REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN

FOR

ROBERT MOSES PARKWAY-SOUTH SITE SOUTHWEST OF THE INTERSECTION OF JOHN DALY BLVD AND BUFFALO AVENUE (SBL #158.16-1-1) NIAGARA FALLS, NIAGARA COUNTY, NEW YORK SITE NO. 932166

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ACRONYM LIST

ASP	Analytical Services Protocol
BGS	Below Ground Surface
CAMP	Community Air Monitoring Plan
CPP	Citizen Participation Plan
DER	Department of Environmental Remediation
DUSR	Data Usability and Summary Report
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
IRM	Interim Remedial Measures
MS/MSD	Matrix Spike / Matrix Spike Duplicate
NYS OPRHP	New York State Office of the Parks, Recreation and Historic Preservation
NYSDOH	New York State Department of Health
PAH	Polycyclic Aromatic Hydrocarbons
PID	Photoionization Detector
RI	Remedial Investigation
FS	Feasibility Study
RI/AAR	Remedial Investigation / Alternative Analysis Report
SCO	Soil Cleanup Objectives
Site	Southwest of the Intersection of John Daly Boulevard and Buffalo Avenue
SVOC	Semi-volatile Organic Compounds
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

EXECUTIVE SUMMARY

This document presents the Remedial Investigation / Feasibility Study Work Plan for the Robert Moses Parkway-South Site. The Site consists of approximately 17 acres of parkland located southwest of the intersection of John Daly Boulevard and Buffalo Avenue, Niagara Falls, New York. The project is summarized below.

Site History

The Site once contained a recreational pond that has since been filled in. Based on recent investigation results, some of the fill materials appear to be impacted by contaminants. In addition, three drums were unearthed during recent construction near the coast of the Niagara River.

In an 1897 report on the State Reservation at Niagara, the Port Day Pond and Port Day Park were both addressed. It was reported that the "dumping of refuse, and the draining of sewers into the pond at Port Day, have been prohibited and discontinued" and that the park, having been worked on for the previous year, had "assumed a park-like appearance." In 1934, a northern portion of the pond was filled. In 1960, the construction of the Robert Moses Parkway resulted in the backfilling of the recreational pond.

Contaminant Source and Constituents

The contamination at the Site was encountered in overburden material that appears to once have been sediment in a former pond. The contamination in the apparent sediment material consists of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals. Additionally, elevated concentrations of pesticides and metals were detected in the groundwater.

Additionally, three buried drums were discovered by Watts Architecture and Engineering (Watts) during recent construction activities. The soils in the immediate vicinity of the drums, referred to as hotspots, were determined by Watts to be likely from waste streams from the same facility, contained pesticides and chlorobenzenes.

Extent of Contamination

Borings and test pits within the area of the former pond, and within the area of a proposed new pond were collected in a prior detailed site investigation. Based on this investigation, the sediment contamination is believed to be confined to four to 10 feet below grade in a dark grey organic layer. The sediment contamination consisting of those constituents listed above is known to be located within the area of the former pond and near buried drums adjacent to the Niagara River. It is expected these known areas are the extent of contamination; however, the extent of contamination is not fully known at this time.

Remedial Investigation/Feasibility Study

The proposed RI includes:

- The excavation of test pits and advancement of direct-push borings
- The collection and analysis of soil samples
- The installation and sampling of groundwater monitoring wells

The results of the RI will be used to identify and evaluate remedial alternatives and this analysis of the remedial alternatives will be presented in a Feasibility Study.

1 INTRODUCTION

The Robert Moses Parkway-South Site is an approximately 17-acre property located to the southwest of the intersection of John Daly Boulevard and Buffalo Avenue in Niagara Falls, Niagara County, New York. This property is herein referred to as the "Site." The Site is owned by New York State Office of Parks, Recreation and Historic Preservation (NYS OPRHP). **Figure 1** shows the location of the Site.

A Detailed Site Investigation (DSI) performed in 2014 included several soil borings and a groundwater well in the general vicinity of the RMP interchange with John Daly Boulevard. Appendix A contains the DSI. The RMP-south segment was constructed on land consisting of fill from various sources that was placed to backfill a portion of the Niagara River. Adjacent to the west of the RMP interchange was a former pond. The pond was adjacent to the Niagara River shoreline and originally a portion of a small channel of the River. A 1931 plan provided by NYS OPRHP shows the pond with a small island in the center. **Figure 2** shows the approximate location of the former pond relative to current conditions. **Appendix A** contains additional detail of the Site's history.

During the DSI, fill material was encountered in borings across the Site and this fill material was underlain by a dark grey organic layer that is suspected to be the bottom sediment of the former pond. Samples taken from the overlying fill generally had no exceedances over Restricted Residential Soil Cleanup Objectives (SCOs). The soil sample analyses indicated that the underlying sediment-like material contained high concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals. Because the extent of the contamination was not completely defined, additional soil and groundwater sampling is necessary to delineate the extent of contamination.

NYS OPRHP retained C&S Engineers, Inc. (C&S) to design and implement this Remedial Investigation (RI) and Feasibility Study (FS) to fulfill a New York State Department of Environmental Conservation (NYSDEC) Order on Consent for the Site. C&S has prepared this Work Plan to provide a detailed description of the RI program to be implemented at the Site, the purpose of which is to characterize the nature and extent of contamination occurring on the Site. The resulting information will be utilized to identify an appropriate approach for the remediation of the Site, if necessary, which will be described in a Feasibility Study.

This document has been developed in general accordance with DER-10, Technical Guidance for Site Investigation and Remediation, published by the NYSDEC, and details the scope and objectives of the RI/FS program. A Community Air Monitoring Plan and Health and Safety Plan have also been appended to the Work Plan. Collectively, these plans form one document that is intended to define the scope of tasks, technical approach and specific procedures to be utilized to complete the RI for the Site.

The scope of the RI program to be implemented at the Site is the product of a scoping process that involved the review of historical information concerning the Site, a telephone conversation with NYSDEC representatives, limited site reconnaissance and sampling, and a geophysical survey. Because the RI process is dynamic and iterative, the Work Plan may be modified during the site characterization process to incorporate new information and refine project objectives, as necessary.

1.1 Site Description

The approximately 17-acre Site is located southwest of John Daly Boulevard and Buffalo Avenue in the City of Niagara Falls, Niagara County, New York. The Site is bounded by Buffalo Avenue and property lines adjacent to Riverside Drive to the north; John Daly Boulevard to the east; the Niagara River to the south; and 4th Street to the west. **Figure 2** shows the Site boundaries.

The Site is relatively flat with some minor topographic relief toward the Niagara River. The Site is covered with maintained turf and a few trees.

1.2 Site History

The Site lies within the eastern portion of NYS OPRHP's larger Niagara Falls State Park. This area has been park land since the Niagara Reservation was created in 1885. Prior to that time, mills and factories were located along the River although such facilities were not shown to exist on the Site. Landscaped areas with groves of trees and natural shorelines incorporated portions of the old mills. The Port Day Pond area was formed out of a cove that was isolated from the Niagara River by a stone pier that circled the pond forming a loop driveway. Bridges were later constructed to the island on the east and west sides.

The Site contains the old Port Day Pond, which was used for recreational purposes until it was filled in 1960. In 1960, the pond was completely filled in with materials from various sources.

1.3 Site Geography, Geology, and Hydrogeology

The Project Site is located within the Erie-Ontario Lake Plain physiographic province of New York. This physiographic region has little relief and is characteristic of an abandoned lakebed. The region includes three plains (Ontario, Huron, and Erie), which are separated by the east-west trending Niagara, Portage and Onondaga escarpments. The City of Niagara Falls is located in the Ontario lowland of the Ontario plain. No unique landforms or geological formations exist on or in the vicinity of the Site.

Topography on the Site averages approximately 575 feet above sea level. In general, the topography gradually drops approximately five to ten feet in elevation from north to south across the Site. Overall, the topography of the Site is relatively level.

The Soil Survey of Erie County (U.S. Department of Agriculture, Soil Conservation Service www.websoilsurvey.nrcs.usda.gov) identifies soils on the Site as unsurveyed area (Ua).

The results of the DSI soil borings encountered native soils consisting of glacial till deposited sandy silt, and gravel soils overlying the Lockport Dolostone bedrock. In most cases, the soil borings indicated the presence of surface topsoil and fill or disturbed indigenous soils above the native soils. This is consistent with topographic modifications associated with the backfilling of the area. In some borings, a dark grey sediment-like material was observed within the fill materials.

Bedrock in the vicinity of the Site consists generally of gray, hard, very thin to thinly bedded, dolostone. The depth to bedrock on the Site ranges from approximately 10 to 24 feet as evidenced by refusal in soil borings conducted during the geotechnical analysis of the Site.

Based on a review of NYSDEC data, the Site is not underlain by any mapped principal or primary aquifers. Groundwater at and in the vicinity of the Site is not used for public drinking water supply.

Groundwater was evaluated as part of the DSI of the Site. As part of its DSI, two groundwater monitoring wells were installed. Groundwater elevation was not noted in the boring logs.

2 SUMMARY OF ENVIRONMENTAL CONDITIONS

2.1 Environmental Reports

Preliminary environmental information currently exists for the Site. The following summarizes the documents described in the BE3 Records Search Report, which is included in **Appendix A.**

Design Report/Environmental Assessment

A Design Report/Environmental Assessment was prepared for the reconstruction of the Robert Moses Parkway. Significant portions of the DR/EA are (1) not related to the RMP - South Site, and (2) centered on development design alternatives for the entire Riverway Project. However, there is a small section of the report that summarizes contaminated and hazardous materials associated with the area in close proximity to John B Daly Boulevard and Buffalo Avenue intersection (the area of the Site). In general, the report describes the past use of this area as the former Port Day Pond, which was backfilled long before (i.e., 1960 and prior) environmental laws were created. As a result, contaminated fill from unknown sources is likely, especially considering the industrial area surrounding the site.

The supporting documentation for the potential of contaminated fill in the RMP – South Site is a Preliminary Screening Investigation (PSI) from March 2010 that focused on environmental risk throughout the Riverway Project area. This report associates the known backfilling operations of the adjacent Hydraulic Canal with similar activities for the Port Day Pond and Niagara River shoreline due west and south of the canal. Gradual reduction in the Pond footprint until completion of the RMP in 1960 when the Port Day Pond was completely backfilled is illustrated in a few of the historical maps presented in the report. Although no spills were formally reported in this area, the PSI indicates that municipal waste, building debris, and industrial wastes were used as backfill throughout this area. Ultimately, the document concluded that further investigation is recommended in this RMP – South Site area if excavation is required for future development due to known backfilling operations with potentially contaminated fill.

Detailed Site Investigation Report

The Detailed Site Investigation (DSI) that subsequently followed the PSI included 37 borings and four test pits placed throughout the Riverway Project area. Samples were collected from 13 of the testing locations and analyzed for VOCs, SVOCs, PCBs, pesticides, metals, cyanide, and hexavalent chromium. No radioactive material analyses were performed; however, all samples were screened in the field for radiation.

During the DSI, brown fill material was present and was underlain by a dark grey layer that was suspected to be the bottom sediment of the former pond. The apparent sediment

material was generally located at four to 10 feet below grade. Samples taken from the overlying fill generally had no concentrations over the NYSDEC's Restricted Residential Soil Cleanup Objectives (SCOs). The soil sample analyses indicated that the underlying sediment-like material contained high concentrations of VOCs, SVOCs, pesticides, and metals. Pesticides and metals were also present at elevated concentrations in groundwater. Because the extent of the contamination was not completely defined, additional soil and groundwater sampling is necessary to delineate the extent of contamination.

It is important to note that no elevated levels of radiation were observed at any location per the field protocol performed during this investigation, and that no characteristic hazardous wastes were detected per the TCLP analyses performed.

The full DSI report is included in **Appendix A**.

The following summarizes recent documents not captured in BE3 Records Search Report.

Geophysical Survey

In addition to the environmental reports discussed in the records search, a geophysical survey was conducted at the Site following the on-site discovery of three buried drums near the Niagara River. The geophysical survey was completed by AMEC Foster Wheeler Environment and Infrastructure between February 1, 2016 and February 8, 2016 using frequency domain electromagnetic techniques. A Geonics EM31 Terrain Conductivity meter measured ground conductivity and a component of the electromagnetic field throughout the Site. Four anomalies were observed. One anomaly appears to be the former pond area, while the three remaining anomalies are suggestive of buried metals and may represent drums, tanks or miscellaneous buried metallic debris. Other features were identified by the geophysical survey that, based on size and shape, may be underground utilities. **Figure 5** shows the proposed utilities, some of which, primarily stormwater, are already built or in the process of construction. The Geophysical Survey Results Report is attached as **Appendix B.**

Staging Area Report

To facilitate staging of construction equipment and supplies, one surface and two subsurface soil samples were collected in the northern portion of the Site, along Buffalo Avenue. Sample locations are shown on **Figure 3.** No VOCS, SVOCs, pesticides or metals were detected at concentrations above Unrestricted Use SCOs in the subsurface soil samples. Three metals (lead, mercury and zinc) were detected at concentrations above Unrestricted Use SCOs, and arsenic was detected at concentrations above Industrial Use SCOs in the surface soil samples. Analytical results from the staging area investigation are attached as **Table 1.** The laboratory report and boring logs will be provided with the RI Report.

Interim Remedial Measures (IRM) Work Plan

In response to the discovery of buried drums and soil contamination near those drums at the Site, Watts developed an Interim Remedial Measures (IRM) Work Plan for the Robert Moses Parkway Riverway Construction Zone located within the Site. This work plan was

submitted by Watts and the NYS Department of Transportation (DOT) to NYSDEC in March 2016. **Figure 4** shows the locations and depths of test pits completed by Watts prior to the IRM as well as test pits to be completed during future construction of utilities. The IRM Work Plan was designed to protect human health and environment during the ongoing NYSDOT construction project.

2.2 Nature and Extent of Contamination

As described above, a number of contaminants were detected at elevated concentrations at the Site. NYSDEC Restricted Residential Use Soil Cleanup Objectives (SCOs) were exceeded in five of the on-site soil sampling locations and one groundwater sample exceeded groundwater standards TOGS 1.1.1. However, further evaluation of the subsurface soil and groundwater is needed.

The following is a brief summary of the contaminants on-site. **Figure 3** also shows the contaminants detected at concentrations above the NYSDEC guidelines.

2.2.1 Soil

Select soil samples collected during the DSI contained elevated concentrations of VOCs, SVOCs, pesticides, and metals above the NYSDEC Restricted Residential SCOs.

2.2.2 Groundwater

The groundwater sampling results show exceedances of pesticides and various metals above groundwater standards TOGS 1.1.1 in the one groundwater sample collected at the Site.

3 OBJECTIVES, SCOPE AND RATIONALE

The objectives of the Remedial Investigation described in this Work Plan are to evaluate contaminant impacts to soil and groundwater in order to identify and evaluate appropriate remedial actions for the Site. The investigation work will include evaluating the magnitude and extent of soil and groundwater impacts, conducting a qualitative exposure assessment for actual or potential exposures to contaminants at the Site and/or emanating from the Site, and producing data that will support the development of an acceptable RI Report and Feasibility Study.

The RI scope of work is based on information previously gathered regarding historical operations conducted at the Site, the results of the limited site characterization, and the project objectives. The RI will include the following:

- Subsurface Soil Evaluation – This task will consist of test pits and/or soil borings and the collection and analysis of subsurface soil samples to characterize soil conditions at the Site.

- Surface Soil Evaluation - This task will consist of the collection and analysis of surface soil samples, as requested by the NYSDEC.

- Groundwater Evaluation – Subsequent to completing the above tasks, seven groundwater monitoring wells will be installed and sampled, as well as two monitoring wells from

Watts, to characterize groundwater conditions and help determine groundwater flow and contaminant conditions.

The RI work will be completed in general accordance with NYSDEC Division of Environmental Remediation: Technical Guidance for Site Investigation and Remediation dated May 2010 (DER-10).

Based on the results of the RI, a Feasibility Study will be performed to develop and evaluate potential remedial alternatives, if necessary.

4 REMEDIAL INVESTIGATION

This RI describes the scope of work necessary to collect sufficient data to determine the extent of contaminated fill material, which will support the identification and implementation of a remedy that facilitates the redevelopment of the Site. This RI will provide an outline for the following sections:

- Field Investigation
- Sampling Plan
- Laboratory Analysis

4.1 Field Investigation

The RI has been separated into the following tasks:

4.1.1 Test Pit Program

Test pits will be excavated with a conventional track-mounted excavator to a minimum of one foot into the native subsurface material or shot rock. In areas were bedrock is encountered, test pits will be to the top of bedrock. Based on boring logs from the DSI, the terminal depth will likely range from six feet to ten feet. Test pits will initially be made in the area closest to the former pond and most-contaminated soil found during the DSI. Test pits will progress outwards from this location to determine the extent of contamination. Additional locations will be excavated in other areas of the Site to confirm the absence of significant contamination in these areas. These locations include but are not limited to the anomalies found in the geophysical survey. **Figure 3** shows planned locations for test pits, although additional test pits may be necessary to fully delineate the contaminated sediment-like material or location of buried materials. **Figure 4** compares the proposed sampling locations to locations and results from Watts (2014) and Watts (2016) and anomalies detected in the geophysical survey.

Because the utilities in **Figure 5** may account for some, but not all, of the additional linear anomalies in the geophysical survey, caution will be exercised in excavations that will occur near those linear features identified in the geophysical survey. The test pit program will investigate the presence of buried utilities based on these linear features to determine if the linear anomalies are utilities or associated with contamination.

Soils from the test pits will be screened in the field for impairment by measuring total organic vapors using a photoionization detector (PID). The PID will be equipped with a lamp suitable for

detecting site contaminants of concern. Additionally, visual and olfactory indications of impairment and evidence of staining will be evaluated during test pit operations. Test pit logs will be completed and include soil description, test pit dimensions, PID measurements, etc. The test pit logs will be included in the RI Report.

Soil samples will be collected from the test pits based on evidence of impairment, media encountered, and to provide spatial distribution. The following summarizes the approximate distribution of samples:

- Up to 15 samples will be collected from the dark grey, apparent sediment material
- Up to five samples will be collected from the fill material that overlies the apparent sediment material
- Up to five samples will be collected from the material that underlies the apparent sediment material
- Up to 15 samples will collected elsewhere throughout the Site based on site conditions and evidence of impairment.

In each of these locations, samples will be collected from the interval or area that exhibits the greatest signs of contamination.

The soil samples will be collected from the test pits and analyzed for the following analyte list:

- Target Compound List (TCL) VOCs
- TCL SVOCs
- TCL pesticides
- PCBs
- Target Analyte List (TAL) metals
- Total cyanide
- Total hexavalent chromium (at a reduced rate of one of every four samples)

Additionally, four samples will be collected from the apparent sediment material for waste disposal characteristics. The waste characterization analysis will include:

- Toxicity Characteristic Leaching Procedure (TCLP) VOCs
- TCLP SVOCs
- TCLP pesticides/herbicides
- PCBs
- TCLP metals
- Reactivity
- Corrosivity
- Ignitability

Soils generated from the test pit program will be staged on plastic sheeting to prevent potential contamination of the surface soil. Any drums, other containers, or other free phase product encountered will be properly containerized for appropriate off-site disposal. Excavated soil may be returned to the test pit upon completion in the same general strata from which it was removed.

4.1.2 Boring Program

If the excavation of test pits does not appear to be practical based on site conditions or if the augmentation of the test pit program is necessary, soil sampling may be conducted using direct-push drilling methods. At each location, the drilling rig will advance borings to a minimum of 12 feet below existing ground surface. The sampling device will be a two-inch inner diameter macro-core sampler that consists of a four-foot long hollow tube lined with a disposable acetate liner and equipped with a hardened steel probing tip. Upon retrieval, each soil sample will be screened with a PID and evaluated for soil classification and evidence of contamination. Pertinent observations will be recorded on boring logs. Sample analysis, if any, will serve to fulfill the number of samples described in **Section 4.1.1** above.

