



90 PERCENT DESIGN

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# 1 Introduction

On behalf of Emerson and its subsidiary, Emerson Power Transmission Corp. (EPT), WSP Engineering of New York, P.C. (WSP Engineering), has prepared this Remedial Design (RD) Report for Operable Unit (OU) No. 3 of the former Morse Industrial Corporation site (currently Emerson Power Transmission); the East Spencer Street Sewer Line Focused Excavation and Venting. This report details the activities that will be performed to implement the remedy for OU No. 3 as described in the Record of Decision issued by the New York Department of Environmental Conservation (NYSDEC) dated October 2010.

Specifically, the remedy will involve removing and replacing approximately 300 feet of the sanitary sewer line along East Spencer Street beginning at its intersection with Turner Place (Figures 1 and 2). The replacement line will be constructed using air-and water tight joints; the pipe bedding will comprise a highly permeable material to promote venting of soil vapor; and perforated pipe will be installed within the bedding material to collect and vent soil vapors which enter the bedding material. Following remedy construction a monitoring program will be implemented to evaluate and assess the performance of the remedy.

This report was prepared in accordance with an Administrative Order on Consent (Index #A7-0125-87-09) entered into by NYSDEC and EPT on July 13, 1987, and the NYSDEC Record of Decision dated October 2010. The report presents the design, pre-design investigation, the associated permitting, and planning elements required for implementation of the remedy.

## 1.1 REMEDIAL OBJECTIVES OU NO. 3

The remedial objectives are to address the three pathways identified for the potential migration of vapors associated with historical releases of volatile organic compounds (VOCs) from the sanitary sewer lines servicing the EPT facility. The potential vapor migration pathways include the following: (1) along the sanitary sewer lines; (2) along the residential sanitary sewer laterals; and (3) within the vertical and horizontal planes of porosity (fractured bedrock) surrounding the sewer lines. As detailed in the South Hill Sanitary Sewer Network Alternatives Analysis report dated September 3, 2009, results of investigations conducted showed that the highest concentration of TCE were detected in soil vapor along an approximate 300 foot length of sewer piping extending from the intersection of Turner Place and East Spencer Street at manhole MH-9, down East Spencer Street. This area is also where the highest TCE concentration was detected in sub slab soil vapor samples, and where the highest TCE concentrations were detected in vapor samples collected above two key fracture features that are present between Turner Place and East Spencer Street. This design report provides the following:

1. appropriate engineering design criteria for various remedial components
2. specific design information such as preliminary equipment selection

## 1.2 REPORT ORGANIZATION

This report has been prepared in accordance with the NYSDEC Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10) and is organized into nine sections. Section 1 describes the project, identifies the purpose of this report, and presents the report organization. Section 2 presents a description and history of the EPT facility, followed by a discussion of the site geology, hydrogeology, and an updated conceptual site model (CSM) for soil vapor migration. Section 3 describes the pre-design investigation activities and findings. Section 4 describes the elements to be undertaken related to implementing the remedy. System start-up and operation is described in Section 5. In Section 6, permits and approvals required to construct and operate the remedy in OU No. 3 are identified. Section 7 discusses health and safety during construction and operation of the remedy.



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Section 8 presents the proposed schedule for the implementation of the remedy and associated reports. Section 9 presents the technical references used for this document.



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## 2 Site Background

### 2.1 SITE LOCATION

The EPT facility occupies approximately 110 acres along South Aurora Street in the South Hill portion of the City of Ithaca, New York (Figure 1). The site elevation ranges from 450 to 720 feet above mean sea level (amsl). The facility consists of three main buildings along the northeast and southwest portions of South Hill which are at an elevation of approximately 600 feet amsl. The main building is flanked by a number of smaller buildings to the southwest and a series of access roads and parking lots for those which terrace the hillside above the plant to the east. Undeveloped woodland borders the site to the southwest along the steep embankments of the hill.

OU No. 3 comprises the South Hill neighborhoods and sewer lines to the north and west of the EPT site (Figure 2). The topography in this area drops off to the north at an approximately 40 percent grade toward Six Mile Creek. Residential structures are generally terraced into the steep hillside with some basements floors constructed directly on bedrock and for others a combination of bedrock and cut and fill. The portion of the South Hill sanitary sewer designated for replacement is approximately 1,250 feet north of the EPT facility at the intersection of Turner Place and East Spencer Street. There are residences along both sides of East Spencer Street. Six Mile Creek is to the north along the base of South Hill and eventually empties into Cayuga Lake approximately 2 miles northwest of OU-3.

### 2.2 SITE HISTORY

The original building at the EPT site was built in 1906 by Morse Industrial Corporation, which manufactured steel roller chain for the automobile industry. From approximately 1928 to 1983, Borg-Warner Corporation owned the property and manufactured automotive components and power transmission equipment. A more detailed description of the site history and construction dates of the various buildings at the site is detailed in the report entitled *Onsite Assessment of the Former Borg Warner – Morse Chain Facility* (ESC 2005). Up until the late 1970s, Borg-Warner Corporation used trichloroethene (TCE), a widely used solvent at the time, for degreasing metal parts. Solvents appear to have been flushed into the plant's sanitary sewer system which connects to the municipal sewer along Turner Place and Cayuga Street. It is believed that solvents leaked from the sewer system through cracks and joints. In addition, results of soil vapor sampling show that solvent releases have occurred from sewer lines originating at the former NCR facility located at 950 Danby Road (currently owned by South Hill Business Campus, LLC) and Therm, Inc., facility located at 100 Hudson Street Extension. The NCR sewer line extends across the south east portion of the EPT property, then north along South Aurora Street, west along Columbia Street, and connects to the sewer on Turner Place and East Spencer Street. The sewer line originating from the Therm facility connects to the South Aurora/Columbia Street sewer line, which in turn, connects to the sewer line along Turner Place and East Spencer Street.

In 1983, Emerson purchased Morse Industrial Corporation from Borg-Warner Corporation and became known as Emerson Power Transmission. EPT manufactured roller chain, bearings, and clutching for the power transmission industry until December 2010 when operations ceased. TCE was never used by EPT at the facility.

### 2.3 GEOLOGY AND HYDROGEOLOGY

OU No.3 lies on the northern limits of a dissected hill within the Cayuga Lake basin, which was formed in a former stream valley eroded and enlarged by the advance of glaciers. Underlying OU No. 3 is a thin, discontinuous veneer of glacial till and man-made fill. Soil depths generally increase with decreasing



elevation and eventually merge with glacio-lacustrine silt and clay that line the bottom of the valley floor below South Hill, near East Spencer Street.

Beneath the glacial till and fill material lies bedrock of the Ithaca Siltstone, a member of the Genesee Formation. The bedrock is typically well-cemented with beds ranging in thickness from 0.1 inch to 2.5 feet in thickness. Along Turner Place, the top of bedrock is found at depths of 2 feet to 7 feet below ground surface (bgs).

Groundwater flow within the overburden and underlying fractured bedrock generally mimics surface topography, which slopes to the northwest. Groundwater flow within the siltstone bedrock is significantly affected by the vertical and horizontal distribution of vertical joint sets and horizontal bedding plane fractures within the upper sections of bedrock. In areas where the soil cover is thin (i.e., steep slopes along Turner Place), the overburden or upper portion of fractured bedrock is not saturated. Along the middle section of Turner Place, groundwater is found in the upper section of fractured bedrock at depths between 15 and 21 feet bgs. Along sections of East Spencer and areas immediately north, alluvial deposits are encountered near the ground surface to 9 to 11 feet bgs.

## 2.4 SOUTH HILL SANITARY SEWER NETWORK - CONCEPTUAL SITE MODEL

This section provides an updated CSM for the South Hill sanitary sewer network. The CSM details the relationship between historical releases of VOCs (solvents) from the sanitary sewer lines on Turner Place, East Spencer Street, and South Cayuga Street and the associated transport pathways.

Two parallel municipal sanitary sewer lines extend north from the EPT site down Turner Place to a manhole near the intersection of Columbia Street. In addition, the sewer lines originating from the former NCR facility and that from the Therm facility connect to the same manhole on Turner Place. From this manhole the sewer lines continue down Turner Place and make a 90 degree turn west to continue along East Spencer Street (Figure 2). A third sewer line extends from the western portion of the EPT property north along South Cayuga Street. According to City utility drawings, the majority of the sanitary sewer lines along Turner Place and South Cayuga Street are trenched directly into the upper section of fractured bedrock and invert elevations range from approximately 5 to 7 feet bgs. In areas where the lines were installed less than 3 feet bgs, flowable fill (concrete) was used to increase the load capacity of the sewer lines.

The sewer lines along Turner Place, East Spencer Street and South Cayuga Street have been identified as historical sources of releases of VOCs to the subsurface. Based on a review of historical information, solvent discharges to the municipal sewers likely occurred over a number of years during Borg Warner's ownership and ceased in the late 1970's. Also, investigations conducted by the NYSDEC suggest that solvents were discharged to the sanitary sewer system of both the former NCR facility and Therm facility. Each of these systems historically discharged in a westerly direction to the Columbia Street sewer line and then to the Turner Place sewer line. The sewer line has since been modified by the City of Ithaca such that only overflow conditions result in discharges into the Columbia Street sewer line. Releases from these sewers can be conceptualized as leaking through cracks and joints of an aging system that migrated and flowed along the surrounding bedding material, where present, or directly into the fractured bedrock (Figure 3). Subsequently, VOC-containing wastewater which seeped into the fractured bedrock continued to migrate into the deeper sediment filled fractures (joints and bedding planes) in bedrock or was held by capillary forces within the pore spaces. VOCs in the sediment filled fractures subsequently volatilize into the gaseous phase and are transported by diffusion both vertically and laterally (based on a pressure differential) through the fractures and along the sewers, eventually reaching the basement of some homes within the South Hill area. VOC vapor migration within identified bedrock features is evident particularly along East Spencer Street where vapors have migrated through vertical bedrock features identified during geophysical testing, into the subsurface beneath some homes as indicated by sub-slab vapor sample results. The results of sub-slab vapor testing for four homes in this area indicated the need





for mandatory mitigation based on the soil vapor/indoor air matrix presented in the New York State Department of Health's (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006. In addition, some of the highest levels of TCE in soil gas were detected in samples collected directly above the sanitary sewer line that extends along East Spencer Street.



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## 3 Pre-Design Investigations

A pre-design investigation was conducted to obtain information on the locations of subsurface utilities in the targeted remedy area and the construction of the retaining wall abutting the east side of East Spencer Street. The scope and results of the investigation are discussed below.

### 3.1 SURVEY

A registered land surveyor was retained to survey the locations of the existing sewer manholes and other landmarks in the vicinity of the project. The survey covered the targeted remedy area at the base of Turner Place and East Spencer Street. Detailed coordinates were gathered for the sections of sewer to be replaced. For the purposes of this design, the sewer segment between manhole MH-9 located on Turner Place and the abandoned manhole MH-18 is referred to as Section 1 while that between the proposed replacement for MH-18 and MH-17 is referred to as Section 2. Based on historic data obtained from the City of Ithaca, the existing manhole MH-18 was partially abandoned by removing the top sections of the structure and restoring the street without an access cover. In order to accurately measure the location of this manhole, the City of Ithaca inserted a camera through MH-11 and measured the horizontal distance to the abandoned manhole. The survey extended to the residence located on corner of East Spencer Street and Turner Place; the findings confirmed that the sewer line extends on City property parallel to the boundary of the residence. The storm sewer and water lines were located and marked in consultation with the City of Ithaca Department of Public Works (DPW). The gas line was marked in consultation with New York State Electric & Gas (NYSEG).

### 3.2 VACUUM EXCAVATION ALONG THE EAST SPENCER STREET

On March 15, 2011 vacuum excavations were completed at five (5) locations along East Spencer Street to obtain information in support of the remedial design. Three (3) excavations were completed adjacent to retaining wall on East Spencer Street to ascertain the base material and construction of the footer for the retaining wall and two (2) were along the segment of the sewer to be replaced to document the thickness of overburden. Vacuum excavation was completed using a high vacuum and high pressure air, (air-knifing) system.

The footer and base material of the retaining wall were uncovered at three locations designated FT1, FT2, and FT3. The vacuum excavation locations and the base material encountered in the one foot wide excavations are depicted in Appendix A, Sheet 3. At location FT1, the excavation was completed to a depth of three feet below ground surface and bedrock was not observed. The excavated materials at this location comprised tightly packed soil and stone. At location FT2, six inches of tightly packed soil and rock was between the bottom of the retaining wall footer and the top of the bedrock. At location FT3, the retaining wall footer was poured directly on top of bedrock. The three excavations along the retaining wall were backfilled using the removed soil and were compacted using a hand tamping device.

Two excavations designated TP1 and TP2 were advanced to bedrock on East Spencer Street (Appendix A, Sheet 3). At each location one foot by one foot holes were jackhammered through the asphalt and soils were excavated to the top of bedrock. TP1 was located approximately 6 feet north of the end of Section 2 between the water main and sanitary sewer line. Bedrock was encountered 24-inch below ground surface. The sewer line and water line are present in separate trenches excavated into the bedrock at this location on the southern end of East Spencer Street. TP2 was excavated five feet north of proposed MH-18 (Appendix A, Sheet 3) to a depth of 76-inches where bedrock was encountered. At this location the sewer line was present in a shallow trench cut into the bedrock and the water line was present at the bedrock surface. The excavation points were backfilled with the excavated soil and compacted using a hand tamping device. A layer of Number 2 gravel, approximately 4-inch thick, was



placed over the soils and then capped with an asphalt patch. The Number 2 gravel and asphalt patch were compacted using a pneumatic compacter.

In summary, the key findings of the vacuum excavation are as follows:

- Bedrock was identified at depths ranging from zero to greater than three feet below the retaining wall and at depths ranging from approximately two to six feet beneath East Spencer Street. Based on drawings provided by the City of Ithaca DPW the sanitary sewer pipe is approximately six feet below the surface within a trench that was likely constructed in the bedrock surface. Along Section 2, the sanitary sewer replacement pipe will be installed in the trench cut for the existing pipe. The bedrock depth along Section 1 is uncertain. If the existing sewer line is located in a trench cut into the bedrock surface it may be necessary cut a new trench for the replacement line in order to connect it to replacement MH-18, as described in Section 4.4.2.
- The footer of the retaining wall abutting the east side of East Spencer Street is situated close to the bedrock surface along a portion of the sewer line replacement. Based on this finding it is likely that the retaining wall can be structurally supported to allow excavation of the sewer pipe along East Spencer Street. Another option may be to remove and replace the wall, in part or in its entirety, to facilitate trenching immediately adjacent to the wall location.
- The excavation conducted at TP-1 indicates that the waterline is installed in a separate bedrock trench towards the southern end of East Spencer Street.

### 3.3 UTILITY LOCATIONS

Reconnaissance visits were conducted with representatives of the City of Ithaca DPW and NYSEG to mark-out the natural gas line and water main along East Spencer Street. The location of the sanitary sewer line on East Spencer Street was marked out by Underground Services, Inc. using a fiberglass fish tape equipped with copper wire. A signal was then sent through the copper wire to trace the sewer line and the alignment was subsequently marked out on the ground surface. During the visit, the City DPW marked out the location of the water main along East Spencer Street. Following completion of the surveys the design drawings were updated to reflect actual locations of the sanitary sewer line and water line along East Spencer Street (Appendix A). Initial drawings provided by the City DPW did not correctly depict the layout of these lines. The work conducted to verify the layout of subsurface utilities revealed that the sanitary sewer follows the alignment of the retaining wall and street curb line on East Spencer Street, and is located as close as 18 inches off of the retaining wall. The finding confirmed that the sewer does not extend beneath the retaining wall and that removal is feasible in conjunction with a support system for the retaining wall.



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## 4 Description of Proposed Remedial Design

### 4.1 DESCRIPTION OF REMEDY

The remedy for OU No.3 will remove potentially impacted bedding material (and sewer pipe material) along an approximate 300-foot section of the sanitary sewer extending from the intersection of Turner Place, MH-9, and along East Spencer Street (Appendix B, Sheet 5). The replacement pipe will be air-tight and bedded with highly permeable granular material. A perforated pipe will be placed in the bedding material to vent to the 300-foot trench to atmosphere via a single exhaust stack equipped with a wind turbine.

### 4.2 MOBILIZATION

The selected remedial subcontractor will be responsible for mobilizing the necessary resources to the site, including all manpower, equipment, and supplies needed to implement the proposed remedy in accordance with this work plan.

### 4.3 SITE PREPARATION

Prior to commencing remedial action activities, site preparation activities will be conducted in accordance with the site-specific Health and Safety Plan (HASP) and Standard Operating Procedures. These activities will include identification of utilities, establishing a support zone, exclusion zone, decontamination area, and staging area. In addition, any necessary erosion, sedimentation, and runoff control measures will be taken within these zones.

#### 4.3.1 Identification of Utilities

Locations of subsurface utilities have been marked and surveyed. Still, before beginning any ground penetrating activities, New York State's Dig Safely New York will be notified to mark underground utilities within the work zone. A private utility locator will be retained as necessary to locate utility connections from residences to the mains along East Spencer within the work areas. The location of the sanitary sewer will be marked using measurements obtained during the activities described in Section 3.3.

#### 4.3.2 Exclusion Zone

An exclusion zone will be established surrounding the work area which unauthorized persons will not be allowed to enter. The work area is directly adjacent to residential housing, so the exclusion zone will not impede residents' access to their homes throughout the construction schedule. The work zone will be delineated with caution tape or temporary snow fence to prevent unnecessary entry. Road and sidewalk closure signs and barricades will be installed to ensure safety (Appendix B, Sheet 4). East Spencer Street will be closed during work hours as the remedy is implemented to ensure vehicle traffic doesn't infringe on the necessary work area. At the end of each work day the excavation will be backfilled with clean soil to approximately two inches below grade and covered with steel plates (see Section 4.4.5) to allow vehicles to access East Spencer Street. During installation of manhole MH-18 access may be restricted overnight due to its location near the centerline of East Spencer Street. Access matters will be coordinated with the City of Ithaca before the start of work.

The exclusion zone will be developed to be at a minimum a 15-foot perimeter (buffer) area surrounding the active work locations. If nearby residents need to enter the exclusion zone to get to their homes during the work day, they will be escorted by WSP Engineering staff or its contractor. Due to inherent nature of excavation activities, the exclusion zone will dynamically change over the course of the project as locations are exposed and then backfilled.



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#### 4.3.3 Contamination Reduction Zone

A contamination reduction zone will be established within the exclusion zone specifically for decontamination activities. In this area, a decontamination pad will be established using poly sheeting and berms to prevent runoff of decontamination water, which will be contained and handled according to state and federal regulations. All construction equipment will be decontaminated before leaving the site.

#### 4.3.4 Support Zone

A support zone will be designated in the vicinity of the work area. Administrative tasks will be performed within the support zone. Generally, the support zone will be established adjacent to the active work area and a support vehicle will be parked in this area.

#### 4.3.5 Staging Area

A secure area will be identified at the EPT facility to stage excavated materials generated during the work activities. Temporary staging of roll-off containers, drums, or tanks will be located in the exclusion zone during the work days and transferred to the staging area at EPT facility at the end of each work day.

### 4.4 REMEDY IMPLEMENTATION

#### 4.4.1 Sanitary Sewer Bypass and Temporary Service Shut-Off


Prior to the start of the remedy work in OU No. 3 the City of Ithaca DPW will construct a bypass system for the sanitary sewer in the work area. The bypass system will pump flow from a sanitary sewer manhole near the base of Turner Place to a manhole that will divert flow away from the remedy area on East Spencer Street. Also, the City DPW will establish temporary sanitary sewer connections to bypass the work zone, and will maintain this system throughout the duration of the remedial work. Flow in the sanitary sewer and laterals to homes will not be restricted during the construction of the new sewer.

As necessary, water and natural gas supply laterals from main supply lines to homes in the work area may be temporarily shut off. Residents will be notified at least 24 hours via written notification prior to any temporary service interruption and such interruptions will be restored at the completion of each work day. The notification will include the date(s) that homes may be affected.

NYSEG will undertake measures to protect utility poles and maintain electricity service to residences in the work area. Preliminary plans for the sewer remedy have been provided to NYSEG and a field reconnaissance was held with NYSEG representatives. Once a firm schedule for the work is established NYSEG will undertake appropriate actions with respect to protecting utility poles and lines.

#### 4.4.2 Removal and Replacement of the Sanitary Sewer

Excavation activities will be performed using an excavator with a boom that can be offset 90 degrees in order to work adjacent to the retaining wall on East Spencer Street. Excavation will start along Section 2 at the lowest point on East Spencer Street at MH-17, approximately 30 feet south of the end of Section 2, and proceed north along East Spencer Street to MH-18. At this point the excavation will proceed to the east along Section 1 toward Turner Place to MH-9. Each day the excavation work will be limited to the length of sewer pipe that can be removed and replaced. Asphalt will be cut, removed, and loaded into a roll-off container. Overburden soil above the sanitary sewer line will be removed and placed in a roll-off. The sanitary sewer and surrounding bedding material will be excavated and staged in a separate roll-off. Once full or at the end of the work day the roll-offs will be staged on the EPT property (management of these materials is discussed in Section 4.4.6). All excavated soil and bedding material will be screened for total volatile organic vapors using photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp. Readings will be recorded in a field log book and the results will be used to ensure that any potentially contaminated material is sampled and managed per Section 4.4.6. If contaminated material is encountered, NYSDEC will be notified immediately.



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Along Section 1 on East Spencer Street manhole MH-11 will be removed due to its close proximity to the proposed new manhole (MH-18) at the north limit of Section 1. Removal of MH-11 will allow for installation of a continuous sewer pipe between MH-17 and MH-18 (Appendix B, Sheet 5). Manhole MH-18 will be constructed approximately 5 feet northeast of the abandoned MH-18 at the existing intersection of Section 1 and Section 2 (Appendix B, Sheet 6). The proposed location of MH-18 was selected to allow adequate clearance from a nearby utility pole. However, if feasible the utility pole will be relocated to allow for the installation of MH-18 and sewer pipe in their existing locations. The possibility of moving the utility pole has been reviewed with NYSEG and a final determination will be made upon further evaluation by NYSEG. The proposed location of MH-18 will also be in close proximity to the 6-inch water main and if necessary, the water main will be rerouted around MH-18. Any re-routing of the water line will be conducted in accordance with standards discussed in Section 6.3.2. From MH-18, the sewer line along Section 1 will be excavated to approximately three feet west of MH-9 (Appendix B, Sheet 8). MH-9 will not be replaced due to its close proximity to the limit of Turner Place and a NYSEG substation.

The replacement sewer line will be 8-inch diameter SDR35 pipe with gasketed joints and fittings. Sewer line laterals will be replaced with SDR35 sewer pipe with gasket joints and fitting. The two connections to be made at the MH-9 and MH-17 will be completed with compression fitting (Appendix A, Sheet 8). Lateral connections will be installed with a controlled low strength material (CLSM) collar which will serve as a barrier to vapor migration and also segregate the trench from bedding material. As shown in Appendix A, Sheet 8, backfill material around the sewer line exiting MH-9 and the end of Section 2 and MH-17 will consist of four inches of CLSM. CLSM backfill will meet the requirements of New York State Department of Transportation (NYSDOT) Standard Specification Section 204: Controlled Low Strength Material, with 5% bentonite additive (Appendix A, Sheets 7 and 8).

The new sewer pipe will be constructed and tested in accordance with:

- ASCE Manual No. 60 / WPCF Manual FD-5, "Gravity Sanitary Sewer Pipe Design and Construction."
- The Handbook of PVC Pipe, Design and Installation available from the Uni-Bell PVC Pipe Association.
- ASTM F1417, "Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air."
- UNI-B-6, "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe."

At the contractor's discretion, the sewer pipe may be tested in sections prior to backfilling to ensure it is leak tight. Upon completion of sections of sewer pipe between manholes, the pipe will be pressurized and tested in accordance with ASTM F1417. Information on pressure applied to the sewer pipe, duration of the test, and test criteria will be maintained in a field log book.

#### 4.4.3 Venting System

A venting pipe consisting of 4-inch, perforated, high-density polyethylene (HDPE) DriscoPlex® 1900 Series, or similar will be installed in the bedding material above or along the side of the sanitary sewer depending on the space available. Perforations will be at least a 1/4-inch diameter, no more than 18-inches apart with sets of three perforations every 18-inches interval (i.e. 0 degrees, 120 degrees, 240 degrees). A non-perforated 4-inch, HDPE DriscoPlex®, or similar, will be utilized to connect the Section 1 venting pipe to the exhaust stack (Appendix A, Sheet 7).

