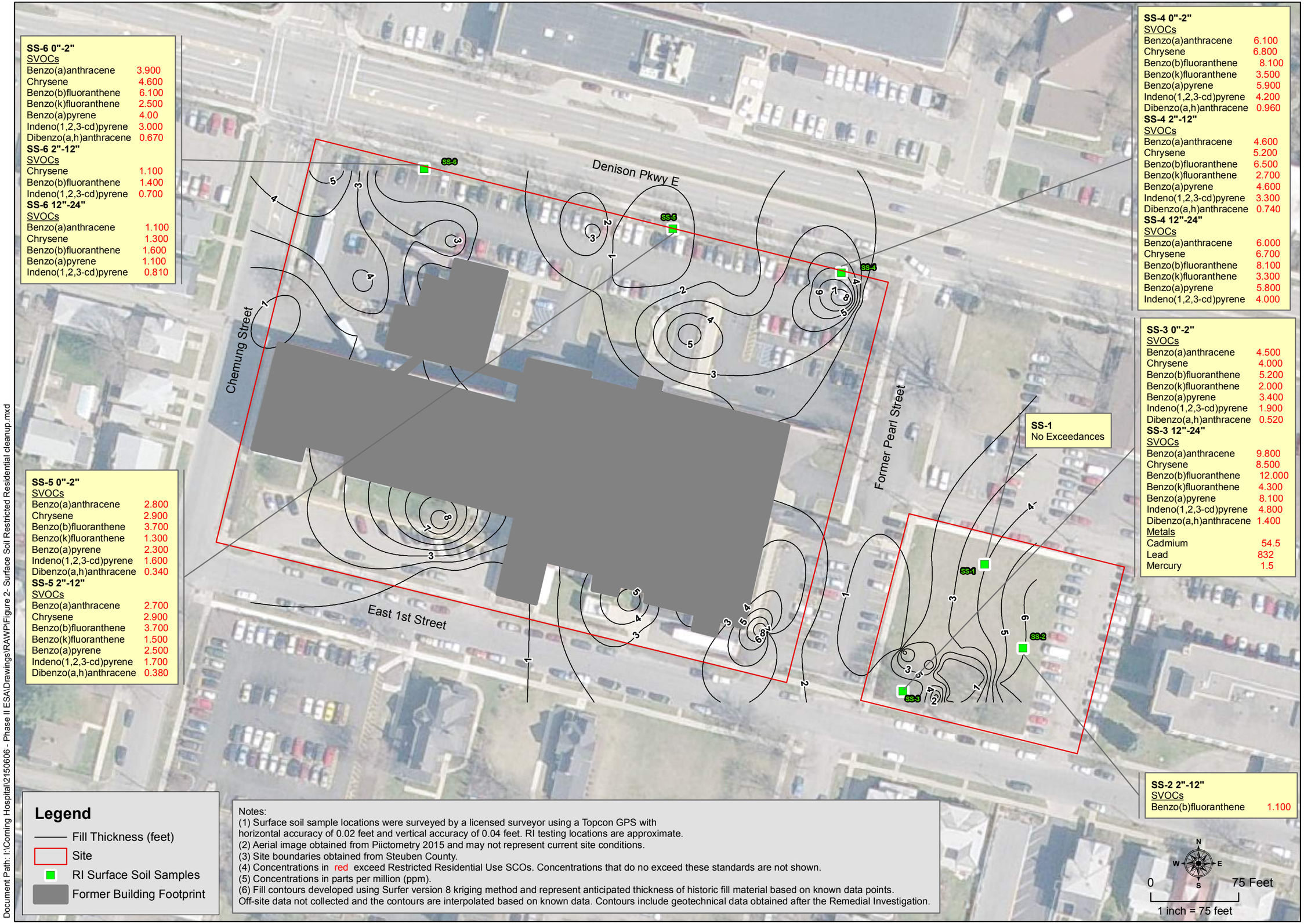
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN

Intended to print as 11x17

PROJECT/DRAWING NUMBER

2150606

FIGURE 1



SS-6 0"-2"
SVOCs

Benzo(a)anthracene	3.900
Chrysene	4.600
Benzo(b)fluoranthene	6.100
Benzo(k)fluoranthene	2.500
Benzo(a)pyrene	4.00
Indeno(1,2,3-cd)pyrene	3.000
Dibenzo(a,h)anthracene	0.670

SS-6 2"-12"
SVOCs

Chrysene	1.100
Benzo(b)fluoranthene	1.400
Indeno(1,2,3-cd)pyrene	0.700

SS-6 12"-24"
SVOCs

Benzo(a)anthracene	1.100
Chrysene	1.300
Benzo(b)fluoranthene	1.600
Benzo(a)pyrene	1.100
Indeno(1,2,3-cd)pyrene	0.810

SS-5 0"-2"
SVOCs

Benzo(a)anthracene	2.800
Chrysene	2.900
Benzo(b)fluoranthene	3.700
Benzo(k)fluoranthene	1.300
Benzo(a)pyrene	2.300
Indeno(1,2,3-cd)pyrene	1.600
Dibenzo(a,h)anthracene	0.340

SS-5 2"-12"
SVOCs

Benzo(a)anthracene	2.700
Chrysene	2.900
Benzo(b)fluoranthene	3.700
Benzo(k)fluoranthene	1.500
Benzo(a)pyrene	2.500
Indeno(1,2,3-cd)pyrene	1.700
Dibenzo(a,h)anthracene	0.380

SS-4 0"-2"
SVOCs

Benzo(a)anthracene	6.100
Chrysene	6.800
Benzo(b)fluoranthene	8.100
Benzo(k)fluoranthene	3.500
Benzo(a)pyrene	5.900
Indeno(1,2,3-cd)pyrene	4.200
Dibenzo(a,h)anthracene	0.960

SS-4 2"-12"
SVOCs

Benzo(a)anthracene	4.600
Chrysene	5.200
Benzo(b)fluoranthene	6.500
Benzo(k)fluoranthene	2.700
Benzo(a)pyrene	4.600
Indeno(1,2,3-cd)pyrene	3.300
Dibenzo(a,h)anthracene	0.740

SS-4 12"-24"
SVOCs

Benzo(a)anthracene	6.000
Chrysene	6.700
Benzo(b)fluoranthene	8.100
Benzo(k)fluoranthene	3.300
Benzo(a)pyrene	5.800
Indeno(1,2,3-cd)pyrene	4.000

SS-3 0"-2"
SVOCs

Benzo(a)anthracene	4.500
Chrysene	4.000
Benzo(b)fluoranthene	5.200
Benzo(k)fluoranthene	2.000
Benzo(a)pyrene	3.400
Indeno(1,2,3-cd)pyrene	1.900
Dibenzo(a,h)anthracene	0.520

SS-3 12"-24"
SVOCs

Benzo(a)anthracene	9.800
Chrysene	8.500
Benzo(b)fluoranthene	12.000
Benzo(k)fluoranthene	4.300
Benzo(a)pyrene	8.100
Indeno(1,2,3-cd)pyrene	4.800
Dibenzo(a,h)anthracene	1.400
Metals	
Cadmium	54.5
Lead	832
Mercury	1.5

SS-1
No Exceedances

SS-2 2"-12"
SVOCs

Benzo(b)fluoranthene	1.100

Legend

- Fill Thickness (feet)
- Site
- RI Surface Soil Samples
- Former Building Footprint

Notes:
(1) Surface soil sample locations were surveyed by a licensed surveyor using a Topcon GPS with horizontal accuracy of 0.02 feet and vertical accuracy of 0.04 feet. RI testing locations are approximate.
(2) Aerial image obtained from Piictometry 2015 and may not represent current site conditions.
(3) Site boundaries obtained from Steuben County.
(4) Concentrations in red exceed Restricted Residential Use SCOs. Concentrations that do no exceed these standards are not shown.
(5) Concentrations in parts per million (ppm).
(6) Fill contours developed using Surfer version 8 kriging method and represent anticipated thickness of historic fill material based on known data points. Off-site data not collected and the contours are interpolated based on known data. Contours include geotechnical data obtained after the Remedial Investigation.

N W E S

0 75 Feet

1 inch = 75 feet

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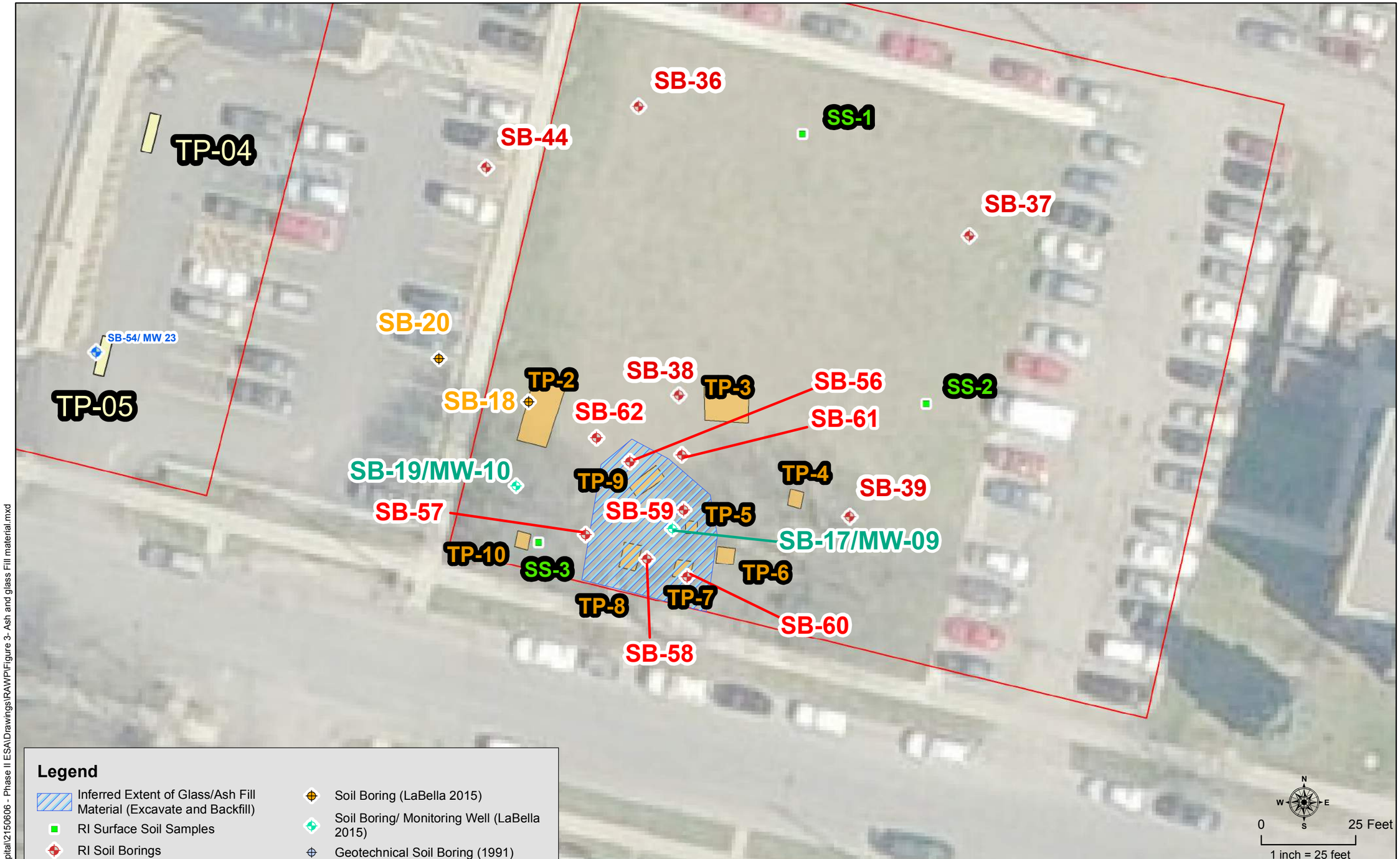
PROJECT/CLIENT
REMEDIAL ACTION WORK PLAN
FORMER CORNING HOSPITAL
AND RELATED PARCELS
CORNING, NEW YORK
C851049

DRAWING TITLE
SURFACE SOIL
IMPACTS AND FILL MATERIAL
EXTENT

ISSUED FOR: FINAL
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN
DATE: 11/22/2017
Intended to print as 11x17

PROJECT/DRAWING NUMBER
2150606
FIGURE 2



Legend

- Inferred Extent of Glass/Ash Fill Material (Excavate and Backfill)
- RI Surface Soil Samples
- RI Soil Borings
- RI Interior Monitoring Wells
- RI Monitoring Wells to 20-ft.
- RI Monitoring Well to 40-ft.
- RI Monitoring Well to 75-ft
- RI Test Pits
- Soil Boring (LaBella 2015)
- Soil Boring/ Monitoring Well (LaBella 2015)
- Geotechnical Soil Boring (1991)
- Geotechnical Borings (Foundation Design 2015)
- Test Pits (LaBella 2015)
- Approximate Basement
- Site

Notes:
(1) LaBella soil borings (except SB-30 and SB-44 which are approximate), surface soil samples, monitoring wells, and RI TP-1 through RI TP-7 were surveyed by a licensed surveyor using a Topcon GPS with horizontal accuracy of 0.02 feet and vertical accuracy of 0.04 feet.
(2) 2015 pits and RI TP-8 through RI TP-10 were measured from existing site features and are considered approximate.
(3) Aerial image obtained from Piictometry 2015 and may not represent current site conditions.
(4) Site boundaries obtained from Steuben County.
(5) Geotechnical soil borings were georeferenced from previous reports and are considered approximate.
(6) Locations tested during the Phase II ESA off the BCP Site with the exception of Former Pearl Street are excluded.
(7) Inferred extent of fill material determined based on a review of all soil borings and test pits shown on this figure and interpolation between testing locations.