Investigation derived wastes (IDW) from boreholes will be handled in accordance with DER-10 Section 3.3(e). Wastes will be returned to the hole of origin, unless free product, NAPL, or grossly contaminated soils are encountered. Any drums, other containers, or other free phase product encountered will be properly containerized for appropriate off-site disposal.

4.1.3 Monitoring Well Installation and Groundwater Sampling

To characterize groundwater conditions at the Site, seven monitoring wells will be installed in locations determined from the results of the test pit program. In addition, two monitoring wells installed and sampled for the DSI by Watts will be sampled, if viable. **Figure 3** shows the proposed monitoring well locations, although the locations may be modified based on the results of the test pit program. Any proposed location modifications will be discussed with the NYSDEC before the wells are installed.

A rotary drill will be used to advance 4-1/4-inch hollow stem augers. Split-spoon samples will be advanced at two-foot intervals using a 140-pound hammer ahead of the augers. The augers and drilling rods will be decontaminated prior to use via high pressure sprayer. The split-spoons will be decontaminated prior to use via an Alconox wash followed by a potable water rinse. Between each soil sample and soil boring, decontamination procedures will be repeated.

Soils from the split-spoons will be screened in the field for visible impairment, olfactory indications of impairment, evidence of NAPLs, and/or indication of detectable VOCs with a PID collectively referred to as “evidence of impairment” and the results recorded on boring logs.

The overburden wells will be constructed to intersect the top of the water table at approximately six to sixteen feet below grade, unless refusal is encountered. Each well will be completed with five to 10 feet of 2-inch Schedule 40 0.010-slot well screen connected to an appropriate length of schedule 40 PVC well riser to complete the well. The annulus will be sand packed with quartz sand to approximately one to two feet above the screen section, and one to two feet of bentonite chips or pellets. The remaining annulus will be grouted to ground surface. Each well will be completed with a stick-up protective casing.

Following a minimum of 24 hours after installation, the monitoring wells will be developed through the removal of up to ten well volumes using dedicated bailers or a peristaltic or submersible pump. The period between installation and development may be extended longer than 24 hours due to hydrogeological properties of the water-bearing zone.

Groundwater sampling will follow well development and be conducted using low flow purging and sampling techniques. A minimum of 24 hours will elapse from the time of development to the time of groundwater sampling. The period between development and sampling may be extended longs than 24 hours due to hydrogeological properties of the water-bearing zone. Before purging the well, water levels will be measured using an electric water level sounder capable of measuring to the 0.01 foot accuracy. Peristaltic or bladder pumps using manufacturer-specified tubing will be used for purging and sampling groundwater. Calibration, purging and sampling procedures will be performed as specified by the USEPA[1] for low flow sampling. Decontamination will be conducted after each well is sampled to reduce the likelihood of cross contamination. Development volumes, calibration times, purging volumes, water levels and field measurements will be recorded in a field log in accordance with DER-10 Section 3.13(c)(4) and will be provided in the RI Report.

The groundwater samples will be analyzed for the following analyte list:

- TCL VOCs
- TCL SVOCs
- TCL pesticides
- PCBs
- TAL metals
- Total cyanide
- Total hexavalent chromium

Wash, development, and purge fluids will be allowed to infiltrate the ground surface of the Site in the vicinity of each soil sampling location in accordance with DER-10 Section 3.3(e)(5). Water generated from monitoring wells with known contamination will be containerized for proper disposal or treated in a manner allowable by DER-10 Section 3.3(e)(5). Excess soil will be broadcast in the vicinity of the boring in accordance with DER-10 Section 3.3(e)(3). Excess soil that exhibits signs of contamination will be containerized for off-site disposal.

In addition to groundwater samples, the stage of the Niagara River will be measured concurrently with groundwater elevations at upstream and downstream locations, based on access at the Site. Stage will be either be measured with the use of a gage or plumb-bob from a fixed point, based on site conditions, weather conditions, and access.

4.1.4 Surface Soil Sampling

Although not anticipated to be a significant concern, surface soil samples will be collected across the Site. The twelve surface soil samples will be spatially distributed across the Site and will be collected from 0 to 2 inches below the vegetative cover using a decontaminated, stainless steel spoon or spatula. The location of surface soil samples is provided on **Figure 3**.

The surface soil samples will be analyzed for the following analyte list:

- TCL SVOCs
- TCL pesticides
- PCBs

[1] U.S. EPA Region 1 Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, January 19, 2010.

- TAL metals
- Total cyanide
- Total hexavalent chromium

4.2 Sampling Plan and Laboratory Analysis

Table 2 summarizes the sampling program described in the sections above. Additionally, Quality Assurance/Quality Control (QA/QC) samples will be collected, and the following describes the minimum number of samples per media type:

- Surface soil samples
  - Blind duplicate – 1 per 20
  - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 per 20
- Subsurface soil samples (borings and test pits)
  - Blind duplicate – 1 per 20
  - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 per 20
- Groundwater samples
  - Trip blank – 1 per shipment
  - Blind Duplicate – 1 per 20
  - Matrix Spike/Matrix Spike Duplicate (MS/MSD) – 1 per 20

C&S will utilize the services of an NYSDOH Environmental Laboratory Approval Program (ELAP) certified laboratory for analytical testing. The laboratory results for the samples will be reported in a Category B deliverables package to facilitate validation of the data, and a third party validator will review the laboratory data and prepare a Data Usability Summary Report (DUSR). The validator will evaluate the analytical results for the field samples and quality assurance/quality control samples and compare the findings to USEPA guidance to determine the accuracy and validity of the results.

5 QUALITY ASSURANCE AND QUALITY CONTROL PROTOCOLS

To ensure that suitable and verifiable data results are obtained from the information collected at the Site, quality assurance procedures are detailed in this section.

5.1 Sampling Methods

Sampling procedures will be conducted in accordance with the NYSDEC *Sampling Guidelines and Protocols Manual*. Collecting of representative samples will include the following procedures:

- Ensuring that the sample taken is representative of the material being sampled;
- Using proper sampling, handling and preservation techniques;
- Properly identifying the collected samples and documenting their collection in field records;
- Maintaining chain-of-custody; and
- Properly preserving samples after collection.

5.1.1 Soil Sampling

Soil sampling will be performed using two methods: (1) grab samples and (2) field screening including visual and olfactory observations and using a PID. Selected samples will be placed directly in pre-cleaned jars provided by the laboratory.

The contaminants of concern during excavation include VOCs, SVOCs, pesticides and metals. As detailed in the *Sampling Guidelines and Protocols Manual*, VOC grab samples will be sampled using Tera Core kits and samples from SVOCs, pesticides and metals will be placed in 8-ounce, wide-mouth, glass jars. Sample jars will immediately be placed on ice in a cooler to maintain a temperature below 4 degrees Celsius. Soil samples submitted for the analysis of other analytes will be placed in appropriately sized jars as per the analytical method requirements.

The sampling plan and rationale for the RI are provided in **Section 4.**

5.1.2 Water Sampling

Water samples will be collected via pouring directly into pre-cleaned bottles provided by the laboratory and immediately placing the bottles on ice. The bottles and associated preservatives, if any, used will be based on the requirements of the analytical methods.

5.1.3 QA/QC Sampling

As described in **Section 4.2**, QA/QC samples will be collected to help evaluate the validity of the laboratory data. Trip blanks, duplicate samples, and MS/MSD samples will be analyzed per the various media as described in **Section 4.2**.

5.2 Sample Nomenclature

Because a variety of types of samples will be generated during the course of this project, strict adherence to a planned nomenclature scheme is necessary. The following presents the planned sample nomenclature:

- Surface soil samples – SS-A1-01
  - SS – Surface soil
  - 01 – First sample
- Subsurface soil samples (test pits) – TP- 01-36-48
  - TP – Test pit soil sample
  - 01 – First sample
  - 36-48 – Sample depth in inches
- Subsurface soil samples (soil borings) – SB- 01-36-48
  - SB – Soil boring soil sample
  - 01 – First sample
  - 36-48 – Sample depth in inches
- Groundwater samples – GW-MW02-01
  - GW – Groundwater
  - MW01 – Monitoring Well 02
  - 01 – First sampling event

5.3 Analytical Procedures

5.3.1 Laboratory Analysis

Laboratory analysis will be conducted by a third-party laboratory that is accredited by the NYSDOH Environmental Laboratory Accreditation Program (ELAP). Laboratory analytical methods will include the most current NYSDEC Analytical Services Protocol (ASP).

Soil and groundwater samples sent to a certified laboratory will be analyzed in accordance with EPA SW-846 methodology for the following contaminants:

- TCL VOCs (EPA Method 8260)
- TCL SVOCs (EPA Method 8270)
- PCBs (EPA Method 8082)
- TCL Pesticides (EPA 8081)
- Target Analytes List for Metals (EPA Method 6010)

Category B deliverables will be requested to be used in a third-party data validation.

5.3.2 Data Usability

A Data Usability Summary Report (DUSR) will be prepared by a third-party data consultant using the most recent methods and criteria from the USEPA. The DUSR will assess all sample analytical data, blanks, duplicates and laboratory control samples and evaluate the completeness of the data package.

5.4 Documentation

5.4.1 Custody Procedures

As outlined in NYSDEC *Sampling Guidelines and Protocols,* a sample is in custody under the following conditions:

- It is in your actual possession;
- It is in your view after being in your physical possession;
- It was in your possession and then you locked or sealed it up to prevent tampering; or
- It is in a secure area

The environmental professional will maintain all chain-of-custody documents that will be completed for all samples that will leave the Site to be tested in the laboratory.

5.4.2 Air Monitoring Records

Air monitoring will be conducted for on-site health and safety. Air monitoring will be conducted during active invasive activities periods. The monitoring will include VOC screening. The specifics of the air monitoring procedures and criteria are detailed in the Health and Safety Plan (HASP) in **Appendix C**) and Community Air Monitoring Plan (CAMP) in **Appendix D.**

6 HEALTH AND SAFETY

To assure the safety of the workers and the local community, monitoring practices of the work environment will be in place during all phases of RI activities. A Health and Safety Plan (HASP) was prepared that details procedures for maintaining safe working conditions and minimizing the potential for exposure to hazardous material. The HASP is provided in **Appendix C.**

Additionally, the Community Air Monitoring Plan (CAMP) in **Appendix D** describes the air monitoring procedure to be employed during ground intrusive activities to ensure the health and safety of residents and others proximal to the Site.

7 QUALITATIVE EXPOSURE ASSESSMENT

As part of the RI, a Qualitative Exposure Assessment will be performed in accordance with DER-10 Appendix 3B and **Section 3.6**. This Qualitative Exposure Assessment will evaluate whether potential or completed exposure pathways exist. This assessment will be based on the soil, sediment and groundwater sampling data generated during the RI.

The Qualitative Exposure Assessment will include the following areas of evaluation:

- Source Areas – Areas with identified impacts will be included as part of the exposure assessment.
- Fate & Transport – The data will be evaluated for potential on-site impacts as well as off-site migration via soil, sediment, and groundwater.
- Route of Exposure – The results of site sampling will be interpreted to determine if contaminant concentrations are at levels that have the potential to be inhaled or ingested.
- Receptor Population – The Site will be evaluated to determine the size and makeup of potential on-site and down-gradient receptors including residents, workers, and neighbors.

8 REMEDIAL INVESTIGATION REPORT

Subsequent to completing the work outlined above, a Final Remedial Investigation Report will be developed in general accordance with NYSDEC DER-10. The report will describe the findings of the RI and implications of those findings. The report will contain summary tables, field logs, laboratory reports, site photographs, and other related materials that are necessary to accurately present the RI results.

9 FEASIBILITY STUDY

Based on the results of the RI, a Feasibility Study will be completed that identifies and evaluates potential remedial approaches to address the contamination, if any, encountered during the RI. The FS will:

- Identify the goal of the remedial program
- Define the nature and extent of contamination to be addressed by the alternatives developed
- Identify the Remedial Action Objectives (RAOs) for the site
- Develop remedial action alternatives

- Undertake an initial screening and detailed analysis of the alternatives

The FS will evaluate, at a minimum, alternatives that include No Action, unrestricted use, and one or more alternatives capable of achieving the most feasible and least restrictive use of the site. The FS Report will include the following sections:

- Introduction
- Site description and history
- Summary of the RI and exposure assessment
- Remedial goals and remedial action objectives
- General response actions
- Identification and screening of technologies
- Development and analysis of alternatives
- Recommended remedy

The FS Report may be a separate document or may be combined with the RI.

10 SCHEDULE

The following schedule presents milestones of the proposed schedule of remedial investigation and remedial action activities for the Site. This schedule is dependent on NYSDEC approvals and does not account for potential delays due to public comments, weather conditions, etc.

Anticipated Date	Milestone
November 15, 2015	Draft Remedial Investigation / Feasibility Study Work Plan Submittal
February 26, 2016	Revised Draft Remedial Investigation / Feasibility Study Work Plan Submittal
March 13, 2016	Remedial Investigation / Feasibility Study Work Plan Approved
March 14, 2016	Remedial Investigation / Feasibility Study Initiated
May 2, 2016	Field Investigation Complete
August 1, 2016	Draft Remedial Investigation Report/Feasibility Study Submittal

TABLES

TABLE 1 - SUMMARY OF ANALYTICAL RESULTS - STAGING AREA
ROBERT MOSES PARKWAY - SOUTH SITE, NIAGARA FALLS, NY

Sample ID Sampling Date	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	**SS-1-0-2IN** 11/10/2015	**SB-5-5-7FT** 11/10/2015	**SB-3-4-6FT** 11/10/2015
Semivolatile Organic Compounds								
Dimethylphthalate	N/S	N/S	N/S	N/S	N/S	0.52	0.41	0.39 J
Phenanthrene	100	100	100	500	1000	0.1 J	ND	ND
Fluoranthene	100	100	100	500	1000	0.13 J	ND	ND
Pyrene	100	100	100	500	1000	0.13 J	ND	ND
Pesticides								
4,4-DDE	0.0033	1.8	8.9	62	120	0.0014	ND	ND
Metals								
Aluminum	N/S	N/S	N/S	N/S	N/S	8280	7160	7910
Arsenic	13	16	16	16	16	***20.5***	3.71	4.81
Barium	350	350	400	400	10000	78.9 N	38.2 N	60 N
Beryllium	7.2	14	72	590	2700	0.635	0.442	0.501
Cadmium	2.5	2.5	4.3	9.3	60	0.838	0.25 J	0.564
Calcium	N/S	N/S	N/S	N/S	N/S	11300	2330	42600
Chromium*	30	36	180	1500	6800	14.9 N	9.08 N	11.2 N
Cobalt	N/S	N/S	N/S	N/S	N/S	9.3	7.46	8.18
Copper	50	270	270	270	10000	23.2 N	26.1 N	7.17 N
Iron	N/S	N/S	N/S	N/S	N/S	19100	18700	18200
Lead	63	400	400	1000	3900	**117**	9.5	23
Magnesium	N/S	N/S	N/S	N/S	N/S	6770	3170	12700
Manganese	1600	2000	2000	10000	10000	371	200	442
Mercury	0.18	0.81	0.81	2.8	5.7	**0.328**	0.021	0.07
Nickel	30	140	310	310	10000	25.9	17.6	18.8
Potassium	N/S	N/S	N/S	N/S	N/S	1460 N	544 N	834 N
Silver	2	36	180	1500	6800	1.72	1.27	1.26
Sodium	N/S	N/S	N/S	N/S	N/S	55.4 J	41.6 J	94.5 J
Vanadium	N/S	N/S	N/S	N/S	N/S	18.6	15.2	14.8
Zinc	109	2200	10000	10000	10000	**238**	98.9	108

Notes

All units are mg/kg (ppm)

* Standard for trivalent chromium is used for comparison

N/S SCO is not specified

Qualifiers

U - The compound was not detected at the indicated concentration.

N (Organics) - Presumptive Evidence of a Compound

N (Inorganics) - The matrix spike recovery was outside control limits

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL. The concentration given is an approximate value.

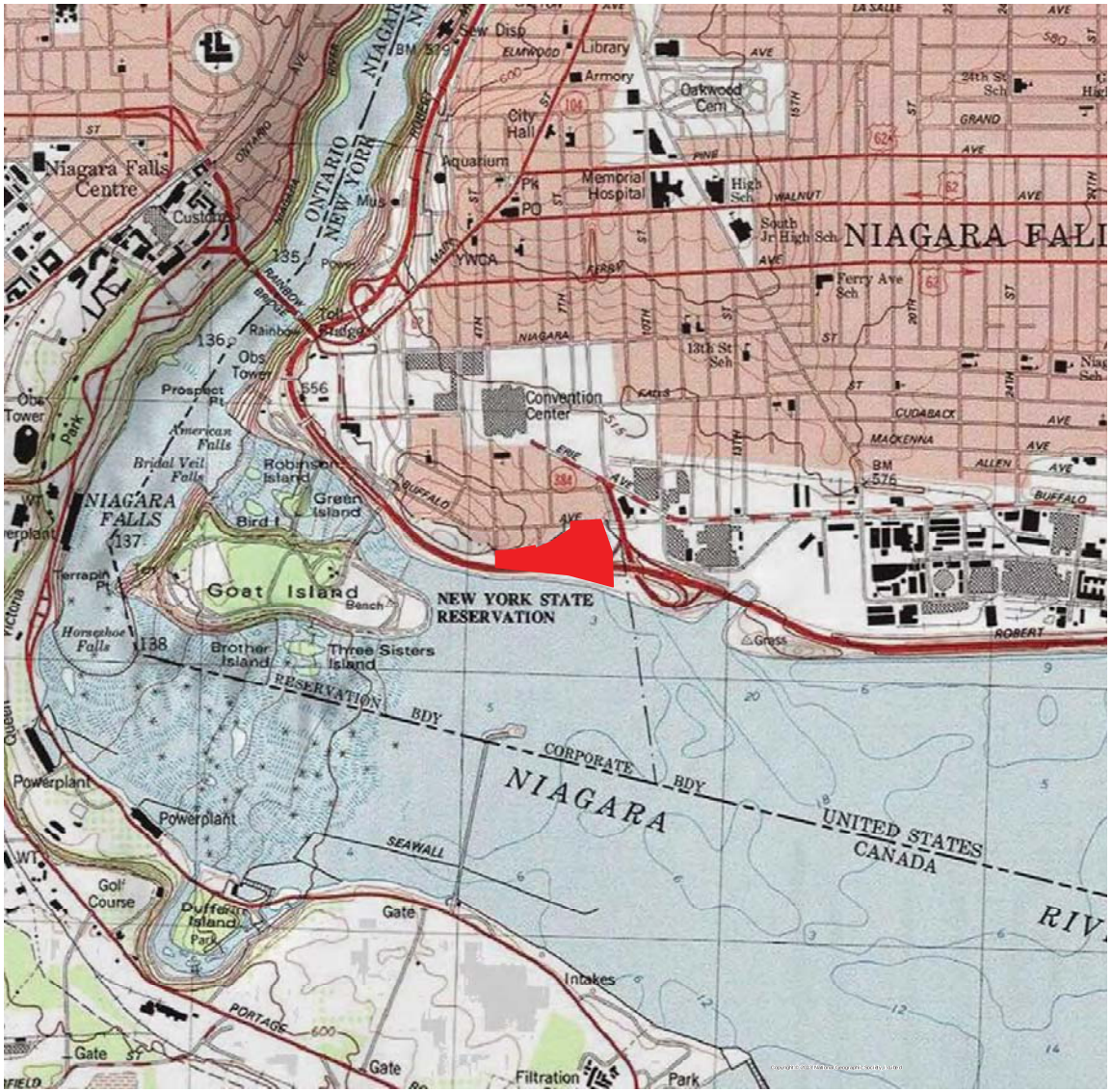
Table 2 – Proposed Remedial Investigation Sampling Program

Robert Moses Parkway-South Site
Site No. 932166

Task	Location	Depth	Number of Samples	Lab Analysis
Surface Soil Samples	Site Wide	0-2 inches	12	TCL SVOCs and pesticides, PCBs, TAL metals, cyanide, hexavalevnt chromium
Subsurface Soil Samples	Site Wide	TBD	40	TCL VOCs, SVOCs, and pesticides, PCBs, TAL metals, cyanide, hexavalevnt chromium
Groundwater Samples	Former Pond Area	TBD	9	TCL VOCs, SVOCs, and pesticides, PCBs, TAL metals, cyanide, hexavalevnt chromium

Notes:
- TBD - Field observations will be used to select locations, depths, etc.