Bedding material will be Type 1 or Type 1A, open graded, clean aggregate (ASTM D2487), compacted to 95% standard proctor density (Appendix B, Sheet 7). A 45 milometer (mil) ethylene propylene diene monomer (EPDM) rubber will be installed directly on top of the bedding material and approximately 1-inch above the venting pipe. The EPDM rubber will eliminate direct water infiltration into the bedding material and vent pipe.





The perforated venting pipe will be connected to an approximately 5-inch diameter steel pipe which will serve as the exhaust stack (Appendix B, Sheet 7). The stack will be approximately 25 feet above grade. A rubber gasket, or similar, will be installed between the outside of the HDPE pipe and exhaust stack at the top of the exhaust stack foundation (Appendix B, Sheet 7). The stack will be equipped with a sample port to allow for vapor monitoring. The sample port will be lockable to inhibit unauthorized access to the port. The installation of the exhaust stack will also ensure the venting pipe is installed at a lower elevation than the inlet to the bottom of the exhaust stack to ensure air flow can rise freely and condensation in the exhaust stack can drain. A wind turbine will be installed on top of the exhaust stack (Appendix A, Sheet 7). Any tree branches in proximity to the vent stack will be trimmed to ensure there are no obstructions that would interfere with operation of the wind turbine. The foundation of the steel utility pole will be installed to manufacturer specifications. As shown in Appendix A, Sheet 6, bollards will be constructed adjacent to the exhaust stack to prevent damage by vehicles parking on the gravel parking.

Clean fill meeting ASTM 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, will be placed above the EPDM (Appendix A, Sheets 7 and 8). As shown in Appendix A, Sheet 7, the solid HDPE pipe between Section 1 and the exhaust stack will be emplaced in 4 inches of CLSM. Along Section 1 on East Spencer Street, No. 2 Run of Crusher base material will be placed followed by asphalt consisting of Type 3 asphalt binder and Type 6 asphalt. The base materials and asphalt are as specified by the City of Ithaca DPW and construction will be in accordance with NYSDOT's Standard Specifications outlined in Section 201-3.15. The sewer along Section 2 will be backfilled up to approximate grade with clean fill and will then be finished to match existing grade (i.e. gravel, grass, or sidewalk).

It is anticipated that four (4) water supply laterals will be encountered during the sewer replacement work. If necessary, the water line laterals will be removed and replaced in accordance with Section 6.3.2. The water supply laterals will be completed with a CLSM collar that will encompass the new and existing water supply lateral connections (Appendix B, Sheet 7). The CLSM collar will serve as a vapor dam that will segregate the trench from bedding material of the supply lateral pipe.

#### 4.4.4 Stormwater Management

Best management practices will be employed during the sewer excavation and replacement work with respect to stormwater management. Sediment and erosion controls will be utilized to mitigate stormwater impact. Management controls that may be utilized include straw bales, silt fence, and construction entrances. Specific methods and materials for erosion control will conform to the "New York State Standards and Specifications for Erosion and Sediment Control" (NYSDEC, 2005).

A stormwater catch basin within the work area along East Spencer Street will need to be removed during the sewer replacement work. Connecting pipes will be cut back and plugged so that stormwater does not enter. A bypass pump will be available to redirect stormwater drainage to a catch basin further south on East Spencer Street. Run-off water along the street will be diverted around the work area using sandbags.

#### 4.4.5 Site Restoration

At the end of each work day, the work area will be restored and covered with steel plates, or similar. Adjacent pavement will be swept to remove dust or soil. The final asphalt pavement placed along East Spencer Street will match the original grade. All sidewalks removed will be restored to City code.

#### 4.4.6 Management of Excavated Materials

PID screening results will be used to segregate clean and potentially impacted excavated overburden and bedding material. Based on the screening results, clean and impacted overburden and bedding material will be placed in separate roll-off containers. Sewer pipe and any debris that is removed will be placed in the roll-off containing potentially impacted bedding material. Roll-offs will be covered and




temporarily staged at the EPT facility at the end of each day. Samples will be collected of potentially impacted overburden and bedding soil as well as the clean overburden and bedding soil stored in the roll-offs and analyzed by a New York State certified laboratory for characterization purposes. The characterization sampling results will be used to determine appropriate offsite disposal of the soils and sewer pipe.

#### 4.5 DECONTAMINATION AND DEMOBILIZATION EQUIPMENT

All equipment and reusable tools and supplies will be cleaned by scraping off bulk residuals. Equipment other than heavy machinery also will be within a temporary decontamination pad that will be constructed at the EPT facility. Wash water will be collected in 55-gallon DOT-approved drums and staged at the EPT facility for subsequent characterization and disposal. Disposable equipment and materials will be collected and disposed of according to state and federal regulations. All construction equipment will be demobilized from the site.





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## 5 Venting System Operation and Performance Monitoring

### 5.1 SYSTEM OPERATION

The venting system will be operational upon installation of the wind turbine. Following installation, an inspection will be conducted to ensure it is operating in accordance with manufacturer specifications.

### 5.2 PERFORMANCE MONITORING

Performance monitoring will be conducted monthly for the first three months and then quarterly for the remainder of the first year. Thereafter, performance sampling will be conducted semiannually until all eight (8) constituents of concern for the site are below  $1 \mu\text{g}/\text{m}^3$  or fall below background levels. Performance monitoring data will be submitted to the NYSDEC when it becomes available from the laboratory. The data will subsequently be presented in progress reports as described in Section 5.4. Air samples will be collected from the sampling port on the riser stack using 1-liter Entech canisters, or similar. A background ambient air sample also will be collected during each sampling event at a location upwind and at the same approximate elevation of the venting system riser pipe. A log will be completed during each sampling event that will include information on sample time, sample identification numbers, barometric pressure, temperature, prevailing wind speed and direction, sample designation and notes on the system operation (wind turbine). Chain-of custody will be completed for all samples. Samples will be analyzed for VOCs using U.S. Environmental Protection Agency (EPA) Method TO-15 by a New York State certified laboratory. Any proposed changes to the performance monitoring schedule will be reviewed with NYSDEC.

### 5.3 INSPECTION AND MAINTENANCE

Inspections will be performed monthly for the first quarter and annually thereafter to ensure that the wind turbine is operating within manufacturer specifications. During the inspections checks will be made to ensure the wind turbine is free of obstructions, dirt, and debris and that it spins freely. Logs will be maintained of each inspection. In the event the turbine is not operating according to manufacturer specifications, it will be repaired or replaced.

### 5.4 REPORTING

Results of the performance monitoring including background ambient air monitoring and inspections will be summarized in progress reports. The progress report will describe the sampling procedures, sampling results, and inspection findings. Sampling and inspection logs will also be included. The progress reports will be submitted to NYSDEC approximately seven weeks after each sampling event.

### 5.5 SITE MANAGEMENT PLAN

A Site Management Plan (SMP) will be prepared for Operable Unit No. 3 and submitted to the NYSDEC under separate cover. The SMP for OU No. 3 at a minimum will included the following elements:

- Institution and Engineering Control Plan
- Post-Remediation Monitoring Plan
- Operation and Maintenance Plan



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## 6 Permits and Approvals

All remedial activities will be performed in compliance with federal, state, and local requirements. A summary of applicable requirements is provided below.

### 6.1 PERMITS

#### 6.1.1 Street Permit

A street permit will be obtained from the City of Ithaca DPW for the sewer replacement work. A copy of this Remedial Design document will be provided to the DPW and schedules for all work activities will be coordinated with the City Of Ithaca.

Sidewalk and street barricades with signage will be installed according to the layout in Appendix A, Sheet 4 at the beginning of the work. Signage will be installed in accordance with the schedule required by the City of Ithaca.

Work hours will be between 7:30 a.m. to 10 p.m. Monday thru Friday per the City of Ithaca requirements. To expedite the work, approval for work on Saturdays may be requested from the Superintendent of the City of Ithaca DPW.

#### 6.1.2 Tree Work Permit

A tree work permit will be obtained to remove one tree on City property. The tree will be replaced in accordance with set forth by the City Forestry Program.

#### 6.1.3 Land Use Easement

An easement will be obtained from the City of Ithaca to install the venting riser pipe on city owned land located at the bottom of Turner Place.

### 6.2 CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN

A Construction Quality Assurance Project Plan (CQAPP) has been prepared to ensure, with a reasonable degree of certainty, that the remedy will meet all design criteria, plans, and specifications. The CQAPP is included in Appendix E of this report. Details of the CQAPP may be revised upon selection of the Remedial Action Contractor(s).

### 6.3 STANDARDS APPLIED TO THE SANITARY SEWER INSTALLATION

#### 6.3.1 Sanitary Sewer Standards

The design of sanitary conveyance systems (sewers), in New York is regulated by a set of recommended policies and standards contained in "Recommended Standards for Wastewater Facilities", 2004 Edition. In addition to the general requirements outlined in Chapter 20 – Plans and Specifications, this design has been prepared in accordance with the following specific requirements:

- Chapter 20, Section 20.2 – Plans of Sewers
- Chapter 30
  - Section 33 – Details of Design and Construction
  - Section 34 – Manholes



- Section 38 – Protection of Water Supplies, and in particular, subsection 38.3, Relation to Watermains

Section 34 provides details on manhole construction including dimensions, and installation and testing criteria. The section also provides a minimum distance of 400 feet between manholes for pipe diameters of 15-inches or less, and is the basis for the removal of MH-11.

Section 38 provides standard offset distances for sewers running in parallel with drinking water mains. In general, the standard recommends a horizontal separation of 10 feet. The standard provides further guidance in cases where this separation is not practical. In these cases, the standard provides for the installation of gravity sewers closer to a water main, provided that the water main is in a separate trench or on an undisturbed earth shelf located on one side of the gravity sewer and at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer. Based on the existing configuration between the sewer and water main, there is an approximate 6 foot horizontal separation and a 2 foot vertical separation, which is consistent with this provision.

The replacement sewer pipe will be the same size of the existing sewer pipe, thus the flow capacity, slope, minimum flow depths, and alignment will not be changed. The existing downstream manhole (MH 17), is a drop-type manhole with an approximate 3.3-foot drop in elevation occurring immediately outside of the manhole. The design for the replacement sewer line is consistent with the existing system layout and not expected to require any modifications. In the event changes are deemed necessary they will be in accordance with the standards in Chapter 30, Section 34.

#### 6.3.2 Water Supply Standards

New York has established a set of recommended policies and standards for replacing water supply pipes “Recommended Standards for Water Works Facilities”, 2007 Edition. The following requirements will be adhered to for water lines:

- Chapter 8 – Distribution System Piping and Appurtenances

Chapter 8 details installation procedures for water mains and will be adhered to as discussed in Section 4.4.2. If removal of water supply laterals is necessary, as discussed in Section 4.4.3, the removal and replacement will also be completed in accordance with Chapter 8 standards.



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## 7 Health and Safety

### 7.1 SITE HEALTH AND SAFETY PLAN

A Site-specific HASP for the construction activities associated with sanitary sewer replacement is included as Appendix C.

### 7.2 AIR MONITORING

During the sewer excavation work air monitoring will be conducted for particulates and organic vapors in accordance with the Community Air Monitoring Plan (CAMP) provided in Appendix D. A PID will be used for continuous monitoring of total VOCs. The PID (MiniRae 2000 by RAE Systems, or similar) equipped with a 10.6 eV lamp will detect VOCs at a level well below the VOC action level specified in the CAMP, and be programmed to perform data logging. The PID will be placed at an approximate breath zone height, estimated at 4 feet above ground surface.

Continuous particulate monitoring will be performed using a MIE PDM-3 Minram direct sensing, real-time monitor or equivalent, with data logging capabilities. This device can detect airborne particulate at levels well below the CAMP particulate action level, and be placed at breathing zone height.



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## 8 Schedule

Solicitation of proposals for the procurement of an installation contractor will begin in May 2011. The implementation of the remedy is anticipated to begin on July 25, 2011 and is projected to take three weeks to complete. This schedule is predicated on review and approval of the work plan in early June 2011. The Remedial Action Report will be submitted to the NYSDEC within 8 weeks of completing the system installation and start-up activities. The Site Management Plan will be submitted following completion of the Remedial Action Report. A description of the content to be included in the Site Management Plan and Remedial Action Report are presented below.

### 8.1 SITE MANAGEMENT PLAN

In accordance with the Record of Decision, a Site Management Plan will be prepared for OU-3. The Plan will include the following:

- An Engineering Control Plan that identifies all engineering controls implemented and details the steps and media-specific requirements necessary to assure the required engineering controls remain in place and are effective.
- A Site Monitoring Plan which outlines the activities necessary to assess the overall performance and effectiveness of the remedy.

### 8.2 REMEDIAL ACTION REPORT

Upon completion of the field work, a Remedial Action Report will be prepared and will include a certification by a professional engineer licensed in the state of New York. In general, the Remedial Action Report will include the following:

- Site history, background, and description of the nature and extent of contamination.
- Description of the remedy selected including a listing of the remedial action objectives.
- Description of the governing remedial design documents.
- Description of the field work implemented.
- Presentation of the data collected during remedy implementation.



---

## 9 References

- Environmental Strategies Corporation. 2005. Onsite Assessment of the Former Borg Warner – Morse Chain Facility.
- Health Research Inc. 2004. Recommended Standards for Wastewater Facilities.
- Health Research Inc. 2007. Recommended Standards for Water Works Facilities.
- New York State Department of Environmental Conservation. 1987. Administrative Order on Consent (Index #A7-0125-87-09) with Emerson Power Transmission. July.
- New York State Department of Environmental Conservation. 1994. Record of Decision for the Morse Industrial Site Inactive Hazardous Waste Site, Ithaca, Tompkins County, New York. December.
- New York State Department of Environmental Conservation. 2002. Draft DER-10 Technical Guidance for Site Investigation and Remediation. December.
- New York State Department of Environmental Conservation . 2005. New York State Standards and Specifications for Erosion and Sediment Control. August.
- New York State Department of Environmental Conservation. 2009. Record of Decision Amendment for the Morse Industrial Corporation, Town of Ithaca, Tompkins County, New York, Site Number 755010. June.
- New York State Department of Health. 2006. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October.
- New York State Department of Health. 2007. Sanitary Code of the New York State Department of Health. October.
- WSP Engineering of New York, P.C. 2008. Revised Supplemental Remedial Program/Alternatives Analysis, Emerson Power Transmission, Ithaca, New York. September.
- WSP Environmental Strategies. 2008. Supplemental Remedial Investigation Report, Emerson Power Transmission, Ithaca, New York. April.



## 10 Acronym List

bgs	below ground surface
CLSM	controlled low strength material
CSM	conceptual site model
DPW	Department of Public Works
EPA	U.S. Environmental Protection Agency
EPT	Emerson Power Transmission
eV	electron volt
HASP	Health and Safety Plan
mg/m <sup>3</sup>	milligrams per cubic meter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
TCE	trichloroethene
VOC	volatile organic compounds
RD	Remedial Design
OU	Operable Unit
DER	Division of Environmental Remediation
amsl	above mean sea level
mil	milometer
NYSEG	New York State Electric & Gas
PID	photoionization detector
HDPE	high-density polyethylene
EDPM	ethylene propylene diene monomer
SMP	Site Management Plan
CQAPP	Construction Quality Assurance Project Plan
CAMP	Community Air Monitoring Plan

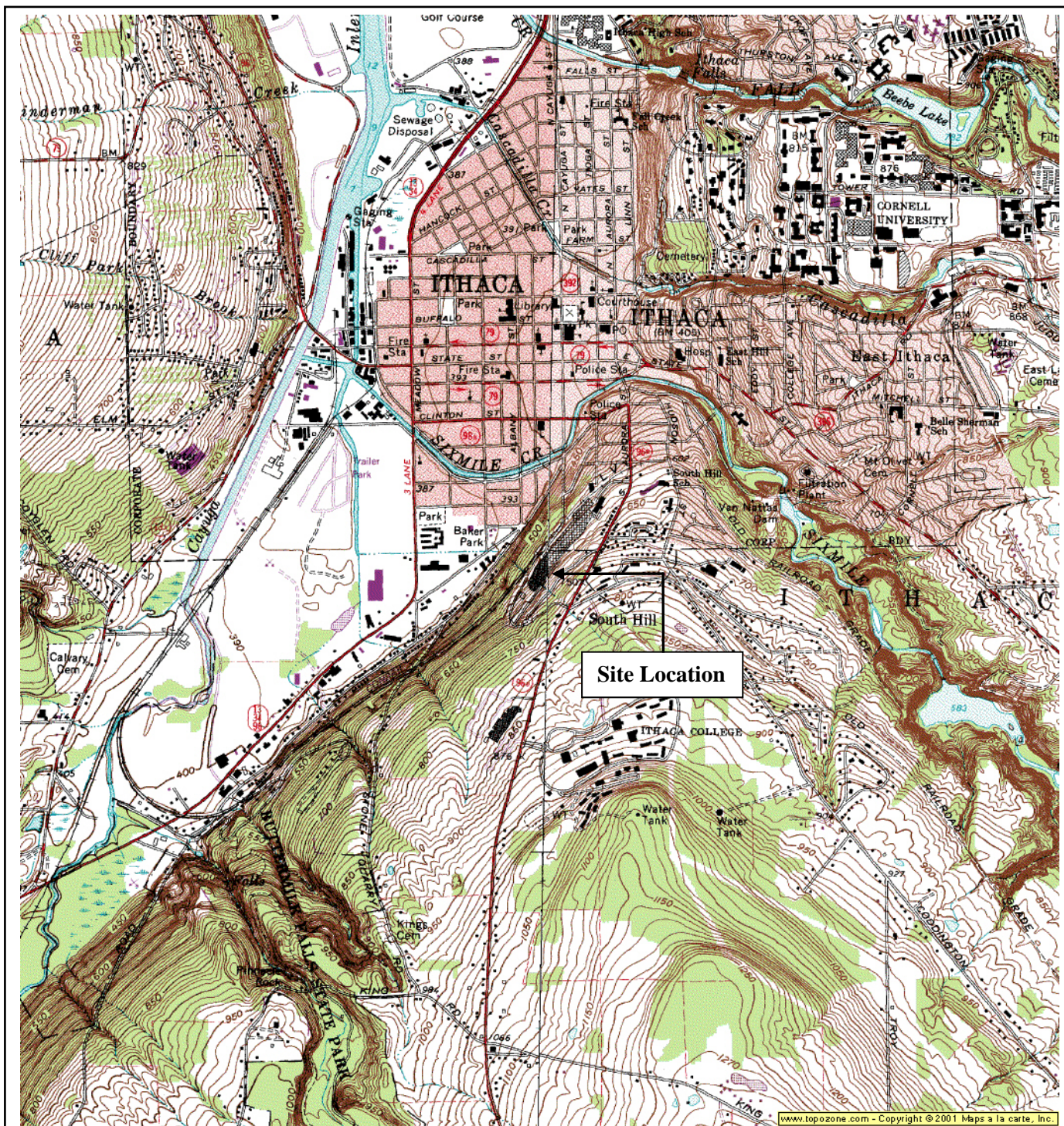


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## Figures

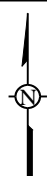






#### Reference

7.5 Minute Series Topographic Quadrangle  
Ithaca East, New York  
Photorevised 1976 Scale 1:25,000 Metric



Scale in Meters

0 500 1000



0 1000 2000

Scale in Feet



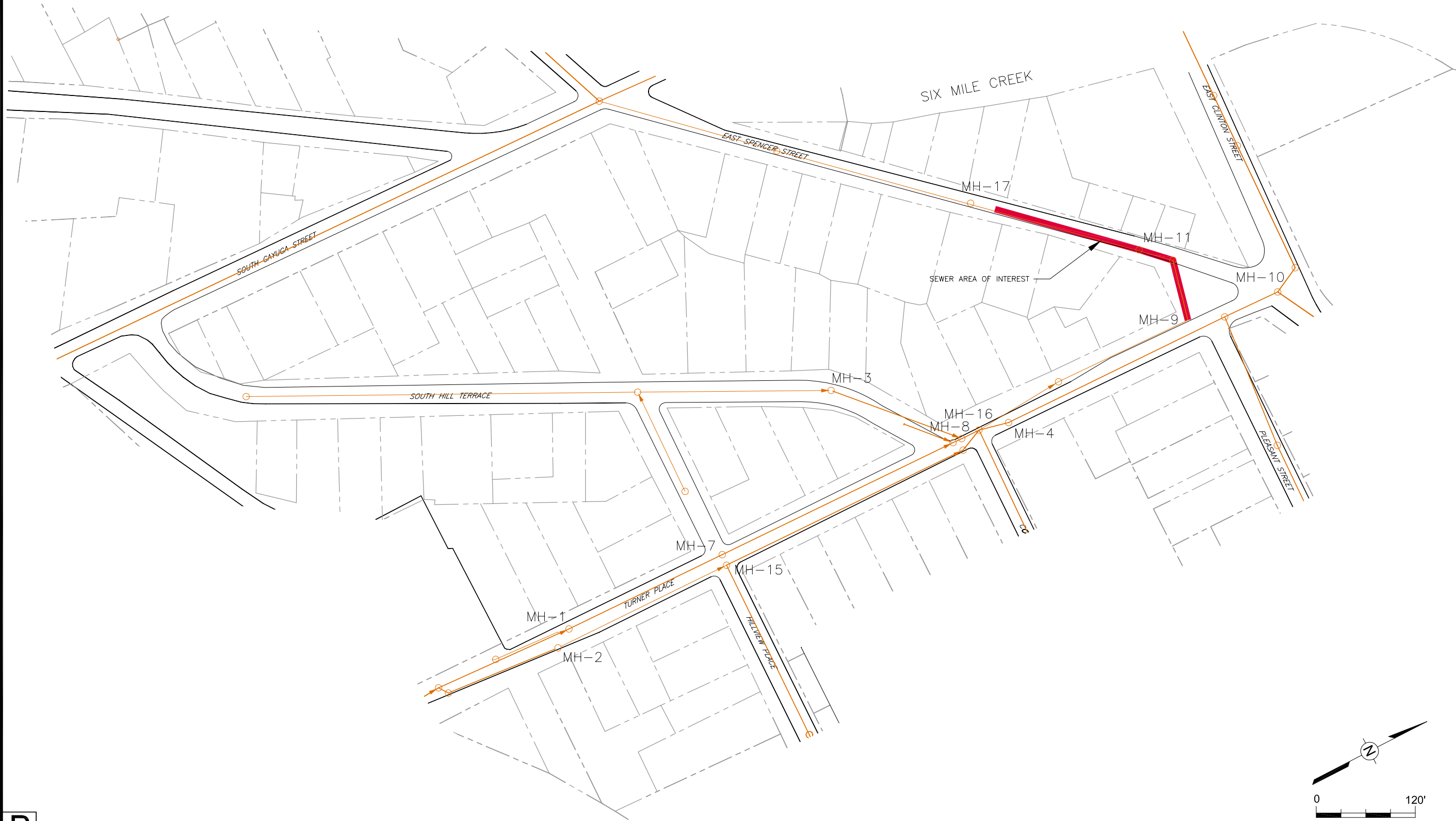
11190 SUNRISE VALLEY DRIVE,  
SUITE 300  
RESTON, VA 20191  
(703) 709-6500

**Figure 1**  
**Site Location**  
**Emerson Power Transmission**  
**Ithaca, New York**

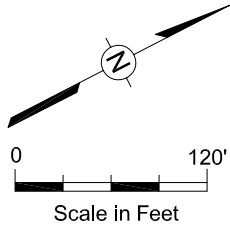


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B



LEGEND  
—— SANITARY SEWER LINE  
MH-1 ○ SANITARY SEWER MANHOLE



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Reston, Virginia 20191  
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Figure 2  
OU NO. 3 SANITARY SEWER NETWORK

