SOIL INJECTION-BLENDING WORK PLAN

FOR

MOYER CARRIAGE LOFTS
BCP SITE NO. C734151
1714 NORTH SALINA STREET
SYRACUSE, ONONDAGA COUNTY, NEW YORK

Prepared by:

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MAY 2022

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FIGURES

APPENDICES

ACRONYM LIST

ASP	Analytical Services Protocol
BGS	Below Ground Surface
CAMP	Community Air Monitoring Plan
COC	Contaminants of Concern
CPP	Citizen Participation Plan
DER	Department of Environmental Remediation
DNAPL	Dense Non-aqueous Phase Liquid
DUSR	Data Usability and Summary Report
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
HFM	Historic Fill Material
IRM	Interim Remedial Measures
MS/MSD	Matrix Spike / Matrix Spike Duplicate
NYSDEC	NYS Department of Environmental Conservation
NYSDOH	New York State Department of Health
OM&M Plan	Operation, Monitoring and Maintenance Plan
PAH	Polycyclic Aromatic Hydrocarbons
PCE	Tetrachloroethylene
PID	Photo-ionization Detector
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
ROD	Record of Decision
SCO	Soil Cleanup Objectives
Site	1714 North Salina Street, Syracuse, New York
SSDS	Sub-slab Depressurization System
SVOC	Semi-volatile Organic Compounds
TCE	Trichloroethene
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

I, Nevin Bradford, certify that I am currently a NYS Registered Professional Engineer and that this Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Nevin Bradford
State of New York Professional Engineer No. 086008

May 3, 2022

1 INTRODUCTION

This Work Plan (WP) has been prepared as a contingency relative to the excavation of the Tetrachloroethylene (PCE) Soil Source Removal, described in detail in Section 4.6 of C&S' Alternatives Analysis / Remedial Action Work Plan (AA/RAWP), dated December 2021. This Work Plan provides a description of the procedures that will be implemented as a contingency to address residual impacts that are unable to be addressed by source removal alone. This WP has been prepared consistent with New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation "Technical Guidance for Site Investigation and Remediation" (DER-10). To effectively characterize the environmental conditions, this WP discusses the following:

- Current and historic site conditions
- Contaminants of concern and the extent of the contamination
- Pre-treatment investigation activities
- Proposed remedial measures
- Health and safety procedures to protect site workers and the local community

1.1 Site Description

The Site is located at 1714 North Salina Street in the City of Syracuse, Onondaga County, New York. The Site includes two contiguous tax parcels: ID numbers are 002.-03-05.1 and 002.-03-05.2. The Site includes five brick and block buildings which account for approximately 204,964 square feet of gross building space. The buildings were constructed sometime before 1892 until 1956. The Site is approximately 2.12 acres in size, which includes a parking lot with 76 parking spaces along the northwestern side of the Site buildings. The buildings are currently vacant and in a distressed condition.

The Site is located in the Syracuse North Side community. The Site is located within the Hiawatha - Lodi (Hi-Lo) Brownfield Opportunity Area (BOA). The Site is bounded to the north by Park Street, south by North Salina Street, east by Wolf Street, and west by Exchange Place. Properties surrounding the Site are commercial and industrial facilities. A gas station was formerly located to the northeast and a dry cleaner was formerly located to the east, on the opposite sides of the adjoining streets.

Figure 1 shows the location of the Site and **Figure 2** shows the Site boundaries and identified pertinent site features.

1.2 Site History

The Site has been used for industrial and commercial purposes since it was first developed prior to 1892 as the Moyer Carriage Factory (a.k.a. Moyer Automobile Company). Site operations included carriage and vehicle manufacturing. Between 1912 and 1958, the Site was home to the Porter Cable Company for use as a tool manufacturing facility. From 1958 to 2012, the Site was owned and operated by Penfield Mattress Company. Site operations included machining, plating, as well as parts and equipment cleaning. In 2012, the Site was purchased by G&K Trucking, LLC. The Site is currently unoccupied and only partially used for material storage. The buildings are in poor condition and not habitable.

1.3 Site Geography, Geology, and Hydrogeology

The Site elevation ranges from approximately 409 feet above mean sea level (amsl) on the west to 415 feet amsl on the east. The Site and vicinity slopes gently toward the west, in the direction of Onondaga Lake, which lies approximately one-half mile to the west.

The Site contains historic fill material (HFM) with observed thickness as deep as approximately nine feet with an average of four to five feet. Per 6 NYCRR Part 375, historic fill is defined as: *non-indigenous or non-native material, historically deposited or disposed in the general area of, or on, a site to create useable land by filling water bodies, wetlands or topographic depressions, which is in no way connected with the subsequent operations at the location of the emplacement, and which was contaminated prior to emplacement*. The HFM contains gravel, black sand, brick, ash, and coal. Native soil is located below the HFM and consists of dense, dry silty clay.

According to USGS documents (*Hydrogeology of the Valley-Fill Aquifer in the Onondaga Trough, Onondaga County, New York*, William M. Kappel and Todd Miller), the Site area is underlain by artificial fill (HFM), lacustrine silt and clay, and till over Vernon shale bedrock. The depth to bedrock at the Site is approximately 44 - 45 feet (371 to 372 feet amsl) along Exchange Place in the west (MW-1 and MW-3). Bedrock was not encountered along the

eastern side of the Site.

At MW-1 through MW-4, the groundwater depth at the time of drilling ranged from 40 to 43 feet below grade within a narrow band (one to two feet) of fractured shale bedrock and till sitting on top of bedrock. The band of water bearing material was observed to be one foot in thickness or less. Immediately subsequent to drilling, MW-5 was dry at 50 feet, but the static water level was 36 feet the subsequent morning. Within the well casing subsequent to development, coupled with hydraulic pressure, the static water levels were approximately 35 to 38 feet below ground surface. Onondaga Lake is located approximately one-half mile to the west. Based on water elevations measured during the RI, groundwater flow is to the west.

The primary drinking water source for the City of Syracuse is Skaneateles Lake, located 15 miles to the southwest. Water processed in the Onondaga County Water Authority (OCWA) potable water plants for the City of Syracuse undergoes varying levels of treatment to ensure that drinking water meets NYSDEC and United States Environmental Protection Agency (USEPA) standards. Groundwater in the City of Syracuse is prohibited from being used for public drinking water supply. Local groundwater is not potable due to elevated concentrations of dissolved inorganics (salts, aluminum, iron, etc.).

1.4 Previous Investigations

In 2019 and 2020, several investigations occurred. These included:

- Phase I Environmental Site Assessment (Phase I ESA)
- Limited Phase II ESA
- Limited Hazardous Building Material Pre-Renovation Survey
- Geotechnical Investigation

Based on the information and data gathered from these investigations, the Site was entered into the BCP.

The BCP Remedial Investigation (RI) was performed in 2021 and was conducted to assess the nature and extent of contamination at the Site. The RI consisted of:

- A buried utilities evaluation
- The collection and analysis of four surface soil samples
- The advancement of 39 (five being groundwater monitoring wells) soil borings and collection and analysis of 76 subsurface soil samples
- The installation of five groundwater monitoring wells and performance of two rounds of groundwater sampling
- The collection of six sub-slab and two soil vapor well air samples
- The collection of quality assurance / quality control (QA / QC) samples

Soil and groundwater samples were analyzed for a combination of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), metals (including cyanide and hexavalent chromium), and per- and polyfluoroalkyl substances (PFAS). Vapor samples were analyzed for TO-15 list VOCs.

HFM is distributed across the Site. Based on the findings of the RI, the known contaminants of concern in the HFM include SVOCs and metals. The variation in analyte concentrations in the soils that contain HFM indicates that the source of contamination in soil samples containing HFM is the HFM itself and no apparent discrete source is located on-site or off-site. HFM will be addressed during remediation by excavation and disposal or placement under a two-foot thick clean soil cover.

A pair of 10,000-gallon underground storage tanks (USTs) are closed-in-place and are located beneath an above grade loading dock along the northwest side of the building. Several soil borings were advanced around the tanks during the RI and there was no physical evidence (stains, odors, detectable photoionization detector readings) of releases from the USTs. The tanks will be removed and properly disposed during remediation.

PCE is present in an isolated area of soil and HFM under the northern portion of the building. A soil delineation effort was performed which indicates that the impacts are isolated to a confined area around SB-15. The impacted soil is underlain by approximately 25 feet of dense native silty clay that extends to bedrock. The impacted soil will be excavated and disposed during remediation.

Soil vapor samples were collected from underneath the slab on grade and basement portions of buildings that will remain after redevelopment. Soil vapor samples were also collected from beneath the parking lot on the west / southwest portion of the Site. Sampling results indicate that vapor mitigation is required for tetrachloroethene (TCE). The building will be equipped with a sub-slab depressurization system (SSDS) to mitigate soil vapor, including Chlorinated VOCs (CVOCs) and radon.

CVOCs are present in groundwater, located approximately 35 to 38 feet below grade. The CVOCs include PCE, TCE, and cis-1,2 dichloroethene (Cis 1,2-DCE). These contaminants exceed their respective NYSDEC TOGS limits. The only CVOCS in soil identified from the remedial investigation are in the immediate area of SB-15. The vertical and horizontal limits of soil impacts in this area are well defined, but may be a source of the CVOCs in groundwater. A former dry cleaner is located immediately upgradient of the Site, and, based on groundwater data collected from the upgradient edge of the Site, may be a contributing source of the CVOC contamination in local groundwater. Groundwater flow is to the west towards an area lacking residential development. The area west of the Site includes an industrial recycling facility, a car wash, a car dealership, and Hiawatha Boulevard / Interstate 81. Groundwater in the City of Syracuse is prohibited from being used for public drinking water supply. Local groundwater is not potable due to elevated concentrations of dissolved inorganics (salts, aluminum, iron, etc.).

Attached is **Figure 3** that show the results of the soil CVOC investigation.

2 SUMMARY OF ENVIRONMENTAL CONDITIONS

2.1 Nature and Extent of Contamination

Chlorinated solvents, primarily PCE and TCE, were identified as the contaminants of concern (COC) for this Site. PCE and TCE are man-made volatile organic compounds used for degreasing metal and electronic parts and dry cleaning. Remedial considerations for PCE / TCE include its low solubility value and heavy molecular weight. PCE / TCE are in a class of chemicals called dense non-aqueous phase liquids (DNAPL) that sink through the water column until they encounter an impermeable barrier.

As shown in **Figure 3** and described below, a potential onsite contributing source area is associated with the soil located beneath the northern portion of the building. The former building activities in this area are unknown. However, it is noteworthy that floor drain trenches are located in this area.

Protection of Groundwater Soil Cleanup Objectives (SCOs) were exceeded for PCE or TCE at five locations. Most concentrations were 12 parts per million (ppm) or less, with the most elevated concentrations of 48 to 110 ppm at a single location.

Based on the scope and results of the remedial investigation (RI), the excavation limits for the source removal are well defined:

- The area around SB-15 is expected to extend to approximately 10 feet below ground surface (bgs) and is approximately 700 square feet.
- The impacts around SB-15b, 15c, 15e, 15f, and 23 are generally expected to terminate shallower than four feet and occupy a footprint of 1,625 square feet.
- The impacts around SB-07 extend to 16 feet and are estimated to occupy an area of 225 square feet.

The aggregate estimated soil removal volume is approximately 600 to 700 cubic yards.

