AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Remedial Design Report
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

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Prepared By Patrick Gratton

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Engineering Certification

I hereby certify that the Remedial Design Report for the Ithaca Court Street Former Manufactured Gas Plant OU-2 Site was prepared in accordance with all applicable statues and regulations and in substantial conformance with the New York State Department of Environmental Conservation Division of Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved OU-2 work plan.

Respectfully submitted,
AECOM Technical Services, Inc.

STATE OF NEW YORK
SCOTT ANDREW UNDERHILL
075332
LICENSED PROFESSIONAL ENGINEER

April 10, 2012

Scott Underhill — Date
Registered Professional Engineer
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List of Acronyms

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylenes
CAMP	Community Air Monitoring Plan
CCR	Construction Completion Report
CHP	Catalyzed Hydrogen Peroxide
DER	Division of Environmental Remediation
DOT	Department of Transportation
DRO	Diesel Range Organics
ESMI	Environmental Soil Management, Inc.
FS	Feasibility Study
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
ISCO	In-Situ Chemical Oxidation
IAWWTF	Ithaca Area Wastewater Treatment Facility
HASP	Health and Safety Plan
LEL	Lower Explosive Limit
MGP	Manufactured Gas Plant
MUTCD	Manual on Uniform Traffic Control Devices
MNA	Monitored Natural Attenuation
NAPL	Non-Aqueous Phase Liquid
NOM	Natural Organic Matter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
NYSEG	New York State Electric & Gas Corporation
OSHA	Occupational Safety and Health Act or Administration
ORP	Oxidation Reduction Potential
OU	Operable Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PDI	Pre-Design Investigation
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	parts per million
psi	pounds per square inch
RDWP	Remedial Design Work Plan
RECs	Renewable Energy Credits
RI	Remedial Investigation
ROD	Record of Decision
SCG	Standard Criteria or Guidance
SMP	Site Management Plan
SVOCs	Semi-Volatile Organic Compounds
TAGM	Technical and Administrative Guidance Memorandum
TCLP	Toxicity Characteristic Leachate Procedure
TEP	Technical Execution Plan
TOD	Total Oxidant Demand
VOCs	Volatile Organic Compounds

1.0 Introduction

This Remedial Design Report describes mobilization and site preparation, excavation of off-site source Areas 1A and 1B, in-situ chemical oxidation (ISCO) implementation for Area 1C, waste management, and site restoration associated with the Ithaca Court Street Former MGP Site Operable Unit-2 (OU-2) located in Ithaca, Tompkins County, New York. This project is being proposed in accordance with Section VII of the Order on Consent (Index Number DO-0002-9309) between New York State Electric & Gas Corporation (NYSEG) and the New York State Department of Environmental Conservation (NYSDEC), and the Record of Decision (ROD) for the site dated March 2011.

The Ithaca Court Street MGP OU-2 Site components are explained in this Remedial Design Report and include:

- Excavation of off-site soils in Areas designated as 1A and 1B. Excavation will be preceded by utility re-location and sheet pile installation. A pre-design investigation (PDI) in Areas 1A and 1B and their immediate vicinity to determine off-site treatment and disposal facility options has been completed. Soil which is not visibly impacted will be used as backfill in the right-of-way portion of OU-2.
- Backfill materials used in the right-of-way portion of Areas 1A and 1B which do not meet residential soil cleanup objectives must have a soil or pavement cover to prevent exposure to underlying soils.
- ISCO for impacted soils in Area 1C. This remedy was preceded by a treatability study to identify the appropriate oxidant(s) and catalyzing agent(s). Results of the Phase 1 testing (total oxidant demand (TOD) and pH buffer capacity tests) and Phase 2 (soil slurry oxidation reactor testing) are complete and summarized herein. An isolated soil boring at the intersection of Esty Street and North Plain Street (SB-168) had NAPL impacts and based on comments from the NYSDEC, this area was also targeted for ISCO treatment.
- Monitoring wells with sumps will be installed to collect and remove flowable non-aqueous phase liquid (NAPL) (if present) in Area 1C.
- To the extent practicable, green remediation and sustainability in accordance with DER-31, have been considered in the design and implementation of the remedy.
- All other areas within OU-2 outside of Areas 1A, 1B, and 1C will be addressed through monitored natural attenuation (MNA). A MNA plan will be developed in the future as part of the Site Management Plan (SMP), following the remediation of Areas 1A, 1B, 1C and around SB-168.

The remedial action will be performed under the approval and oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

A remedial design package for the remediation of the remaining portion of Ithaca Court Street Operable Unit-1 (OU-1) site (i.e., the Markles Flats building) will be submitted to the NYSDEC under separate cover.

1.1 Site Location and Description

Location: The Ithaca Court Street Manufactured Gas Plant (MGP) is located in a residential area of Ithaca, Tompkins County, NY. The former MGP property is bounded by North Plain Street, West Court Street and Esty Street. The former MGP property is currently owned by the Ithaca City School District. The surrounding area consists primarily of single family homes, but also includes private and public schools, a city pool, and an activity center.

Features: The original gas house is still in place at the southwest corner of the site. This building was named the Markles Flats building by students when the building was briefly used as a school and remains the only aboveground MGP structure. Former subsurface structures of interest, which have been removed as part of OU-1 remediation activities, include the foundations of gas holders, and a series of conduits within West Court Street that ran from the east side of the Markles Flats building to Cayuga Inlet.

Current Zoning: The former MGP property is zoned P-1 (Community Services), which could include schools or public recreation. The surrounding area is zoned residential, and is occupied primarily by single family and multi-family housing.

An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. Operational Unit 2, which is the subject of this document, consists of off-site areas where impacts from former site operation have been identified. OU-2 includes three off-site subareas (Area 1A, 1B and 1C) adjacent to the former MGP and adjacent off-site contaminated soils and groundwater under North Plain Street and Esty Street. The OU-2 ROD includes excavation of subsurface soils in Areas 1A and 1B and ISCO in Area 1C as components of the off-site remedy.

1.2 Site History

The former gas plant site was initially investigated by NYSEG in 1986. For remediation purposes, areas affected by the former gas plant operations have been separated into two different OUs. A full remedial investigation was initiated in October 2001. During the investigation, coal tar and associated contamination were identified beyond the boundaries of the site and tar conduits in West Court Street. The site was then organized into two OUs, OU-1 is the plant site and the conduits, and OU-2 is the off-site areas where contamination had migrated through the subsurface, away from the OU-1 area and into the surrounding residential community.

1.3 Previous Investigations and Remedial Actions

The remediation of the conduits in West Court Street started in the fall of 2002 and was completed in the fall of 2010. Remediation of the OU-1 gas plant site began in the fall of 2008 and was completed in January 2010, with the exception of the Markles Flats building. The Construction Completion Report for that work was approved in December 2010 [URS, 2010]. The Remedial Investigation Report [AECOM, 2011a] and Feasibility Study for OU-2 [AECOM, 2011b] is currently available for public review in the document repositories established for this site.

Between 1986 and 2011 the site has been subject to several investigations. These are listed below as compiled by NYSDEC in the “Record of Decision” for OU-2 in 2011 and AECOM in the “Remedial Design Work Plan” 2011.

1. “Investigation of the Former Coal Gasification Site at West Court Street, Ithaca, New York; Task 1 Report, Preliminary Site Evaluation.” Prepared by E.C. Jordan Co., April 1986

2. “Investigation of the Former Coal Gasification Site at West Court Street, Ithaca, New York; Task 2 Report, Initial Field Investigation Program.” Prepared by E.C. Jordan Co., April 1987

3. Order on Consent, Index No. DO-0002-9309, between the Department and New York State Electric and Gas (NYSEG), executed on March 30, 1994.

4. "Interim Remedial Measures Final Engineering Report for Activities at Ithaca Cayuga Inlet Coal Tar Site, City of Ithaca, Tompkins County, New York". NYSEG, June 1999.

5. "Interim Remedial Measures Final Engineering Report for Activities at Ithaca Court Street Former Manufactured Gas Plant Site Subsurface Wooden Duct Extension, City of Ithaca, Tompkins County, New York", prepared by NYSEG, August 2001.

6. "Ithaca Court Street MGP Site, Interim Draft Supplemental Remedial Investigation Report for Operable Unit-2", prepared by MWH for NYSEG, August 27, 2002.

7. "Interim Remedial Measures Work Plan for Removal of Coal Tar Impacted Soil on Washington Street Between W. Court and Cascadilla Streets Associated with Ithaca Court Street Former Manufactured Gas Plant Site City of Ithaca, Tompkins County, New York", prepared by NYSEG Environmental Compliance Site Investigation and Remediation, March 2005.

8. "Final Engineering Report Removal of the Subsurface Wooden Duct and Removal of Coal Tar Impacted Soil of Washington Street Between W. Court and Cascadilla Streets Associated with Ithaca Court Street Former manufactured Gas Plant Site, City of Ithaca, Tompkins County, New York", prepared by NYSEG Environmental Compliance Site Investigation and Remediation, April 2007.

9. "OU2 Interim Remedial Measure Work Plan for Wooden Duct Removal Project on W. Court Street Between Meadow and Fulton Streets, Ithaca Court Street Former manufactured Gas Plant Site, City of Ithaca, Tompkins County, New York, prepared by NYSEG, October 2010.

10. Proposed Remedial Action Plan for the NYSEG Ithaca Court St. MGP site, Operable Unit No. 2, prepared by NYSDEC, February 2011.

11. "Remedial Investigation Report Operable Unit 2 NYSEG's Court Street Former MGP Site, Ithaca, New York", prepared by AECOM for NYSEG, February 2011.

12. "Feasibility Study Report Operable Unit 2 NYSEG's Court Street Former MGP Site, Ithaca, New York, NYSDEC Site No: 7-55-008, Index No. D0-00029309", prepared by AECOM for NYSEG, February 2011.

13. "Remedial Design Work Plan Ithaca Court Street Former MGP Site OU-2 Ithaca, New York NYSDEC Site # 7-55-008", prepared by AECOM for NYSEG, July 2011.

All of the documents associated with these Investigation and Reports are available for public review at the following document repositories:

New York State Department of Environmental Conservation
Central Office, 625 Broadway 11th Floor
Albany, New York 12233-7014
Attn: Ms. Elizabeth B. Lukowski
(866) 520-2334
(By appointment only)

Tompkins County Public Library
101 E. Green Street
Ithaca, NY 14850
(607) 272-4557
Mon-Thurs 10:00 AM – 8:15 PM
Friday-Sat 10:00 AM – 5:00 PM
Sunday 1:00 PM – 5:00 PM

Coal Tar Advisory Committee
106 Washington Street
Ithaca, NY 14850
(607) 272-1239
Attn: Jutta Dotterweich

City of Ithaca
Office of the Mayor
108 East Green Street
(607) 274-6501

1.3.1 Pre-Design Investigation Activities

A pre-design investigation (PDI) was performed at the Site in July 2011 and included advancement of a total of 44 soil borings, four geotechnical borings and installation of seven new monitoring wells. Work was completed in accordance with the Ithaca Court Street Former MGP Site OU-2 Remedial Design Work Plan (RDWP) [AECOM, 2011c]. A total of 21 borings were drilled and seven samples were collected for the purpose of refining the limits of Areas 1A, 1B and 1C based on the presence of visible MGP impacts. The presence of visible MGP impacts noted in the boring logs and results of these samples are provided in the attached Pre-Design Investigation Summary Report (Appendix D).

Soil samples were collected from 28 of the 44 soil borings and placed in clean containers provided by the laboratory if analytical testing was to be performed. The remaining soil was placed in gallon zip lock bags for use during the ISCO Treatability Study described in the Ithaca RDWP.

A total of 10 samples were collected for the purpose of waste characterization and 13 samples for evaluating soil re-use in Areas 1A and 1B. The results of this analysis are also provided in the PDI Summary Report. Additional detail regarding waste characterization is provided in Section 4.6.

2.0 Remedial Action Objectives

In accordance with the ROD, the remedial objectives for this site are:

Public Health Protection

Groundwater

- Prevent people from drinking groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater.

Soil

- Prevent ingestion/direct contact with contaminated soil.

Environmental Protection

Groundwater

- Remove the source of ground water contamination
- Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.

Soil

- Prevent migration of contaminants that would result in groundwater contamination.
- Remove the source of ground water contamination.

3.0 Organizational Structure and Responsibility

NYSEG and New York State regulatory agencies will participate jointly in this remedial action associated with the Ithaca Court Street former MGP site. NYSEG has the ultimate responsibility for implementing the remedial action for the project, including the utility relocation of gas lines and overhead lines within the excavation areas and community air-monitoring program during construction (see Organizational Chart in Appendix A). Approval of this Remedial Design Report by the NYSDEC and the NYSDOH will be secured prior to intrusive activities, site excavation and ISCO. NYSDEC and NYSDOH personnel are anticipated to be on-site periodically for purposes of general program oversight. The remediation contractor will be responsible for all on-site construction operations during the project, unless otherwise stated herein, including: utility re-location, sheet pile installation, excavation and ISCO implementation, and protection of adjacent structures and utilities; construction personnel health and safety; traffic management and safety; implementation of contingency plans for odor control; management of wastewater and waste-handling operations; maintenance of site controls (i.e., run-off, run-on); the construction and material handling activities associated with the remedial action; and documentation of the extent of the removal action.

Communication with regulatory agencies and with members of the surrounding community will be managed by NYSEG. The plan for sharing project information with the community is described in the *Citizens Participation Plan* for the Ithaca Court Street former MGP site OU-2 included in Appendix B.

Key personnel and their assigned responsibilities for implementation of the remedial action include:

NYSEG: Mr. Joseph M. Simone, PE: Manager – EH&S Compliance
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224
Binghamton, New York 13902
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NYSDOH: Justin Deming: Bureau of Environmental Exposure Investigation – Central Section
NYSDOH
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Troy, New York 12180-2216
Phone: (518) 402-7860
E-mail : jhd01@health.state.ny.us

4.0 Remedial Design

4.1 Introduction

This remedial design includes a chronological description and performance schedule of anticipated project activities for OU-2. Documents include design drawings, a sheetpile and shoring specification for excavation in Areas 1A and 1B, utility re-location plan, by-pass pumping specification, an ISCO specification for Area 1C, a Community Participation Plan, an ISCO Bench Scale Study, a Construction Quality Assurance Plan, a Quality Assurance Project Plan, a Transportation Plan, a Project Schedule, an Organizational Structure, a Vapor Emission Response Plan, a Community Air Monitoring Plan, and NYSDEC Remedial Action Design approval letter located in Appendix O.

Actual project data (e.g., community air-monitoring, noise, dust control) obtained from NYSEG's previous remediation efforts at other MGP sites have been used as guidance to design the procedures for the Ithaca Court Street site remediation project.

All work will be conducted to minimize public impact (e.g., traffic, parking, noise) to the extent practicable. Construction operations will generally not begin prior to 7 a.m. or continue after 5 p.m., Monday through Friday. Work on weekends will only be undertaken as necessary to meet the project completion schedule. The following sections describe the procedures to be used for remedial activities.

4.2 Summary of Remedial Activities

The primary activities covered under this remedial design include:

- Mobilization and site preparation;
- Air monitoring to evaluate potential fugitive emissions;
- Excavation of soil containing visible MGP impacts in areas designated as Areas 1A and 1B, along with off-site treatment and disposal at a permitted facility;
- Soil that is not impacted will be used as backfill for the remedial excavation areas. Backfill on residential properties must meet residential SCGs;
- Backfill materials used in the right-of-way portion of Areas 1A and 1B that do not meet residential soil cleanup objectives require a soil or paving/concrete cover to prevent exposure to underlying soils in vegetated and non-vegetated areas;
- The clean soil cover will include a demarcation layer and will be a minimum of 24 inches thick for soil in vegetated areas and 6 inches thick for pavement/concrete in non-vegetated areas. The finished surface over most of the site will be pavement, with some areas receiving vegetation;
- In-situ chemical oxidation treatment of the gravel seam containing MGP tar in Area 1C and of a location at the intersection of Esty Street and North Plain Street;
- Monitoring wells with sumps will be installed to collect and remove flowable NAPL if present in Area 1C;
- Transportation and management of excavation soils to an off-site permitted facility; and
- Surveying and site restoration.

The remainder of this section describes these activities and provides the information used as the basis for the design. Additional specific instructions to the remediation Contractor are provided in the Specifications and Drawings.

4.3 Mobilization and Site Preparation

The Contractor will prepare the site for the required excavation and ISCO work. Note separate mobilizations by different contractors may be required for the excavation work and for the ISCO work. The site preparation activities include:

- Mobilization;
- Installation of erosion and sedimentation controls;
- Set-up of temporary site facilities;
- Utility location, protection, and relocation, if necessary;
- Emergency access development; and
- Set-up of traffic management at the project site.

4.3.1 Mobilization

The Contractor will mobilize to the site all necessary labor, equipment, and materials to initiate the work. The initial mobilization will include the delivery of the materials and equipment for site preparation. This will be followed by delivery of equipment and materials needed for the excavation and ISCO work.

4.3.2 Erosion and Sediment Controls

Erosion and sediment controls, including silt fence, will be installed prior to any disruption of site soil. The erosion and sediment controls will be maintained throughout the duration of the work. Erosion and sediment controls are further described in Section 4.8.3.

4.3.3 Clearing and Placement of Site Facilities

The Contractor will set up site facilities needed to support and execute the work. Fencing, trees, and other surface features that impede access to the excavation area will be removed. The following site facilities will be needed during remedial construction:

- Construction offices;
- Utilities (electric, water, sewer, and telephone);
- Community air monitoring equipment;
- Lighting;
- Security fencing;
- Fuel storage and dispensing;
- Sanitary facilities;
- Haul roads;
- Decontamination pad(s);
- Health and safety equipment;

- Material laydown areas;
- Soil stockpile areas;
- Traffic control signage; and
- Parking areas.

In addition to the above facilities, all work areas will be secured and barricaded with temporary fencing and caution tape to ensure the safety of the workers, visitors, and surrounding public, as well as to prevent vandalism and unauthorized access. The fencing will have professionally-made signs stating that access to the site is limited to authorized personnel, and work within the site must be done with the appropriate personal protective equipment (PPE).

Work zones will be established within the site boundaries in accordance with the site-specific Health and Safety Plan (HASP) that will define the initial exclusion zones, the decontamination zones, and the support zone. These zones will change as the work progresses in order to maintain safety and allow for practical completion of the work.

4.3.4 Surveying

The Contractor will retain a New York State-licensed surveyor to provide initial benchmarks and stakeout for horizontal and vertical excavation control points and ISCO injection points. The Contractor will use this initial survey to confirm and maintain horizontal and vertical limits as the work proceeds. The licensed surveyor will return to the site as needed to document actual excavation and ISCO work limits, measurement of unit cost bid items, and to complete an as-built survey of the finished work. NYSEG will perform a pre-construction survey of select residential and commercial properties adjacent to the remediation areas to verify existing conditions prior to the start of work activities. This survey will be used to evaluate if any damage is caused by construction activities and will be used as a guide to properly restore the properties to pre-construction conditions.

4.3.5 Protection of Utilities

The Contractor will identify and protect all utilities within the project work areas. The Drawings identify known utilities active in the work areas that may require protection and/or relocation to facilitate the work. Where necessary, these utilities will be removed, relocated and replaced at the direction or to the satisfaction of the engineer. The Contractor will also be responsible for maintaining utility service to all affected properties throughout the work area.

4.3.6 Utility Relocation

During the excavation work, the overhead electrical lines along the OU-1 boundary and the overhead and buried utilities along both sides of North Plain Street and Esty Street will be impacted. The overall plan and specific phasing for dealing with these utilities throughout the work is shown in the attached drawings and summarized below. Overhead utilities and underground gas mains will be relocated prior to remedial activities by the affected utility companies. The proposed relocation plans for NYSEG overhead electric and underground gas can be found in (Appendix L) for informational purposes only; actual locations will need to be field verified by the Remediation Contractor prior to mobilization. The project Remediation Contractor shall be responsible for water and sewer relocation and restoration as displayed in the attached drawings. The City of Ithaca Department of Public Works – Water and Sewer Division has provided details and specifications that shall be followed by the Contractor during temporary relocation and permanent restoration of the sanitary sewer and water mains and associated services (Appendix M).

The excavation work on Esty Street in Area 1A will conflict with the overhead electric power (NYSEG), telephone (Verizon), fiber optic lines (Fiber Technologies, LLC) and cable television utilities (Time Warner Cable) that are located overhead on poles just south of the southern curb. These utilities will be relocated by others prior to the mobilization of the Remediation Contractor. Additionally, the Esty Street excavation work is in the same area as the underground potable water, sanitary sewer and natural gas mains (NYSEG) and building services. All of these utilities except underground gas and overhead utilities will be temporarily relocated by the Remediation Contractor to a corridor between the northern street line of Esty Street and the northern limit of the excavation. The temporary relocation of these utilities will require the removal and replacement of seven of the existing trees located in the Esty Street northern shoulder within the public right of way. The removal of these trees will occur prior to remedial activities and will be performed by NYSEG or a separate NYSEG Contractor. Stump removal will be left to the remedial contractor because of the potential for disturbing contaminated soils with that process.

The excavation work on North Plain Street in Area 1B will conflict with the overhead electric power (NYSEG), telephone (Verizon), and cable television utilities (Time Warner Cable) that are located overhead on poles just east of the eastern curb. . These utilities will be relocated by others prior to the mobilization of the Remediation Contractor. Additionally the North Plain Street excavation work is in the same area as the underground potable water main, water service to house number 418, two sanitary sewer mains and three natural gas mains. The Remediation Contractor will be responsible for the relocation of the water and sewer services; NYSEG will be responsible for the relocation of the natural gas mains, prior to the mobilization of the Remediation Contractor. Water supply to the affected house will be maintained by temporarily relocating the water service outside of the excavation area. The water main in the excavation area will be temporarily capped and removed. Sanitary sewer service to house number 418 will be provided by temporary sewer service. The two sewer mains located in the excavation area will be temporarily plugged at new manholes to be installed just south of the excavation area and temporarily plugged at the existing manholes located in the intersection of North Plain Street and Esty Street. Wastewater flows will be pumped around the excavation area though the use of a temporary bypass pumping system. The bypass pumping system will be sized to handle peak wet weather flows and employ redundant pumps. The pumps will be provided with acoustic enclosures and critical silencers to minimize the associated sound.

Following completion of the remediation work, existing utilities and services which have been temporarily relocated will be returned to their approximate original locations. The Remediation Contractor shall be responsible for restoring water and sewer services to their original locations. Restoration of overhead lines and poles as well as underground natural gas and associated service connections will be restored by the affected utility companies and not the Remediation Contractor.

4.3.7 Emergency Access

Due to excavation within the street right-of-way and the closure of North Plain Street and Esty Street, emergency access needs to be established. The emergency access to be provided will be dependent on the phase and area of excavation. In Area 1A the emergency access pathway will span between the curb line to the back edge of the sidewalk from 120 Esty Street to 503 North Plain Street. The emergency access lane shall also serve as access to these homes 24 hours a day.

In Area 1B, multiple phases will be implemented and the emergency access will change based on the stage of work. The driveway for the house at 420 North Plain Street will be used as an emergency access travel lane and parking for the resident located at 418 North Plain Street. The house at 420 North Plain Street is owned by NYSEG and will be demolished by NYSEG or a separate contractor prior to remedial activities.

The construction and location of the emergency access lanes are presented in the attached drawings. During the various stages of the work, the Contractor shall be in contact with City of Ithaca emergency services (fire, police and ambulance) throughout project activities to ensure access 24 hours a day.

4.3.8 Traffic Management

All project traffic is to follow the site transportation route identified in the Transportation Plan (Appendix C). Further instructions to the Contractor regarding the means and methods of transportation of impacted soil and MGP waste are also provided in the Transportation Plan.

General public traffic on North Plain Street and Esty Street will be managed in accordance with New York State Department of Transportation (NYSDOT) regulations and in conjunction with local officials (i.e. the City of Ithaca street permit). During excavation activities, closure of North Plain Street and Esty Street is anticipated to ensure both worker and public safety. The Remediation Contractor will be responsible for obtaining the City Street Permit and coordinating general public traffic flow throughout the project. The Remediation Contractor will also be responsible for maintaining access to all of the private properties adjacent to the project work areas. The Remediation Contractor shall also arrange for police assistance with traffic management when necessary and required by the City.