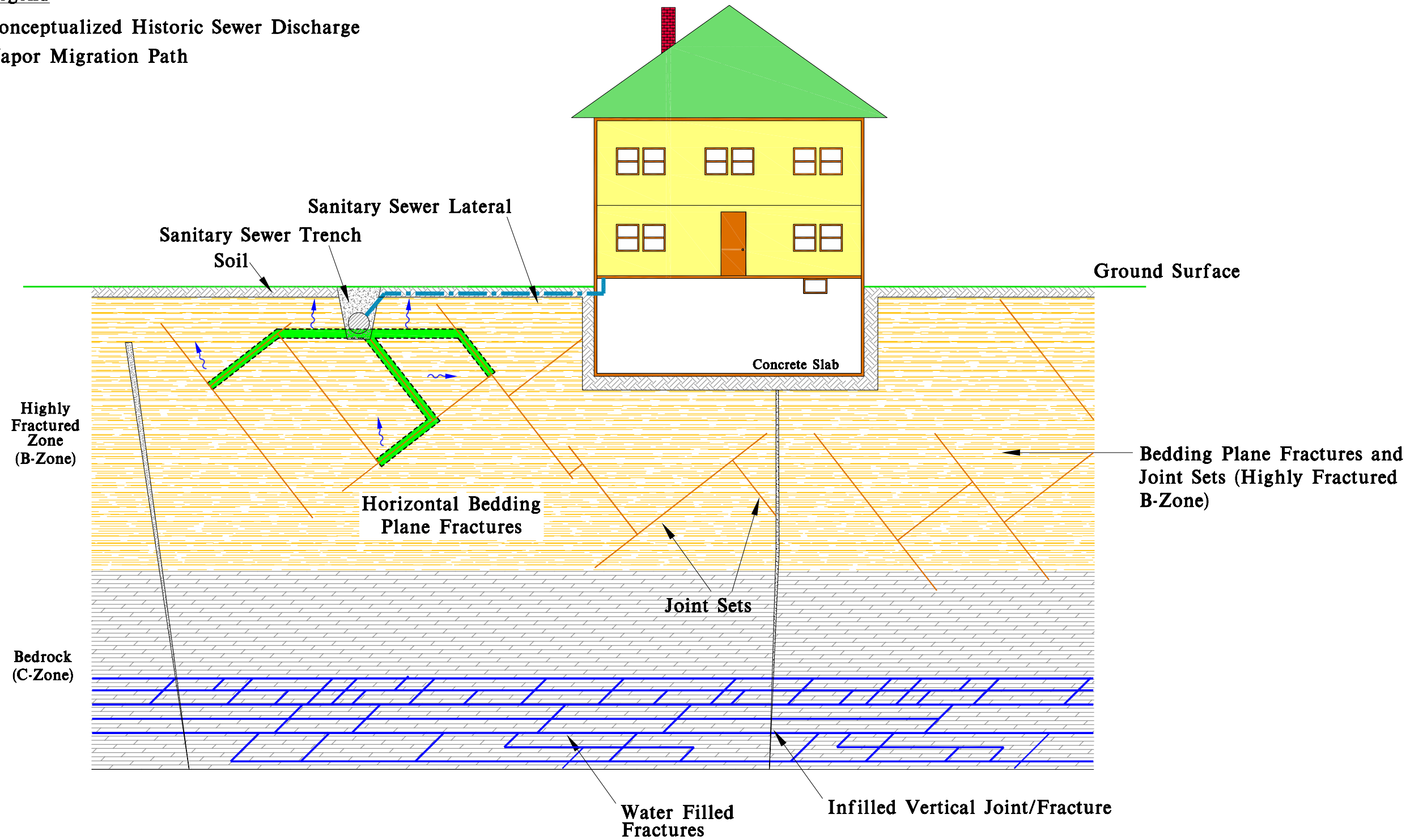
EMERSON POWER TRANSMISSION  
ITHACA, NEW YORK  
PREPARED FOR  
EMERSON POWER TRANSMISSION

Drawn By: EGC  
Checked: *SBP*  
Approved: *KAS*  
DWG Name: 00003197-012

R:\ACADDWG\08007408007428.dwg, Figure 3 11x17, 4/28/2011 1:11:51 PM, usec01012

**Legend**

-  Conceptualized Historic Sewer Discharge
-  Vapor Migration Path



Drawn By: EGC

Checked: LKB

Approved: TMM

DWG Name: 08007428

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Figure 3

SOIL VAPOR MIGRATION PATHWAYS  
CONCEPTUAL SITE MODEL

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## Appendix A – Design Drawings





<u>DRAWING NUMBER</u>	<u>SHEET NUMBER</u>	<u>DESCRIPTION</u>
00003197-003	1	TITLE SHEET
00003197-004	2	SITE PLAN
00003197-005	3	PRE-DESIGN VACUUM EXCAVATION
00003197-006	4	ROAD AND SIDEWALK CLOSURE PLAN
00003197-005	5	300-FOOT VENTING SYSTEM LAYOUT
00003197-007	6	EAST SPENCER STREET SEWER LINE RELOCATION
00003197-009	7	SITE WORK DETAILS
00003197-009	8	MANHOLE CONNECTION DETAILS

# OPERABLE UNIT NO. 3

## 300-FOOT VENTING SYSTEM

### DESIGN DRAWINGS


# EMERSON POWER TRANSMISSION FACILITY

## ITHACA, NEW YORK

**PREPARED FOR**

# EMERSON POWER TRANSMISSION

D

<div><div>WSP Engineering of New York, P.C. 2360 Sweet Home Road, Suite 3 Amherst, New York 14226 (716) 691-5232 www.wspenvironmental.com/usa</div></div>		SHEET 1		Drawing Number		00003197-003	
TITLE SHEET				EMERSON POWER TRANSMISSION			
PREPARED FOR				EMERSON POWER TRANSMISSION			
ITHACA, NEW YORK							
DRAWN BY		EGC		SEAL			
CHECKED		SEP		09/12/01			
APPROVED		AS		09/12/01			
<p>NOTES: THIS DRAWING HAS BEEN REDESIGNED UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. IT IS A REVISION OF AN EXISTING DRAWING. THE EXISTING DRAWING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT IN ANY WAY.</p>				REV		REVISIONS	
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D

- REFERENCES:
- SANITARY SEWER LOCATION FROM CITY OF ITHACA WATER & SEWER DEPARTMENT, SHEETS R17, S17, 154-A, 178, AND 199.
  - TOWN OF ITHACA CONTRACT DRAWINGS, SANITARY SEWERMAIN REPLACEMENT SOUTH HILL, DATED APRIL 1994.



- LEGEND
- PROPERTY LINE
  - EXISTING SANITARY SEWER
  - EXISTING STORM WATER LINE
  - EXISTING WATER LINE
  - EXISTING NATURAL GAS LINE

NOTES:

UTILITY INFORMATION HAS BEEN PLOTTED FROM AVAILABLE SOURCES AND THEIR LOCATIONS AND SIZE SHOULD BE CONSIDERED APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXACT UTILITY LOCATIONS AND SIZES. IF UNCHARTED OR MISPLOTTED UTILITIES ARE ENCOUNTERED, THE CONTRACTOR IS REQUIRED TO NOTIFY THE OWNER IMMEDIATELY.

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SITE PLAN

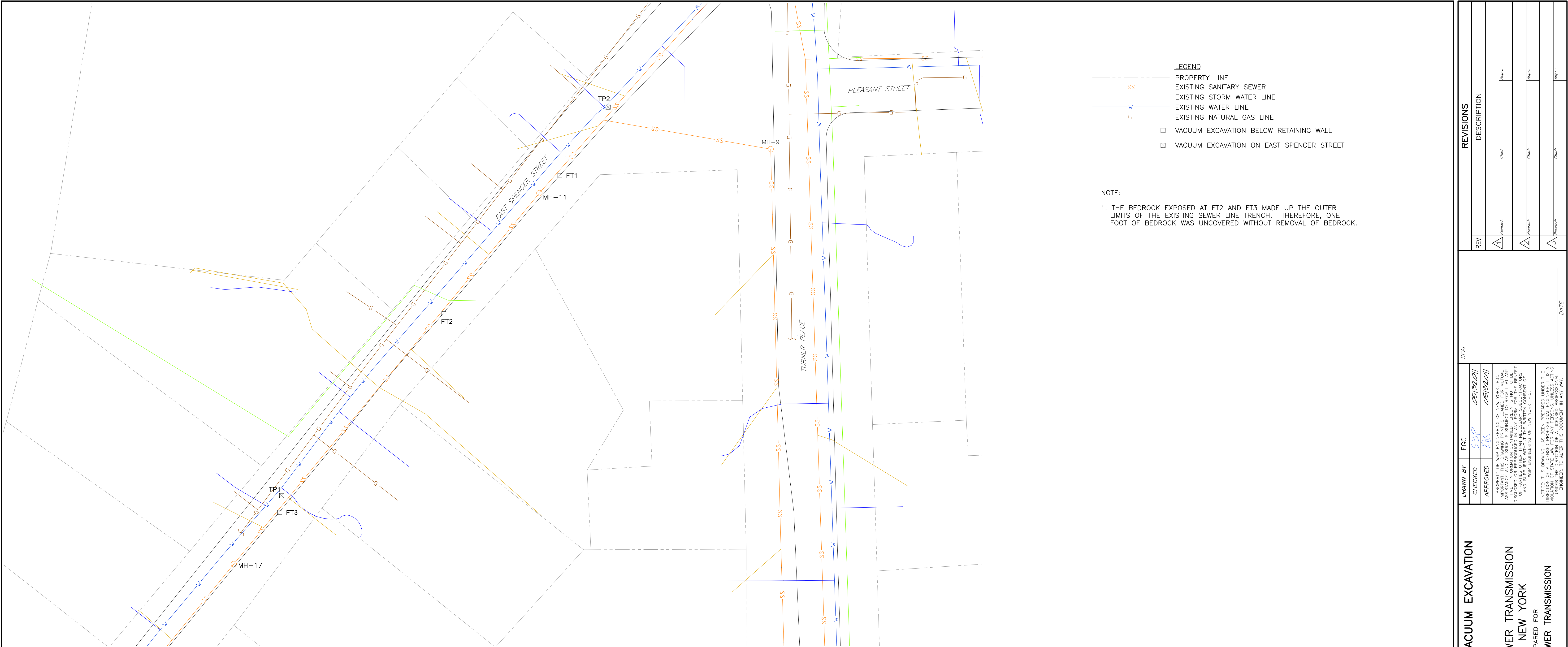
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ITHACA, NEW YORK

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SHEET 2

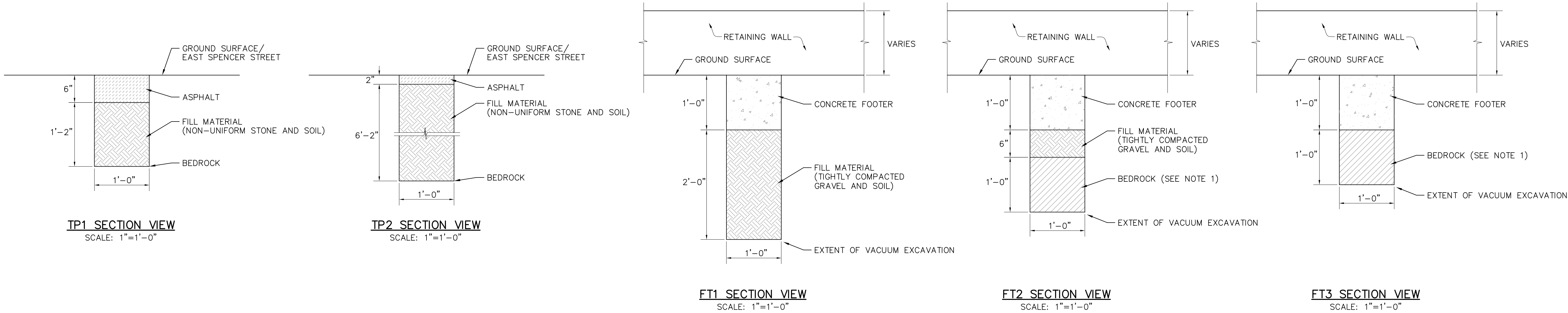
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3	05/13/11	APPROVED	05/13/11
4	05/13/11	APPROVED	05/13/11



- LEGEND**
- PROPERTY LINE
  - SS EXISTING SANITARY SEWER
  - W EXISTING STORM WATER LINE
  - G EXISTING WATER LINE
  - G EXISTING NATURAL GAS LINE
  - VACUUM EXCAVATION BELOW RETAINING WALL
  - VACUUM EXCAVATION ON EAST SPENCER STREET

NOTE:  
1. THE BEDROCK EXPOSED AT FT2 AND FT3 MADE UP THE OUTER LIMITS OF THE EXISTING SEWER LINE TRENCH. THEREFORE, ONE FOOT OF BEDROCK WAS UNCOVERED WITHOUT REMOVAL OF BEDROCK.



D

REFERENCES:  
1. SANITARY SEWER LOCATION FROM CITY OF ITHACA WATER & SEWER DEPARTMENT, SHEETS R17, S17, 154-A, 178, AND 199.  
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**PRE-DESIGN VACUUM EXCAVATION**

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ITHACA, NEW YORK

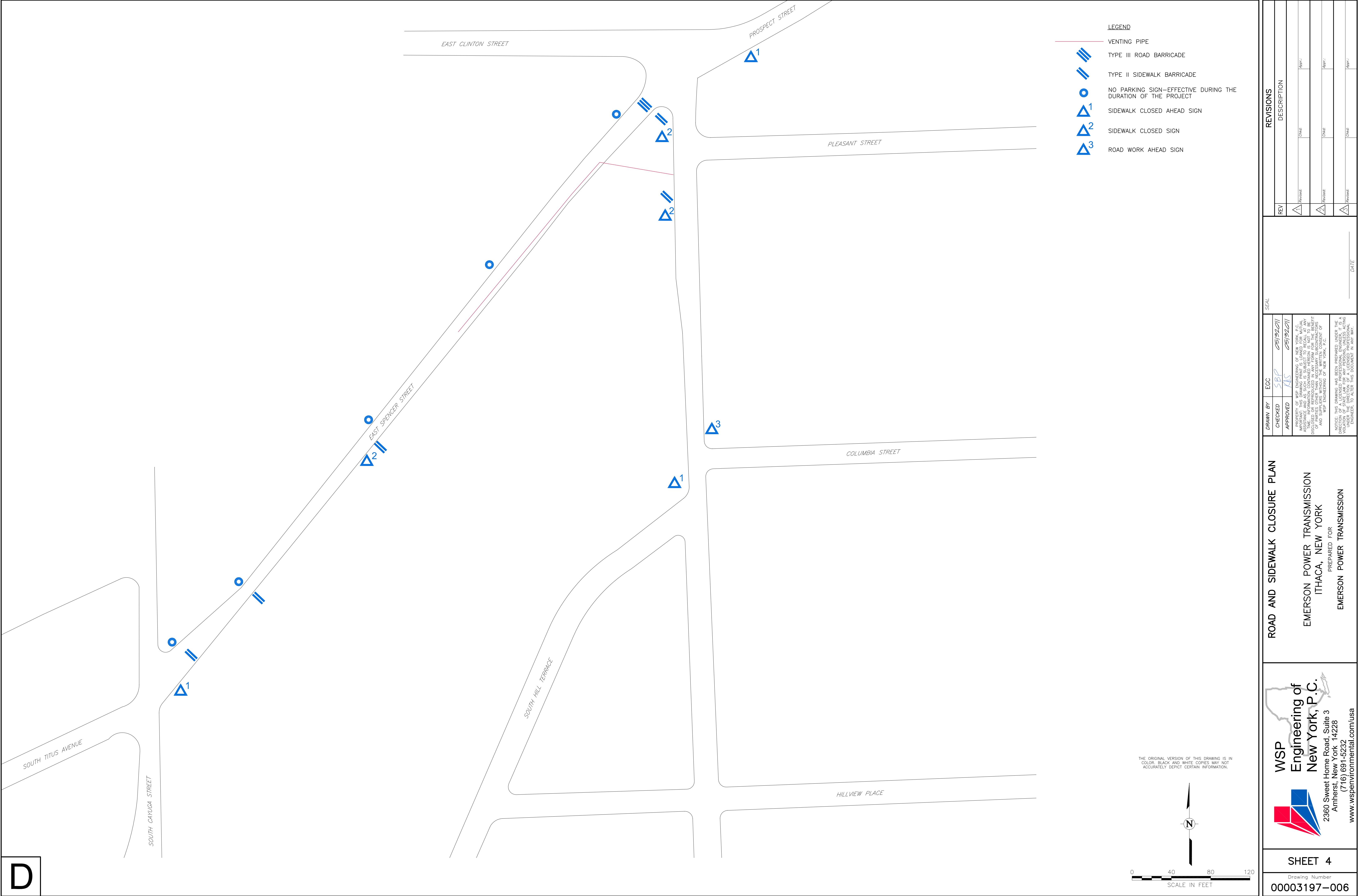
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**EMERSON POWER TRANSMISSION**

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**SHEET 3**

Drawing Number  
**00003197-005**





D

- LEGEND
- VENTING PIPE
  - TYPE III ROAD BARRICADE
  - TYPE II SIDEWALK BARRICADE
  - NO PARKING SIGN—EFFECTIVE DURING THE DURATION OF THE PROJECT
  - SIDEWALK CLOSED AHEAD SIGN
  - SIDEWALK CLOSED SIGN
  - ROAD WORK AHEAD SIGN

0

40

80

120

SCALE IN FEET

N

WSP

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SHEET 4

Drawing Number

00003197-006

ROAD AND SIDEWALK CLOSURE PLAN

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EMERSON POWER TRANSMISSION

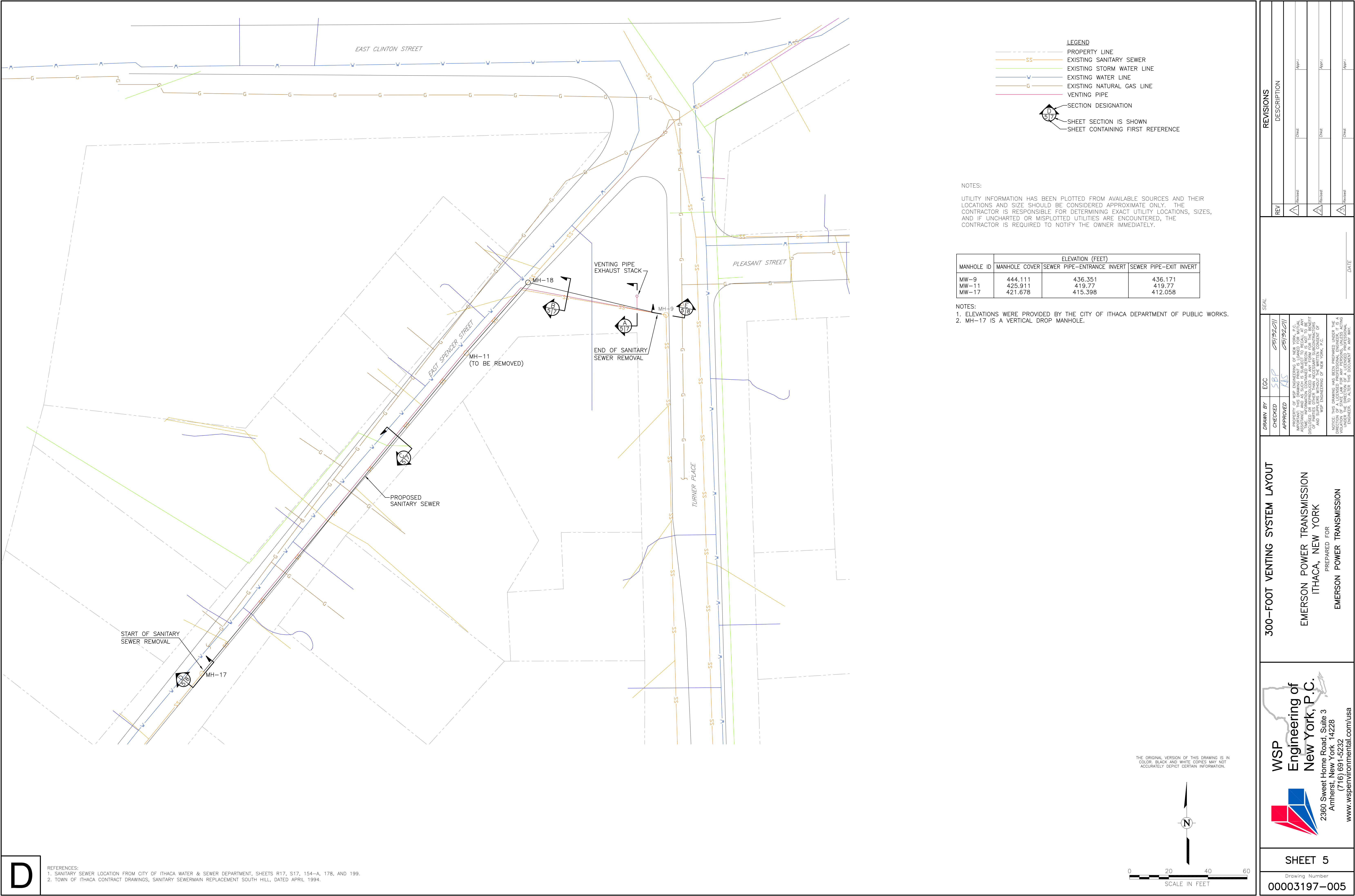
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4	CHIEF
5	CHIEF





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REFERENCES:  
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2. TOWN OF ITHACA CONTRACT DRAWINGS, SANITARY SEWERMAIN REPLACEMENT SOUTH HILL, DATED APRIL 1994.

LEGEND

- PROPERTY LINE
- EXISTING SANITARY SEWER
- EXISTING STORM WATER LINE
- EXISTING WATER LINE
- EXISTING NATURAL GAS LINE
- VENTING PIPE
- SECTION DESIGNATION
- SHEET SECTION IS SHOWN
- SHEET CONTAINING FIRST REFERENCE

NOTES:  
UTILITY INFORMATION HAS BEEN PLOTTED FROM AVAILABLE SOURCES AND THEIR LOCATIONS AND SIZE SHOULD BE CONSIDERED APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXACT UTILITY LOCATIONS, SIZES, AND IF UNCHARTED OR MISPLOTTED UTILITIES ARE ENCOUNTERED, THE CONTRACTOR IS REQUIRED TO NOTIFY THE OWNER IMMEDIATELY.

MANHOLE ID	ELEVATION (FEET)		
	MANHOLE COVER	SEWER PIPE-ENTRANCE INVERT	SEWER PIPE-EXIT INVERT
MW-9	444.111	436.351	436.171
MW-11	425.911	419.77	419.77
MW-17	421.678	415.398	412.058

NOTES:  
1. ELEVATIONS WERE PROVIDED BY THE CITY OF ITHACA DEPARTMENT OF PUBLIC WORKS.  
2. MH-17 IS A VERTICAL DROP MANHOLE.

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N

0 20 40 60  
SCALE IN FEET

300-FOOT VENTING SYSTEM LAYOUT

EMERSON POWER TRANSMISSION  
ITHACA, NEW YORK  
PREPARED FOR  
EMERSON POWER TRANSMISSION

WSP

Engineering of  
New York, P.C.