3 OBJECTIVES, SCOPE AND RATIONALE

The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

3.1 Record of Decision

As stated in the Decision Document (DD), the remedial action objectives (RAOs) selected for soil at this Site are:

Soil RAOs

The RAOs for soil used in this AA are:

- RAOs for Public Health Protection
  - Prevent ingestion/direct contact with contaminated soil.
  - Prevent inhalation exposure to contaminants volatilizing from soil.

- RAOs for Environmental Protection
  - Prevent migration of contaminants that would result in groundwater or surface water contamination.

Groundwater RAOs

The RAOs for groundwater used in this AA are:

- RAOs for Public Health Protection
  - Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards; and
  - Prevent contact with, or inhalation of, volatiles from contaminated groundwater.
- RAOs for Environmental Protection
  - Restore groundwater aquifer to pre-disposal / pre-release conditions, to the extent practicable.
  - Remove the source of the ground or surface water contamination.

Soil Vapor RAOs

The RAOs for soil vapor used in this AA are:

- RAOs for Public Health Protection
- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a Site.

3.2 Standards, Criteria, and Guidance

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The standards, criteria and guidance (SCGs) that will be, or will likely be, directly applicable to the site's remediation include those listed below.

- New York Codes, Rules, and regulations, Title 6 (6 NYCRR), Chapter IV, Subpart 375-6: *Remedial Program Soil Cleanup Objectives*, and *DEC CP-51 Soil Cleanup Guidance*, issued October 21, 2010.

4 DESCRIPTION OF REMEDIAL ACTION

The PCE soil source area occupies a combined footprint of approximately 2,500 square feet under the north portion of the existing building. By volume, the impacts are approximately divided between an area with impacts to 10 feet bgs and an adjoining area with impacts to four feet bgs. This portion of the building will be demolished as part of the initial phase of site redevelopment. Subsequent to demolition, the soils will be excavated for landfill disposal.

Removal of the soil in this area will eliminate the ability of soil contamination to impact groundwater. The following tasks will be implemented to address the impacted soil. It should be noted that these tasks were excerpted from section 4.6 of the approved AAR/RAWP:

- Excavation will proceed as necessary to remove source material, and care will also be taken not to undermine or destabilize building foundations / footings. The soil removal areas are shown on **Figure 3**.

- Prior to initiating the source removal, soil samples will be collected and submitted for laboratory analysis for waste characterization purposes. Since soils destined for disposal will be pre-characterized, soil will not need to be stockpiled to perform the remedy, and therefore can be loaded directly into waste hauler trucks ((e.g. load and go. (*Note that this task has been performed and the soils are non-hazardous*)). Groundwater is located more than 30 feet bgs and is unlikely to be encountered.

- Soil will be excavated with a track-mounted excavator and loaded directly into waste hauler trucks. Excavator operators will be required to possess a valid and current 40-Hour HAZWOPER Certification and waste haulers will be required to possess a valid and current NYSDEC Part 364 permit. The soils are expected to be non-hazardous and will be taken to a solid waste facility permitted to properly manage such wastes.

- Confirmatory soil samples will be collected and excavations will proceed, as needed, to ensure that soils that exceed soil cleanup objectives (SCOs) are removed. Samples will be collected at a frequency of one per 30 linear feet of sidewall and one per 900 square feet of bottom. Samples will be analyzed for PCE and TCE via USEPA Method 8260. Sample results will be compared to Unrestricted Use, Protection of Groundwater, and Restricted Residential Use SCOs.

- The efforts will be conducted consistent with the following previously approved work plans:

    - Community Air Monitoring Plan (CAMP)
    - Health & Safety Plan (HASP)
    - Excavation Work Plan (EWP)
    - Quality Assurance Project Plan (QAPP)

If these efforts fail to achieve the goals of the RAWP, a contingency remediation will be undertaken as described below. This section of the work plan identifies the steps to be taken to perform the contingency remediation, that will be required if excavation alone is

insufficient to meet remedial goals. The Department will be notified if the contingency requires implementation.

4.1 Treatment Area

The treatment area(s) will consist of the remaining horizontal or vertical limits of the impacts not removed via excavation. To determine if the excavation is successful, soil sampling for VOCs will be performed. Soil samples will be collected to represent every 900 square feet of excavation bottom and every 30 linear feet of excavation sidewall. No further excavation or remediation will be performed if soil sample results show compliance with Protection of Groundwater SCOs. If sample results do not meet these SCOs, structural controls will be installed to allow further excavation and testing, or the remedial contingency will ensue.

If complete soil excavation is not feasible due to building structural concerns, one of the following will be completed:

- Soil boring injection of potassium permanganate ($KMnO_4$) into the remaining impacted soil.

- Mechanical blending of $KMnO_4$ into the remaining impacted soil.

The extent of impacts is shown in **Figure 3**. The extent of impacts is based on data collected during the RI, including a delineation effort in this area.

- For soil blending, the $KMnO_4$ slurry will be mechanically mixed into the subsurface, resulting in a very high percentage of direct contact with remaining impacts.

- For soil boring injections, injections points will be evenly spread out in the remaining horizontal limits to provide even coverage. An area of influence of +/- 10 feet will be the basis for boring spacing. Injections will be at discrete and multiple depths as needed to provide vertical coverage.

4.2 Remedial Approach

In Situ Chemical Oxidation (ISCO) in soil using $KMnO_4$ has been demonstrated at a large number of sites worldwide to address chlorinated solvents such as TCE and PCE. $KMnO_4$ is known for its rapid kinetics and effectiveness in oxidizing PCE. Therefore, C&S recommends ISCO via KMnO4. The following equation describes the overall chemical reaction for the oxidation of TCE:

$$2KMnO_4 + C_2HCl_3 \rightarrow 2CO_2 + 2MnO_2 + 2K^+ + 3Cl^- + H^+$$

Oxidation using $KMnO_4$ causes cleavage of carbon-carbon bonds often facilitated by free-radical oxidation mechanisms. Byproducts from the reaction include carbon dioxide, manganese dioxide solids, and potassium and chloride when halogenated compounds are the contaminant of concern. The byproducts are non-toxic at the concentrations produced. Delivery and recirculation of the oxidant is applied to saturated permeable media.

For soil boring injections, proprietary mixing / injection equipment will be utilized to mix batches of $KMnO_4$ slurry. The slurry be injected into the subsurface through an injection point at the end of a geoprobe rod. Approximately 110 pounds of $KMnO_4$ and 55 gallons of water will be injected at each location.

For soil blending, $KMnO_4$ powder will be spread at the surface of the treatment area and blended into the subsurface using a mechanical blending head affixed to the end of the arm of a track mounted excavator. A dosage rate of +/- 5 grams / kilogram will be applied. Since soil blending greatly reducing the bearing strength of soil, Portland cement will also be blended so that the soil can be properly compacted.

4.2.1 Storage of Chemicals

The product will be shipped directly to the Site and stored in conditions in accordance with the manufacturer's specifications. All product will be used for this treatment.

Decontamination of equipment, storage, personal protection, and other related safety concerns will be completed in accordance with vendor recommendations. Product information sheets and a safety data sheet (SDS) are presented in **Appendix A**.

5 POST-TREATMENT MONITORING PLAN

5.1 Groundwater Monitoring

Post-treatment groundwater sampling is required as part of the overall evaluation to assess the effectiveness of the remedy and monitor its short-term and long-term effects. The elements of the remedy expected to reduce CVOCs in groundwater include the Groundwater Injection Program as the principal element, and the PCE Soil Source Removal as a complementary effort. The groundwater sampling described in C&S' May 2022 Groundwater Injection Work Plan will be relied upon to determine the success of these remedial efforts.

In addition to the three downgradient wells that will be sampled, MW-6 will be installed at the approximate located of TW-1, which is proximate to the soil removal area. The well will be sampled for VOCs.

Note that all of the Site wells are expected to be sampled at an annual interval for VOCs and monitored natural attenuation (MNA) parameters consistent with the forthcoming Site Management Plan (SMP).

5.2 Soil Vapor Monitoring

Consistent with the Decision Document (DD), determination of the effectiveness of the remedy requires consideration of further assessment for soil vapor. The need for additional soil vapor testing will be discussed with the Department during the preparation of the SMP.

6 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 will be applied as detailed in previously approved work plans that detail the required sampling.

7 HEALTH AND SAFETY

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

8 REPORTING

Based on the results of the work described above, a letter report will be prepared to describe the methodologies and results of the injections. The portions of the report will describe:

- Investigative methods;
- Observations and findings;
- Inspection/monitoring observations of the remedial measures; and
- Analytical results.

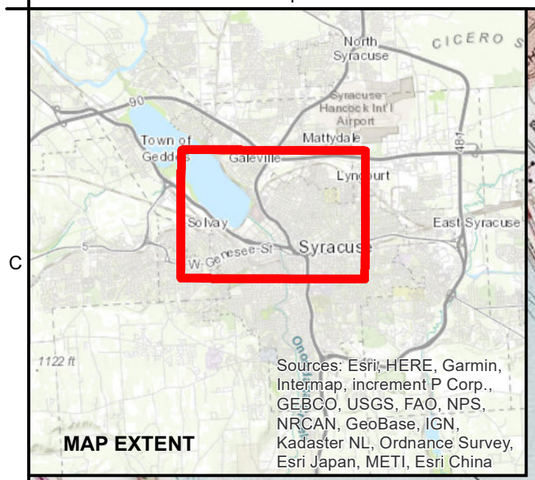
The documents will be submitted to the NYSDEC for review and approval.

9 SCHEDULE

Below is an anticipated schedule of milestones for the injections.

Anticipated Date	Milestone
April 2022	Draft Soil Injection-Blending Work Plan Submission
May 2022	Soil Injection-Blending Work Plan Approval
June 2022	Soil Excavation
July 2022	Injection or Blending Program (if needed)
Fall 2022	Report Submission

FIGURES



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Site

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False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
Scale Factor: 0.9999
Latitude Of Origin: 40.0000
Units: Foot US

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0 2,000 Feet

1 inch = 2,000 feet

Moyer Carriage Lofts
1714 North Salina Street
Syracuse, Onondaga County, New York