FIGURES



LEGEND

SITE LOCATION

NOTES

1) BASE MAPPING IS PROVIDED BY THE UNITED STATES GEOLOGICAL SURVEY.

0 750 1,500 3,000 FEET

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NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION
ROBERT MOSES PARKWAY - SOUTH SITE
REMEDIAL INVESTIGATION
NIAGARA FALLS, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	190720009
DATE:	FEBRUARY 23, 2016
DRAWN BY:	A.DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

SITE LOCATION

FIGURE 1

LEGEND

- SITE BOUNDARY
- OUTLINE OF FORMER POND

NOTES

1) COORDINATE SYSTEM: NAD 1983 STATEPLANE NY WEST FIPS 3103
PROJECTION: TRANSVERSE MERCATOR
DATUM: NORTH AMERICAN 1983
UNITS: FOOT US

2) THE SITE BOUNDARY INCLUDES ALL LAND UP TO THE WATER'S EDGE, DESPITE THE BOUNDARY SET BY THE TAX PARCEL.

0 100 200 400
FEET

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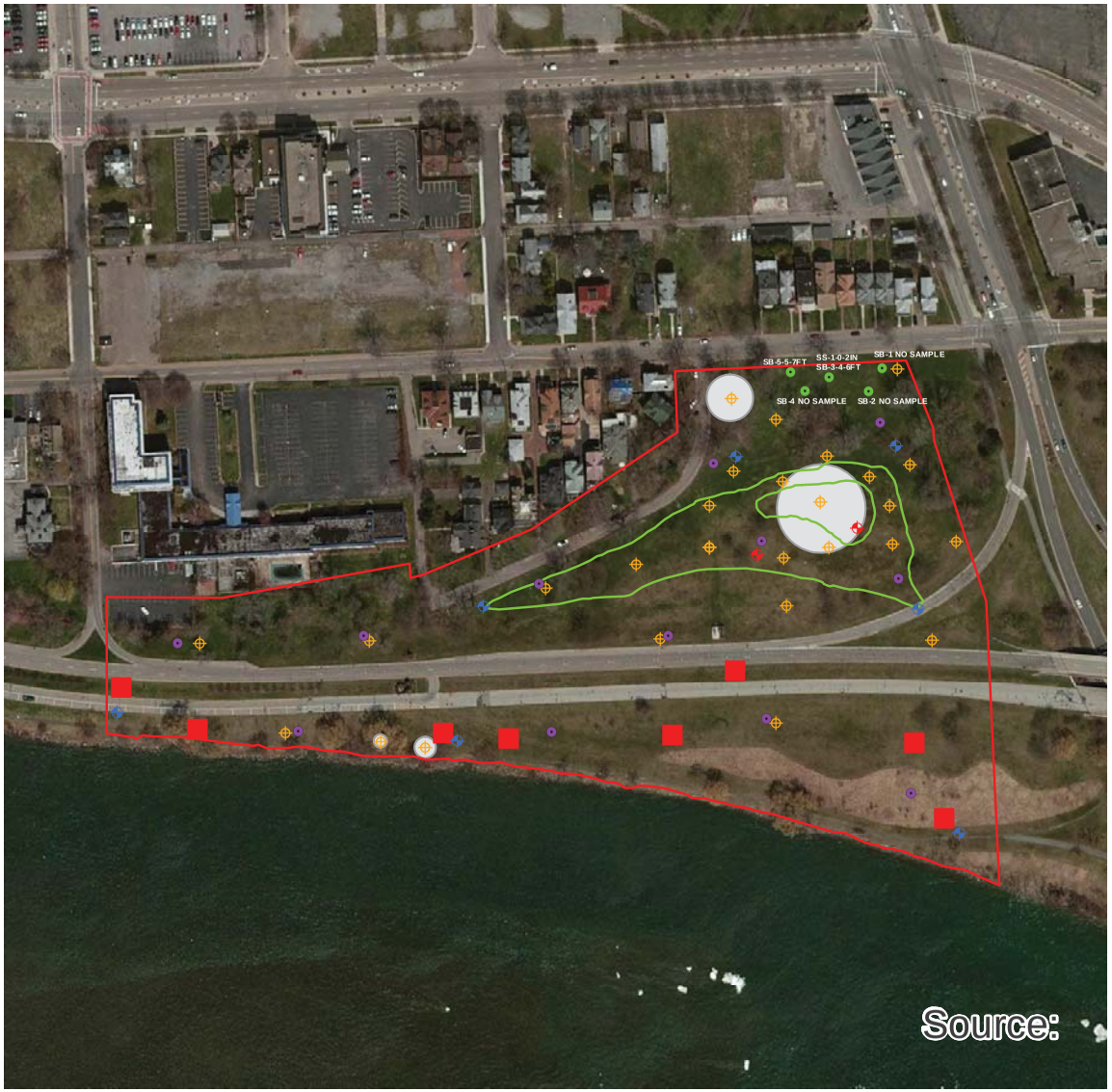
DRAWN BY:	A DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

SITE MAP

FIGURE 2



LEGEND

- SITE BOUNDARY
- OUTLINE OF FORMER POND
- PROPOSED TEST PIT LOCATION
- PROPOSED GROUNDWATER MONITORING WELL LOCATION
- PROPOSED SURFACE SAMPLE LOCATION
- WATTS GROUNDWATER MONITORING WELL LOCATION
- APPROXIMATE AREA OF ANOMALY IDENTIFIED BY GEOPHYSICAL SURVEY
- STAGING AREA SOIL BORING LOCATIONS AND SAMPLE ID
- WATTS/ NYSDOT HOT SPOT REMOVAL AND TEST PITS

NOTES

1) TWO GROUNDWATER MONITORING WELLS WERE PREVIOUSLY INSTALLED IN 2014 BY WATTS.

2) COORDINATE SYSTEM: NAD 1983 STATEPLANE NY WEST FIPS 3103
PROJECTION: TRANSVERSE MERCATOR
DATUM: NORTH AMERICAN 1983
UNITS: FOOT US

3) TEST PIT LOCATIONS AND QUANTITIES ARE SUBJECT TO CHANGE BASED ON SITE AND SOIL CONDITIONS.

4) THE SITE BOUNDARY INCLUDES ALL LAND UP TO THE WATER'S EDGE, DESPITE THE BOUNDARY SET BY THE TAX PARCEL.

5.) WATTS / NYSDOT HOT SPOT EXCAVATIONS WILL BE TO WATER DEPTH (APPROXIMATELY 4-8 FEET) AND TEST PITS WILL BE TO SHOT ROCK (APPROXIMATELY 2-4 FEET).

0 100 200 400
FEET

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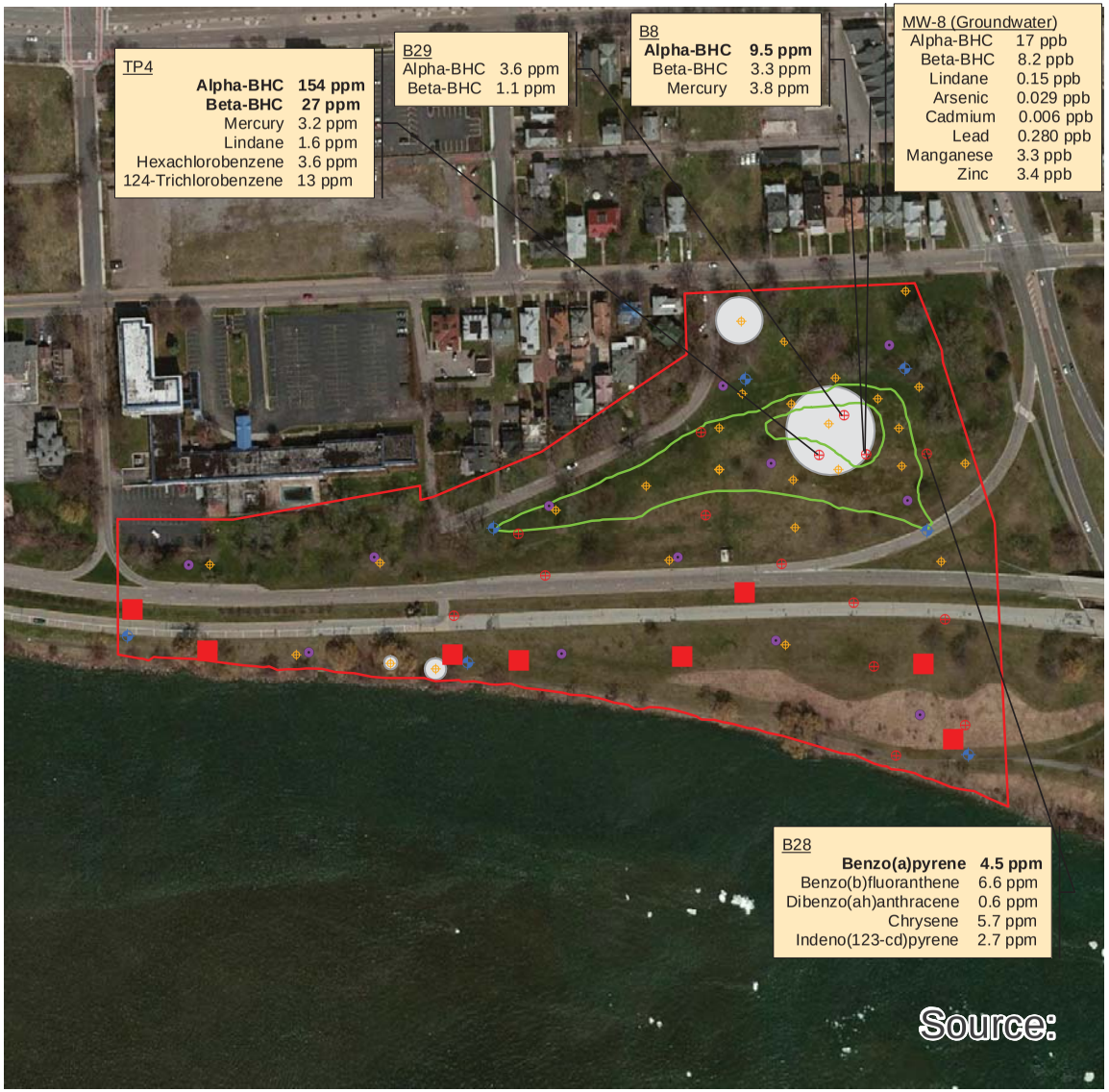
NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION
ROBERT MOSES PARKWAY - SOUTH SITE
REMEDIAL INVESTIGATION
NIAGARA FALLS, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	190720009
DATE:	FEBRUARY 26, 2016
DRAWN BY:	A DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

PROPOSED RI SAMPLING PROGRAM

FIGURE 3



LEGEND

- SITE BOUNDARY
- OUTLINE OF FORMER POND
- PROPOSED TEST PIT LOCATION
- PROPOSED GROUNDWATER MONITORING WELL LOCATION
- PROPOSED SURFACE SAMPLE LOCATION
- 2014 WATTS BORING, TEST PIT OR SAMPLE LOCATIONS
- WATTS / NYSDOT HOT SPOT REMOVAL AND TEST PITS
- APPROXIMATE AREA OF ANOMALY IDENTIFIED BY GEOPHYSICAL SURVEY

Watts 2014 Exceedances

Soil Parameter	Industrial
Soil Parameter	Restricted Residential
Groundwater Parameter (MW8)	TOGS 1.1.1

NOTES

1) WATTS SAMPLE LOCATIONS TAKEN FROM WATTS AE PHASE II REPORT FIGURE 2 - SAMPLE LOCATION MAP SCO EXCEEDANCES HIGHLIGHTS* (2014) AND WATTS IRM FIGURE 1 (2016)

2) FIGURE SHOWS EXCEEDANCES OF RESTRICTED RESIDENTIAL SCOS ONLY

3) COORDINATE SYSTEM: NAD 1983 STATEPLANE NY WEST FIPS 3103
PROJECTION: TRANSVERSE MERCATOR
DATUM: NORTH AMERICAN 1983
UNITS: FOOT US

4) THE SITE BOUNDARY INCLUDES ALL LAND UP TO THE WATER'S EDGE, DESPITE THE BOUNDARY SET BY THE TAX PARCEL.

5.) WATTS / NYSDOT HOT SPOT EXCAVATIONS WILL BE TO WATER DEPTH (APPROXIMATELY 4-8 FEET) AND TEST PITS WILL BE TO SHOT ROCK (APPROXIMATELY 2-4 FEET).

0 100 200 400 FEET

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DRAWN BY:	A DeMARCHI
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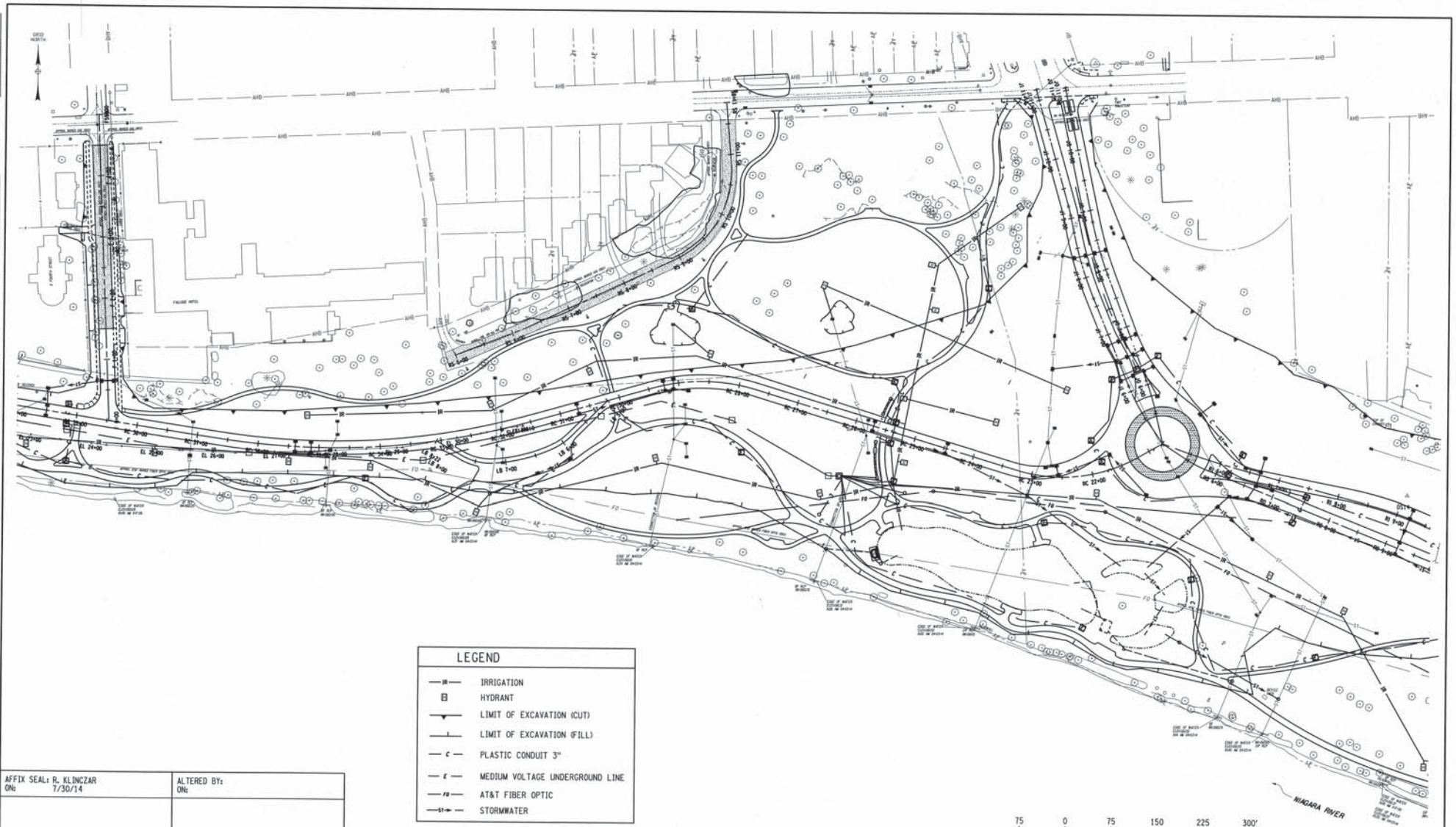
CHECKED BY:	D. RIKER

PROPOSED RI SAMPLING PROGRAM COMPARED TO WATTS STUDY AND GEOPHYSICAL SURVEY

FIGURE 4



AFFIX SEAL: R. KLINCZAR ON: 7/30/14	ALTERED BY: ON:

AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS:

ROBERT MOSES PARKWAY
NY ROUTE 957A (SH9322)
ROBERT MOSES PARKWAY - SOUTH SEGMENT - "RIVERWAY"
COUNTY: NIAGARA

PIN 5410.54
NY ROUTE 957A
UTILITY QUALITY LEVEL D

Hatch Mott MacDonald

BRIDGES
BIN 1068141
BIN 1068142

CULVERTS

ALL DIMENSIONS IN ft UNLESS OTHERWISE NOTED

CONTRACT NUMBER
D262671
DRAWING NO.
SHEET NO.

NEW YORK STATE DEPARTMENT OF TRANSPORTATION REGION 05
DOCUMENT NAME:

DESIGN SUPERVISOR R. KLINCZAR | JOB MANAGER J. LEBSACK | DESIGN M. MRUK | CHECK R. KLINCZAR | DRAFTING G. MCEWEN | CHECK D. LAMB | PROJECT MANAGER J. LEBSACK

FILE NAME = P:\@NYSOPRNP\@253346\@11 CAD\@SOIL_PLAN.dgn
DATE/TIME = 1/5/2016

APPENDICES

APPENDIX A
RECORDS SEARCH REPORT

RECORDS SEARCH REPORT
for the
Robert Moses Parkway – South Site
Intersection of John B Daly Blvd and Buffalo Ave.
Niagara Falls, NY 14303

Prepared for:

NYS Office of Parks, Recreation and Historic Preservation
625 Broadway
Albany, New York, 12238

Prepared by:

Brydges ▪ environment ▪ engineering ▪ energy
33 Washington Highway
Amherst, NY 14226

September 2015

Prepared By: Jason M. Brydges, PE	**Signature:**	**Date:** 9/22/15	**Title:** BE3 - PM
Reviewed By: Dan E. Riker, PG	**Signature:**	**Date:** 9/22/15	**Title:** C&S - PM

APPENDIX B
GEOPHYSICAL SURVEY RESULTS REPORT

Amec Foster Wheeler Environment & Infrastructure
Hillcrest Building 1, 751 Arbor Way, Suite 180
Blue Bell, PA 19422-1960

February 22, 2016

Daniel E. Riker, P.G.
Managing Geologist
C&S Companies
141 Elm Street, Suite 100
Buffalo, NY 14203

Transmitted via email to: driker@cscos.com

Dear Mr. Riker:

Subject: Geophysical Survey Results,
Riverway Project
Niagara Falls, NY

1.0 INTRODUCTION

This letter report presents the results of the geophysical investigation performed for C&S Companies in support of their environmental investigation of a property located in Niagara Falls, NY (the Site). The Site is currently undergoing construction activities related to the realignment of the Robert Moses Parkway and associated improvements to adjacent NY State Park lands. The portion of Site investigated is bounded by the Niagara River to the south, 4th Street to the west, Riverside Drive and Buffalo Avenue to the north and John Daly Blvd to the east.