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REMEDIAL ACTION WORK PLAN
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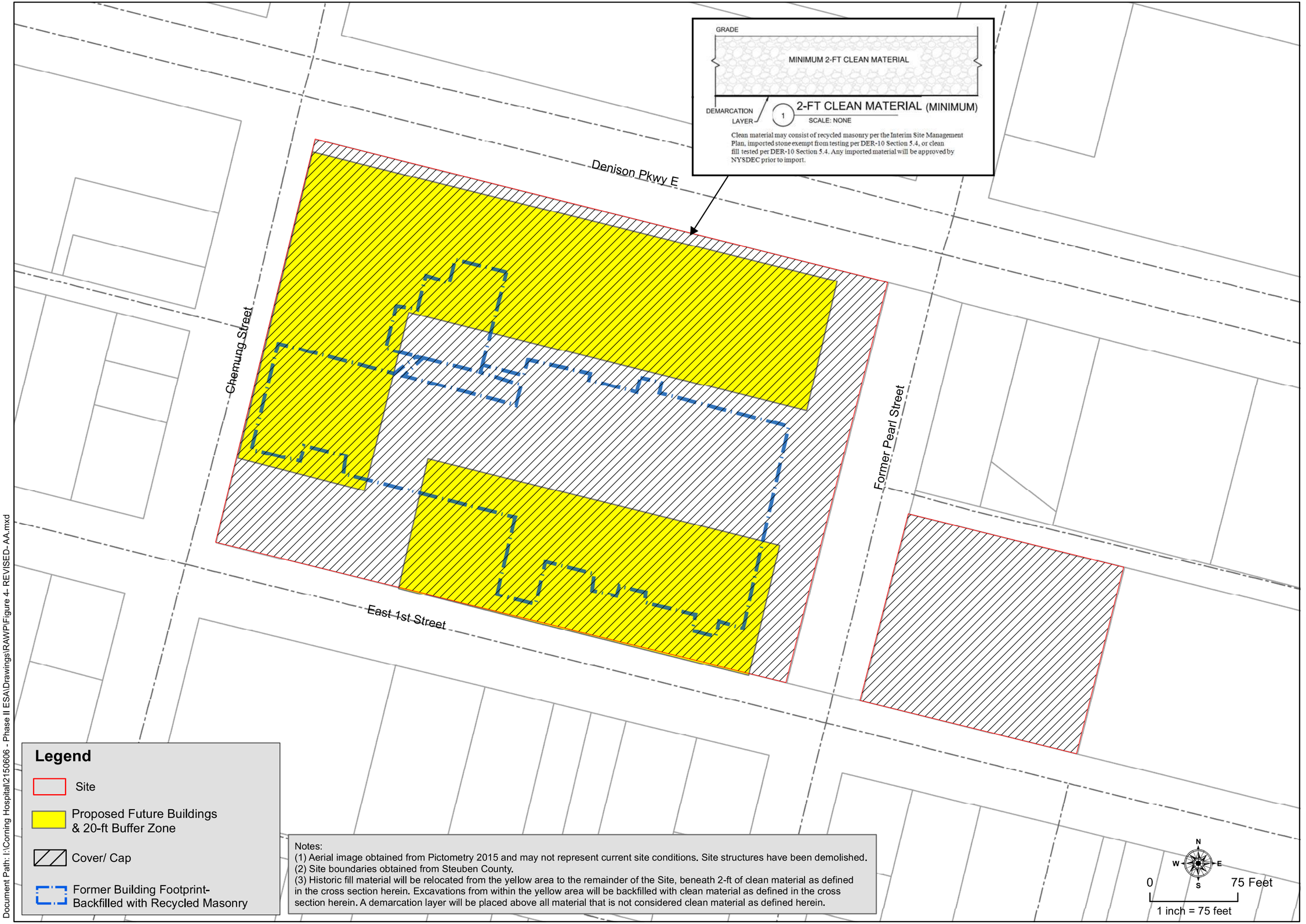
DRAWING TITLE
RAOC #4 ASH AND GLASS FILL MATERIAL

ISSUED FOR: FINAL
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN
DATE: 11/21/2017
Intended to print as 11x17

PROJECT/DRAWING NUMBER
2150606
FIGURE 3

Document Path: I:\Corning Hospital\2150606 - Phase II ESA\Drawings\RAWP\Figure 3- Ash and glass Fill material.mxd



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PROJECT/CLIENT

REMEDIAL ACTION WORK PLAN

FORMER CORNING HOSPITAL AND RELATED PARCELS
CORNING, NEW YORK
C851049

DRAWING TITLE

SELECTED REMEDY
RESTRICTED RESIDENTIAL
CLEANUP (TRACK 4)

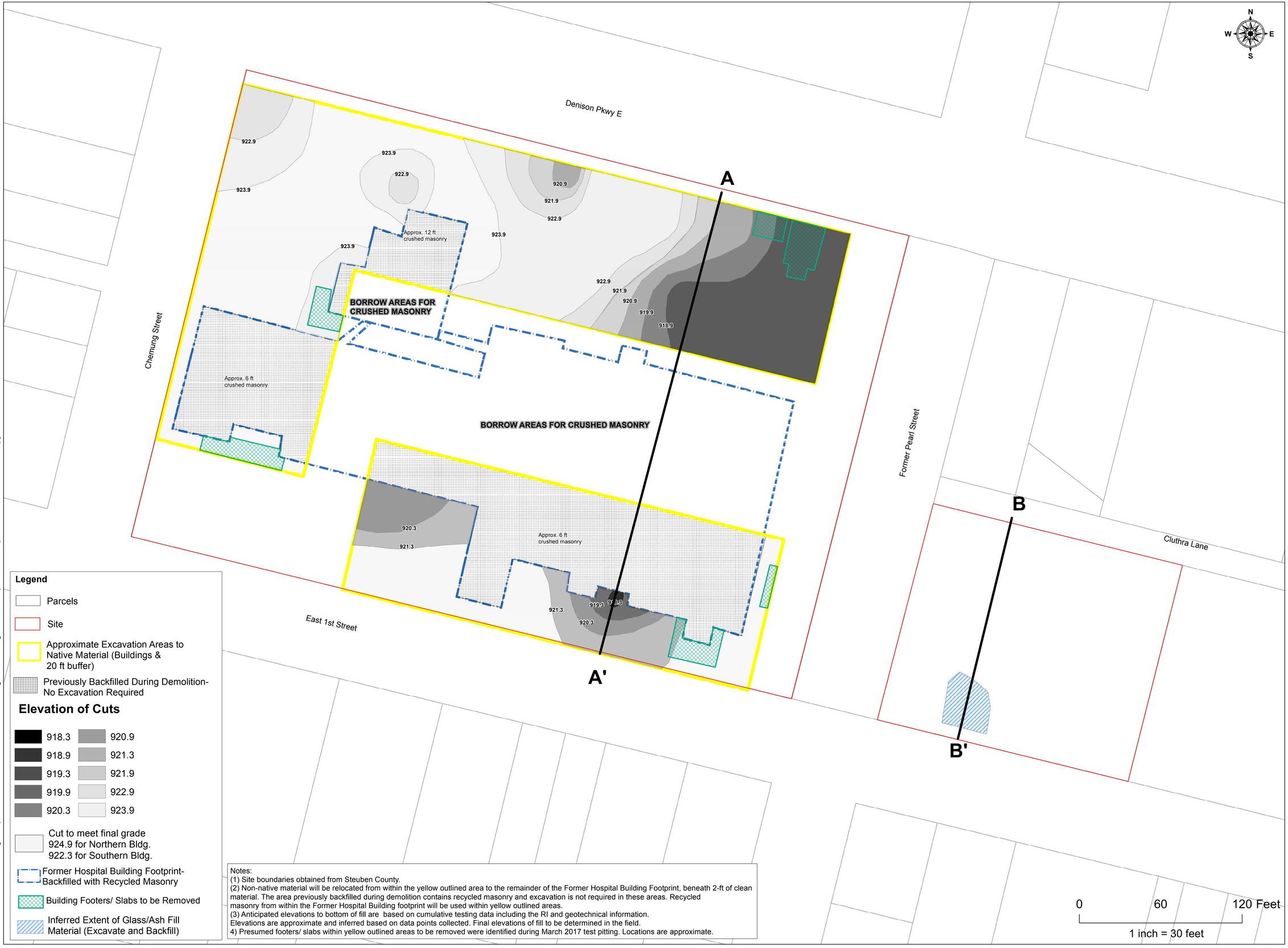
ISSUED FOR: FINAL
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN
DATE: 11/20/2017
Intended to print as 11x17

PROJECT/DRAWING NUMBER

2150606

FIGURE 4

Document Path: I:\Corning Hospital\2150606 - Phase II ESA\Drawings\RAWP\Figure 4- REVISED- AA.mxd



Legend

- Parcels
- Site
- Approximate Excavation Areas to Native Material (Buildings & 20 ft buffer)
- Previously Backfilled During Demolition- No Excavation Required

Elevation of Cuts

918.3	920.9
918.9	921.3
919.3	921.9
919.9	922.9
920.3	923.9

- Cut to meet final grade 924.9 for Northern Bldg. 922.3 for Southern Bldg.
- Former Hospital Building Footprint- Backfilled with Recycled Masonry
- Building Footers/ Slabs to be Removed
- Inferred Extent of Glass/Ash Fill Material (Excavate and Backfill)

Notes:
(1) Site boundaries obtained from Steuben County.
(2) Non-native material will be relocated from within the yellow outlined area to the remainder of the Former Hospital Building Footprint, beneath 2-ft of clean material. The area previously backfilled during demolition contains recycled masonry and excavation is not required in these areas. Recycled masonry from within the Former Hospital Building footprint will be used within yellow outlined areas.
(3) Anticipated elevations to bottom of fill are based on cumulative testing data including the RI and geotechnical information. Elevations are approximate and inferred based on data points collected. Final elevations of fill to be determined in the field.
4) Presumed footers/ slabs within yellow outlined areas to be removed were identified during March 2017 test pitting. Locations are approximate.

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REMEDIAL ACTION WORK PLAN

FORMER CORNING HOSPITAL AND RELATED PARCELS CORNING, NEW YORK C851049

DRAWING TITLE

SITE GRADING AND EXCAVATIONS

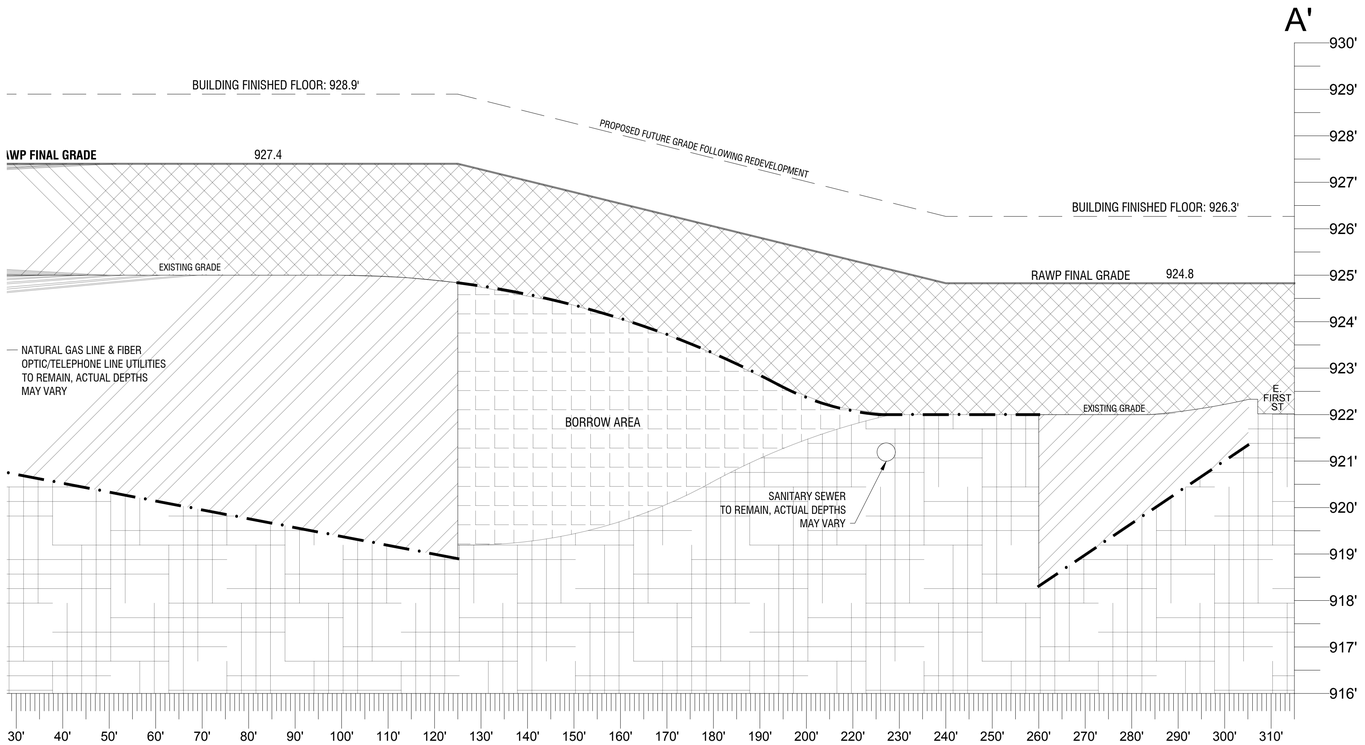
ISSUED FOR: FINAL
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN
DATE: 11/22/2017
Intended to print as 36 X 24 (ARCH D)

PROJECT/DRAWING NUMBER

2150606

FIGURE 5

Document Path: I:\Corning Hospital\2150606 - Phase II ESA\Drawings\RAWP\Figure 5- Anticipated Fill Depths ARCH D revised - Copy.mxd



N PREVIOUS TESTING AND INFERRED BETWEEN DATA POINTS.
PROXIMATE AND TO BE DETERMINED IN THE FIELD.
CONSIST OF RECYCLED MASONRY PER THE INTERIM SITE
PORTED STONE EXEMPT FROM TESTING PER DER-10 SECTION
TED PER DER-10 SECTION 5.4. ANY IMPORTED MATERIAL WILL
YSDEC.
S LOCATION WHERE CRUSHED MASONRY WILL BE REMOVED &
ERIAL & RELOCATED FILL MATERIAL PLACED BENEATH COVER.

- CRUSHED MASONRY
- NATIVE MATERIAL
- FILL MATERIAL AREA WITHIN FUTURE BUILDING ARE TO BE EXCAVATED & BACKFILLED WITH COVER MATERIAL
- FILL MATERIAL - EXCAVATE AND BACKFILL WITH CLEAN COVER MATERIAL
- DEMARCATION LAYER

NO.	REVISION	BY	DATE
1			
2			
3			
4			
5			
6			

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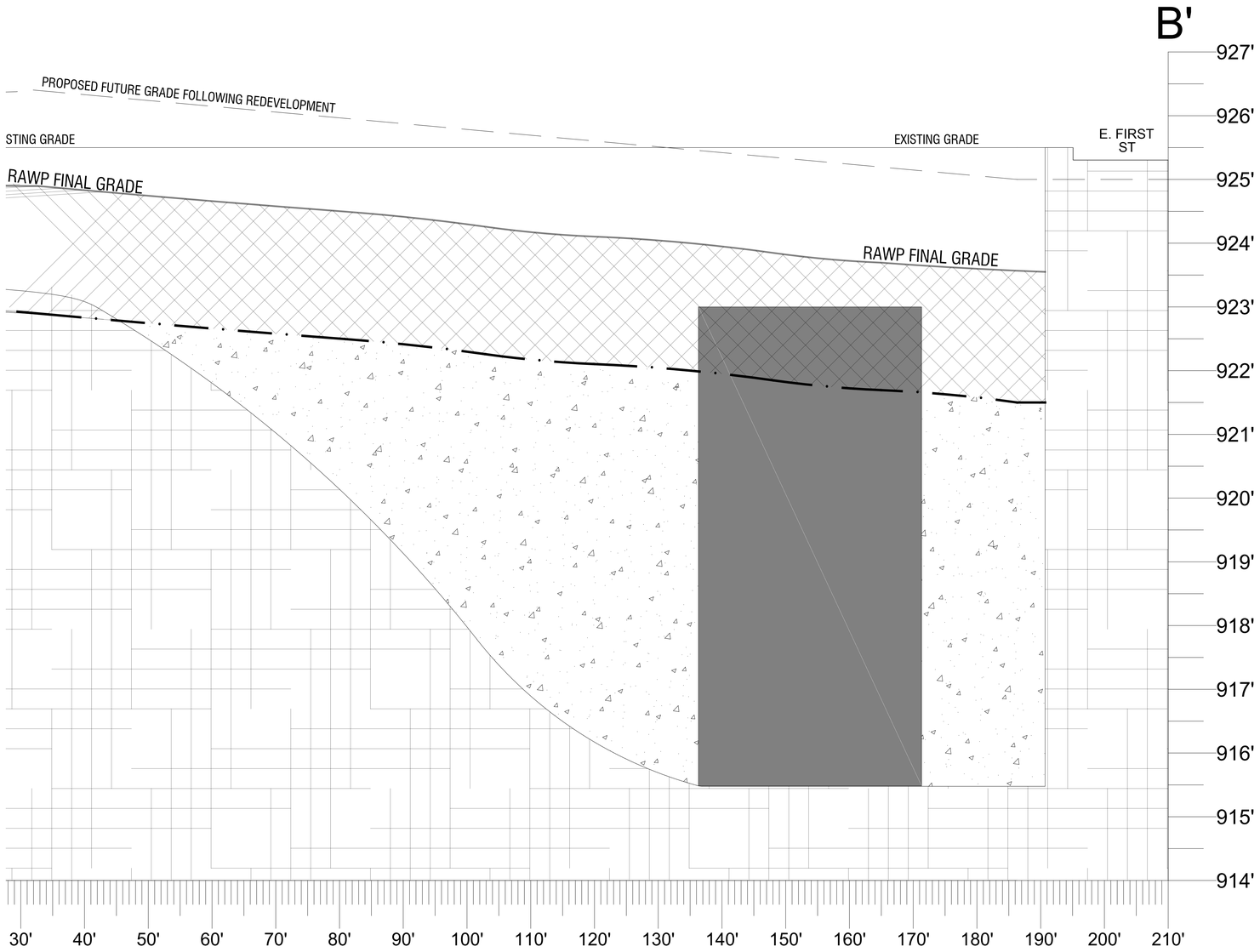
C851049