2360 Sweet Home Road, Suite 3  
Amherst, New York 14226  
(716) 691-5232  
www.wspenvironmental.com/usa

SHEET 5

Drawing Number  
00003197-005

REVISIONS		DESCRIPTION
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4	Approved	Chief

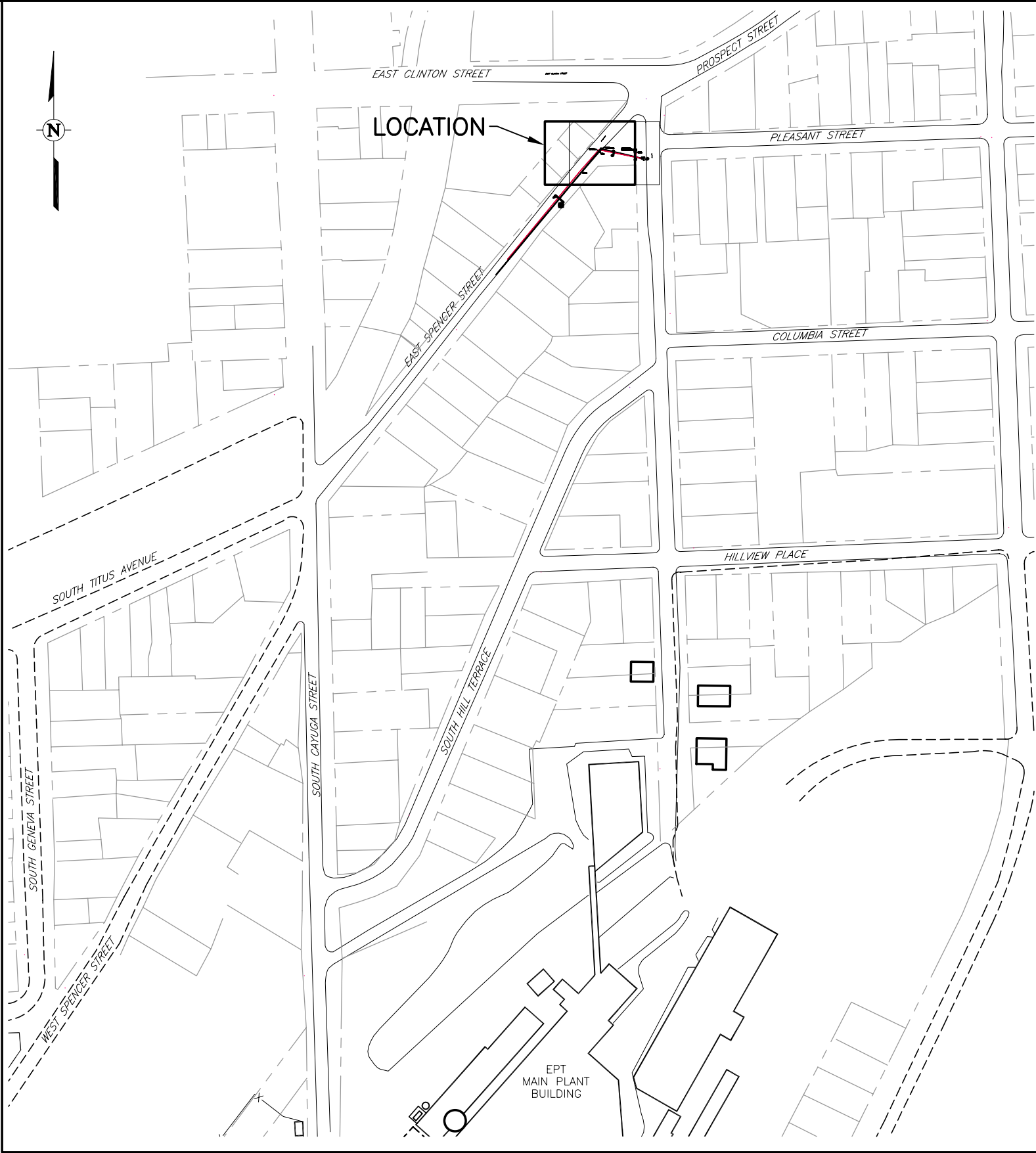
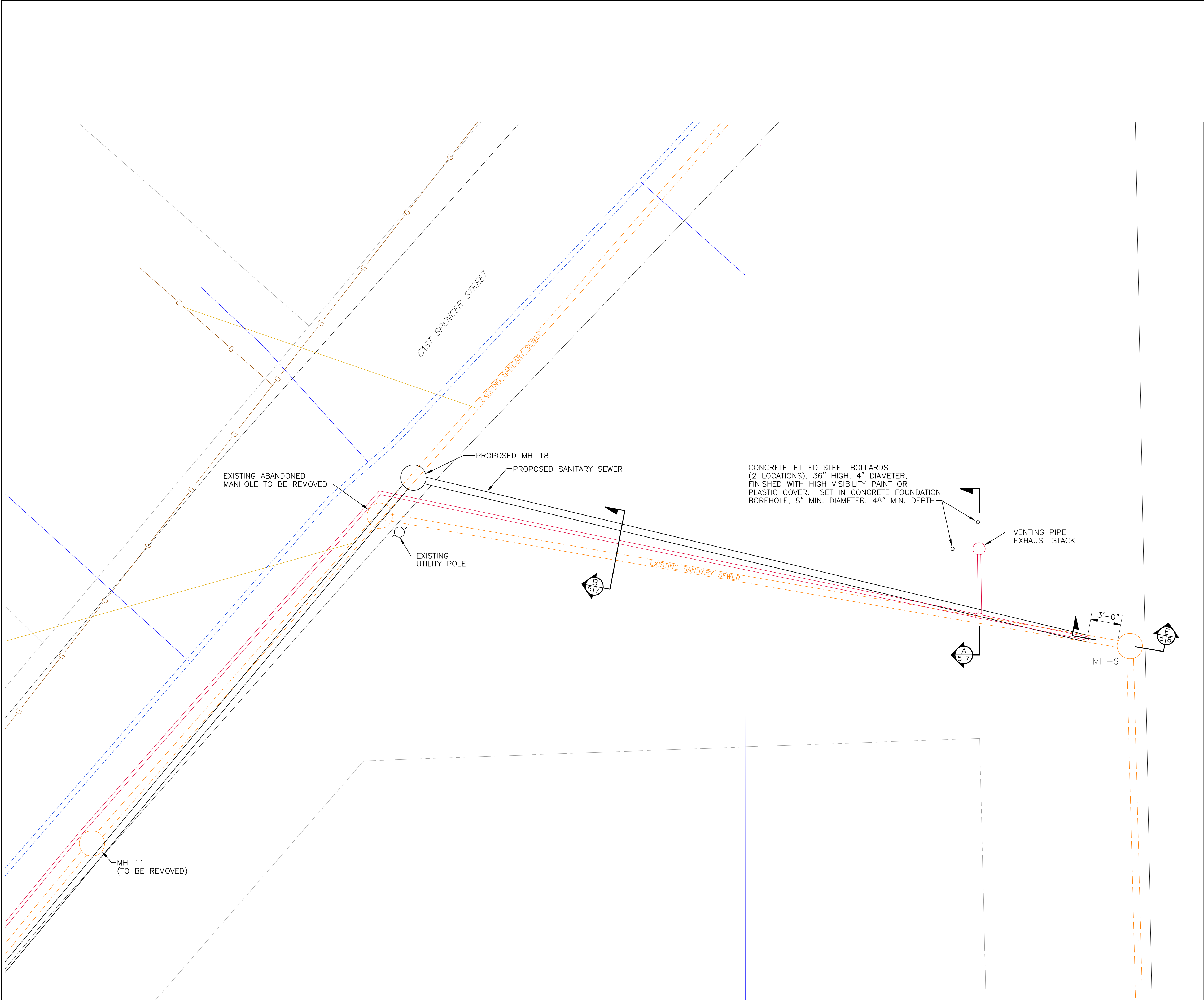
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05/19/11

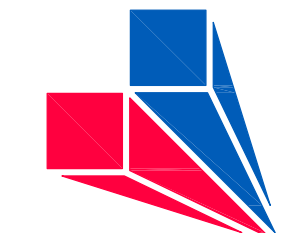
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- LEGEND
- PROPERTY LINE
  - EXISTING SANITARY SEWER
  - EXISTING WATER LINE
  - EXISTING NATURAL GAS LINE
  - EXISTING SANITARY SEWER LATERAL (SIZE UNKNOWN)
  - VENTING PIPE
  - SECTION DESIGNATION
  - SHEET SECTION IS SHOWN
  - SHEET CONTAINING FIRST REFERENCE

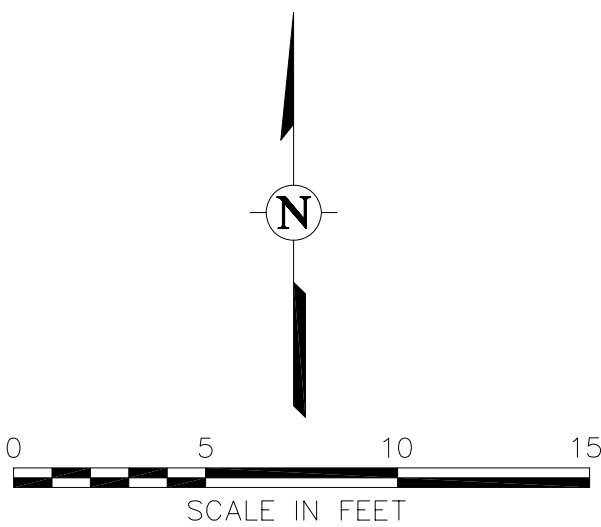
NOTES:

UTILITY INFORMATION HAS BEEN PLOTTED FROM AVAILABLE SOURCES AND THEIR LOCATIONS AND SIZE SHOULD BE CONSIDERED APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXACT UTILITY LOCATIONS, SIZES, AND IF UNCHARTED OR MISPLOTTED UTILITIES ARE ENCOUNTERED, THE CONTRACTOR IS REQUIRED TO NOTIFY THE OWNER IMMEDIATELY.

DRAWN BY		ECG	SCALE	REV		REVISIONS	
CHECKED	SBP	APPROVED	AK	05/13/2011	05/13/2011	05/13/2011	05/13/2011
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EAST SPENCER STREET SEWER LINE RELOCATION				EMERSON POWER TRANSMISSION ITHACA, NEW YORK PREPARED FOR EMERSON POWER TRANSMISSION			
 2360 Sweet Home Road, Suite 3 Amherst, New York 14226 (716) 691-5232 www.wspenvironmental.com/usa				SHEET 6			
				Drawing Number 00003197-007			

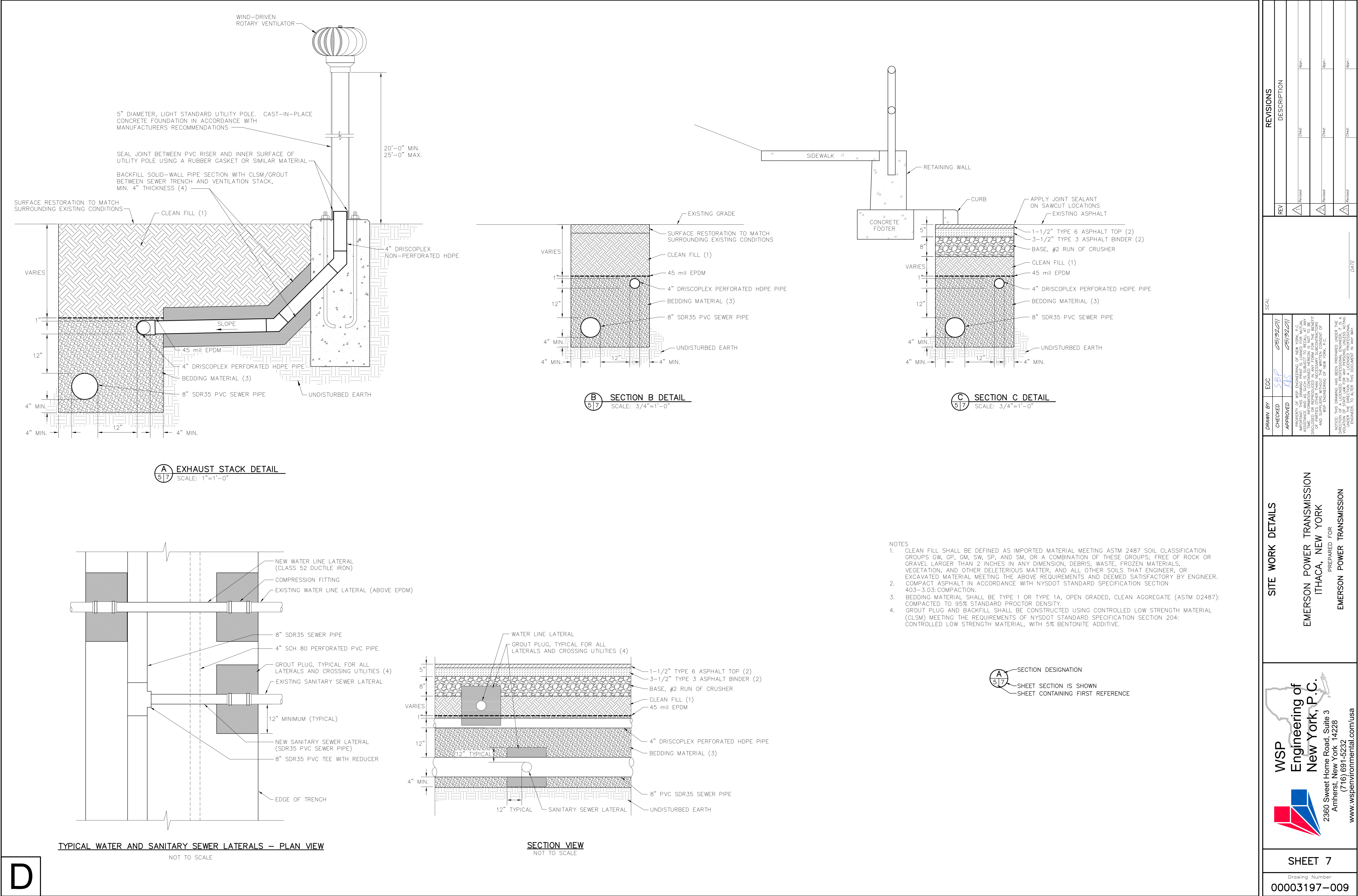
D

- REFERENCES:
- SANITARY SEWER LOCATION FROM CITY OF ITHACA WATER & SEWER DEPARTMENT, SHEETS R17, S17, 154-A, 178, AND 199.
  - TOWN OF ITHACA CONTRACT DRAWINGS, SANITARY SEWERMAIN REPLACEMENT SOUTH HILL, DATED APRIL 1994.



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REVISIONS		DESCRIPTION	
REV	DATE	BY	APP.
1		CH	AP
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5		CH	AP

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APPROVED	AK	05/13/2011	05/13/2011

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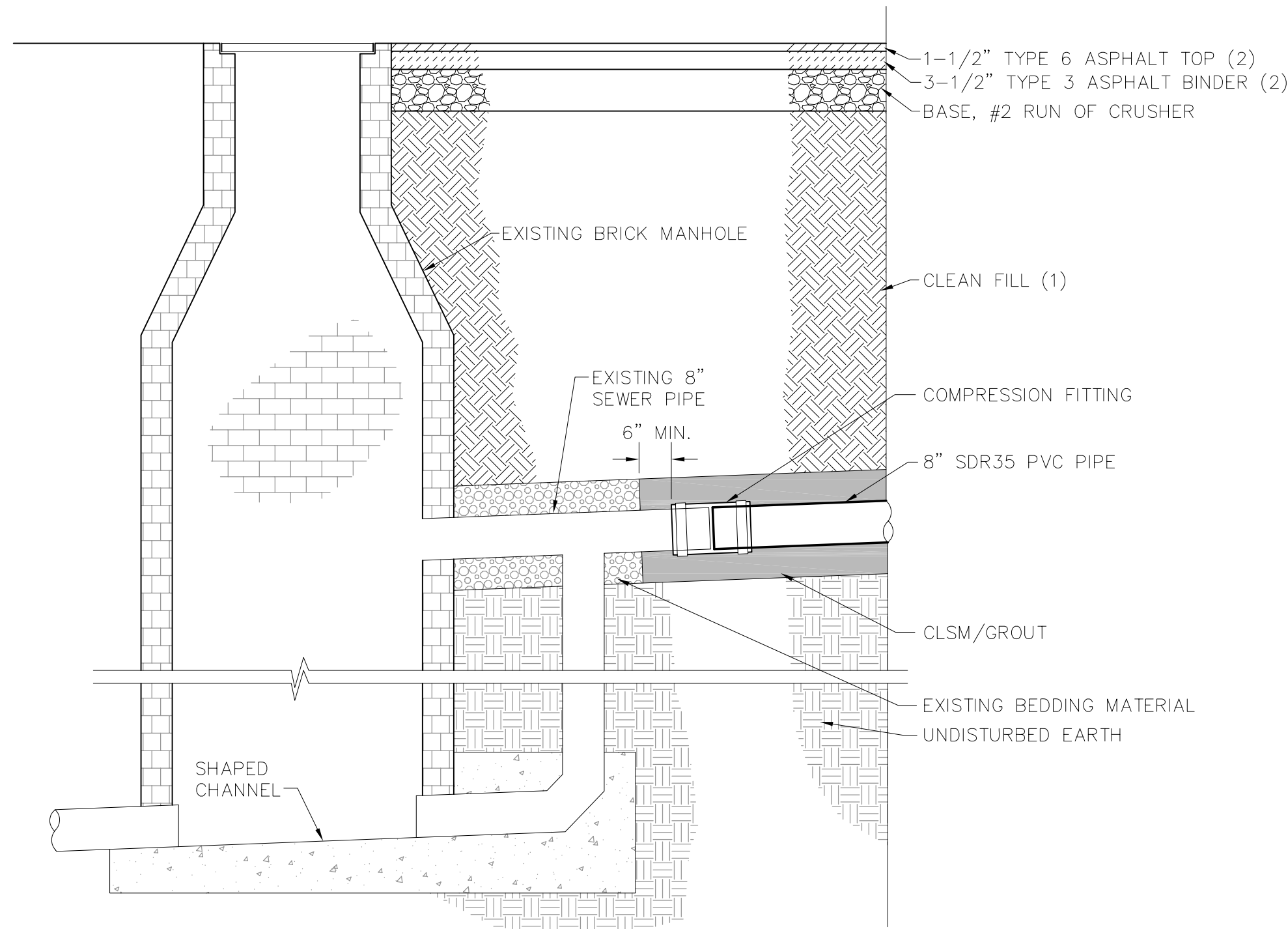
**SITE WORK DETAILS**

**EMERSON POWER TRANSMISSION**  
ITHACA, NEW YORK

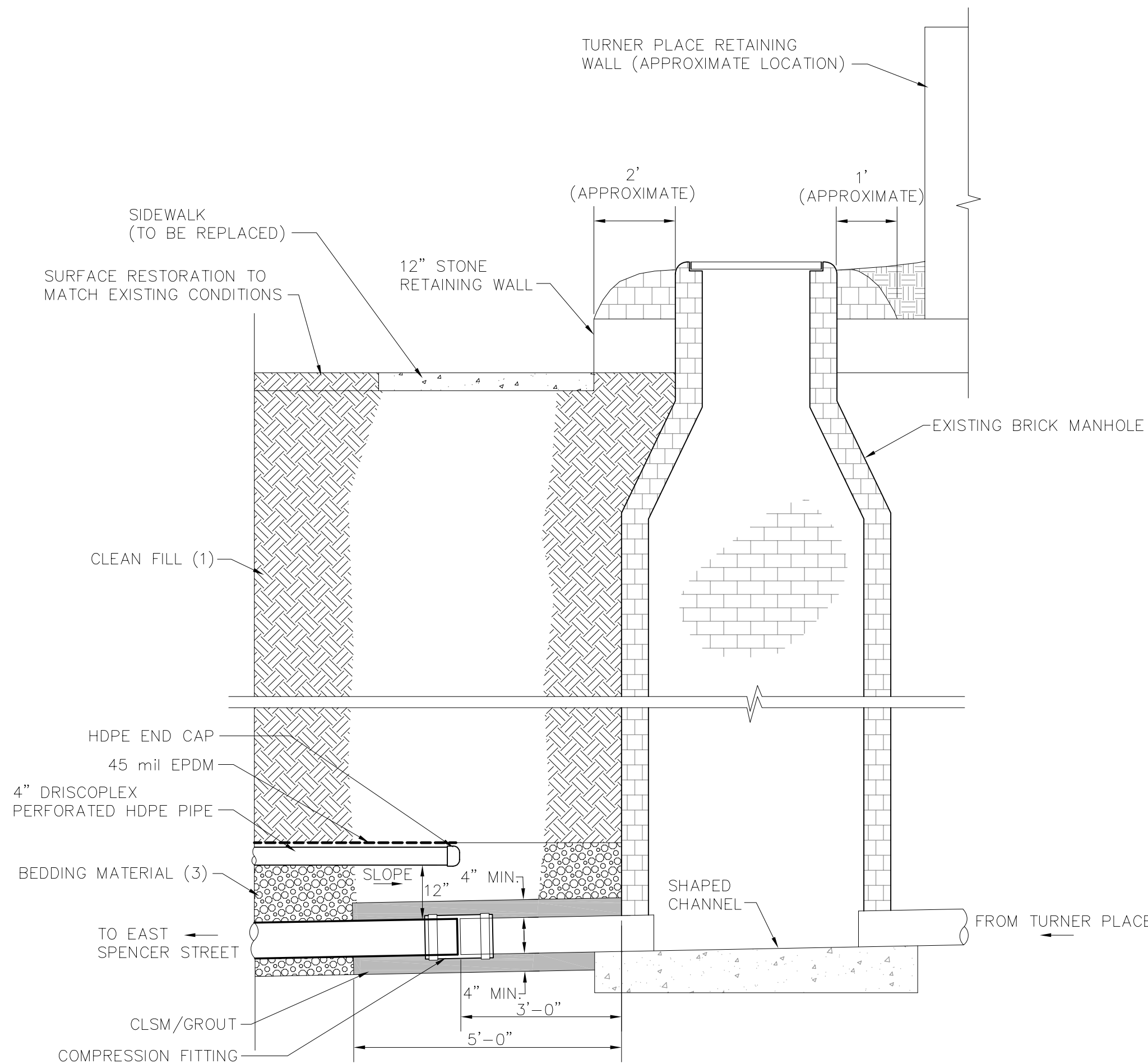
**EMERSON POWER TRANSMISSION**

**Engineering of New York, P.C.**  
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**SHEET 7**  
Drawing Number  
00003197-009



**D** MH-17 CONNECTION DETAIL  
5/8 NOT TO SCALE



**E** MH-9 CONNECTION DETAIL  
5/8 NOT TO SCALE

- NOTES
- CLEAN FILL SHALL BE DEFINED AS IMPORTED MATERIAL MEETING ASTM 2487 SOIL CLASSIFICATION GROUPS GW, GP, GM, SW, SP, AND SM, OR A COMBINATION OF THESE GROUPS; FREE OF ROCK OR GRAVEL LARGER THAN 2 INCHES IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER, AND ALL OTHER SOILS THAT ENGINEER, OR EXCAVATED MATERIAL MEETING THE ABOVE REQUIREMENTS AND DEEMED SATISFACTORY BY ENGINEER.
  - COMPACT ASPHALT IN ACCORDANCE WITH NYSDOT STANDARD SPECIFICATION SECTION 403-3.03; COMPACTION
  - BEDDING MATERIAL SHALL BE TYPE 1 OR TYPE 1A, OPEN GRADED, CLEAN AGGREGATE (ASTM D2487); COMPACTED TO 95% STANDARD PROCTOR DENSITY
  - GROUT PLUG AND BACKFILL SHALL BE CONSTRUCTED USING CONTROLLED LOW STRENGTH MATERIAL (CLSM) MEETING THE REQUIREMENTS OF NYSDOT STANDARD SPECIFICATION SECTION 204: CONTROLLED LOW STRENGTH MATERIAL, WITH 5% BENTONITE ADDITIVE.

**D** SECTION DESIGNATION  
5/8 SHEET SECTION IS SHOWN  
SHEET CONTAINING FIRST REFERENCE

REVISIONS	
REV	DESCRIPTION
1	Chief
2	Chief
3	Chief
4	Chief

SEAL	
DRAWN BY	ECG
CHECKED	SBP
APPROVED	AK
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MANHOLE CONNECTION DETAILS	
EMERSON POWER TRANSMISSION ITHACA, NEW YORK	
PREPARED FOR EMERSON POWER TRANSMISSION	

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Amherst, New York 14226  
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---

## Appendix B – Construction Quality Assurance Project Plan







Construction Quality Assurance  
Project Plan  
Remedial Design Operable Unit No. 3  
Emerson Power Transmission  
Ithaca, New York

WSP Engineering of New York, P.C.  
11190 Sunrise Valley Drive  
Suite 300  
Reston, VA 20191

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# 1 INTRODUCTION

This Construction Quality Assurance Project Plan (CQAPP) has been prepared by WSP Engineering of NY, P.C. (WSP) to describe the quality assurance (QA) observation and testing activities to be performed during implementation of the Remedial Design (RD) for Operable Unit (OU) No. 3 of the former Morse Industrial Corporation site (currently Emerson Power Transmission); the East Spencer Street Sewer Line Focused Excavation and Venting.

## 1.1 PURPOSE

The purpose of this CQAPP is to establish the minimum standards for independent QA observation that will be used to verify the Contractor's conformance with the material and construction quality control (QC) requirements for the project.