4.4 Excavation

4.4.1 Excavation Objectives

Excavation of soil in Area 1A will be conducted prior to excavation in Area 1B and ISCO work in Area 1C to limit disturbance of the local traffic flow and access to residences in the area. The objectives of this excavation are to:

- Excavate soils containing “visible MGP impacts”;
- Stockpile and analytically test potential reuse soil identified during the PDI as suitable for re-use as backfill within the right-of-way portion of OU-2; and
- In accordance with the ROD, meet the remedial objectives set forth for the protection of the environment and public health.

4.4.2 Limits of Excavation

The overall limits of the excavation of soils in Areas 1A and 1B will be based on both the historical subsurface investigations in the area as well as the observations made during the recent pre-design investigation. Only the volume of soil necessary to remove the visibly MGP impacted material will require excavation and disposal. For purposes of removal, disposal, and/or reuse the term “Visible MGP Impacts” describes any material with sheens, blebs, or NAPL. This definition determined the proposed vertical and horizontal delineation boundaries of the excavation to be performed in Areas 1A and 1B.

The horizontal limits of excavation in Areas 1A and 1B have been refined based on the results of the July 2011 PDI and subsequent discussions with the NYSDEC. In Area 1A, the western boundary of the excavation area has been extended towards the intersection of North Plain Street and Esty Street in response to boring PDI-18, which contained non-viscous and saturated NAPL at approximately 19 feet; the eastern boundary has been extended to PDI-28. In Area 1B, the boundary will extend from SB-57 in the north to borings PDI-16 and PDI-17 in the south to ensure the horizontal sheet pile limits extend to borings that did not have any MGP-impacts.

Historic boring SB-168 exhibited non-viscous NAPL at approximately 13 feet is an isolated point of contamination. During the PDI, three additional points (PDI-7, PDI-8 and PDI-31) were installed in close proximity to SB-168 and none of these contained visible MGP impacts. The boring log for SB-168 in comparison to the surrounding points reveals a depression in the clay layer, which may have resulted in a small concentrated area of MGP impacted material at this location. Based on discussions with the NYSDEC, this area will be treated by ISCO since the impacted area around SB-168 is small and isolated and difficult to excavate, due to the exiting utilities and traffic at this street intersection.

The vertical limits of excavation in Areas 1A and 1B have been estimated based on previous investigation information and the recent PDI results. In order to remove any potential underlying lenses of impacted material, excavation depths are planned to extend 1 foot into the silty-clay layer. If visible MGP impacts remain beneath this depth, the contractor shall consult with NYSEG to determine the appropriate course of action since the sheet pile has been designed for certain vertical excavation depths. Additional excavation may be necessary but will only be performed if directed by NYSEG or its designated agent in writing and an excavation supporting system design is provided by the Remediation Contractor stamped by a New York State registered professional engineer if necessary.

The upper portion of the soil being excavated that does not contain MGP-impacts will be stockpiled on site and reused as backfill; only after meeting the requirements set forth in section 4.4.3. In general, the anticipated overall excavation depths range from 8.5 to 22.5 feet below ground surface in Area 1A and 8 to 15 below ground surface in Area 1B. A one foot buffer was added to the upper limit of the impacted layer to ensure impacted soils are not mixed with soil to be re-used. Anticipated excavation depths will be adjusted where necessary based on field observations during the actual work.

The attached drawings depict the approximate representation of targeted areas for excavation due to the presence of visible MGP-impacts within Areas 1A and 1B. A total of approximately 7,600 cubic yards of soil is anticipated to be excavated from these areas. Soil with no visible impacts will be segregated for reuse as backfill and soil with visible impacts will be disposed of off-site. A total of approximately 5,050 cubic yards of soil is anticipated to be reused on-site.

Soil excavation will extend to beneath the groundwater table and excavation dewatering will be conducted to minimize the infiltrating groundwater. However, soil excavated from beneath the groundwater table may still contain free-draining liquids. This soil will be temporarily placed on top of other impacted material within the excavation limits to help drain the liquid from the material prior to its removal from the excavation. Proper odor control techniques will be utilized during the excavation activities.

To the maximum extent possible, impacted soil will be excavated and directly loaded into trucks for immediate transport to the off-site disposal facility. Where immediate loading and removal of impacted soils is not practicable, impacted soils will be staged on other soils yet to be excavated or in bermed areas within the project staging/support area. All stockpiles of impacted soil will be secured and managed to collect runoff and dewatered fluids (constructed soil staging areas with gravity sumps) and covered/anchored properly to control odor

4.4.3 Soil Re-Use Onsite and Imported Backfill

Boring logs indicated that the upper zone of soil within Areas 1A and 1B does not contain visible impacts with MGP residuals. As set forth in the ROD, the upper zone of excavated materials that does not contain visible impacts may be stockpiled and utilized for reuse as backfill material for excavation Areas 1A and 1B. Sampling and analysis during the PDI indicates that the upper zone of soils without visible impacts and intended for reuse as backfill meets NYSDEC Part 375-6.8(b) requirements for residential use.

The vertical limits of the upper zone of soil without visible impacts in Areas 1A and 1B have been estimated. Care will be taken to ensure that any potential underlying impacted material is not removed and commingled with the upper zone of soil intended for reuse. In general, the anticipated excavation depths of soil for reuse range from 8.5 to 18 feet below ground surface in Area 1A and 8 to 12.5 below ground surface in Area 1B. Excavation depths of soil intended for reuse are planned to approximately 1 foot above the highest elevation of identified visible MGP impacts. These anticipated depths and excavation configuration are shown on the attached drawings. The anticipated excavation depths of soil to be reused will be adjusted where necessary based on field observations during the actual work.

Potential re-use soil (i.e., non MGP-impacted soil) that has been excavated shall be stockpiled and analytically tested prior to its use. This material must meet the requirements of NYSDEC Part 375-6.8(b) requirements for commercial use to be reused as backfill within the street right-of-way. Re-used soil shall be placed prior to any imported backfill material. Imported soil will be necessary to balance out the volumes necessary to backfill excavation areas. The estimated volumes of reuse soil is 5,050 cubic yards and the estimated volume of backfill required is 2,550 cubic yards Analytical testing shall be performed on all imported backfill prior to its use on-site. This imported material must meet the requirements of NYSDEC Part 375-6.8(b) requirements for commercial use when placed within the (street right-of-way) and residential use for (Cell 1B-3). If backfill material is used in the right-of-way portion of Areas 1A and 1B, which does not meet residential use, specific cover requirements for vegetated and non-vegetated areas are specified in the drawings. Per DER-10 requirements the potential re-use soil and imported backfill material shall be sampled and analyzed for the following analyses – VOCs, SVOCs, PCBs, Pesticides and Metals. The potential reuse soil and imported backfill shall be sampled at the respective frequencies of 1 sample per 500 cubic yards and a minimum of one sample per borrow source. The reuse soil and imported backfill material will also be required to meet the NYSDOT requirements of Embankment in Place item number 203.03. All such stockpiled soils will be protected with soil erosion controls and dust controls.

4.4.4 Excavation Sidewall Stability

Due to the various site constraints throughout the remedial excavation areas (public streets within tightly developed urban neighborhoods), temporary excavation support will be installed along the planned horizontal limits of the excavations.

Steel sheet piles will be used to provide excavation support. Sheet pile with internal bracing will be required. The steel sheet piles will be completed in a series of subdivided excavation cells for areas 1A and 1B as shown on the drawings.

Excavations are located in close proximity to existing structures. Accordingly, pre-condition surveys will be performed by NYSEG for select buildings to document their condition prior to commencement of the work. In addition, permissible vibration criteria has been established based on industry standard practices and vibration monitoring will be performed at the closest structure during sheet pile installation to verify that vibration criteria are met. The steel sheet piles shall be hydraulic pressed into the ground to minimize risk of vibration damage. NYSEG owned AZ-48 sheet piles are available for use if the contractor is capable of pressing the provided sheet piles as per the drawings. If the NYSEG provided sheet piles are not compatible with the Contractor’s proposed press system and cannot be used, the Contractor shall provide all necessary sheet piles with a minimum section modulus as per the drawings.

The sheet piles will be installed to adequate depth (into the underlying clay layer) to facilitate a hydraulic cutoff. This will enhance excavation stability and minimize groundwater inflow.

All sheet pile work will comply with relevant Occupational Safety and Health Administration (OSHA) requirements. Additional project requirements for sheet piles are provided in the attached drawings and technical specifications.

4.4.5 Dewatering

The proposed excavations within Areas 1A and 1B will extend beneath the existing groundwater table. The sheet piles installed along the perimeter of the excavations will help to limit groundwater infiltration into the open excavations; however limited excavation dewatering is anticipated. Excavation dewatering will be performed using dewatering sumps within the excavation area containing trash pumps to remove the water. Due to the nature of the dewatering, the extracted water will be routed through a temporary treatment system to be located in the project staging/support area prior to discharge to a nearby sanitary sewer manhole. The temporary treatment system shall be capable of treating a flow of 50 gallons per minute and meet the requirements of the Temporary Treatment System specification.

4.5 In-Situ Chemical Oxidation

This section presents the basis for the ISCO design, including consideration of the horizontal and vertical extents of the treatment area, oxidant selection, chemical oxidation injection activities, injection point construction, performance criteria, and other design considerations. The ISCO Contractor will conduct ISCO in accordance with the requirements discussed herein as well as the design drawings and the attached specifications. As discussed throughout this section, an ISCO Technical Execution Plan (TEP) will be prepared and submitted for review and approval by NYSEG by the ISCO Contractor prior to commencement of field ISCO activities which will provide more specific details for the field implementation of ISCO, including but not limited to injection equipment, vapor monitoring and collection methods, oxidant dosages, and performance monitoring.

In accordance with the ROD, NAPL found in monitoring wells shall be removed prior to ISCO injection. Gauging for free NAPL in monitoring wells was performed on three separate occasions during the summer of 2011, and no measurable quantities were observed. If free NAPL is observed in any monitoring well or injection well in the ISCO treatment area, the ISCO Contractor will perform appropriate recovery efforts (i.e., manual bailing and/or pumping).

4.5.1 Horizontal Limits of ISCO

The horizontal limits of remediation in Area 1C (ISCO) were determined based upon the pre-design investigation, visual impacts in soil borings, laboratory analysis of soil and groundwater samples, and physical boundaries (i.e., adjacent structures and structures associated with North Plain Street). Remediation is targeted within the horizontal area where visible MGP impacts were observed. In addition, the horizontal limits of ISCO were expanded to include the area around monitoring well MW-C12, where the highest concentrations of VOCs and GRO were measured in groundwater samples collected in 2011. The horizontal limits of ISCO cover approximately 4,900 square feet and are shown in the Drawings. Contamination in areas located outside of the ISCO remediation area will be treated by natural attenuation processes (dispersion, dilution, volatilization, transformation) following ISCO remediation.

Hardened tar was observed in a discrete area on the west side of North Plain Street above the clay layer found at the bottom of the fill. This observation is anomalous as only two borings observed hardened tar (SB-134 and MW-C15) of the many borings advanced in Area 1C during the RI and the 2011 PDI. No BTEX or PAHs analytes were detected in monitoring well MW-C15 screened below the upper clay, and this hardened tar is likely not mobile or adversely impacting groundwater. In addition a soil sample collected from the interval (6-7 feet bgs) where the hardened tar was observed (6.5-6.7 feet bgs) did not measure any BTEX VOCs and only detected very low concentrations of site contaminants. Based on all of these factors, no ISCO treatment will be performed for the limited hardened tar located in the bottom of the fill above the clay in this area.

ISCO will also be completed in the immediate vicinity of soil boring SB-168, where moderately viscous NAPL was observed in the soil boring within a sandy gravel layer at an approximate depth of 13 to 13.5 feet. NAPL or visible MGP impacts were not observed in several other borings advanced in the vicinity (PDI-7, PDI-8, SB-23), and therefore the impact is limited to the immediate area around this boring. The horizontal treatment extent around historic boring SB-168 is shown on the attached Drawings.

4.5.2 Vertical Limits of ISCO

The vertical limits for ISCO remediation in Area 1C were selected based on visible MGP impacts in soil borings, elevated concentrations of COCs in soil and/or groundwater samples, and PID screening from soil borings (see Table 4-1 in Appendix I). Based on soil borings completed as part of the Remedial Investigation as well as the 2011 PDI activities, visible MGP impacts in Area 1C have been observed at depths between approximately 10 and 15 feet bgs; however, the MGP impacts are typically located in a coarse gravel/fine sand approximately 0.5 to 2.0 feet thick located between two confining layers of silty clay. This was observed in borings advanced throughout Area 1C (average observed thickness of 1.3 feet in 15 borings throughout Area 1C). Near soil boring SB-168, a vertical soil stratigraphy similar to Area 1C was noted with MGP impacts only noted within the coarse gravel/sand layer. The ISCO remediation will primarily target the gravel/sand layer. Impacts were also observed to a lesser extent in the silty clay layer immediately above and below the coarse gravel/fine sand layer. Specific depths of the coarse gravel/fine sand layer vary vertically within Area 1C based on field observations, and a larger ISCO injection interval (five to six feet) will be used to achieve treatment of the coarse gravel/fine sand layer as well as the silt/clay layers above and below in Area 1C and near SB-168.

4.5.3 Oxidant Selection and Field Approach

Several chemical oxidants are available for remediation of organic contaminants, including permanganate (MnO_4^-), persulfate ($S_2O_8^{2-}$), hydrogen peroxide, H_2O_2), and ozone (O_3). These oxidants are all able to cause rapid and complete chemical destruction of many organic chemicals. For treatment of contaminants at the Ithaca Court Street MGP Site OU-2, an oxidant will be required that is capable of oxidizing PAHs, BTEX, and petroleum hydrocarbon fractions (i.e., GRO and DRO) in addition to reducing the mass of MGP related impacts. Catalyzed hydrogen peroxide (CHP), activated persulfate, and ozone have been demonstrated to successfully oxidize these contaminants [ITRC, 2005, USEPA, 2006]. Benzene is recalcitrant to oxidation by permanganate. Ozone has been applied in-situ at MGP sites but was not considered at Area 1C due to the need for continuously operating infrastructure and the potential vapor intrusion concerns associated with ozone.

ISCO bench scale testing was conducted using soils and groundwater obtained from the pre-design investigation to assist in selecting the most appropriate oxidant(s) and activating/catalyst agents for in-situ application and to collect site-specific information to enhance full-scale remedial implementation. Bench scale testing was completed by the AECOM Treatability Laboratory following the In-Situ Chemical Oxidation Treatability Study Work Plan (ISCO TWP) approved by the NYSDEC [AECOM, 2011c, Appendix B]. A summary of the bench scale testing and results is provided as Appendix I.

Phase 1 of the ISCO treatability study consisted of quantifying natural oxidant demand and pH buffer capacity of site soils. ISCO using CHP involves reaction of hydrogen peroxide with ferrous iron (Fe(II)) in order to generate a range of powerful oxidizing free radicals including the hydroxyl free radical (•OH) and the superoxide radical ($•O_2^-$). One method to maintain iron in the dissolved phase using CHP is to lower groundwater pH. The acid buffer capacity test evaluates the ability to lower the pH of a soil slurry by acid addition. ISCO using sodium persulfate requires an activating agent (catalyst) in order to form powerful free radicals, including sulfate radicals ($\bullet SO_4^-$), which are more powerful oxidants than persulfate. Alkaline activation is the most common method (elevated pH); other activating agents include elevated temperatures, ferrous iron (Fe(II)), and peroxide. The base buffer capacity test estimates the amount of base required to raise the pH to alkaline conditions in a soil slurry. A wide range of naturally occurring reactants other than the target contaminant(s), including organic matter and reduced metals species, also react with chemical oxidants. Oxidant demand attributed to soil and organic matter within soil (also termed non-target, natural, or background demand) is typically greater than the demand from target contaminants. The TOD tests estimates the combined effects of non-target and contaminant demand which can be used to determine persulfate dosages if persulfate is to be used at a field scale.

Phase 2 testing of the treatability study involved soil slurry bench-scale test reactors evaluating chemical oxidation effectiveness at destroying site contaminants using different dosages and combinations of oxidants. As described in the ISCO TSWP, each of the oxidation test reactors received a series of three different chemical oxidant applications of CHP or base activated sodium persulfate. The following observations from the bench scale ISCO testing were used in oxidant selection for the field-scale treatment:

- The base buffer titration testing indicated that site soils are circumneutral but are weakly buffered in relation to alkaline pH change, and therefore base can be used for persulfate activation.
- The acid buffer titration testing indicated that site soils are well buffered against acidic pH change. Use of MFR by lowering the pH to maintain iron in a dissolved form would be very difficult to do in-situ, and therefore other means of catalyzing peroxide at a neutral pH would be required to implement CHP (i.e., chelated iron).
- TOD testing with persulfate indicated similar results for low-impact and highly-impacted soils, suggesting that a significant component of TOD is natural oxidant demand. The TOD testing with activated persulfate yielded results of 14.5 to >15 g/kg, which indicated that an appropriate dose will need to be injected to achieve contaminant reduction.
- A stabilized hydrogen peroxide was used for the reactor tests (Phase II), which resulted in significantly less off-gassing and temperature increase than past experience by the AECOM Treatability Laboratory using non-stabilized hydrogen peroxide. For in-situ remediation in a residential neighborhood with numerous utilities, the use of stabilized hydrogen peroxide is recommended.
- Contaminant concentration reductions were approximately the same or better in reactors with the low dosage hydrogen peroxide, compared to the high dosage hydrogen peroxide (see Tables 4, 5, and 6 in Appendix I). Hydrogen peroxide reactions are more vigorous at high concentrations, and the low dosage likely allowed oxidation reactions to occur for a longer period of time resulting in more contaminant oxidation. For the field application a lower dosage of hydrogen peroxide is recommended, especially for use in a residential area.
- Following the second oxidant application in the bench tests, contaminant concentration reductions (BTEX, GRO, DRO) were approximately the same or better, with the exception of total PAHs, in reactors treated with hydrogen peroxide followed by sodium persulfate, compared with reactors treated with two dosages of hydrogen peroxide (see Tables 4, 5, and 6 in Appendix I). The longer persistence of the sodium persulfate compared to the hydrogen peroxide likely allowed more oxidation reaction time. For the field application, both CHP and activated sodium persulfate are recommended.
- Following the second oxidant application in the bench tests, contaminant concentration reductions for total PAHs were better in reactors treated with two dosages of hydrogen peroxide (see Tables 4, 5, and 6 in Appendix I).

- Following the third oxidant application (hydrogen peroxide in all reactors), a significant decrease in pH was noted only in reactors where sodium persulfate was applied. For field application below utilities, application of iron catalyzed hydrogen peroxide is not recommended following injection of sodium persulfate.

The bench scale testing demonstrated improved contaminant destruction by oxidation when applying a combination of CHP and activated sodium persulfate, and the full-scale design for Area 1C will sequentially apply both oxidants similar to the bench testing. Incorporating all of the above observations from the bench scale testing, the full-scale ISCO field injection approach is summarized below:

1. Injection of stabilized hydrogen peroxide (low concentration, e.g., inject 3-5% solution) for initial oxidation and desorption of contaminants from soils. The peroxide should be injected ahead of the iron catalyst (Step 2) to allow some peroxide to react with natural organic matter (NOM) without catalyst. Oxidation of NOM would enhance dissolution of contaminant mass that was sorbed to the NOM;
2. Injection of iron solution to catalyze the hydrogen peroxide as well as to improve distribution of the hydrogen peroxide away from the injection well;
3. Injection of additional stabilized hydrogen peroxide for additional oxidation and desorption and to react with the iron catalyst in the ground near the injection wells. Following initial reaction with hydrogen peroxide with NOM and iron catalyst, a higher concentration of peroxide is recommended than used in Step 1 (e.g., inject 5-10% solution).
4. Injection of base activated sodium persulfate (inject 10-20% solution). Sodium persulfate persists in the subsurface for weeks to months and will react with contaminants that desorb following the CHP injections (Steps 1-3) as well as continue to desorb after injection activities are complete. Incorporating a strong base into the oxidant solution will be completed to activate the sodium persulfate as well as mitigate against a significant pH decrease in the ISCO treatment area.

The four steps represent one injection event or mobilization.

For completing ISCO near SB-168, only activated sodium persulfate will be applied. This small area is located within the street intersection and is outside of the portion of North Plain Street that will be closed for excavation of Area 1B. Application of only activated sodium persulfate will reduce the time of disturbance at the intersection of Esty Street and North Plain Street, by not requiring venting to reduce pressure from off-gassing (see Section 4.5.9.2) and from the higher anticipated injection flow rates compared to hydrogen peroxide. Based on AECOM experience at several sites where both hydrogen peroxide and other liquids have been injected, injection flow rates for hydrogen peroxide will be less (approximately half) than that of other injected solutions (base activated persulfate, iron catalyst). In addition, the reactive persistence of the activated persulfate will be longer when not applied in sequence with hydrogen peroxide.

Technical data sheets; material safety data sheets; and guidance for handling, use, and storage of hydrogen peroxide, sodium persulfate, and sodium hydroxide (base activator for sodium persulfate) are provided within Appendix J.

4.5.4 Oxidant Volume, Dosages, and Frequency

ISCO requires that the oxidant (or the generated free radicals) make direct contact with contamination in the subsurface. Therefore, delivery of the oxidant to the contaminant is the primary factor in achieving a successful ISCO remediation. Oxidant dosages and injection volumes should be selected to maximize delivery and performance of ISCO; however, these design parameters must also balance not affecting nearby receptors and maintaining the health and safety of site workers and the public. The ISCO TEP prepared and submitted by the ISCO Contractor prior to mobilization to the site will detail the specific oxidant concentrations, volumes, and equipment to be used within the ranges presented in this Remedial Design.

Based on the presence of MGP-related NAPL, tar, and stringers, and the baseline soil and groundwater concentrations in Area 1C, the full-scale ISCO approach assumes that three discrete ISCO mobilizations will be performed in order to achieve a high degree of contact between oxidant and contaminants. Three discrete ISCO injections will also be completed in the vicinity of soil boring SB-168. When treating MGP sites with ISCO, groundwater contaminant concentrations can remain high following initial application(s), despite overall contaminant mass reduction, from dissolution of sorbed contaminants as well as oxidation of NOM that previously sorbed contamination. Follow-up injections will oxidize the contaminants released to the aqueous phase after the first injection as well as achieve additional mass reduction to achieve the ISCO objectives and performance criteria presented in Section 4.5.7.

Injection volumes of oxidant solutions (sum of Steps 1 through 4) for each full-scale ISCO injection event will be approximately 20 to 25 percent of the pore volume in the treatment volume. This equates to 12,000 to 15,000 gallons injected in Area 1C for each injection event, or 36,000 to 45,000 gallons over the three events. This pore water target injection volume is proposed based on other in-situ remediation projects that successfully reduced target contaminant concentrations from AECOM experience while also minimizing mounding of the groundwater table. Excessive mounding of the groundwater could lead to day-lighting of oxidants, pressure build-up in the subsurface, and formation of preferential pathways for the injected solutions. The potential for mounding is assumed to be high for Area 1C due to the site soils that primarily consist of silty clay. Contemporary ISCO guidance indicates a greater success of ISCO for sites where oxidant solutions greater than 0.5 pore volumes were applied [Siegrist, et. al., 2011]. Greater than 0.5 pore volumes of oxidant will be injected in Area 1C through the completion of three injection events with injection volumes of 20 to 25% per injection event of the treatment area pore volume. This design injection volume is consistent with the ISCO application completed in the Fall 2011 at the Former Mount Vernon Works MGP site in Mount Vernon, NY; the AECOM design at this site included injection volumes ranging from 24 to 34% for different areas of the site based on observed contamination.

Injection flow rates are assumed low for Area 1C due to the predominance of silty clay with a coarser layer within. In addition, injection flow rates for hydrogen peroxide will be less (approximately half) than that of other injected solutions (base activated persulfate, iron catalyst) based on AECOM experience at several sites where both hydrogen peroxide and other liquids have been injected.

The four step ISCO approach presented in Section 4.5.3 will be applied during each injection event in Area 1C. The anticipated time frame between ISCO mobilizations for Area 1C and the vicinity of soil boring SB-168 will be selected and specified in the ISCO TEP to be prepared by the ISCO Contractor. The areal extent, injection volumes, and oxidant dosages for the second and third ISCO applications may vary from previous injections based on the observations during injection events as well performance monitoring after each event.