PROJECT NO:	W96.001.004
DATE:	February 2022
SCALE:	AS SHOWN
DRAWN BY:	JTB
DESIGNED BY:	JTB
CHECKED BY:	MLW

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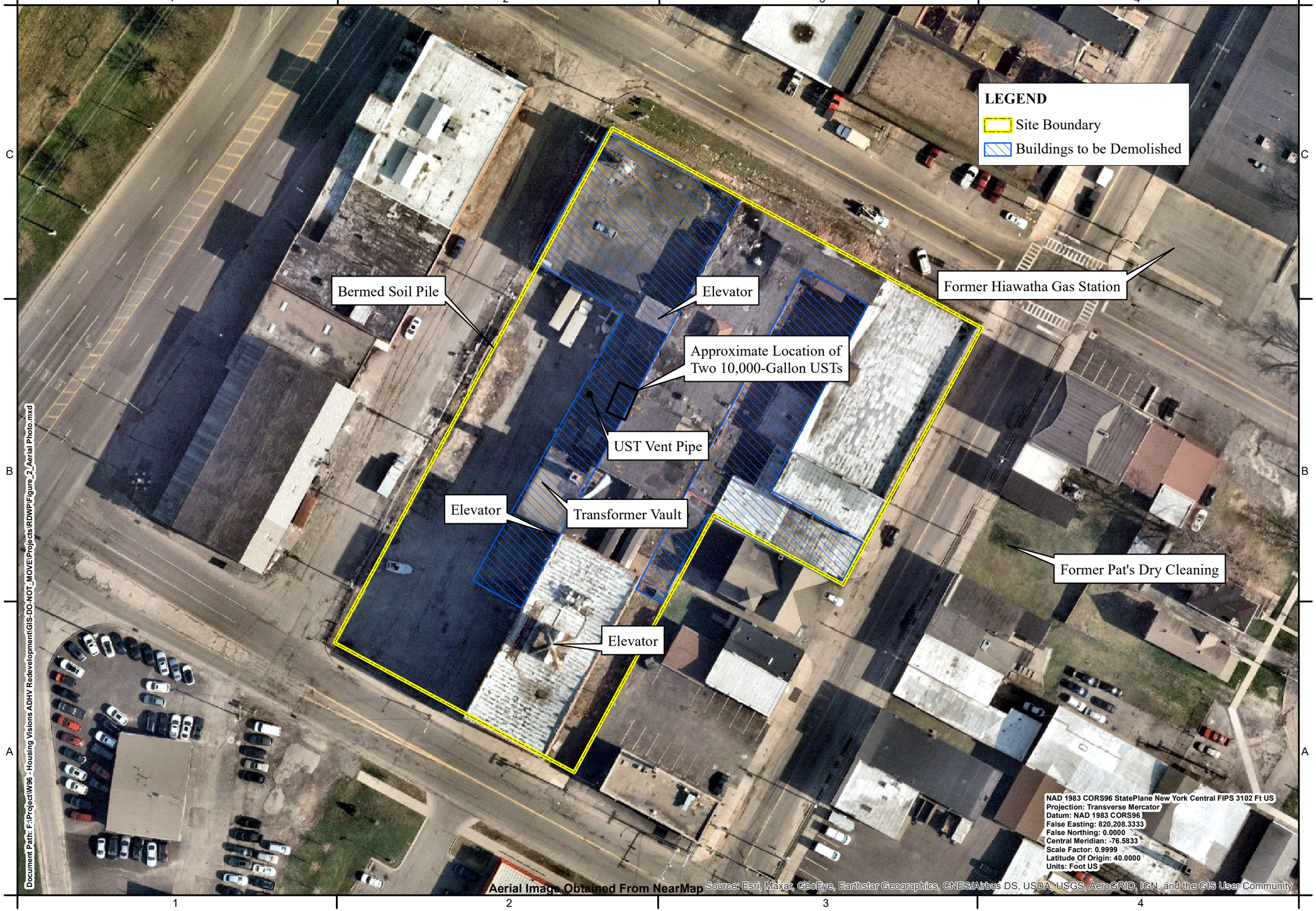
SITE LOCATION

Figure 1



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0 60 Feet
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SITE MAP

Figure 2

LEGEND

Site Boundary

Soil Removal Area

PCE / TCE SCOs

Unrestricted Use
Protection of Groundwater SCO = 1.3 / 0.47

Residential Use SCO= 5.5 / 10

Residential-Restricted Use SCO = 19 / 21

Commercial Use SCO = 150 / 200

Industrial Use SCO = 300 / 400

SAMPLE ID
(SAMPLE DEPTH) PCE / TCE CONCENTRATION
CONTAMINANT ABOVE
PROTECTION OF GROUNDWATER SCO

NOTES: Data in parts per million
Unrestricted Use SCOs and Protection of Groundwater SCOs are the same for TCE and PCE.

RI-SB-17
(0.5'-5') PCE - 0.0084 / TCE - 0.0012
(6'-8') PCE - 0.0018 / TCE - ND

RI-SB-16
(0.5'-4') PCE - 0.0048 / TCE - 0.00018
(6'-10') PCE - 0.0025 / TCE - ND

Soil removal area to 10' below grade

RI-SB-01
(8-9') PCE - 0.0015 / TCE - 0.00031
(9'-12') PCE - ND / TCE - ND

RI-SB-15A
(0-4') PCE - 0.026 / TCE - 0.0016
(4'-8') PCE - 0.068 / TCE - 0.0021
(8'-11') PCE - 0.095 / TCE - 0.0037

RI-SB-15C
(0-4') PCE - 12 / TCE - 3.8
(4'-8') PCE - 0.058 / TCE - 0.005
(8'-10') PCE - 0.008 / TCE - 0.00072

RI-SB-15
(0.5'-6') PCE - 110 / TCE - 0.82
(6'-8') PCE - 0.24 / TCE - 0.0028
(8'-9') PCE - 48 / TCE - 0.66

RI-SB-15E
(0-4') PCE - 12 / TCE - 3.5
(4'-7') PCE - 0.069 / TCE - 0.0062

Soil removal area to 4' below grade

RI-SB-15B
(0-4') PCE - 8.4 / TCE - 0.15
(4'-8') PCE - 0.064 / TCE - 0.0012
(8'-12') PCE - 0.0084 / TCE - 0.0097
(12'-15') PCE - 0.22 / TCE - 0.09

RI-SB-21
(6'-8') PCE - ND / TCE - ND

RI-SB-15D
(0-4') PCE - 0.0036 / TCE - 0.00036
(4'-8') PCE - 0.0061 / TCE - ND
(8'-9.5') PCE - 0.0016 / TCE - 0.0012

Soil removal area to 6' below grade

RI-SB-15F
(0-4') PCE - 12 / TCE - 1.4
(4'-8') PCE - 0.11 / TCE - 0.0075

RI-SB-15G
(0-4') PCE - 0.042 / TCE - 0.046
(4'-8') PCE - 0.016 / TCE - 0.011

Soil removal area to 16' below grade

RI-SB-22
(6'-9.5') PCE - ND / TCE - ND

RI-SB-02
(8-10') PCE - 0.067 / TCE - 0.0067
(10'-12') PCE - 0.026 / TCE - 0.0026

RI-SB-23
(3.5'-5') PCE - 6.1 / TCE - 19
(6'-8') PCE - 0.011 / TCE - 0.016

RI-SB-07
(15'-16') PCE - 2.2 / TCE - 0.0048

RI-SB-08
(0-4') PCE - 0.0096 / TCE - 0.0026
(8'-12') PCE - 0.048 / TCE - 0.0039

NAD_1983_CORS96_StatePlane_New_York_Central_FIPS_3102_Ft_US
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False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
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Latitude Of Origin: 40.0000
Units: Foot US

Aerial Image Obtained From NearMap

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PCE SUBSURFACE SAMPLE RESULTS

Figure 3

APPENDICES

APPENDIX A

ABC PRODUCT INFORMATION

REDOX TECH, LLC

"Providing Innovative In Situ Soil and Groundwater Treatment"

A CASE STUDY FOR *IN SITU* SOIL BLENDING WITH PERMANGANATE TO TREAT TCE AND DCE IN CLAY AT A FORMER INDUSTRIAL SITE

Project Location
Former Industrial Site
Midwest US

Contaminants
Trichloroethene (TCE)
Dichloroethene (DCE)

Product Used
Permanganate (RemOx® S)

Scope and Media
ISCO Soil Blending in Clay

Results
TCE↓ non-detect
DCE↓ non-detect

A full scale implementation of *in situ* soil blending was completed during summer 2015. Redox Tech's proprietary soil blending equipment was used to treat clay that was impacted with TCE and daughter products at a former industrial site. *In situ* soil blending was selected over soil stabilization and dig and haul because it was less expensive and provides permanent treatment.

BACKGROUND

Past solvent management practices at the site resulted in soil and groundwater impacts with TCE and DCE. The soil is glacial till with interbedded sand layers. Soil vapor extraction had been utilized to treat the soil, but it did not completely eliminate the source area. Dig and haul had also been used to removed a small portion of the impacted soil. The impacted soil was limited to two areas. One was inside the footprint of the building and the other was along the edge of the building, and was both inside and outside. Figure 1 shows the area extent of impact soil above 750 ppb, as well as some pre-treatment contaminant levels. The impacted soil was between 2 feet and 25 feet below surface. The mass of soil for treatment in the respective areas was 420 and 16,250 tons of soil. Carus Corporations remediation potassium permanganate (Remox® S) was selected to treat the target contaminants in the soil.

APPLICATION AND RESULTS

A total of 167,800 pounds of potassium permanganate was used to treat the soil. The permanganate dose was 5 grams per Kg on average. Most of the soil was treated at 5 g/Kg, but the permanganate dose was varied for some cells to account for variation in contaminant levels. The individual treatment cells are shown in Figure 1. The permanganate was added to the soil in solid form, and makeup water was used to dissolve the permanganate in place. Blending the entire volume required 49 days in the field, which included site preparation and returning clean soil back to the area. The average amount of soil blended per day was 340 tons of soil. Soil sampling was completed by collecting soil samples with an excavator bucket within the cell. At least one confirmatory sample was collected in each cell, and at varying depths. All samples showed non-detectable levels of chlorinated solvents after treatment. Figures 2 and 3 are photos taken during the blending process. The blending was completed until a uniform purple color was achieved within the cell.

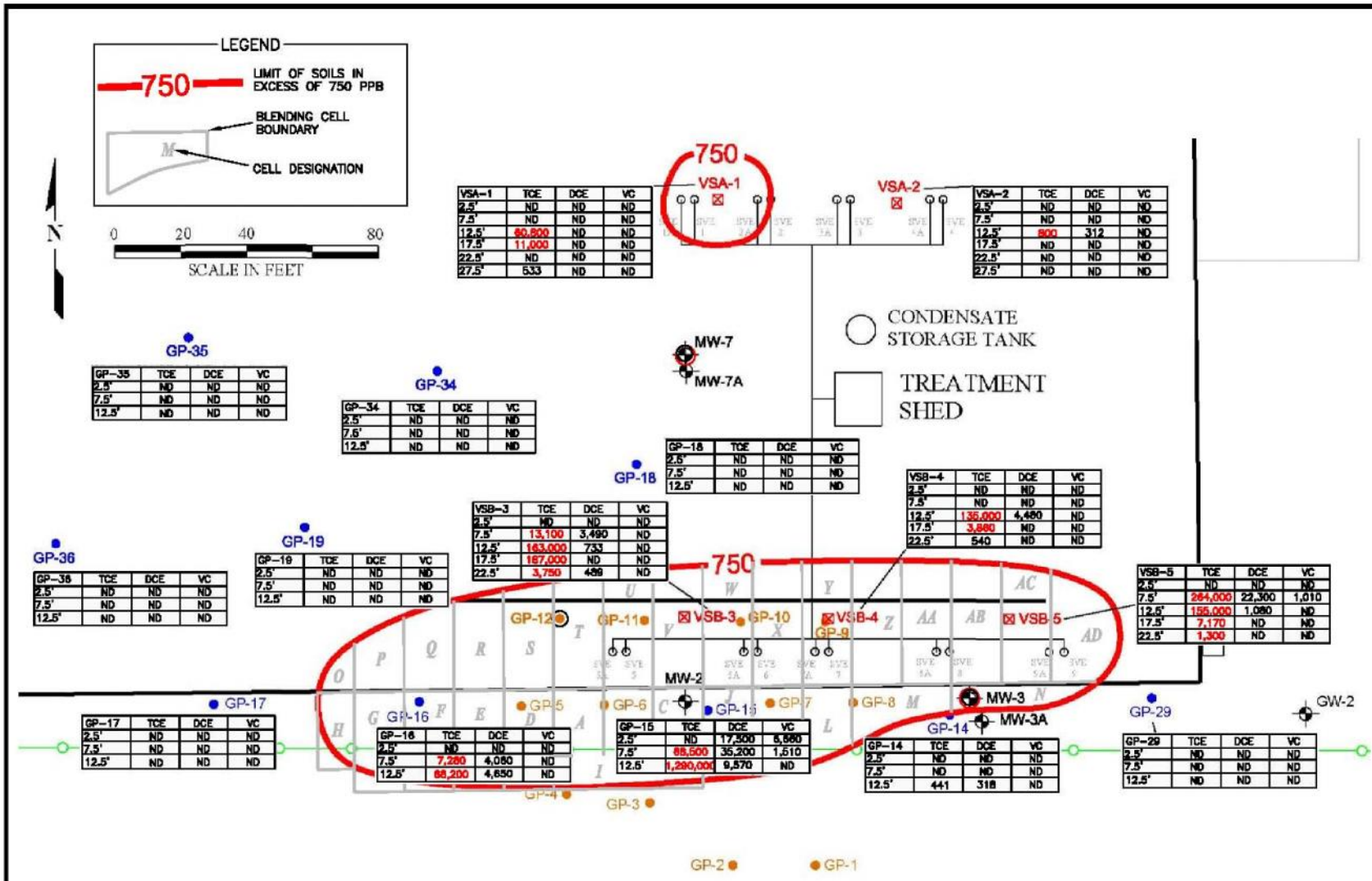

FIGURE 1. PRE-BLEND SOIL CONCENTRATION AND BLENDING CELLS.