## 1.2 ORGANIZATION, RESPONSIBILITIES, AND QUALIFICATIONS

A description of the project organization and the QA/QC roles and responsibilities of those involved in this project are described in the following paragraphs and illustrated in Figure 1-1.

**Project Owner** – As Owner, Emerson the parent of Emerson Power transmission (EPT) is ultimately responsible for the successful completion of the remedial action phase of work at the Site. The Owner has retained WSP Engineering of New York (WSP) to perform all construction quality assurance (CQA) activities for the remedial action work. The Owner will also hire a qualified Contractor (based on a bid and negotiation process) to perform the construction work in accordance with the approved Contract Drawings and Specifications, and Contract Documents.

**Design Engineer** – WSP is the Design Engineer and is a qualified, licensed engineering firm registered in the state of New York. WSP is responsible for developing the remedial design and specifications, engineering drawings, schedule, and all documents required for the work. WSP will furnish interpretations and clarifications of the design documents to the CQA representatives during implementation, as applicable and required. WSP will perform the role of Resident Engineer.

**Resident Engineer** – The Resident Engineer is Kevin Sullivan, P.E., of WSP who is a licensed professional engineer having experience in the support and implementation of similar remedial actions. The Resident Engineer will provide oversight of the remedial action phase of work. The Resident Engineer may (1) be the same or a different person or entity than the Design Engineer and/or (2) serve as an "Owner's Representative". The Resident Engineer will primarily be responsible for reviewing and approving (on behalf of the Owner) all submittals furnished by the Contractor, all work completed, and all payment requests submitted by the Contractor during and following completion of required construction work. All project changes affecting the design will be routed through the Resident Engineer to the Design Engineer.

The Resident Engineer will also perform CQA functions including:

- attending significant issue resolution meetings, as required
- reviewing field reports and providing engineering review of all design and/or final certification issues
- providing QC oversight of CQA activities, including conducting site visits on a random basis or as required
- review of any field changes that would constitute a change in design from the original design Drawings or Specifications





- preparing or reviewing the final Certification Report, including review of the Record Drawings

**Construction Quality Assurance (CQA) Official** – The CQA Official will be Scott Petersen of WSP. Mr. Petersen will be responsible for observing, testing, and documenting all construction activities related to the specified remedial work. He is responsible for issuing a final Certification Report and As-Built Drawings documenting that the construction was performed in compliance with approved design documents. The Resident Engineer, a Professional Engineer registered in the State of New York will review and stamp the Certification Report.

Mr. Petersen will report directly to Mr. Sullivan, the Resident Engineer and will be onsite at all times during construction activities and be responsible for the following activities:

- directing implementation of this CQAPP
- serving as point of contact with the on-Site and off-Site project personnel regarding all QA issues related to the remedial work
- leading all on-site project coordination meetings (i.e., resolution, pre-construction, daily, weekly, etc.)
- preparing daily report(s) and logs, as appropriate
- ongoing preparation of the Record Drawings
- checking borrow source testing and other materials test results for compliance with the Specifications
- verifying that completed areas of work are protected before backfill materials are placed
- providing oversight of the Contractor's sampling of waste materials and labeling the samples for chemical conformance testing by the Contractor's selected QC testing laboratory
- identifying and reporting all problems/observations; resolutions to construction problems will also be noted in the daily reports
- collecting samples of materials of construction on behalf of the Owner

**Contractor** – The Contractor shall have a demonstrated history of successful remedial construction projects of a similar nature to this project. The Contractor may utilize qualified subcontractors and engineering firms to perform specialty work. The Contractor will be responsible to provide a structural design for the shoring system to be used at the site and will need to employ the services of a licensed structural engineer. The Contractor will be solely responsible for all construction QC activities and requirements, including QC functions provided by subcontractors. The Contractor shall be responsible for all work activities performed by all subcontractors.

**Contract Laboratories** – (1) WSP will retain one or more laboratories for waste material, backfill material and other material physical and/or chemical analysis as required by the Specifications. These laboratories will be independent of the Owner, Contractor, and CQA Official. Laboratories shall meet "Recommended Requirements for Independent Laboratory Qualifications" published by American Council of Independent Laboratories. Some of these requirements include the following:

- Must be a United States Environmental Protection Agency Contract Laboratory Program (USEPA CLP) certified laboratory, or at least perform USEPA analytical methods equivalent to those in the current CLP work scopes for inorganic and organic analysis.
- Must have a Laboratory Quality Assurance Plan (LQAP) that can be provided to the Contractor.
- Must be certified by the New York State Department of Health under the Environmental Laboratory Approval Program (NYSDOH-ELAP) in order to perform various analyses on non-potable water and environmental solid and hazardous waste samples. Certificates must be provided.



- Must participate in the QA/QC program that includes NYSDOH audits and evaluated testing through semi-annual analysis of proficiency testing samples, which shall be provided to the Contractor. This is similar to the CLP Performance Evaluation system.

### 1.3 SCOPE OF WORK

QA oversight of the sanitary sewer replacement project will be provided for the definable features of the project, as described below. Details of each of the features are provided in the drawings and specifications.

In general, the definable features of the remedial design are:

- Removal of the existing sanitary sewer from MH-9 located on Turner Place to the abandoned manhole, MH-18, located on East Spencer Street (Section 1), and further to MH-17 located approximately 300-ft south of MH-18 on East Spencer Street (Section 2).
- Replacement of sewer piping using SDR 35 PVC pipe with gasketed fittings and installation of a new manhole at the turn between Sections 1 and 2.
- Installation of the ventilation system including the bedding vent piping, the ventilation stack, and the ventilation turbine.
- Backfilling and restoration of East Spencer Street including replacement of water and storm sewer appurtenances, installation of the new road surface, installation of the new curb, and repair and/or replacement of the retaining wall along the project boundary.



---

## 2 PROJECT INITIATION AND PRE-CONSTRUCTION MEETING

Prior to the start of construction a kickoff meeting will be held to discuss the conduct of the work. The Pre-Construction Meeting will be attended by representatives from WSP, City of Ithaca, and the Contractor. The objectives of the meeting are: (1) to establish lines of communication between the various parties during construction, and (2) to discuss the project as a team in order to identify and/or resolve outstanding issues.

The meeting agenda will include, at a minimum, the following:

- introduction of all attendees and their respective roles and responsibilities
- review of the project scope and objectives
- review of the project drawings, specifications, and the site procedures
- review of the project schedule
- coordination of QC and QA activities
- review of document control and change control procedures
- establishing meeting schedules and objectives
- establishing dispute/resolution procedures



---

## 3 THREE PHASES OF CONTROL

To control the quality of the work, a three-phase QA program will be implemented.

### 3.1 PREPARATORY PHASE

A preparatory meeting will be held with WSP and the Contractor prior to the start of work on each definable feature of work. The meeting will include the following:

- review of applicable Drawings and Specification sections
- review of QC and QA requirements
- verification of submittal and material approval process
- review of Contractor's means, methods, and schedule

### 3.2 IMPLEMENTATION PHASE

During this phase, progress inspections of the work being completed will be performed for each definable feature of work. The quality of workmanship will be examined, and the QC testing protocols will be reviewed for compliance with the contract documents. During this phase, random or continuous QA inspections will be performed on a daily basis until the definable feature of work is completed to verify continuing compliance with QC requirements.

### 3.3 FOLLOW-UP PHASE

The Follow-Up Phase consists primarily of two milestone inspection, the Pre-Final and Final Inspections, discussed below.

#### 3.3.1 Pre-Final Inspections

At the completion of all the work or some portion of the work, the Contractor's QC Representative will schedule a pre-final inspection. The QA and QC Representatives will develop a list of deficiencies, commonly called a "punch list", of items not meeting the requirements of the drawings, specifications, and site procedures. The punch list will be included in the Daily QA Report. The completed portion of the work will not be covered up by subsequent work until all of the punch list items have been resolved, and final acceptance of the work has been granted.

#### 3.3.2 Final Inspections

The final inspection of the Site will be conducted when it has been determined that all items previously identified as requiring corrective action have been completed. The Contractor, WSP's Resident Engineer and CQA Official, as well as the City of Ithaca participate in the final inspection of the completed work.



---

## 4 QUALITY ASSURANCE ACTIVITIES

The Contractor has the ultimate responsibility for all QC activities necessary to manage, control, and document that the work complies with the requirements established by the drawings and specifications. QA, separate from but coordinated with QC, is used to verify that the level of quality required by the drawings and specifications has been achieved by the Contractor.

This section describes the QA review, observation, and testing activities that will occur during construction of each definable feature of the remedy.

QA representatives will be responsible for observing and documenting all of the construction activities. QA activities will be documented in a daily report. The CQA official will provide written notification to Owner and Resident Engineer for any work that is not in conformance with the drawings or specifications.

### 4.1 SUBMITTAL REVIEWS

WSP will review all Contractor submittals identified in the specifications and any additional requests for information specifically made by the Contractor. The submittals will be reviewed for completeness and compliance with the specifications. Based on the review, the WSP will approval or disapproval of the submittals. WSP will coordinate resolution of disapproved submittals with the Contractor before the work proceeds.

If necessary, interpretations and clarifications of the contract, specifications, drawings, or other design documents will be furnished by WSP's Resident Engineer or CQA Official, who is ultimately responsible for the design. Any and all project changes that affect the design shall be routed through the WSP prior to acceptance and implementation.

### 4.2 REVIEW OF THE CONTRACTOR'S QC LABORATORIES

QA personnel will review the test methods and results provided by the Contractor's independent QC laboratory(ies).

### 4.3 RESOLUTION OF QA/QC ISSUES

**Deficient Items.** A deficient item is a portion of the work that is found during QA/QC activities to be incomplete and/or not in conformance with the project requirements (drawings, specifications, and site procedures). Generally the deficient item is identified at a point in the construction process in which it can be corrected in the field by additional work. The Contractor will document and control deficient items that are identified by WSP's CQA officer using a deficiency log or punch list. All punch list items will be resolved before installation of subsequent materials and before the impacted portion of the work is accepted during the Pre-Final Inspection process. WSP's CQA official and the Contractor will agree upon the method for defining the extent of a deficient work item, and on the procedure that will be used for corrective action.

**Non-Conforming Items.** A non-conforming item is a deficiency that is identified when the work has progressed beyond the point at which it can be easily corrected in the field by additional work. WSP's CQA official will inform and review any potential non-conforming items with WSP's resident engineer. Resolution of the non-conforming item will be reviewed with Emerson and the City, as necessary. Also, if a variance from the Contract requirements is requested by the Contractor, WSP's Resident Engineer will review with Emerson and the City, as appropriate.

For items such as a design change or a non-conforming item, that requires a variance from the Contract Documents, the Contractor will prepare a change/variation request. The request will be submitted to



WSP's Resident Engineer for review, and if the request is granted, it will be forwarded to the appropriate personnel concurrence. If a request for a non-conforming item of construction is denied, WSP's Resident Engineer and CQA official, and the Contractor will agree upon the method for defining the extent of the non-conforming work item and on the procedure that will be used for corrective action.

**Quality Action Meeting.** During the course of the project, WSP's CQA official and Contractor may identify the need for a meeting to resolve an issue related to the quality of the work. Project personnel will meet as a team to discuss what caused the problem, how to correct it, and how to minimize the possibility of its recurrence. The amount of increased oversight and methods to determine the extent of deficient work will be discussed at these meetings.



---

## 5 SOIL MATERIALS AND AGGREGATE

### 5.1 GENERAL

Soil materials are to be placed at the locations shown or specified in the Contract Documents. Soil materials, including aggregate, will be used as trench backfill; backfilling over-excavated areas, and for general site grading. Aggregate materials of the types specified at locations shown on the Contract Drawings will be used for bedding for concrete structures; trench bedding work; and for pavement courses.

### 5.2 REFERENCE STANDARDS

Soil materials will comply with the applicable provisions and recommendations of the State of New York Department of Transportation Design and Construction Division "Standard Specifications", Construction and Materials, dated January 1990 (NYSDOTSS) and all addenda, unless otherwise shown or specified.

Material classifications will be in accordance with the Unified Soil Classification System (USCS), ASTM D2487.

Test methods for all soil materials will be carried out in accordance with approved methods including primarily, procedures developed by the American Society of Testing and Materials (ASTM). Those tests that may be required in the course of this project and the accepted test method reference are detailed in the Specifications. Substitution of a method other than that specified for a particular test is subject to the approval of the Engineer. Also, the use of test methods for those tests not listed in the Specifications, but that are deemed necessary for the work, is subject to the approval of the Engineer.

Material that is "free of contamination" will be defined in accordance with the New York State Department of Environmental Conservation guidelines: there will be no visual or olfactory evidence of contamination, and the material will meet NYCRR Part 375-6.8(a) requirements for Unrestricted Use.

### 5.3 MATERIALS

#### 5.3.1 Aggregate


The Contractor will conform to the material definition provided in the Specifications for materials to be provided. The Contractor will:

- Provide representative samples of each material furnished to the Engineer upon request for approval, and will provide the source location. (Each source will be considered as a separate material entity requiring its own submittal)
- Submit certificates of compliance with reference standards for each aggregate material from approved independent laboratories.

#### 5.3.2 Soil Materials

It is the responsibility of the Contractor to provide approved and appropriate soil materials to be used in the work of the project. The Contractor will not be permitted to bring materials into the work area until the required submittals are approved by WSP's CQA Official. No on-site materials, stockpiled or in-situ, will be permitted to be placed without WSP's approval.

Testing of stockpiled materials shall not be required, unless necessary for satisfaction of performance of QC testing (i.e., compaction).



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All proposed off-site material will be free from organic or other perishable material, roots, frozen material, stones larger than six (6) inches, debris, contaminants, and any other objectionable material in accordance with the Specifications. Gap-graded or segregated materials will not be permitted. Excessively wet material will not be permitted for placement if it appears too wet to effectively compact, as determined by the WSP's CQA Official.

Prior to bringing materials on site the Contractor will submit and receive WSP's CQA Official's approval of certified laboratory test reports by an approved Independent Testing Laboratory, for all laboratory testing required by the Specifications. Each proposed borrow source and material will require representation by laboratory testing in conformance with the Specifications. For NYSDOTSS items, certifications may be submitted instead of actual laboratory test data.

The Contractor's proposed testing laboratory will be subject to the WSP CQA Official's approval. Any testing services performed by an unapproved laboratory may be disallowed by WSP's CQA Official, in which case the materials will be retested by an approved laboratory.

WSP's CQA Official may inspect any of the Contractor's proposed borrow sources. The Contractor will make all necessary arrangements to accommodate such inspections.

The Contractor will conform to the materials definition provided in the Specifications for soil materials to be provided for: grading fill, general fill, structural fill, trench backfill, and aggregate materials (as discussed in the next section).

#### 5.4 CONSTRUCTION QUALITY EVALUATION

The Contractor will provide all necessary supervision, labor, equipment, and materials as needed to perform the specified work. WSP's CQA Official will approve the Contractor's proposed methods and equipment prior to the start of the work.

##### 5.4.1 Aggregate Bedding and Backfill

The aggregate materials will be approved by WSP's CQA Official prior to placement. The CQA Official will perform the following during placement of the material:

- observe and document the quality of workmanship and aggregate
- materials used by the Contractor personnel in performance of the work
- perform construction quality testing (i.e., pressure testing, compaction testing, etc.)
- verify the thickness of the placed aggregate materials

Proper placement of bedding is critical to the long-term structural stability of the pipe. The contractor must follow the procedures identified in the specifications and contained in the applicable guidance documents for PVC pipe (See RD Report).

WSP's CQA Official will witness all backfilling up to 12 inches above the top of the pipe, and above that as necessary, to ensure that proper procedures are followed.

Backfill and bedding around structures and sewer piping will be placed in 6-inch thick lifts. Placement and compaction will proceed uniformly around the structure to prevent eccentric loadings. QA inspection personnel will witness all such backfilling to ensure that no damage is done to any structure or appurtenance.





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#### 5.4.2 Pipe Trenches

Pipe trenches must be excavated and prepared to provide a smooth, firm foundation for the placement of bedding stone and pipe. Unsuitable materials, as defined in the Specifications, must be identified by the Contractor during excavation, removed, and replaced with acceptable materials.



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## 6 SANITARY SEWER PIPE AND CONNECTIONS

### 6.1 GENERAL

New sanitary sewer pipe will be installed to match existing slopes. Following installation the sanitary pipe will be tested using low pressure air in accordance with ASTM F1417 as indicated in the design specifications. The contractor will be responsible for the testing including setup, performing, and breakdown the testing equipment. The contractor shall provide appropriate test documentation to WSP's CQA Official relating to procedure, test data, results and conclusions.

Inspections will be performed and documented on a daily basis to ensure that the completed work is in accordance with the design.

### 6.2 REFERENCE STANDARDS

Installation of the sanitary sewer will adhere to standard industry practice and be in accordance with contract drawings, specifications, city standards, and applicable references, such as "Recommended Standards for Wastewater Facilities" 2004 Edition.

### 6.3 PRODUCTS AND MATERIALS

The Contractor will conform to the definitions provided in the specifications for products and materials provided under this contract including piping, fittings, and accessories.

### 6.4 CONSTRUCTION QUALITY EVALUATION

WSP's CQA Official will perform the following during sanitary sewer installation:

- Review and accept contractor submittals as required by the contract documents, prior to installation of sewer materials.
- Observe and document sanitary sewer installation including the existing pipe conditions at the beginning and end of the contract limits, as well as at each of the sewer lateral tie-ins.
- Observe and document hydrostatic (or air) testing of all sewer piping and where necessary gravity pipe.
- Verify and document proper operation of the completed sewer as well as each of the lateral tie-ins from the adjacent buildings.



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## 7 DOCUMENTATION

### 7.1 FIELD LOGBOOK

The CQA Official will maintain a bound field logbook to record observations, actions, QA tests conducted, and other information related to daily QA activities. The field logbook will contain sufficient information for the CQA Official to reconstruct the day's activities and decisions for inclusion in the daily QA report. Actual field data will be recorded on the appropriate field QA forms. The field logbook will contain information such as:

- date and time
- weather conditions
- description of work
- field observations
- field measurements
- field tests observed or conducted
- field samples taken

### 7.2 PHOTOGRAPHIC RECORDS

The CQA Official will provide digital photographic documentation of the construction activities. The photographs will be used to illustrate construction progress, problem areas, deviations, and corrective actions.

Photographs for tracking progress will be taken on a weekly basis from a sufficient number of vantage points to adequately display the overall project activities. Subsequent photographs will be taken from the same vantage points, if possible. Photographs will be recorded on a photo log format that is acceptable to the Resident Engineer.

### 7.3 DAILY QUALITY ASSURANCE REPORTS

The Daily QA Report will document Contractor construction activities and also QA observations/testing. The reports will be completed each day by WSP's CQA Official and will be maintained at the field office files. At the end of each week, they will be compiled for distribution to the Resident Engineer. The format of the Daily QA Report is shown in Attachment 1.

The information contained in this report will include the: date, temperature, weather conditions, report number, names of the Contractor and any subcontractors on-site that day, visitors to the site, description of construction activities, problems including delays and extra work, discussions with the Contractor and/or other responsible parties and safety issues. Verification will be provided that soil, aggregate, pipe, and other project materials meet the project specifications and that placement quality control is being maintained. Deviations from the drawings, specifications, work plans, and quality control procedures will be noted for later resolution.

Daily field QA test reports, as well as daily Contractor QC observation/test reports, will be included with the Daily QA Report.



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#### 7.4 FIELD QA REPORTS

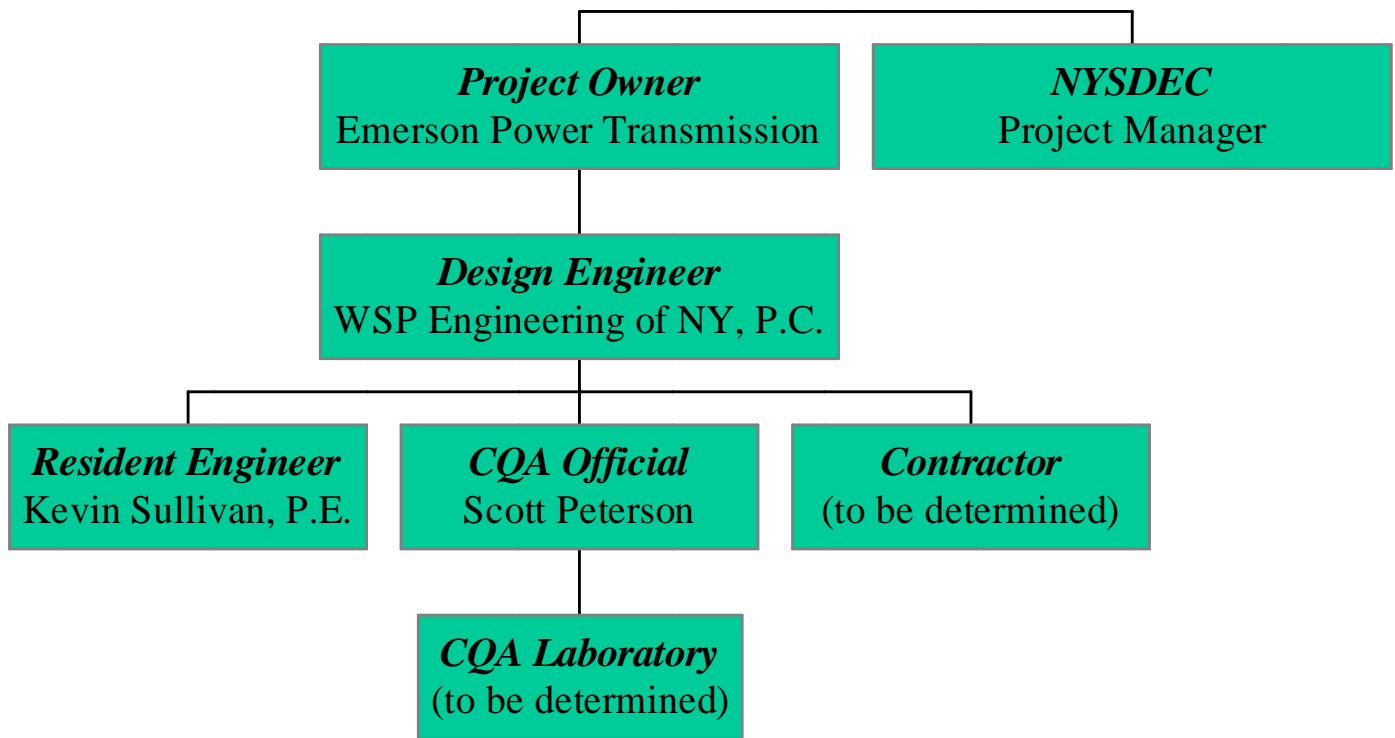
The results of QA observations and/or testing will be reported on the forms provided in Attachment 1.

#### 7.5 REMEDIAL ACTION REPORT

Within 60 days after the Final Inspection has been completed and other requirements set forth in the ROD have been attained, a Draft Remedial Action Report will be prepared and submitted to NYSDEC. The Remedial Action Report will include, but not be limited to, the following elements:

- Documentation of construction activities: A description of the construction activities including completion milestones achieved; Modifications or changes to the approved plans and specifications of the Final Design Report will be documented and “as-built” drawings will be provided showing all such modifications, including rationale for the modifications. The Draft Remedial Action Report and “as-built” drawings will be signed and stamped by a New York State licensed professional engineer.
- Documentation of construction quality control: A description of the construction quality control process including documentation that the Remedial Action was constructed in accordance with the plans, specifications, and reports shall be provided. The documentation will illustrate consistency with the approved ROD.
- Pre-final and Final Inspections: Documentation of the pre-final and final inspections conducted by Stakeholders at the completion of the remedial action work will be documented. Items that are found to be deficient, including corrective measures employed to resolve the deficiency, will be documented.

The Remedial Action Report will be provided as Final once NYSDEC comments on the draft version are adequately addressed.