We understand that recent construction activities unearthed portions of buried drums in fill material adjacent to the Niagara River in the southwest area of the Site. A geophysical survey was requested to explore for anomalies of additional drums and to identify anomalies that may be related to areas of potential environmental concern.

As the survey area is an active construction site the contractor made significant efforts to move and consolidate equipment that might interfere with geophysical data acquisition. Several stockpiles of materials (soils and building supplies) were present within the survey area that were not practical to relocate.

The geophysical investigation was designed to geophysically characterize the subsurface and focus a follow-up intrusive investigation, if warranted.

The information provided herein is intended to assist C & S Companies with their assessment of potential environmental concerns at the Site. AMEC Foster Wheeler Environment and Infrastructure, Inc. (Amec) performed geophysical data acquisition between February 1 and 8th, 2016 using frequency domain electromagnetic techniques.

2.0 Electromagnetic EM31 Survey Methodology

A Geonics EM31 Terrain Conductivity meter was used to measure and record the quadrature component (ground conductivity) and the inphase component of the EM field at the Site. The EM31 survey utilized a differential GPS system for positioning. The equipment was the Trimble AG114 interfaced to an Allegro data logger. Positioning was displayed in real time. Geophysical data were collected along lines nominally spaced approximately 10 ft apart.

The quadrature component of the EM field is a measurement of the apparent ground conductivity. The inphase component of the EM field is sensitive to metallic objects. Comparison of the quadrature component of the EM field data (expressed in units of milliSiemens per meter (mS/m)) and the inphase component data (expressed in units of parts per thousand (ppt)) results in increased anomaly definition. The character of the EM response, low or high, is partially dependent on the orientation of the buried target relative to the orientation of the EM31 device during data acquisition, and the survey direction. A buried metal pipe, for example, will exhibit a high valued response when the trend of the pipe is parallel to the survey direction. Alternatively, when a survey line crosses a buried metal pipe whose trend is

EM31 with GPS in use (photo not from this site)

perpendicular to the survey direction, it is characterized by a low response. Similarly, other complex buried metal anomalies are indicated by a coupling of a high and low response.

A non-metallic cart was constructed to tow the EM31. All readings were taken with the instrument oriented parallel to the direction of travel, in the vertical dipole mode and with the instrument at a height of approximately 24 inches. The depth of penetration with the instrument in this configuration is approximately 12 to 15 feet below ground surface. Data were collected and stored in a solid state memory data logger during the survey. The data logger was interfaced to a portable computer and the data were transferred for subsequent processing and interpretation. A survey base station was established on-site and was revisited throughout the survey to check for instrument drift and malfunction. No significant drift or malfunction was observed.

The terrain conductivity and inphase data were initially edited and then plotted for interpretation. Contour maps of the data were then constructed and utilized for final interpretation. The geophysical data are presented in final form as a series of color contour maps. The color maps allow for an illustration of detected anomalies that are associated with conductive materials such as buried metals, wastes, fill, utilities, and changes in soil texture and/or moisture content.

3.0 EM31 Results

EM31 conductivity and inphase data for the site is shown in Figures 1 and 2, respectively. Surface features that were observed during the data acquisition are noted on the figures. Positioning was accomplished using an integrated GPS system. Areas with no data (white areas on Figures 1 and 2) are related to stockpiles or other obstructions where data could not be collected. The approximate locations of roads are sketched on the figure to aid the reader with spatial orientation.

Responses from various surface metallic features are evident in the geophysical data. Most notable are the heavy equipment located on the far eastern portion of the survey area. The locations of some of these surface features are noted on the figures so they are distinguishable from the interpreted subsurface anomalies.

Numerous linear anomalies are observed across the site and these likely represent buried metallic utilities.

Conductivity values at the site were observed to range from below 0 mS/m to over 40 mS/m. The variation in terrain conductivity may be related to any one or combination of the following conditions:

- A change in soil/fill type. For example, an increase in relative clay content may increase the measured conductivity and variations in fill type will cause associated anomalies;

- A change in soil moisture. Moisture content would be expected to increase in areas of low topographic elevation as more saturated sediments lie within the depth of investigation of the EM instrument;

- A change in pore fluid specific conductance. For example, the presence of salt-impacted water within the pore space of the shallow soil will increase the measured electrical conductivity primarily due to the presence of chloride ions;

- Interference from surface metallic anthropogenic features such as powerlines, fences, pipes, equipment and other metallic structures; and/or

- Subsurface objects with varying electrical properties

The inphase data set that is shown in Figure 2 exhibits a response that is similar to the conductivity data. The inphase response data is often referred to as the "metal detection" mode however buried metallic objects are expressed as anomalies in both inphase and conductivity data sets.

Only a very small amplitude anomaly was observed in the area where pieces of drums were previously identified. This brings into question the utility of the geophysical survey to exclude other areas of buried partial drums. Buried metallic drums typically exhibit a pronounced response using the EM31. The magnitude of this response would be expected to diminish in the presence of smaller quantities of drum remnants.

Four anomalies were identified as potentially being related to features of environmental significance and are labeled **A** through **D** on Figures 1 and 2. These anomalies are expressed in both conductivity and inphase data sets. Subsurface material with uniform (or gradually varying) electrical properties would be expected to exhibit a uniform of slowly varying response. Buried objects are interpreted by recognizing an abrupt lateral change in measured response. Buried metallic drums would typically be expressed as a low (or negative) response (shades of dark blue on Figures 1 and 2). While such a low response is "typical" it is not uniquely the case. The shape and orientation of buried metallic objects sometimes cause a high amplitude positive response (shown in shades of red on Figures 1 and 2). The identified anomalies do not represent an exhaustive list of anomalous responses; rather the largest and most compelling are identified as areas where further intrusive investigation may be warranted.

Anomaly **A** is located in the northeast portion of the survey area. We understand a pond possibly associated with chemical impacts was previously located in this area. Anomaly A may reflect the lateral extents of this feature.

Anomalies **B** and **C** are buried metal anomalies located along the shoreline east of the area where drum remnants were previously discovered. These anomalies suggest the presence of buried metals and if intrusive work is planned to explore for additional drums they are offered as potential targets of the investigation.

Anomaly **D** is a zone of anomalous responses located in the far north end of the survey area southeast of the intersection of Riverside Drive and Buffalo Avenue. This zone of anomalies is also suggestive of buried metals and may represent drums, tanks, or miscellaneous buried metallic debris.

Any of the additional anomalous responses may be significant from an environmental perspective however we believe they are more likely associated with surface features, utilities, and/or artifacts of data processing.

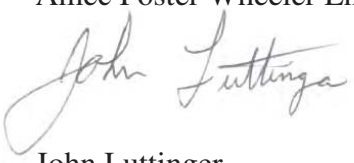
4.0 LIMITATIONS

The geophysical methods used during this survey are established, indirect techniques for non-destructive subsurface reconnaissance exploration. As these instruments utilize indirect methods, they are subject to inherent limitations and ambiguities. Metallic surface features (trailers, heavy equipment, manholes, scrap metal, etc.) preclude reliable non-invasive data/results beneath, and in the immediate vicinity of, the surface features. Targets such as buried drums, buried tanks, conduits, etc. are detectable only if they produce recognizable anomalies or patterns against the background geophysical data collected. As with any remote sensing technique, the anomalies identified during a geophysical survey should be further investigated by other techniques such as historical aerial photography, test pit excavation and/or test boring, if warranted.

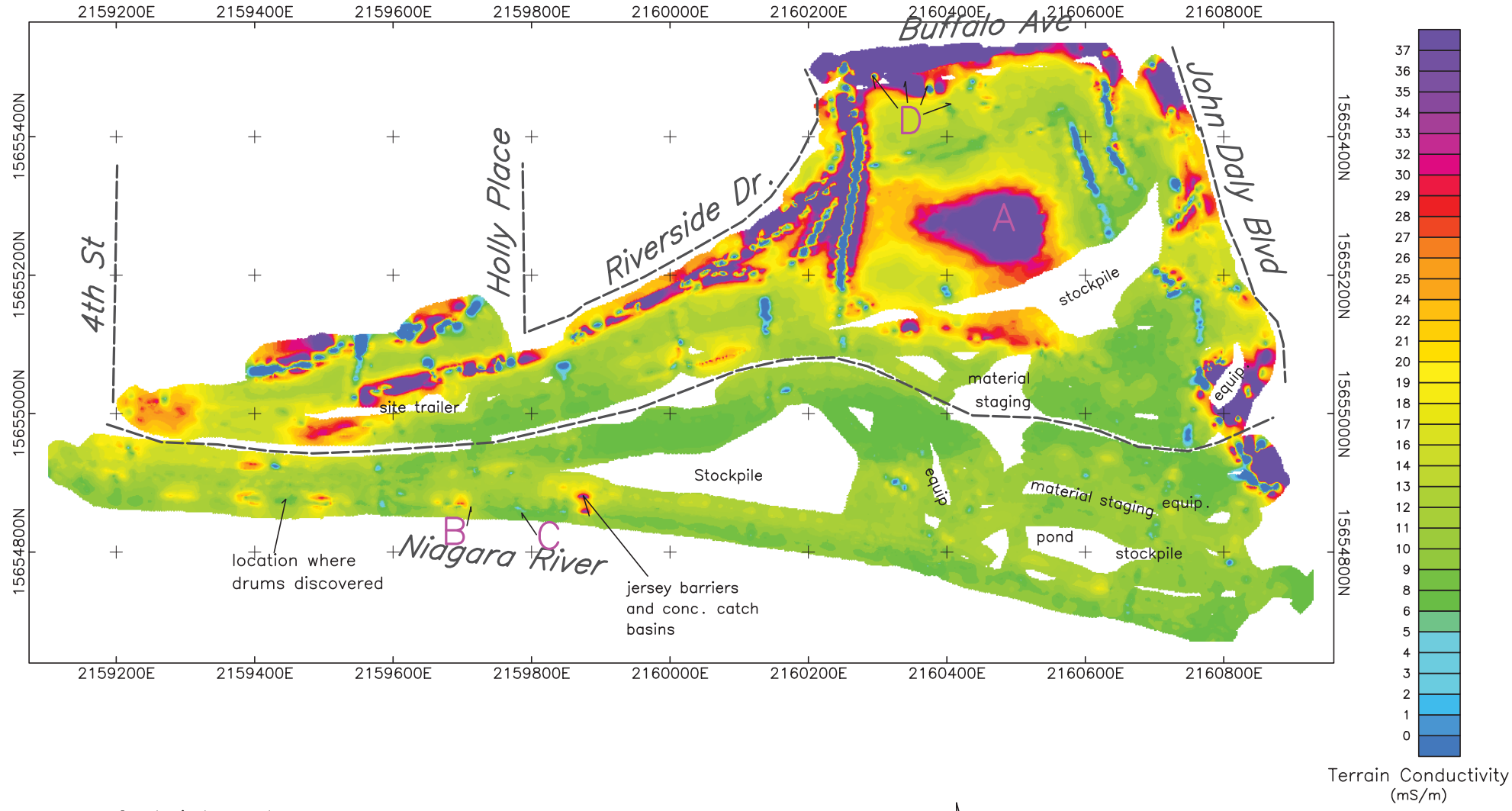
Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely yours,

Amec Foster Wheeler Environment & Infrastructure, Inc.



John Luttinger
Senior Geophysicist



A Geophysical anomaly discussed in report

Approx. location of roads (for spatial reference only)

Scale 1:1800

100 0 100 200 300

(feet)

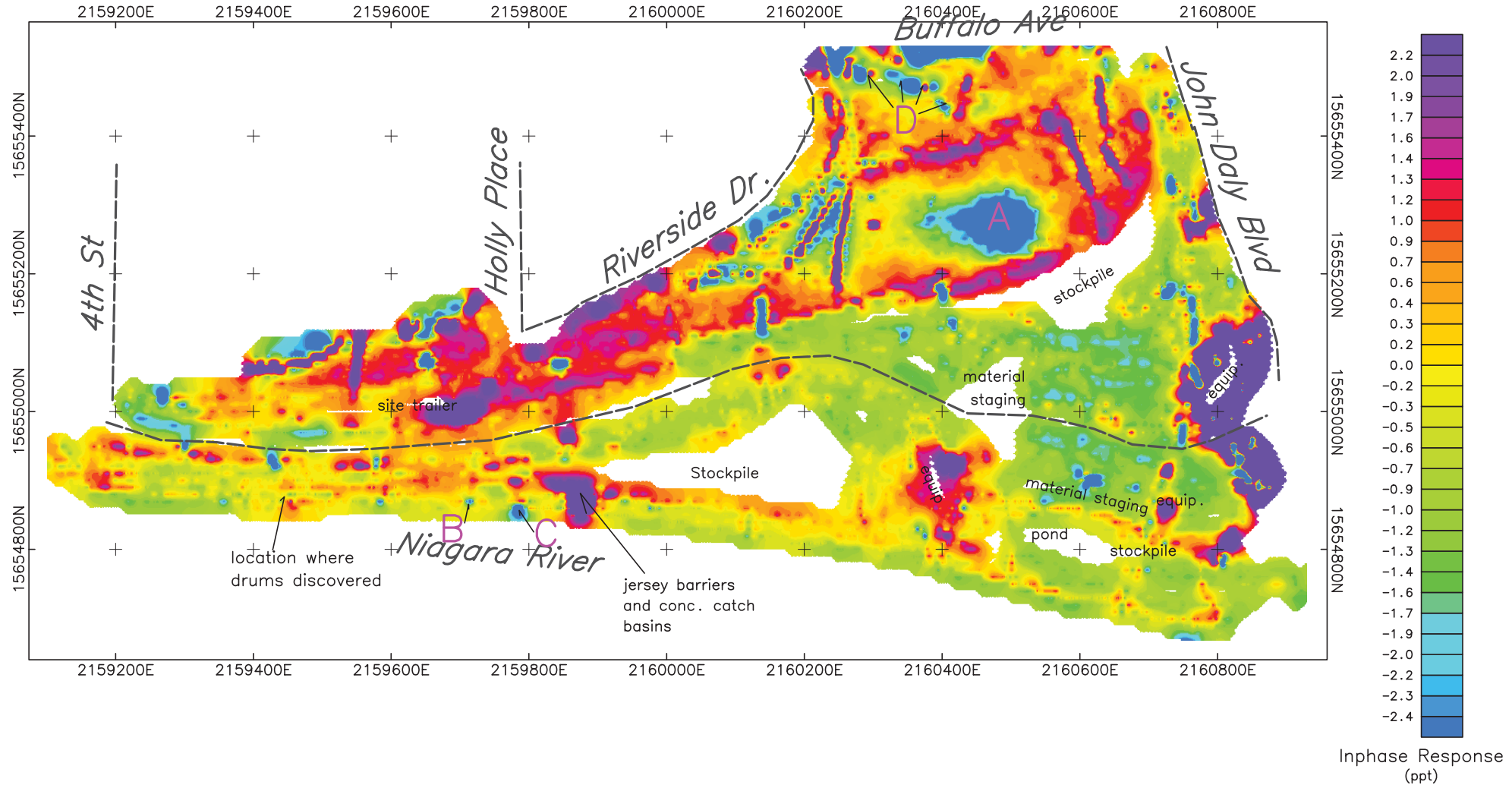
N

Figure 1

Geophysical Survey Results
Color Contours of EM31 Data
Terrain Conductivity (mS/m)

Niagara Parks Riverview Site
Niagara Falls, NY
C&S Engineers

AMEC FW (716) 998-6973



A Geophysical anomaly discussed in report

Approx. location of roads (for spatial reference only)

Scale 1:1800

100 0 100 200 300

(feet)

N

Figure 2

Geophysical Survey Results
Color Contours of EM31 Data
Inphase Response (ppt)

Niagara Parks Riverview Site
Niagara Falls, NY
C&S Engineers

AMEC FW (716) 998-6973

APPENDIX C
HEALTH AND SAFETY PLAN

Health and Safety Plan for Remedial Investigation / Feasibility Study Work Plan

Robert Moses Parkway-South Site Southwest of the Intersection of John Daly Boulevard and Buffalo Avenue (SBL #158.16-1-1) Niagara Falls, Niagara County, New York

Site No. 932166

Prepared by

C&S Engineers, Inc.
141 Elm Street, Suite 100
Buffalo, New York 14203

January 2016

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

APPENDICES

SECTION 1 – GENERAL INFORMATION

The Health and Safety Plan (HASP) described in this document will address health and safety considerations for all those activities that personnel employed by C&S Engineers, Inc., may be engaged in during site investigation and remediation work at the Robert Moses Parkway-South Site located southwest of the intersection of Joh Daly Boulevard and Buffalo Avenue in the City of Niagara Falls, Niagara County, New York (Site). Figure 1 shows the approximate location of the Site. This HASP will be implemented by the Health and Safety Officer (HSO) during site work.

Compliance with this HASP is required of all C&S personnel who enter this Site. The content of the HASP may change or undergo revision based upon additional information made available to the health, safety, and training (H&S) committee, monitoring results or changes in the technical scope of work. Any changes proposed must be reviewed by the H&S committee.

Responsibilities

Project Manager…….	Mark Colmerauer Phone: (716) 847-1630 Cell: (716) 570-3457
Site Health and Safety Officer……...	Cody Martin Phone: (716) 847-1630 Cell: (716) 864-3752
Emergency Coordinator…….	Daniel Riker Phone: (716) 847-1630 Cell: (716) 572-5312
Health and Safety Manager……	Daniel Riker Phone: (716) 847-1630 Cell: (716) 572-5312

Emergency Phone Numbers

Emergency Medical Service	911
Police: Niagara Falls Police Department (NYPD)	911
Hospital: Niagara Falls Memorial Medical Center	(716) 278-4395
Fire: Niagara Falls Fire Department	911
National Response Center	(800) 424-8802
Poison Control Center	(800) 222-1222
Center for Disease Control	(800) 311-3435
NYSDEC Region 9 (Buffalo, New York)	(716) 851-7220
C&S Engineers	(716) 847-1630

SECTION 2 - HEALTH AND SAFETY PERSONNEL

2.0 Health and Safety Personnel Designations

The following information briefly describes the health and safety designations and general responsibilities for this Site.

2.1 Project Manager (PM)

The PM is responsible for the overall project including the implementation of the HASP. Specifically, this includes allocating adequate manpower, equipment, and time resources to conduct Site activities safely.

2.2 Health and Safety Manager

- Has the overall responsibility for coordinating and reporting all health and safety activities and the health and safety of Site Workers.
- Must have completed, at a minimum, the OSHA 30-Hour Construction Safety Training, and either the 24-Hour training course for the Occasional Hazardous Waste Site Worker or the 40-Hour training course for the Hazardous Waste Operations Worker that meets OHSA 29 CFR 1910.
- Must have completed the 8-Hour Site supervisor/manager's course for supervisors and managers having responsibilities for hazardous waste Site operations and management.
- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment (PPE).
- Conducts initial on-site specific training prior to Site Workers commencing work.
- Conducts and documents daily and periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Immediately notifies the Construction Manager (CM) Project Manager and Superintendent of all accident/incidents.