Figure 2. Shallow soil Blending

Figure 3. Deep Soil Blending

SAFETY DATA SHEET

1. Identification

Product identifier	**RemOx® S ISCO Reagent**
Other means of identification	Not available.
Recommended use	Remediation of soils and groundwater.
Recommended restrictions	Use in accordance with supplier's recommendations.

Manufacturer / Importer / Supplier / Distributor information

Manufacturer/Supplier	CARUS CORPORATION
Address	315 Fifth Street, Peru, IL 61354, USA
Telephone	815 223-1500 - All other non-emergency inquiries about the product should be directed to the company
E-mail	salesmkt@caruscorporation.com
Website	www.caruscorporation.com
Contact person	Dr. Chithambarathanu Pillai
Emergency Telephone	For Hazardous Materials [or Dangerous Goods] Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC at CHEMTREC®, USA: 001 (800) 424-9300 CHEMTREC®, Mexico (Toll-Free - must be dialed from within country): 01-800-681-9531 CHEMTREC®, Other countries: 001 (703) 527-3887

2. Hazard(s) identification

Physical hazards	Oxidizing solids	Category 2
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1B
	Specific target organ toxicity, single exposure	Category 1 (Respiratory System)
	Specific target organ toxicity, repeated exposure	Category 1 (Respiratory System, central nervous system)

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement May intensify fire; oxidizer. Harmful if swallowed. Causes severe skin burns and eye damage. Causes damage to organs (Respiratory System). Causes damage to organs (Respiratory System, central nervous system) through prolonged or repeated exposure.

Precautionary statement

Prevention Keep away from heat. Take any precaution to avoid mixing with combustibles/ Keep/Store away from clothing//combustible materials. Wash thoroughly after handling. Do not breathe dust. Wear protective gloves/protective clothing/eye protection/face protection. Do not eat, drink or smoke when using this product.

Response In case of fire: Use water for extinction. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) Not classified.

Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 1

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
Potassium permanganate		7722-64-7	> 97.5

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. For breathing difficulties, oxygen may be necessary. Get medical attention immediately.

Skin contact Take off immediately all contaminated clothing. Immediately flush skin with plenty of water. Get medical attention immediately. Wash contaminated clothing before reuse.

Contact with skin may leave a brown stain of insoluble manganese dioxide. This can be easily removed by washing with a mixture of equal volume of household vinegar and 3% hydrogen peroxide, followed by washing with soap and water.

Eye contact Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyelids wide apart. Continue rinsing. Get medical attention immediately.

Ingestion Immediately rinse mouth and drink plenty of water. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention immediately.

Most important symptoms/effects, acute and delayed Contact with this material will cause burns to the skin, eyes and mucous membranes. Permanent eye damage including blindness could result.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. In case of shortness of breath, give oxygen. Decomposition products are alkaline. Brown stain is insoluble manganese dioxide.

General information In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Flood with water from a distance, water spray or fog.

Unsuitable extinguishing media The following extinguishing media are ineffective: Dry chemical. Foam. Carbon dioxide (CO2). Halogenated materials.

Specific hazards arising from the chemical May intensify fire; oxidizer. May ignite combustibles (wood, paper, oil, clothing, etc.). Contact with incompatible materials or heat (135 ºC / 275 ºF) could result in violent exothermic chemical reaction. Oxidizing agent, may cause spontaneous ignition of combustible materials. By heating and fire, corrosive vapors/gases may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.

Fire-fighting equipment/instructions Move container from fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Dike fire control water for later disposal. Water runoff can cause environmental damage.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep upwind. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Avoid inhalation of vapors and contact with skin and eyes. Wear protective clothing as described in Section 8 of this safety data sheet. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up

Keep combustibles (wood, paper, oil, etc.) away from spilled material. Should not be released into the environment. This product is miscible in water. Stop leak if possible without any risk. Dike the spilled material, where this is possible. Clean up spills immediately by sweeping or shoveling up the material. Do not return spilled material to the original container; transfer to a clean metal or plastic drum. To clean up potassium permanganate solutions, follow either of the following two options:

Option # 1: Dilute to approximately 6% with water, and then reduce with sodium thiosulfate, a bisulfite or ferrous salt solution. The bisulfite or ferrous salt may require some dilute sulfuric acid (10% w/w) to promote reduction. Neutralize with sodium carbonate to neutral pH, if acid was used. Decant or filter and deposit sludge in approved landfill. Where permitted, the sludge may be drained into sewer with large quantities of water.

Option # 2: Absorb with inert media like diatomaceous earth or inert floor dry, collect into a drum and dispose of properly. Do not use saw dust or other incompatible media. Disposal of all materials shall be in full and strict compliance with all federal, state, and local regulations pertaining to permanganates.

To clean contaminated floors, flush with abundant quantities of water into sewer, if permitted by federal, state, and local regulations. If not, collect water and treat as described above.

Never return spills in original containers for re-use. For waste disposal, see Section 13 of the MSDS.

Environmental precautions

Do not allow to enter drains, sewers or watercourses. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and storage

Precautions for safe handling

Take any precaution to avoid mixing with combustibles. Keep away from clothing and other combustible materials. Do not get this material in your eyes, on your skin, or on your clothing. Do not breathe dust or mist or vapor of the solution. If clothing becomes contaminated, remove and wash off immediately. When using, do not eat, drink or smoke. Good personal hygiene is necessary. Wash hands and contaminated areas with water and soap before leaving the work site. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Store locked up. Keep container tightly closed and in a well-ventilated place. Store in a cool, dry place. Store away from incompatible materials (See Section 10). Follow applicable local/national/international recommendations on storage of oxidizers. Store in accordance with NFPA 430 requirements for Class II oxidizers.

Before using, read Material Safety Data Sheet (MSDS) for this product.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Potassium permanganate (CAS 7722-64-7)	Ceiling	5 mg/m3

US. ACGIH Threshold Limit Values

Components	Type	Value
Potassium permanganate (CAS 7722-64-7)	TWA	0.2 mg/m3

US NIOSH Pocket Guide to Chemical Hazards: Recommended exposure limit (REL)

Components	Type	Value	Form
Potassium permanganate (CAS 7722-64-7)	TWA	1 mg/m3	Fume.

US NIOSH Pocket Guide to Chemical Hazards: Short Term Exposure Limit (STEL)

Components	Type	Value	Form
Potassium permanganate (CAS 7722-64-7)	STEL	3 mg/m3	Fume.

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

Follow standard monitoring procedures.

Appropriate engineering controls

Provide adequate general and local exhaust ventilation. An eye wash and safety shower must be available in the immediate work area.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles). Wear face shield if there is risk of splashes.

Skin protection

Hand protection	Use protective gloves made of: Rubber or plastic. Suitable gloves can be recommended by the glove supplier.
Other	Wear chemical-resistant, impervious gloves.
Respiratory protection	In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA 29 CFR 1910.134. Measurement Element: Manganese (Mn) 10 mg/m3 Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100 or P100. Any supplied-air respirator. 25 mg/m3 Any supplied-air respirator operated in a continuous-flow mode. Any powered, air-purifying respirator with a high-efficiency particulate filter. 50 mg/m3 Any air-purifying, full-face piece respirator equipped with an N100, R100, or P100 filter. Any supplied-air respirator with a tight-fitting face piece that is operated in a continuous-flow mode. Any powered, air-purifying respirator with a tight-fitting face piece and a high-efficiency particulate filter. Any self-contained breathing apparatus with a full face piece. Any supplied-air respirator with a full face piece. 500 mg/m3 Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode. Emergency or planned entry into unknown concentrations or IDLH conditions - Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode. Escape Any air-purifying, full-face piece respirator equipped with an N100, R100, or P100 filter. Any appropriate escape-type, self-contained breathing apparatus.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	When using, do not eat, drink or smoke. Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance	Dark purple solid with metallic luster.
Physical state	Solid.
Form	Solid.
Color	Dark purple.
Odor	Odorless.
Odor threshold	Not available.
pH	Not applicable.
Melting point/freezing point	Starts to decompose with evolution of oxygen (O2) at temperatures above 150 °C. Once initiated, the decomposition is exothermic and self sustaining.
Initial boiling point and boiling range	Not applicable.
Flash point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non flammable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not applicable.
Flammability limit - upper (%)	Not applicable.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure	Not applicable.
Vapor density	Not applicable.
Relative density	2.7 (20 °C) (Water = 1)
Solubility(ies)	6 % (20 °C) 20 % (65 °C)
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not applicable.
Other information	
Explosive properties	Not explosive. Can explode in contact with sulfuric acid, peroxides and metal powders.
Molecular weight	158.03
Oxidizing properties	Strong oxidizing agent.

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions.
Possibility of hazardous reactions	Contact with combustible material may cause fire. Can explode in contact with sulfuric acid, peroxides and metal powders. Starts to decompose with evolution of oxygen (O2) at temperatures above 150 °C. Once initiated, the decomposition is exothermic and self sustaining.
Conditions to avoid	Contact with incompatible materials or heat (135 °C / 275 °F) could result in violent exothermic chemical reaction.
Incompatible materials	Acids. Peroxides. Reducing agents. Combustible material. Metal powders. Contact with hydrochloric acid liberates chlorine gas.
Hazardous decomposition products	By heating and fire, corrosive vapors/gases may be formed.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Harmful if swallowed.
Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Symptoms related to the physical, chemical and toxicological characteristics	Contact with this material will cause burns to the skin, eyes and mucous membranes. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity Harmful if swallowed.

Components	Species	Test Results
Potassium permanganate (CAS 7722-64-7)		
Acute		
Oral		
LD50	Rat	780 mg/kg, 14 days, (Male) 525 mg/kg, 14 days, (Female)

Skin corrosion/irritation	Causes severe skin burns.
Serious eye damage/eye irritation	Causes serious eye damage.
Respiratory sensitization	Not classified.
Skin sensitization	Not classified.
Germ cell mutagenicity	Not classified.
Carcinogenicity	Not classified.
Reproductive toxicity	Not classified.
Specific target organ toxicity - single exposure	Causes damage to organs (respiratory system).