DRAWING TITLE:
CONCEPTUAL SITE MODEL
CROSS SECTION A-A'

ISSUED FOR: FINAL
DATE: NOVEMBER, 2017
DESIGNED BY: AA
DRAWN BY: DRP
REVIEWED BY: AA

PROJECT/DRAWING NUMBER
2150606

FIGURE 5A



PREVIOUS TESTING AND INFERRED BETWEEN DATA POINTS.
OXIMATE AND TO BE DETERMINED IN THE FIELD.
ISIST OF RECYCLED MASONRY PER THE INTERIM SITE
RTED STONE EXEMPT FROM TESTING PER DER-10 SECTION
D PER DER-10 SECTION 5.4. ANY IMPORTED MATERIAL WILL
DEC, PRIOR TO IMPORT.

- ASH/GLASS FILL TO BE REMOVED/BACKFILLED WITH CLEAN MATERIAL
- FILL MATERIAL TO BE LEFT IN PLACE
- NATIVE MATERIAL
- FILL MATERIAL - EXCAVATE AND BACKFILL WITH CLEAN COVER MATERIAL
- DEMARCATION LAYER

NO.	REVISION	BY	DATE
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DRAWING TITLE:
CONCEPTUAL SITE MODEL
CROSS SECTION B-B'

ISSUED FOR: FINAL
DATE: NOVEMBER, 2017
DESIGNED BY: AA
DRAWN BY: DRP
REVIEWED BY: AA

PROJECT/DRAWING NUMBER
2150606

FIGURE 5B

Legend

- 10,000-gallon UST
- Petroleum impacts beneath retaining wall
- Retaining Wall
- Area of petroleum impacts removed during demolition
- Former Building Footprint- Demolished 2016-2017

0 20 Feet

1 inch = 20 feet

N W E S

Notes:
(1) Aerial image obtained from Pictometry 2015 and may not represent current site conditions. Site structures have been demolished.

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PROJECT/CLIENT

REMEDIAL ACTION WORK PLAN

FORMER CORNING HOSPITAL
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CORNING, NEW YORK
C851049

DRAWING TITLE

PETROLEUM IMPACTS

ISSUED FOR: FINAL
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN
DATE: 11/21/2017

Intended to print as 11x17

PROJECT/DRAWING NUMBER

2150606

FIGURE 6

Document Path: I:\Corning Hospital\2150606 - Phase II ESA\Drawings\RAWP\Figure 6- Petroleum Impacts.mxd

GENERAL NOTES:

1. THE CONTRACTOR ALONE SHALL BE RESPONSIBLE TO LOCATE UTILITIES OUTSIDE THE RIGHT-OF-WAY INCLUDING PRIVATE ROADS (i.e., FORMER PEARL STREET).
2. SITE DRAINAGE, INCLUDING THE PROJECT SITE AND ADJACENT PRIVATE AND PUBLIC ROADWAYS, DRIVES, PARKING AREAS OR PROPERTIES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING ALL MATERIALS, TOOLS AND EQUIPMENT, INCLUDING SPECIAL CUTTING DEVICES, NECESSARY TO PERFORM THE WORK CONTAINED IN THIS CONTRACT.
4. THE SIZES AND MATERIAL OF CONSTRUCTION OF WATER MAINS, SANITARY SEWERS AND STORM SEWERS TO REMAIN ARE REPUTED. THE CONTRACTOR SHALL VERIFY SIZES OF ALL UTILITIES WHERE CONNECTIONS TO OR DISCONNECT FROM SAID EXISTING UTILITIES ARE REQUIRED. EXCAVATION TO VERIFY THESE UTILITIES SHALL BE MADE AT NO ADDITIONAL COST TO THE OWNER.
5. THE CONTRACTOR SHALL PROTECT ALL EXISTING SITE AMENITIES NOT DESIGNATED FOR REMOVAL.
6. UNLESS OTHERWISE INDICATED ON THE PLANS OR DIRECTED BY THE ARCHITECT/ENGINEER, THE CONTRACTOR IS RESPONSIBLE FOR PRESERVING AND PROTECTING FROM DAMAGE ALL TREES, SHRUBS AND PLANTS IN THE VICINITY OF THE PROPOSED WORK.
7. THE CONTRACTOR SHALL PROTECT AND SUPPORT ALL EXISTING UTILITIES DESIGNATED TO REMAIN FOR THE DURATION OF THE CONTRACT.
8. ANY SITE AMENITY, UTILITY, STREET APPURTENANCE, OR OTHER ITEM WHICH BECOMES DAMAGED AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED IN-KIND BY THE CONTRACTOR AS DETERMINED BY THE PROJECT MANAGER OR ARCHITECT/ENGINEER AND AT NO ADDITIONAL COST TO THE OWNER.

EROSION & SEDIMENT CONTROL NOTES

1. ALL EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL, AND LOCAL GOVERNING SOIL AND WATER CONSERVATION AGENCY RECOMMENDATIONS AND STANDARDS.
2. THE CONTRACTOR IS RESPONSIBLE FOR UTILIZING EROSION AND SEDIMENTATION CONTROL TECHNIQUES IN ALL AREAS OF CONSTRUCTION WHERE SEDIMENT LADEN RUNOFF MAY BE GENERATED BY CONSTRUCTION OPERATIONS.
3. FOR THE DURATION OF THE PROJECT, THE CONTRACTOR SHALL PROTECT ALL WETLANDS, STORM SEWERS AND WATER COURSES FROM CONTAMINATION BY WATER BORNE SILTS, SEDIMENTS, FUELS, SOLVENTS, LUBRICANTS OR OTHER POLLUTANTS ORIGINATING FROM ANY WORK DONE ON, OR IN SUPPORT OF THIS PROJECT.
4. THE CONTRACTOR SHALL MAINTAIN SITE CONDITIONS WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS OR INTERFERE WITH THE OPERATION OF THE EXISTING FACILITY. THE CONTRACTOR SHALL KEEP CLEAN AND FREE ALL SIDEWALKS, STREETS, DRIVES, CART PATHS AND OTHER PAVEMENTS FROM DIRT, MUD, STONES AND OTHER HAULED MATERIALS AS A RESULT OF HIS WORK.

DEMOLITION NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BID. NO ALLOWANCE WILL BE MADE FOR ADDITIONAL COSTS DUE TO CONTRACTOR'S FAILURE TO VERIFY EXISTING CONDITIONS AND DIMENSIONS.
2. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL TO NOTIFY DIG SAFELY NEW YORK AT 1-800-962-7962 TO REQUEST UTILITY STAKEOUT OF ALL PUBLIC UTILITIES.
3. WORK ASSOCIATED WITH THIS CONTRACT WILL OCCUR IN AN URBAN SETTING WITH ADJACENT ACTIVE SIDEWALKS AND STREETS. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO MINIMIZE DISRUPTION TO THE ADJACENT PUBLIC AREAS. CONTRACTOR SHALL BE SOLELY RESPONSIBLE TO PROVIDE A SAFE WORK SITE AND TO PROTECT THE PUBLIC, VISITORS AND EMPLOYEES FROM HARM AS A RESULT OF HIS CONSTRUCTION ACTIVITIES.
4. THE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING ABOVE GROUND AND BELOW GROUND UTILITIES, STRUCTURES, AND APPURTENANCES SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES, STRUCTURES, AND APPURTENANCES IN THE PATH OF AND ADJACENT TO THE PROPOSED WORK.
5. SITE DRAINAGE, INCLUDING THE PROJECT SITE AND ADJACENT PRIVATE AND PUBLIC ROADWAYS, DRIVES, PARKING AREAS OR PROPERTIES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
6. CONTRACTOR SHALL PROTECT AND SUPPORT ALL EXISTING UTILITIES DESIGNATED TO REMAIN FOR THE DURATION OF THE CONTRACT.
7. THE CONTRACTOR SHALL NOTIFY THE LOCAL GOVERNMENT, LOCAL FIRE DEPARTMENT AND THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) AS NECESSARY AND SHALL OBTAIN ANY REQUIRED PERMITS PRIOR TO BEGINNING WORK. COPIES OF ANY REQUIRED PERMITS SHALL BE PROVIDED TO THE OWNER BY THE CONTRACTOR PRIOR TO BEGINNING THE WORK.
8. CONTRACTOR SHALL REMOVE FROM SITE, MATERIALS NOT INDICATED TO BE SALVAGED INCLUDING ALL DEBRIS. ALL REMOVED MATERIALS SHALL BECOME THE PROPERTY OF CONTRACTOR WHO SHALL LEGALLY DISPOSE OF SAME.
9. ALL TREES, SHRUBS AND PLANTS DESIGNATED TO REMAIN AND DISTURBED BY CONSTRUCTION OPERATIONS, SHALL BE REPLACED IN-KIND AS DIRECTED BY THE ARCHITECT/ENGINEER AND/OR OWNER'S DESIGNATED REPRESENTATIVE AT NO ADDITIONAL COST TO THE OWNER.
10. IN ACCORDANCE WITH NYSDEC REGULATIONS, TREES SHALL BE REMOVED FROM NOV. 1 TO APR. 1. NO TREE REMOVALS OUTSIDE OF THESE DATES WILL BE PERMITTED.
11. THE CONTRACTOR SHALL MAINTAIN SAFE VEHICULAR AND PEDESTRIAN ACCESS TO THE EXISTING BUILDINGS FOR THE DURATION OF THE CONTRACT.
12. WHEN EXISTING CONSTRUCTION WHICH IS TO REMAIN IS DAMAGED DURING THE COURSE OF CONSTRUCTION AS A RESULT OF CONTRACTORS WORK, IT SHALL BE REPAIRED AND/OR REPLACED WITH SIMILAR OR LIKE MATERIALS AS MUCH AS POSSIBLE, AT NO COST TO THE OWNER. ALL REPAIRS AND/OR REPLACEMENTS WILL BE SUBJECT TO OWNERS APPROVAL.
13. COORDINATE LOCATION OF TEMPORARY CONSTRUCTION FENCE AND TEMPORARY STONE STAGING AREA WITH OWNER

SURVEY NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BID. NO ALLOWANCE WILL BE MADE FOR ADDITIONAL COSTS DUE TO CONTRACTOR'S FAILURE TO VERIFY EXISTING CONDITIONS,
2. THE CONTRACTOR SHALL LOCATE, MARK, SAFEGUARD AND PRESERVE ALL SURVEY MARKERS AND RIGHT-OF-WAY MARKERS IN THE AREA OF CONSTRUCTION.
3. ANY IRON PINS, MONUMENTS OR OTHER ITEMS DEFINING PROPERTY LINES WHICH ARE DISTURBED BY CONSTRUCTION OPERATIONS SHALL BE PROPERLY TIED AND ACCURATELY RESET BY A NYS LICENSED SURVEYOR UPON COMPLETION OF THE WORK.

BROWNFIELD CLEANUP PROGRAM SITE NOTES

1. PROMPTLY REMOVE AND PROPERLY DISPOSE OF OFF-SITE ALL MATERIALS NOT OTHERWISE DESIGNATED TO BE STORED, REUSED, RELOCATED OR TURNED OVER TO THE OWNER. ALL DISPOSALS SHALL BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. OBTAIN ANY AND ALL PERMITS REQUIRED FOR THE DISPOSAL. ALL EXCAVATION ACTIVITIES MUST BE COMPLETED IN ACCORDANCE WITH THE NYSDEC APPROVED REMEDIAL ACTION WORK PLAN.
2. THE CONTRACTOR SHALL DEWATER ALL EXCAVATIONS (AS NECESSARY) TO PREVENT THE INTRODUCTION OF GROUNDWATER INTO THE TRENCHES/EXCAVATIONS. PROVIDE ALL EQUIPMENT NECESSARY TO MAINTAIN THE GROUNDWATER LEVEL AS NECESSARY. ALL DEWATERING ACTIVITIES MUST BE COMPLETED PER THE NYSDEC APPROVED REMEDIAL ACTION WORK PLAN.
3. CONTRACTOR SHALL PROVIDE AT LEAST 48-HR NOTICE PRIOR TO ANY SUBSURFACE ACTIVITIES SO THAT THE OWNER CAN PROVIDE COMMUNITY AIR MONITORING AND ENVIRONMENTAL MONITORING PER THE NYSDEC APPROVED REMEDIAL ACTION WORK PLAN. NO GROUND INTRUSION WORK CAN OCCUR WITHOUT COMMUNITY AIR MONITORING.
4. ALL IMPORTED SOIL AND STONE MATERIALS REQUIRE NYSDEC APPROVAL PRIOR TO IMPORTING TO THE SITE. CONTRACTOR SHALL PROVIDE SOURCE, QUANTITY AND SIEVE ANALYSIS OF ALL PROPOSED IMPORTED MATERIAL TO ENGINEER PRIOR TO ANY MOBILIZATION AND ENGINEER WILL COORDINATE APPROVAL OR ANY REQUIRED SAMPLING PRIOR TO MOBILIZATION. CONTRACTOR SHALL EXPECT A MINIMUM OF 3 TO 4 WEEKS FOR APPROVAL FOR ANY MATERIAL THAT REQUIRES TESTING.