- Determines upgrading or downgrading of PPE based on Site conditions and/or real time monitoring results.

- Ensures that monitoring instruments are calibrated daily or as the manufacturer's instructions determine.

- Reports to the CM Project Manager and Superintendent to provide summaries of field operations and progress.

- Submits and maintains all documentation required in this HASP and any other pertinent health and safety documentation.

2.3 Health and Safety Officer (HSO)

- Must be designated to the Health and Safety Manager by each Subcontractor as a Competent Person having, at a minimum, the OSHA 30-Hour Construction Safety Training.

- Must schedule and attend a Pre-Construction Safety Meeting with the Health and Safety Manager to discuss the Subcontractor Safety Requirements and must attend the Weekly Subcontractor Coordination Meeting.

- Responsible for ensuring that their lower tier contractors comply with project safety requirements.

- Must make frequent and regular inspections of their work areas and activities and ensure hazards that are under their control are corrected immediately and all other hazards are reported to the Construction Manager's Project Manager and Health and Safety Manager.

- Must report all work related injuries, regardless of severity, to the Construction Manager's Project Manager and the Health and Safety Manager within 24 hours after they occur.

2.4 Emergency Coordinator

- The Emergency Coordinator or his on-site designee will, in concert with New York State Office of Parks, Recreation and Historic Preservation, will implement the emergency response procedures whenever conditions at the Site warrant such action.
- The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel as necessary, and notification of emergency response units (refer to phone listing in the beginning of this HASP) and the appropriate management staff.

2.5 Site Workers

- Report any unsafe or potentially hazardous conditions to the Health and Safety Manager.
- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP.
- Comply with rules, regulations, and procedures as set forth in this HASP, including any revisions that are instituted.
- Prevent unauthorized personnel from entering work Site.

SECTION 3 - PERTINENT SITE INFORMATION

3.1 Site Location and General History

The ~17-acre Site is located southwest of the intersection of John Daly Boulevard and Buffalo Avenue in the City of Niagara Falls, Niagara County, New York. The Site is bounded by Buffalo Avenue on the north; John Daly Boulevard on the east; Robert Moses Parkway on the south; and Riverside Drive properties on the west. Further information concerning the Site is presented below.

Site Description

The ~8-acre Site is located southwest of John Daly Boulevard and Buffalo Avenue in the City of

Niagara Falls, Niagara County, New York. The Site is bounded by Buffalo Avenue on the north; John Daly Boulevard on the east; Robert Moses Parkway on the south; and 4th Street on the west .

The Site is relatively flat with some minor topographic relief dipping towards the Niagara River. Features on the property include trees, existing roadways, newly constructed roadways, and the Site is currently disturbed due to construction on the RMP. The Site has been subject of a recent investigation which demonstrated that the environmental integrity of the property has been impacted by the past uses of the Site.

Site History and Suspect Recognized Environmental Conditions

The Site lies within the eastern portion of OPRHP's larger Niagara Falls State Park. This site has always been park land since the Niagara Reservation was created in 1885. Prior to that time, mills and factories were located along the River but not documented in this area. Landscape architects were fascinated with this area and provided groves of trees with heavily planted natural shorelines that were incorporated with parts of old mills. The Port Day Pond area was formed out of a cove that was isolated from the river by a stone pier that circled the pond forming a loop driveway. Eventually, the focus on the park area and water features led to construction of bridges that were planned as early as 1887.

The Site contains the old Port Day Pond, which was used for recreational purposes until it was filled in 1960. From the early 1900s until the 1950s, significant documentation suggests the industry in Niagara Falls impacted this area adversely and dumping appears to have occurred in the pond.

As part of recent construction efforts, 10 soil and 2 groundwater samples were collected from the Site in 2014. The soil samples were analyzed for total metals, mercury, cyanide, hexavalent chromium, PCBs, VOCs, SVOCs, and pesticides, while the groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, chlorinated herbicides, and inorganics.

NYSDEC Industrial Use SCOs were exceeded in 3 of the 10 soil sampling locations, NYSDEC Restricted Residential Use SCOs were exceeded in 5 of the 10 soil sampling locations, and 1 groundwater sample exceeded groundwater standards TOGS 1.1.1. However, further evaluation of the subsurface soil and groundwater in needed.

Exposure pathway concerns with these contaminants are generally through skin absorption, ingestion and inhalation of airborne dust particles. Following guidelines described in this HASP will reduce exposure.

SECTION 4 - HAZARD ASSESSMENT AND HAZARD COMMUNICATION

Hazards to workers during a site work include typical construction-related hazards such as slip-trip-fall, equipment malfunction, faulty electrical grounding, and heat/cold/excessive noise exposure. In addition to those typical construction-related hazards, there is also the potential for chemical exposures associated with environmental conditions. The most likely routes of chemical exposure during site work tasks include skin adsorption and inhalation of airborne dust particles.

It is difficult to draw a correlation between the concentrations of contaminants found in one media and the potential for exposure to these contaminants to site workers. However, their potential presence indicates that the potential for exposure to these compounds exist, and the requirements for protective measures and monitoring of exposure is based on this potential.

SECTION 5 - TRAINING

5.1 Site-specific Training

Training will be provided that specifically addresses the activities, procedures, monitoring, and equipment for the Site operations prior to going on site. Training will include familiarization with Site and facility layout, known and potential hazards, and emergency services at the Site, and details all provisions contained within this HASP. This training will also allow Site Workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

5.2 Safety Briefings

C&S project personnel will be given briefings by the HSO on a daily or as needed basis to further assist Site Workers in conducting their activities safely. Pertinent information will be provided when new operations are to be conducted. Changes in work practices must be

implemented due to new information made available, or if Site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices. When conformance with these practices is not occurring or if deficiencies are identified during safety audits, the project manager will be notified.

SECTION 6 - ZONES

Four types of Site activity zones are identified for the Brownfield investigation activities, including the Exclusion Zone, Contamination Reduction Zone, Remediation Zone and the Support Zone. Prior to commencement of field work a further definition of where these zones will be set up will be established.

6.1 Exclusion Zone

The area where the unexpected condition is discovered would be considered the Exclusion Zone (EZ). All excavation and handling of contaminated materials generated as a result of the discovery of an unexpected condition would take place within the EZ. This zone will be clearly delineated by hay bales, jersey barriers, and/or similar methods. Safety tape may be used as secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The Site Safety Manager/Director may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Site Workers will not be allowed in the EZ without:

- A buddy (co-worker);
- Appropriate PPE in accordance with OSHA regulations;
- Medical authorization; and
- Training certification in accordance with 29 CFR 1910.120.

6.2 Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) will be established between the EZ and the property limits. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for

decontamination of Site equipment. The CRZ will be used for general Site entry and egress, in addition to access for heavy equipment and emergency support services. Site Workers will not be allowed in the CRZ without:

- A buddy (co-worker);
- Appropriate PPE in accordance with OSHA regulations;
- Medical authorization; and
- Training certification in accordance with 29 CFR 1910.120.

In addition, the CRZ will include a Site Worker Cleaning Area that will include a field wash station for Site Workers, equipment, and PPE to allow Site Workers to wash their hands, arms, neck, and face after exiting areas of grossly contaminated soil or hazardous materials. All Site Workers will be required to pass through the Site Worker Cleaning Area and wash their hands and remove any loose fill and soils from their clothing and boots prior to exiting the CRZ.

6.3 Remediation Zone

A Remediated Zone (RZ) will be established in portions of the Site where the remediation has been completed and only general construction work will be performed. Setup of the RZ will consist of implementing several measures designed to reduce the risk of workers' exposure and prevent non-trained workers from entering the non-remediated zone. Non-trained workers will work only in areas where the potential for exposure has been minimized by removal of all hazardous materials. The remediated zone will then be separated from the non-remediated zone by installing and maintaining temporary plywood or other construction fences along the boundary between the two zones. If potentially impacted material is uncovered in the RZ, all non-trained workers will be removed and the Site Safety Manager/Director will assess the potential risks. If, at any other time, the risk of exposure increases while non-trained workers are present in the RZ, the non-trained workers will be removed. At all times, when non- trained workers are present in the RZ, air monitoring for the presence of VOCs will be conducted in the RZ, as well as at the fence line of the non-remediated zone.

6.4 Support Zone

The Support Zone (SZ) will be an uncontaminated area that will be the field support area for the Site operations. The SZ will contain the temporary project trailers and provide for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated equipment or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. Meteorological conditions will be observed and noted from this zone, as well as those factors pertinent to heat and cold.

SECTION 7 - PERSONAL PROTECTIVE EQUIPMENT

7.1 General

The level of protection to be worn by field personnel will be defined and controlled by the HSO. Depending upon the type and levels of material present or anticipated at the site, varying degrees of protective equipment will be needed. If the possible hazards are unknown, a reasonable level of protection will be taken until sampling and monitoring results can ascertain potential risks. The levels of protection listed below are based on USEPA Guidelines. A list of the appropriate clothing for each level is also provided.

Level A protection must be worn when a reasonable determination has been made that the highest available level of respiratory, skin, eye, and mucous membrane protection is needed. It should be noted that while Level A provides maximum available protection, it does not protect against all possible hazards. Consideration of the heat stress that can arise from wearing Level A protection should also enter into the decision making process. Level A protection includes:

- Open circuit, pressure-demand self-contained breathing apparatus (SCBA)
- Totally encapsulated chemical resistant suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level B protection must be used when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body (e.g., the back of the neck) is unlikely. Level B protection includes:

- Open circuit, pressure-demand SCBA or pressure airline with escape air bottle
- Chemical protective clothing: Overalls and long sleeved jacket; disposal chemical resistant coveralls; coveralls; one or two piece chemical splash suit with hood
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level C must be used when the required level of respiratory protection is known, or reasonably assumed to be, not greater than the level of protection afforded by air purifying respirators; and hazardous materials exposure to the few unprotected areas of the body (e.g.., the back of the neck) is unlikely. Level C protection includes:

- Full or half face air-purifying respirator
- Chemical protective clothing: Overalls and long-sleeve jacket; disposable chemical resistant coveralls; coveralls; one or two piece chemical splash suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level D is the basic work uniform. It cannot be worn on any site where respiratory or skin hazards exist. Level D protection includes:

- Safety boots/shoes
- Safety glasses
- Hard hat with optional face shield

Note that the use of SCBA and airline equipment is contingent upon the user receiving special training in the proper use and maintenance of such equipment.

7.2 Personal Protective Equipment – Site Specific

Level D with some modification will be required when working in the work zone on this Site. In addition to the basic work uniform specified by Level D protection, Nitrile gloves will be required when contact with soil or ground water is likely. Hearing protection will be worn when power equipment is used to perform subsurface investigation work. An upgrade to a higher level (Level C) of protection may occur if determined necessary by the HSO.

SECTION 8 - MONITORING PROCEDURES

8.1 Monitoring During Site Operations

All Site environmental monitoring should be accompanied by periodic meteorological monitoring of appropriate climatic conditions.

8.1.1 Drilling Operations (Monitoring Well Installation and Subsurface Borings) and Test Pit Excavations

Monitoring will be performed by the HSO or drilling observer during the conduct of work. A photoionization detector (PID) equipped with a 10.0 eV lamp will be utilized to monitor for the presence of volatile organic vapors within the breathing zone, the borehole, and subsurface samples upon their retrieval. Drill cuttings and excavation spoils will also be monitored by use of the PID. The PID will be field checked for calibration accuracy three times per day (morning, lunch, and end of day. If subsurface conditions warrant, a combustible gas indicator (CGI) with oxygen alarm may also be used to monitor the borehole for the presence of combustible gases. Similar monitoring of fluids produced during well development will also be conducted.

8.1.2 Interim Remedial Measures

If future Interim Remedial Measures (IRM) occurs, monitoring will be performed during excavation and sampling operations when C&S personnel are within the work zone. Although historical information previously obtained at the Site indicates low level of volatile organic vapors and compounds, a photoionization detector (PID) will be used during subsurface activities. If an IRM is performed, the, the remedial contractor will be required to employ dust control practices during work.

8.2 Action Levels

If readings on the PID exceed 10 ppm for more than fifteen minutes consecutively, then personal protective equipment should be upgraded to Level C. The air purifying respirator used with Level C protective equipment must be equipped with organic vapor cartridges. If readings on the explosive gas meter are within a range of 10%-25% of the LEL then continuous monitoring will be implemented. Readings above 25% of the LEL indicate the potential for an explosive condition. Sources of ignition should be removed and the Site should be evacuated.

8.3 Personal Monitoring Procedures

Personal monitoring shall be performed as a contingency measure in the event that VOC concentrations are consistently above the 10 ppm action level as detected by the PID. If the concentration of VOCs is above this action level, then amendments to the HASP must be made before work can continue at the Site.

SECTION 9 - COMMUNICATIONS

A phone will be located on Site to be utilized by personnel conducting investigation and IRM efforts. Cell phones will be the primary means of communicating with emergency support services/facilities.

SECTION 10 - SAFETY CONSIDERATIONS FOR SITE OPERATIONS

10.1 General

Standard safe work practices that will be followed include:

- Do not climb over/under drums, or other obstacles.
- Do not enter the work zone alone.
- Practice contamination avoidance, on and off-site.
- Plan activities ahead of time, use caution when conducting concurrently running activities.
- No eating, drinking, chewing or smoking is permitted in work zones.
- Due to the unknown nature of waste placement at the Site, extreme caution should be practiced during excavation activities.
- Apply immediate first aid to any and all cuts, scratches, abrasions, etc.
- Be alert to your own physical condition. Watch your buddy for signs of fatigue, exposure, etc.
- A work/rest regimen will be initiated when ambient temperatures and protective clothing create a potential heat stress situation.
- No work will be conducted without adequate natural light or without appropriate supervision.
- Task safety briefings will be held prior to onset of task work.
- Ignition of flammable liquids within or through improvised heating devices (barrels, etc.) or space heaters is forbidden.

- Entry into areas of spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment is prohibited.
- Any injury or unusual health effect must be reported to the Site health and safety officer.
- Prevent splashing or spilling of potentially contaminated materials.
- Use of contact lenses is prohibited while on site.
- Beards and other facial hair that would impair the effectiveness of respiratory protection are prohibited if respiratory protection is necessary.
- Field crew members should be familiar with the physical characteristics of investigations, including:
  - Wind direction in relation to potential sources
  - Accessibility to co-workers, equipment, and vehicles
  - Communication
  - Hot zones (areas of known or suspected contamination)
  - Site access
  - Nearest water sources
- The number of personnel and equipment in potentially contaminated areas should be minimized consistent with site operations.

10.2 Field Operations

10.2.1 Intrusive Operations

The HSO or designee will be present on-site during all intrusive work, e.g., drilling operations, excavations, trenching, and will provide monitoring to oversee that appropriate levels of protection and safety procedures are utilized by C&S Engineers, Inc., personnel. The use of salamanders or other equipment with an open flame is prohibited and the use of protective clothing, especially hard hats and boots, will be required during drilling or other heavy equipment operations.

10.2.2 Excavations and Excavation Trenching

Guidance relating to safe work practices for C&S employees regarding excavations and excavating/trenching operation is presented in Appendix A of this HASP.

SECTION 11 - DECONTAMINATION PROCEDURES

Decontamination involves physically removing contaminants and/or converting them chemically into innocuous substances. Only general guidance can be given on methods and techniques for decontamination. Decontamination procedures are designed to:

- Remove contaminant(s).
- Avoid spreading the contamination from the work zone.
- Avoid exposing unprotected personnel outside of the work zone to contaminants.

Contamination avoidance is the first and best method for preventing spread of contamination from a hazardous site. Each person involved in site operations must practice the basic methods of contamination avoidance listed below. Additional precautions may be required in the HASP.

- Know the limitations of all protective equipment being used.
- Do not enter a contaminated area unless it is necessary to carry out a specific objective.
- When in a contaminated area, avoid touching anything unnecessarily.
- Walk around pools of liquids, discolored areas, or any area that shows evidence of possible contamination.
- Walk upwind of contamination, if possible.
- Do not sit or lean against anything in a contaminated area. If you must kneel (e.g., to take samples), use a plastic ground sheet.
- If at all possible, do not set sampling equipment directly on contaminated areas. Place equipment on a protective cover such as a ground cloth.
- Use the proper tools necessary to safely conduct the work.

Specific methods that may reduce the chance of contamination are:

- Use of remote sampling techniques.
- Opening containers by non-manual means.
- Bagging monitoring instruments.
- Use of drum grapplers.
- Watering down dusty areas.

Equipment which will need to be decontaminated includes tools, monitoring equipment, and personal protective equipment. Items to be decontaminated will be brushed off, rinsed, and

dropped into a plastic container supplied for that purpose. They will then be washed with a detergent solution and rinsed with clean water. Monitoring instruments may be wrapped in plastic bags prior to entering the field in order to reduce the potential for contamination. Instrumentation that is contaminated during field operations will be carefully wiped down. Heavy equipment, if utilized for operations where it may be contaminated, will have prescribed decontamination procedures to prevent contaminant materials from potentially leaving the Site. On-site contractors, such as drillers or backhoe operators, will be responsible for decontaminating all construction equipment prior to demobilization.

SECTION 12 – DISPOSAL PROCEDURES

All discarded materials, waste materials, or other objects shall be handled in such a way as to reduce or eliminate the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary and segregated for proper disposal. All contaminated waste materials shall be disposed of as required by the provisions included in the contract and consistent with regulatory provisions. All non-contaminated materials shall be collected and bagged for appropriate disposal. Investigation derived waste will be managed consistent with the work plan for this Site and DER-10 Technical Guidance for Site Investigation and Remediation dated May 2010.

SECTION 13 - EMERGENCY RESPONSE PROCEDURES

As a result of the hazards at the Site, and the conditions under which operations are conducted, there is the possibility of emergency situations. This section establishes procedures for the implementation of an emergency plan.

13.1 Emergency Coordinator

Emergency Coordinator: .....Daniel Riker .....Work Phone: (716) 847-1640

The Emergency Coordinator or his on-site designee will, in concert with New York State Office of Parks, Recreation and Historic Preservation will implement the emergency response procedures whenever conditions at the Site warrant such action. The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment,

emergency transport of C&S personnel as necessary, and notification of emergency response units (refer to phone listing in the beginning of this HASP) and the appropriate management staff.

13.2 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of toxic gases, etc., all personnel will evacuate and assemble in a designated assembly area. The Emergency Coordinator or his on-site designee will have authority to contact outside services as required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The Emergency Coordinator or his on-site designee must see that access for emergency equipment is provided and that all ignition sources have been shut down once the emergency situation is established. Once the safety of all personnel is established, the Fire Department and other emergency response groups will be notified by telephone of the emergency.

13.3 Potential or Actual Fire or Explosion

Immediately evacuate the Site and notify local fire and police departments, and other appropriate emergency response groups, if LEL values are above 25% in the work zone or if an actual fire or explosion has taken place.

13.4 Environmental Incident (spread or release of contamination)

Control or stop the spread of contamination if possible. Notify the Emergency Coordinator and the Project Manager. Other appropriate response groups will be notified as appropriate.

13.5 Personnel Injury

Emergency first aid shall be applied on-site as necessary. Then, decontaminate (en route if necessary) and transport the individual to nearest medical facility if needed. The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. The directions to the hospital are shown in Section 1 of this HASP and a map is shown in Attachment A.

13.6 Personnel Exposure

- *Skin Contact*: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eyes should be thoroughly rinsed with water for at least 15 minutes.
- *Inhalation*: Move to fresh air and/or, if necessary, decontaminate and transport to emergency medical facility.
- *Ingestion*: Decontaminate and transport to emergency medical facility.
- *Puncture Wound/Laceration*: Decontaminate, if possible, and transport to emergency medical facility.