Specific target organ toxicity - repeated exposure	Causes damage to organs (respiratory system, central nervous system) through prolonged or repeated exposure.
Aspiration hazard	Not classified.
Chronic effects	May cause damage to respiratory system. Prolonged exposure, usually over many years, to manganese oxide fume/dust can lead to chronic manganese poisoning, chiefly affecting the central nervous system.
Further information	No other specific acute or chronic health impact noted.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Components		Species	Test Results
Potassium permanganate (CAS 7722-64-7)			
Aquatic			
Fish	LC50	Bluegill (Lepomis macrochirus)	2.7 mg/l, 96 hours, static
			2.3 mg/l, 96 hours, flow through
			2.3 mg/l, 96 hours
			1.8 - 5.6 mg/l
		Carp (Cyprinus carpio)	3.16 - 3.77 mg/l, 96 hours
			2.97 - 3.11 mg/l, 96 hours
		Goldfish (Carassius auratus)	3.3 - 3.93 mg/l, 96 hours, static
		Milkfish, salmon-herring (Chanos chanos)	> 1.4 mg/l, 96 hours
		Rainbow trout (Oncorhynchus mykiss)	1.8 mg/l, 96 hours
			1.08 - 1.38 mg/l, 96 hours
			0.77 - 1.27 mg/l, 96 hours
		Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.275 - 0.339 mg/l, 96 hours

Persistence and degradability	Expected to be readily converted by oxidizable materials to insoluble manganese oxide.
Bioaccumulative potential	Potential to bioaccumulate is low.
Mobility in soil	Not available.
Mobility in general	The product is water soluble and may spread in water systems.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	D001: Ignitable waste The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Do not allow this material to drain into sewers/water supplies. Dispose in accordance with all applicable regulations.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Rinse container at least three times to an absence of pink color before disposing. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1490
UN proper shipping name	Potassium permanganate
Transport hazard class(es)	5.1
Subsidiary class(es)	-
Packing group	II
Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.
Labels required	5.1
Special provisions	IB8, IP2, IP4, T3, TP33
Packaging exceptions	152
Packaging non bulk	212
Packaging bulk	240

IATA

UN number	UN1490
UN proper shipping name	Potassium permanganate
Transport hazard class(es)	5.1
Subsidiary class(es)	-
Packaging group	II
Environmental hazards	Yes
Labels required	5.1
ERG Code	5L
Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.

IMDG

UN number	UN1490
UN proper shipping name	POTASSIUM PERMANGANATE
Transport hazard class(es)	5.1
Subsidiary class(es)	-
Packaging group	II
Environmental hazards	
Marine pollutant	Yes
Labels required	5.1
EmS	F-H, S-Q
Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code This substance/mixture is not intended to be transported in bulk.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

CERCLA/SARA Hazardous Substances - Not applicable.

Drug Enforcement Administration (DEA) (21 CFR 1310.02 (b) 8: List II chemical.

Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (6 CFR 27, Appendix A): Listed.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
SARA 302 Extremely hazardous substance	No
SARA 311/312 Hazardous chemical	Yes

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Potassium permanganate (CAS 7722-64-7)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)	Hazardous substance
Safe Drinking Water Act (SDWA)	Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Potassium permanganate (CAS 7722-64-7) 6579

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Potassium permanganate (CAS 7722-64-7) 15 % wt

DEA Exempt Chemical Mixtures Code Number

Potassium permanganate (CAS 7722-64-7) 6579

Food and Drug Administration (FDA) Not regulated.

US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

California OSH Hazardous Substance List: Listed.

US. Massachusetts RTK - Substance List

Potassium permanganate (CAS 7722-64-7)

US. New Jersey Worker and Community Right-to-Know Act

Potassium permanganate (CAS 7722-64-7) 500 lbs

US. Pennsylvania RTK - Hazardous Substances

Potassium permanganate (CAS 7722-64-7)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 04-03-2013

Revision date -

Version # 01

Further information Not available.

List of abbreviations LD50: Lethal Dose, 50%.
LC50: Lethal Concentration, 50%.

References HSDB® - Hazardous Substances Data Bank
Registry of Toxic Effects of Chemical Substances (RTECS)
ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices

Disclaimer

This safety data sheet was prepared in accordance with the Safety Data Sheet for Chemical Products (JIS Z 7250:2005). The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. CARUS CORPORATION DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. CARUS CORPORATION MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTIABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Carus Corporation, and shall be the sole responsibility of the holder or user of the product.

APPENDIX B

HEALTH AND SAFETY PLAN

Health and Safety Plan
for
Brownfield Remedial Investigation

Moyer Carriage Lofts

1714 North Salina Street
(SBL 002.-03-05.0)
Syracuse, Onondaga County, New York

Site No. TBD

Prepared by

C&S Engineers, Inc.
499 Colonel Eileen Collins Boulevard
Syracuse, New York 13212

September 2020

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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 Moyer Carriage Lofts Site located at 1714 North Salina Street in Syracuse, Onondaga 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.

DISCLAIMER

This document addresses 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. Every contractor is expected to prepare and implement their own site-specific health and safety plan. This document may be used as a general outline to inform the creation of other health and safety plans for this NYSDEC Brownfield site.

Responsibilities

Project Manager and H&S Manager…….	Matt Walker Phone: (315) 703-4323 Cell: (315) 200-5872
Site Health and Safety Officer……..	Jordan Berti Phone: (315) 703-4349 Cell: (315) 657-6202
Emergency Coordinator…….	Jordan Berti Phone: (315) 703-4349 Cell: (315) 657-6202

Emergency Phone Numbers

Emergency Medical Service.....911

Police: Onondaga County Sheriff or NYS Police 911

Fire: Syracuse Fire Department.....911

Hospital: Upstate Medical University .....(315) 464-4276

National Response Center .....(800) 424-8802

Poison Control Center .....(800) 222-1222

Center for Disease Control.....(800) 311-3435

NYSDEC Region 7 (Syracuse, New York) .....(315) 426-7400

C&S Engineers.....(315) 455-2000

Site Superintendent .....**TBD**

Project Field Office Trailer .....**TBD**

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 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 Moyer Carriage Lofts Site (Site) is located at 1714 North Salina Street in the City of Syracuse, Onondaga County, New York. The Site includes five brick and block buildings which account for approximately 204,964 square feet of gross building space. The buildings were constructed sometime before 1892 until 1956. The Site is approximately 2.12 acres in size, which includes a parking lot along the northwestern side of the Site buildings. The buildings are currently vacant and in a distressed condition.

The Site is located in the Syracuse North Side community. The Site is located within the Hiawatha - Lodi (Hi-Lo) Brownfield Opportunity Areas (BOA). The site is bounded to the north by Park Street, to the south by North Salina Street, east by Wolf Street, and west by Exchange Place. Properties surrounding the Site are commercial and industrial facilities.

Figure 1 shows the location of the Site and Figure 2 shows the Project Area and Site Boundaries.

Site History and Suspect Recognized Environmental Conditions

The Property has been used for industrial and commercial purposes since it was first developed prior to 1892 as the Moyer Carriage Factory (a.k.a. Moyer Automobile Company). Site operations included carriage and vehicle manufacturing. Between 1912 and 1958, the Site was home to the Porter Cable Company for use as a tool manufacturing facility. From 1958 to 2012, the Site was owned and operated by Penfield Mattress Company. Site operations included machining, plating as well as parts and equipment cleaning. In 2012, the Site was purchased by G&K Trucking, LLC. The site is currently unoccupied and only partially used for material storage.

The soil across the Site generally consists of historic fill extending to two feet bgs. Consistent with historic fill found in cities in the Northeast US, this historic fill contains SVOC and metal contamination, as shown in recent sampling. No discrete contamination layer was observed within the fill, and therefore, the extent of contamination within the fill material is difficult to identify due to its heterogeneous nature. The latitudinal extent of the fill appears to comprise nearly the entire extent of the exposed Site, which is approximately 0.83 acres (36,500 square feet) or 2,704 cubic yards of material.

In addition to impacts identified within the historic fill, there is a potential for petroleum related impacts in the soil surrounding the abandoned 10,000-gallon USTs. There is also a potential for historic fill to be present beneath the building footprint. Impacts related to historic fill beneath the building footprint and abandoned tanks will be documented as part of the Remedial Investigation.

Impacts to groundwater will be documented as part of the Remedial Investigation.

SECTION 4 - HAZARD ASSESSMENT AND HAZARD COMMUNICATION

Hazards to workers during 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, 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 Remedial Measures

During Remedial Measures (RM), 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 RM 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 remedial 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: ..... Jordan Berti .....Cell Phone: (315) 657-6202

The Emergency Coordinator or his on-site designee will, in concert with the Volunteer, 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 (see Appendix C of the RIWP) 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.

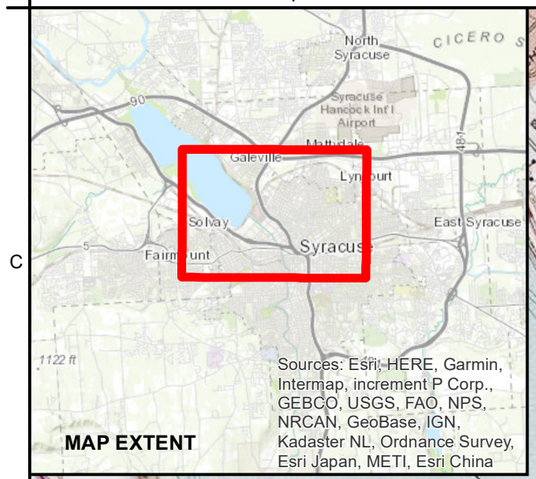
During completion of Site investigation, a community air monitoring plan meeting the requirements of the site's Community Air Monitoring Plan will be implemented for the duration of intrusive activities. These additional air monitoring activities will include establishment of background conditions, continuous 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



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China

Site

NAD 1983 CORS96 StatePlane New York Central FIPS 3102 Ft US
Projection: Transverse Mercator
Datum: NAD 1983 CORS96
False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
Scale Factor: 0.9999
Latitude Of Origin: 40.0000
Units: Foot US

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499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667
www.cscos.com

N

0 2,000 Feet
1 inch = 2,000 feet

Brownfield Cleanup Program
Remedial Investigation Work Plan (RIWP)
for
Moyer Carriage Lofts
Syracuse, Onondaga County, New York