EXCAVATION/GRADING NOTES

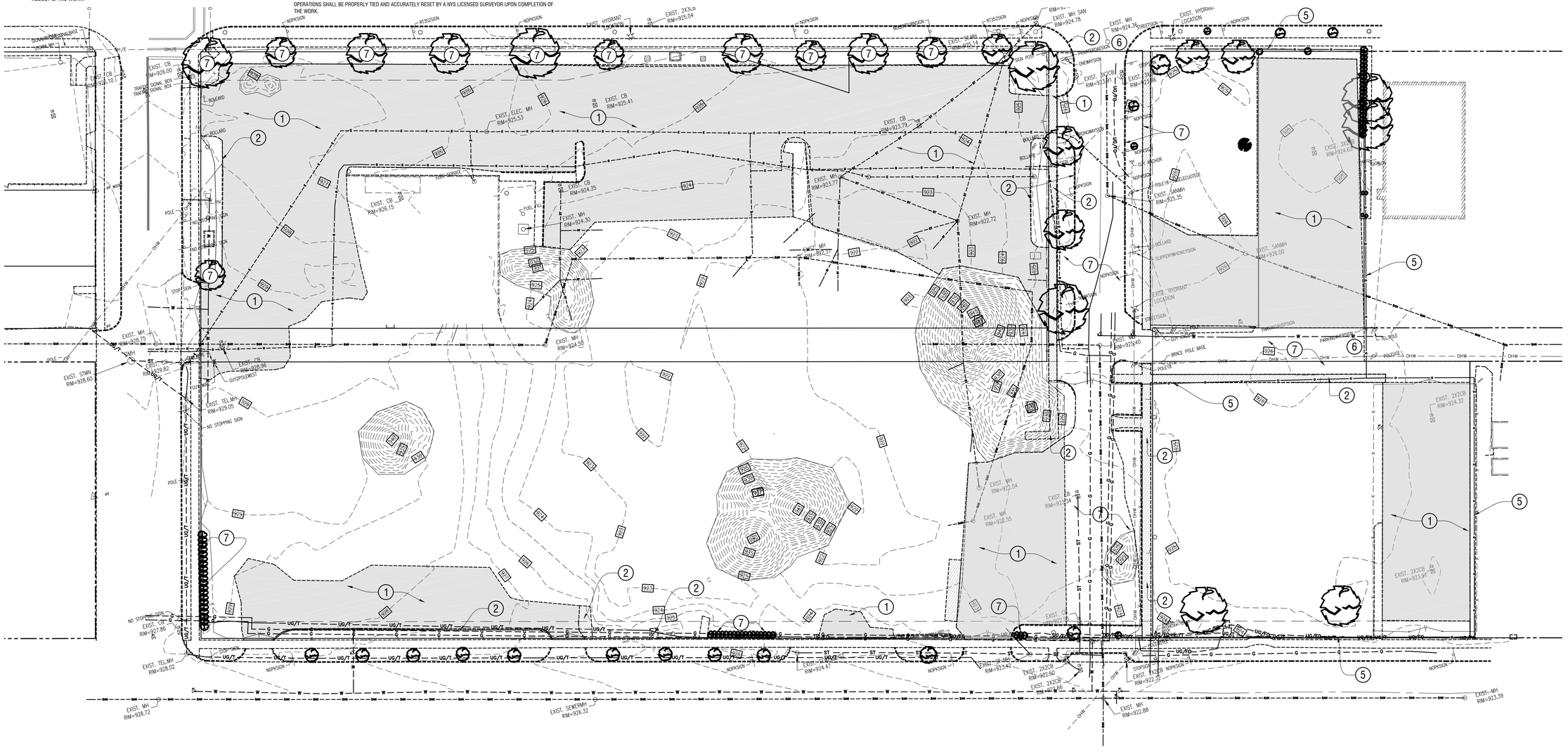
1. CONFORM TO THE REQUIREMENTS OF OSHA, AND ANY OTHER AGENCY HAVING JURISDICTION WITH REGARD TO SAFETY PRECAUTIONS WITH TRENCHING OPERATIONS. THE REQUIREMENTS SET FORTH HEREIN ARE INTENDED TO SUPPLEMENT REQUIREMENTS ESTABLISHED BY THESE AGENCIES. IN THE CASE OF A CONFLICT BETWEEN REQUIREMENTS OF OTHER JURISDICTIONAL AGENCIES AND THESE DOCUMENTS, THE MORE STRINGENT REQUIREMENT SHALL APPLY.
2. STORE EXCAVATED OR OTHER MATERIALS A MINIMUM OF 2 FEET FROM THE EDGE OF TRENCH.
3. GUARD WALLS OR FACES OF TRENCHES 5 FEET DEEP OR GREATER WITH A SHORING SYSTEM, TO PREVENT CAVE-IN.
4. PROVIDE AN ADEQUATE MEANS OF EXIT, SUCH AS LADDERS OR STEPS, LOCATED NO MORE THAN 25 FEET OF LATERAL TRAVEL, IN ALL TRENCHES 4 FEET OR MORE DEEP.
5. ASSIGN AN AUTHORIZED, AND COMPETENT, REPRESENTATIVE TO CONDUCT DAILY INSPECTIONS OF EXCAVATIONS.
6. INSTRUCT ALL EMPLOYEES TO RECOGNIZE AND AVOID THE HAZARDS ASSOCIATED WITH UNDERGROUND CONSTRUCTION ACTIVITIES.
7. SUPPLY FRESH AIR TO ALL UNDERGROUND WORK AREAS.
8. SHEETING, IF REQUIRED DURING CONSTRUCTION, IS CONSIDERED TO BE PART OF THIS CONTRACT AND PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

STREET NOTES (CITY ROADS)

1. MATERIAL, EQUIPMENT AND VEHICLES ARE NOT TO BE STORED OR PARKED WITHIN PAVEMENT OF STREETS.
2. SAFE AND CONTINUOUS THROUGH TRAFFIC AND INGRESS AND EGRESS FOR PRIVATE DRIVEWAYS, SERVICE ROADS, AND PUBLIC STREETS SHALL BE MAINTAINED THROUGHOUT NON WORKING HOURS.
3. IF, BY AGREEMENT WITH THE OWNER, A STREET WILL REQUIRE TEMPORARY CLOSING DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY IN WRITING THE LOCAL AND STATE POLICE, AND LOCAL FIRE DEPARTMENT AND TOWN DPW REGARDING THE CLOSING & CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER, SHALL ERECT ANY SIGNAGE, SAFTY PRECAUTIONS OR OTHER AS REQUIRED BY ANY SUCH ENTITY. ACCESS TO PRIVATE DRIVEWAYS SHALL BE RESTORED AT THE END OF EACH WORK DAY.
4. ROADS ARE TO BE KEPT CLEAR OF MUD AND DEBRIS AT ALL TIMES.
5. ROADSIDE DRAINAGE TO BE MAINTAINED AT ALL TIMES.
6. MAINTENANCE AND PROTECTION OF TRAFFIC MUST COMPLY WITH THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES", SECTION 619 OF THE CURRENT NYSDOT STANDARD SPECIFICATIONS AND AS ORDERED BY THE ARCHITECT/ENGINEER.
7. NO NIGHT WORK SHALL BE ALLOWED UNLESS APPROVED PRIOR TO START OF PROJECT. ADDITIONAL MAINTENANCE AND PROTECTION OF TRAFFIC MAY BE REQUIRED INCLUDING THE ADDITION OF REFLECTIVE MATERIALS AND LIGHTING.
8. IF ELEVATIONS OR DEPTHS OF MATERIALS ARE DETERMINED TO NOT BE IN COMPLIANCE WITH THE CONTRACT PLANS THE CONTRACTOR SHALL TAKE CORRECTIVE ACTIONS AS DETERMINED BY THE ARCHITECT/ENGINEER. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL INSTALLATION.

DEMOLITION KEY NOTES

1. CONTRACTOR SHALL REMOVE ALL ASPHALT IDENTIFIED FOR REMOVAL & TRANSPORT OFF-SITE FOR RECYCLING. RECEIPTS OF ALL SHIPMENTS TO BE PROVIDED TO ENGINEER.
2. CONTRACTOR SHALL REMOVE ALL CONCRETE SIDEWALKS, CURBING, PARKING STOPS & SUBSURFACE CONCRETE STRUCTURES IDENTIFIED, CONCRETE SHALL BE CRUSHED TO 2-INCH MINUS & REUSED ON-SITE OR SENT OFF-SITE FOR RECYCLING OR DISPOSAL. RECEIPTS OF ALL OFF-SITE SHIPMENTS TO BE PROVIDED TO ENGINEER.
3. CONTRACTOR SHALL REMOVE ALL UTILITIES THAT ARE NOT ACTIVE.
4. CONTRACTOR HALL PROTECT ALL ACTIVE UTILITIES AND IF DAMAGED THE CONTRACTOR SHALL REPAIR AT THEIR OWN COST.
5. CONTRACTOR SHALL EXTEND FENCE TO ENCOMPASS ENTIRE WORK AREA.
6. CONTRACTOR TO INSTALL TEMPORARY SIGNAGE INDICATING STREET CLOSED TO ALL TRAFFIC OR OTHER AS REQUIRED BY CITY DPW,
7. CURBING, SIDEWALK OR LANDSCAPING TO REMAIN.



NO.	REVISION	BY	DATE
1			
2			
3			
4			
5			
6			

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Architecture
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PROJECT/CLIENT
REMEDIAL ACTION WORK PLAN
FORMER CORNING HOSPITAL AND RELATED PARCELS
CORNING, NEW YORK
C851049

DRAWING TITLE
SITE DEMOLITION PLAN

ISSUED FOR:

DESIGNED BY: ---
DRAWN BY: DRP
REVIEWED BY: ---
DATE: NOVEMBER, 2017
E:\Users\drpayne\Desktop\Corning Hospital Demo Drawing.dwg

PROJECT/DRAWING NUMBER
2150606

FIGURE 7

Legend

- Site
- Parcels
- Approximate Excavation Areas to Native Material (Buildings & 20 ft buffer)
- Previously Backfilled During Demolition-No Excavation Required

Anticipated Final Thickness of Cover

- 2 ft
- 2.5 ft
- 3.5-4.5 ft
- 4.5-5.5 ft
- 5.5-6.5 ft
- 6.5-7.5 ft
- 7.5-8.5 ft
- 8.5-9.5 ft

Former Hospital Building Footprint-Backfilled with Recycled Masonry

Notes:
(1) Site boundaries obtained from Steuben County.
(2) Anticipated final thickness of cover represents the thickness of the cover system following completion of the remedy. Site will be left 1.5-ft below future development grades.

Document Path: I:\Corning Hospital\2150606 - Phase II ESA\Drawings\RAWP\Figure 8- Backfill.mxd

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REMEDIAL ACTION WORK PLAN
FORMER CORNING HOSPITAL AND RELATED PARCELS
CORNING, NEW YORK
C851049

DRAWING TITLE

ANTICIPATED FINAL COVER THICKNESS

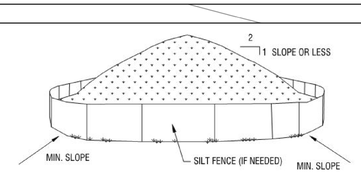
ISSUED FOR: FINAL
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN
DATE: 11/22/2017

Intended to print as 36 X 24 (ARCH D)

PROJECT/DRAWING NUMBER

2150606

FIGURE 8

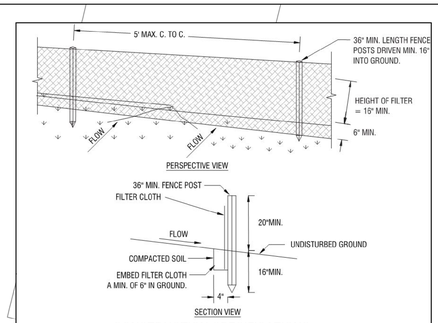


CONSTRUCTION SPECIFICATIONS

1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. STOCK PILE SHALL BE PLACED ON POLY & COVERED WITH POLY AT ALL TIMES EXCEPT WHEN ACTIVELY USING OR CREATING THE PILE. POLY SHALL EXTEND AT LEAST 2-FT BEYOND PILE ON ALL SIDES.
3. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1V:2H.
4. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH SILT FENCING IF THERE IS THE POTENTIAL FOR OFF-SITE STORM WATER FLOW.
5. SEE SPECIFICATIONS FOR INSTALLATION OF SILT FENCE.

4 TEMPORARY BCP SITE MATERIAL STOCKPILE

Scale: N.T.S.



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12 1/2 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

2 SILT FENCE

Scale: N.T.S.

Legend

- Parcels
- Site
- Approximate Excavation Areas to Native Material (Buildings & 20 ft buffer)
- Previously Backfilled During Demolition- No Excavation Required
- Former Hospital Building Footprint- Backfilled with Recycled Masonry
- Staging Area for Cover System Materials (Class 1)
- Staging Area for Apparent Clean Native Materials (Class 2)
- Staging Area for Historic Fill (Class 3 & 4)

Notes:
(1) Site boundaries obtained from Steuben County.
(2) All staging to occur in accordance with Remedial Action Work Plan, Interim Site Management Plan, and Health and Safety Plan.
(3) Areas of staging are approximate and may vary based on amount of material being placed.
(4) Temporary staging of material may occur in other locations than that shown based on Site constraints at time of work.

0 60 120 Feet

1 inch = 30 feet

N W E S

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PROJECT/CLIENT

REMEDIAL ACTION WORK PLAN
FORMER CORNING HOSPITAL AND RELATED PARCELS
CORNING, NEW YORK
C851049

DRAWING TITLE

STOCKPILE MANAGEMENT PLAN

ISSUED FOR: FINAL
DESIGNED BY: DPN
DRAWN BY: AA
REVIEWED BY: DPN
DATE: 2/16/2018

Intended to print as 36 X 24 (ARCH D)

PROJECT/DRAWING NUMBER

2150606

FIGURE 9

Document Path: I:\Corning Hospital\2150606 - Phase II ESA\Drawings\RAWP\Figure 9 - Stockpile Management Plan.mxd

LaBella Associates, D.P.C.
300 State Street

Rochester, New York 14614

Appendix 1

Health and Safety Plan

Site Health and Safety Plan
Corning Hospital and Related Parcels
BCP Site #C851049

Location:

176 Denson Parkway East and
201 East First Street
Corning, New York

Prepared For:

Corning Hospital
1 Guthrie Drive
Corning, NY 14830
and
The Guthrie Clinic
1 Guthrie Square
Sayre, PA 18840

LaBella Project No. 2150606
November 2017

Site Health and Safety Plan
Corning Hospital and Related Parcels
BCP Site #C851049

Location:

176 Denison Parkway East and 201 East First Street
Corning, New York

Prepared For:

Corning Hospital
1 Guthrie Drive
Corning, NY 14830

The Guthrie Clinic
1 Guthrie Square
Sayre, PA 18840

LaBella Project No. 2150606

November 2017

Table of Contents

SITE HEALTH AND SAFETY PLAN

Project Title:	Corning Hospital and Related Parcels
Project Number:	2150606
Project Location (Site):	176 Denison Parkway East and 201 East First Street
Environmental Director:	Gregory Senecal, CHMM
Site Safety Manager:	Richard Rote, CIH
Site Contact:	Dan Noll
Site Control Provided By:	LaBella Associates, D.P.C.
Project Manager:	Dan Noll
Plan Review Date:	12/9/2015
Plan Approval Date:	12/9/2015
Plan Approved By:	 Mr. Richard Rote, CIH
Site Conditions:	4.77 acres; formerly occupied by Corning Hospital
Site Environmental Information Provided By:	• *Soil Boring Report*, 1991 (Appendices only) • *Phase I Environmental Hazard Audit* by The Sear-Brown Group dated September 17th, 1991 • *Soil Core Investigation* by The Sear-Brown Group dated September 24th, 1997 (appendices including laboratory data not available for review). • *Underground Storage Tank Removal and Remediation* by the Sear-Brown Group dated October 30th, 1998 (appendices including laboratory data not available for review). • *SPDES Permitting Review* by the Sear-Brown Group dated March 10th, 1998 • *Corning Hospital and Associated Parcels Phase I Environmental Site Assessment (ESA)* by Stantec Consulting Services Inc. dated March 27th, 2014 • *Corning Hospital and Associated Parcels Phase II Environmental Site Assessment* by LaBella Associates, D.P.C. dated May 2015

Air Monitoring Provided By: LaBella Associates, D.P.C.