4.5.5 Chemical Oxidation Injection Points

Injection can be performed through semi-permanent PVC wells or directly through direct-push (i.e., GeoProbe®) rods. Advantages of semi-permanent wells are that future, follow-up injections can be completed without additional drilling activity and that injection wells serve as additional data collection points. Use of direct-push injections eliminate the need for no permanent well construction and therefore no added cost for well installation, development, and abandonment is recognized; and direct-push points offer greater flexibility for follow-up injections as injection locations can be moved.

As described in Section 4.5.4 above, the full-scale ISCO approach consists of three discrete injection events based on the presence of MGP-related NAPL and staining, as well as the baseline soil and groundwater concentrations in Area 1C. Therefore, oxidant injection will performed through a grid composed of semi-permanent PVC wells. Utilizing semi-permanent PVC wells will minimize the drilling activities associated with ISCO as there will be no drilling activities associated with the follow-up ISCO mobilizations. Installing a grid of injection wells will limit the number of holes drilled (and pre-cleared) in the road, reduce safety concerns and risks from additional drilling activities around numerous underground and overhead utilities, and reduces the amount of disturbance to the surrounding community by limiting the amount of time needed on-site to complete follow-up injections thus mitigating the noise, traffic control, and safety concerns associated with additional drilling. The injection wells will allow for quick connection for follow-up injections reducing field time for the second and third injections as well as allow for injection to be performed such that volumes proposed for individual points can be distributed over several discrete injections, which AECOM has demonstrated to reduce mounding and daylighting at other ISCO projects. At each injection location, a discrete injection screen interval will be installed to treat the vertical remediation target thickness. Specific vertical screen intervals were selected across Area 1C based on depth of the observed sandy gravel layer, depths of visible MGP impacts, and PID screening from soil borings (Table 4-1).

This Remedial Design assumes that injection wells will be installed using a direct-push rig in Area 1C to allow smaller drilled boreholes in the vicinity of numerous underground utilities and to reduce the drilling disturbance time to nearby residences, as direct-push rigs have higher installation production rates than other drilling methods. Injection well construction details are included in the Drawings, which show that injection wells will be 2.0-inch diameter or less PVC. However, a larger diameter injection well (2 or 4-inch PVC) will be used near SB-168 for evaluation, and collection if necessary, for the presence of mobile NAPL.

The injection point locations will be placed based on a number of factors including the location of nearby houses, overhead and underground utilities and nature and extent of contaminant sources. Injection wells will be installed at locations within the public right-of-way on North Plain Street. Spacing of injection wells will be approximately 12 feet, but actual spacing may vary in the field due to adjustments for surface and subsurface features. This grid spacing is selected based on observed subsurface stratigraphy from soil boring logs (the predominance of silty clays with sand and gravel lenses within), local hydrogeologic parameters (hydraulic conductivity and hydraulic gradient), and AECOM experience with ISCO injections (a 12-foot grid spacing was implemented at the Ottati and Goss Superfund Site and successfully treated VOCs and 1,4-dioxane in low permeability, heterogeneous silty, fine sand and dense till [Metcalf&Eddy|AECOM, 2008 and AECOM, 2011]). When setting the injection grid, ISCO injection points will be offset at least four feet (or to the extent practicable) from known underground utilities to minimize damage to utilities during drilling and to reduce the potential that the injected amendment does not short circuit through the utility conduits. Overhead utilities will also factor into the final location due to the safety concerns posed by the lines during injection point installation.

A plan view of the injection locations in Area 1C (42 injection wells) is shown on the attached Drawings. This injection well layout will provide a generally consistent distribution of the oxidants throughout the treatment area. Injection will be completed into all injection wells during the first event, and the initial plan is to use all of the injection wells for subsequent rounds. However, the number of injection wells (areal extent of ISCO) for the second and/or third ISCO applications may be reduced for follow-up injection events based on groundwater performance monitoring. For performance of ISCO in the vicinity of boring SB-168, only a single injection well will be installed as close as possible to the historic boring location.

4.5.6 Chemical Oxidation Injection Activities

Hydrogen peroxide and sodium hydroxide will be delivered to the site as concentrated liquid solutions. Sodium persulfate will be delivered as a powder. All bulk chemical storage as well as dilution activities will occur at the OU-1 property or a NYSEG-owned property in close proximity. Secondary containment will be erected around where the chemicals will be stored and dilution and batching will be performed. Chemicals will be stored and separated as appropriate, in accordance with the MSDS. Containers for materials storage shall be properly labeled per the supplier's requirements and to be compliant with all local, state, and federal regulations.

Exclusion and decontamination zones will be established using caution tape, cones, and/or jersey barriers around the bulk storage area, the dilution and batching area, and active injection points. All workers entering the exclusion zone will be required to wear appropriate personal protective equipment (PPE), including but not limited to face shields, protective gloves, steel toe work boots, and chemical resistance coveralls (i.e., Tyvek). Additional health and safety equipment will be provided including an emergency shower, an eyewash station, a potable water supply system, and first-aid station(s).

The injection system equipment will consist of batching tanks, pumps, hoses, and fittings. All materials for tanks, pumps, hoses, and fittings will be selected from materials that are compatible for use with chemical oxidants. Pressure gauges and flow meters will be implemented on each active injection well to monitor flow rates and total volume added to each well. All hoses will be flexible and placed above ground. To the extent practical, injections will be performed at low pressures (less than 10 psi). All systems will be leak-checked daily prior to chemical injection by pressurizing the system with water to prevent oxidant releases from the injection system. To minimize mounding and improve delivery, injection will generally not be performed at adjacent wells at the same time. In addition to reduce mounding and improve delivery, when possible, injection will be performed in alternating batches where a fraction of the total volume proposed for a particular well will be injected at any one time and the entire proposed volume for each well will be injected in several discrete injections to distribute the overall injection across the site over the entire injection period (each for Steps 1 through 4). Air quality monitoring will be conducted during ISCO injections for total VOCs using a PID to ensure a safe working environment for site workers and the public.

Work hours for all field activities in Area 1C (drilling, ISCO injection, performance monitoring and sampling) will be between the hours of 7:00 AM and 5:00 PM. No unsecured materials or equipment will be left in Area 1C overnight or during the unattended hours. Equipment may be used for continuous vapor extraction (see Section 4.5.9.2), and such equipment and materials may remain in the injection area contained within a temporary fence.

4.5.7 In-situ Chemical Oxidation Objectives and Performance Criteria

The remediation objectives for implementing ISCO within Area 1C include:

- Reduce time required to reach groundwater quality standards by removing high concentrations of MGP contamination and sources of groundwater contamination;
- Meet the soil RAOs related to protecting human health and the environment over the long term;
- Achieve short term goal of reducing MGP waste mass and a long term goal of meeting groundwater quality standards within Area 1C;
- Delivery and distribution of the oxidant consistently throughout Area 1C;
- Contain and reduce the mass and overall mobility of the NAPL within Area 1C;
- Implement remediation safely while minimizing disturbance to nearby properties and utilities; and
- Incorporate green remediation principals into the site remediation approach in comparison to ex-situ treatment options by treating contaminated media in-place.

The primary ISCO performance criteria for Area 1C will be the application of a specified oxidant dosage of oxidant within the identified extent of treatment (Section 4.5.1 and 4.5.2). Chemical oxidation bench scale testing performed by AECOM using highly-impacted soils from Area 1C achieved reductions in aqueous concentrations of BTEX, PAHs, GRO, and DRO of greater than 80 percent, along with greater than 60% reductions in soil concentrations through a combination of CHP and activated sodium persulfate (first two oxidant applications in the bench scale test). From the first two applications of oxidant in bench scale testing (soil-slurry reactors dosed to achieve a 5% aqueous concentration of hydrogen peroxide followed by a dosage to achieve 15% aqueous concentration of sodium persulfate), oxidant quantities have been extrapolated to determine the equivalent oxidant dosage for the pore volume within the targeted treatment zone of Area 1C. The ISCO performance criteria for this project are to apply the following oxidant dosages to the Area 1C (North Plain Street north of Esty Street) and in the area around boring SB-168:

- Area 1C and SB-168
- 7,810 pounds of hydrogen peroxide (approximately 28,920 lbs of 27% solution); and
- 26,400 pounds of sodium persulfate.

Calculations to establish these oxidant dosage performance criteria are provided within Appendix I. Since the reductions in concentrations observed in the bench scale testing were from highly impacted samples, these dosages are assumed to be appropriate for treating the entire area within the horizontal and vertical extents. As noted in Section 4.5.2, ISCO injection will be performed across the bottom of the upper clay, the coarse gravel/fine sand layer, and the top of the lower clay. It is assumed that the gravel/sand layer is where a significant fraction of the MGP impacts have traveled and are located, and where a significant portion of the injected volumes will travel. For determining the oxidant dosage performance criteria, the average treatment thickness of the sand/gravel layer (1.3 feet within 15 borings across Area 1C) plus a 25% safety factor was used for determining pore volume in the treatment areas.

Oxidant application performance criteria have been approved by NYSDEC and implemented at numerous MGP sites, including at the former Mount Vernon Works MGP site in Mount Vernon, NY where ISCO was performed in 2011 with an oxidant mass and volume performance criteria. Similar to the Ithaca Court Street Former MGP Site (OU-2), the Mount Vernon ISCO was completed in areas downgradient of excavation areas, including within a road right of way, where excavation would be too disruptive to subsurface utilities and nearby residential buildings. For the Mount Vernon ISCO, bench scale testing was also completed to evaluate different oxidants and to select a field dosage.

The above specified dosages of oxidants would be applied over the series of three ISCO mobilizations (Section 4.5.4). The first ISCO application would evenly apply oxidant solutions through the entire treatment area. However, based on results of ISCO performance monitoring, the oxidant dosages and locations of applications may be modified. In addition, if sustained reductions in contaminant concentrations are observed in monitoring wells during performance monitoring sampling, the ISCO Contractor may appeal to NYSDEC to remove portions of the treatment area from future injections and accordingly reduce the oxidant application mass (by a function of the fraction of area removed and the number of remaining injections). If contaminant concentrations and mass are demonstrated to be reduced, decreasing the quantities of chemical oxidants and activating chemicals being injected in the subsurface would be consistent with NYSDEC Program Policy on Green Remediation (DER-31) to “minimize the environmental footprint of cleanup actions” [NYSDEC, 2010b].

4.5.8 Performance Monitoring

Groundwater sampling will be conducted after ISCO injections to evaluate performance of the remediation and may be used for adjusting the ISCO approach and scope for subsequent injection mobilizations with

NYSEG and NYSDEC approval. Groundwater samples collected during the 2011 Pre-Design Investigation will be considered pre-treatment baseline conditions for both contaminant concentrations as well as groundwater quality parameters (pH, ORP, specific conductivity).

ISCO performance monitoring samples will be analyzed for VOCs, SVOCs, TPH, DRO, TPH GRO, and select metals (As, Fe, and Cr). At least one round of groundwater sampling will be conducted prior to completing follow-up ISCO injections. Seven monitoring wells were installed within Area 1C in 2011 as part of the pre-design investigation, and sampling results from these wells were used to finalize the horizontal extent of ISCO treatment (see Section 4.5.1 and the Drawings). Additional portions of the Area 1C treatment extent were determined based on visible impacts in soil borings advanced outside of the ISCO treatment area presented in the Record of Decision [NYSDEC, 2011] and NYSDEC approved Remedial Design Work Plan [AECOM, 2011d]. Additional monitoring wells may be installed and sampled prior to ISCO injections to evaluate changes in groundwater contaminant concentrations in these areas from in-situ remediation and to evaluate mounding, water quality parameters, and presence of oxidants during injections. The specific monitoring wells, sampling frequencies, field and laboratory analytical parameters, and oxidant screening/quenching methods will be presented in the ISCO Contractor's TEP.

Laboratory analysis will not provide an accurate measurement of concentration of organic contaminants if residual oxidant is present in groundwater samples, as continued oxidation can occur between sample collection and laboratory analysis. If oxidant (persulfate or hydrogen peroxide) is detected in post-ISCO performance monitoring samples, a chemical agent (for example, sodium thiosulfate) may be added prior to submitting to the laboratory to quench the ISCO reactions in the sample to prevent further oxidation (change in concentration) from occurring in the samples in the time between sample collection and analysis at the laboratory. This approach is industry practice to ensure the sample is representative of the groundwater conditions at the time of sample collection.

4.5.9 Design Considerations

In addition to the selection of oxidant(s), dosages, volumes, and injection well details, additional ISCO design considerations need to include traffic control, mitigation of pressure and vapors, and metals mobility. Attention to these considerations is especially critical for ISCO implementation within a residential neighborhood. If the ISCO Contractor desires, a pilot test may be performed to the satisfaction of NYSEG and NYSEG's representative prior to the injections to evaluate these design consideration with actual field operating conditions.

4.5.9.1 Traffic Control

One lane on North Plain Street should be open to maintain traffic flow in the area; however, closure of the entire street for certain periods may be necessary during the injection to ensure both worker and public safety. To the extent practicable, injection activities will be sequenced to maintain traffic flow and minimize neighborhood disturbance during injection activities. A street permit shall be obtained from the Ithaca City Engineer's office for work within the public street ROW. The proposed traffic control measures shall be implemented in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), including both the federal version and the NYS supplement [NYSDOT, 2009]. Hose ramps or similar protective measures shall be used for above ground hoses on open lanes in the road (see photographs in Appendix J). Throughout all of the work activities, emergency access will be maintained to all homes and other facilities in the vicinity of the treatment area.

4.5.9.2 Mitigation of Pressure and Vapors

Chemical oxidation reactions are exothermic, and a product of ISCO with hydrogen peroxide is oxygen gas. As a result, heat, pressure, and steam may be generated in the subsurface. Therefore, a number of precautions will be considered to alleviate potential pressure and vapors generated by ISCO. As noted in Section 4.5.3, use of stabilized hydrogen peroxide results in less off-gassing and temperature increase than non-stabilized hydrogen peroxide. With hydrogen peroxide, pressure and heat generation is correlated to the concentration utilized, so applying a lower dosage of peroxide minimizes pressure and heat. Application of lower concentrations of hydrogen peroxide will reduce the off-gassing rates and minimize the generation of steam. Soil vapor monitoring will also be conducted between injection points and adjacent structures in conjunction with monitoring of utilities (catch basins).

Injections will be performed in a manner to minimize increases in formation pressure. A method of active vapor collection and control will be implemented to relieve subsurface pressure during and after injection of hydrogen peroxide solutions from installed injection wells as well as dedicated wells for vapor monitoring and venting. Vent wells will likely be constructed similar to injection wells, but may be screened slightly shallower (approximately 7 to 15 feet) than the injection well screens to relieve pressure within the injection interval and in the silty clay above. The number, specific locations, and design details for vent wells will be finalized by the ISCO Contractor in the ISCO TEP. Vapor extraction will likely be performed in a similar manner to a soil vapor extraction system. All extracted vapors will be treated with liquid knock-out drum(s) and vapor phase activated carbon, and no direct venting to the atmosphere will be permitted. Specific venting equipment will be specified in the ISCO TEP. Based on observed formation pressure changes, passive venting may also be applied if deemed sufficient. In addition, the production of oxygen gas and/or steam can strip volatile compounds into the vapor phase.

Vapor monitoring will be performed of the extracted vapors as well as the breathing zone for site workers. At a minimum, vapor monitoring would include the following measures. Extracted vapors will be monitored for VOCs using a photoionization detector (PID) as well as lower explosive limit (LEL), carbon dioxide (CO_2), and oxygen (O_2). Summa canister samples will be collected once per day during the first two days of operation of any vapor extraction activities, and weekly thereafter, with analysis for VOCs by US EPA TO Method 15. Specific monitoring requirements and action criteria are included in the IN SITU CHEMICAL OXIDATION Specification section.

4.5.9.3 Utilities

Numerous underground utilities are present in Area 1C, including a water main, two sanitary sewers, and a gas main along with residential connections to each. The locations and depths of these utilities have been reviewed as part of ISCO design. The bottom of the sewer lines are approximately 8.7 feet and 6.3 feet below grade on the west and east side of North Plain Street, respectively. The gas lines and water main are located shallower than the western sewer. The top of the injection interval is 10 feet below grade, and as noted in Section 4.5.5 injection wells will be offset from utilities by at least four feet, to the extent practicable. In addition, injections will be sequenced to minimize groundwater mounding (discrete injections of a fraction of the total volume proposed for a particular well, no injections at adjacent wells). Therefore injected oxidant is not expected to be in contact with underground utilities. The sewer pipes in North Plain Street are constructed of tile pipe and transite pipe. These materials are concrete based and are not organic, so chemical oxidants will not react directly with the pipe materials. However, acidic groundwater may degrade these materials. The bench scale tests did not observe generation of acidic conditions except in the two reactors where hydrogen peroxide was applied after sodium persulfate. Application of CHP following sodium persulfate was not selected as part of the ISCO design based on this observation. As a contingency, additional base solutions (sodium hydroxide) will be available on site during injections in the event that chemical oxidation reactions results in acidic groundwater.

4.5.9.4 Metals Mobility

Shifts in groundwater geochemistry as a result of ISCO can temporarily impact the mobility of certain metals. Chromium mobility is enhanced by increasing the oxidizing nature of groundwater. Conversely, iron, manganese, and arsenic are generally less mobile under more oxidizing conditions. Increased potential for dissolution and mobility of iron, manganese, and arsenic however can temporarily occur with a decrease in groundwater pH, which can occur from breakdown of persulfate to sulfuric acid or lowering the groundwater pH for performing in-situ CHP. The bench scale testing did indicate increases in metals concentrations with application of oxidant, and metals increases were greater in the test reactors where pH decrease occurred. However, changes in geochemistry (pH and ORP) are temporary, and metals concentrations return to baseline concentrations at most ISCO sites within a period of months after injection [Moore and Crimi, 2008]. Groundwater geochemistry will be monitored, and as noted in Section 4.5.8 post-injection groundwater samples will be analyzed for metals and compared to baseline concentrations from 2011 to evaluate metals mobilization as a consequence of the ISCO injections. Mobilization of metals, if any, will be temporary.

4.5.9.5 Site Maintenance and Restoration

Following well installation and ISCO injection activities, hot patching will be applied for pavement repairs, per direction of the City of Ithaca. At boreholes where a well is not constructed, the vacant bore hole will be filled with hydrated bentonite chips to approximately six inches below surface grade, with the remaining void volume filled with clean sand (or other materials as directed by the City of Ithaca) and hot patch.

At the completion of ISCO remediation activities, injection wells and wells for vapor monitoring and venting shall be decommissioned in accordance with NYSDEC Guidance CP-43 "Groundwater Monitoring Well Decommissioning Policy" [NYSDEC, 2009]. A minimum of 35 wells will be located within North Plain Street; road surface restoration in the vicinity of the abandoned wells will be coordinated following completion of the ISCO work between NYSEG, NYSDEC, and the City of Ithaca. Maintenance and upkeep of the monitoring wells, injection wells, and wells for vapor monitoring and venting prior to abandonment will be the responsibility of the ISCO Contractor. Future road surface restoration work in this area following completion of ISCO will be performed by a separate contractor and will not be the responsibility of the ISCO Contractor.

4.6 Waste Management

Several potential waste streams have been identified that may be generated during the remedial actions:

1. Impacted (non-hazardous, but containing visible MGP impacts) soil excavated during remedial excavation activities;
2. Impacted (potentially hazardous for Toxic Characteristic Leaching Procedure [TCLP] benzene and containing visible MGP impacts) soil excavated during the remedial excavation activities;
3. Construction debris;
4. Extracted groundwater; and
5. Incidental project wastes such as PPE.

All of the visibly impacted material that is excavated will be sent off-site for treatment or disposal. This excavated material will be sent to a licensed off-site facilities approved by NYSEG.

4.6.1 On-site Waste Management

Because of construction sequencing and off-site treatment or disposal facility scheduling issues, and in order to consolidate large amounts of waste material for bulk truck shipments, storing impacted material on site prior to loading and shipment may be necessary. To the extent possible, impacted material generated during excavation will be loaded directly into trucks for off-site transportation. However, if necessary, excavated soil will be transported by loader or on-site haul truck from the excavation areas to the stockpile area. In addition, excavated soil designated for reuse will be stockpiled for future reuse as project backfill. Stockpile areas will be located on OU-1, which provides a fenced in area to secure the stockpiled material. The use of liners and berms will be based on whether the material is classified for disposal or re-use. If necessary, material stockpiles will be sprayed with odor suppressing foam and/or covered to mitigate the potential for odors migrating into the surrounding community.

Remediation equipment will require decontamination at certain points in the project. In addition, debris generated during excavation may require decontamination to meet disposal facility acceptance requirements. Decontamination will take place using brushes, steam cleaners, and/or pressure washers. Residues from decontamination operations will be collected and managed with other contaminated soil. Decontamination water will be collected for off-site disposal or treatment. Groundwater seeping into the excavation areas will be captured, treated on-site, tested, and then released to the sanitary sewer after the results are reviewed and approved by the Ithaca Area Wastewater Treatment Facility (IAWWTF). Based on confirmation from the IAWWTF pretreatment coordinator the anticipated maximum allowable discharge rate allowed to the sanitary sewer in this area will be approximately 100 gpm.

All waste management activities, including handling and loading, will be done in such a manner that odors and vapors are controlled in accordance with the Community Air Monitoring Plan (CAMP) provided in Appendix E.

Street sweeping will be provided by the Contractor whenever any soil or dust appears on the road or as directed by the Engineer of NYSDEC.

4.6.2 Pre-Remediation Waste Characterization

The soils within the Ithaca Court Street site were pre-characterized for disposal during the July 2011 PDI. The results of this pre-remediation waste characterization are provided in Appendix D. This pre-characterization data was used to help facilitate the profiling and pre-acceptance of the materials by the intended disposal facilities prior to soil excavation. The Engineer will provide relevant data to the Contractor who will use this information in finalizing acceptance at the disposal facilities. The disposal of impacted material has been categorized into non-hazardous MGP waste and conditionally exempt MGP remediation waste. The delineation of these waste streams and the associated disposal facilities are displayed in the attached drawings.

The intended disposal facilities have been contacted and pre-acceptance of disposal materials have been coordinated. Existing pre-characterization analytical data will be made available for the Contractor to coordinate final approval and contract requirements with the selected disposal facilities prior to commencing the work. Should additional waste characterization data be required during the work, the material requiring characterization will be stockpiled and samples will be collected and analyzed for the necessary disposal parameters. This additional data will be made available to the disposal facility as soon as practicable.

4.6.3 Off-site Transportation

The Contractor will load, transport, and dispose of material identified for off-site disposal. Waste materials will be transported in dump or tanker trucks to the receiving facilities. Transportation of impacted materials from the site will be performed in accordance with all hazardous waste, non-hazardous waste, and transportation regulatory requirements.

All haul trucks will have poly bed liners and tarp covers and, if there is the potential for liquids or tarry material leaking from the waste, they will have gasketed tailgates. Trucks will be sprayed, as necessary, with odor suppressive foam prior to covering to reduce vapor and odor emissions.

Trucks will be loaded in such a manner as to avoid contamination of their exteriors, including tires. In the case when truck exteriors do become contaminated, they will be decontaminated prior to leaving the site. All trucks will be checked before leaving the site and all loose soil or other materials will be brushed off to prevent spreading to the streets.

Hazardous waste shipments will be documented using standard hazardous waste manifests as required by applicable hazardous waste regulations. Other waste materials that have no specific documentation requirements will be documented using waste tracking forms, bills of lading, and receipts. All shipments of waste from the site will be documented, describing the type and amount of waste and the receiving facility. NYSEG designated representatives will sign the transportation manifests prior to loads leaving the site. Off-site trucking will follow the route shown in the transportation plan.

4.6.4 Off-site Disposal or Treatment

All excavated materials sent off-site will be disposed of only at facilities specifically approved by NYSEG. Soil characterized as non-hazardous MGP waste will be disposed of at Seneca Meadows and soil characterized as conditionally exempt MGP waste will be disposed of at Environmental Soil Management, Inc. (ESMI) of New York. Further specifics for each facility are as follows.

ESMI, NY

Address: 304	Towpath Road
	Fort Edward, New York 12828
Contact:	Todd Calder – Vice President of Sales and Marketing
Phone Number:	1 (860) 649-344
Fax:	1 (860) 649-3377
Cell:	1 (860) 803-1000
E-mail:	tcalder@semiofny.com

Seneca Meadows

Address:	1786 Salcman Road
	Waterloo, NY 13165-9570
Contact:	Ron Principio – Special Waste Coordinator
Phone Number:	(315) 539-5624
Fax:	(315) 539-0557
E-mail:	rprincipio@iesi.com

Pre-characterization data collected during the PDI has been provided to each of these facilities for the anticipated waste stream and each facility has provided a preliminary acceptance of the materials.