PROJECT NO:	W96.001.002
DATE:	September 2020
SCALE:	AS SHOWN
DRAWN BY:	JTB
DESIGNED BY:	JTB
CHECKED BY:	MLW

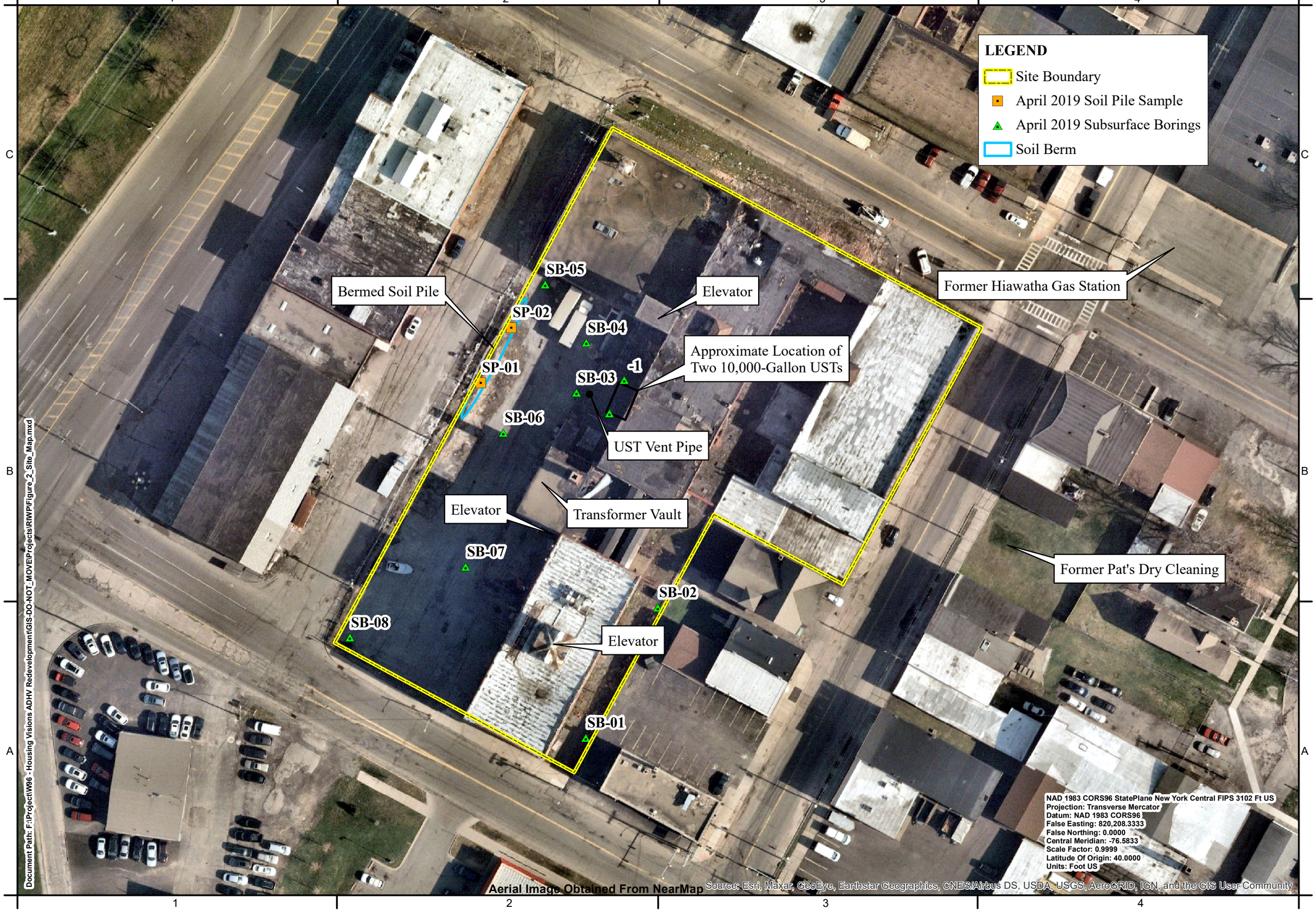
Modified: 9/14/2020 @ 12:33:27 PM

SITE LOCATION

Figure 1

FIGURE 2

SITE MAP



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N

0 50 Feet
1 inch = 60 feet

Brownfield Cleanup Program
Remedial Investigation Work Plan (RIWP)
for
Moyer Carriage Lofts
Syracuse, Onondaga County, New York

PROJECT NO:	W96.001.002
DATE:	March 2021
SCALE:	AS SHOWN
DRAWN BY:	JTB
DESIGNED BY:	JTB
CHECKED BY:	MLW

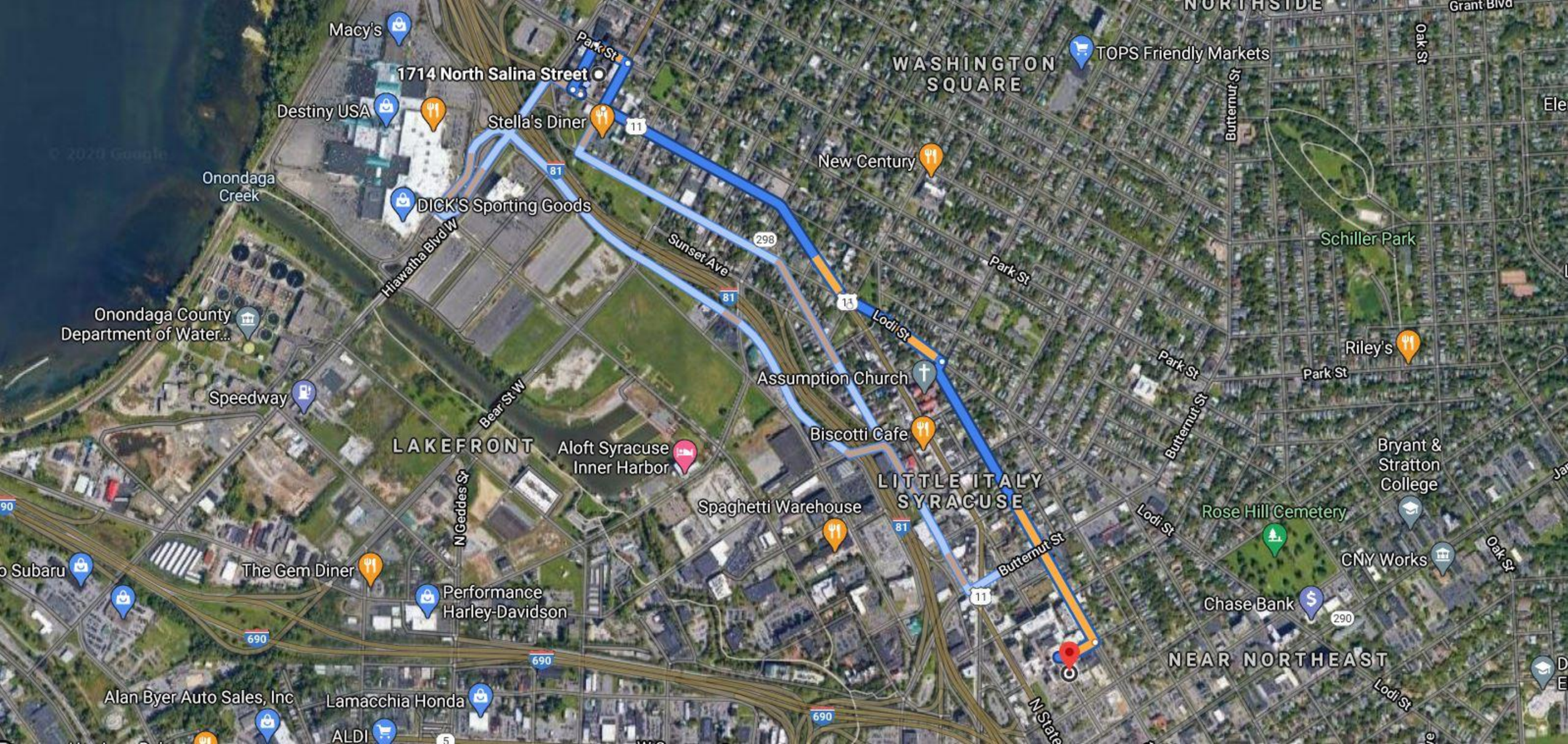
Modified: 3/12/2021 @ 7:36:20 AM

SITE MAP

Figure 2

ATTACHMENT A

MAP TO HOSPITAL


1714 North Salina Street
Macy's
Destiny USA
Stella's Diner
TOPS Friendly Markets
WASHINGTON SQUARE
NORTHSIDE
New Century
DICK'S Sporting Goods
Onondaga Creek
Hiawatha Blvd W
Sunset Ave
Park St
Lodi St
Schiller Park
Riley's
Onondaga County Department of Water...
Speedway
Bear St W
Assumption Church
Biscotti Cafe
LAKEFRONT
Aloft Syracuse Inner Harbor
LITTLE ITALY
SYRACUSE
Spaghetti Warehouse
Butternut St
Bryant & Stratton College
Rose Hill Cemetery
CNY Works
Chase Bank
N Geddes St
The Gem Diner
Performance Harley-Davidson
NEAR NORTHEAST
Alan Byer Auto Sales, Inc
Lamacchia Honda
ALDI
Oak St
Grant Blvd
N State St

APPENDIX A

EXCAVATION / TRENCHING GUIDELINE

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

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• **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.

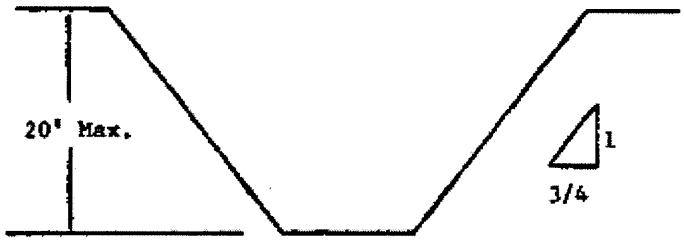
Figure B-1

Slope Configurations

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

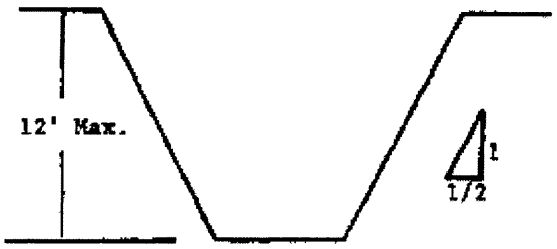
B-1.1 Excavations made in Type A soil.

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



SIMPLE SLOPE -- GENERAL

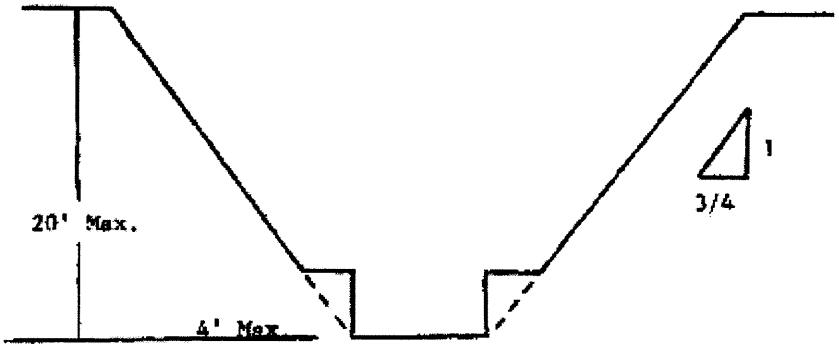
Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have maximum allowable slope of ½:1.