Site Control Provided By: Contractor(s) TBD

EMERGENCY CONTACTS

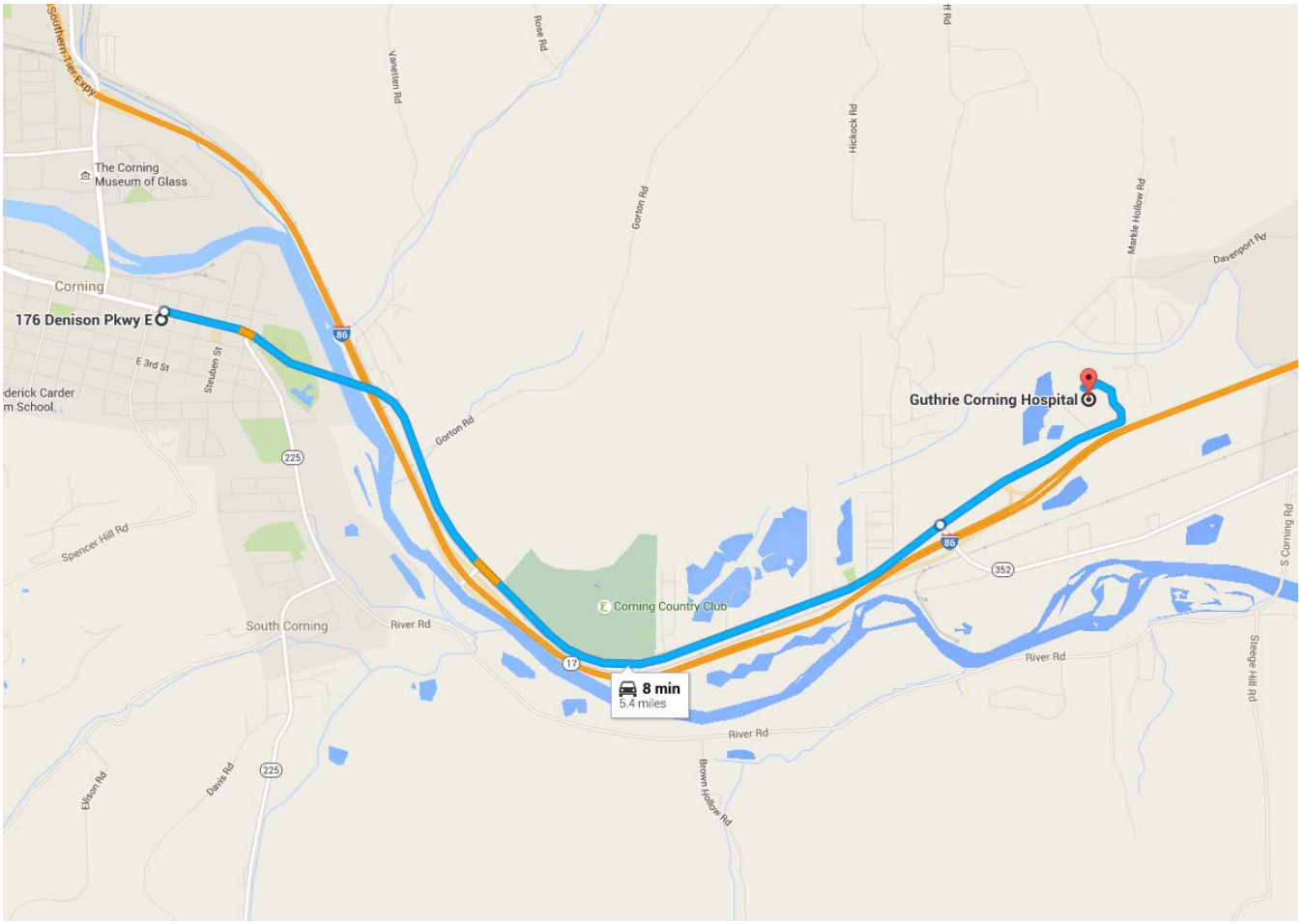
	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Guthrie Corning Hospital	607-937-7200
Poison Control Center:	Finger Lakes Poison Control	585-273-4621
Police (local, state):	Corning Police Department	911
Fire Department:	Corning Fire Department	911
Site Contact:	Anita Kingsbauer, Guthrie	570-887-4317
Agency Contact	Tim Schneider, NYSDEC	585-226-5480
Project Manager	Dan Noll, LaBella	585-295-6611
Site Safety Manager:	Richard Rote, LaBella	585-414-8891

MAP AND DIRECTIONS TO THE MEDICAL FACILITY
GUTHRIE CORNING HOSPITAL

Address: 1 Guthrie Drive, Corning NY

1. Head east on Denison Parkway East/ NY-352 E
2. Continue straight onto E Corning Rd
3. Destination will be on left

Total Travel Estimate: 5.4- miles - about 8 minutes



1.0 Introduction

The purpose of this Health and Safety Plan (HASP) it to provide guidelines for responding to potential health and safety issues that may be encountered during the field activities relating to the implementation of Brownfield Cleanup Program (BCP) requirements at the property addressed as 176 Denison Parkway East and 201 East First Street, City of Corning, Steuben County, New York (the Site). This HASP presents the minimum requirements that must be adhered to by all personnel on-site; however, each contractor or entity working on-site must also develop their own HASP to ensure their own worker safety. The provisions of the HASP were developed in general accordance with 29 CFR 1910 and 29 CFR 1926 and do not replace or supersede any regulatory requirements of the USEPA, NYSDEC, OSHA or and other regulatory body.

2.0 Responsibilities

This HASP presents guidelines to minimize the risk of injury to project personnel, and to provide rapid response in the event of injury. The Project Manager shall implement the provisions of this HASP for the duration of the project. It is the responsibility of LaBella employees to follow the requirements of this HASP, and all applicable company safety procedures. It is also the responsibility of any contractors to adhere to this HASP as the minimum requirements to be conducted at the Site. It is the responsibility of the contractor to develop their own HASP to further define additional requirements that are specific to their activities to ensure their own workers safety.

3.0 Activities Covered

The activities covered under this HASP are limited to the following:

- Environmental remediation
- Environmental monitoring
- Collection of samples
- Management of excavated soil and fill.

4.0 Work Area Access and Site Control

The contractor(s) will have primary responsibility for work area access and site control.

5.0 Potential Health and Safety Hazards

This section lists some potential health and safety hazards that project personnel may encounter at the project site and some actions to be implemented by approved personnel to control and reduce the associated risk to health and safety. This is not intended to be a complete listing of any and all potential health and safety hazards. New or different hazards may be encountered as site environmental and site work conditions change. The suggested actions to be taken under this plan are not to be substituted for good judgment on the part of project personnel. At all times, the Site personnel has responsibility for site safety and his or her instructions must be followed.

5.1 Hazards Due to Heavy Machinery

Potential Hazard:
Heavy machinery including trucks, excavators, backhoes, etc will be in operation at the site. The presence of such equipment presents the danger of being struck or crushed. Use caution when working near heavy machinery.

Protective Action:
Make sure that operators are aware of your activities, and heed operator's instructions and warnings. Wear bright colored clothing and walk safe distances from heavy equipment. A hard hat, safety glasses and steel toe shoes are required.

5.2 Excavation Hazards

Potential Hazard:
Excavations and trenches can collapse, causing injury or death. Edges of excavations can be unstable and collapse. Toxic and asphyxiant gases can accumulate in confined spaces and trenches. Tasks that require working within the excavation will require air monitoring in the breathing zone (refer to Section 9.0).

Excavations left open create a fall hazard which can cause injury or death.

Protective Action:
Personnel must receive approval from the Project Manager to enter an excavation for any reason, and may require additional training. Subsequently, approved personnel are to receive authorization for entry from the Site personnel. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped, shored or otherwise protected. Additional personal protective equipment may be required based on the air monitoring.

Personnel should exercise caution near all excavations at the site as it is expected that excavation sidewalls will be unstable.

Fencing and/or barriers accompanied by "no trespassing" signs should be placed around all excavations when left open for any period of time when work is not being conducted.

5.3 Cuts, Punctures and Other Injuries

Potential Hazard:
In any excavation or construction~~,~~ work site there is the potential for the presence of sharp or jagged edges on rock, metal materials, and other sharp objects. Serious cuts and punctures can result in loss of blood and infection.

Protective Action:
Serious injuries are to be reported immediately to the Project Manager. The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. Do not move seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager.

5.4 Injury Due to Exposure of Chemical Hazards

Potential Hazards:
Volatile organic vapors from petroleum products, chlorinated solvents or other chemicals may be encountered during excavation activities at the project work site. Inhalation of high concentrations of organic vapors can cause headache, stupor, drowsiness, confusion and other health effects. Skin contact can cause irritation, chemical burn, or dermatitis.

Protective Action:
The presence of organic vapors may be detected by their odor and by monitoring instrumentation. Approved employees will not work in environments where hazardous concentrations of organic vapors are present. Air monitoring (refer to Section 9.0) of the work area will be performed at least every 60 minutes or more often using a Photoionization Detector (PID). Personnel are to leave the work area whenever PID measurements of ambient air exceed 25 ppm consistently for a 5 minute period. In the event that sustained total volatile organic compound (VOC) readings of 25 ppm is encountered personnel should upgrade personal protective equipment to Level C (refer to Section 8.0) and an Exclusion Zone should be established around the work area to limit and monitor access to this area (refer to Section 6.0).

5.5 Injuries Due to Extreme Hot or Cold Weather Conditions

Potential Hazards:
Extreme hot weather conditions can cause heat exhaustion, heat stress and heat stroke or extreme cold weather conditions can cause hypothermia.

Protective Action:
Precaution measures should be taken such as dress appropriately for the weather conditions and drink plenty of fluid. If personnel should suffer from any of the above conditions, proper techniques should be taken to cool down or heat up the body and taken to the nearest hospital if needed.

6.0 Work Zones

In the event that conditions warrant establishing various work zones (i.e., based on hazards - Section 5.4), the following work zones should be established:

Exclusion Zone (EZ):
The EZ will be established in the immediate vicinity and adjacent downwind direction of site activities that elevate breathing zone VOC concentrations to unacceptable levels based on field screening. These site activities include contaminated soil excavation and soil sampling activities. If access to the site is required to accommodate non-project related personnel then an EZ will be established by constructing a barrier around the work area (yellow caution tape and/or construction fencing). The EZ barrier shall encompass the work area and any equipment staging/soil staging areas necessary to perform the associated work. The contractor(s) will be responsible for establishing the EZ and limiting access to approved personnel. Depending on the condition for establishing the EZ, access to the EZ may require adequate PPE (e.g., Level C).

Contaminant Reduction Zone (CRZ):
The CRZ will be the area where personnel entering the EZ will don proper PPE prior to entering the EZ and the area where PPE may be removed. The CRZ will also be the area where decontamination of equipment and personnel will be conducted as necessary.

7.0 Decontamination Procedures

Upon leaving the work area, approved personnel shall decontaminate footwear as needed. Under normal work conditions, detailed personal decontamination procedures will not be necessary. Work clothing may become contaminated in the event of an unexpected splash or spill or contact with a contaminated substance. Minor splashes on clothing and footwear can be rinsed with clean water. Heavily contaminated clothing should be removed if it cannot be rinsed with water. Personnel assigned to this project should be prepared with a change of clothing whenever on site.

Personnel will use the contractor's disposal container for disposal of PPE.

8.0 Personal Protective Equipment

Generally, site conditions at this work site require level of protection of Level D or modified Level D. However, air monitoring will be conducted to determine if up-grading to Level C PPE is required (refer to Section 9.0). Descriptions of the typical safety equipment associated with Level D and Level C are provided below:

Level D:
Hard hat, safety glasses, rubber nitrile sampling gloves, steel toe construction grade boots, etc.

Level C:
Level D PPE and full or ½-face respirator and tyvek suit (if necessary). [*Note: Organic vapor cartridges are to be changed after each 8-hours of use or more frequently.*]

9.0 Air Monitoring

According to 29 CFR 1910.120(h), air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection required for personnel working onsite. Air monitoring will consist at a minimum of the procedures described below. Site perimeter and community air monitoring and appropriate response actions will be implemented as described in the New York State Department of Health (NYSDOH) Generic Community Air Monitoring guidance.

The Air Monitor will utilize a photoionization Detector (PID) to screen the ambient air in the work areas for total Volatile Organic Compounds (VOCs) and a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. Air monitoring of the work areas and EZ, if established, will be performed at least every 60 minutes or more often using a PID, and the DustTrak meter.

If sustained PID readings of greater than 25 ppm are recorded in the breathing zone in the work area or EZ, work should be temporarily ceased and personnel are to leave the work area until satisfactory readings are obtained, the source of vapors identified and addressed through corrective actions or approved personnel may re-enter the work areas wearing at a minimum a ½ face respirator with organic vapor cartridges for an 8-hour duration (i.e., upgrade to Level C PPE). Organic vapor cartridges are to be changed after each 8-hours of use or more frequently, if necessary.

If PID readings are sustained, in the work area, at levels above 50 ppm for a 5 minute average, work will be stopped immediately until safe levels of VOCs are encountered or additional PPE will be required (i.e., Level B).

If dust concentrations exceed the upwind concentration by 150 µg/m^3 (0.15 mg/m^3) consistently for a 10 minute period within the work area or at the downwind location, then LaBella personnel may not re-enter the work area until dust concentrations in the work area decrease below 150 µg/m^3 (0.15 mg/m^3), which may be accomplished by the construction manager implementing dust control or suppression measures.

10.0 Emergency Action Plan

In the event of an emergency, employees are to turn off and shut down all powered equipment and leave the work areas immediately. Employees are to walk or drive out of the Site as quickly as possible and wait at the assigned 'safe area'. Follow the instructions of the Site personnel.

Employees are not authorized or trained to provide rescue and medical efforts. Rescue and medical efforts will be provided by local authorities.

11.0 Medical Surveillance

Medical surveillance will be provided to all employees who are injured due to overexposure from an emergency incident involving hazardous substances at this site.

12.0 Employee Training

Personnel who are not familiar with this site plan will receive training on its entire content and organization before working at the Site.

Individuals involved with the investigation must be 40-hour OSHA HAZWOPER trained with current 8-hour refresher certification.