4.6.5 Water Management

Water containing MGP constituents will be generated, collected, and contained during decontamination of debris and equipment. The volume of collected impacted water is expected to be relatively small. Although in some cases excavation will take place below the groundwater elevation, the excavation will be dewatered which should help to minimize the water present in the soil removed. The use of proper run-on and runoff controls will further limit the amount of impacted water to be collected. Decontamination water will also require collection and treatment. Collected water will be treated on-site, tested and discharged to the nearby public sanitary sewer. The discharge requirements will follow the IAWWTF temporary discharge permit to be obtained prior to discharge to the on-site sanitary sewer. Anticipated discharge activities have been reviewed with the City IAWWTF and they have provided a preliminary draft of their anticipated discharge permit. The final working draft of this discharge permit can be found in Appendix K. The Contractor will be required to finalize this permit with the IAWWTF pretreatment coordinator prior to any actual wastewater discharge.

A temporary construction water treatment system will be established in the project support/staging area to treat dewatering wastewater and other project wastewater streams. The basic components of the construction water treatment system are anticipated to consist of fractionation tank(s) for equalization and initial settling of solids, an oil/water separator and oil storage tank for removal and collection of free phase product, solids filtration (basket filter, bag filter or comparable), organo-clay filtration, granular activated carbon for removal of dissolved organic contaminants and anion resin for treatment of cyanide. If necessary, additional treatment components will also be utilized to achieve the city sanitary sewer effluent limits. Following treatment, the treated dewatering wastewater will be discharged to the public sanitary sewer via a convenient sanitary sewer manhole. The treatment system will be capable of handling at least 50 gallons per minute.

Additional information regarding the project water treatment system is provided in the attached drawings and technical specifications.

4.7 Site Restoration

Following excavation activities in Areas 1A and 1B, the affected areas will be backfilled to lawn, sidewalk or pavement subgrade elevations with excavated material suitable for reuse as project backfill and clean imported fill material. A typical roadway cross-section and other restoration details can be found in the attached drawings, which display final remedial construction grade and condition sections. The roadway restoration section shows a temporary restoration surface to be completed as part of the remediation work. This temporary restoration will serve the community until a subsequent project for final street restoration is performed. Permanent street restoration, curbing and other features within the street right-of-ways will be completed, coordinated and finalized between the City of Ithaca and NYSEG. Final permanent street restoration will not be the responsibility of the Remediation Contractor; this will be performed by the City and their contractors pursuant to the agreement to be established between the city and NYSEG.

The City of Ithaca – Streets and Facilities Division has classified North Plain Street as a collector street and Esty Street as a residential street. The permanent street restoration specifications and cross-sections for both North Plain Street and Esty Street will be in accordance with the City of Ithaca and NYSDOT requirements. All other features within the project area that may have been disturbed by the work (such as driveways, lawns, signs, mailboxes, trees and shrubs) will be restored to the pre-existing conditions during the permanent street restoration work to be completed by the city. The Remediation Contractor will be responsible for restoring the area to a suitable temporary condition as indicated in the project drawings and specifications.

The removal of trees will be completed prior to the start of remedial activities by NYSEG. NYSEG will coordinate this tree removal work with the City of Ithaca Tree Forester. The tree forester has requested that NYSEG send a notification letter in for review prior to it being sent out to the affected residents. Tree and lawn restoration will be included as part of the final permanent street restoration project and will not be the responsibility of the Remediation Contractor. The Remediation Contractor is required to remove and dispose of any tree stumps remaining from the prior tree removal activities. Pursuant to the ROD if any backfill material is used in the right-of-way portion of Areas 1A and 1B which does not meet NYCRR Part 375 Criteria for Residential Use, a soil cover will be provided over all areas to prevent exposure to underlying soils. In vegetated areas, the two foot thick cover will consist of clean soil in which the top six inches of soil must be of sufficient quality to support vegetation. Clean soil must meet NYCRR Part 375 Criteria for Residential Use. Non-vegetated areas (buildings, roadways, parking lots, etc.) will be covered by either a paving system or concrete at least 6 inches thick. The clean soil cover will be underlain by a demarcation layer (e.g., orange plastic snow fence). The purpose of the demarcation layer is to distinguish between the cover soils, and soils exceeding the requirements for clean cover soils.

4.8 Environmental Monitoring and Controls

The Contractor will provide environmental controls to ensure that the work activities do not spread impacted soil and MGP wastes outside the impacted areas and maintain the protection of human health and the environment throughout the project.

4.8.1 Odor, Vapor, Dust, and Noise Control

A variety of engineering controls will be available to control odors, vapors, and dust associated with excavation activities. Those controls will include, but will not necessarily be limited to, wetting soils with water to control dust, limiting the size of excavations, covering contaminated soils with plastic sheeting or foam, spraying soils with Biosolve™ and placing a temporary structure with air handling system with off-gas controls over the excavation areas. The Contractor shall provide detailed descriptions and drawings with the means and methods proposed for controlling and monitoring odors and vapors during the work. All odor and vapor control equipment and materials shall be approved by the Engineer prior to use.

Equipment or material substitutions for odor and vapor control will be evaluated by the Engineer prior to use on-site on a case-by-case basis. Alternative means and methods of controlling odors and vapors will not be used until approval by the Engineer in writing.

Air Monitoring will be performed in accordance with the CAMP (Appendix E). The work will be stopped in a controlled stand-down procedure, if acceptable levels of air impacts are exceeded. The work stoppage will continue until the source of the emissions is found and the appropriate mitigation efforts are in place. Engineering controls will be applied as needed based upon site conditions and the results of air monitoring activities.

Care will also be exercised to mitigate noise impacts during the project activities. Work hours will be limited to routine daytime hours and equipment will be maintained in proper working order. Where necessary, shrouding and/or sound dampening measures will be utilized to minimize noise. All City ordinances and requirements regarding noise will be followed.

4.8.2 Air Monitoring

Site perimeter and work zone air monitoring will be performed per NYSDOH and Occupational Safety and Health Act (OSHA) requirements, and according to the Engineer's HASP and CAMP and the Contractor's HASP. The contaminants of concern are VOCs and particulates. The CAMP is located in Appendix E.

Summaries of all air monitoring data will be provided to the appropriate parties (e.g., NYSEG, NYSDEC, NYSDOH) on a weekly basis to facilitate the transfer of information related to potential health risks.

4.8.3 Erosion and Sediment Control

Erosion will be prevented and sediment will be controlled during all on-site earthwork activities in accordance with the applicable New York State guidance. Storm water run-off will be controlled in a manner to prevent contact with impacted soils. Any storm water that does contact impacted soils will be managed in accordance with Section 4.6.5. Hay bales, silt fence, stone, and/or rip rap will be used as necessary to prevent erosion of exposed soils. All erosion controls will be inspected a minimum of once per week and after significant rainfall events, greater than ½ inch per day. Additional erosion control materials will be kept on site to immediately repair any deficiencies that are discovered during the inspections. If the actively disturbed area exceeds 1 acre in size, a Storm Water Pollution Prevention Plan shall be prepared by the Contractor and submitted to the Engineer for review prior to beginning intrusive work on-site.

5.0 Documentation of Site Activities

5.1 Daily Field Construction Report

A daily field construction report will be prepared by the NYSEG project coordinator using the on-site computer to document daily on-site activities. The Daily Field Construction Report will be submitted at the end of each week in an electronic format to Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

5.2 Transportation Log

A transportation log will be prepared by the NYSEG project coordinator using the on-site computer to document all loads of solid or liquid waste that are transported off-site. The Transportation Log will be submitted at the end of each week in an electronic format to Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

5.3 Daily Community Air Monitoring Report

A daily community air-monitoring report will be prepared by the NYSEG sampling technician using an on-site computer to document daily air-monitoring results. The daily community air-monitoring report will be submitted at the end of each week in an electronic format to Mr. Svante L. Myrick, City of Ithaca Mayor at asherman@cityofithaca.org (Annie Sherman – Executive Assistant to the Mayor), Mr. Justin Deming, NYSDOH at jhd01@health.state.ny.us, Ms. Elizabeth B. Lukowski, NYSDEC at eblukows@gw.dec.state.ny.us, and Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

5.4 Master Sample Log

A laboratory notebook will remain in the field office to record every sample collected. The sampling technician will log in all samples collected and those sent to the off-site analytical laboratory. Waybill numbers will be logged at the end of each day.

5.5 Chain of Custody

A Chain-of-Custody form will document custody of all samples from the field to the laboratory.

5.6 Waybills

A waybill receipt will be obtained at the time of accepted sample shipment by Federal Express or courier and will be attached to the Master Sample Log.

5.7 NYSEG's Public Liability Accident Report, NYSEG's Report of Employee Injury, and NYSEG's Incident Report

The above-mentioned report forms will be used to document any accident occurring on-site during the remedial project. The sheets are attached to the *Health and Safety Plan* and will be located in the field project trailer.

5.8 Construction Completion Report

Following completion of the excavation and ISCO remedial actions, a CCR will be prepared and submitted to the NYSDEC. This report will include a summary of all of the Daily Field Construction Reports, Daily Community Air-Monitoring Reports, Photographic Log, Sampling Log, Material Disposition Log, and Variances to Work Plan.

The CCRs will be signed and certified by a professional engineer that all activities were completed in full accordance with NYSDEC-approved Remedial Design (this document) and the NYSDEC Order on Consent Index #DO-0002-9309.

6.0 Permitting and Regulatory Requirements

6.1 Permitting

The following permits shall be obtained by the remediation contractor prior to initiation of any work at the site and the substantive requirements of these permits shall be met during all project activities.

- City of Ithaca – Street Opening Permit
- Ithaca Area Wastewater Treatment Facility – Temporary Discharge Permit

Extensive coordination with the City and its relevant departments has already been completed to facilitate the final permits.

6.2 Regulatory Requirements

Environmental regulations regarding hazardous and non-hazardous waste management apply to this work and will be implemented accordingly. These include provisions for the containment and cleanup of spills and other standard provisions that will be included in the specifications.

Regulations promulgated by OSHA specify safety and health requirements for work procedures at all work places and specifically at construction sites and hazardous waste sites.

Industry standards for work at hazardous waste sites presented in 29 CFR 1910.120 describe specific requirements, including the following:

- Preparation of a project HASP;
- Training and medical monitoring of personnel who may be exposed to hazardous substances; and
- Air monitoring, respiratory protection and PPE.

Procedures outlined in the HASP include daily health and safety review meetings, proper use of safety equipment, proper mechanical equipment use, and other policies. At a minimum, the PPE to be worn on site will include safety glasses, hard hat, and steel-toed shoes or boots.

The Contractor shall prepare their own HASP. The Contractor's HASP will be subject to the Engineer's review. The Contractor shall follow the requirements of their own HASP throughout the work.

Prior to the work, the selected Contractor will provide to the Engineer written evidence of the following items for each person who will be entering the work zone:

- Date of respirator fit test;
- Date of OSHA 40 hour training (or 8 hour refresher training); and
- Date of annual physical.

Persons without these items, both up-to-date and on file with the Engineer will not be allowed to enter the work zone.

6.3 Transportation Requirements

The federal Department of Transportation (DOT) has developed requirements which regulate the transportation of hazardous materials by road and rail. Among the hazardous materials identified in these regulations are coal tar distillates. In addition, as discussed above, hazardous waste regulations specify that shipments of hazardous wastes must meet certain requirements presented in the federal and applicable state regulations.

Specific requirements for hazardous material shipments include the following:

- All truckers must have valid 364 Waste Transporter Permits;
- Shipping papers must include a description of hazardous materials included in the shipment along with the DOT designated identification number and hazard class. Hazardous wastes may not be shipped without a manifest (49 CFR 172.200);
- Each container, package, or vehicle containing a hazardous material must be marked or labeled with the DOT shipping name, technical name, identification number, and hazard class (49 CFR 172.300 and .400);
- Each vehicle or container containing a hazardous material must be appropriately placarded (49 CFR 172.500);
- When hazardous materials are transported, emergency response information must be available at the point of loading, unloading, and during transport; and
- Truck routes to and from the site will comply with the Transportation Plan that will be developed as part of the remedial design.

7.0 Quality Assurance

Quality assurance procedures will be implemented during the work to ensure that it is in conformance with the Remedial Design, and to provide the basis for implementation of contingency actions, if necessary, to bring the work into conformance with the Remedial Design. Please refer to the procedures noted below and those located in the Construction Quality Assurance Plan (Appendix G) and the Quality Assurance Project Plan (Appendix H).

7.1 General Quality Assurance Procedures

The following quality assurance procedures and tests will be implemented:

- Surveying of the work limits as described in Section 4.3.4;
- Submittal by the Contractor of weigh tickets for all earthen materials transported to or from the site;
- Submittal by the Contractor, prior to the work, of sieve analyses for all imported earthen materials;
- Evaluation by the Engineer of the Contractor's proposed borrow source(s) for imported earthen materials. The Contractor will provide to the Engineer analytical data indicating that imported material meets the requirements specified in Section 4.4.3;
- Evaluation by the Engineer of the Contractor's delivery quantities of the proposed oxidant(s) and verifying dilution batching during the injection process; and
- Field verification by the Engineer of excavation, ISCO injection volumes, and placed material depths, areas, and volumes.

7.2 Contingency Plan

In the event of a site emergency, such as a spill, power loss, severe weather, fire, structural collapse, or other life-threatening incident not specifically addressed in the site HASP, the employees on scene should immediately check the scene, evacuate if life threatening, call 911, and give care as appropriate within the scope of their training. Additional information and requirements can be found in Appendix F.

8.0 Project Reporting

During the course of the work, the Contractor will regularly provide to the Engineer:

- Daily field logs;
- Equipment and material testing records; and
- Weigh tickets.

At the conclusion of each workday, the Contractor and the Engineer will review the work completed and reach agreement on the quantities for payment obtained from the previous day.

During the course of the work, weekly progress meetings will be conducted with attendance by NYSDEC and NYSDOH, if needed.

The Engineer will provide weekly Progress Reports to NYSEG and NYSDEC. Progress Reports will include:

- The previous week's actions;
- Next week's planned actions;
- Sampling and analytical results;
- Design changes and other modifications to the design; and
- Revised project schedules.

Within 90 days of completion of the remedial activities, the Engineer will prepare a Construction Completion Report (CCR) for each phase of the remedy (i.e., excavation phase and ISCO phase), approved by a professional engineer licensed in the State of New York.

The following items will be included in the CCR:

- A description of all field work performed;
- As-built drawings;
- Identification of all changes to the Remedial Design;
- Copies of all pertinent analytical results, testing records, weigh tickets, bills of lading, and manifests from the disposal of materials; and
- Engineer's certification.

9.0 Green Remediation

The work completed as part of this work plan will comply with all NYSDEC guidance documents including DER-31: Green Remediation [NYSDEC 2010]. To ensure compliance with DER-31 the work will be completed using the best practices and techniques described below. In addition to the items discussed in Section 8.0 – Project Reporting, specific reporting methods relative to DER-31 are further described below.

9.1 Best Practices and Techniques

DER-31 provides some examples of best practices and techniques that could be applied during all phases of remediation (Attachment 1 of the DER-31 policy). In addition, NYSDEC expects that the techniques identified below will be implemented at sites unless a site-specific evaluation demonstrates impracticability or favors an alternative green approach:

Practice/Technique	Potential Benefits[1]	Applicable to this Work Plan
Use renewable energy where possible or purchase Renewable Energy Credits (RECs)	Reduce/supplement purchased energy use	
Use of remediation technologies with an intermittent energy supply (i.e., energy use during peak energy generation only)	Reduce energy use	
Incorporate green building design	Reduce future use impacts	
Reuse existing buildings and infrastructure to reduce waste	Reduce waste and material use	X
Reuse and Recycle construction and demolition (C&D) debris and other materials (i.e., grind waste wood and other organics for on-site use)	Reduce waste and material use	X
Design cover systems to be usable (i.e., habitat or recreation)	Reduce construction impacts of future development	X
Reduce vehicle idling	Reduce air emissions and fuel use	X
Use of Low Sulfur Diesel Fuel (LSDF) or alternate fuels (i.e., biodiesel or E85)	Reduce air emissions	X
Sequence work to minimize double-handling of materials	Reduce construction impacts	X
Use energy efficient systems and office equipment in the job trailer	Reduce energy use	X
1. Potential benefits listed are not all inclusive and will vary dependent upon the site and implementation of the practice or technique.		

In order to comply with the requirements of DER-31 the following actions will be taken:

- All vehicles and fuel consuming equipment onsite will be shut off if not in use for more than 5 minutes;
- If necessary, any soil cover placed onsite will meet NYCRR Part 375 residential use soil standards and will allow future use of the site in a residential setting;
- Work will be sequenced, to the extent practicable, to allow the direct loading of waste containers for off-site disposal;
- To the extent practicable, energy efficient systems and office equipment will be utilized within the site trailers;
- Where practicable non-impacted excavated soil and construction debris that has been segregated from impacted materials will be reused onsite during backfill and site restoration activities; and
- All vehicles and equipment that consume diesel fuel will be required to use ULSD.

9.2 Reporting

All green and sustainable practices and techniques employed each day will be discussed within the daily reports described in Section 5.1 – Daily Reporting. Specifically, the report will acknowledge that the six actions described above were taken that day (if applicable). In addition, the following information will be provided within the daily report:

- The estimated quantity of fuel consumed by onsite vehicles and equipment;
- The estimated distance traveled by trucks and equipment delivering goods or removing waste; and
- The estimated water use during onsite activities.

The information collected will be presented within the construction completion report with a discussion of the estimated environmental impact associated with the information.

10.0 Schedule and Hours of Operation

The remedial activities are planned to begin in the fall of 2012. Excavation and utility re-location work is anticipated to take approximately one year. ISCO activities will coincide with excavation activities in Area 1B and include the initial injection followed by subsequent performance monitoring and injection events. Weather-dependent site restoration activities, such as establishment of vegetative cover, are anticipated to continue periodically throughout the project duration. Final permanent street restoration will occur as part of a separate contract between the city and NYSEG following completion of the remediation work.

Hours allowed for equipment operation during the remedial activities will be daylight hours between 7 AM and 5 PM, Monday through Friday, unless otherwise allowed in writing by NYSEG. The Contractor may be on site earlier or later than actual hours of equipment operation, holding safety meetings and other daily planning associated with the site work. A schedule of activities can be found in Appendix N.

11.0 Bid Package/Technical Execution Plan

A TEP will be prepared and submitted by the prospective contractors during the bidding process for this work for NYSEG's review and approval. It will describe:

- The materials, equipment, and methods to be used to perform the work;
- Drawings, specifications, and a layout sequence of the proposed odor, vapor, dust, and noise controls;
- The proposed schedule for completing the work;
- Resumes of key project personnel; and
- Other TEP requirements as outlined in the technical specifications.

The selected Contractor may be required by NYSEG to provide additional clarifications to their TEP prior to, and during the course of, the work.

12.0 References

AECOM. 2011a. Remedial Investigation Report, Operable Unit 2, NYSEG's Court Street Former MGP Site, Ithaca, New York. February 2011.

AECOM, 2011b. Feasibility Study Report, Operable Unit 2, NYSEG's Ithaca Court Street Former MGP Site, Ithaca, New York, February 2011.

AECOM, 2011c, Remedial Design Work Plan, Operable Unit 2, NYSEG's Ithaca Court Street Former MGP Site, Ithaca, New York, July 2011.

AECOM, 2011d, In-Situ Chemical Oxidation Remedial Action Summary Report, Ottati & Goss/Kingston Steel Drum Superfund Site, Operable Unit 3, Kingston, New Hampshire. December 2011.

Crain, L.J., 1974. Groundwater Resources of the Western Oswego River Basin, New York. State of New York Department of Environmental Conservation, Basin Planning Report ORB-5.

E.C. Jordan Co., 1986. Investigation of the Former Coal Gasification Site at West Court Street Ithaca, New York; Task 1 Report, Preliminary Site Evaluation. April 1986.

E.C. Jordan Co., 1987. Investigation of the Former Coal Gasification Site at West Court Street Ithaca, New York; Task 2 Report, Initial Field Investigation Program. February 1987.

Interstate Technology and Regulatory Council (ITRC). 2005. Technical and Regulatory Guidance for InSitu Chemical Oxidation of Contaminated Soil and Groundwater, Second Edition. January, 2005.

Metcalf & Eddy|AECOM. 2008b. Basis of Design Report for In-Situ Chemical Oxidation, Ottati and Goss/Kingston Steel Drum Superfund Site, Kingston, NH. March 2008.

Moore, K.A. and Crimi, M. 2008. Geochemical Impacts of ISCO: A Field-Scale Assessment. FMC Peroxygen Talk. November 2008.
http://www.envsolutions.fmc.com/ResourceCenter/PeroxygenTalkArchive.aspx?itemId=872

MWH Americas, Inc., 2002. Interim Draft Supplemental Remedial Investigation Report for Operable Unit-2, Ithaca Court Street MGP Site; NYSEG RFP#02-063. August 27, 2002.

NYSDEC, 1990. Division Technical and Administrative Guidance Memorandum [TAGM 4030]: Selection of Remedial Actions At Inactive Hazardous Waste Sites Division of Environmental Remediation, Albany, New York, May 15, 1990.

NYSDEC, 1994. Division Technical and Administrative Guidance Memorandum [TAGM 4046]: Determination of Soil Cleanup Objectives and Cleanup Levels. Division of Hazardous Waste Remediation, Albany, New York, January 24, 1994.

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values, Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), October, and addendums added: January, 1999, April 2000, and June 2004.

NYSDEC, 2009. CP-43: Groundwater Monitoring Well Decommissioning Policy, November 2009.

NYSDEC, 2010a. Draft DER-10 Technical Guidance for Site Investigation and Remediation, May 2010.

NYSDEC, 2010b. Draft DER-31 Green Remediation. March 17, 2010.

NYSDEC 2011. Record of Decision, Operable Unit 2, NYSEG's Ithaca Court Street MGP, Site No. 755008, Ithaca, New York, March 2011.

NYSDOT, 2009. Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition. December, 2009.

NYSEG, 1999. Interim Remedial Measures Final Engineering Report for Activities at Ithaca Cayuga Inlet Coal Tar Site, City of Ithaca, Tompkins County, New York. NYSEG, June 1999.

NYSEG, 2007. Interim Remedial Measures Final Engineering Report; Removal of the Subsurface Wooden Duct and Removal of Coal Tar Impacted Soil on Washington Street Between W. West Court and Cascadilla Streets, Associated with Ithaca Court Street Former Manufactured Gas Plant Site, City of Ithaca, Tomkins County, New York. NYSEG, April 2007.

Siegrist, R. L., Crimi, M. and Simpkin, T. J., 2011. *In Situ Chemical Oxidation for Groundwater Remediation.* SERDP/ESTCP Remediation Technology Monograph Series. Springer 2011.

URS, October 2010. Construction Completion Report Operable Unit 1 (OU-1) Remediation. Ithaca Court Street Former Manufactured Gas Plant Ithaca, New York.U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS), 1965. Soil Survey for Tompkins County, New York. Prepared in cooperation with Cornell University Experiment Station, Series 1961, No. 25, Ithaca, New York.

United States Environmental Protection Agency. April 1999. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites Directive No. 9200.4-17P.

United States Environmental Protection Agency (USEPA). 2006. Publication EPA/600/R-06/072, Engineering Issue Paper, In Situ Chemical Oxidation. August 2006.