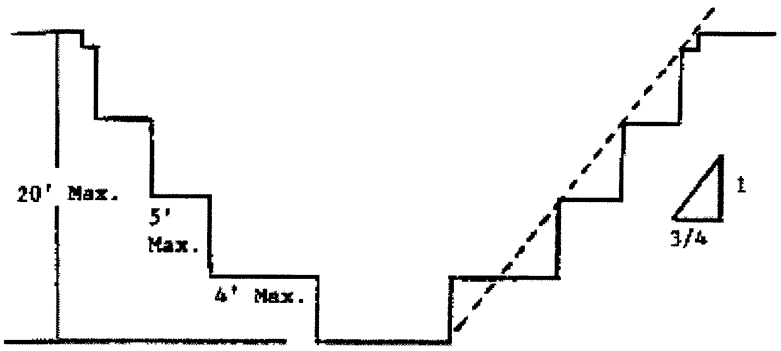
SIMPLE SLOPE -- SHORT TERM

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:

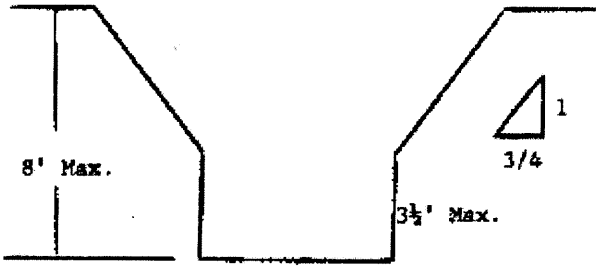


SIMPLE BENCH



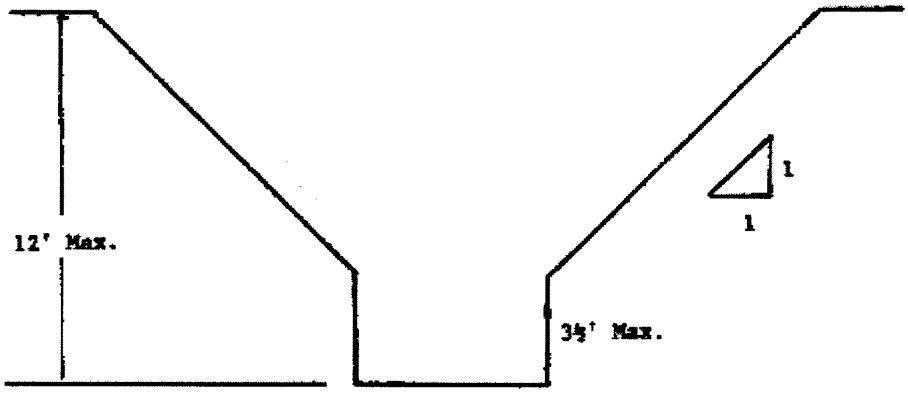
MULTIPLE BENCH

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



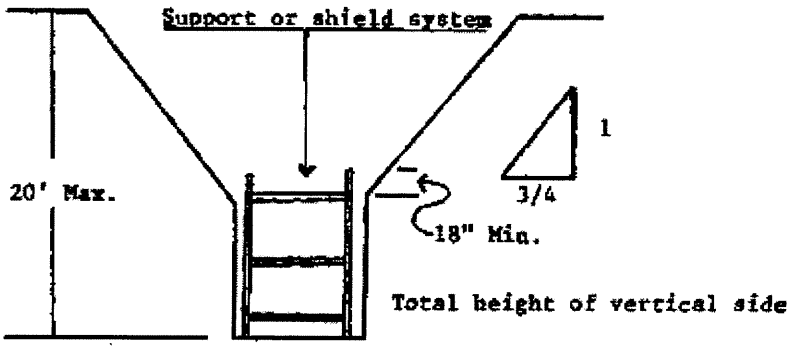
UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 8 FEET IN DEPTH)

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.

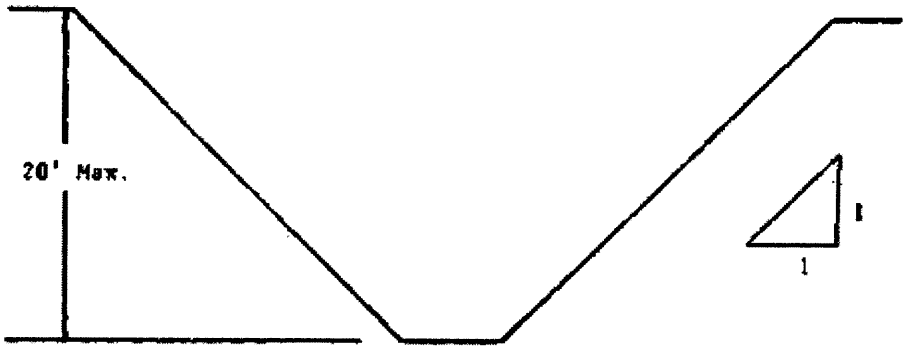


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

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).

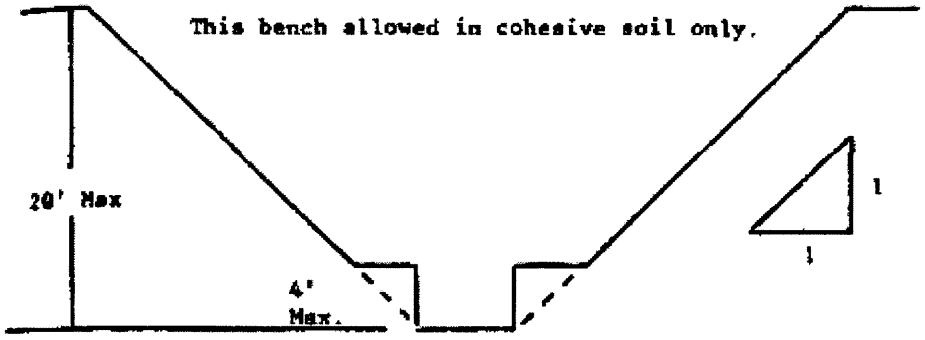
B-1.2 Excavations Made in Type B Soil

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

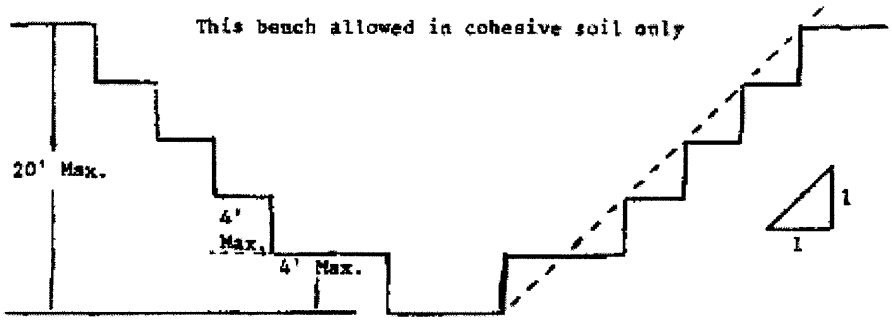


SIMPLE SLOPE

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

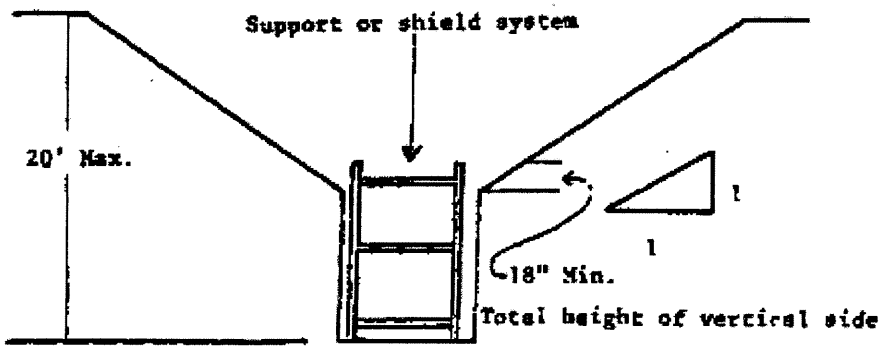


SINGLE BENCH



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.

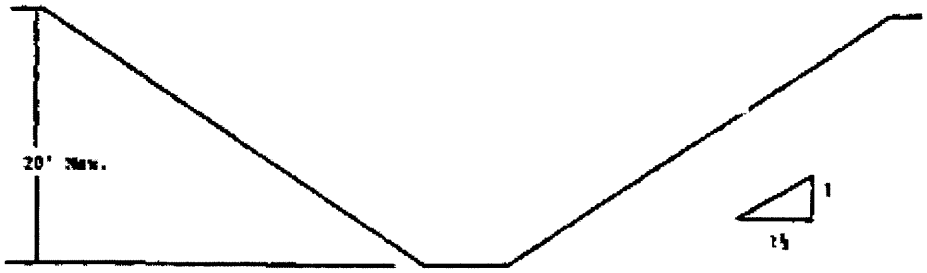


VERTICALLY SIDED LOWER PORTION

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

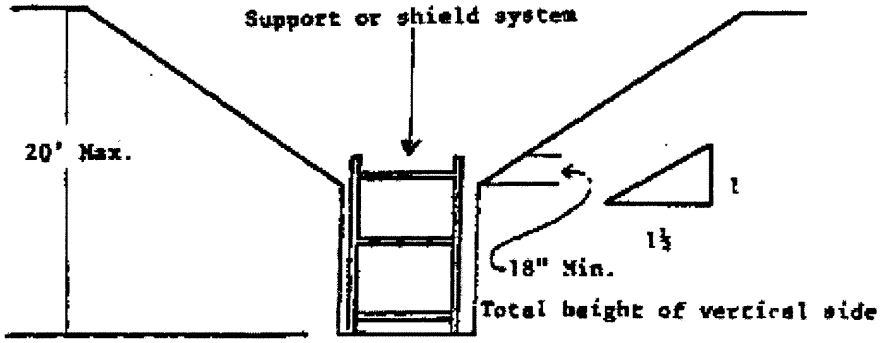
B-1.3 Excavations Made in Type C Soil

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.

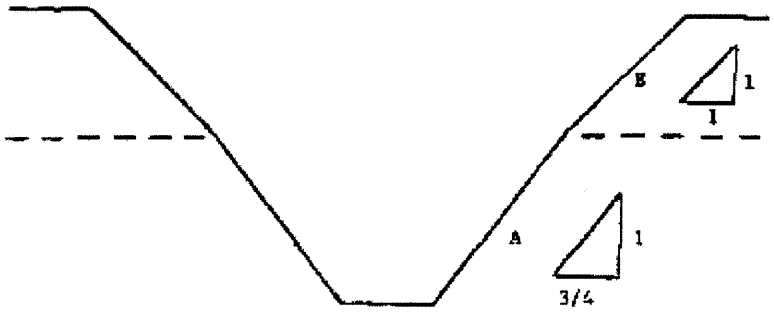


VERTICAL SIDED LOWER PORTION

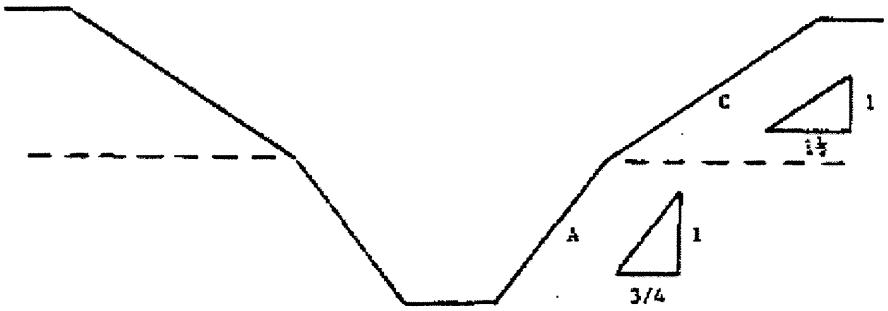
3. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