Table 1
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL (ppm)(b)	LEL (%)(e)	UEL (%)(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69
Anthracene	.2	.2	NA	NA	NA	NA	Faint aromatic	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	.096	10.07
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07
Ethyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100	100	NA	1.0	6.7	2,000	Ether	2.3	8.76
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol	400	200	500	2.0	12.7	2,000	Rubbing alcohol	3	10.10
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	50	NA	12	23	5,000	Chloroform-like	10.2	11.35
Naphthalene	10, Skin	10	NA	0.9	5.9	250	Moth Balls	0.3	8.12
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphoric Acid	1	1	3	NA	NA	10,000	NA	NA	NA
Polychlorinated Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium Hydroxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane	NA	NA	NA	NA	NA	NA	Sweet	NA	NA
Toluene	100	100	NA	0.9	9.5	2,000	Sweet	2.1	8.82
Trichloroethylene	100	50	NA	8	12.5	1,000	Chloroform	1.36	9.45
1,2,4-Trimethylbenzene	NA	25	NA	0.9	6.4	NA	Distinct	2.4	NA
1,3,5-Trimethylbenzene	NA	25	NA	NA	NA	NA	Distinct	2.4	NA
Vinyl Chloride	1	1	NA	NA	NA	NA	NA	NA	NA
Xylenes (o,m,p)	100	100	NA	1	7	1,000	Sweet	1.1	8.56
Metals									
Arsenic	0.01	0.2	NA	NA	NA	100, Ca	NA	NA	NA
Cadmium	0.2	0.5	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1	0.5	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.15	NA	NA	NA	700	NA	NA	NA
Mercury	0.05	0.05	NA	NA	NA	28	NA	NA	NA
Selenium	0.2	0.02	NA	NA	NA	Unknown	NA	NA	NA

(a) Skin = Skin Absorption
(b) OSHA-PEL Permissible Exposure Limit (flame weighted average, 8-hour): NIOSH Guide, June 1990
(c) ACGIH – 8 hour time weighted average from Threshold Limit Values and Biological Exposure Indices for 2003.
(d) Metal compounds in mg/m3
(e) Lower Exposure Limit (%)
(f) Upper Exposure Limit (%)
(g) Immediately Dangerous to Life or Health Level: NIOSH Guide, June 1990.

Notes:
1. All values are given in parts per million (PPM) unless otherwise indicated.
2. Ca = Possible Human Carcinogen, no IDLH information.

LaBella Associates, D.P.C.
300 State Street

Rochester, New York 14614

Appendix 2

Community Air Monitoring Plan

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

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

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

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

LaBella Associates, D.P.C.
300 State Street

Rochester, New York 14614

Appendix 3

Quality Control Plan

LABELLA Associates, D.P.C.
Engineering
Architecture
Environmental
Planning

Quality Control (QC) Program

Location:

Corning Hospital and Related Parcels
176 Denison Parkway East and 201 East First Street
Corning, New York

Prepared For:

Corning Hospital
1 Guthrie Drive
Corning, NY 14830
and
The Guthrie Clinic
1 Guthrie Square
Sayre, PA 18840

LaBella Project No. 2150606

November 2017

Quality Control (QC) Program

Location:

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November 2017

LaBella Associates, D.P.C.
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Table of Contents

Table of Contents (continued)

Page

1.0 Introduction

LaBella's Quality Control (QC) Program is an integral part of its approach to environmental remediation. By maintaining a rigorous QC program, our firm is able to provide accurate and reliable data. QC also provides safe working conditions for all on-Site workers.

The QC program contains procedures which allow for the proper collection and evaluation of data and documents that QC procedures have been followed during field investigations. The QC program presents the methodology and measurement procedures used in collecting quality field data. This methodology includes the proper use of equipment, documentation of sample collection, and sample handling procedures.

Procedures used in the firm's QC program are compatible with federal, state, and local regulations, as well as, appropriate professional and technical standards.

This QC program has been organized into the following areas:

- QC Objectives and Checks
- Field Equipment, Handling, and Calibration
- Sampling Techniques
- Sample Handling and Packaging

It should be noted that project-specific work plans (e.g., Remedial Action Work Plans) may have project specific details that will differ from the procedures in this QC program. In such cases, the project-specific work plan should be followed (subsequent to regulatory approval).

2.0 Quality Control Objectives

The United States Environmental Protection Agency (EPA) has identified five general levels of analytical data quality as being potentially applicable to site investigations conducted under CERCLA. These levels are summarized below:

- **Level I -** Field screening. This level is characterized by the use of portable instruments, which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations.
- **Level II -** Field analysis. This level is characterized by the use of portable analytical instruments, which can be used on site or in mobile laboratories stationed near a site (close-support labs). Depending upon the types of contaminants, sample matrix, and personnel skills, qualitative and quantitative data can be obtained.
- **Level III -** Laboratory analysis using methods other than the Contract Laboratory Program (CLP) Routine Analytical Services (RAS). This level is used primarily in support of engineering studies using standard EPA-approved procedures. Some procedures may be equivalent to CLP RAS, without the CLP requirements for documentation.
- **Level IV -** CLP Routine Analytical Services. This level is characterized by rigorous QC protocols and documentation and provides qualitative and quantitative analytical data. Some regions have obtained similar support via their own regional laboratories, university

laboratories, or other commercial laboratories.

- **Level V** - Non-standard methods. Analyses, which may require method modification and/or development. CLP Special Analytical Services (SAS) are considered Level V.

Unless stated otherwise, all data will be generated in accordance with Level IV. When CLP methodology is not available, federal and state approved methods will be utilized. Level III will be utilized, as necessary, for non-CLP RAS work which may include ignitability, corrosivity, reactivity, EP toxicity, and other state approved parameters for characterization. Level I will be used throughout the RI for health and safety monitoring activities.

All measurements will be made to provide that analytical results are representative of the media and conditions measured. Unless otherwise specified, all data will be calculated and reported in units consistent with other organizations reporting similar data to allow comparability of data bases among organizations. Data will be reported in micrograms per liter (µg/L) and milligrams (mg)/L for aqueous samples, and µg/ kilogram (kg) and mg/kg (dry weight) for soils, or otherwise as applicable.

The characteristics of major importance for the assessment of generated data are accuracy, precision, completeness, representativeness, and comparability. Application of these characteristics to specific projects is addressed later in this document. The characteristics are defined below.

2.1 Accuracy

Accuracy is the degree of agreement of a measurement or average of measurements with an accepted reference or "true" value and is a measure of bias in the system.

2.2 Precision

Precision is the degree of mutual agreement among individual measurements of a given parameter.

2.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

2.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition

Careful choice and use of appropriate methods in the field will ensure that samples are representative. This is relatively easy with water or air samples since these components are homogeneously dispersed. In soil and sediment, contaminants are unlikely to be evenly distributed, and thus it is important for the sampler and analyst to exercise good judgment when removing a sample.

2.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another. The data sets may be inter- or intra- laboratory.

3.0 Measurement of Data Quality

3.1 Accuracy

Accuracy of a particular analysis is measured by assessing its performance with "known" samples. These "knowns" take the form of EPA standard reference materials, or laboratory prepared solutions of target analytes spiked into a pure water or sample matrix. In the case of gas chromatography (GC) or GC/MS (mass spectrometry) analyses, solutions of surrogate compounds are used. These solutions can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination.

In each case the recovery of the analyte is measured as a percentage, correcting for analytes known to be present in the original sample if necessary, as in the case of a matrix spike analysis. For EPA supplied known solutions, this recovery is compared to the published data that accompany the solution.

For the firm's prepared solutions, the recovery is compared to EPA-developed data or the firm's historical data as available. For surrogate compounds, recoveries are compared to EPA CLP acceptable recovery tables.

If recoveries do not meet required criteria, then the analytical data for the batch (or, in the case of surrogate compounds, for the individual sample) are considered potentially inaccurate. The analyst or his supervisor must initiate an investigation of the cause of the problem and take corrective action. This can include recalibration of the instrument, reanalysis of the QC sample, reanalysis of the samples in the batch, or flagging the data as suspect if the problems cannot be resolved. For highly contaminated samples, recovery of the matrix spike may depend on sample homogeneity. As a rule, analyses are not corrected for recovery of matrix spike or surrogate compounds.

3.2 Precision

Precision of a particular analysis is measured by assessing its performance with duplicate or replicate samples. Duplicate samples are pairs of samples taken in the field and transported to the laboratory as distinct samples. Their identity as duplicates is typically not known to the laboratory. For most purposes, precision is determined by the analysis of replicate pairs (i.e., two samples prepared at the laboratory from one original sample). Often in replicate analysis the sample chosen for replication does not contain target analytes so that quantitation of precision is impossible. For EPA CLP analyses, replicate pairs of spiked samples, known as matrix spike/matrix spike duplicate samples, are used for precision studies. This has the advantage that two real positive values for a target analyte can be compared.

Precision is calculated in terms of Relative Percent Difference (RPD).

- Where X_1 and X_2 represent the individual values found for the target analyte in the two replicate analyses or in the matrix spike/matrix spike duplicate analyses.
- RPDs must be compared to the method RPD for the analysis. The analyst or his supervisor must investigate the cause of RPDs outside stated acceptance limits. This may include a visual inspection of the sample for non-homogeneity, analysis of check samples, etc. Follow-up action may include sample reanalysis or flagging of the data as suspect if problems cannot be resolved.
- During the data review and validation process, field duplicate RPDs are assessed as a measure of the total variability of both field sampling and laboratory analysis.

3.3 Completeness

Completeness for each parameter is calculated as follows:

- The firm's target value for completeness for all parameters is 100%. A completeness value of 95% will be considered acceptable. Incomplete results will be reported to the site managers. In planning the field sample collection, the site manager will plan to collect field duplicates from identified critical areas. This procedure should assure 100% completeness for these areas.

3.4 Representativeness

The characteristic of representativeness is not quantifiable. Subjective factors to be taken into account are as follows:

- The degree of homogeneity of a site;
- The degree of homogeneity of a sample taken from one point in a site; and
- The available information on which a sampling plan is based.

To maximize representativeness of results, sampling techniques and sample locations will be carefully chosen so that they provide laboratory samples representative of the site and the specific area. Within the laboratory, precautions are taken to extract from the sample bottle an aliquot representative of the whole sample. This includes premixing the sample and discarding pebbles from soil samples.

4.0 Quality Control Targets

Target values for detection limit, percent spike recovery and percent "true" value of known check standards, and RPD of duplicates/replicates are included in the QCP, Analytical Procedures. Note that tabulated values are not always attainable. Instances may arise where high sample concentrations, non-homogeneity of samples, or matrix interferences preclude achievement of target detection limits or other quality control criteria. In such instances, the firm will report reasons for deviations from these detection limits or noncompliance with quality control criteria.

5.0 Sampling Procedures

This section describes the sampling procedures to be utilized for each environmental medium that will be collected and analyzed in accordance with appropriate state and federal requirements. All procedures described are consistent with EPA sampling procedures as described in SW-846, third edition, September 1986, and subsequent updates. All samples will be delivered to the laboratory and analyzed within the holding times specified by the analytical method.

6.0 Soil & Groundwater Investigation

The groundwater sampling plan outlined in this subsection has been prepared in general accordance with RCRA Groundwater Monitoring Technical Enforcement Guidance Document 9950.1 (September 1986), Office of Solid Waste and Emergency Response.

Prior to drilling, all drill sites will be cleared with appropriate utility companies to avoid potential accidents relating to underground utilities.

6.1 Test Borings and Well Installation

6.1.1 Drilling Equipment

Direct Push Geoprobe Soil Borings:

Soil borings and monitoring wells will be advanced with a Geoprobe direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The Geoprobe utilizes a four-foot macrocore sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four-foot sections, and can be easily cut from the polyethylene sleeves for observation and sampling. The macrocore sampler will be decontaminated between samples and borings using an alconox and water solution.

Hollow-Stem Auger Advanced Soil Borings:

The drilling and installation of soil borings and monitoring wells will be performed using a rotary drill rig which will have sufficient capacity to perform 4 1/2-inch inside diameter (ID) hollow-stem auger drilling in the overburden, retrieve Macrocore or split-spoon samples, and perform necessary rock coring to provide a minimum 3-inch diameter core, known in the industry as "NX." The borehole may be reamed to 5 1/2-inch diameter prior to monitoring well installation as cased hole in the bedrock, or may be left as open hole, with regulatory concurrence. Equipment sizes and diameters may vary based on project-specific criteria. Any investigative derived waste generated during the advancement of soil borings and monitoring well installations will be containerized and characterized for proper disposal.

6.1.2 Drilling Techniques

Direct Push Geoprobe Advanced Borings:

Prior to initiating drilling activities, the Geoprobe, Macrocores, drive rods, and pertinent equipment, will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used. All sampling equipment will be steam cleaned or washed with an alconox and water solution upon completion of the investigation and prior to leaving the Site.

Test borings will be advanced with 2-inch (or larger) inside diameter (ID) direct push macrocore through overburden soils. Drilling fluids, other than water from a NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

It will be the responsibility of the consultant to arrange for the appropriate drilling equipment to be present at the Site. Standby time to arrange for additional equipment or a water supply will not be allowed unless caused by unexpected Site conditions.

During the drilling, a properly calibrated photoionization detector (PID) will be used to screen soil cores retrieved from the Macrocores.

Direct Push Geoprobe advanced groundwater-monitoring wells typically utilize 1.25-inch threaded flush joint PVC pipe with 0.010-in. slotted screen. However, well construction will vary by project and will be specified in the project-specific work plan. PVC piping used for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe, and shall bear markings that will identify the material as that which is specified. All materials used to construct the wells will be NSF/ASTM approved.

Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well. All risers and screens shall be set round, plumb, and true to line.

Hollow-Stem Auger Advanced Borings:

Prior to initiating drilling activities, the drill rig, augers, rods, Macrocore, split spoons, and/or other pertinent equipment will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. These activities will be performed in a designated on-site decontamination area. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used. The drilling rig and all equipment will be steam cleaned or washed with an alconox and water solution upon completion of the investigation and prior to leaving the site.

Test borings will be advanced with 4 1/2-inch (ID) hollow stem augers through overburden, and NX-sized diamond core barrels in competent rock, driven by truck-, track-, or trailer-mounted drilling equipment. Alternative methods of drilling or equipment may be allowed or requested for project-specific criteria, but must be approved by the NYSDEC. Drilling fluids, other than water from a NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

It will be the responsibility of the consultant to arrange for the appropriate drilling equipment to be present at the site. Standby time to arrange for additional equipment or a water supply will not be allowed unless caused by unexpected site conditions.

During the drilling, a (PID) will be used to screen soils retrieved from the split spoons or Macrocores.

Where bedrock wells are required, test borings shall be advanced into rock with NX (or similar) coring tools. Only water from an approved source shall be used in rock coring. The consultant shall monitor and record the petrology, core recovery, fractures, rate of advance, water levels, and water lost or produced in each test boring. The Rock Quality Determination (RQD) value shall be calculated for each 5-foot core. Each core shall be screened with a PID upon extraction to determine proper handling procedure. All core samples shall be retained and stored by the consultant in an approved wooden core box for a period of not less than one year.

The method selected may be percussion or rotary drilling at the option of the subcontractor. The method and equipment selected must be capable of penetrating the bedrock at each well location to a depth required by the work plan and will be selected based on the results of the rock coring performed.