Attachment 1

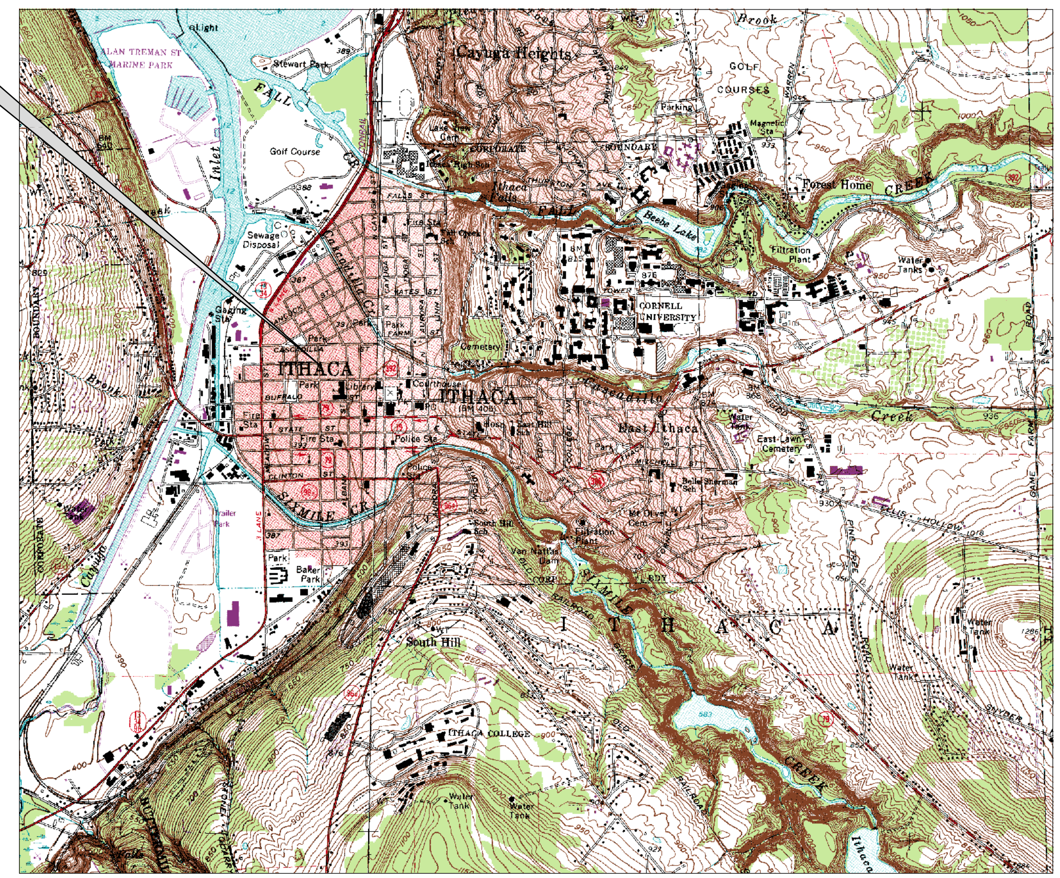
Design Drawings

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, TOMPKINS COUNTY, NEW YORK
APRIL 2012

INDEX OF DRAWINGS

DWG. NO.	DRAWING TITLE
1	COVER SHEET
2	GENERAL NOTES
3	EXISTING CONDITIONS
4	HISTORIC SAMPLE LOCATIONS
5	PROJECT REMEDIATION AREAS
6	REMEDIATION AREA 1A GENERAL LAYOUT
7	REMEDIATION AREA 1A PLAN AND SECTION
8	REMEDIATION AREA 1B GENERAL LAYOUT
9	REMEDIATION AREA 1B PHASE 1B-1 PLAN AND SECTION
10	REMEDIATION AREA 1B PHASE 1B-2 PLAN AND SECTION
11	REMEDIATION AREA 1B PHASE 1B-3 PLAN AND SECTION
12	EXCAVATION AREAS 1A & 1B EXCAVATION SUPPORT SYSTEM PLAN
13	TYPICAL EXCAVATION SUPPORT SYSTEM DETAILS
14	REMEDIATION AREA 1C CHEMICAL OXIDATION INJECTION PLAN
15	INJECTION WELL IW-43 LOCATION PLAN AND TYPICAL ISCO DETAILS
16	TYPICAL ROADWAY SECTIONS
17	SITE SOIL MANAGEMENT PLAN
18	SITE RESTORATION PLAN
19	GROUNDWATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM
20	TYPICAL DETAILS 1 OF 2
21	TYPICAL DETAILS 2 OF 2

SITE LOCATION



SOURCE: USGS ITHACA WEST & ITHACA EAST 7.5' SERIES QUADRANGLES

PROJECT LOCATION

0' 1000' 2000' 4000'

100% DESIGN

(NOT FOR BIDDING)

Prepared For:

NYSEG

NEW YORK STATE ELECTRIC & GAS Corp.
18 Link Drive
Binghamton, New York 13904

Prepared By:

AECOM

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STATE OF NEW YORK · SCOTT ANDREW UNDERHILL · 075332 · LICENSED PROFESSIONAL ENGINEER

4/10/2012
Date

Scott A. Underhill, P.E.
NYSPE Lic. No. 075332

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GENERAL NOTES

THE CONTRACTOR IS ADVISED THAT ADDITIONAL "NOTES" WILL BE FOUND ON SUBSEQUENT SHEETS OF THE CONTRACT PLANS AND SUCH "NOTES", WHILE PERTAINING TO THE SPECIFIC SHEETS THEY ARE PLACED ON, ALSO SUPPLEMENT THE GENERAL NOTES LISTED HEREIN.

CONTRACTOR SHALL NOTE THAT ANOTHER PROJECT MAY OCCUR AT THE SAME TIME FOR THE DEMOLITION OF THE MARKLES FLATS BUILDING ON OU-1. REMEDIATION CONTRACTOR SHALL COORDINATE WITH DEMOLITION CONTRACTOR TO ENSURE OU-1 CAN BE UTILIZED BY BOTH CONTRACTORS AS A LAYDOWN/STAGING AREA.

EXISTING CONDITIONS, AS PRESENTED, REPRESENT THOSE CURRENT AS OF THE DATE OF THE FIELD SURVEY. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF SITE CONDITIONS PRIOR TO THE START OF WORK.

ALL ON-SITE REMEDIATION ACTIVITIES SHALL BE IN ACCORDANCE WITH THE ENTIRE CONTRACT DOCUMENTS PACKAGE INCLUDING DESIGN REPORT AND ATTACHMENTS, DRAWINGS AND TECHNICAL SPECIFICATIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY LOCAL, STATE, AND FEDERAL PERMITS REQUIRED THAT HAVE NOT BEEN PREVIOUSLY OBTAINED AND MADE PART OF THE CONTRACT DOCUMENTS.

ALL FUEL, OIL, PAINT OR OTHER HAZARDOUS MATERIALS SHALL BE STORED IN A SECONDARY CONTAINMENT AREA AND SECURED IN A LOCKED AREA WITH AN IMPERVIOUS FLOOR DURING NON-WORK HOURS.

A SUPPLY OF ABSORBENT SPILL RESPONSE MATERIAL SUCH AS BOOMS OR BLANKETS SHALL BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES TO CLEAN UP POTENTIAL SPILLS OF HAZARDOUS MATERIALS SUCH AS GASOLINE AND OIL.

REMOVAL OF TREES IN AREAS 1A AND 1B WILL OCCUR PRIOR TO THE START OF REMEDIAL ACTIVITIES AND WILL BE PERFORMED BY OTHERS. REMAINING STUMPS SHALL BE REMOVED BY CONTRACTOR.

CONTRACTOR TO PERFORM CLEARING AND GRUBBING AS NECESSARY WITHIN PROJECT LIMITS. LIMITS OF CLEARING AND GRUBBING SHALL NOT EXTEND BEYOND THE LIMITS SHOWN. PHASE ALL CLEARING TO MINIMIZE CLEARED AREAS REQUIRED TO COMPLETE SPECIFIED WORK. STUMPS OUTSIDE AREAS OF CONTAMINATED SOIL MAY BE DISPOSED OF AS BULKY WASTE AT PERMITTED OFF SITE FACILITY.

CONTRACTOR SHALL OBTAIN CITY PERMIT FOR ALL WORK WITHIN THE CITY OF ITHACA STREET RIGHT-OF-WAY (R.O.W.).

CONTRACTOR SHALL CONTACT DIG-SAFE FOR UTILITY MARK OUTS PRIOR TO ANY SUBSURFACE WORK.

CONTRACTOR SHALL MAINTAIN ACCESS TO ALL EXISTING UTILITY VALVES AND OTHER APPURTENANCES WITHIN PROJECT WORK AREAS.

THE CONTRACTOR SHALL CONTACT NYSEG IMMEDIATELY IF IMPACTED MATERIAL IS ENCOUNTERED OUTSIDE OF IDENTIFIED AREAS DURING TEMPORARY UTILITY RELOCATION ACTIVITIES OR STUMP REMOVAL.

THE CONTRACTOR SHALL PROVIDE A SIGN AT THE BEGINNING OF THE EMERGENCY ACCESS CORRIDOR, WHICH SHOULD INDICATE THE FOLLOWING "THIS ACCESS WAY IS INTENDED FOR EMERGENCY VEHICLES AND ACCESS TO RESIDENTIAL HOMES ONLY AND SHALL NOT BE USED FOR THUR TRAFFIC. PEDESTRIANS USING THIS ACCESS WAY FOR FOOT TRAFFIC SHOULD BE AWARE THIS IS ALSO BEING USED AS A TRAVEL LANE FOR VEHICLES." THE SIGN SHALL BE APPROVED BY THE ENGINEER PRIOR TO USE.

PROTECTION OF THE TRAVELING PUBLIC

ALL WORK AREAS SHALL BE COMPLETELY FENCED, CONFORMING WITH OSHA REGULATIONS AND TO THE SATISFACTION OF THE ENGINEER, TO PROTECT THE PUBLIC AND PREVENT UNAUTHORIZED ENTRY.

WHILE WORKING WITHIN THE CITY OF ITHACA RIGHT OF WAY (R.O.W.) THE CONTRACTOR SHALL BE REQUIRED TO FOLLOW MAINTENANCE AND PROTECTION OF TRAFFIC, ITEM 619 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND THE 2009 EDITION OF THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS INCLUDING THE NEW YORK STATE SUPPLEMENT.

TEMPORARY LANE CLOSURES ARE ANTICIPATED FOR WORK OUTSIDE THE REMEDIAL EXCAVATIONS AREAS (I.E. SANITARY SEWER WORK AT THE INTERSECTION OF ESTY AND NORTH PLAIN STREETS) AND FOR THE ISCO WORK WITHIN REMEDIATION AREA 1C. THE CONTRACTOR SHALL INSTALL AND MAINTAIN LANE CLOSURES, FOR THIS WORK AND AS ORDERED BY THE ENGINEER, IMPLEMENTING FLAGGING OPERATIONS FOR 2 LANE - 2 WAY ROADWAYS AND FLAGGING OPERATIONS FOR 2 LANE - 2 WAY INTERSECTION IN ACCORDANCE WITH THE APPLICABLE NEW YORK STATE DEPARTMENT OF TRANSPORTATION US CUSTOMARY STANDARD SHEETS 619-60 AND 619-61.

WORK WITHIN THE PUBLIC RIGHT OF WAY (R.O.W.)

ALL ACTIVE AND OPEN PORTIONS OF THE ROADWAYS SHALL BE KEPT CLEAN OF MUD AND DEBRIS AT ALL TIMES.

ROADSIDE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES.

MATERIALS, EQUIPMENT AND VEHICLES SHALL NOT BE STORED OR PARKED WITHIN THE CITY OF ITHACA RIGHT OF WAY (R.O.W.).

ALL IMPORTED BACKFILL MATERIALS SHALL BE TESTED FOR CHEMICAL AND GEOTECHNICAL PARAMETERS AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY THE SERVICES OF AN INDEPENDENT TESTING LABORATORY, APPROVED BY NYSEG, TO PERFORM AND DOCUMENT ALL REQUIRED TESTS. TESTING SHALL CONFORM TO THE APPLICABLE ASTM, NYSDOT, AND NYSDEC STANDARDS AND SPECIFICATIONS. TESTING LABORATORY SHALL SUBMIT A WRITTEN REPORT DESCRIBING THE TESTS PERFORMED AND THE RESULTS OF SUCH TESTS TO THE CONTRACTOR AND ENGINEER.

THE ENGINEER WILL BE RESPONSIBLE FOR ANY COLLECTION OF SAMPLES AND ANALYSIS OF SOIL FOR CONFIRMATION SAMPLING TO VERIFY VERTICAL LIMITS AND POTENTIAL REUSE SOIL TO VERIFY USE AS BACKFILL. THE CONTRACTOR WILL ASSIST THE ENGINEER IN THE COLLECTION OF THESE SAMPLES AS REQUIRED.

ALL BACKFILL WITHIN THE STREET RIGHT OF WAY (R.O.W.) SHALL MEET REFERENCED NYSDOT SPECIFICATIONS INCLUDING MATERIAL, PLACEMENT, COMPACTION AND TESTING.

GENERAL SUBSURFACE CONDITIONS

BORINGS INDICATE THAT OVERBURDEN IS COMPRISED OF FILL OVER SILTY SAND FOLLOWED BY A HIGHLY PERMEABLE THIN LAYER OF GRAVEL, UNERLAIN BY A SILTY-CLAY LAYER.

BORINGS EXTEND TO A MAXIMUM DEPTH OF 60 FEET, TERMINATING IN THE SILTY-CLAY LAYER. TOP OF ROCK WAS NOT ENCOUNTERED IN THE BORINGS.

GENERAL GROUNDWATER CONDITIONS

GROUNDWATER DEPTH IS BASED ON AVAILABLE BORING LOGS AND THE REMEDIAL INVESTIGATION REPORT (AECOM, FEBRUARY 2011)

THE DESIGN GROUNDWATER LEVEL IS AT A DEPTH OF 6 FEET BELOW EXISTING GRADE (APPROXIMATE ELEVATION 386.5). GROUNDWATER LEVELS WILL VARY BY SEASON, WEATHER CONDITIONS AND WATER LEVEL IN CAYUGA LAKE.

PROTECTION OF EXISTING FACILITIES

PROTECT ADJACENT FACILITIES FROM DAMAGE. THESE INCLUDE, BUT ARE NOT LIMITED TO, EXISTING UTILITIES, SIDEWALKS, CURBS, PAVEMENT, AND LIGHT POLES BEYOND PROJECT AREA. REPAIR AND/OR REPLACE DAMAGED FACILITIES AS APPROVED BY NYSEG AT NO ADDITIONAL COST.

PROTECT ADJACENT STRUCTURES FROM DAMAGE. THESE INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING PROPERTIES:
AREA 1A
503 NORTH PLAIN STREET
134 ESTY STREET
132 ESTY STREET
128 ESTY STREET
124 ESTY STREET
120 ESTY STREET

AREA 1B
418 NORTH PLAIN STREET
416 NORTH PLAIN STREET

AREA 1C
503 NORTH PLAIN STREET
504/506 NORTH PLAIN STREET
509 NORTH PLAIN STREET
510 NORTH PLAIN STREET
511 NORTH PLAIN STREET
512 NORTH PLAIN STREET
514 NORTH PLAIN STREET

IN AREAS 1A AND 1B MONITOR VIBRATIONS AT ADJACENT STRUCTURES DURING WORK. VIBRATIONS RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL NOT EXCEED A PEAK PARTICLE VELOCITY OF 1 INCH PER SECOND (1 IPS). IF NECESSARY, THE CONTRACTOR SHALL MODIFY THEIR OPERATIONS SO AS TO LIMIT MEASURED PEAK PARTICLE VELOCITY AT THE ADJACENT STRUCTURES TO 1 IPS.

DEWATERING

INSTALL DEWATERING SUMP(S) WITHIN EACH EXCAVATION AREA AND PUMP TO DRAWDOWN THE GROUNDWATER LEVEL.

TO THE EXTENT PRACTICABLE, GROUNDWATER LEVEL IN EACH EXCAVATION AREA SHALL BE AT LEAST 1 FOOT BELOW EXCAVATION SUBGRADE LEVEL AT ALL TIMES.

EXCAVATION

PROPOSED VERTICAL LIMITS OF EXCAVATION ARE ESTIMATED BASED ON AVAILABLE INFORMATION. ACTUAL LIMITS OF EXCAVATION WILL LIKELY VARY BASED ON THE ACTUAL FIELD CONDITIONS. THE CONTRACTOR SHALL EXCAVATE TO A DEPTH OF APPROXIMATELY 1 FOOT INTO THE SILTY-CLAY LAYER. IF VISIBLE MGP IMPACTS REMAIN BENEATH THIS, CONTRACTOR SHALL CONSULT WITH NYSEG TO DETERMINE APPROPRIATE COURSE OF ACTION. ADDITIONAL EXCAVATION MAY BE NECESSARY BUT WILL ONLY BE PERFORMED IF DIRECTED BY NYSEG OR ITS DESIGNATED AGENT IN WRITING.

CONTRACTOR TO PROVIDE DUST CONTROL AS NECESSARY THROUGHOUT DURATION OF ALL PROJECT ACTIVITIES.

GENERAL NOTES (CON'T)

EXCAVATION (CON'T)

CONTRACTOR TO SECURE AND MAINTAIN OPEN REMEDIAL EXCAVATIONS AT ALL TIMES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORT AND DISPOSAL OF ALL WASTES GENERATED DURING THIS PROJECT.

BACKFILLING EXCAVATION AREAS

THE CONTRACTOR SHALL STOCKPILE EXCAVATED FOR POTENTIAL REUSE SOIL FOR ANALYTICAL TESTING PRIOR TO ITS REUSE. THIS MATERIAL MUST MEET THE REQUIREMENTS OF NYSDEC PART 375-6.8(b) REQUIREMENTS FOR IT TO BE REUSED AS BACKFILL ON THE PROJECT. IF ACCEPTABLE, THIS MATERIAL SHALL BE PLACED PRIOR TO ANY IMPORTED BACKFILL MATERIAL.

ALL IMPORTED BACKFILL SHALL BE TESTED PRIOR TO ITS USE ON-SITE. THIS IMPORTED MATERIAL MUST MEET THE REQUIREMENTS OF NYSDEC PART 375-6.8(B) REQUIREMENTS FOR COMMERCIAL USE WHEN PLACED WITHIN THE STREET RIGHT-OF-WAY (R.O.W.) AND RESIDENTIAL USE FOR (CELL 1B-3).

BACKFILL ON THE RESIDENTIAL PROPERTY MUST MEET RESIDENTIAL SOIL CLEANUP OBJECTIVES.

IF BACKFILL MATERIAL IS USED IN THE RIGHT-OF-WAY PORTION OF AREAS 1A AND 1B, WHICH DOES NOT MEET RESIDENTIAL USE, SPECIFIC COVER REQUIREMENTS FOR VEGETATED AND NON-VEGETATED AREAS ARE SPECIFIED IN THE DRAWINGS.

PER DER-10 REQUIREMENTS, POTENTIAL RE-USE SOIL AND IMPORTED BACKFILL SHALL BE SAMPLED AND ANALYZED FOR THE FOLLOWING ANALYSES – VOCS, SVOCS, PCBS, PESTICIDES AND METALS. POTENTIAL REUSE SOIL AND IMPORTED BACKFILL SHALL BE SAMPLED AT THE RESPECTIVE FREQUENCIES OF 1 SAMPLE PER 500 CUBIC YARDS AND A MINIMUM OF ONE SAMPLE PER BORROW SOURCE FOR THIS PURPOSE.

REUSE SOIL AND IMPORTED BACKFILL SHALL MEET THE REQUIREMENTS OF NYSDOT SPECIFICATION SECTION 203.03 - EMBANKMENT IN PLACE.

EROSION AND SEDIMENTATION CONTROL NOTES

THE CONTRACTOR SHALL CONSTRUCT ENTRANCE PAD(S) AND TEMPORARY ACCESS/HAUL ROAD(S) WHERE NEEDED TO COMPLETE THE WORK. EACH DAY, CONTRACTOR SHALL SWEEP/CLEAN-UP ANY OFF-SITE TRACKING OF MATERIAL THAT OCCURS AT THE TIME IT OCCURS, OR AT LEAST ONCE A DAY.

CONTRACTOR SHALL INSTALL AND MAINTAIN FILTER FABRIC ENVELOPES ON ALL EXISTING CATCH BASINS WITHIN THE IMMEDIATE VICINITY OF THE PROPOSED WORK ACTIVITIES.

UTILITIES

GENERAL

LOCATION OF EXISTING UTILITIES BASED UPON BEST INFORMATION AVAILABLE AT TIME OF DESIGN.

CONTRACTOR TO CONFIRM LOCATION OF ALL UTILITIES PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL VERIFY UTILITY RELOCATION OF OVERHEAD UTILITIES AND GAS LINES PRIOR TO ANY EXCAVATION.

CONTRACTOR SHALL SCHEDULE ALL WORK WITH UTILITY OWNERS PRIOR TO RELOCATION AND RESTORATION.

FOR SPECIAL CITY OF ITHACA MATERIAL REQUIREMENTS SEE "CITY OF ITHACA - WATER & SEWER MATERIAL SPECIFICATIONS" FOUND IN APPENDIX "M" OF THE PROJECT SPECIFICATIONS.

CONTRACTOR SHALL OBTAIN PERMIT APPLICATION FOR BOTH TEMPORARY AND PERMANENT REPLACEMENT OF WATER AND SEWER SERVICES 3 WEEKS PRIOR TO CONSTRUCTION ACTIVITIES.

CITY OF ITHACA - WATER

CONTRACTOR SHALL ESTABLISH TEMPORARY WATER SERVICES TO EACH PROPERTY AFFECTED PRIOR TO WORK ON THE EXISTING UTILITIES.

WATER SERVICE TEMPORARY INTERRUPTIONS SHALL BE COMPLETED IN LESS THAN 1-HOUR (PREFERABLY A FEW MINUTES) FOR EACH AFFECTED PROPERTY.

THE EXISTING DUCTILE IRON WATER MAIN IS TO BE EXCAVATED, CUT, PLUGGED, CAPPED AND BACKFILLED AT THE APPROXIMATE LOCATIONS SHOWN ON THE PLANS.

THE CONTRACTOR SHALL CHOOSE A TIME TO COMPLETE THE CUTTING AND CAPPING WORK AS TO NOT DISTURB EXISTING WATER SERVICES. IF THIS CAN NOT BE ACHIEVED, THE CONTRACTOR SHALL SUPPLY A TEMPORARY WATER SERVICE TO EXISTING CUSTOMERS. TEMPORARY WATER SERVICES SHALL BE PROVIDED BY MEANS OF A WET TAP OR OTHER METHOD(S) APPROVED BY THE ENGINEER. ALL TEMPORARY WORK SHALL BE BACKFILLED IN CONFORMANCE WITH ITEM 663 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT) STANDARD SPECIFICATIONS

WATER MAIN CAPS SHALL PROVIDE NO WATER LEAKAGE AT FULL OPERATING PRESSURE. WATER MAIN CAPS SHALL BE TESTED FOR LEAKAGE PRIOR TO BACKFILLING. CARE SHALL BE TAKEN NOT TO DISTURB THE PORTION(S) OF THE EXISTING WATER MAIN TO REMAIN.

ALL TEMPORARY AND PERMANENT WORK ON THE CITY OF ITHACA WATER SUPPLY INSTALLATION AND/OR RESTORATION SHALL BE IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION (NYSDOT) STANDARD SPECIFICATIONS, LATEST EDITION. REFERENCE ITEMS ARE AS FOLLOWS:

663.0106	DUCTILE IRON CEMENT LINED WATER PIPE
663.06XX	COPPER WATER SERVICE
663.1006	RESILIENT WEDGE VALVE & VALVE BOX
663.2001	IRON WATER MAIN FITTINGS

FURTHER WATER SUPPLY INFORMATION AND INSTALLATION DETAILS CAN BE FOUND IN GROUP 663 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION US CUSTOMARY STANDARD SHEETS.

CITY OF ITHACA - SEWER

CONTRACTOR SHALL ESTABLISH TEMPORARY SEWER SERVICES TO EACH PROPERTY AFFECTED PRIOR TO WORK ON THE EXISTING UTILITIES.

SEWER SERVICE TEMPORARY INTERRUPTIONS SHALL BE COMPLETED IN LESS THAN 1-HOUR (PREFERABLY A FEW MINUTES) FOR EACH AFFECTED PROPERTY.

FOR SPECIAL CITY OF ITHACA SANITARY SEWER PIPE SPECIFICATIONS SEE "SECTION 33 31 00 SANITARY SEWER PIPING" FOUND IN APPENDIX "M" OF THE PROJECT SPECIFICATIONS.

FOR SPECIAL CITY OF ITHACA SANITARY SEWER MANHOLE SPECIFICATIONS SEE "SECTION 33 39 13 SANITARY SEWER MANHOLES" FOUND IN APPENDIX "M" OF THE PROJECT SPECIFICATIONS.

SANITARY SEWER BY-PASS PUMPING NOTES

LIMITED FLOW INFORMATION IS AVAILABLE ON THE CITY OF ITHACA SANITARY SEWER MAINS (24" AND 16") THAT IS PRESENT IN THE UTILITY CORRIDOR ON NORTH PLAIN STREET.