B-1.4 Excavations Made in Layered Soils

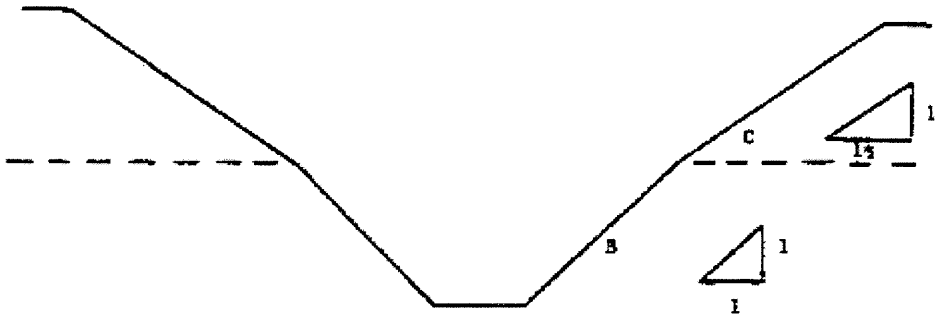
1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth b



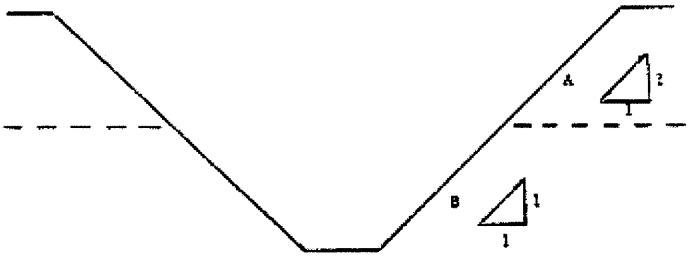
B OVER A



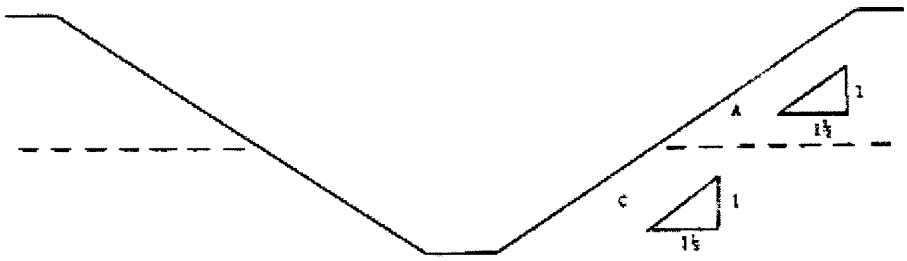
C OVER A



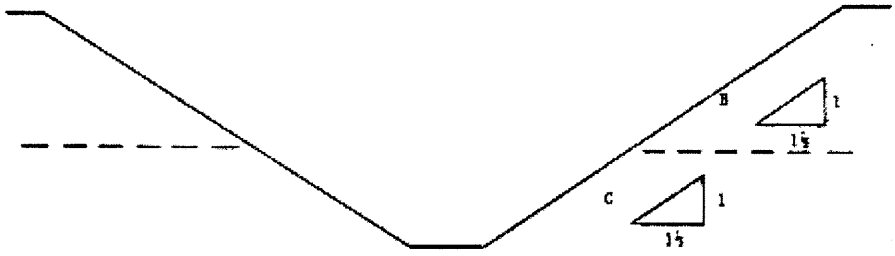
C OVER B



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).

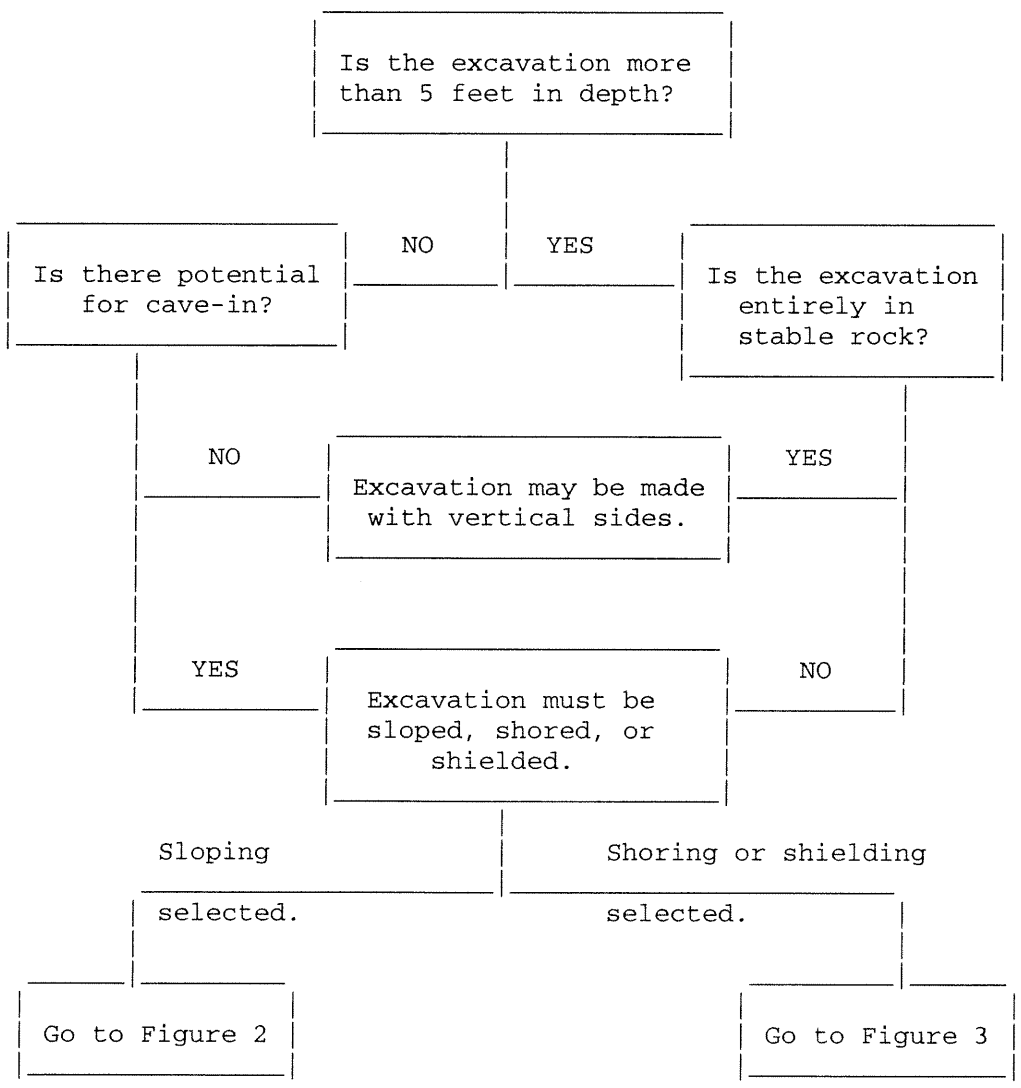


FIGURE 1 - PRELIMINARY DECISIONS

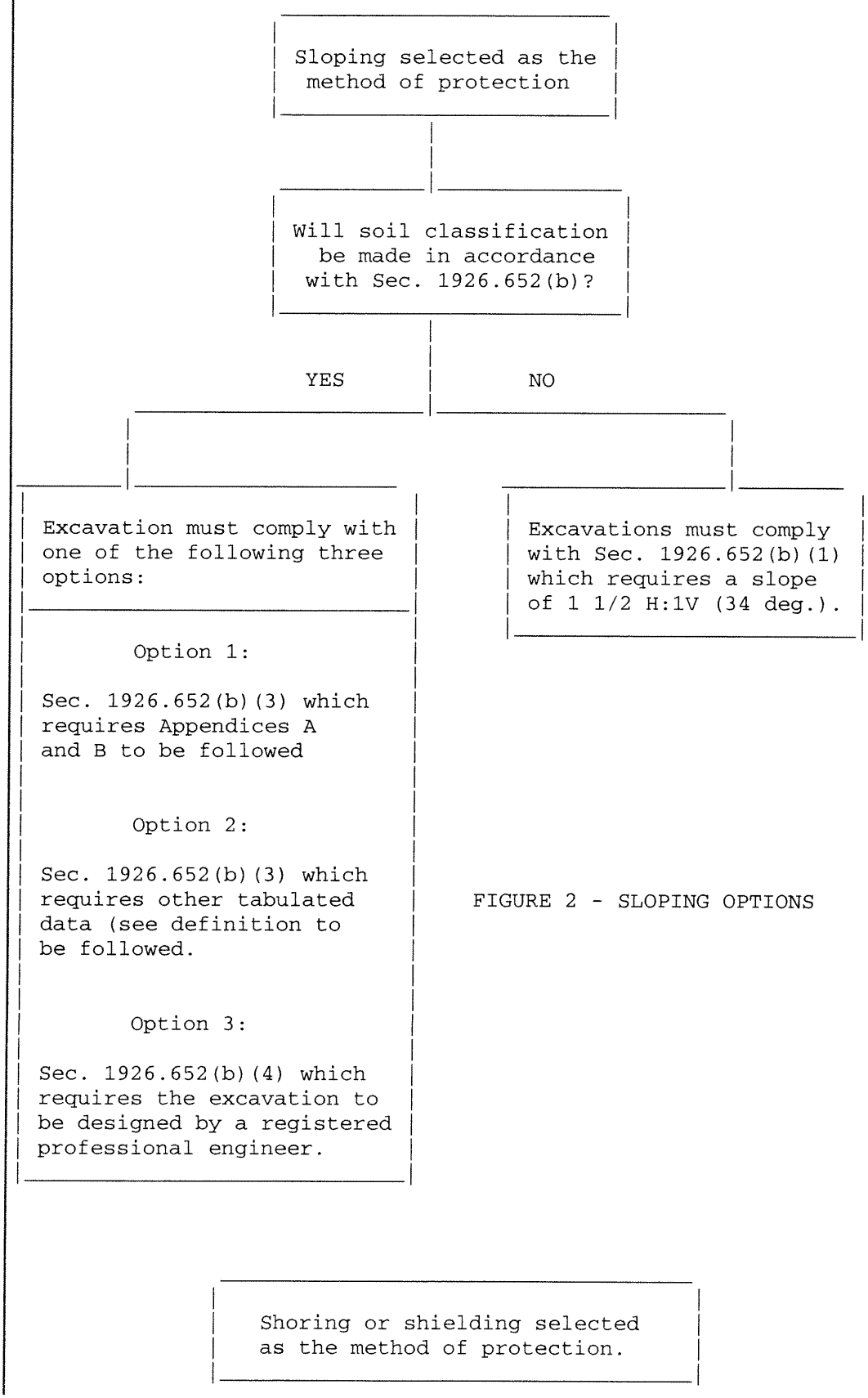


FIGURE 2 - SLOPING OPTIONS

Shoring or shielding selected as the method of protection.

Soil Classification is required when shoring or shielding is used. The excavation must comply with one of the following four options:

Option 1

Sec. 1926.652(c)(1) which requires Appendices A and C to be followed (e.g. timber shoring).

Option 2

Sec. 1926.652(c)(2) which requires manufacturers data to be followed (e.g. hydraulic shoring, trench jacks, air shores, shields).

Option 3

Sec. 1926.652(c)(3) which requires tabulated data (see definition) to be followed (e.g. any system as per the tabulated data).

Option 4

Sec. 1926.652(c)(4) which requires the excavation to be designed by a registered professional engineer (e.g. any designed system).

FIGURE 3 - SHORING AND SHIELDING OPTIONS

APPENDIX B

GUIDANCE ON INCIDENT INVESTIGATION

AND REPORTING

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.