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## Appendix C – Health and Safety Plan



**Project No.: 0003197-04**

**Site Specific Health and Safety Plan For Sites in North America**

Site Name: Emerson Power Transmission – Ithaca, NY

Site Location:

Street Address: 620 South Aurora Street

City: Ithaca

State and Zip Code: New York, 14850

Location of Work:

Street Address: East Spencer Street

City: Ithaca

State and Zip Code: New York, 14850

Site Representative/Owner: Scott Gibson/Derek Chase

Phone Number: 607-272-1717/1-416-254-7452

Start Date of Site Work: August 1, 2011

Projected End Date of Site Work: September 9, 2011

HASP Prepared by: Scott Petersen

HASP Reviewed by: Jim Bulman

<u>Personnel</u>	<u>Responsibilities</u>
<u>Jim Bulman</u>	<u>General Supervisor/Project Manager</u>
<u>Kevin Sullivan</u>	<u>General Supervisor/Project Manager</u>
<u>Scott Petersen</u>	<u>Site Health and Safety Officer</u>
<u>Scott Petersen</u>	<u>Task # 1 Field Personnel</u>

## Site Information

Site Description (at a minimum include: current site operations, major structures, site topography, access by road and air):

The EPT facility is located at 620 South Aurora Street in Ithaca, New York. The facility site comprises approximately 110 acres within the City of Ithaca and the Town of Ithaca in Tompkins County and includes the New York State Electric and Gas substation property to the west (Figure 1). The area surrounding the facility consists mostly of residential homes. The campus of Ithaca College borders the site on the east across South Aurora Street. The southern portion of the property is unused and vacant. Wooded land and residential areas border the property to the west, and residential areas are located to the north. Cayuga Lake is approximately 2 miles north of the site. None of the offsite work zones can be reasonably accessed by air. The work zones located at the EPT facility can be accessed by road from entrances located along South Aurora Street and at the northern End of Turner place. The northernmost extent of the EPT property is an open field, which can be accessed by air.

Site History (at a minimum include past site operations, and source [if known], location, and media affected by chemicals of concern, specific chemicals of concern, and known concentrations of chemicals of concern):

The original building at the EPT site was built in 1906 by Morse Industrial Corporation, which manufactured steel roller chain for the automobile industry. From approximately 1928 to 1983, Borg-Warner Corporation owned the property and manufactured automotive components and power transmission equipment. A more detailed description of the site history and construction dates of the various buildings at the site is detailed in the report entitled *Onsite Assessment of the Former Borg Warner – Morse Chain Facility* (ESC 2005). Up until the late 1970s, Borg-Warner Corporation used trichloroethene (TCE), a widely used solvent at the time, for degreasing metal parts. Solvents appear to have been flushed into the plant's sanitary sewer system which connects to the municipal sewer along Turner Place and Cayuga Street. It is believed that solvents leaked from the sewer system through cracks and joints. In addition, results of soil vapor sampling show that solvent releases have occurred from sewer lines originating at the former NCR facility located at 950 Danby Road (currently owned by South Hill Business Campus, LLC) and Therm, Inc., facility located at 100 Hudson Street Extension. The NCR sewer line extends across the south east portion of the EPT property, then north along South Aurora Street, west along Columbia Street, and connects to the sewer on Turner Place and East Spencer Street. The sewer line originating from the Therm facility connects to the South Aurora/Columbia Street sewer line, which in turn, connects to the sewer line along Turner Place and East Spencer Street.

In 1983, Emerson purchased Morse Industrial Corporation from Borg-Warner Corporation and became known as Emerson Power Transmission. EPT manufactured roller chain, bearings, and clutching for the power transmission industry until December 2010 when operations ceased. TCE was never used by EPT at the facility.

Based on previous investigations, knowledge of releases, and the Sewer Manhole Assessment Report (WSP 2008) chemicals of concern (COC) likely to be encountered along the sewer line are 1,1,1-Trichloroethane, 1,2-Dichloroethane, cis-1,2-Dichloroethylene, Methylene Chloride, Tetrachloroethene, trans-1,2-Dichloroethene, Trichloroethene, and Vinyl Chloride.



## **Proposed Onsite Activities** (*this is your comprehensive work plan*):

### Introduction

Operable Unit (OU) No. 3 is a section of sanitary sewer located in the South Hill neighborhood of Ithaca NY. As detailed in the South Hill Sanitary Sewer Network Alternatives Analysis report dated September 3, 2009, results of investigations showed that the highest concentration of TCE were detected in soil vapor along the OU No. 3 section. The remedy for OU No. 3 is to remove potentially impacted bedding plane material (and sewer pipe material) along an approximate 300-foot section of the sanitary sewer extending from the intersection of Turner Place, MH-9, and along East Spencer Street. The replacement pipe will be air-tight and bedded with highly permeable granular material. A perforated pipe will be placed in the bedding material to vent the 300-foot trench to atmosphere via a single exhaust stack equipped with a wind turbine.

### **Task 1:**

#### Sanitary Sewer Bypass and Temporary Service Shut-Off

Prior to the start of the remedy work in OU No. 3 the City of Ithaca DPW will construct a bypass system for the sanitary sewer in the work area. The bypass system will pump sanitary water from a manhole near the base of Turner Place to a manhole beyond the remedy area on East Spencer Street. Also, the City DPW will establish temporary sanitary sewer connections to bypass the work zone, and will maintain this system throughout the duration of the remedy work.

As necessary, water and natural gas supply laterals from main supply lines to homes in the work area will be temporarily shut off. Residents will be notified at least 24 hours prior to any temporary service interruption and such interruptions will be restored at the completion of each work day.

NYSEG will undertake measures to protect utility poles and maintain electricity service to residences in the work area. Preliminary plans for the sewer remedy have been provided to NYSEG and a filed reconnaissance was held with NYSEG representatives. Once a firm schedule for the work is established NYSEG will undertake appropriate actions.

### **Task 2:**

#### Removal and Replacement of the Sanitary Sewer

Excavation will start along Section 2 at the lowest point on East Spencer Street at MH-17, approximately 30 feet south of the end of Section 2, and proceed north along East Spencer Street to MH-18. At this point the excavation will proceed to the east along Section 1 toward Turner Place to MH-9. Each day the excavation work will be limited to the length of sewer pipe that can be removed and replaced. Asphalt will be cut, removed, and loaded into a roll-off container. Overburden soil above the sanitary sewer line will be removed and placed in a roll-off. The sanitary sewer and surrounding bedding material will be excavated and staged in a separate roll-off base on photoionization detector readings.

### **Task 3:**

#### Venting System

A venting pipe consisting will be installed in the bedding material above or along the site depending on the space available for the replacement sewer line. Perforations will be at least a 1/4-inch diameter, no more than 18-inches apart with sets of three perforations every 18-inches

interval (i.e. 0 degrees, 120 degrees, 240 degrees). A second venting pipe will be utilized to connect the Section 1 venting pipe to the exhaust stack.

A 45 mil ethylene propylene diene monomer (EPDM) rubber will be installed directly on top of the bedding material and approximately 1-inch above the venting pipe. The EPDM rubber will eliminate direct water infiltration into the bedding material and vent pipe.

The perforated venting pipe will be connected to an approximately 5-inch diameter steel pipe which will serve as the exhaust stack. The stack will be approximately 25 feet high. A rubber gasket, or similar, will be installed between the outside of the HDPE pipe and exhaust stack at the top of the exhaust stack foundation. The stack will be equipped with a sample port to allow for monitoring. The sample port will be lockable to inhibit unauthorized access to the port. The installation of the exhaust stack will also ensure the venting pipe is installed at a lower elevation than the inlet to the bottom of the exhaust stack to ensure air flow can rise freely and condensation in the exhaust stack can drain. A wind turbine will be installed on top of the exhaust stack. The foundation of the steel utility pole will be installed to manufacturer specifications. Bollards will be constructed adjacent to the exhaust stack to prevent damage by vehicles parking on the gravel parking.

Clean fill free of rock or gravel larger than 2 inches in any dimension will be placed above the EPDM. Backfill material will be placed around the sewer line exiting MH-9, between Section 1 and the exhaust stack, and between the end of Section 2 and MH-18. Along Section 1 on East Spencer Street, No. 2 Run of Crusher base material will be placed followed by asphalt consisting of Type 3 asphalt binder and Type 6 asphalt. The sewer along Section 2 will be backfilled up to approximate grade with clean fill and will then be finished to match existing grade (i.e. gravel, grass, or sidewalk).

It is anticipated that four (4) water supply laterals will be encountered during the sewer replacement work. If necessary, the water line laterals will be removed and replaced. The water supply laterals will be completed with a grout collar that will encompass the new and existing water supply lateral connections. The grout collar will serve as a vapor dam that will segregate the trench from bedding material of the pipe.

#### ***Task 4:***

##### **Stormwater Management**

Best management practices will be employed during the sewer excavation and replacement work with respect to stormwater management. Sediment and erosion controls will be utilized to mitigate stormwater impact. Specific methods and materials for erosion control will conform to the "New York State Standards and Specifications for Erosion and Sediment Control" (NYSDEC, 2005).

A stormwater catch basin within the work area along East Spencer Street will need to be removed during the sewer replacement work. Connecting pipes will be cut back and plugged so that stormwater does not enter the excavation. A bypass pump will be available to redirect stormwater drainage to a catch basin further south on East Spencer Street. Run-off water along the street will be diverted around the work area using sandbags.

#### ***Task 5:***

##### **Site Restoration**

At the end of each work day, the work area will be restored and covered with stone. Adjacent pavement will be swept to remove dust or soil. The final asphalt pavement placed along East Spencer Street will match the original grade. All sidewalks removed will be restored to City code.

#### **Task 6:**

##### Management of Excavated Materials

Excavated overburden and bedding soil will be placed in separate roll-off containers. Sewer pipe and any debris that is removed will be placed in the roll-off containing bedding material. Roll-offs will be covered and staged at the EPT facility at the end of each day. Samples will be collected of overburden and bedding soil in roll-offs and analyzed by a New York State certified laboratory for characterization purposes. The characterization sampling results will be used to determine appropriate disposition of the soils.

#### **Task 7:**

##### Decontamination and Demobilization Equipment

All equipment and reusable tools and supplies will be cleaned by scraping off bulk residuals. Equipment other than heavy machinery also will be within a temporary decontamination pad that will be constructed at the EPT facility. Wash water will be collected in 55-gallon DOT-approved drums and staged at the EPT facility for subsequent characterization and disposal. Disposable equipment and materials will be collected and disposed of according to state and federal regulations. All construction equipment will be demobilized from the site.

### **Hazard Evaluations**

Task 1: Sanitary Sewer Bypass and Temporary Service Shut-Off

Description: Oversight of sewer bypass and temporary shut-off of natural gas lines.

Waste Types:   X   Vapor   X   Liquid   X   Solid      Sludge

Characteristics:      Corrosive      Ignitable      Radioactive

  X   Volatile   X   Toxic      Reactive

Identification of Hazards/Hazard Assessment:

- Potential dermal contact and/or inhalation of vapors or particulate associated with contaminated soil or bedrock
- Potential dermal contact and/or inhalation of vapors from the sewer bypass
- Slip, trip and fall hazards
- Working around large equipment (tracked excavator)
- Elevated noise levels above PELs
- Working outdoors with potential overexposure to UV radiation, heat stress (see Appendix E), cold stress, and insects such as ticks
- Outdoor physical hazards such as poisonous plants, and wildlife

*Primary potential hazards are volatile compounds, heat stress, explosion/flammable, organic chemicals, physical stress, and general splashes. Be aware and watchful of the locations of equipment and people; be aware of slip and trip hazards; always practice safe lifting techniques. Take frequent breaks and drink plenty of fluids.*

Task 2: Removal and Replacement of the Sanitary Sewer

Description: Oversight of the removal of the sanitary sewer and natural gas laterals. Possible removal of water line laterals. Oversight of the installation of a new sewer line and gas laterals.

Waste Types:   X   Vapor   X   Liquid   X   Solid      Sludge

Characteristics:   X   Corrosive   X   Ignitable      Radioactive  
  X   Volatile   X   Toxic      Reactive

Identification of Hazards/Hazard Assessment:

- Potential dermal contact and/or inhalation of vapors or particulate associated with contaminated soil or bedrock
- Splash hazards
- Explosion hazards due to natural gas lines
- Working around heavy equipment (Caterpillar 308 SB Excavator, Komatsu WA320 Front End Loader, etc.)
- Elevated noise levels above PELs
- Working outdoors with potential overexposure to UV radiation, heat stress, cold stress, and insects such as ticks
- Working in and near active public roadways with unpredictable local traffic
- Working in the vicinity of caustic materials (grout)
- Contact with overhead hazards such as trees and power lines
- Working on private property

Task 3: Venting System

Description: Installation of the venting system and exhaust stack.

Waste Types:   X   Vapor   X   Liquid   X   Solid      Sludge

Characteristics:      Corrosive      Ignitable      Radioactive  
  X   Volatile   X   Toxic      Reactive

Identification of Hazards/Hazard Assessment:

- Potential dermal contact and/or inhalation of vapors or particulate associated with contaminated soil or bedrock
- Working around heavy equipment (Caterpillar 308 SB Excavator, Komatsu WA320 Front End Loader, etc.)
- Working around overhead equipment (for installation of the exhaust stack)
- Elevated noise levels above PELs
- Working outdoors with potential overexposure to UV radiation, heat stress, cold stress, and insects such as ticks
- Working in and near active public roadways with unpredictable local traffic
- Contact with overhead hazards such as trees and power lines

Task 4: Stormwater Managment

Description: Oversight of the redirecting of storm water around the work area.

Waste Types:   X   Vapor   X   Liquid   X   Solid      Sludge

Characteristics:      Corrosive      Ignitable      Radioactive  
  X   Volatile   X   Toxic      Reactive

Identification of Hazards/Hazard Assessment:

- Potential dermal contact and/or inhalation of vapors or particulate associated with contaminated soil or bedrock
- Splash and slip hazards
- Elevated noise levels above PELs
- Working outdoors with potential overexposure to UV radiation, heat stress, cold stress, and insects such as ticks
- Working in and near active public roadways with unpredictable local traffic
- Working in erosion zones during setup of erosion control protections

Task 5: Site Restoration

Description: Oversight of the backfilling and paving of the road. Oversight of the reseeding and landscaping of the work area.

Waste Types:      Vapor      Liquid   X   Solid      Sludge

Characteristics:      Corrosive      Ignitable      Radioactive  
  X   Volatile   X   Toxic      Reactive

Identification of Hazards/Hazard Assessment:

- Working around heavy equipment (Caterpillar 308 SB Excavator, Komatsu WA320 Front End Loader, etc.)
- Elevated noise levels above PELs
- Working outdoors with potential overexposure to UV radiation, heat stress, cold stress, and insects such as ticks
- Working in and near active public roadways with unpredictable local traffic

Task 6: Management of Excavated Materials

Description: Sampling and monitoring (with a PID) soil as it is removed from the excavation.

Waste Types: ☒ Vapor ☒ Liquid ☒ Solid ☐ Sludge

Characteristics: ☐ Corrosive ☐ Ignitable ☐ Radioactive  
☒ Volatile ☒ Toxic ☐ Reactive

Identification of Hazards/Hazard Assessment:

- Potential dermal and/or inhalation of vapors or particulate associated with contaminated soil or bedrock
- Splash hazards
- Slips, trips, and falls
- Working around heavy equipment (Caterpillar 308 SB Excavator, Komatsu WA320 Front End Loader, etc.)
- Elevated noise levels above PELs
- Working outdoors with potential overexposure to UV radiation, heat stress, cold stress, and insects such as ticks

Task 7: Decontamination and Demobilization

Description: Oversight of the decontamination of equipment.

Waste Types: ☒ Vapor ☒ Liquid ☒ Solid ☐ Sludge

Characteristics: ☐ Corrosive ☐ Ignitable ☐ Radioactive  
☒ Volatile ☒ Toxic ☐ Reactive

Identification of Hazards/Hazard Assessment:

- Potential dermal and/or inhalation of vapors or particulate associated with contaminated soil or bedrock
- Splash hazards

- Working outdoors with potential overexposure to UV radiation, heat stress, cold stress, and insects such as ticks

### **Required Personal Protective Equipment**

The following levels of personal protection have been designated for the following tasks:

**Task 1:        Sanitary Sewer Bypass and Temporary Service Shut-Off**

Respiratory: None for Level D, upgrade to Level C if action level triggered

Clothing: Shirt with sleeves and long pants

Gloves: Nitrile gloves for sampling

Boots: Steel Toe

Other: Hi-vis traffic vest, hard hat, safety glasses, hearing protection, sunscreen and insect repellent.

**Task 2:        Removal and Replacement of the Sanitary Sewer**

Respiratory: None for Level D, upgrade to Level C if action level triggered

Clothing: Shirt with sleeves and long pants

Gloves: Nitrile gloves for sampling

Boots: Steel Toe

Other: Hi-vis traffic vest, hard hat, safety glasses, hearing protection, sunscreen and insect repellent.

**Task 3:        Venting System**

Respiratory: None for Level D, upgrade to Level C if action level triggered

Clothing: Shirt with sleeves and long pants

Gloves: Nitrile gloves for sampling

Boots: Steel Toe

Other: Hi-vis traffic vest, hard hat, safety glasses, hearing protection, sunscreen and insect repellent.

**Task 4:        Stormwater Managment**

Respiratory: None for Level D, upgrade to Level C if action level triggered

Clothing: Shirt with sleeves and long pants

Gloves: Nitrile gloves for sampling

Boots: Steel Toe  
Other: Hi-vis traffic vest, hard hat, safety glasses, hearing protection, sunscreen and insect repellent.

Task 5: Site Restoration

Respiratory: None for Level D, upgrade to Level C if action level triggered  
Clothing: Shirt with sleeves and long pants  
Gloves: Nitrile gloves for sampling  
Boots: Steel Toe  
Other: Hi-vis traffic vest, hard hat, safety glasses, hearing protection, sunscreen and insect repellent.

Task 6: Management of Excavated Materials

Respiratory: None for Level D, upgrade to Level C if action level triggered  
Clothing: Shirt with sleeves and long pants  
Gloves: Nitrile gloves for sampling  
Boots: Steel Toe  
Other: Hi-vis traffic vest, hard hat, safety glasses, hearing protection, sunscreen and insect repellent.

Task 7: Decontamination and Demobilization

Respiratory: None for Level D, upgrade to Level C if action level triggered  
Clothing: Shirt with sleeves and long pants  
Gloves: Nitrile gloves for sampling  
Boots: Steel Toe  
Other: Hi-vis traffic vest, hard hat, safety glasses, hearing protection, sunscreen and insect repellent.

**NO CHANGES TO THE SPECIFIED LEVEL OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE HEALTH AND SAFETY OFFICER AND THE PROJECT GENERAL SUPERVISOR/PROJECT MANAGER.**



## Monitoring Procedures

Site Monitoring Equipment:

☒ PID    ☐ OVA    ☒ Aerosol Dust Monitor

☐ Colorimetric Tube    ☐ Radiation Dosimeters

Action Levels for Protective Equipment Upgrades (assume all work begins in Level D):

☒ C    ☐ B

Dust and PID monitoring will be monitored, at a minimum, in accordance with the CAMP prepared for OU-3.

Action Level Calculation based upon: The PEL for vinyl chloride is 1 ppm as a TWA.  
Therefore, the action level for respiratory upgrade is 0.5 ppm (half of the PEL for vinyl chloride).

Description of action level calculation, monitoring procedures, and PPE upgrade procedures:

*Vinyl chloride was detected in groundwater. All injection and sampling activities will be initiated in Level D protection. A PID with a 10.6 eV lamp will be used to monitor total volatile organic concentrations in the breathing zone and in the headspace of monitoring wells and piezometers in each test area. If PID readings of 0.5 ppm (one half of the PEL of vinyl chloride) are monitored for a sustained period of 5 minutes, work shall cease until engineering controls (e.g., ventilation) are instituted to prevent vapors from reaching the breathing zone and compound-specific analysis can be conducted. An upgrade to Level C PPE may be instituted. If vinyl chloride is detected at concentrations equal to or greater than 0.5 ppm by colorimetric analysis, site activities will cease until constituent-specific personal monitoring (i.e., an OSHA Reference Method or NIOSH reference method) is conducted to determine if an upgrade to Level B PPE is necessary. If constituent-specific monitoring indicates that Level B PPE is required, site activities will cease. The NIOSH reference guide is included in Appendix B.*

\*All breathing zone monitoring will be conducted continuously with the exception of colorimetric tubes.

\*All equipment will be calibrated per the manufacturer's recommendations. A battery and field check of each instrument will be made before it is used.

## **Personal Protective Equipment and Personnel Decontamination Procedures**

Detergent and water will be used as the decontamination solution unless otherwise specified.

Decontamination procedures will include the following (describe onsite decon procedures for PPE and personnel; for example [e.g., boot wash]):

- Nitrile glove removal, field wash.

**Equipment Decontamination Procedures will be conducted in accordance with WSP's Standard Operating Procedures 15 through 19**

### **Onsite Control**

The prevailing wind conditions are unknown (cardinal direction). No CRZ or support zone will be established downwind of a work/exclusion zone.

All WSP employees are responsible for onsite control. During work activities, the following zones will be established:

Work/Exclusion Zone *(describe specific location in which no unauthorized person will be permitted):*

The Work/Exclusion zone will be defined as a 15-foot perimeter surrounding the excavation location during active work.

Contamination Reduction Zone *(describe specific location in which all decon procedures will be performed):*

The Contamination Reduction zone will be located at the periphery of Work/Exclusion Zone.

Support Zone *(describe specific location in which no contaminated media is present where administrative tasks will be performed):*

All other areas not included in Work/Exclusion and Contaminant Reduction Zones will be defined as the Support Zone.

### Standard Operating Procedures

1. Whenever possible, use the buddy system.
2. Conduct a pre-entry briefing before beginning site activities each day and record in field book
3. Practice contamination avoidance. Never sit down or kneel, never lay equipment on the ground, avoid obvious sources of contamination such as puddles, and avoid unnecessary contact with onsite objects.
4. Do not eat, drink, or use tobacco products outside the designated support zone.
5. Whenever possible, do not use contact lenses while onsite.
6. Thoroughly wash hands and face before eating, drinking, etc.
7. Keep copies of the health and safety plan available in the support zone.
8. In the event PPE is ripped or torn, stop work and remove and replace PPE as soon as possible.
9. In the event of direct skin contact, immediately wash the affected area with soap and water.
10. Ensure that all subcontractors have a site specific HASP that is maintained onsite
11. Report all accidents, injuries, and environmental releases as required by WSP Environmental Global Directives 3 and 4.

### Confined Space Entry

No WSP employee may conduct permit required confined space entries. All non-permit required confined space entries will be approved by the WSP Corporate Health and Safety Officer or His/Her designee.

Approved by: \_\_\_\_\_ (***no approval means no entry***)

  X   No attempt will be made to enter any type of confined space including utility trenches

## Medical Surveillance

All employees, regardless of the exposure involved, are required to participate in the medical monitoring program established by WSP. OSHA regulations state that employees involved in certain activities that may expose them to hazardous materials at or above permissible exposure limits (PELs) or above the published exposure limit for greater than 30 days per year, or all employees who wear a respirator are required to participate in the monitoring program.

The purposes of the medical monitoring program are to identify any illness or condition that might be aggravated by exposure to hazardous materials or work conditions; to certify that each employee can use negative-pressure respirators as required by OSHA and withstand heat or cold stress; to ensure that employees are able to physically perform their assigned tasks and to establish and maintain a medical record to monitor for abnormalities that may be related to work exposure that could increase injury risk for the employee. WSP's medical monitoring program includes the following:

- a baseline physical examination
- a medical determination of fitness for duty, including work restrictions after any injury or illness that may affect employee safety
- a review of potential exposures to determine the need for specific biological and medical monitoring

List any site specific medical monitoring/needs here, based on the hazard analysis, if applicable: (e.g., severe allergies of site personnel to flora/fauna, need for an epinephrine pen, additional testing during annual physicals [e.g., PCBs, pesticides]):

## Communication Procedures

All onsite personnel will practice constant communication with other WSP personnel, subcontractors, and facility personnel during active work. Generally, verbal and/or cellular telephone communication will be used while onsite.

Special Communication Procedures (e.g., two-way radios for large sites with multiple workers):

**None**

If the site is an active facility, WSP will follow established onsite evacuation procedures.