Bedrock well installation will involve construction of a rock socket in the weathered bedrock. The socket will be drilled into the top of rock (typically 1-ft. to 5-ft. into the top of rock) at each bedrock well location to allow a permanent steel casing to be grouted securely in place prior to completion of the well. The purpose for this is to provide a seal at the overburden/bedrock interface and into the upper bedrock surface, to prevent the entrance of overburden water into the bedrock. After the grout and casing have set up for a minimum of 12 hours, the remaining bedrock can be NX (or similar) cored through the steel casing to a depth determined by the project-specific work plan.

Bedrock wells will either be open coreholes in the rock or consist of threaded, flush-joint PVC piping. Construction will vary depending on the project and as such, specific construction of the wells will be

detailed in the project-specific work plan. Bedrock wells which do utilized PVC piping for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe, and shall bear markings that will identify the material as that which is specified. All materials used to construct the wells will be NSF/ASTM approved.

The well screen slot size will be selected based on the filter pack grain size and the ability to hold back 85 percent or more of the filter pack materials. Screen and riser sections shall be joined by flush-threaded coupling to form watertight unions that retain 100% of the strength of the casing. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well. All risers and screens shall be set round, plumb, and true to line.

6.1.3 Artificial Sand Pack

When utilized, granular backfill will be chemically and texturally clean, inert, siliceous, and of appropriate grain size for the screen slot size and the host environment The sand pack will be installed using a tremie pipe, when possible (i.e., a tremie pipe may not fit into smaller, 2-in. diameter boreholes). When utilized, the well screen and casing will be installed, and the sand pack placed around the screen and casing to a depth extending 2-ft. or at least 25 percent of the screen length above the top of the screen.

An artificial sand pack will not be utilized in bedrock wells without screens (i.e., open borehole wells).

6.1.4 Bentonite Seal

A minimum 2-ft. thick seal of tamped bentonite pellets will be placed directly on top of the sand pack, and care will be taken to avoid bridging. In the event that Site geology does not allow for a 2-ft. seal (e.g., only 1-ft. of space remains between the top of the sand pack and ground surface), the remaining space in the annulus will be filled with bentonite. The seal will be measured immediately after placement, without allowance for swelling.

6.1.5 Grout Mixture

Upon completion of the bentonite seal, the well may be grouted with a non-shrinking cement grout (e.g., Volclay®) mix to be placed from the top of the bentonite seal to the ground surface. The cement grout shall consist of a mixture of Portland cement (ASTM C 150) and water, in the proportion of not more than 7 gallons of clean water per bag of cement (1 cubic foot or 94 pounds). Additionally, 3% by weight of bentonite powder shall be added, if permitted.

6.1.6 Surface Protection

At all times during the progress of the work, precautions shall be used to prevent tampering with or the entrance of foreign material into the well. Upon completion of the well, a suitable lockable cap shall be installed to prevent material from entering the well. Where permanent wells are to be installed, the well riser shall be protected by a flush mounted road box set into a concrete pad. A concrete pad, sloped away from the well, shall be constructed around the flush mount road box at ground level.

Any well that is to be temporarily removed from service or left incomplete due to delay in construction shall be capped with a watertight cap and equipped with a "vandal-proof" cover, satisfying applicable NYSDEC regulations or recommendations.

6.1.7 Surveying

Coordinates and elevations will be established for each monitoring well and sampling location. Elevations to the closest 0.01 foot shall be used for the survey. These elevations shall be referenced to a regional, local, or project-specific datum. USGS benchmarks will be used whenever available. The location, identification, coordinates, and elevations of the wells will be plotted on maps with a scale large enough to show their location with reference to other structures at each site.

6.1.8 Well Development

After completion of the well, but not sooner than 24 hours after grouting is completed, development will be accomplished using pumping, bailing, or surge blocking. No dispersing agents, acids, disinfectants, or other additives will be used during development or introduced into the well at any other time. During development, water will be removed throughout the entire water column by periodically lowering and raising the pump intake (or bailer stopping point).

Development water will be either properly contained and treated as waste until the results of chemical analysis of samples are obtained or discharged on Site as determined by the Site-specific work plans and/or consultation with the NYSDEC representatives on Site.

The development process will continue until a stabilization of pH, specific conductance, temperature, and turbidity (goal of <50 NTUs) of the discharge is achieved for three consecutive intervals following the removal of a minimum of 110% of the water lost during drilling, or three well volumes; whichever is greater. In the event that limited recharge does not allow for the recovery of all drilling water lost in the well or three (3) well volumes, the well will be allowed to stabilize to conditions deemed representative of groundwater conditions. Stabilization periods will vary by project but will be confirmed with the NYSDEC prior to sampling.

7.0 Geologic Logging and Sampling

At each investigative location, borings will be advanced through overburden using either a drill rig and hollow-stem auger or direct push technology. Soils will be evaluated for visual and olfactory evidence of impairment (i.e., staining, odors, and elevated PID readings) by a geologist, engineer or qualified Environmental Professional. Sampling devices will be decontaminated according to procedures outlined in the Decontamination section of this document. When utilized, split-spoon samplers will be driven into the soil using a minimum 140-pound safety hammer and allowed to free-fall 30-inches, in accordance with ASTM-D 1586-84 specifications. The number of blows required to drive the sampler each 6-inches of penetration will be recorded. When required, samples will be stored in glass jars until they are needed for testing or the project is complete.

If hard boulders or bedrock result in auger refusal, rock coring will be used to advance the hole to design depth. If hydrogeologic conditions are favorable for well installation at a depth less than design, the well may be installed at the boring or coring termination depth. In the event that maximum design depth is reached and hydrogeologic conditions are not suitable for well installation, the maximum drilling depth may be revised. Hydrogeologic suitability for well placement will be determined by the supervising geologist, engineer or qualified Environmental Professional in consultation with NYSDEC, based on thickness and estimated hydraulic conductivity of the saturated zone encountered. If necessary, the borehole will be advanced to water or abandoned.

Boulders and bedrock encountered during well installation may be cored by standard diamond-core drilling methods using an "NX" size core barrel. All rock cores recovered will be logged by a geologist,

labeled and stored in wooden core boxes. The cores will be stored by the firm until the project is completed or for at least one year. Drilling logs will be prepared by an experienced geologist or engineer, who will be present during all drilling operations. One copy of each field boring and well construction log and groundwater data, will typically be submitted as part of the investigation summary report (e.g., Remedial Investigation Report). The RQD value shall be calculated for each 5-foot section. Information provided in the logs shall include, but not be limited to, the following:

- Date, test hole identification, and project identification;
- Name of individual developing the log;
- Name of driller and assistant(s);
- Drill, make and model, auger size;
- Identification of alternative drilling methods used and justification thereof (e.g., rotary drilling with a specific bit type to remove material from within the hollow stem augers);
- Standard penetration test (ASTM D-1586) blow counts;
- Field diagram of each monitoring well installed with the depth to bottom of screen, top of screen, and pack, bentonite seal, etc.;
- Reference elevation for all depth measurements;
- Depth of each change of stratum;
- Thickness of each stratum;
- Identification of the material of which each stratum is composed, according to the USCS system or standard rock nomenclature, as appropriate;
- Depth interval from which each sample was taken;
- Depth at which hole diameters (bit sizes) change;
- Depth at which groundwater is encountered;
- Depth to static water level and changes in static water level with well depth;
- Total depth of completed well;
- Depth or location of any loss of tools or equipment;
- Location of any fractures, joints, faults, cavities, or weathered zones;
- Depth of any grouting or sealing;
- Nominal hole diameters;
- Amount of cement used for grouting or sealing;
- Depth and type of well casing;
- Description of well screen (to include depth, length, location, diameter, slot sizes, material, and manufacturer);
- Any sealing-off of water-bearing strata;
- Static water level upon completion of the well and after development;
- Drilling date or dates;
- Construction details of well; and
- An explanation of any variations from the work plan.

8.0 Groundwater Sampling Procedures

The groundwater in all new monitoring wells will be allowed to stabilize for at least 24-hours following development. Water levels will be measured to within 0.01 feet prior to purging and sampling. Sampling of each well will typically be accomplished in one of two ways; active or passive.

Active Sampling:

Purging will be completed prior to active sampling. During purging, the following will be recorded in field books or groundwater sampling logs:

- date
- purge start time
- weather conditions
- PID reading immediately after the well cap is removed
- presence of NAPL, if any, and approximate thickness
- pH
- dissolved oxygen
- temperature
- specific conductance
- depth of well
- depth to water
- estimated water volume
- purge end time
- volume of water purged

In general, wells will be purged until the pH, conductivity, temperature, and turbidity of the water being pumped from the well have stabilized with a turbidity goal of 50 NTU. All wells will be purged of at least three well volumes or to dryness.

Passive Sampling:

Groundwater samples will be collected via passive methods (i.e., no-purge) according to the following procedures and in the volumes specified in Table 11-1:

- Samples will be collected via passive diffusion bag (PDB) samplers. PDB samplers are made of low-density polyethylene plastic tubing (typically 4 mil), filled with laboratory grade (ASTM Type II) deionized water and sealed at both ends.
- PDB samplers will only be used to collect groundwater samples which will be analyzed for VOCs.
- PDB samplers will be deployed by hanging in the well at the middle of the well screen unless a low water table, need to deploy multiple samplers or the targeting of a specific depth interval is identified. The PDB samplers will be deployed at least 14 days prior to sampling.
- The PDB samplers will be deployed using a Teflon® coated string or synthetic rope.
- When transferring water from the PDB to sample containers, care will be taken to avoid agitating the sample, since agitation promotes the loss of volatile constituents;
- Any observable physical characteristics of the groundwater (e.g., color, sheen, odor, turbidity) at the time of sampling will be recorded; and
- Weather conditions (i.e., air temperature, sky condition, recent heavy rainfall, drought conditions) at the time of sampling will be recorded.

All groundwater samples and their accompanying QC samples will be run for volatile organic compounds (VOCs) using NYSDEC Analytical Services Protocol (ASP; revised July 2005 and subsequent amendments or revisions).

9.0 Management of Investigative-Derived Waste

Purpose:

The purposes of these guidelines are to ensure the proper holding, storage, transportation, and disposal of materials that may contain hazardous wastes. Investigation-derived waste (IDW) included the following:

- Drill cuttings, discarded soil samples, drilling mud solids, and used sample containers;
- Well development and purge waters and discarded groundwater samples;
- Decontamination waters and associated solids;
- Soiled disposable personal protective equipment (PPE);
- Used disposable sampling equipment;
- Used plastic sheeting and aluminum foil;
- Other equipment or materials that either contain or have been in contact with potentially-impacted environmental media.
- Because these materials may contain regulated chemical constituents, they must be managed as a solid waste. This management may be terminated if characterization analytical results indicate the absence of these constituents.

Procedure:

1. Contain all investigation-derived wastes in Department of Transportation (DOT)-approved 55-gallon drums, roll-off boxes, or other containers suitable for the wastes.
2. Containerize wastes from separate borings or wells in separate containers (i.e. do not combine wastes from several borings/wells in a single container, unless it is a container used specifically for transfer purposes, or unless specific permission to do so has been provided by the LaBella Project Manager. Unused samples from surface sample locations within a given area may be combined.
3. To the extent practicable, separate solids from drilling muds, decontamination waters, and similar liquids. Place solids within separate containers.
4. Transfer all waste containers to a staging area. Access to this area will be controlled. Waste containers must be transferred to the staging area as soon as practicable after the generating activity is complete.
5. Pending transfer, all containers will be covered and secured when not immediately attended,
6. Label all containers with regard to contents, origin, and date of generation. Use indelible ink for all labeling.
7. Collect samples for waste characterization purposes, use boring/well sample analytical data for characterization.
8. For wastes determined to be hazardous in character, be aware on accumulation time limitations. Coordinate the disposal of these wastes with the Owner and NYSDEC.
9. Dispose of investigation-derived wastes as follows;
    - Soil, water, and other environmental media for which analysis does not detect organic constituents, and for which inorganic constituents are at levels consistent with background, may be spread on-site (pending NYSDEC approval) or otherwise treated as a non-waste material.
    - Soils, water, and other environmental media in which organic compounds are

detected or metals are present above background will be disposed as industrial waste or hazardous waste, as appropriate. Alternate disposition must be consistent with applicable State and Federal laws.

- Personal protective equipment, disposable bailers, and similar equipment may be disposed as municipal waste, unless waste characterization results mandate disposal as industrial wastes

10. If waste is determined to be listed hazardous waste, it must be handled as hazardous waste as described above, unless a contained-in determination is accepted by the NYSDEC.

10.0 Decontamination

Sampling methods and equipment have been chosen to minimize decontamination requirements and to prevent the possibility of cross-contamination. Decontamination of equipment will be performed between discrete sampling locations. Equipment used to collect samples between composite sample locations will not require decontamination between collection of samples. All drilling equipment will be decontaminated after the completion of each drilling location. Special attention will be given to the drilling assembly and augers.

Split spoons and other non-disposable equipment will be decontaminated between each sampling event. The sampler will be cleaned prior to each use, by one of the following procedures:

- Initially cleaned of all foreign matter;
- Sanitized with a steam cleaner;

OR

- Initially cleaned of all foreign matter;
- Scrubbed with brushes in alconox solution;
- Triple rinsed; and
- Allowed to air dry.

11.0 Sample Containers

The containers required for sampling activities are pre-washed and ordered directly from a laboratory, which has the containers prepared in accordance with USEPA bottle washing procedures. The following tables detail sample volumes, containers, preservation and holding time for typical analytes.

Table 11-1
Water Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Maximum Holding Time
VOCs	40-ml glass vial with Teflon-backed septum	Two (2); fill completely, no air space	Cool to 4° C (ice in cooler), Hydrochloric acid to pH <2	7 days
Semivolatile Organic Compounds (SVOCs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Polychlorinated biphenyls (PCBs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Metals	500-ml polyethylene	One (1); fill completely	Cool to 4° C (Nitric acid to pH <2	6 months

*Holding time is based on verified time of sample collection.

Note: All sample bottles will be prepared in accordance with USEPA bottle washing procedures.

TABLE 11-2
Soil Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Maximum Holding Time
VOCs, SVOCs, PCBs, and Pesticides	8-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7 days
VOCs by USEPA Method 5035 (if specified in work plan) Closed-system Purge and Trap Method	40-ml glass vial with Teflon-backed septum	Three (3), fill with 5 grams of soil using soil syringe	Cool to 4° C (ice in cooler). Two (2) with 10 mL DI water or 5 mL sodium bisulfate, one (1) with 5 mL methanol.	14 days
RCRA/TAL Metals, and cyanide	8-oz. glass jar with Teflon-lined cap	One (1); fill completely	Cool to 4° C (ice in cooler)	Must be extracted within 10 days; analyzed with 30 days

* Holding time is based on the times from verified time of sample collection.

Note: All sample bottles will be prepared in accordance with USEPA bottle washing procedures.