CONTRACTOR TO PROVIDE A SANITARY SEWER BYPASS PUMPING SYSTEM INCLUDING PUMPS AND APPURTENANCES WITH CAPACITY TO HANDLE PEAK FLOWS IN EACH SEWER.

THE BY-PASS PUMPING SYSTEM SHALL PROVIDE 100% BACKUP BY-PASS PUMPING CAPACITY IN CASE OF PRIME BY-PASS PUMPING FAILURE.

THE BY-PASS PUMPS WILL BE PROVIDED WITH ACOUSTIC ENCLOSURES AND CRITICAL SILENCERS TO MINIMIZE ASSOCIATED SOUND.

THE CONTRACTOR SHALL INSTALL A METERING DEVICE IN THE SANITARY SEWER MAIN TO RECORD FLOW RATES FOR A DURATION OF AT A MINIMUM 8 WEEKS AS DETAILED IN THE SPECIFICATIONS. UPON COMPLETION OF THIS MONITORING THE CONTRACTOR SHALL SUBMIT TO NYSEG A TECHNICAL EXECUTION PLAN ADDENDUM DETAILING FINALIZED BY-PASS PUMPING SYSTEM DESIGN.

THE FINAL BY-PASS PUMPING SYSTEM DESIGN, SHALL INCLUDE ALL REQUIRED INFORMATION AS INDICATED IN THE SPECIFICATIONS.

NEW YORK STATE ELECTRIC AND GAS - GAS RELOCATION

GAS UTILITY RELOCATION WILL BE CONDUCTED BY OTHERS PRIOR TO THE START OF REMEDIAL ACTIVITIES.

NEW YORK STATE ELECTRIC AND GAS - OVERHEAD UTILITIES RELOCATON

OVERHEAD UTILITY RELOCATION WILL BE CONDUCTED BY OTHERS PRIOR TO THE START OF REMEDIAL ACTIVITIES.

NYSEG WILL COORDINATE WITH OTHER OVERHEAD UTILITY COMPANIES TO ENSURE COMPLETION OF OVERHEAD UTILITY RELOCATION PRIOR TO THE START OF REMEDIAL ACTIVITIES. OTHER OVERHEAD UTILITIES PRESENT AT THE SITE INCLUDE:
VERIZON
FIBER TECHNOLOGIES, LLC
TIME WARNER CABLE

GENERAL NOTES (CON'T)

CONSTRUCTION MONITORING

SETTLEMENT

ESTABLISH SURVEYED ELEVATION BENCH MARKS PRIOR TO COMMENCING WORK AND MONITOR DURING PILE DRIVING OPERATIONS IN ACCORDANCE WITH THE SPECIFICATION. SURVEY ELEVATIONS OF MONITORING POINTS A MINIMUM OF 3 TIMES PRIOR TO THE START OF CONSTRUCTION TO ESTABLISH A BASELINE. MEASURE SURVEY POINTS AND PROVIDE DOCUMENTATION TO THE ENGINEER IN ACCORDANCE WITH THE SPECIFICATIONS.

AREA 1A
3 POINTS MINIMUM AT 503 NORTH PLAIN STREET
3 POINTS MINIMUM AT 134 ESTY STREET
3 POINTS MINIMUM AT 132 ESTY STREET
3 POINTS MINIMUM AT 128 ESTY STREET
3 POINTS MINIMUM AT 124 ESTY STREET
3 POINTS MINIMUM AT 120 ESTY STREET

AREA 1B
3 POINTS MINIMUM AT 418 NORTH PLAIN STREET
3 POINTS MINIMUM AT 416 NORTH PLAIN STREET
3 POINTS MINIMUM AT 412 NORTH PLAIN STREET

CRACK GAUGING

CRACK GAUGES SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATION.

INCLINOMETERS SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATION.

VIBRATION

MONITOR VIBRATIONS ON THE GROUND NEXT TO STRUCTURES CLOSEST TO THE REMEDIATION AREAS 1A AND 1B TO PROVIDE AMBIENT VIBRATION DATA. POSITION SEISMOGRAPH AT POINT NEAREST PILE DRIVING OPERATIONS.

MONITORING VIBRATIONS FOR A MINIMUM OF THREE (3) DAYS PRIOR TO THE START OF THE CONSTRUCTION ACTIVITIES TO ESTABLISH A BASELINE.

MONITOR VIBRATIONS WHILE DRIVING SHEET PILES OF THE CLOSEST STRUCTURES APPROVED BY THE ENGINEER. POSITION SEISMOGRAPH AT POINT NEAREST PILE DRIVING OPERATION.

TABULATE MONITORING DATA AND PROVIDE SUMMARY TO THE ENGINEER ON A WEEKLY BASIS.

PROJECT COORDINATION

ENGINEER SHALL BE RESPONSIBLE FOR ALL VERIFICATION AND PERFORMANCE TESTING SAMPLING AND ANALYSIS REQUIRED DURING THE PROJECT (INCLUDING BUT NOT LIMITED TO SOIL FOR IMPORTED BACKFILL AND WATER DISCHARGE SAMPLES). CONTRACTOR SHALL COORDINATE WITH AND ASSIST ENGINEER WITH THESE EFFORTS.

ENGINEER SHALL BE RESPONSIBLE FOR PERFORMING PERIMETER AIR MONITORING SPECIFIED IN THE COMMUNITY AIR MONITORING PLAN. CONTRACTOR SHALL COORDINATE WITH AND ASSIST ENGINEER WITH THESE EFFORTS.

CITY OF ITHACA - OFFICE OF THE CITY ENGINEER

THE CONTRACTOR SHALL COMPLETE AND SUBMIT AN APPLICATION TO REQUEST STREET CLOSURE OF A CITY STREET AT LEAST (2) WEEKS BEFORE THE EVENT.

CITY OF ITHACA - WATER AND SEWER DEPARTMENT

THE CONTRACTOR SHALL BE IN DAILY COMMUNICATION WITH THE WATER AND SEWER DEPARTMENT DURING RELOCATION AND REPLACEMENT ACTIVITIES.

THE FOLLOWING INDIVIDUALS SHALL BE CONTACTED DURING WATER AND SEWER WORK (607-272-1717):

WATER DISTRIBUTION SYSTEM AND SERVICE WORK - DON CORWIN (WATER SYSTEMS SUPERVISOR)

SANITARY SEWER COLLECTION SYSTEM AND SERVICE WORK - ART MCFALL (SEWER SYSTEMS SUPERVISOR)

INSPECTION AND DOCUMENTATION OF WORK PRIOR TO BACKFILL - MARK FULLER (WATER & SEWER SYSTEMS UTILITY LOCATION TECHNICIAN)

SITUATION REQUIRING PLAN CHANGES, SPECIAL, UNFORESEEN, OR ADDITIONAL ENGINEERING - GEORGE SEELEY, MATT SLEDJESKI, SCOTT GIBSON, OR ERIK WHITNEY

THE CONTRACTOR SHALL NOTIFY THE WATER AND SEWER DEPARTMENT 1 WEEK IN ADVANCE OF CONDUCTING PRESSURE TESTS AND DISINFECTION, SO A REPRESENTATIVE FROM THE DEPARTMENT OF WATER AND SEWER CAN WITNESS THE TEST.

SURVEY AND STAKE-OUT

CONTRACTOR SHALL PROVIDE THE SERVICES OF A NEW YORK STATE LICENSED LAND SURVEYOR AS NECESSARY FOR ALL WORK. SURVEYOR SHALL STAKE OUT LIMITS OF EXCAVATION AS SPECIFIED AND OTHER PROJECT LOCATIONS WHERE REQUIRED. SURVEYOR SHALL LOCATE IN THE FIELD ALL SIGNIFICANT PROJECT COMPONENTS AND MILESTONES, INCLUDING BUT NOT LIMITED TO UTILITIES, FINAL LIMITS (VERTICAL AND HORIZONTAL) OF EXCAVATION, ACTUAL ISCO INJECTION POINTS AND OTHER APPURTENANT FEATURES. SURVEYOR TO PROVIDE FINAL RECORD DRAWINGS OF THE ACTUAL WORK PERFORMED.

THE NEW YORK STATE LICENSED LAND SURVEYOR SHALL STAKEOUT IN THE FIELD THE EDGE OF THE CITY OF ITHACA STREET RIGHT-OF-WAY (R.O.W.).THE CONTRACTOR SHALL CONFINE ALL OF WORK ACTIVITIES WITHIN THE STREET RIGHT-OF-WAY, EXCEPT FOR SPECIFIC ACCESS REQUIREMENTS NECESSARY FOR 418 NORTH PLAIN STREET. ACCESS PERMISSION TO BE OBTAINED BY NYSEG PRIOR TO REMEDIAL ACTIVITIES.

SITE RESTORATION

THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS WITHIN THE CITY OF ITHACA RIGHT OF WAY (R.O.W.) TO THE "FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION" AS DEPICTED ON DRAWING 16 OF 21, TYPICAL ROADWAY SECTIONS.

THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS ON PRIVATE PROPERTY TO EXISTING GRADE AND CONDITIONS.

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

DRN BY: — DES BY: — CHK BY: — APP BY: —

1 INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

GENERAL NOTES

100% DESIGN
(NOT FOR BIDDING)

PROJECT DATE (M / Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 2 OF 21
DRAWING NO.: 2

Plotted By: melsterk
Plot File Date Created: Apr/10/2012 1:29 PM
Layout-Sheet Name: NOTES
Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-

LEGEND

- EXISTING STRUCTURE
- ROADWAY
- SITE PERIMETER FENCE
- EXISTING SHEET PILE
- FORMER MGP STRUCTURE
- EXISTING MGP STRUCTURE
- SANITARY SEWER MAIN
- WATER MAIN
- GAS MAIN
- OVERHEAD UTILITIES
- STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- GAS VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- CITY STREET MONUMENT
- CONTOUR (0.5 FT. INTERVAL)

NOTE

THE STRUCTURES ON LOT 420 NORTH PLAIN STREET TO BE DEMOLISHED (BY OTHERS) PRIOR TO THE START OF REMEDIATION PROJECT.

0' 25' 50' 100'

MAPPING NOTES:

DATUM OF ELEVATIONS IS NAVD 88 PER CITY OF ITHACA SURVEY CONTROL MONUMENTS #1066.

CONTOUR INTERVAL IS 0.5 FEET.

MAPPING REFERENCE:

BASE MAPPING COMPILED FROM THE FOLLOWING SOURCES:

1) A FIELD SURVEY AND DRAWING TITLED "TOPOGRAPHIC MAP FOR ITHACA COURT STREET MGP OU-2 PROJECT" INCLUDING ALL NOTE AND REFERENCE THEREIN, PERFORMED BY T. G. MILLER P.C., DATED 9/13/2011.

2) PLANIMETRIC FEATURES AND UTILITY INFORMATION PROVIDED BY NYSEG.

3) UTILITY INFORMATION PROVIDED BY THE CITY OF ITHACA DEPARTMENT OF PUBLIC WORKS, WATER & SEWER DIVISION.

100% DESIGN
(NOT FOR BIDDING)

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

VERIFY SCALE IF PLAN SHEET IS REDUCED
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DRN BY: | DES BY: | CHK BY: | APP BY: |

AECOM

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

EXISTING CONDITIONS

PROJECT DATE (M / Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 3 OF 21
DRAWING NO.: 3

Plotted By: melsterk
Plot File Date Created: Apr/10/2012 11:24 AM
Layout-Sheet Name: EXIST
Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-

LEGEND

EXISTING STRUCTURE
ROADWAY
SITE PERIMETER FENCE
EXISTING SHEET PILE
FORMER MGP STRUCTURE
EXISTING MGP STRUCTURE

PRE-DESIGN INVESTIGATION SAMPLE LEGEND

PDI-21 / C21 / MW-C16 — INVESTIGATION SAMPLE LOCATION (AECOM, JULY 2011)

HISTORICAL SAMPLE LEGEND

MW-1S — MONITORING WELL
SB-18 — SOIL BORING
HP-24 — HYDRO PUNCH
SS-3 — SURFACE SOIL SAMPLE PER IT CORPORATION
TP-7 — TEST PIT - SHAPES & SIZES VARIED
RW-1 — RECOVERY WELL

SOURCE:
"REMEDIAL INVESTIGATION REPORT OPERABLE UNIT 2 NYSEG'S COURT STREET FORMER MGP SITE, ITHACA, NEW YORK", PREPARED BY AECOM FOR NYSEG, FEBRUARY 2011

100% DESIGN
(NOT FOR BIDDING)

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

VERIFY SCALE IF PLAN SHEET IS REDUCED
1 INCH

DRN BY: | DES BY: | CHK BY: | APP BY:

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

HISTORICAL SAMPLE LOCATIONS

PROJECT DATE (M / Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 4 OF 21
DRAWING NO.: 4

Plotted By: melsterk Apr/10/2012 11:25 AM
Plot File Date Created:
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Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-

LEGEND

	EXISTING STRUCTURE
	ROADWAY
	UTILITY POLE
	LIGHT POLE
	DECIDUOUS TREE
	CONIFEROUS TREE
	SIGN
	CITY STREET MONUMENT
393.5	CONTOUR (0.5 FT. INTERVAL)
	EXISTING SITE PERIMETER FENCE
	APPROXIMATE EXISTING SHEET PILE ALIGNMENT (AZ-48)
MW-1S	MONITORING WELL
SB-18	SOIL BORING
HP-24	HYDRO PUNCH
SS-3	SURFACE SOIL SAMPLE PER IT CORPORATION
TP-7	TEST PIT - SHAPES & SIZES VARIED
RW-1	RECOVERY WELL
PDI-21 C21 MW-C16	PREDESIGN INVESTIGATION SAMPLE (AECOM, JULY 2011)

KEY

	NAPL SATURATED SOILS AND/OR NON VISCOUS NAPL
	AREA OF REMEDIATION

0' 10' 20' 40'

100% DESIGN
(NOT FOR BIDDING)

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1 INCH

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

DRN BY: | DES BY: | CHK BY: | APP BY:

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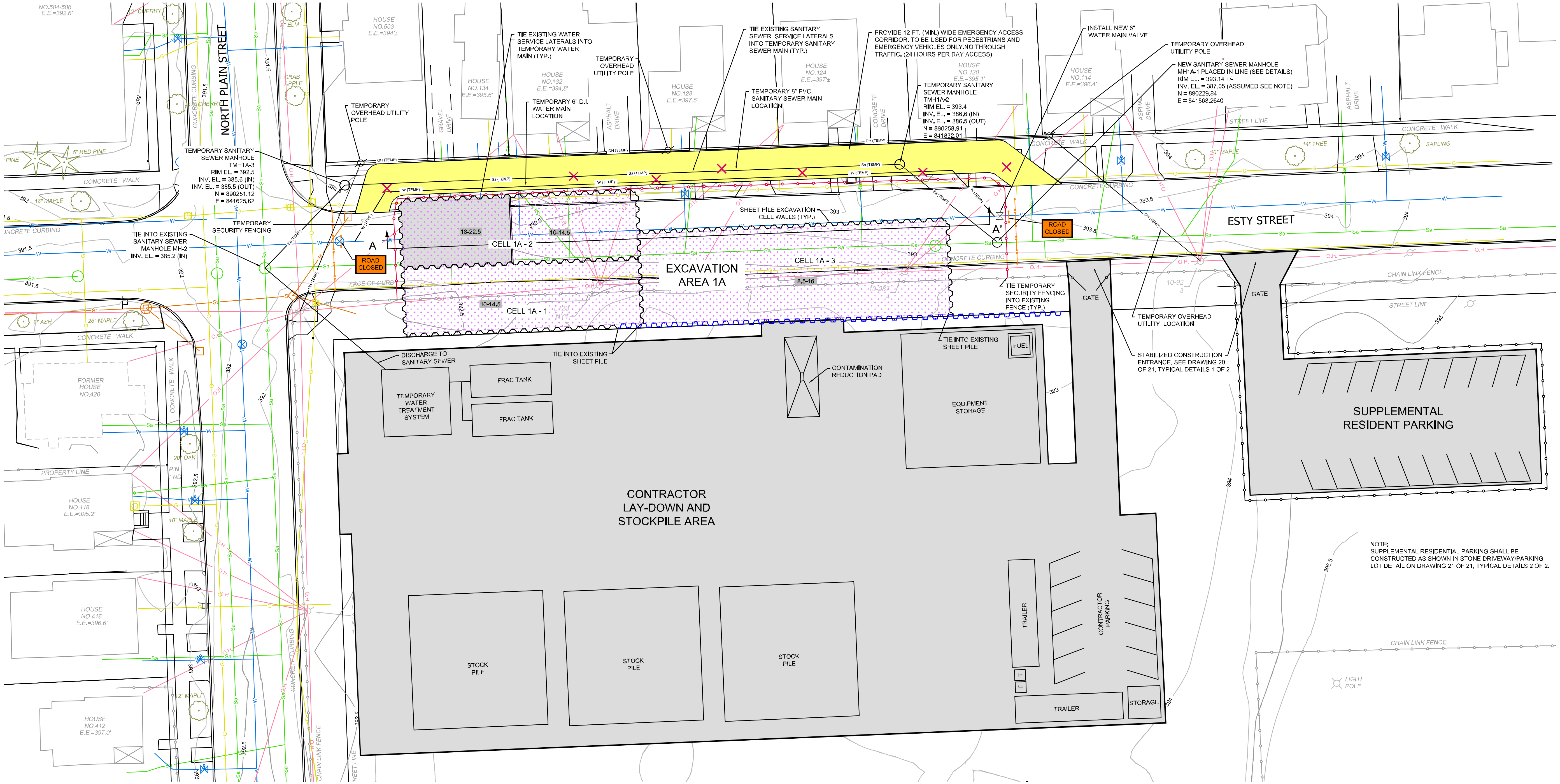
NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

PROJECT REMEDIATION AREAS

PROJECT DATE (M/Y) APRIL 2012
PROJECT NO. 60215637
FILENAME 60215637-ITHACA-COURT_ST.dwg
SHEET NO. 5 OF 21
DRAWING NO. 5

Plotted By: melsterk
Plot File Date Created: Apr/10/2012 11:26 AM
Layout-Sheet Name: AREAS
Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-



NOTES:

1) SEE DRAWING 7 OF 21 FOR REMEDIATION AREA 1A PLAN AND SECTION.

2) RELOCATION OF THE EXISTING GAS MAINS AND GAS SERVICES WILL BE PERFORMED BY NYSEG AND IS NOT DEPICTED.

3) OVERHEAD UTILITIES WILL BE RELOCATED TO THE APPROXIMATE LOCATION SHOWN BY OTHERS PRIOR TO THE START OF THE PROJECT.

4) CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY WATER AND SANITARY SEWER SERVICES IN THE APPROXIMATE LOCATION SHOWN.

5) TREE REMOVAL BY OTHERS, STUMP REMOVAL BY CONTRACTOR.

6) ALL TRAFFIC AND PEDESTRIAN CONTROLS SHALL BE IN ACCORDANCE WITH SECTION 619 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND THE 2009 EDITION OF THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS INCLUDING THE NEW YORK STATE SUPPLEMENT. APPROXIMATE LOCATION FOR CONTROL DEVICES SHOWN.

7) UTILITY INFORMATION AND ELEVATIONS SHOWN BASED ON BEST AVAILABLE INFORMATION AT TIME OF DESIGN. CONTRACTOR TO CONFIRM ALL PIPE TYPES, SIZES, AND ELEVATIONS PRIOR TO ORDERING MATERIALS.

8) LAYOUT OF CONTRACTOR LAY-DOWN AND STOCKPILE AREA IS FOR INFORMATION ONLY. CONTRACTOR MAY MODIFY THIS LAYOUT AS NECESSARY FOR HIS WORK.

SUGGESTED CONSTRUCTION SEQUENCE:

EXCAVATION AREA 1A

MOBILIZE, INSTALL CONTRACTOR LAY-DOWN AND STOCKPILE AREA, TEMPORARY WATER TREATMENT SYSTEM, CONSTRUCTION OFFICES, AND SUPPLEMENTAL RESIDENT PARKING AREA

INSTALL MAINTENANCE AND PROTECTION OF TRAFFIC AND PEDESTRIAN CONTROLS

INSTALL TEMPORARY SECURITY FENCING

INSTALL NEW SANITARY SEWER (DOGHOUSE) MANHOLE MH1A-1 IN THE LOCATION SHOWN

INSTALL TEMPORARY 8" PVC SANITARY SEWER MAIN FROM MH1A-1 TO MH-2 (EXISTING), INCLUDING TEMPORARY MANHOLE STRUCTURES TMH1A-2 & TMH1A-3

INSTALL NEW 6" WATERMAIN VALVE AND TEMPORARY 6" D.I. WATERMAIN IN THE LOCATION SHOWN

SUGGESTED CONSTRUCTION SEQUENCE (CON'T):

INSTALL TEMPORARY SANITARY SEWER SERVICES TO HOUSES 124, 128, 132, 134 ESTY STREET

INSTALL TEMPORARY WATER SERVICES TO HOUSES 124, 128, 132, 134 ESTY STREET

ESTABLISH EMERGENCY ACCESS ROUTE AS SHOWN

INSTALL TEMPORARY EXCAVATION PROTECTION SYSTEM FOR CELL 1A-1

EXCAVATE CELL 1A-1 TO THE LIMITS SHOWN ON PLANS

BACKFILL CELL 1A-1 TO FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON PLANS AND DETAILS

INSTALL TEMPORARY EXCAVATION PROTECTION SYSTEM FOR CELL 1A-2

EXCAVATE CELL 1A-2 TO THE LIMITS SHOWN ON PLANS

BACKFILL CELL 1A-2 TO FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON PLANS AND DETAILS

INSTALL TEMPORARY EXCAVATION PROTECTION SYSTEMS FOR CELL 1A-3

EXCAVATE CELL 1A-3 TO THE LIMITS SHOWN ON PLANS

BACKFILL CELL 1A-3 TO FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON PLANS AND DETAILS

EXCAVATE, INSTALL, AND BACKFILL NEW PORTION OF 8" PVC SANITARY SEWERMAIN IN THE LOCATION SHOWN, USING APPROPRIATE COUPLERS (SEE DETAILS)

EXCAVATE, INSTALL, AND BACKFILL NEW PORTION OF 6" D.I.WATERMAIN

EXCAVATE, INSTALL, AND BACKFILL NEW SANITARY SEWER AND WATER SERVICES FOR HOUSES 124, 128, 132, 134 ESTY STREET

RESTORE ALL DISTURBED PORTIONS OF ESTY STREET TO THE FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON PLANS AND DETAILS

REMOVE TEMPORARY MAINTENANCE AND PROTECTION OF TRAFFIC AND PEDESTRIAN CONTROLS AND TEMPORARY SECURITY FENCING

OPEN ESTY STREET TO TRAFFIC WITH THE APPROVAL OF THE CITY OF ITHACA.