Facility evacuation procedures have been reviewed (if applicable)

Verification initials (by a person assigned to the project): \_\_\_\_\_

**(no review means no work can be conducted)**

## Emergency Hand Signals

The following standard hand signals will be used in case injury or circumstance does not allow for verbal or other communication:

Hand gripping throat ..... Out of air, can't breathe  
Grip partner's wrist or both hands around waist..... Leave area immediately  
Hands on top of head..... Need assistance  
Thumbs up ..... Ok, I'm all right, I understand  
Thumbs down ..... No, negative

## Emergency Procedures

The following standard emergency procedures will be used by onsite personnel. The site health and safety officer shall be notified of any onsite emergency and shall be responsible for ensuring that the appropriate procedures are followed. The reporting of accidents and injuries is included in Appendix D.

### Air Release or Fire/Explosion

On notification of an air release or a fire/explosion, all personnel will travel at a right angle to the upwind direction. The site health and safety officer will then account for all personnel and notify the proper emergency agencies.

If the site health and safety officer is not available, the task manager or appropriate field personnel will assume these responsibilities.

### Personal Injury in the Work/Exclusion Zone With Buddy System

If onsite personnel require emergency medical treatment, and the buddy system is used, the following steps will be taken:

1. Evaluate the nature of the injury and obtain the onsite copy of this HASP
2. Contact local emergency service
3. Decontaminate to the extent possible before administration of first aid
4. Stay with the injured person.

### Personal Injury in the Work/Exclusion Zone While Working Alone

If onsite personnel are working alone, the following steps will be taken:

Before beginning work each day:

1. A cellular telephone will be kept with the employee at all times (before starting work, ensure that there is emergency service at a minimum)
2. Inform an onsite contact (if they will be present throughout all active work activities) or senior member of WSP of your plans for the day and your expected active work schedule.

If an injury has occurred:

1. Evaluate the injury and decide whether emergency services are required
2. Contact emergency services if necessary
3. If emergency services are not necessary, attempt first aid alone or contact an onsite contact or WSP contact for assistance.

### Basic First Aid Procedures

Skin Contact: Remove any contaminated clothing. Wash immediately with water for at least 15 minutes.

Inhalation: Remove from contaminated atmosphere. Contact emergency services.

Ingestion: Never induce vomiting on an unconscious person. Never induce vomiting when acids, alkalis, or petroleum products are suspected. Contact the poison control center.

### Personal Protective Equipment Failure

If any worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his or her buddy shall immediately leave the exclusion zone. Reentry shall not be permitted until the equipment has been replaced or repaired.

### Emergency Information and Telephone Numbers

To obtain medical assistance as soon as possible in case of an emergency, the following telephone numbers, addresses, and directions for the nearest medical treatment facilities will be posted in each on-site vehicle:

Nearest Telephone: Inside facility or Cell Phone

Ambulance (name): Bangs Ambulance

Phone: 911

Hospital (name): Cayuga Medical Center

Phone: 607-274-4411

Police (local or state): Ithaca Police Department

Phone: 911

Fire Department (name): Ithaca Fire Department

Phone: 911

State Poison Control Center: Poison Control Center Central NY

Phone: 1-800-252-5655

#### DIRECTIONS TO HOSPITAL:

1. Start at 620 S AURORA ST, ITHACA going toward HILLVIEW PL - go 0.4 mi
2. Turn Left on E SENECA ST(RT-79 W) - go 0.5 mi
3. Turn Right on N CORN ST
4. Turn Left on W BUFFALO ST - go 0.5 mi
5. Continue on CLIFF ST(RT-96) - go 1.0 mi
6. Continue to follow RT-96 - go 1.2 mi
7. Turn Right on HARRIS B DATES DR
8. Turn Left on HARRIS B DATES DR
9. Arrive at CAYUGA MEDICAL CENTER, 101 DATES DR, ITHACA, NY 14850 on the Right

Total Estimated Time: 12 minutes Total Estimated Distance: 3.81 miles

A copy of the route is included in Appendix A.



In an emergency situation, all WSP personnel will take direction from the site health and safety coordinator. The Contractor's site health and safety coordinator is responsible for notifying the appropriate emergency organization. The names and phone numbers of all personnel and agencies that could be involved in an emergency response will be determined by the Contractor's site health and safety coordinator and will be readily available at the site.

All site personnel **MUST** sign this page to acknowledge the requirements of this HASP.

Name

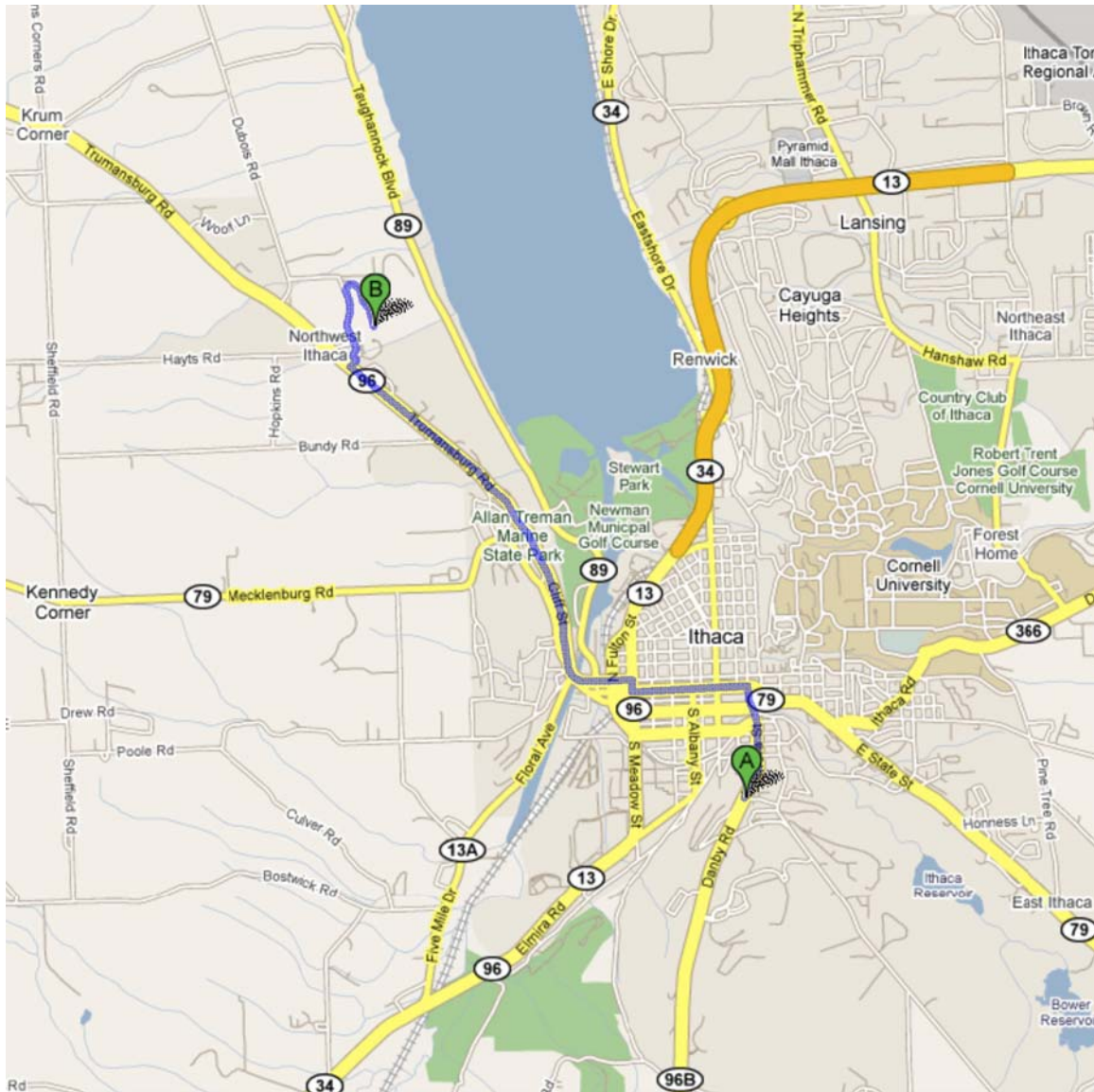
Signature

[illegible]

Project Manager Review/Sign-off:

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## Appendix A – Route to nearest Hospital/Emergency Room



Distance: **3.81 miles** Time: **12 mins**

1. Start at 620 **S AURORA ST**, ITHACA going toward **HILLVIEW PL** - go **0.4 mi**
2. Turn Left on **E SENECA ST**(RT-79 W) - go **0.5 mi**
3. Turn Right on **N CORN ST**
4. Turn Left on **W BUFFALO ST** - go **0.5 mi**
5. Continue on **CLIFF ST**(RT-96) - go **1.0 mi**
6. Continue to follow **RT-96** - go **1.2 mi**
7. Turn Right on **HARRIS B DATES DR**
8. Turn Left on **HARRIS B DATES DR**
9. Arrive at **CAYUGA MEDICAL CENTER, 101 DATES DR, ITHACA, NY 14850** on the Right

Appendix B – NIOSH Pocket Guide to Hazardous Chemicals Pages  
(include a page for each chemical of concern reviewed during the hazard assessment)

<b>Methyl chloroform</b>		<b>CAS</b> 71-55-6
<b>CH<sub>3</sub>CCl<sub>3</sub></b>		<b>RTECS</b> <a href="#">KJ2975000</a>
<b>Synonyms &amp; Trade Names</b> Chloroethene; 1,1,1-Trichloroethane; 1,1,1-Trichloroethane (stabilized)		<b>DOT ID &amp; Guide</b> 2831 <a href="#">160</a>
<b>Exposure Limits</b>	<b>NIOSH REL:</b> C 350 ppm (1900 mg/m <sup>3</sup> ) [15-minute] <a href="#">See Appendix C</a> (Chloroethanes)	
	<b>OSHA PEL†:</b> TWA 350 ppm (1900 mg/m <sup>3</sup> )	
<b>IDLH</b> 700 ppm See: <a href="#">71556</a>		<b>Conversion</b> 1 ppm = 5.46 mg/m <sup>3</sup>
<b>Physical Description</b> Colorless liquid with a mild, chloroform-like odor.		
MW: 133.4	BP: 165°F	FRZ: -23°F
VP: 100 mmHg	IP: 11.00 eV	Sp.Gr: 1.34
Fl.P: ?	UEL: 12.5%	LEL: 7.5%
Combustible Liquid, but burns with difficulty.		
<b>Incompatibilities &amp; Reactivities</b> Strong caustics; strong oxidizers; chemically-active metals such as zinc, aluminum, magnesium powders, sodium & potassium; water [Note: Reacts slowly with water to form hydrochloric acid.]		
<b>Measurement Methods</b> NIOSH <a href="#">1003</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>		
<b>Personal Protection &amp; Sanitation</b> ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		<b>First Aid</b> ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
<b>Respirator Recommendations</b> NIOSH/OSHA <b>Up to 700 ppm:</b> (APF = 10) Any supplied-air respirator* (APF = 50) Any self-contained breathing apparatus with a full facepiece <b>Emergency or planned entry into unknown concentrations or IDLH conditions:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>		
<b>Exposure Routes</b> inhalation, ingestion, skin and/or eye contact		
<b>Symptoms</b> Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage		
<b>Target Organs</b> Eyes, skin, central nervous system, cardiovascular system, liver		

<b>Ethylene dichloride</b>		<b>CAS</b> 107-06-2
<b>CICH<sub>2</sub>CH<sub>2</sub>Cl</b>		<b>RTECS</b> <a href="#">K10525000</a>
<b>Synonyms &amp; Trade Names</b> 1,2-Dichloroethane; Ethylene chloride; Glycol dichloride		<b>DOT ID &amp; Guide</b> 1184 <a href="#">131</a>
<b>Exposure Limits</b>	<b>NIOSH REL:</b> Ca TWA 1 ppm (4 mg/m <sup>3</sup> ) ST 2 ppm (8 mg/m <sup>3</sup> ) <a href="#">See Appendix A</a> <a href="#">See Appendix C</a> (Chloroethanes)	
	<b>OSHA PEL</b> †: TWA 50 ppm C 100 ppm 200 ppm [5-minute maximum peak in any 3 hours]	
<b>IDLH</b> Ca [50 ppm] See: <a href="#">107062</a>		<b>Conversion</b> 1 ppm = 4.05 mg/m <sup>3</sup>
<b>Physical Description</b> Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.]		
MW: 99.0	BP: 182°F	FRZ: -32°F
VP: 64 mmHg	IP: 11.05 eV	Sp.Gr: 1.24
Fl.P: 56°F	UEL: 16%	LEL: 6.2%
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.		
<b>Incompatibilities &amp; Reactivities</b> Strong oxidizers & caustics; chemically-active metals such as magnesium or aluminum powder, sodium & potassium; liquid ammonia [Note: Decomposes to vinyl chloride & HCl above 1112°F.]		
<b>Measurement Methods</b> NIOSH <a href="#">1003</a> ; OSHA <a href="#">3</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>		
<b>Personal Protection &amp; Sanitation</b> ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench		<b>First Aid</b> ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
<b>Respirator Recommendations</b> NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>		
<b>Exposure Routes</b> inhalation, ingestion, skin absorption, skin and/or eye contact		
<b>Symptoms</b> Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]		
<b>Target Organs</b> Eyes, skin, kidneys, liver, central nervous system, cardiovascular system <b>Cancer Site</b> [in animals: forestomach, mammary gland & circulatory system cancer]		

<b>Tetrachloroethylene</b>		<b>CAS</b> 127-18-4
<b>Cl<sub>2</sub>C=CCl<sub>2</sub></b>		<b>RTECS</b> <a href="#">KX3850000</a>
<b>Synonyms &amp; Trade Names</b> Perchloroethylene, Perchloroethylene, Perk, Tetrachloroethylene		<b>DOT ID &amp; Guide</b> 1897 <a href="#">160</a>
<b>Exposure Limits</b>	<b>NIOSH REL:</b> Ca Minimize workplace exposure concentrations. <a href="#">See Appendix A</a>	
	<b>OSHA PEL</b> †: †: TWA 100 ppm C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm	
<b>IDLH</b> Ca [150 ppm] See: <a href="#">127184</a>		<b>Conversion</b> 1 ppm = 6.78 mg/m <sup>3</sup>
<b>Physical Description</b> Colorless liquid with a mild, chloroform-like odor.		
MW: 165.8	BP: 250°F	FRZ: -2°F
VP: 14 mmHg	IP: 9.32 eV	Sp.Gr: 1.62
Fl.P: NA	UEL: NA	LEL: NA
Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.		
<b>Incompatibilities &amp; Reactivities</b> Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash		
<b>Measurement Methods</b> NIOSH <a href="#">1003</a> ; OSHA <a href="#">1001</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>		
<b>Personal Protection &amp; Sanitation</b> ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		<b>First Aid</b> ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
<b>Respirator Recommendations</b> NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>		
<b>Exposure Routes</b> inhalation, skin absorption, ingestion, skin and/or eye contact		
<b>Symptoms</b> Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]		
<b>Target Organs</b> Eyes, skin, respiratory system, liver, kidneys, central nervous system <b>Cancer Site</b> [in animals: liver tumors]		



Trichloroethylene		CAS 79-01-6	
ClCH=CCl <sub>2</sub>		RTECS <a href="#">KX4550000</a>	
Synonyms & Trade Names Ethylene trichloride, TCE, Trichloroethene, Trilene		DOT ID & Guide 1710 <a href="#">160</a>	
Exposure Limits	NIOSH REL: Ca <a href="#">See Appendix A</a> <a href="#">See Appendix C</a>		
	OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)		
IDLH Ca [1000 ppm] See: <a href="#">79016</a>		Conversion 1 ppm = 5.37 mg/m <sup>3</sup>	
Physical Description Colorless liquid (unless dyed blue) with a chloroform-like odor.			
MW: 131.4	BP: 189°F	FRZ: -99°F	Sol(77°F): 0.1%
VP: 58 mmHg	IP: 9.45 eV		Sp.Gr: 1.46
Fl.P: ?	UEL(77°F): 10.5%	LEL(77°F): 8%	
Combustible Liquid, but burns with difficulty.			
Incompatibilities & Reactivities Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)			
Measurement Methods NIOSH <a href="#">1022</a> , <a href="#">3800</a> ; OSHA <a href="#">1001</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>			
Personal Protection & Sanitation ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]			
Target Organs Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system <b>Cancer Site</b> [in animals: liver & kidney cancer]			

Nickel metal and other compounds (as Ni)		CAS 7440-02-0 (Metal)	
Ni (Metal)		RTECS <a href="#">QR5950000</a> (Metal)	
Synonyms & Trade Names Nickel metal: Elemental nickel, Nickel catalyst Synonyms of other nickel compounds vary depending upon the specific compound.		DOT ID & Guide	
Exposure Limits	NIOSH REL*: Ca TWA 0.015 mg/m <sup>3</sup> <a href="#">See Appendix A</a> [*Note: The REL does not apply to Nickel carbonyl.]		
	OSHA PEL*†: TWA 1 mg/m <sup>3</sup> [*Note: The PEL does not apply to Nickel carbonyl.]		
IDLH Ca [10 mg/m <sup>3</sup> (as Ni)] See: <a href="#">7440020</a>		Conversion	
Physical Description Metal: Lustrous, silvery, odorless solid.			
MW: 58.7	BP: 5139°F	MLT: 2831°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.90 (Metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air.			
Incompatibilities & Reactivities Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate			
Measurement Methods NIOSH <a href="#">7300</a> , <a href="#">7301</a> , <a href="#">7303</a> , <a href="#">9102</a> ; OSHA <a href="#">ID121</a> , <a href="#">ID125G</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>			
Personal Protection & Sanitation ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid ( <a href="#">See procedures</a> )  Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. <a href="#">Click here</a> for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]			
Target Organs Nasal cavities, lungs, skin Cancer Site [lung and nasal cancer]			

<b>Methylene chloride</b>		<b>CAS</b> 75-09-2
<b>CH<sub>2</sub>Cl<sub>2</sub></b>		<b>RTECS</b> <a href="#">PA8050000</a>
<b>Synonyms &amp; Trade Names</b> Dichloromethane, Methylene dichloride		<b>DOT ID &amp; Guide</b> 1593 <a href="#">160</a>
<b>Exposure Limits</b>	<b>NIOSH REL:</b> Ca <a href="#">See Appendix A</a>	
	<b>OSHA PEL:</b> [1910.1052] TWA 25 ppm ST 125 ppm	
<b>IDLH</b> Ca [2300 ppm] See: <a href="#">75092</a>		<b>Conversion</b> 1 ppm = 3.47 mg/m <sup>3</sup>
<b>Physical Description</b> Colorless liquid with a chloroform-like odor. [Note: A gas above 104°F.]		
MW: 84.9	BP: 104°F	FRZ: -139°F
VP: 350 mmHg	IP: 11.32 eV	Sp.Gr: 1.33
Fl.P: ?	UEL: 23%	LEL: 13%
Combustible Liquid		
<b>Incompatibilities &amp; Reactivities</b> Strong oxidizers; caustics; chemically-active metals such as aluminum, magnesium powders, potassium & sodium; concentrated nitric acid		
<b>Measurement Methods</b> NIOSH <a href="#">1005</a> , <a href="#">3800</a> ; OSHA <a href="#">59</a> , <a href="#">80</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>		
<b>Personal Protection &amp; Sanitation</b> <a href="#">(See protection codes)</a> Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		<b>First Aid</b> <a href="#">(See procedures)</a> Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
<b>Respirator Recommendations</b> <a href="#">(See Appendix E)</a> NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>		
<b>Exposure Routes</b> inhalation, skin absorption, ingestion, skin and/or eye contact		
<b>Symptoms</b> Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingle limbs; nausea; [potential occupational carcinogen]		
<b>Target Organs</b> Eyes, skin, cardiovascular system, central nervous system <b>Cancer Site</b> [in animals: lung, liver, salivary & mammary gland tumors]		

Lead		CAS 7439-92-1	
Pb		RTECS <a href="#">OF7525000</a>	
Synonyms & Trade Names Lead metal, Plumbum		DOT ID & Guide	
Exposure Limits	NIOSH REL*: TWA (8-hour) 0.050 mg/m <sup>3</sup> <a href="#">See Appendix C</a> [*Note: The REL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C.</a> ]		
	OSHA PEL*: [1910.1025] TWA 0.050 mg/m <sup>3</sup> <a href="#">See Appendix C</a> [*Note: The PEL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C.</a> ]		
IDLH 100 mg/m <sup>3</sup> (as Pb) See: <a href="#">7439921</a>		Conversion	
Physical Description A heavy, ductile, soft, gray solid.			
MW: 207.2	BP: 3164°F	MLT: 621°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 11.34
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid in bulk form.			
Incompatibilities & Reactivities Strong oxidizers, hydrogen peroxide, acids			
Measurement Methods NIOSH <a href="#">7082</a> , <a href="#">7105</a> , <a href="#">7300</a> , <a href="#">7301</a> , <a href="#">7303</a> , <a href="#">7700</a> , <a href="#">7701</a> , <a href="#">7702</a> , <a href="#">9100</a> , <a href="#">9102</a> , <a href="#">9105</a> ; OSHA <a href="#">ID121</a> , <a href="#">ID125G</a> , <a href="#">ID206</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>			
Personal Protection & Sanitation ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: Daily		First Aid ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations ( <a href="#">See Appendix E</a> ) NIOSH/OSHA <b>Up to 0.5 mg/m<sup>3</sup>:</b> (APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators. <a href="#">Click here</a> for information on selection of N, R, or P filters. (APF = 10) Any supplied-air respirator <b>Up to 1.25 mg/m<sup>3</sup>:</b> (APF = 25) Any supplied-air respirator operated in a continuous-flow mode (APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter <b>Up to 2.5 mg/m<sup>3</sup>:</b> (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. <a href="#">Click here</a> for information on selection of N, R, or P filters. (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode (APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter (APF = 50) Any self-contained breathing apparatus with a full facepiece (APF = 50) Any supplied-air respirator with a full facepiece <b>Up to 50 mg/m<sup>3</sup>:</b> (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode <b>Up to 100 mg/m<sup>3</sup>:</b> (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode <b>Emergency or planned entry into unknown concentrations or IDLH conditions:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. <a href="#">Click here</a> for information on			

selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus  
[Important additional information about respirator selection](#)

**Exposure Routes**

inhalation, ingestion, skin and/or eye contact

**Symptoms**

Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension

**Target Organs**

Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue

<b>Copper (dusts and mists, as Cu)</b>		<b>CAS</b> 7440-50-8	
<b>Cu</b>		<b>RTECS</b> <a href="#">GL5325000</a>	
<b>Synonyms &amp; Trade Names</b> Copper metal dusts, Copper metal fumes		<b>DOT ID &amp; Guide</b>	
<b>Exposure Limits</b>	NIOSH REL*: TWA 1 mg/m <sup>3</sup> [*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.]		
	OSHA PEL*: TWA 1 mg/m <sup>3</sup> [*Note: The PEL also applies to other copper compounds (as Cu) except copper fume.]		
<b>IDLH</b> 100 mg/m <sup>3</sup> (as Cu) See: <a href="#">7440508</a>		<b>Conversion</b>	
<b>Physical Description</b> Reddish, lustrous, malleable, odorless solid.			
MW: 63.5	BP: 4703°F	MLT: 1981°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.94
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid in bulk form, but powdered form may ignite.			
<b>Incompatibilities &amp; Reactivities</b> Oxidizers, alkalis, sodium azide, acetylene			
<b>Measurement Methods</b> NIOSH <a href="#">7029</a> , <a href="#">7300</a> , <a href="#">7301</a> , <a href="#">7303</a> , <a href="#">9102</a> ; OSHA <a href="#">ID121</a> , <a href="#">ID125G</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>			
<b>Personal Protection &amp; Sanitation</b> ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		<b>First Aid</b> ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
<b>Respirator Recommendations</b> NIOSH/OSHA <b>Up to 5 mg/m<sup>3</sup>:</b> (APF = 5) Any quarter-mask respirator. <a href="#">Click here</a> for information on selection of N, R, or P filters.* <b>Up to 10 mg/m<sup>3</sup>:</b> (APF = 10) 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, P100. <a href="#">Click here</a> for information on selection of N, R, or P filters.* (APF = 10) Any supplied-air respirator* <b>Up to 25 mg/m<sup>3</sup>:</b> (APF = 25) Any supplied-air respirator operated in a continuous-flow mode* (APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.* <b>Up to 50 mg/m<sup>3</sup>:</b> (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. <a href="#">Click here</a> for information on selection of N, R, or P filters. (APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter* (APF = 50) Any self-contained breathing apparatus with a full facepiece (APF = 50) Any supplied-air respirator with a full facepiece <b>Up to 100 mg/m<sup>3</sup>:</b> (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode <b>Emergency or planned entry into unknown concentrations or IDLH conditions:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. <a href="#">Click here</a> for information on			

selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus  
[Important additional information about respirator selection](#)