TABLE 11-3
List of Major Instruments for Sampling and Analysis

- MSA 360 0_2 /Explosimeter
- Hollige Series 963 Nephlometer (turbidity meter)
- EM-31 Geomics Electromagnetic Induction Device
- pH/Temperature/Conductivity Meter - Portable
- Hewlett Packard (HP) 1000 computer with RTE-6 operating system; and HP 9144 computer with RTE-4 operating system equipped with Aquarius software for control and data acquisition from gas chromatograph/mass spectrometer (GC/MS) systems; combined wiley and National Bureau of Standards (NBS) mass spectral library; and data archiving on magnetic tape
- Viriam 6000 and 37000 gas chromatrographs equipped with flame ionization, electron capture, photoionization and wall detectors as appropriate for various analyses,, and interfaced to Variam DS604 or D5634 data systems for processing data.
- Spectra-Physics Model SP 4100 and SP 4270 and Variam 4270 cam puting integrators
- Perkin Eimer (PE) 3000% and 3030% fully Automated Atomic Absorption Spectrophotometers (AAS) with Furnace Atomizer and background correction system
- PE Plasma II Inductively Coupled Argon Plasma (ICAP) Spectre meter with PE7500 laboratory computer
- Dionex 20001 ion chromatograph with conductivity detector for anion analysis, with integrating recorder

12.0 Sample Custody

This section describes standard operating procedures for sample identification and chain-of-custody to be utilized for all field activities. The purpose of these procedures is to ensure that the quality of the samples is maintained during their collection, transportation, and storage through analysis. All chain-of-custody requirements comply with standard operating procedures indicated in USEPA sample handling protocol.

Sample identification documents must be carefully prepared so that sample identification and chain-of-custody can be maintained and sample disposition controlled. Sample identification documents include:

- Field notebooks,
- Sample label,
- Custody seals, and
- Chain-of-custody records.

12.1 Chain-of-Custody

The primary objective of the chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is in custody if it is:

- In someone's physical possession;
- In someone's view;
- Locked up; or
- Kept in a secured area that is restricted to authorized personnel.

12.2 Field Custody Procedures

- As few persons as possible should handle samples.
- Sample bottles will be obtained pre-cleaned from a source such as I-Chem. Coolers or boxes containing cleaned bottles should be sealed with a custody tape seal during transport to the field or while in storage prior to use.
- The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under chain-of-custody rules.
- The sample collector will record sample data in the notebook.
- The site manager will determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

12.3 Sample Tags

Sample tags attached to or affixed around the sample container must be used to properly identify all samples collected in the field. The sample tags are to be placed on the bottles so as not to obscure any QC lot numbers on the bottles; sample information must be printed in a legible manner using waterproof ink. Field identification must be sufficient to enable cross-reference with the logbook. For chain-of-custody purposes, all QC samples are subject to exactly the same custodial procedures and documentation as "real" samples.

12.4 Transfer of Custody and Shipment

- The coolers in which the samples are packed must be accompanied by a chain-of-custody record.

When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on the chain-of-custody record. This record documents sample custody transfer

- Shipping containers must be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information are entered in the "Remarks" section of the chain-of-custody record and traffic reports.
- All shipments must be accompanied by the chain-of-custody record identifying their contents. The original record accompanies the shipment. The other copies are distributed appropriately to the site manager.
- If sent by mail, the package is registered with return receipt requested. If sent by common carrier, a bill of lading is used. Freight bills, Postal Service receipts, and bill of lading are retained as part of the permanent documentation.

12.5 Chain-of-Custody Record

The chain-of-custody record must be fully completed in duplicate, using black carbon paper where possible, by the field technician who has been designated by the project manager as responsible for sample shipment to the appropriate laboratory for analysis. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations, etc.), the person completing the chain-of-custody record should note these constraints in the "Remarks" section of the record.

12.6 Laboratory Custody Procedures

A designated sample custodian accepts custody of the shipped samples and verifies that the sample identification number matches that on the chain-of-custody record and traffic reports, if required. Pertinent information as to shipment, pickup, and courier is entered in the "Remarks" section.

12.7 Custody Seals

Custody seals are preprinted adhesive-backed seals with security slots designed to break if the seals are disturbed. Sample shipping containers (coolers, cardboard boxes, etc., as appropriate) are sealed in as many places as necessary to ensure security. Seals must be signed and dated before use. On receipt at the laboratory, the custodian must check (and certify, by completing the package receipt log and LABMIS entries) that seals on boxes and bottles are intact. Strapping tape should be placed over the seals to ensure that seals are not accidentally broken during shipment.

13.0 Laboratory Requirements and Deliverables

This section will describe laboratory requirement and procedures to be followed for laboratory analysis. Samples collected in New York State will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory. When required, analyses will be conducted in accordance with the most current NYSDEC Analytical Services Protocol (ASP). For example, ASP Category B reports will be completed by the laboratory for samples representing the final delineation of the Remedial Investigation, confirmation samples, samples to determine closure of a system, and correlation samples taken using field testing technologies analyzed by an ELAP-certified laboratory to determine correlation to field results. Data Usability Summary Reports will be completed by a third party for samples requiring ASP Category B format reports. Electronic data deliverables (EDDs) will also be generated by the laboratory in EQUIS format for samples requiring ASP Category B format reports.

14.0 Documentation

14.1 Sample Identification

All containers of samples collected from the project will be identified using the following format on a label or tag fixed to the sample container:

XX-ZZ-O/D-DDMMYYYY

XX:	This set of initials indicates the Site from which the sample was collected.
ZZ:	These initials identify the sample location. Actual sample locations will be recorded in the task log.
O/D:	An "O" designates an original sample; "D" identifies it as a duplicate.
DDMMYYYY:	This set of initials indicates the date the sample was collected

Each sample will be labeled, chemically preserved (if required) and sealed immediately after collection. To minimize handling of sample containers, labels will be filled out prior to sample collection when possible. The sample label will be filled out using waterproof ink and will be firmly affixed to the sample containers. The sample label will give the following information:

- Date and time of collection
- Sample identification
- Analysis required
- Project name/number
- Preservation

14.2 Daily Logs

Daily logs and data forms are necessary to provide sufficient data and observations to enable participants to reconstruct events that occurred during the project and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings.

The site log is the responsibility of the site manager and will include a complete summary of the day's activity at the site.

The **Task Log** will include:

- Name of person making entry (signature).
- Names of team members on-site.
- Levels of personnel protection:
  - Level of protection originally used;
  - Changes in protection, if required; and
  - Reasons for changes.
-
- Documentation on samples taken, including:
  - Sampling location and depth station numbers;
  - Sampling date and time, sampling personnel;
  - Type of sample (grab, composite, etc.); and
  - Sample matrix.
- On-site measurement data.
- Field observations and remarks.
- Weather conditions, wind direction, etc.
- Unusual circumstances or difficulties.
- Initials of person recording the information.

15.0 Corrections to Documentation

15.1 Notebook

As with any data logbooks, no pages will be removed for any reason. If corrections are necessary, these must be made by drawing a single line through the original entry (so that the original entry can still be read) and writing the corrected entry alongside. The correction must be initialed and dated. Most corrected errors will require a footnote explaining the correction.

15.2 Sampling Forms

As previously stated, all sample identification tags, chain-of-custody records, and other forms must be written in waterproof ink. None of these documents are to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made on a document assigned to one individual, that individual may make corrections simply by crossing a line through the error and entering the corrected information. The incorrect information should not be obliterated. Any subsequent error discovered on a document should be corrected by the person who made the entry. All corrections must be initialed and dated.

15.3 Photographs

Photographs will be taken as directed by the site manager. Documentation of a photograph is crucial to its validity as a representation of an existing situation. The following information will be noted in the task log concerning photographs:

- Date, time, location photograph was taken;
- Photographer
- Description of photograph taken;

16.0 Sample Handling, Packaging, and Shipping

The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling, and shipping hazardous materials are promulgated by the United States DOT in the Code of Federal Regulation, 49 CFR 171 through 177. All samples will be delivered to the laboratory and analyzed within the holding times specified by the analytical method for that particular analyte.

All chain-of-custody requirements must comply with standard operating procedures in the USEPA sample handling protocol.

16.1 Sample Packaging

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample packaging requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers.
- The sample volume level can be marked by placing the top of the label at the appropriate

sample height, or with a grease pencil. This procedure will help the laboratory to determine if any leakage occurred during shipment. The label should not cover any bottle preparation QC lot numbers.

- All sample bottles are placed in a plastic bag to minimize the potential for cross-contamination.
- Shipping coolers must be partially filled with packing materials and ice when required, to prevent the bottles from moving during shipment.
- The sample bottles must be placed in the cooler in such a way as to ensure that they do not touch one another. Ice will be added to the cooler to ensure that the samples reach the laboratory at temperatures no greater than 4°C.
- The environmental samples are to be placed in plastic bags. Ice is not to be used as a substitute for packing materials.
- Any remaining space in the cooler should be filled with inert packing material. Under no circumstances should material such as sawdust, sand, etc., be used.
- A duplicate custody record and traffic reports, if required must be placed in a plastic bag and taped to the bottom of the cooler lid. Custody seals are affixed to the sample cooler.

16.2 Shipping Containers

Shipping containers are to be custody-sealed for shipment as appropriate. The container custody seal will consist of filament tape wrapped around the package and custody seals affixed in such a way that access to the container can be gained only by cutting the filament tape and breaking a seal.

Field personnel will make arrangements for transportation of samples to the lab. The lab must be notified as early in the week as possible regarding samples intended for Saturday delivery.

16.3 Marking and Labeling

- Chain of custody seals shall be placed on the container, signed, and dated prior to taping the container to ensure the chain of custody seals will not be destroyed during shipment.
- If samples are designated as medium or high hazard, they must be sealed in metal paint cans, placed in the cooler with vermiculite and labeled and placarded in accordance with DOT regulations.
- In addition, the coolers must also be labeled and placarded in accordance with DOT regulations if shipping medium and high hazard samples.

17.0 Calibration Procedures and Frequency

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations as well as criteria set forth in the applicable analytical methodology references. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Section 11 lists the major instruments to be used for sampling and analysis. In addition, brief descriptions of calibration procedures for major field and laboratory instruments follow.

18.0 Field Instrumentation

18.1 Photovac/MiniRae Photoionization Detector (PID)

Standard operating procedures for the PID require that routine maintenance and calibration be performed every six months. The packages used for calibration are non-toxic analyzed gas mixtures available in pressurized containers.

18.2 Organic Vapor Analyzer

Organic vapor analyzers (OVAs) are calibrated and routine maintenance performed every six months when the units are not in use. Calibration is performed and the major system checks are performed prior to the instrument being released for field use.

Calibration of the OVA 128 GC must be performed by a factory-authorized service representative. The instrument is removed from its protective case and the probe is connected to the base unit. After checking for an airtight seal in the sample line (plugging the sample inlet to stop the pump), the hydrogen supply is turned on and the pressure is set to 10 psi. The electronics are turned on and the instrument is allowed to warm up for at least 5 minutes. After warm up, the instrument is zeroed on the "X10" scale using the adjust knob. The flame is then lit and a gas-tight sample bag is filled with a mixture of 100 ppm methane in air. The sample bag is then attached to the probe inlet and the internal pump is allowed to draw in as much sample as is needed. R32 on the control board is adjusted to read 100 ppm on the "X10" scale and then the hydrogen supply is shut down. The pump can now be turned off and the sample bag removed. Using the adjust knob, the meter is set to read 4 ppm on the "X1" scale. Switching back to the "X10" scale the adjust knob is again used to set the meter to 40 ppm. The scale is then set to "X100" and R33 is adjusted until the meter reads 40 ppm on the "X100" scale.

The OVA has a detection limit of 0.1 ppm in methane equivalents and a working range of 0 to 1,000 ppm. During daily field use, system checks are performed which involve calibration and maintenance of the pump systems, gases, and filters. Care is taken to check for and prevent clogging or leaks. Quad rings and the burner chamber are examined on a weekly basis. Routine biannual maintenance includes a thorough cleaning as well as a re-examination of the pump system for leaks and wear. Parts are replaced as necessary. Instrument operation is verified by calibrating and running the OVA for 4 to 6 hours. An instrument specific logbook is maintained with the OVA to document its use and maintenance.

18.3 Conductance, Temperature, and pH Tester

Temperature and conductance instruments are factory calibrated. Temperature accuracy can be checked against an NBS certified thermometer prior to field use if necessary. Conductance accuracy may be checked with a solution of known conductance and recalibration can be instituted, if necessary.

18.4 Turbidity Meter

LaMotte 2020WE Turbidity Meter is calibrated before each use. The default units are set to NTU and the default calibration curve is formazin. A 0 NTU Standard (Code 1480) is included with the meter. To calibrate, rinse a clean tube three times with the blank. Fill the tube to the fill line with the blank. Insert the tube into the chamber, close the lid, and select “scan blank”.

19.0 Internal Quality Control Checks

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of field equipment. Field-based QC will comprise at least 10% of each data set generated and will consist of standards, replicates, spikes, and blanks. Field duplicates and field blanks will be analyzed by the laboratory as samples and will not necessarily be identified to the laboratory as duplicates or blanks. For each matrix, field duplicates will be provided at a rate of one per 10 samples collected or one per shipment, whichever is greater. Field blanks which consist of trip, routine field, and rinsate blanks will be provided at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater.

Calculations will be performed for recoveries and standard deviations along with review of retention times, response factors, chromatograms, calibration, tuning, and all other QC information generated. All QC data, including split samples, will be documented in the site logbook. QC records will be retained and results reported with sample data.

19.1 Blank Samples

Blank samples are analyzed in order to assess possible contamination from the field and/or laboratory so that corrective measures may be taken, if necessary. Field samples are discussed in the following subsection:

19.2 Field Blanks

Various types of blanks are used to check the cleanliness of field handling methods. The following types of blanks may be used: the trip blank, the routine field blank, and the field equipment blank. They are analyzed in the laboratory as samples, and their purpose is to assess the sampling and transport procedures as possible sources of sample contamination. Field staff may add blanks if field circumstances are such that they consider normal procedures are not sufficient to prevent or control sample contamination, or at the direction of the project manager. Rigorous documentation of all blanks in the site logbooks is mandatory.

- **Routine Field Blanks** or bottle blanks are blank samples prepared in the field to access ambient field conditions. They will be prepared by filling empty sample containers with deionized water and any necessary preservatives. They will be handled like a sample and shipped to the laboratory for analysis.
- **Trip Blanks** are similar to routine field blanks with the exception that they are **not** exposed to field conditions. Their analytical results give the overall level of contamination from everything except ambient field conditions. For the RI/FS, one trip blank will be collected with every batch of water samples for VOC analysis. Each trip blank will be prepared by filling a 40-ml vial with deionized water prior to the sampling trip, transported to the site, handled like a sample, and returned to the laboratory for analysis without being opened in the field.
- **Field Equipment Blanks** are blank samples (sometimes called transfer blanks or rinsate blanks) designed to demonstrate that sampling equipment has been properly prepared and cleaned before field use, and that cleaning procedures between samples are sufficient to minimize cross contamination. If a sampling team is familiar with a particular site, they may be able to predict which areas or samples are likely to have the highest concentration of contaminants. Unless other constraints apply, these samples should be taken last to avoid excessive contamination of sampling equipment.

19.3 Field Duplicates

Field duplicate samples consist of a set of two samples collected independently at a sampling location during a single sampling event. In some instances the field duplicate can be a blind duplicate, i.e., indistinguishable from other analytical samples so that personnel performing the analyses are not able to determine which samples are field duplicates. Field duplicates are designed to assess the consistency of the overall sampling and analytical system.

19.4 Quality Control Check Samples

Inorganic and organic control check samples are available from EPA free of charge and are used as a means of evaluating analytical techniques of the analyst. Control check samples are subjected to the entire sample procedure, including extraction, digestion, etc., as appropriate for the analytical method utilized.