13.7 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work can continue without sacrificing the health and safety of field workers.

13.8 Incident Investigation and Reporting

In the event of an incident, procedures discussed in the Medical Emergency/Incident Response Protocol, presented in Appendix B of this HASP, shall be followed.

SECTION 14 - COMMUNITY RELATIONS

14.1 Community Health and Safety Plan

14.1.1 Community Health and Safety Monitoring

As part of the site work, three general types of efforts are scheduled, including, non-intrusive reconnaissance tasks, sampling or monitoring tasks (monitoring point sampling), and intrusive tasks (test trenching, subsurface borings, monitoring well installation). During completion of general reconnaissance and sampling or monitoring tasks, potential for health and safety risks to off-site landowners or the local community are not anticipated.

During completion of intrusive efforts at or adjacent to the Site, health and safety monitoring efforts will be concentrated on the area or areas in which intrusive efforts are being completed. Since the air pathway is the most available and likely avenue for the release of potential contaminants to the atmosphere at or near the Site, in addition to limiting public or community

access to the areas in which intrusive efforts are completed, health and safety measures will primarily consist of monitoring the air pathway for worker exposure.

14.1.2 Community Air Monitoring Plan

Efforts will be taken to complete field work in a manner which will minimize the creation of airborne dust or particulates. Under dry conditions, work areas may be wetted to control dust. During periods of extreme wind, intrusive field work may be halted until such time as the potential for creating airborne dust or particulate matter as a result of investigation activities is limited. Periodic monitoring following the guidelines of the site's Community Air Monitoring Plan (attached) will be implemented during all non-intrusive Site investigation activities, including surface soil and sediment sampling, and collection of groundwater samples from groundwater monitoring wells.

During completion of Site investigation, a community air monitoring plan meeting the requirements of the site's Community Air Monitoring Plan (attcahed) will be implemented for the duration of intrusive activities. These additional air monitoring activities will include establishment of background conditions, continuous monitoring for volatile organic compounds and/or particulates at the downwind work area (exclusion zone) perimeter, recording of monitoring data, and institution and documentation of Response Levels and appropriate actions in accordance with NYSDOH guidance.

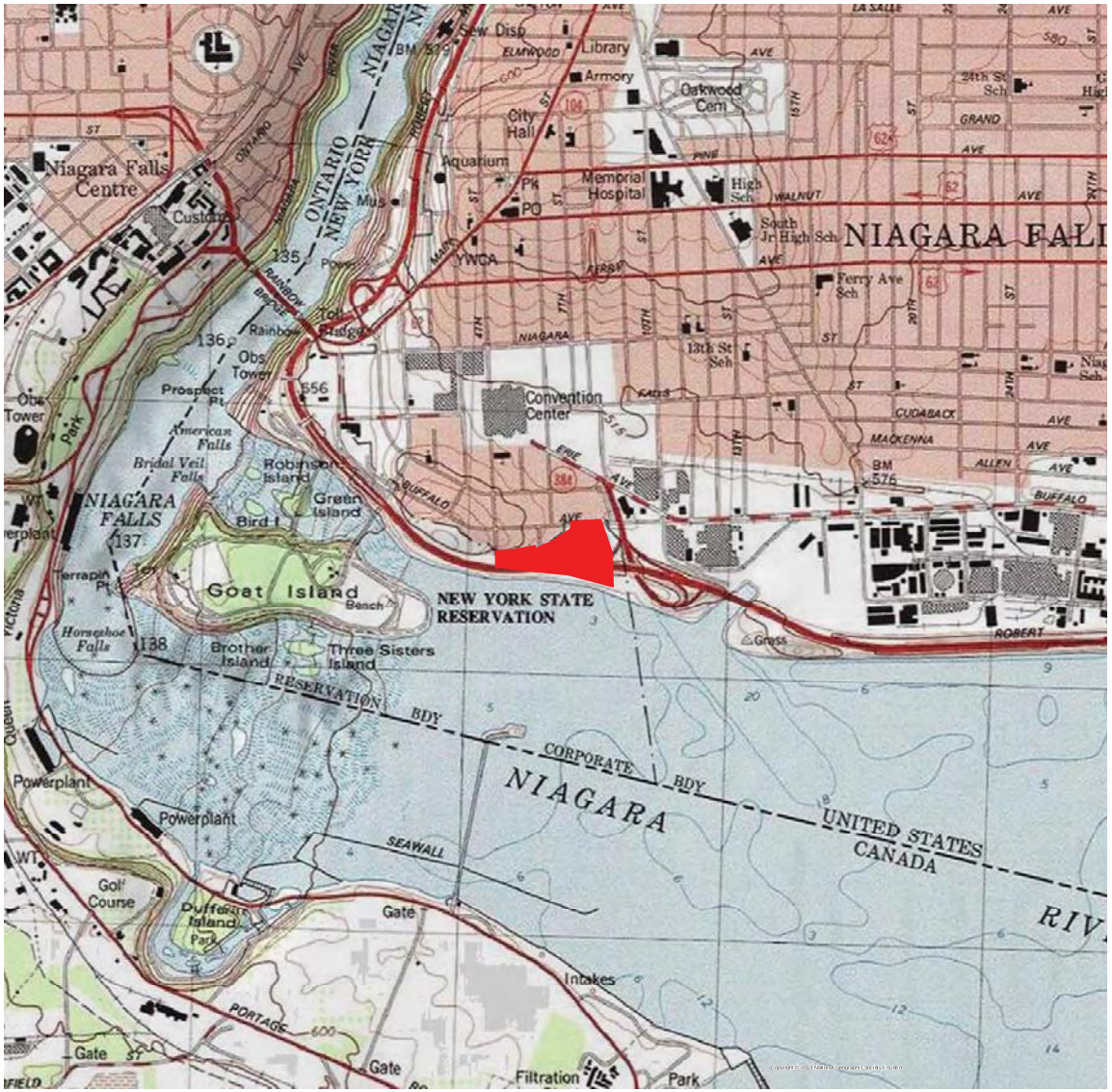
SECTION 15 - AUTHORIZATIONS

Personnel authorized to enter the Site while operations are being conducted must be approved by the HSO. Authorization will involve completion of appropriate training courses, medical examination requirements, and review and sign-off of this HASP. No C&S personnel should enter the work zone alone. Each site visitor should check in with the HSO or Project Manager prior to entering the work zones.

FIGURE 1

SITE LOCATION MAP

C&S ENGINEERS



LEGEND

SITE LOCATION

NOTES

1) BASE MAPPING IS PROVIDED BY THE UNITED STATES GEOLOGICAL SURVEY.

0 750 1,500 3,000 FEET

C&S Engineers, Inc.
141 Elm Street
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454
www.cscos.com

N

NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION
ROBERT MOSES PARKWAY - SOUTH SITE
REMEDIAL INVESTIGATION
NIAGARA FALLS, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	190720009
DATE:	FEBRUARY 23, 2016
DRAWN BY:	A.DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

SITE LOCATION

FIGURE 1

FIGURE 2

SITE AERIAL PHOTO

C&S ENGINEERS

LEGEND

- SITE BOUNDARY
- OUTLINE OF FORMER POND

NOTES

1) COORDINATE SYSTEM: NAD 1983 STATEPLANE NY
WEST FIPS 3103
PROJECTION: TRANSVERSE MERCATOR
DATUM: NORTH AMERICAN 1983
UNITS: FOOT US

0 100 200 400
FEET

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N

NEW YORK STATE OFFICE
OF PARKS, RECREATION
AND HISTORIC PRESERVATION
ROBERT MOSES PARKWAY - SOUTH SITE
REMEDIAL INVESTIGATION
NIAGARA FALLS, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	190720009
DATE:	FEBRUARY 23, 2016
DRAWN BY:	A.DeMARCHI
DESIGNED BY:	A. DeMARCHI
CHECKED BY:	D. RIKER

SITE MAP

FIGURE 2

ATTACHMENT A

MAP TO HOSPITAL

C&S ENGINEERS

NIAGARA FALLS MEMORIAL MEDICAL CENTER
621 10TH STREET
NIAGARA FALLS, NY 14301

1.	TURN LEFT TOWARD JOHN DALY BOULVARD	148 FT
2.	CONTINUE STRAIGHT	0.1 MI
3.	CONTINUE ONTO JOHN DALY BOULVARD	0.4 MI
4.	TURN RIGHT ONTO NIAGARA STREET	0.1 MI
5.	TURN LEFT ONTO 10TH STREET (DESTINATION WILL BE ON THE RIGHT)	0.3 MI

Feet
1000 0 1000 2000

1:12000
IMAGE SOURCE: GOOGLE MAPS

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NEW YORK STATE OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION
ROBERT MOSES PARKWAY-SOUTH SITE
NIAGARA FALLS, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO: 190.720.004
DATE: 9-17-15
DRAWN BY: B. ROGERS
DESIGNED BY: B. ROGERS
CHECKED BY: M. COLMERAUER

MAP AND DIRECTIONS TO HOSPITAL

ATTACHMENT A

Appendix A

EXCAVATION/TRENCHING GUIDELINE

C&S ENGINEERS

C&S ENGINEERS, INC. HEALTH & SAFETY GUIDELINE #14
EXCAVATION/TRENCHING OPERATIONS

TABLE OF CONTENTS

C&S ENGINEERS, INC.
EXCAVATION/TRENCHING OPERATIONS

1.0 PURPOSE

To establish safe operating procedures for excavation/trenching operations at C&S work sites.

2.0 SCOPE

Applies to all C&S activity where excavation or trenching operations take place.

3.0 DEFINITIONS

Excavation — Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation.

Trench — A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

4.0 RESPONSIBILITY EMPLOYEES

Employees — All employees must understand and follow the procedures outlined in this guideline during all excavation and trenching operations.

Health and Safety Coordinator/Officer (HSC/HSO) - The HSC/HSO is responsible for ensuring that these procedures are implemented at each work site.

5.0 GUIDELINES

5.1 Hazards Associated With Excavation/Trenching

The principal hazards associated with excavation/trenching are:

- Suffocation, crushing, or other injury from falling material.
- Damage/failure of installed underground services and consequent hazards.
- Tripping, slipping, or falling.
- Possibility of explosive, flammable, toxic, or oxygen-deficient atmosphere in excavation.

5.2 Procedures Prior to Excavation

1. Underground Utilities

   - Determine the presence and location of any underground chemical or utility pipes, electrical, telephone, or instrument wire or cables.
   - If the local DigSafely NY is unable to locate private/domestic or plant utilities, then an independent utility locating service must be contacted and mobilized to the site.
   - Identify the location of underground services by stakes, markers or paint.
   - Arrange to de-energize or isolate underground services during excavation. If not possible, or if location is not definite, method of excavation shall be established to minimize hazards by such means as:

     a) Use of hand tools in area of underground services.
     b) Insulating personnel and equipment from possible electrical contact.
     c) Use of tools or equipment that will reduce possibility of damage to underground services and hazard to worker.

2. Identify Excavation Area — Areas to be excavated shall be identified and segregated by means of barricades, ropes, and/or signs to prevent access of unauthorized personnel and equipment. Suitable means shall be provided to make barriers visible at all times.
3. Surface Water Provide means of diverting surface water from excavation.
4. Shoring/Bracing — Shoring or bracing that may be required for installed equipment adjacent to the excavation shall be designed by a competent person.
5. Structural Ramps — Structural ramps that are used solely by employees as a means of access to or egress from the excavation shall be designed by a competent person.

5.3 Procedures For Doing The Excavation

1. **Determine the need for shoring/sloping** — the type of soil will establish the need for shoring, slope of the excavation, support systems, and equipment to be used. The soil condition may change as the excavation proceeds. Appendices A, B, C, D, E, and F of the OSHA Excavation Regulation, 29 CFR 1926 Subpart P, are to be used in defining shoring and sloping requirements.

2. **Mobile equipment** — For safe use of mobile industrial equipment in or near the excavation, the load carrying capacity of soil shall be established and suitable protection against collapse of soil provided by the use of mats, barricades, restricting the location of equipment, or shoring.

3. Excavated material (spoil) shall be stored at least two (2) feet from the edge of the excavation.

4. All trench (vertical sides) excavations greater than five (5) feet deep shall be shored.

5. The excavation shall be inspected daily for changes in conditions, including the presence of ground water, change in soil condition, or effects of weather such as rain or freeze. A safe means of continuing the work shall be established based on changes in condition. Typically test trench excavations made as part of an environmental subsurface nvestigation are made and backfilled the same day.

6. Appropriate monitoring for gas, toxic, or flammable materials will be conducted to establish the need for respiratory equipment, ventilation, or other measures required to continue the excavation safely.

7. Adequate means of dewatering the excavation shall be provided by the contractor as required.

8. A signal person shall be provided to direct powered equipment if working in the excavation with other personnel.

9. A signal person shall be provided when backfilling excavations to direct powered equipment working in the excavation with other personnel.

10. Warning vests will be worn when employees are exposed to public vehicular traffic.

11. Employees shall stand away from vehicles being loaded or unloaded, and shall not be permitted underneath loads handled by lifting or dragging equipment.

12. Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available if hazardous atmospheric conditions exist or may be expected to develop. The specifics will be determined by the HSC/HSM.

13. Walkways or bridges with standard guardrail shall be provided where employees or equipment are required or permitted to cross over excavations.

5.4 Entering the Excavation

No C&S Engineers, Inc., employee shall enter an excavation which fails to meet the requirements of Section 5.3 of this guideline.

6.0 REFERENCES

29 CFR 1926, Subpart P - Excavations

7.0 ATTACHMENTS

29 CFR 1926 Subpart P - Appendices A, B, F

• **Part Number:**	1926
• **Part Title:**	Safety and Health Regulations for Construction
• **Subpart:**	P
• **Subpart Title:**	Excavations
• **Standard Number:**	1926 Subpart P App A
• **Title:**	Soil Classification

(a) Scope and application - (1) Scope. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets for requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) Application. This appendix applies when a sloping or benching system is designed in accordance with the requirements set fo 1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excav designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selec from data prepared in accordance with the requirements set forth in 1926.652(c), and the use of the data is predicated on the us classification system set forth in this appendix.

(b) Definitions. The definitions and examples given below are based on, in whole or in part, the following; American Society for T Materials (ASTM) Standards D653-85 and D2488; The Unified Soils Classification System; The U.S. Department of Agriculture (US Textural Classification Scheme; and The National Bureau of Standards Report BSS-121.

"Cemented soil" means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

"Cohesive soil" means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

"Dry soil" means soil that does not exhibit visible signs of moisture content.

"Fissured" means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

"Granular soil" means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

"Layered system" means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

"Moist soil" means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

"Plastic" means a property of a soil which allows the soil to be

deformed or molded without cracking, or appreciable volume change.
"Saturated soil" means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.
"Soil classification system" means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.
"Stable rock" means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.
"Submerged soil" means soil which is underwater or is free seeping.
"Type A" means cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:
(i) The soil is fissured; or
(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
(iii) The soil has been previously disturbed; or
(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
(v) The material is subject to other factors that would require it to be classified as a less stable material.
"Type B" means:
(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.
(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
(v) Dry rock that is not stable; or
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.
"Type C" means:
(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
(ii) Granular soils including gravel, sand, and loamy sand; or
(iii) Submerged soil or soil from which water is freely seeping; or
(iv) Submerged rock that is not stable, or
(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.
"Unconfined compressive strength" means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.
"Wet soil" means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) Requirements - (1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent perso Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.

(2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other reco methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Depart Agriculture textural classification system.

(3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of thi shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify prc properties, factors, and conditions affecting the classification of the deposits.

(4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each laye classified individually where a more stable layer lies under a less stable layer.

(5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any w changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumst

(d) Acceptable visual and manual tests. - (1) Visual tests. Visual analysis is conducted to determine qualitative information regarc excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil take samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the amounts of the particle sizes. Soil that is primarily composed of fine-grained material material is cohesive material. Soil composec of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does nc clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tens could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of m ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground s and to identify previously disturbed soil.

(v) Observed the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slop the excavation. Estimate the degree of slope of the layers.

(vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water see the sides of the excavation, or the location of the level of the water table.

(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the s the excavation face.

(2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil a provide more information in order to classify soil properly.

(i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohe material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch be held on one end without tearing, the soil is cohesive.

(ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is g combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clu only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps wh break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the s considered unfissured.

(iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive so test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designatior "Standard Recommended Practice for Description of Soils (Visual - Manual Procedure).") Type A soils with an unconfined compre strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great eff soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molde finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicat excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influe flooding), the classification of the soil must be changed accordingly.

(iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetron using a hand-operated shearvane.

(v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesi and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.5 six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil ha cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the t pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cc fissures. If they pulverize easily into very small fragments, the material is granular.

Next Standard (1926 Subpart P App B)

Regulations (Standards - 29 CFR) - Table of Contents

• **Part Number:**	1926
• **Part Title:**	Safety and Health Regulations for Construction
• **Subpart:**	P
• **Subpart Title:**	Excavations
• **Standard Number:**	1926 Subpart P App B
• **Title:**	Sloping and Benching

(a) ***Scope and application***. This appendix contains specifications for sloping and benching when used as methods of protecting working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protectiv is to be performed in accordance with the requirements set forth in § 1926.652(b)(2).

(b) ***Definitions***.

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phen the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slu material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the fa excavation; and ravelling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site condi protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

(c) ***Requirements*** -- (1) ***Soil classification***. Soil and rock deposits shall be classified in accordance with appendix A to subpart I 1926.

(2) ***Maximum allowable slope***. The maximum allowable slope for a soil or rock deposit shall be determined from Table B-1 of tl appendix.

(3) ***Actual slope***. (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occur slope shall be cut back to an actual slope which is at least ½ horizontal to one vertical (½H:1V) less steep than the maximum allo slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person sh determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with § 1926.651(i).

(4) ***Configurations***. Configurations of sloping and benching systems shall be in accordance with Figure B-1.

TABLE B-1
MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V)(1) FOR EXCAVATIONS LESS THAN 20 FEET DEEP(3)
STABLE ROCK	VERTICAL (90°)
TYPE A (2)	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 ½:1 (34°)

Footnote(1) Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angle rounded off.

Footnote(2) A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feed (3.67 m) or l depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).

Footnote(3) Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

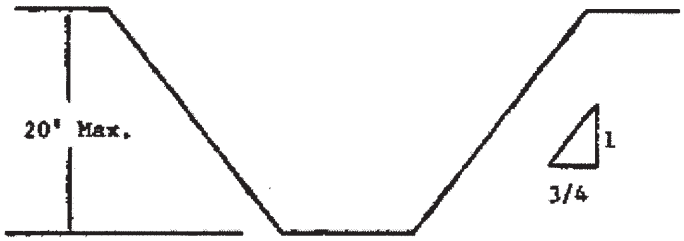
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

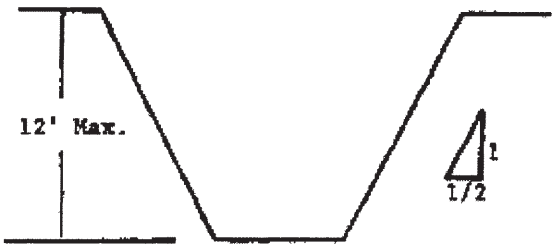
B-1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



SIMPLE SLOPE -- GENERAL

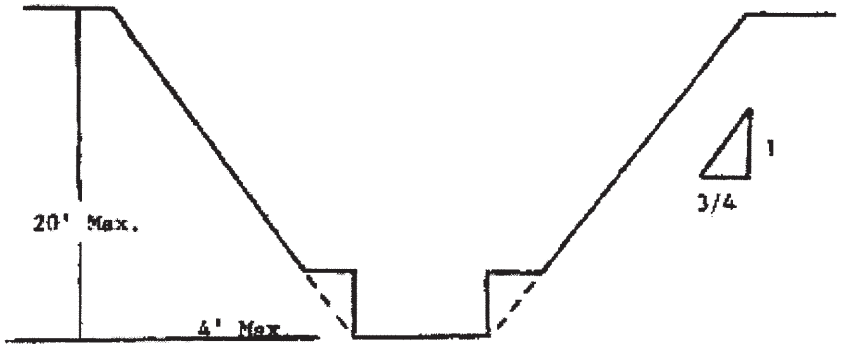
Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have maximum allowable slope of ½:1.