**Exposure Routes**

inhalation, ingestion, skin and/or eye contact

**Symptoms**

Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing

**Target Organs**

Eyes, skin, respiratory system, liver, kidneys (increase(d) risk with Wilson's disease)

Cadmium dust (as Cd)		CAS 7440-43-9 (metal)	
Cd (metal)		RTECS <a href="#">EU9800000</a> (metal)	
Synonyms & Trade Names Cadmium metal: Cadmium Other synonyms vary depending upon the specific cadmium compound.		DOT ID & Guide 2570 <a href="#">154</a> (cadmium compound)	
Exposure Limits	NIOSH REL*: Ca <a href="#">See Appendix A</a> [*Note: The REL applies to all Cadmium compounds (as Cd).]		
	OSHA PEL*: [1910.1027] TWA 0.005 mg/m³ [*Note: The PEL applies to all Cadmium compounds (as Cd).]		
IDLH Ca [9 mg/m³ (as Cd)] See: <a href="#">IDLH INDEX</a>		Conversion	
Physical Description Metal: Silver-white, blue-tinged lustrous, odorless solid.			
MW: 112.4	BP: 1409°F	MLT: 610°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.65 (metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Noncombustible Solid in bulk form, but will burn in powder form.			
Incompatibilities & Reactivities Strong oxidizers; elemental sulfur, selenium & tellurium			
Measurement Methods NIOSH <a href="#">7048</a> , <a href="#">7300</a> , <a href="#">7301</a> , <a href="#">7303</a> , <a href="#">9102</a> ; OSHA <a href="#">ID121</a> , <a href="#">ID125G</a> , <a href="#">ID189</a> , <a href="#">ID206</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>			
Personal Protection & Sanitation ( <a href="#">See protection codes</a> ) Skin: No recommendation Eyes: No recommendation Wash skin: Daily Remove: No recommendation Change: Daily		First Aid ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations ( <a href="#">See Appendix E</a> ) NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. <a href="#">Click here</a> for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>			
Exposure Routes inhalation, ingestion			
Symptoms Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]			
Target Organs respiratory system, kidneys, prostate, blood Cancer Site [prostatic & lung cancer]			



Arsenic (inorganic compounds, as As)		CAS 7440-38-2 (metal)	
As (metal)		RTECS <a href="#">CG0525000</a> (metal)	
Synonyms & Trade Names Arsenic metal: Arsenia Other synonyms vary depending upon the specific As compound. [Note: OSHA considers "Inorganic Arsenic" to mean copper acetoarsenite & all inorganic compounds containing arsenic except ARSINE.]		DOT ID & Guide 1558 <a href="#">152</a> (metal) 1562 <a href="#">152</a> (dust)	
Exposure Limits	NIOSH REL: Ca C 0.002 mg/m³ [15-minute] <a href="#">See Appendix A</a>		
	OSHA PEL: [1910.1018] TWA 0.010 mg/m³		
IDLH Ca [5 mg/m³ (as As)] See: <a href="#">7440382</a>		Conversion	
Physical Description Metal: Silver-gray or tin-white, brittle, odorless solid.			
MW: 74.9	BP: Sublimes	MLT: 1135°F (Sublimes)	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.73 (metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame.			
Incompatibilities & Reactivities Strong oxidizers, bromine azide [Note: Hydrogen gas can react with inorganic arsenic to form the highly toxic gas arsine.]			
Measurement Methods NIOSH <a href="#">7300</a> , <a href="#">7301</a> , <a href="#">7303</a> , <a href="#">7900</a> , <a href="#">9102</a> ; OSHA <a href="#">ID105</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>			
Personal Protection & Sanitation ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations ( <a href="#">See Appendix E</a> ) NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having an N100, R100, or P100 filter. <a href="#">Click here</a> for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>			
Exposure Routes inhalation, skin absorption, skin and/or eye contact ingestion			
Symptoms Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, [potential occupational carcinogen]			
Target Organs Liver, kidneys, skin, lungs, lymphatic system Cancer Site [lung & lymphatic cancer]			

1,2-Dichloroethylene		CAS 540-59-0	
ClCH=CHCl		RTECS <a href="#">KV9360000</a>	
Synonyms & Trade Names Acetylene dichloride, cis-Acetylene dichloride, trans-Acetylene dichloride, sym-Dichloroethylene		DOT ID & Guide 1150 <a href="#">130P</a>	
Exposure Limits	NIOSH REL: TWA 200 ppm (790 mg/m³)		
	OSHA PEL: TWA 200 ppm (790 mg/m³)		
IDLH 1000 ppm See: <a href="#">540590</a>		Conversion 1 ppm = 3.97 mg/m³	
Physical Description Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.			
MW: 97.0	BP: 118-140°F	FRZ: -57 to -115°F	Sol: 0.4%
VP: 180-265 mmHg	IP: 9.65 eV		Sp.Gr(77°F): 1.27
Fl.P: 36-39°F	UEL: 12.8%	LEL: 5.6%	
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Strong oxidizers, strong alkalis, potassium hydroxide, copper [Note: Usually contains inhibitors to prevent polymerization.]			
Measurement Methods NIOSH <a href="#">1003</a> ; OSHA <a href="#">7</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>			
Personal Protection & Sanitation ( <a href="#">See protection codes</a> ) Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid ( <a href="#">See procedures</a> ) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH/OSHA Up to 1000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode <sup>£</sup> (APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) <sup>£</sup> (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister (APF = 50) Any self-contained breathing apparatus with a full facepiece (APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, respiratory system; central nervous system depression			
Target Organs Eyes, respiratory system, central nervous system			

Vinyl chloride		CAS 75-01-4
CH <sub>2</sub> =CHCl		RTECS <a href="#">KU9625000</a>
<b>Synonyms &amp; Trade Names</b> Chloroethene, Chloroethylene, Ethylene monochloride, Monochloroethene, Monochloroethylene, VC, Vinyl chloride monomer (VCM)		<b>DOT ID &amp; Guide</b> 1086 <a href="#">116</a> P (inhibited)
<b>Exposure Limits</b>	NIOSH REL: Ca <a href="#">See Appendix A</a>	
	OSHA PEL: [1910.1017] TWA 1 ppm C 5 ppm [15-minute]	
<b>IDLH</b> Ca [N.D.] See: <a href="#">IDLH INDEX</a>		<b>Conversion</b> 1 ppm = 2.56 mg/m <sup>3</sup>
<b>Physical Description</b> Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. [Note: Shipped as a liquefied compressed gas.]		
MW: 62.5	BP: 7°F	FRZ: -256°F
VP: 3.3 atm	IP: 9.99 eV	RGasD: 2.21
Fl.P: NA (Gas)	UEL: 33.0%	LEL: 3.6%
Flammable Gas		
<b>Incompatibilities &amp; Reactivities</b> Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol. Attacks iron & steel in presence of moisture.].		
<b>Measurement Methods</b> NIOSH <a href="#">1007</a> ; OSHA <a href="#">4</a> , <a href="#">75</a> See: <a href="#">NMAM</a> or <a href="#">OSHA Methods</a>		
<b>Personal Protection &amp; Sanitation</b> <a href="#">(See protection codes)</a> Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite wash		<b>First Aid</b> <a href="#">(See procedures)</a> Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
<b>Respirator Recommendations</b> <a href="#">(See Appendix E)</a> NIOSH <b>At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:</b> (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus <b>Escape:</b> (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus <a href="#">Important additional information about respirator selection</a>		
<b>Exposure Routes</b> inhalation, skin, and/or eye contact (liquid)		
<b>Symptoms</b> Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]		
<b>Target Organs</b> Liver, central nervous system, blood, respiratory system, lymphatic system <b>Cancer Site</b> [liver cancer]		

Appendix C – WSP Personnel Applicable OSHA Certificates  
(at a minimum include the latest valid HAZWOPER refresher, First Aid/CPR, and Respirator Fit  
Test certificates)

# *Certificate of Completion*

*awarded to*

*Mr. Scott B. Petersen*

*8-Hour Refresher Training in Hazard Communication, Hazardous Waste Operations and Emergency Response (HAZWOPER), and Permit-Required Operations*

*in accordance with OSHA Standards*

*29 CFR 1910.120, .146, .1200 and 29 CFR 1926.20, .21, .25, .50, .65, .104, .200, .202, .203*

*Conducted on May 9, 2011, in Cazenovia, New York*

*Accreditation Expires: May 9, 2012*

*presented by*



A handwritten signature in black ink, reading "Keith E. Green", is written over a horizontal line.

Keith E. Green, CIH CSP  
Instructor

## Respirator Qualitative Fit Test Worksheet

Employee: Scott Petersen

Employee Number: 708

Employee WSP Office: Cazenovia

Fit-Test Date: 9-May-11

WSP E & E Office: Cazenovia  
(Where testing was conducted)

Fit Testing Agent: Irritant Smoke (Stanic Chloride)

Agent Recognition (circle one): Yes No

### Respirator Information:

Type (Circle one): Full face Half face      Spectacle Kit? (Circle one): Yes No

Manufacturer: MSA      Model: Advantage 1000

Size (Circle one): Small Medium Large X-Large

(b) Comfort of fit (Circle one): Comfortable Not Comfortable

Employee Signature: [Signature]      Examiner's Signature: [Signature]

a/if test fails, record possible cause of failure in notes column, complete form for records, and re-test  
b/if fit is not comfortable, complete form for records as failed test, re-test with different size/model respirator

Fit Test Expiration Date:	<u>8-May-12</u>
Test Result: (Circle one)	<u>Pass</u> (a) <u>Fail</u>
Examiner Init <i>Kate E. Gurn</i>	Examiner Init.:
Notes:	

# *Certificate of Completion*

*awarded to*

*Mr. Kevin Sullivan*

*8-Hour Refresher Training in Hazard Communication, Hazardous Waste Operations and Emergency Response (HAZWOPER), and Permit-Required Operations*

*in accordance with OSHA Standards*

*29 CFR 1910.120, .146, .1200 and 29 CFR 1926.20, .21, .25, .50, .65, .104, .200, .202, .203*

*Conducted on May 9, 2011, in Cazenovia, New York*

*Accreditation Expires: May 9, 2012*

*presented by*



A handwritten signature in black ink, reading "Keith E. Green", is positioned above a horizontal line.

Keith E. Green, CIH CSP  
Instructor

## Appendix D-Reporting of Incidents and Accidents



## Immediate Reporting of Accidents and Incidents

The following accidents and incidents need to be reported to as soon as possible and in any case within 24 hrs. A telephone contact plus an email, providing brief of the event must be submitted to the WSPE Global MD and WSPE Global HSE Director. Note that this notification requirement is in addition to any local crisis arrangements and national reporting requirements.

Fatality	A fatality is defined as the death of any person (all employees, visitors, members of the public or contractors), as a result of a work related incident or acute exposure event, occurring within one year of the accident or exposure. This includes death from an occupational illness within one year of the illness being diagnosed.
Serious Injury	A serious injury in any work related injury or acute exposure as detailed in the accompanying list
Serious Environmental incident	<p>A serious environmental incident includes any incident, which:</p> <ul style="list-style-type: none"><li>• Requires immediate action by the emergency services or any other external agency to avoid or mitigate the effects of the incident</li><li>• Produces obvious detrimental environmental effects off-site (e.g. fish kill, visible pollution of water course etc)</li><li>• Any environmental incident that results in regional or national media coverage</li></ul>
Major Incident	As detailed in the accompanying list
Regulatory Enforcement Action	Regulatory enforcement action includes formal notice of prosecution, the prohibition of any operations on ground of HSE (for any period), or a formal notice (an enforcement notice) requiring improvements to plant, equipment, procedures, training etc)
Occupational Ill Health	A case of occupational ill health is any illness which requires notification under relevant national regulations

### ***Serious Injury***

- Any work related injury or acute exposure which results in the hospitalization of any employees, visitors, members of the public or contractors for greater than 24 hours
- Any fracture, other than to the fingers, thumbs or toes
- Any amputation, involving part or all of any bone but not flesh removal from the finger tip
- Dislocation of the shoulder, hip, knee or spine
- Loss of sight (whether temporary or permanent)
- A chemical or hot metal burn to the eye or any penetrating injury to the eye
- Any injury resulting from an electric shock or electrical burn (including any electrical burn caused by arcing or arcing products) leading to unconsciousness or requiring resuscitation or admittance to hospital for more than 24 hours

- Any other injury:
  - Leading to hypothermia, heat-induced illness or to unconsciousness
  - Requiring resuscitations, or
  - Requiring admittance to hospital for more than 24 hours
- Loss of consciousness caused by asphyxia or by exposure to a harmful substance or biological agent
- Acute illness, which requires medical treatment, or loss of consciousness resulting from the absorption or any substance by inhalation, ingestion or through the skin
- Acute illness which requires medical treatment where there is reason to believe that this resulted from exposure to a biological agent or its toxins or infected material

***Major incidents***

- Explosion or fire
- Lifting equipment failure
- Failure of pressure
- Contact with overhead electrical lines

Employee	Employees include all personnel, whether temporary or permanent, who are directly employed by WSP, including trainees, agency staff (under the direct control of WSP staff). Includes those staff within business partners/ joint ventures
Contractors / Subcontractors	Contractors or subcontractors including any persons providing services to WSP
Visitors	Visitors include any persons on a WSP site/facility who are neither employees nor contractors

## Appendix F – Heat Stress

## Heat Stress and Heat Stress Monitoring

Heat is one of the most common (and potentially serious) illnesses at hazardous waste sites where PPE is worn; therefore, regular monitoring and other preventive precautions are vital. Shelter from the sun will be provided during rest periods. Below is a list of the signs and symptoms of heat stress. Initial work schedules will be approximately 90 minutes of work followed by 15 minutes of rest. Work intervals will be adjusted to shorter periods based on the assessment of the Site Health and Safety Coordinator. Monitoring for heat stress will be conducted by visual observation by the individual team members.

### Signs and Symptoms of Heat Stress

- **Heat rash** may result from continuous exposure to heat or humid air.
- **Heat cramps** are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:
  - muscle spasms
  - pain in the hands, feet, and abdomen
- **Heat exhaustion** occurs from increased stress on various body organs, including inadequate blood circulation caused by cardiovascular insufficiency or dehydration. Signs and symptoms include:
  - pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting
- **Heat stroke** is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms include:
  - red, hot, usually dry skin
  - lack of or reduced perspiration
  - nausea
  - dizziness and confusion
  - strong, rapid pulse
  - coma

First-aid remedies for heat stress and heat stroke include removing the worker to a cool place, providing cool water or a commercial sport drink, loosening tight clothing, and calling for an ambulance if victim vomits or starts to lose consciousness.



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## Appendix D – Community Air Monitoring Plan





WSP Engineering of New York, P.C.  
11190 Sunrise Valley Drive  
Suite 300  
Reston, VA 20191

Tel: +1 703 709 6500  
Fax: +1 703 709 8505





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## Figures

Figure 1 – Example Ambient Air Monitoring Locations



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# 1 Introduction

WSP Environment & Energy, on behalf of Emerson and its subsidiary, Emerson Power Transmission Corp. (EPT), has prepared this Community Air Monitoring Plan (CAMP), which presents a scope of work for monitoring ambient air quality to protect receptors in the South Hill community during the implementation of the remedial action for Operable Unit No.3 (OU No. 3) at the Morse Industrial Corporation Site in Ithaca, New York. Specifically, the proposed air-monitoring plan is designed to ascertain whether the sewer excavation and replacement work may give rise to chlorinated volatile organic compounds (VOCs) that could affect ambient air quality within the South Hill community. This work plan was prepared in accordance with requirements outlined in the July 13, 1987, Consent Order (Index # A7-0125-87-09) entered into by the New York State Department of Environmental Conservation (NYSDEC) and EPT.

The New York State Department of Health (NYSDOH) requires the implementation of a CAMP for sites where ground intrusive activities, including the excavation and handling of contaminated soil, is performed. The CAMP for the sewer excavation and replacement project for OU No. 3 addresses both VOC and particulate monitoring in accordance with NYSDOH requirements. CAMP requirements consist of periodic and continuous monitoring, based primarily on the type of intrusive work being performed. Activities to be performed for the sewer restoration project fulfill both types of monitoring, which are described in detail below.

This work plan provides background information on the site, the work plan objective, the scope of work for the proposed sampling activities, and information regarding report preparation and project schedule.

## 1.1 SELECTION OF CAMP MONITORING LOCATIONS

Since the purpose of CAMP is to protect potential receptors from contaminants generated during the sewer excavation and replacement work, monitoring locations will be positioned at project (i.e., perimeter) areas downwind of potential contaminant-generating activities. Two monitoring locations will be placed +/-30 degrees of the predominant down wind direction, as established by local weather station data. An upwind monitoring location will be positioned opposite the down wind direction (i.e., +/-180 degrees) to determine background VOC and particulate concentrations entering the site. Both periodic and continuous monitoring will be performed at these locations.

In the event that site conditions change or the predominant wind direction experienced during site work appears significantly different than reported locally, the monitoring locations may be moved to perimeter locations most likely to detect generated contaminants.

## 1.2 PERIODIC MONITORING

WSP will collect instantaneous VOC measurements at the initiation and during the sewer excavation and replacement activities. Intermittent VOC measurements will also be collected when health-related monitoring in the work area detects VOCs above the CAMP action level.

## 1.3 CONTINUOUS MONITORING

Continuous monitoring for VOCs and particulate will be conducted during ground intrusive activities, primarily during excavation work during the sewer restoration project. Appropriate monitoring equipment will be employed to continuously monitor these parameters, as well as data log for CAMP recordkeeping requirements.





For VOCs, a photoionization detector (PID) will be used for continuous monitoring. A PID will detect VOCs at a level well below the CAMP VOC action level, and be programmed to perform data logging. The PID will be placed at an approximate breath zone height, estimated at 4 feet above ground surface.

Continuous particulate monitoring will be performed using a MIE PDM-3 Minram direct sensing, real-time monitor or equivalent, with data logging capabilities. This device can detect airborne particulate at levels well below the CAMP particulate action level, and be placed at breathing zone height.



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## 2 Action and Response Levels

CAMP specifies action and response levels for VOC and particulate concentrations detected during continuous monitoring. All equipment must be capable of calculating 15 minute running averages. The detailed requirements are described below.

### 2.1 VOCS

- If ambient VOC concentrations at a downwind perimeter monitor exceeds 5 parts per million (ppm) above background for a 15-minute average, work activities must be temporarily halted and monitoring continued. If the VOC concentrations readily decrease, as demonstrated by instantaneous readings, to below 5 ppm over background, then work activities may resume with continued monitoring.
- If ambient VOC concentrations at a downwind perimeter monitor persist at levels above 5 ppm over background, but below 25 ppm, work activities must be halted, the source of VOCs identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the VOC level 200 feet down wind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case less than 20 feet), is below 5 ppm over background for a 15 minute average.
- If VOC levels exceed 25 ppm at the perimeter of the work area, then activities must be discontinued.

All 15-minute measurements must be recorded and made available for New York State personnel to review, including but not limited to, NYSDEC and NYSDOH. Any instantaneous measurements used for decision purposes should also be recorded.

### 2.2 PARTICULATE

- If ambient particulate concentrations at a downwind perimeter monitor exceed 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) above background for a 15-minute average, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work activities may resume with dust suppression techniques provided that downwind particulate levels do not exceed  $150 \mu\text{g}/\text{m}^3$  above the upwind level and provided that no visible dust is migrating from the work area.
- If after implementation of dust suppression techniques, downwind particulate levels are greater than  $150 \mu\text{g}/\text{m}^3$  above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures or other controls adequately reduce downwind particulate concentrations to within  $150 \mu\text{g}/\text{m}^3$  of the upwind level and in preventing visible dust migration offsite.

All measurements must be recorded and made available for New York State personnel to review, including but not limited to, NYSDEC and NYSDOH.



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## 3 References

New York State Department of Health. 2000. Generic Community Air Monitoring Plan. June.

WSP Engineering of New York, P.C. 2011. Remedial Design Report – Emerson Power Transmission – Operabe Unit No., Ithaca, New York. May 13.



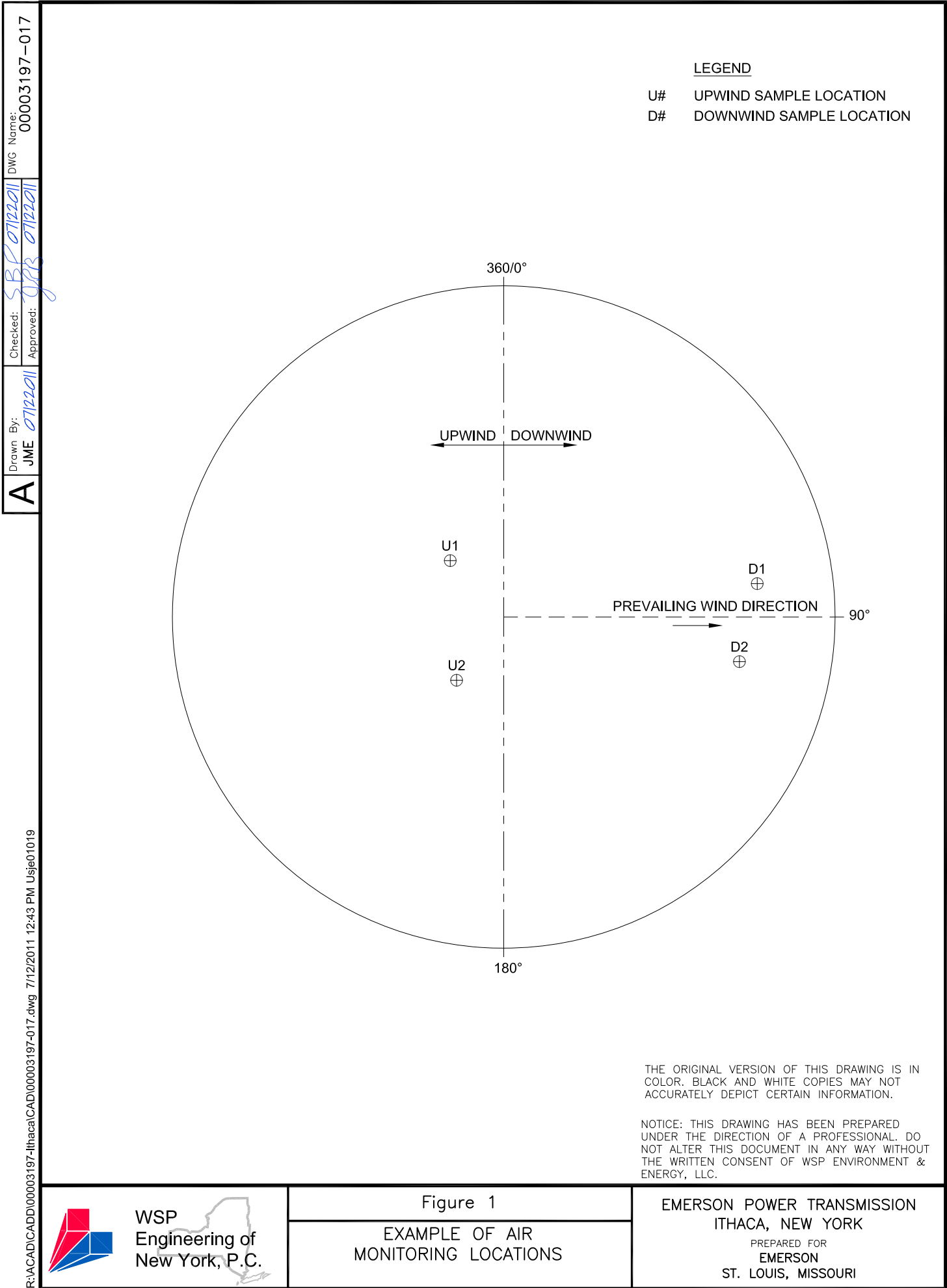
CAMP	Community Air Monitoring Plan
EPT	Emerson Power Transmission
µg/m <sup>3</sup>	micrograms per cubic meter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PID	photoionization detector
ppm	parts per million
VOC	volatile organic compounds



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# Figures





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