LEGEND

- SANITARY SEWER MAIN
- WATER MAIN
- GAS MAIN
- OVERHEAD UTILITIES
- STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- GAS VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- CITY STREET MONUMENT
- 393.5 CONTOUR (0.5 FT. INTERVAL)
- EXISTING SITE PERIMETER FENCE
- APPROXIMATE EXISTING SHEET PILE ALIGNMENT (AZ-48)
- PROPOSED SHEET PILE ALIGNMENT (AZ-19)
- Sa (TEMP) PROPOSED LOCATION OF TEMPORARY SANITARY SEWER
- W (TEMP) PROPOSED LOCATION OF TEMPORARY WATER MAIN
- OH (TEMP) PROPOSED LOCATION OF TEMPORARY OVERHEAD UTILITIES (BY OTHERS)
- PROPOSED LOCATION OF TEMPORARY SECURITY FENCING
- TYPE III BARRICADE
- PROPOSED EXCAVATION AREA
- 18-24 PROPOSED EXCAVATION DEPTH INTERVAL (FEET)
- EMERGENCY ACCESS ROUTE
- TREE TO BE REMOVED BY OTHERS, STUMP TO BE REMOVED BY CONTRACTOR

100% DESIGN
(NOT FOR BIDDING)

|—1 INCH—| VERIFY SCALE IF PLAN SHEET IS REDUCED

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

DRN BY: — DES BY: — CHK BY: — APP BY: —

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

REMEDIATION AREA 1A
GENERAL LAYOUT

PROJECT DATE (M / Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 6 OF 21
DRAWING NO.: 6

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Plot File Date Created: Apr/10/2012 11:28 AM
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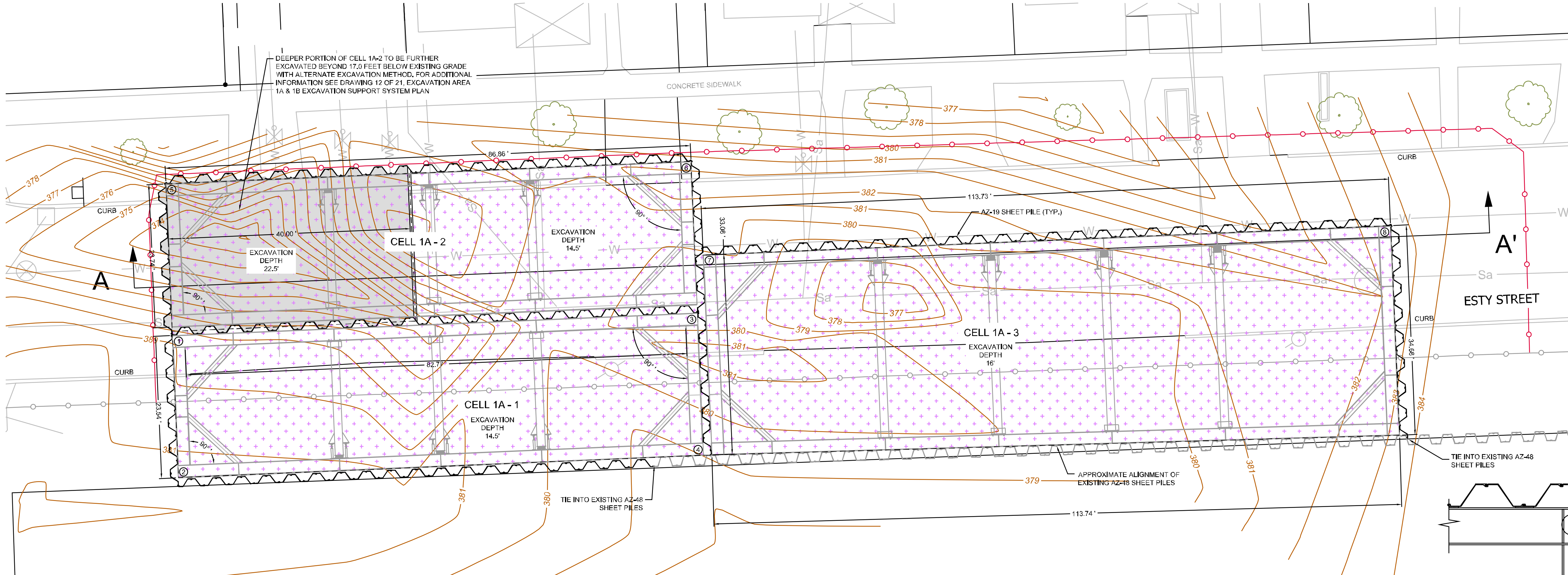
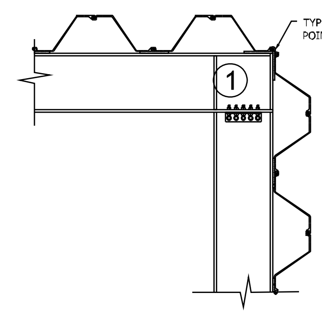


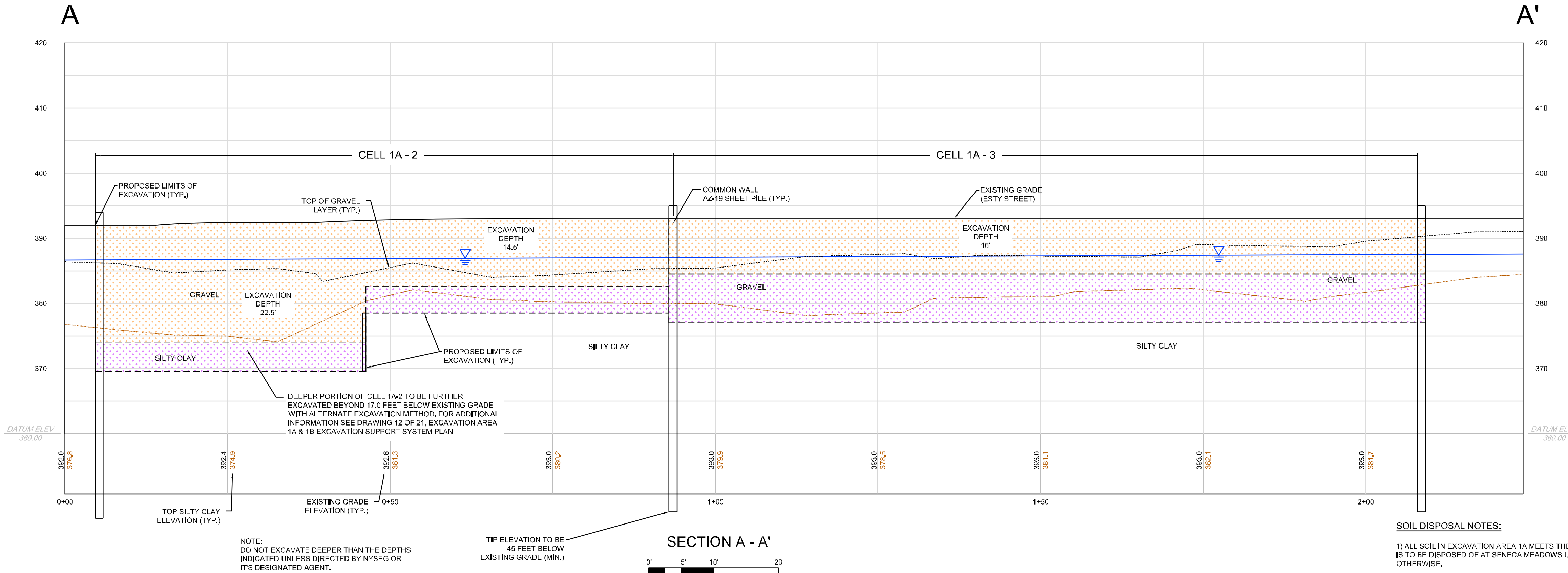
LEGEND

- SANITARY SEWER MAIN
- WATER MAIN
- STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- GAS VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- CITY STREET MONUMENT
- EXISTING SITE PERIMETER FENCE
- EXISTING CLAY SURFACE CONTOUR (1 FT. INTERVAL)
- APPROXIMATE EXISTING SHEET PILE ALIGNMENT (AZ-48)
- PROPOSED SHEET PILE ALIGNMENT (AZ-19)
- PROPOSED LOCATION OF TEMPORARY SECURITY FENCING



STAKE-OUT DETAIL

NOT TO SCALE



NOTE:
DO NOT EXCAVATE DEEPER THAN THE DEPTHS INDICATED UNLESS DIRECTED BY NYSEG OR IT'S DESIGNATED AGENT.

SECTION A - A'

STAKE-OUT COORDINATE TABLE

NORTH	EAST	DESCRIPTION
890219.59	841647.79	1
890196.07	841648.79	2
890223.31	841734.56	3
890199.79	841735.56	4
890244.68	841646.71	5
890248.39	841733.49	6
890232.89	841735.52	7
890237.75	841849.14	8

SOIL EXCAVATION KEY

- PROPOSED LIMITS OF SOIL TO BE EXCAVATED, STOCKPILED, AND SAMPLED FOR REUSE
- PROPOSED LIMITS OF SOIL TO BE EXCAVATED AND DISPOSED

SECTION NOTES:

1) TOP OF SILTY-CLAY AND TOP OF GRAVEL CONTOURS FROM HISTORIC AND PRE-DESIGN INVESTIGATION DATA.

2) EXISTING GRADE SHOWN FROM A SURVEY PERFORMED BY T. G. MILLER P.C., DATED 9/13/2011.

3) APPROXIMATE ELEVATIONS SHOWN BASED ON BEST AVAILABLE INFORMATION. ACTUAL DEPTHS MAY VARY BASED ON ACTUAL FIELD CONDITIONS.

SOIL DISPOSAL NOTES:

1) ALL SOIL IN EXCAVATION AREA 1A MEETS THE REQUIREMENTS OF NON-HAZARDOUS WASTE AND IS TO BE DISPOSED OF AT SENECA MEADOWS UNLESS FIELD OBSERVATIONS INDICATE OTHERWISE.

2) WASTE CHARACTERIZATION DATA CAN BE FOUND IN APPENDIX D OF THE REMEDIAL DESIGN REPORT .

100% DESIGN
(NOT FOR BIDDING)

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

REMEDIATION AREA 1A
PLAN AND SECTION

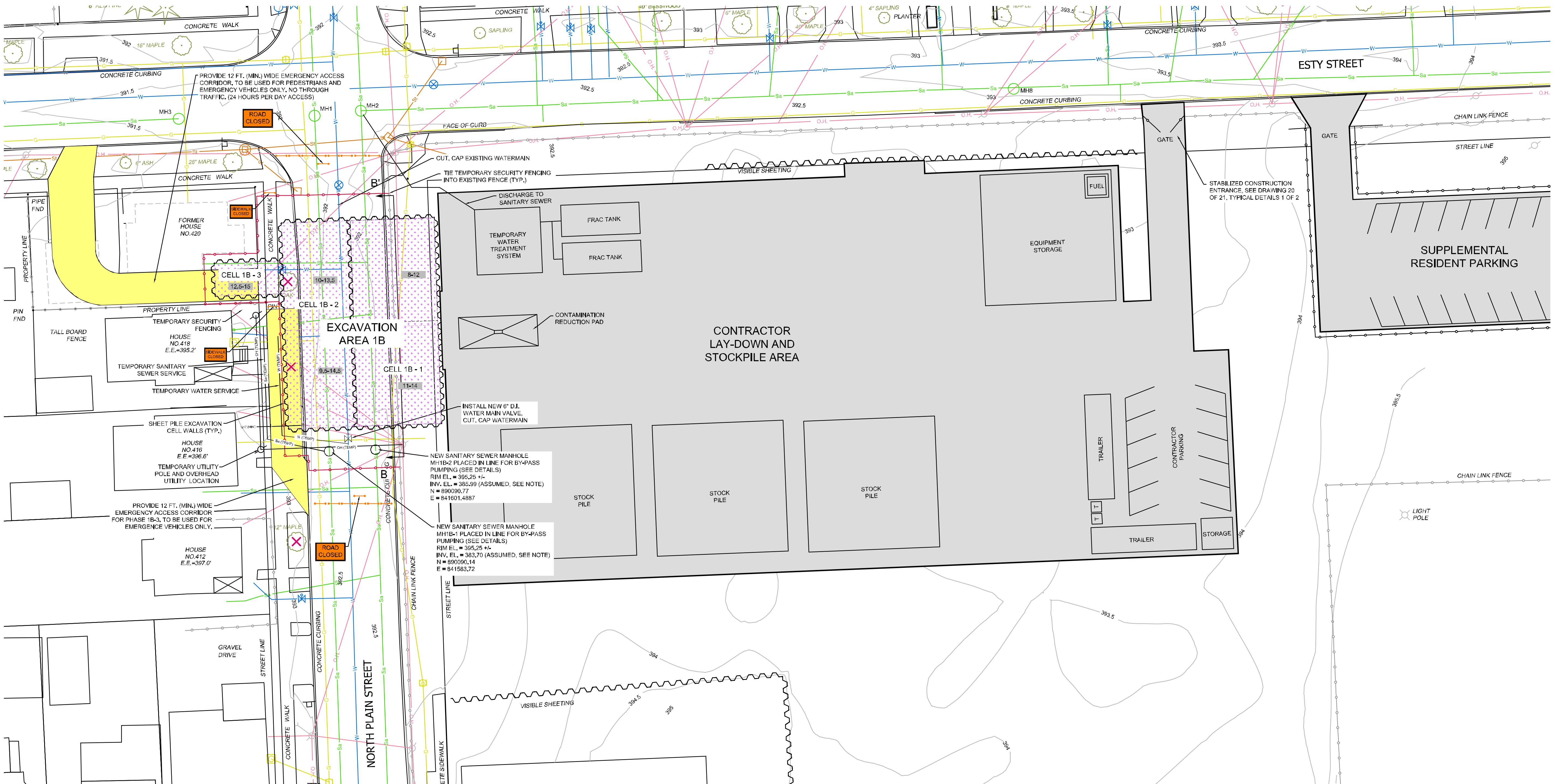
VERIFY SCALE IF PLAN SHEET IS REDUCED

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

DRN BY: | DES BY: | CHK BY: | APP BY:

PROJECT DATE (M / Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 7 OF 21
DRAWING NO.: 7

Plotted By: meisterk
Plot File Date Created: Apr/10/2012 11:30 AM
Layout-Sheet Name: 1A-EX-LAYOUT
Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-



NOTES:

1) SEE DRAWING 9 OF 21 FOR REMEDIATION AREA 1B PHASE 1B-1 PLAN AND SECTION.

2) SEE DRAWING 10 OF 21FOR REMEDIATION AREA 1B PHASE 1B-2 PLAN AND SECTION.

3) SEE DRAWING 11 OF 21 FOR REMEDIATION AREA 1B PHASE 1B-3 PLAN AND SECTION.

4) RELOCATION OF THE EXISTING GAS MAINS AND GAS SERVICES WILL BE PERFORMED BY NYSEG AND IS NOT DEPICTED.

5) TREE REMOVAL BY OTHERS, STUMP REMOVAL BY CONTRACTOR.

6) OVERHEAD UTILITIES WILL BE RELOCATED TO THE APPROXIMATE LOCATION SHOWN BY OTHERS PRIOR TO THE START OF THE PROJECT.

7) CONTRACTOR SHALL INSTALL AND MAINTAIN TEMPORARY WATER AND SANITARY SEWER SERVICES IN THE APPROXIMATE LOCATION SHOWN.

8) ALL TRAFFIC AND PEDESTRIAN CONTROLS SHALL BE IN ACCORDANCE WITH SECTION 619 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND THE 2009 EDITION OF THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS INCLUDING THE NEW YORK STATE SUPPLEMENT. APPROXIMATE LOCATION FOR CONTROL DEVICES SHOWN.

9) UTILITY INFORMATION AND ELEVATIONS SHOWN BASED ON BEST AVAILABLE INFORMATION AT TIME OF DESIGN. CONTRACTOR TO CONFIRM ALL PIPE TYPES, SIZES, AND ELEVATIONS PRIOR TO ORDERING MATERIALS.

LEGEND

- Sa — SANITARY SEWER MAIN
- W — WATER MAIN
- G — GAS MAIN
- O.H. — OVERHEAD UTILITIES
- St — STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- GAS VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- CITY STREET MONUMENT
- 393.5 — CONTOUR (0.5 FT. INTERVAL)
- EXISTING SITE PERIMETER FENCE
- PROPOSED SHEET PILE ALIGNMENT (AZ-19)
- Sa (TEMP) — PROPOSED LOCATION OF TEMPORARY SANITARY SEWER
- W (TEMP) — PROPOSED LOCATION OF TEMPORARY WATER MAIN
- OH (TEMP) — PROPOSED LOCATION OF TEMPORARY OVERHEAD UTILITIES (BY OTHERS)
- PROPOSED LOCATION OF TEMPORARY SECURITY FENCING
- TYPE III BARRICADE
- PROPOSED EXCAVATION AREA
- 18-24 — PROPOSED EXCAVATION DEPTH INTERVAL (FEET)
- EMERGENCY ACCESS ROUTE
- TREE TO BE REMOVED BY OTHERS, STUMP TO BE REMOVED BY CONTRACTOR

0' 10' 20' 40'

100% DESIGN
(NOT FOR BIDDING)

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

VERIFY SCALE IF PLAN SHEET IS REDUCED 1 INCH

DRN BY: — DES BY: — CHK BY: — APP BY: —

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2 ITHACA, NEW YORK

REMEDIATION AREA 1B GENERAL LAYOUT

PROJECT DATE (M/Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 8 OF 21
DRAWING NO.: 8

Plotted By: melsterk Apr/10/2012 11:31 AM
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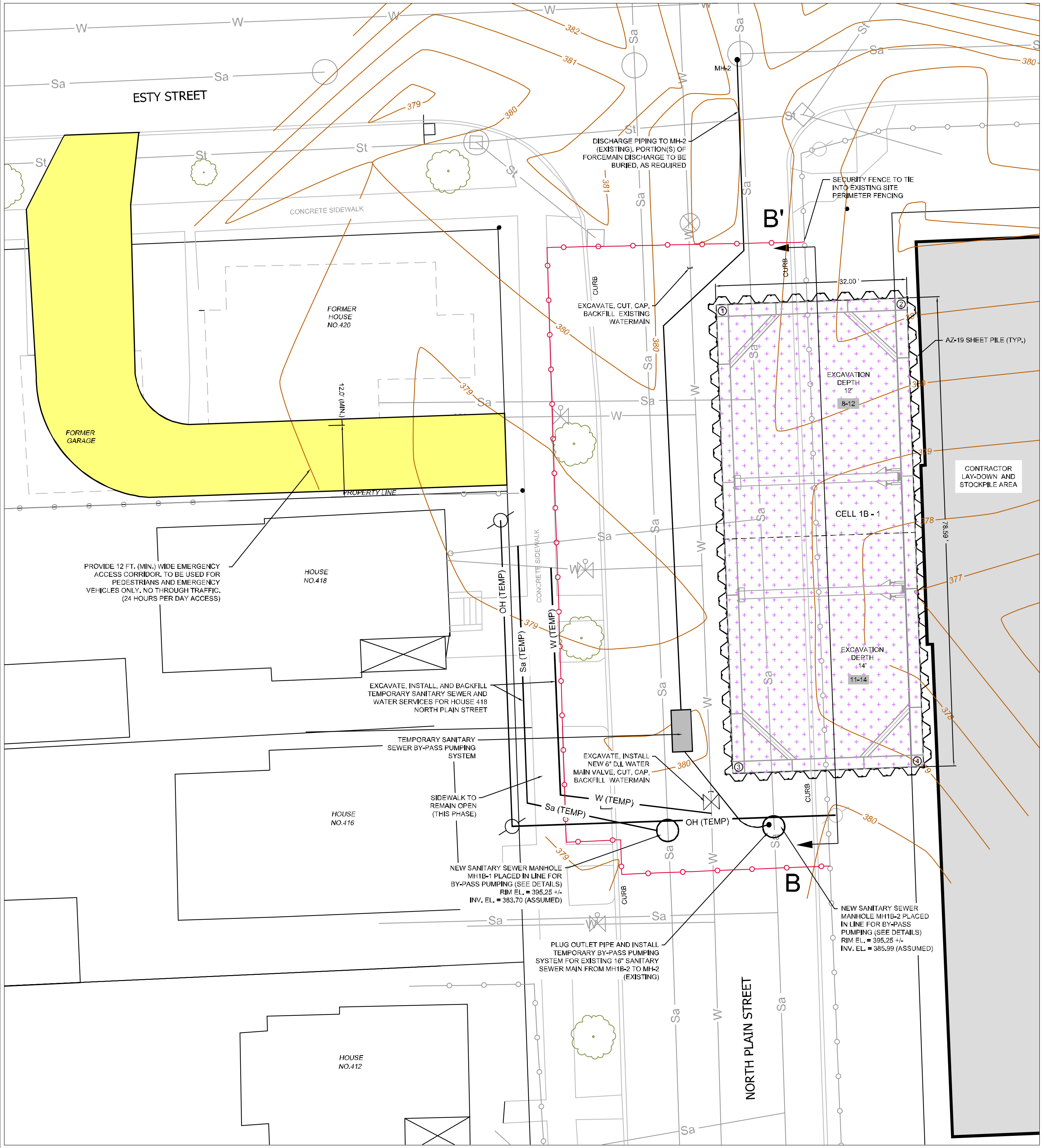

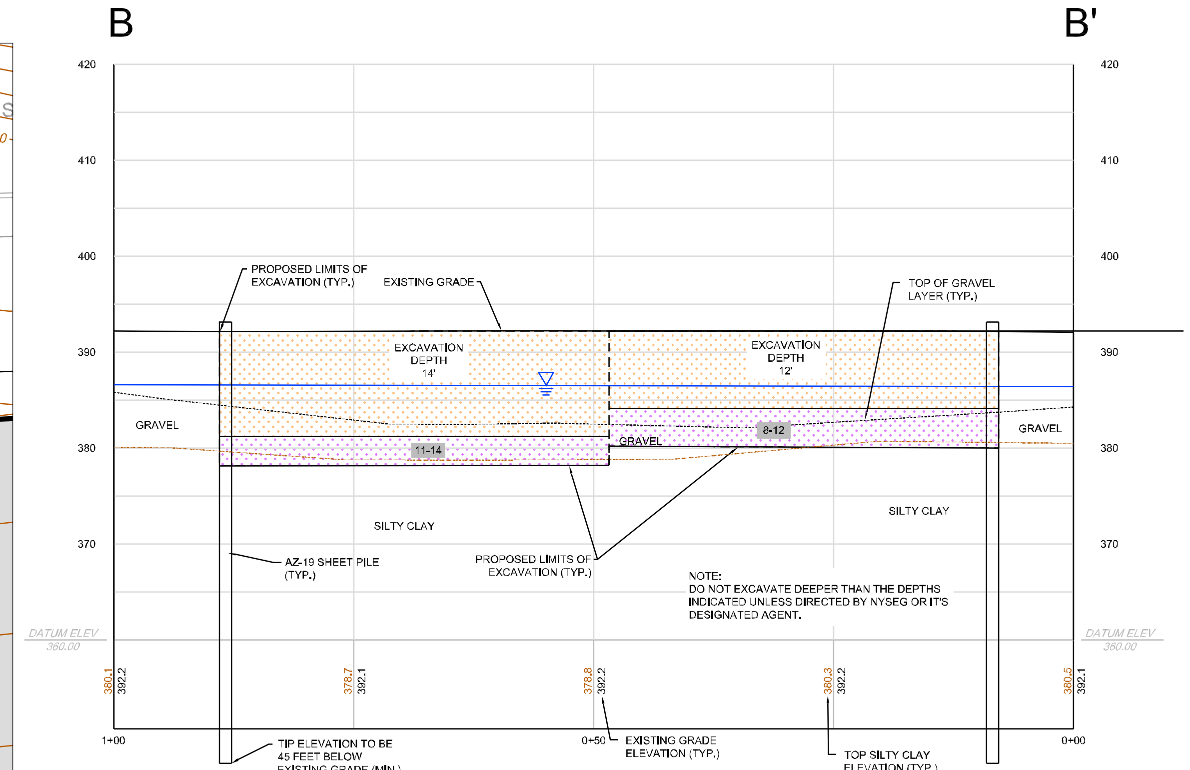

SECTION NOTES:

1) TOP OF SILTY-CLAY AND TOP OF GRAVEL CONTOURS FROM HISTORIC AND PRE-DESIGN INVESTIGATION DATA.

2) EXISTING GRADE SHOWN FROM A SURVEY PERFORMED BY T. G. MILLER P.C., DATED 9/13/2011.

3) APPROXIMATE ELEVATIONS SHOWN BASED ON BEST AVAILABLE INFORMATION. ACTUAL DEPTHS MAY VARY BASED ON ACTUAL FIELD CONDITIONS.

SECTION B - B'

SOIL EXCAVATION KEY

PROPOSED LIMITS OF SOIL TO BE EXCAVATED, STOCKPILED, AND SAMPLED FOR REUSE

PROPOSED LIMITS OF SOIL TO BE EXCAVATED AND DISPOSED

LEGEND

- SANITARY SEWER MAIN
- WATER MAIN
- STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- CITY STREET MONUMENT
- EXISTING SITE PERIMETER FENCE
- EXISTING CLAY SURFACE CONTOUR (1 FT. INTERVAL)
- PROPOSED SHEET PILE ALIGNMENT (AZ-19)
- PROPOSED LOCATION OF TEMPORARY SANITARY SEWER SERVICE
- PROPOSED LOCATION OF TEMPORARY WATER SERVICE
- PROPOSED LOCATION OF TEMPORARY OVERHEAD UTILITIES
- PROPOSED LOCATION OF TEMPORARY SECURITY FENCING
- EMERGENCY ACCESS ROUTE

SOIL DISPOSAL NOTES:

1) ALL SOIL IN EXCAVATION AREA 1A MEETS THE REQUIREMENTS OF NON-HAZARDOUS WASTE AND IS TO BE DISPOSED OF AT SENECA MEADOWS UNLESS FIELD OBSERVATIONS INDICATE OTHERWISE.