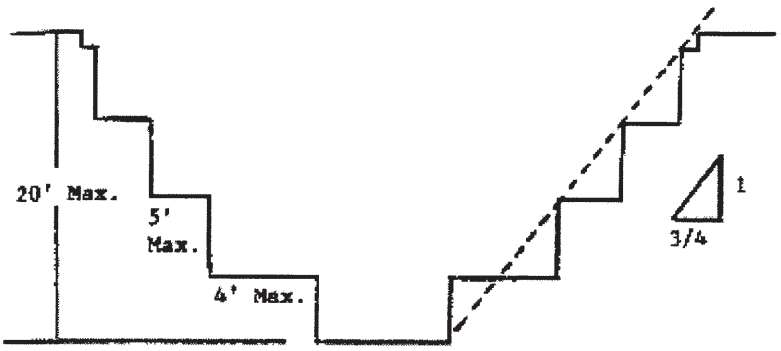
SIMPLE SLOPE -- SHORT TERM

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimens

follows:

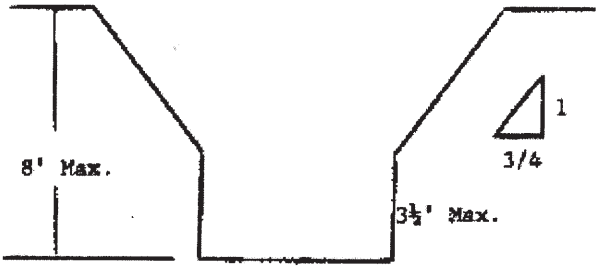


SIMPLE BENCH



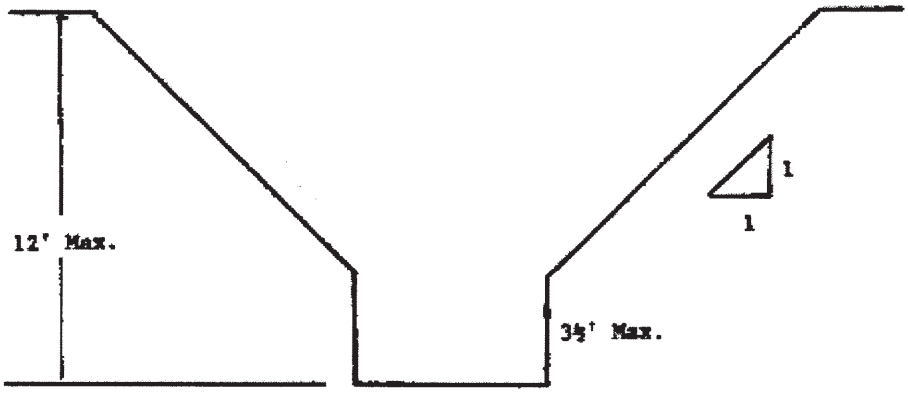
MULTIPLE BENCH

3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical sid feet.



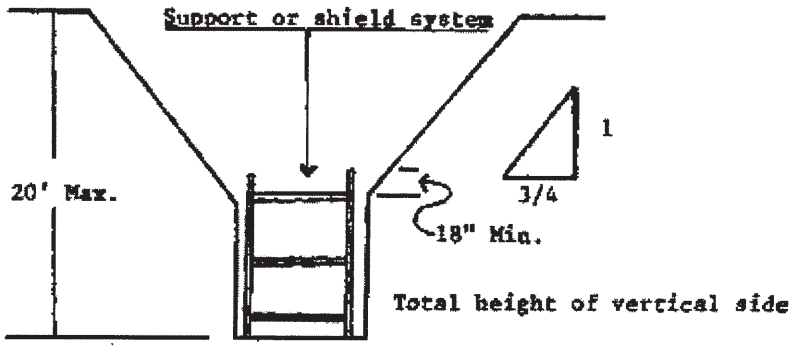
UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 8 FEET IN DEPTH)

All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a r allowable slope of 1:1 and a maximum vertical side of 3½ feet.



UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 12 FEET IN DEPTH)

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maxi allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

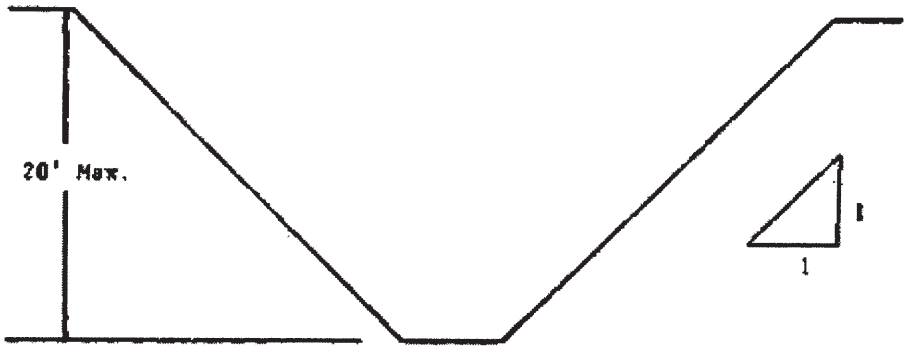


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other opt permitted under § 1926.652(b).

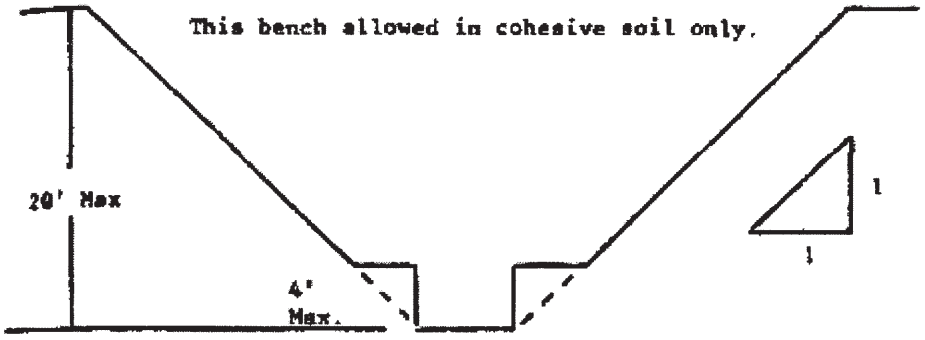
B-1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

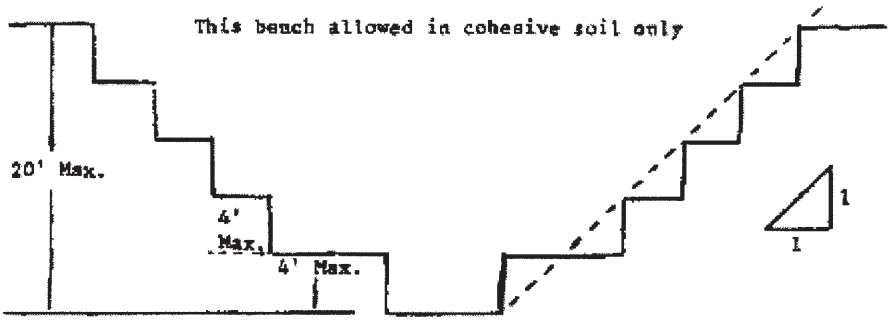


SIMPLE SLOPE

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions

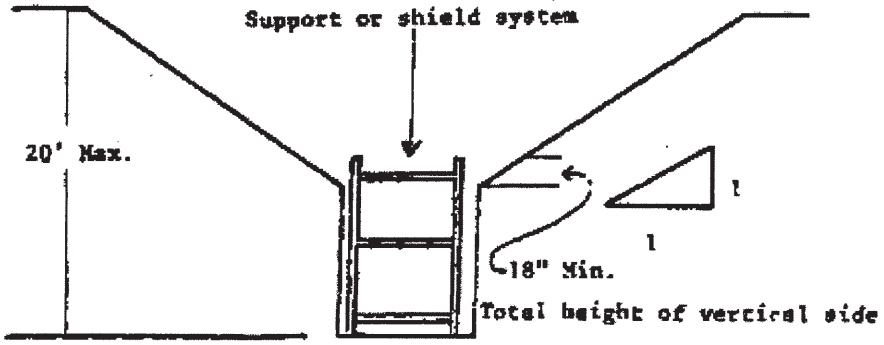


SINGLE BENCH



MULTIPLE BENCH

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at le inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

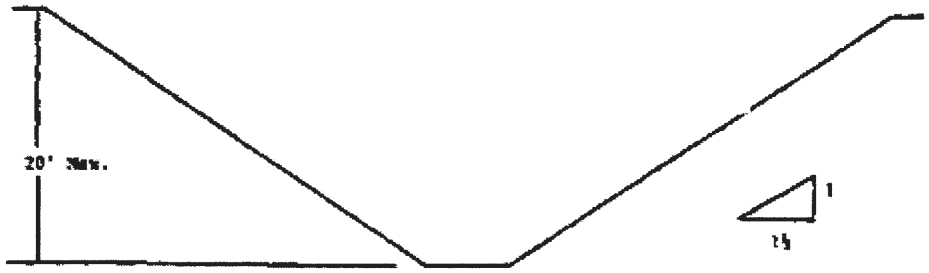


VERTICALLY SIDED LOWER PORTION

4. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

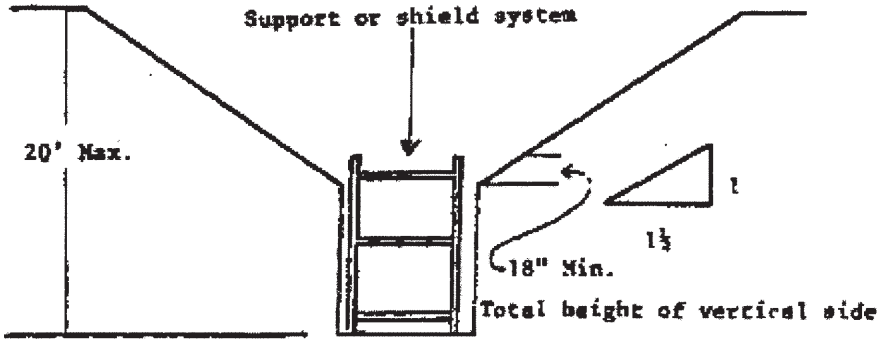
B-1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



SIMPLE SLOPE

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at le inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.

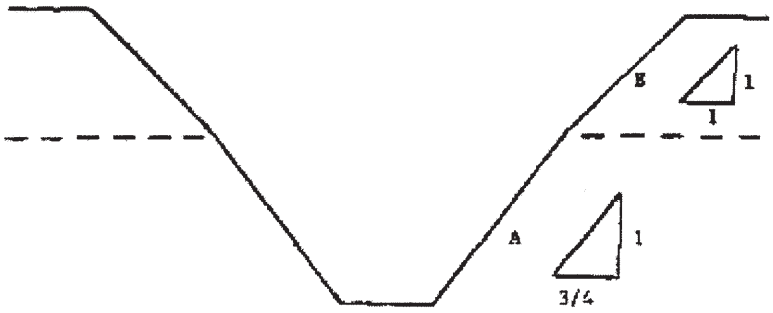


VERTICAL SIDED LOWER PORTION

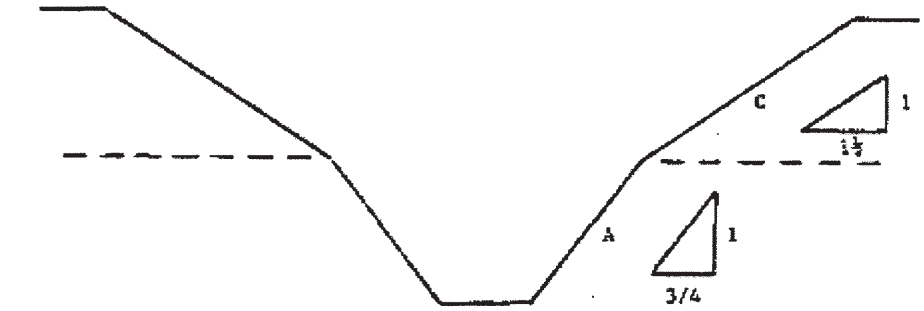
3. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

B-1.4 Excavations Made in Layered Soils

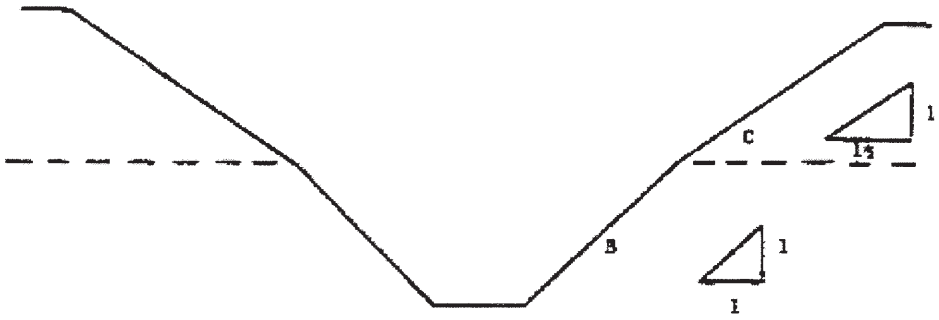
1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth b



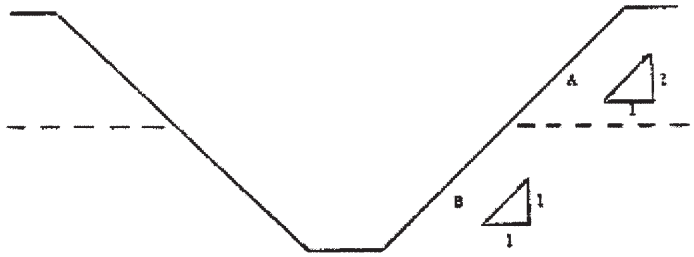
B OVER A



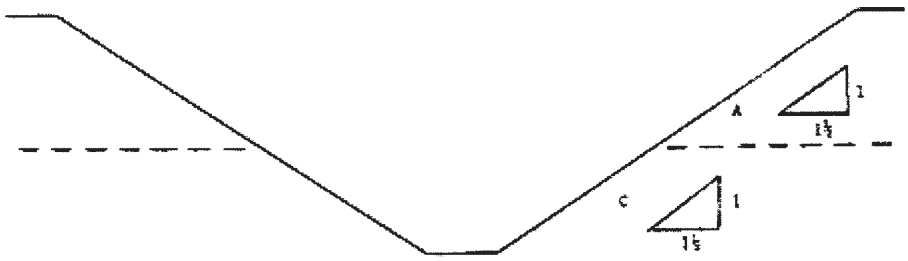
C OVER A



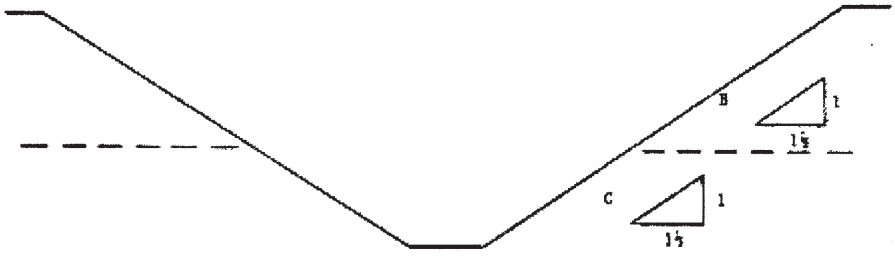
C OVER B



A OVER B



A OVER C



B OVER C

2. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

Next Standard (1926 Subpart P App C)

Regulations (Standards - 29 CFR) - Table of Contents

• **Part Number:**	1926
• **Part Title:**	Safety and Health Regulations for Construction
• **Subpart:**	P
• **Subpart Title:**	Excavations
• **Standard Number:**	1926 Subpart P App F
• **Title:**	Selection of Protective Systems

The following figures are a graphic summary of the requirements contained in subpart P for excavations 20 feet or less in depth. Prc systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer in accordance wit 1926.652(b) and (c).

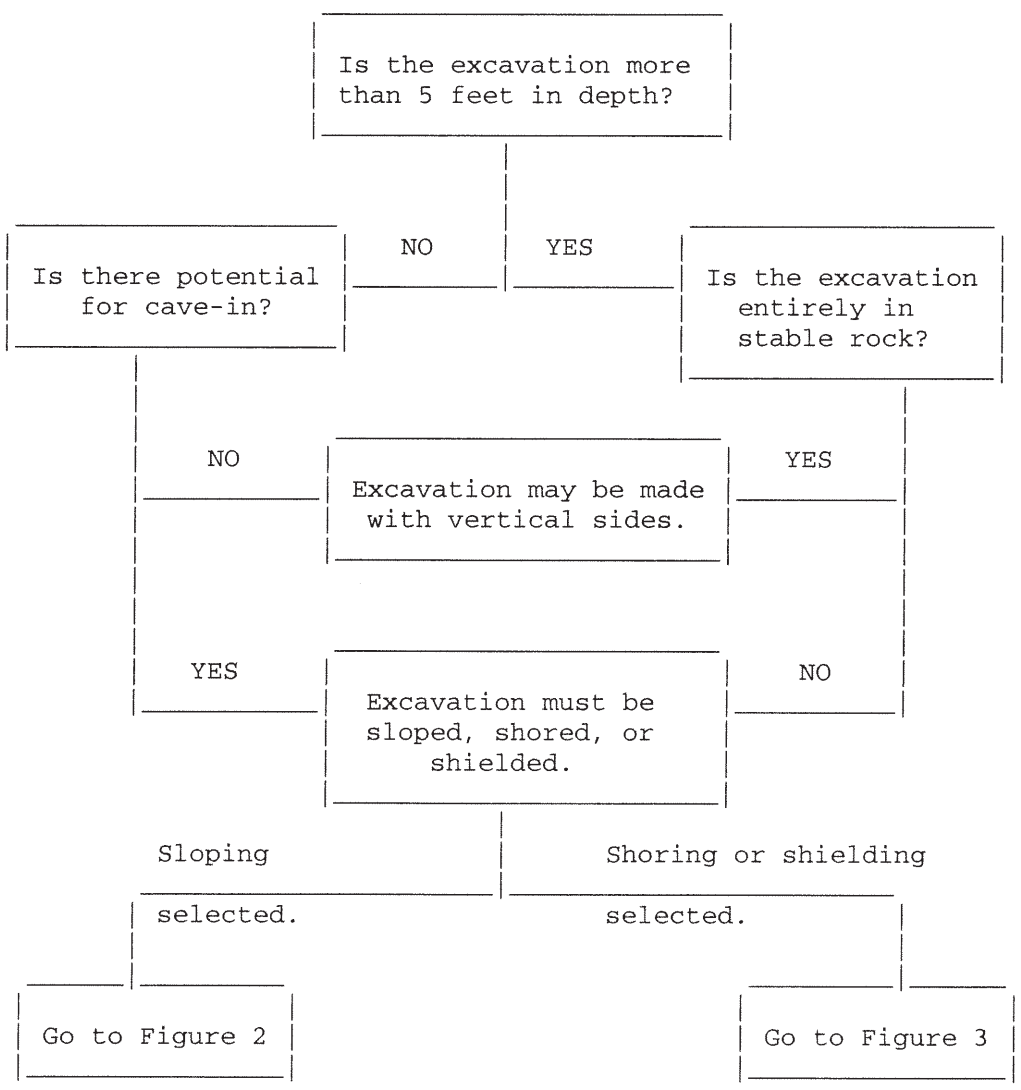


FIGURE 1 - PRELIMINARY DECISIONS

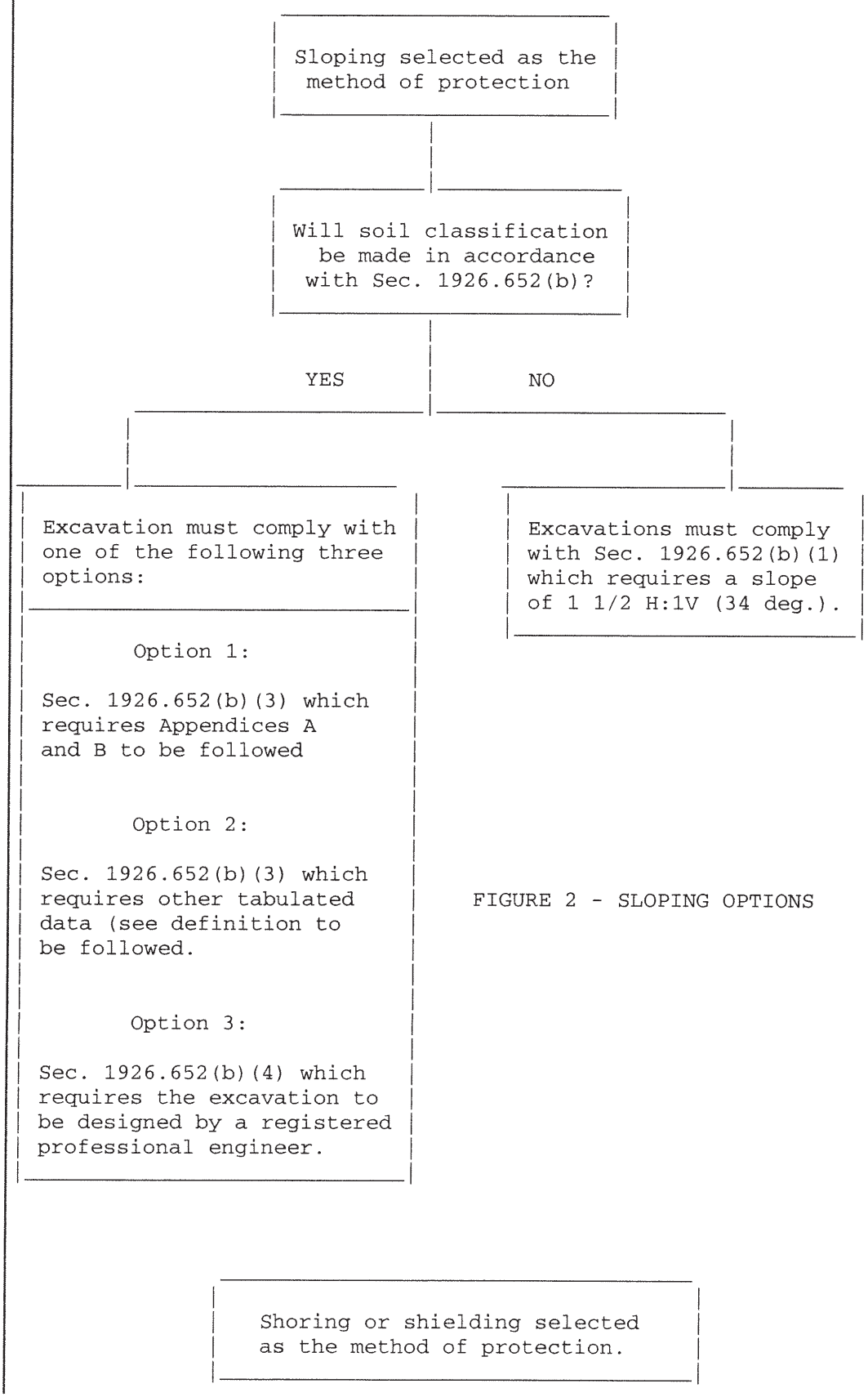


FIGURE 2 - SLOPING OPTIONS

Shoring or shielding selected as the method of protection.

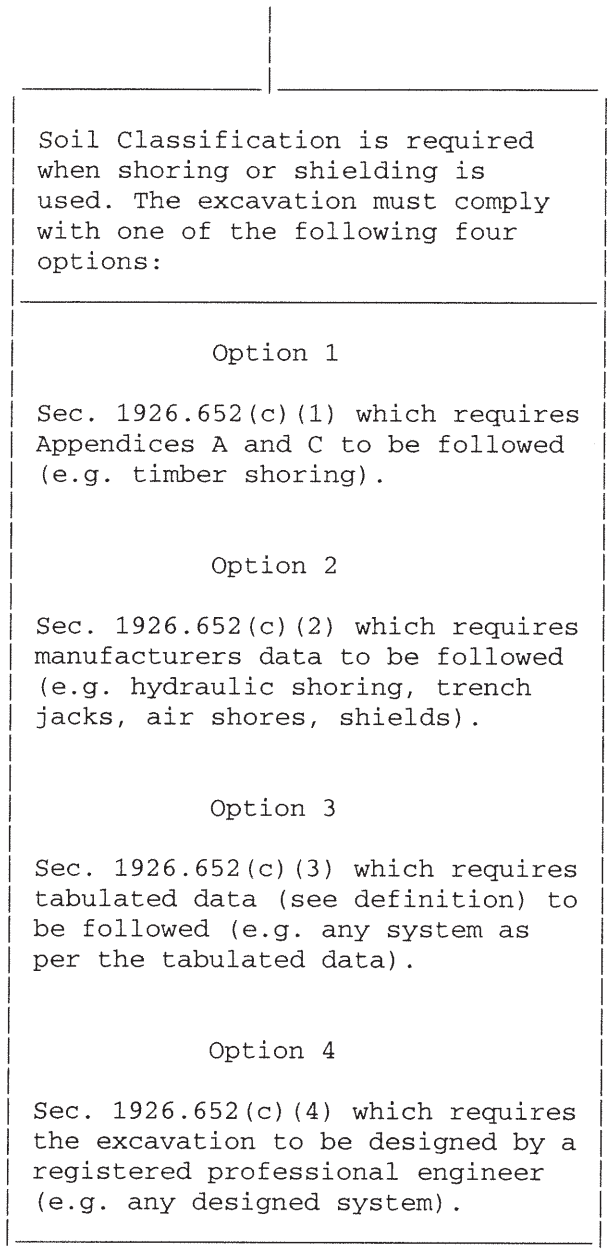


FIGURE 3 - SHORING AND SHIELDING OPTIONS

Next Standard (1926 Subpart Q)

Regulations (Standards - 29 CFR) - Table of Contents

Appendix B

GUIDANCE ON INCIDENT INVESTIGATION

AND REPORTING

C&S ENGINEERS

MEDICAL EMERGENCY/INCIDENT RESPONSE PROTOCOL

1.0 PURPOSE

From time to time employees of C & S Engineers, Inc. will sustain an injury while working on the job. While every effort is being made to prevent this, in the event of an injury or illness on the job, the following procedures will be implemented. This format may also be utilized in the event of a property damage incident.

2.0 SCOPE

This guideline applies to all C & S Engineers, Inc. job sites and employees.

3.0 GUIDELINES

Upon notification or awareness of an incident/accident with injuries or illness the Emergency Coordinator or his On-Site Designee will:

1. Ensure that the injured employee is receiving immediate first aid and medical care.
2. Notify Emergency Services (911) if injuries are severe.
3. Stabilize the work area; ensure that no one else can be injured.
4. Notify the Project Manager at the earliest possible convenience**.**
5. Notify the Owner/Client at the earliest possible convenience.

To assist the Health and Safety Manager in the root cause analysis, the Emergency Coordinator or his On-Site Designee will also make an attempt to:

1. Obtain the names and phone numbers of witnesses.
2. Preserve the accident scene if possible for analysis.

Injury Management

1. If the patient is stable with non-life threatening injuries, the foreman will ensure the employee is transported to Mount St. Mary's Hospital of Niagara Falls.

   At no time will an injured employee drive themselves to medical care.

2. If the patient has serious or life threatening injuries, the emergency coordinator or his on-site designee will notify the emergency services for the area for treatment and transport to a hospital or emergency room. Serious injuries can be considered but not limited to head injuries, loss of consciousness, severe laceration or amputation, fractured bones, burns and eye injuries.

3. Following the treatment and care of the injured employee, the emergency coordinator or his on-site designee and the project manager will initiate the completion of the first injury report. The Health & Safety Manager will assist.

Project Manager

1. Upon notification of a personal injury or illness on the job site, will notify C & S Engineers, Inc, President and Corporate Legal and C&S Companies Health and Safety Manager.
2. Will report to the worksite to initiate the first injury report.
3. Will report to the treatment facility to check on the well being of the injured employee. The project manager will ensure that the treatment facility is aware that this is a workers compensation case.
4. Will assist the Health and Safety Manager in the analysis of the incident.

Health & Safety Manager

1. Upon notification of the personal injury will determined if it is necessary to report to the treatment facility or the accident site, depending on the nature of the injuries and the circumstances of the accident.
2. Will report to the worksite to begin a root cause analysis investigation of the accident. The investigation may include interview of witnesses, field crew , and project manager, the photographing of the scene, reconstruction of the accident scene, using test instruments and taking measurements. The Health and Safety Manager may draw diagrams from the information learned.
3. The Health and Safety Manager will work with the owner/client as necessary to investigate the accident.
4. The Health & Safety manager will ensure that the site is safe to resume work.
5. The Health & Safety Manager shall initiate the New York State Compensation form requirements (C-2) and forward a copy of the C-2 to the C & S Engineers, Inc. controller for transmittal to the Compensation Carrier within 8 hrs of notification of the incident or by the end of the next business day.
6. The Health and Safety manager, upon completion of the investigation, will provide the Project Manager with a written investigative report (copy to the President)
7. The accident will be reviewed at the next Project Managers meeting with the intent to prevent further or similar events on other projects.
8. The Health & Safety Manager will assess the incident to determine OSHA record ability and make record if necessary on the OSHA 300 form, within five working days.

Incident Response

1.0 PURPOSE

To prevent the occurrence of accidents on C&S Engineers, Inc., work sites and to establish a procedure for investigation and reporting of incidents occurring in, or related to C&S work activities.

2.0 SCOPE

Applies to all incidents related to C&S Engineers, Inc. work activities.

3.0 DEFINITIONS

Accident - An undesired event resulting in personal injury and/or property damage, and/or equipment failure.

Fatality - An injury or illness resulting in death of the individual.

Incident - Any occurrence which results in, or could potentially result in, the need for medical care or property damage. Such incidents shall include lost time accidents or illness, medical treatment cases, unplanned exposure to toxic materials or any other significant occurrence resulting in property damage or in "near misses."

Incidence Rate - the number of injuries, illnesses, or lost workdays related to a common exposure base of 100 full-time workers. The rate is calculated as:

N/EH x 200,000

N = number of injuries and illnesses or lost workday cases; EH = total hours worked by all associates during calendar year. 200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

Injury - An injury such as a cut, fracture, sprain, amputation, etc. which results from a work accident or from a single instantaneous event in the work environment.

Lost Workday Case - A lost workday case occurs when an injured or ill employee experiences days away from work beginning with the next scheduled work day. Lost workday cases do not occur unless the employee is effected beyond the day of injury or onset of illness.

Recordable Illness - An illness that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These illnesses require medical treatment and evaluation of work related injury. For example, dermatitis, bronchitis, irritation of eyes, nose, and throat can result from work and non-work related incidents.

Recordable Injury - An injury that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These injuries require medical treatment; may involve loss of consciousness; may result in restriction of work or motion or transfer to another job; or result in a fatality.

Near Miss - An incident which, if occurring at a different time or in a different personnel or equipment configuration, would have resulted in an incident.

4.0 RESPONSIBILITIES

Employees - It shall be the responsibility of all C&S Engineers, Inc. employees to report all incidents as soon as possible to the HSC, regardless of the severity.

Human Resources - has overall responsibility for maintaining accident/ incident reporting and investigations according to current regulations and recording injuries/ illness on the OSHA 300 log, and posting the OSHA 300 log.

Emergency Coordinator - It is the responsibility of the Emergency Coordinator to investigate and prepare an appropriate report of all accidents, illnesses, and incidents occurring on or related to C&S Engineers, Inc. work. The Emergency Coordinator shall complete Attachment A within 24 hours of the incident occurrence.

Health and Safety Manager (HSM) - It is the responsibility of the HSM to investigate and prepare an appropriate report of all lost time injuries and illnesses and significant incidents occurring on or related to C&S Companies. The HSM shall maintain the OSHA 300 form.

Project Managers (PM) - It shall be the PM's responsibility to promptly correct any deficiencies in personnel, training, actions, or any site or equipment deficiencies that were determined to cause or contribute to the incident investigated.

5.0 GUIDELINES

5.1 Incident Investigation

The Project Manager will immediately investigate the circumstances surrounding the incident and will make recommendations to prevent recurrence. The HSM shall be immediately notified by telephone if a serious accident/ incident occurs. The incident shall be evaluated to determine whether it is OSHA recordable. If the incident is determined to be OSHA 300 recordable, it shall be entered on the OSHA 300 form.

The Project Manager with assistance from the HSM must submit to the office an incident report form pertaining to any incident resulting in injury or property damage.

5.2 Incident Report

The completed incident report must be completed by the Project Manager within 12 hours of the incident and distributed to the HSM, and Human Resources. This form shall be maintained by Human Resources for at least five years for all OSHA recordable cases. This form serves as an equivalent to the OSHA 101 form.

5.3 Incident Follow-up Report

The Incident Follow-Up Report (Attachment B) shall be distributed with the Incident Report within one week of the incident. Delay in filing this report shall be explained in a brief memorandum.

5.4 Reporting of Fatalities or Multiple Hospitalization Accidents

Fatalities or accidents resulting in the hospitalization of three or more employees must be reported to OSHA verbally or in writing within 8 hours. The report must contain 1) circumstances surrounding the accident(s), 2) the number of fatalities, and 3) the extent of any injuries.

5.5 OSHA 300A Summary Form

Recordable cases must be entered on the log within six workdays of receipt of the information that a recordable case has occurred. The OSHA log must be kept updated to within 45 calendar days.
OSHA 300 forms must be updated during the 5 year retention period, if there is a change in the extent or outcome of an injury or illness which affects an entry on a log. If a change is necessary, the original entry should be lined out and a corrected entry made on that log. New entries should be made for previously unrecorded cases that are discovered or for cases that initially weren't recorded but were found to be recordable after the end of the year. Log totals should also be modified to reflect these changes.

5.5.1 Posting

The log must be summarized at the end of the calendar year and the summary must be posted from February 1 through May 31.

5.6 OSHA 300A

Facilities selected by the Bureau of Labor Statistics (BLS) to participate in surveys of occupational injuries and illnesses will receive the OSHA 300A. The data from the annual summary on the OSHA 300 log should be transferred to the OSHA 300A, other requested information provided and the form returned as instructed by the BLS.

5.7 Access to OSHA Records

All OSHA records (accident reporting forms and OSHA 300 logs) should be available for inspection and copying by authorized Federal and State government officials.

Employees, former employees, and their representatives must be given access for inspection and copying to only the log, OSHA No. 300, for the establishment in which the employee currently works or formerly worked.

6.0 REFERENCES

29 CFR Part 1904

7.0 ATTACHMENTS

Attachment A - Incident Investigation Form
Attachment B - Incident Follow-Up Report
Attachment C - Establishing Recordability

ATTACHMENT A

INCIDENT INVESTIGATION FORM

Accident investigation should include:

Location: _____

Time of Day: _____

Accident Type: _____

Victim: _____

Nature of Injury: _____

Released Injury: _____

Hazardous Material: _____

Unsafe Acts: _____

Unsafe Conditions: _____

Policies, Decisions: _____

_____

Personal Factors: _____

_____

Environmental Factors: _____

_____

_____

ATTACHMENT B

Date _____

Foreman: _____

INCIDENT FOLLOW-UP REPORT

Date of Incident: _____

Site: _____

Brief description of incident: _____

_____

_____

_____

_____

Outcome of incident: _____

_____

_____

_____

Physician's recommendations: _____

_____

_____

_____

Date the injured returned to work: _____

Project Manager Signature: _____

Date: _____

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT C

ESTABLISHING RECORDABILITY

1. Deciding whether to record a case and how to classify the case.

   Determine whether a fatality, injury or illness is recordable.

   A fatality is recordable if:

   - Results from employment

   An injury is recordable if:

   - Results from employment and
   - It requires medical treatment beyond first aid or
   - Results in restricted work activity or job transfer, or
   - Results in lost work day or
   - Results in loss of consciousness

   An illness is recordable if:

   - It results from employment

2. Definition of "Resulting from Employment"

   Resulting from employment is when the injury or illness results from an event or exposure in the work environment. The work environment is primarily composed of: 1) The employer's premises, and 2) other locations where associates are engaged in work-related activities or are present as a condition of their employment.

   The employer's premises include company rest rooms, hallways, cafeterias, sidewalks and parking lots. Injuries occurring in these places are generally considered work related.

   The employer's premises EXCLUDES employer controlled ball fields, tennis courts, golf courses, parks, swimming pools, gyms, and other similar recreational facilities, used by associates on a voluntary basis for their own benefit, primarily during off work hours.

   Ordinary and customary commute, is not generally considered work related.

   Employees injured or taken ill while engaged in consuming food, as part of a normal break or activity is not considered work related. Employees injured or taken ill as the result of smoking, consuming illegal drugs, alcohol or applying make up are generally not considered work related. Employee injured by un authorized horseplay is generally not considered work related, however, an employee injured as a result of a fight or other workplace violence act, may be considered work related.

Associates who travel on company business are considered to be engaged in work related activities all the time they spend in the interest of the company. This includes travel to and from customer contacts, and entertaining or being entertained for purpose of promoting or discussing business. Incidents occurring during normal living activities (eating, sleeping, recreation) or if the associate deviates from a reasonably direct route of travel are not considered OSHA recordable.

3. Distinction between Medical Treatment and First Aid.

First aid is defined as any one-time treatment, and any follow up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, etc., which do not ordinarily require medical care. Such one time treatment, and follow up visit for the purpose of observation, is considered first aid even though provided by a physician or registered professional personnel.

Medical Treatment (recordable)

a) They must be treated only by a physician or licensed medical personnel.

b) They impair bodily function (i.e. normal use of senses, limbs, etc.).

c) They result in damage to physical structure of a non superficial nature (fractures).

d) They involve complications requiring follow up medical treatment.

APPENDIX D
COMMUNITY AIR MONITORING PROGRAM

Community Air Monitoring Plan

for

Robert Moses Parkway-South Site
Southwest of the Intersection of John Daly Boulevard
and Buffalo Avenue (SBL #158.16-1-1)
Niagara Falls, Niagara County, New York

Site No. 932166

January 2016

Community Air Monitoring Plan

Overview

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

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Based on previous investigation, the site contamination is likely to be limited to pesticides, mercury, and SVCOs.

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.

<u>VOC Monitoring, Response Levels and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment

should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate, such as isobutylene. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 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/m3 of the upwind level and in preventing visible dust migration.

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

Fugitive Dust and Particulate Monitoring

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

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

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

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

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number;
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;

(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50$_o$ C (14 to 122$_o$ F); and
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

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

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM-10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed.

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

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

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

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