2) WASTE CHARACTERIZATION DATA CAN BE FOUND IN APPENDIX D OF THE REMEDIAL DESIGN REPORT .

STAKE-OUT COORDINATE TABLE

NORTH	EAST	DESCRIPTION
890178.21	841591.82	1
890179.35	841623.81	2
890099.67	841594.62	3
890100.81	841626.60	4

NOTES:

ALL TRAFFIC AND PEDESTRIAN CONTROLS SHALL BE IN ACCORDANCE WITH ITEM 619 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND THE 2009 EDITION OF THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS INCLUDING THE NEW YORK STATE SUPPLEMENT. SEE DRAWING 8 OF 21, REMEDIATION AREA 1B GENERAL LAYOUT, FOR APPROXIMATE LOCATION OF CONTROL DEVICES.

OVERHEAD UTILITIES TO BE RELOCATED TO THE APPROXIMATE LOCATION SHOWN, BY OTHERS, PRIOR TO THE START OF THE PROJECT.

RELOCATION OF THE EXISTING GAS MAINS AND GAS SERVICES WILL BE PERFORMED BY NYSEG AND IS NOT DEPICTED.

SUGGESTED CONSTRUCTION SEQUENCE:

EXCAVATION AREA 1B

PHASE 1B-1

INSTALL MAINTENANCE AND PROTECTION OF TRAFFIC AND PEDESTRIAN CONTROLS AS SHOWN ON DRAWING 8 OF 21, REMEDIATION AREA 1B GENERAL LAYOUT.

ESTABLISH EMERGENCY ACCESS TO HOUSE 418 NORTH PLAIN STREET THROUGH LOT 420 NORTH PLAIN STREET FOR PHASES 1B-1 AND 1B-2 AS SHOWN

INSTALL TEMPORARY SECURITY FENCING

INSTALL NEW SANITARY SEWER (DOGHOUSE) MANHOLES MH1B-1 AND MH1B-2 AT THE LOCATIONS SHOWN

CUT EXISTING 6" D.I. WATERMAIN, INSTALL NEW 6" WATERMAIN VALVE

ISOLATE WATERMAIN WITHIN THE EXCAVATION AREA BY VALVES, EXCAVATE, CUT, PLUG, AND BACKFILL WATERMAIN IN LOCATIONS SHOWN

INSTALL TEMPORARY SANITARY SEWER BY-PASS PUMPING SYSTEM FROM MH1B-2 TO MH-2 (EXISTING) FOR THE ISOLATION OF THE 16" TILE SANITARY SEWER WITHIN THE EXCAVATION. PORTION(S) OF FORCEMAIN DISCHARGE TO BE BURIED, AS REQUIRED

EXCAVATE, INSTALL, AND BACKFILL TEMPORARY SANITARY SEWER AND WATER SERVICES FOR HOUSE 418 NORTH PLAIN STREET

RESTORE SIDEWALK TO "TEMPORARY SIDEWALK CONDITION", SEE DETAILS

INSTALL TEMPORARY EXCAVATION PROTECTION SYSTEM FOR CELL 1B-1

EXCAVATE CELL 1B-1 TO THE LIMITS SHOWN IN PLANS

BACKFILL CELL 1B-1 TO FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON PLANS AND DETAILS

PLAN

0' 5' 10' 20'

100% DESIGN
(NOT FOR BIDDING)

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

REMEDIATION AREA 1B
PHASE 1B-1
PLAN AND SECTION

DRN BY:	—
DES BY:	—
CHK BY:	—
APP BY:	—

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

VERIFY SCALE IF PLAN SHEET IS REDUCED — 1-INCH —

PROJECT DATE (M / Y) APRIL 2012
PROJECT NO. 60215637
FILENAME 60215637-ITHACA-COURT_ST.dwg
SHEET NO. 9 OF 21
DRAWING NO. 9

Plotted By: melsterk
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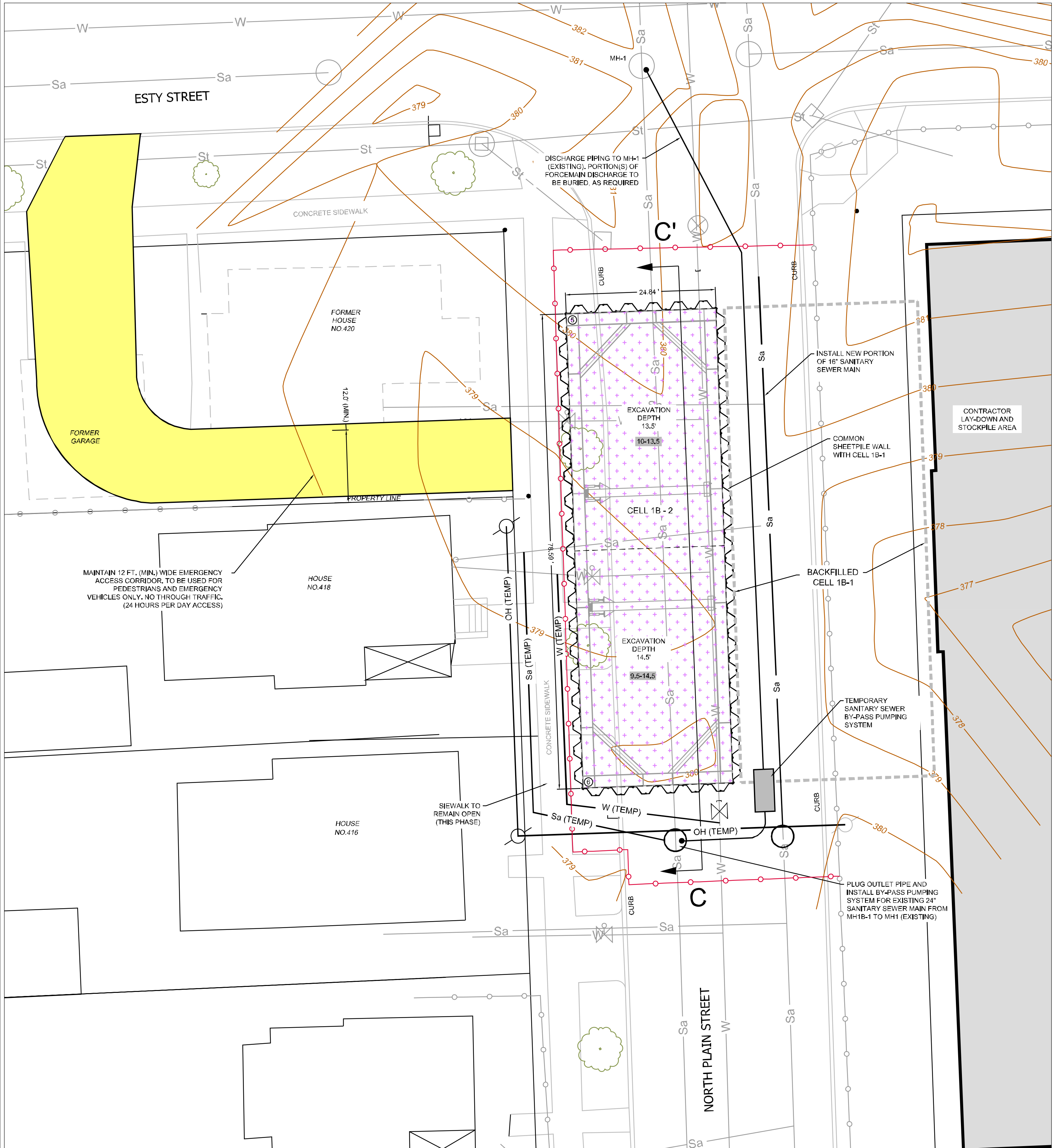
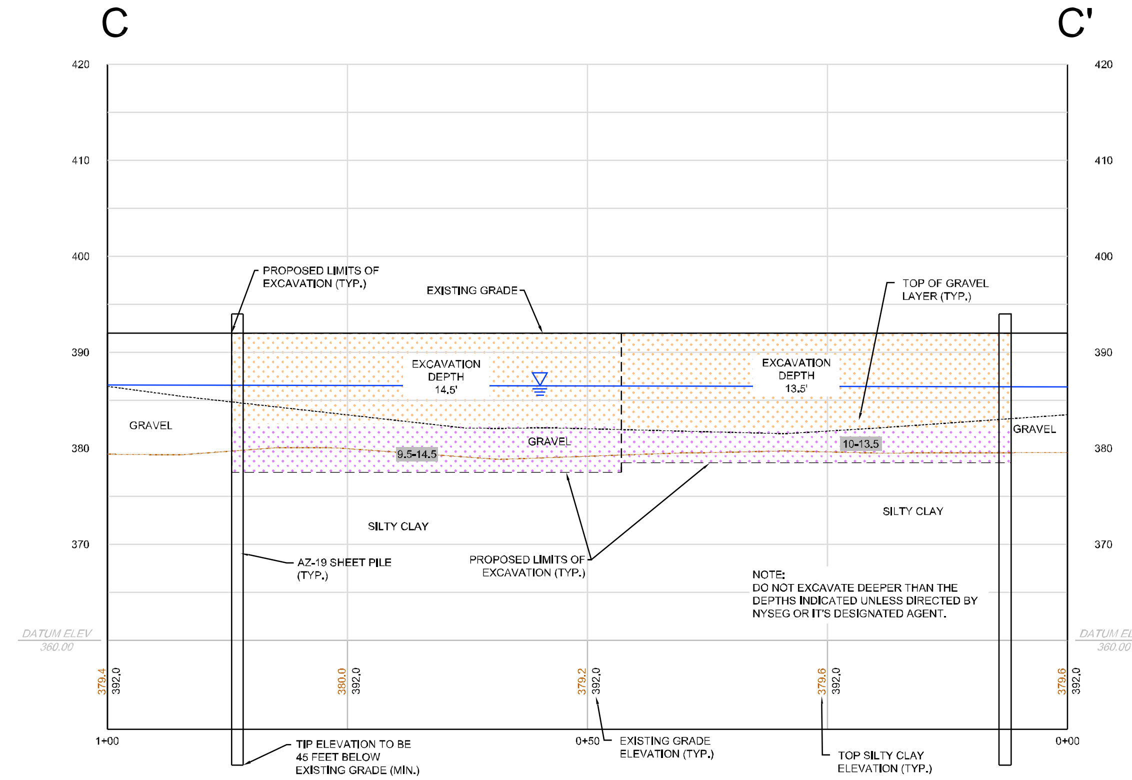




SECTION C - C'

SECTION NOTES:

1) TOP OF SILTY-CLAY AND TOP OF GRAVEL CONTOURS FROM HISTORIC AND PRE-DESIGN INVESTIGATION DATA.

2) EXISTING GRADE SHOWN FROM A SURVEY PERFORMED BY T. G. MILLER P.C., DATED 9/13/2011.

3) APPROXIMATE ELEVATIONS SHOWN BASED ON BEST AVAILABLE INFORMATION. ACTUAL DEPTHS MAY VARY BASED ON ACTUAL FIELD CONDITIONS.

SOIL EXCAVATION KEY

- PROPOSED LIMITS OF SOIL TO BE EXCAVATED, STOCKPILED, AND SAMPLED FOR REUSE
- PROPOSED LIMITS OF SOIL TO BE EXCAVATED AND DISPOSED

LEGEND

- SANITARY SEWER MAIN
- WATER MAIN
- STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- CITY STREET MONUMENT
- EXISTING SITE PERIMETER FENCE
- EXISTING CLAY SURFACE CONTOUR (1 FT. INTERVAL)
- PROPOSED SHEET PILE ALIGNMENT (AZ-19)
- LOCATION OF NEW SANITARY SEWER MAIN
- PROPOSED LOCATION OF TEMPORARY SANITARY SEWER SERVICE
- PROPOSED LOCATION OF TEMPORARY WATER SERVICE
- PROPOSED LOCATION OF TEMPORARY OVERHEAD UTILITIES
- PROPOSED LOCATION OF TEMPORARY SECURITY FENCING
- EMERGENCY ACCESS ROUTE

SOIL DISPOSAL NOTES:

1) SOILS IN NORTHERN HALF OF EXCAVATION CELL 1B-2 MEETS THE REQUIREMENTS OF NON-HAZARDOUS WASTE AND IS TO BE DISPOSED OF AT SENECA MEADOWS UNLESS FIELD OBSERVATIONS INDICATE OTHERWISE.

2) SOILS IN SOUTHERN HALF OF EXCAVATION CELL 1-B2 HAS BEEN CHARACTERIZED AS A CONDITIONALLY EXEMPT MGP REMEDIATION WASTE AND ARE TO BE DISPOSED OF AT ESMI OF NEW YORK.

3) WASTE CHARACTERIZATION DATA CAN BE FOUND IN APPENDIX D OF THE REMEDIAL DESIGN REPORT .

NOTES:

OVERHEAD UTILITIES TO BE RELOCATED TO THE APPROXIMATE LOCATION SHOWN, BY OTHERS, PRIOR TO THE START OF THE PROJECT.

RELOCATION OF THE EXISTING GAS MAINS AND GAS SERVICES WILL BE PERFORMED BY NYSEG AND IS NOT DEPICTED.

SUGGESTED CONSTRUCTION SEQUENCE:

EXCAVATION AREA 1B

PHASE 1B-2

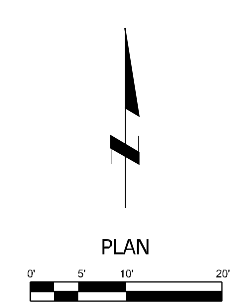
EXCAVATE AND INSTALL NEW PORTION OF 16" PVC SANITARY SEWER USING APPROPRIATE COUPLERS, BACKFILL AS SHOWN IN DETAILS

MOVE TEMPORARY SANITARY SEWER BY-PASS PUMPING SYSTEM FOR PUMPING FROM MH1B-1 TO MH1 (EXISTING). PUMPING OPERATION IS FOR THE ISOLATION OF THE 24" TRANSITE SANITARY SEWER WITHIN THE EXCAVATION. PORTION(S) OF FORCEMAIN DISCHARGE TO BE BURIED, AS REQUIRED

INSTALL TEMPORARY EXCAVATION PROTECTION SYSTEM FOR CELL 1B-2

EXCAVATE CELL 1B-2 TO THE LIMITS SHOWN ON PLANS

BACKFILL CELL 1B-1 TO FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON PLANS AND DETAILS



PLAN

STAKE-OUT COORDINATE TABLE

NORTH	EAST	DESCRIPTION
890177.28	841565.63	5
890098.74	841568.43	6

100% DESIGN
(NOT FOR BIDDING)

AECOM

VERIFY SCALE IF PLAN SHEET IS REDUCED
1 INCH

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

DRN BY: | DES BY: | CHK BY: | APP BY:

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

REMEDIATION AREA 1B
PHASE 1B-2
PLAN AND SECTION

PROJECT DATE (M / Y)	APRIL 2012
PROJECT NO.	60215637
FILENAME	60215637-ITHACA-COURT_ST.dwg
SHEET NO.	10 OF 21
DRAWING NO.	10

Plotted By: meisterk
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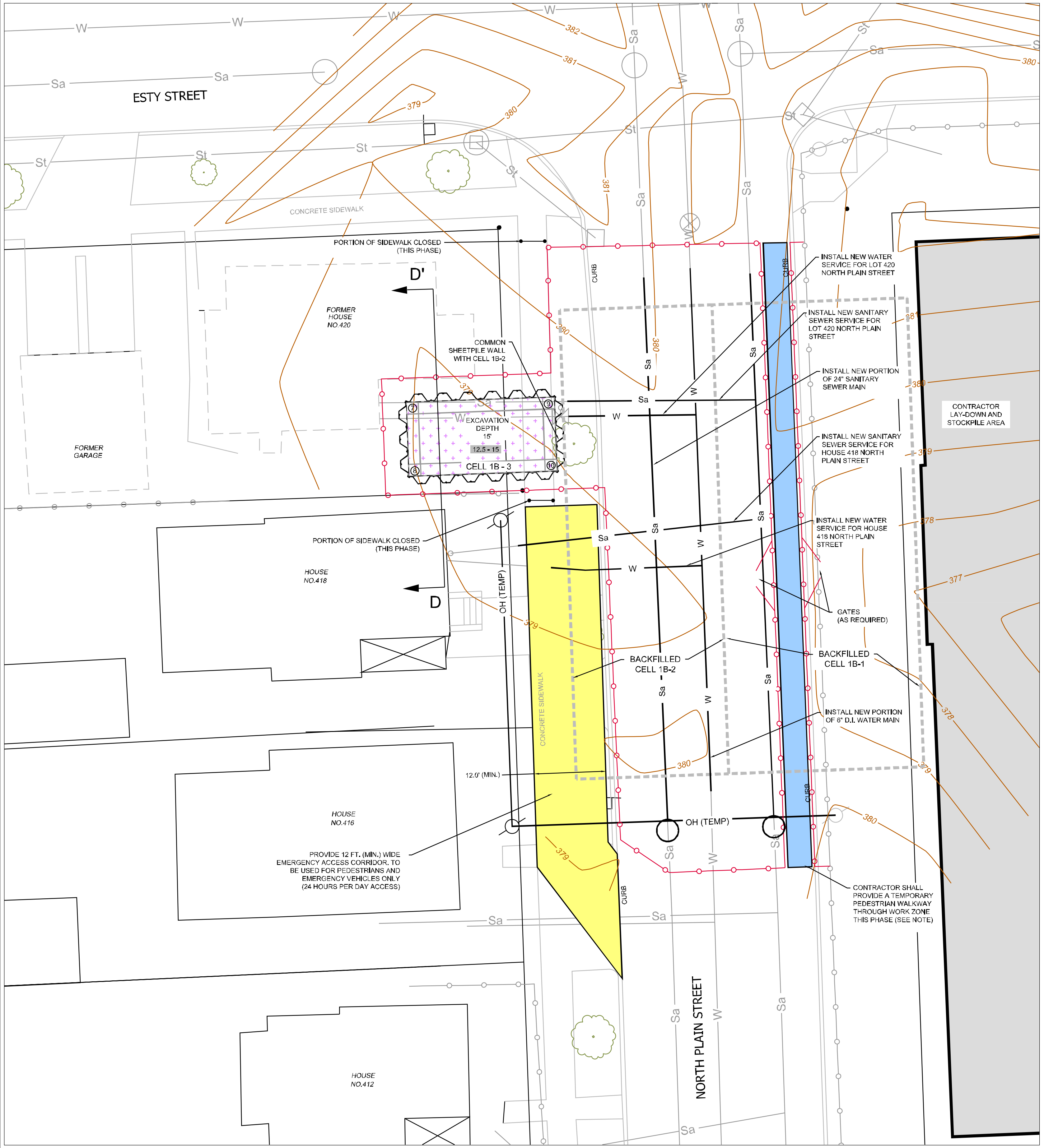
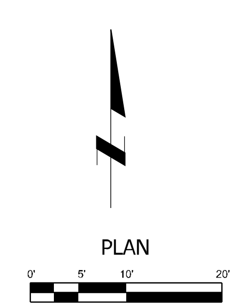
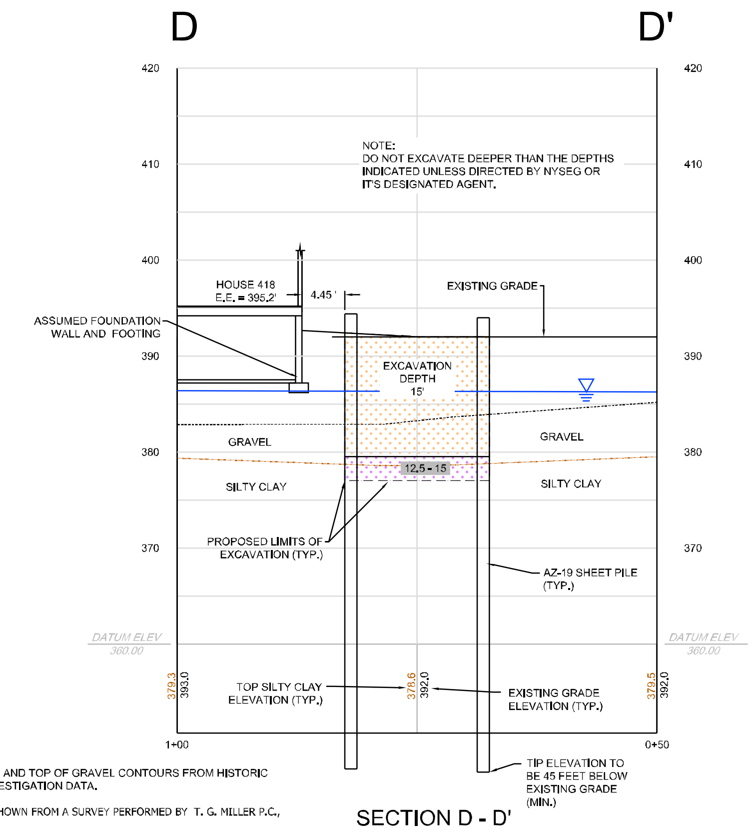




PLAN



SECTION D - D'

SECTION NOTES:

1) TOP OF SILTY-CLAY AND TOP OF GRAVEL CONTOURS FROM HISTORIC AND PRE-DESIGN INVESTIGATION DATA.

2) EXISTING GRADE SHOWN FROM A SURVEY PERFORMED BY T. G. MILLER P.C., DATED 9/13/2011.

3) APPROXIMATE ELEVATIONS SHOWN BASED ON BEST AVAILABLE INFORMATION. ACTUAL DEPTHS MAY VARY BASED ON ACTUAL FIELD CONDITIONS.

SOIL EXCAVATION KEY

- PROPOSED LIMITS OF SOIL TO BE EXCAVATED, STOCKPILED, AND SAMPLED FOR REUSE
- PROPOSED LIMITS OF SOIL TO BE EXCAVATED AND DISPOSED

LEGEND

- Sa — SANITARY SEWER MAIN
- W — WATER MAIN
- St — STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- CITY STREET MONUMENT
- EXISTING SITE PERIMETER FENCE
- 388 — EXISTING CLAY SURFACE CONTOUR (1 FT. INTERVAL)
- PROPOSED SHEET PILE ALIGNMENT (AZ-19)
- Sa — LOCATION OF NEW SANITARY SEWER MAIN AND SERVICES
- W — LOCATION OF NEW WATER MAIN AND SERVICES
- OH (TEMP) — PROPOSED LOCATION OF TEMPORARY OVERHEAD UTILITIES
- PROPOSED LOCATION OF TEMPORARY SECURITY FENCING
- EMERGENCY ACCESS ROUTE
- TEMPORARY PEDESTRIAN WALKWAY

SOIL DISPOSAL NOTE:

ALL SOIL IN EXCAVATION CELL 1B-3 HAS BEEN CHARACTERIZED AS CONDITIONALLY EXEMPT MGP REMEDIATION WASTE AND IS TO BE DISPOSED OF AT ESMI OF NEW YORK.

STAKE-OUT COORDINATE TABLE

NORTH	EAST	DESCRIPTION
890161.89	841539.95	7
890149.45	841540.39	8
890162.77	841564.78	9
890150.34	841565.22	10

NOTES:

ALL TRAFFIC AND PEDESTRIAN CONTROLS SHALL BE IN ACCORDANCE WITH ITEM 619 OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND THE 2009 EDITION OF THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS INCLUDING THE NEW YORK STATE SUPPLEMENT. SEE DRAWING 8 OF 21, REMEDIATION AREA 1B GENERAL LAYOUT, FOR APPROXIMATE LOCATION OF CONTROL DEVICES.

OVERHEAD UTILITIES TO BE RELOCATED TO THE APPROXIMATE LOCATION SHOWN, BY OTHERS, PRIOR TO THE START OF THE PROJECT.

RELOCATION OF THE EXISTING GAS MAINS AND GAS SERVICES WILL BE PERFORMED BY NYSEG AND IS NOT DEPICTED.

THE CONTRACTOR SHALL INSTALL AND MAINTAIN A TEMPORARY PEDESTRIAN WALKWAY, IN THE APPROXIMATE LOCATION SHOW, DURING THE EXCAVATION OF CELL 1B-3 FOR PEDESTRIAN TRAFFIC ON NORTH PLAIN STREET. THIS TEMPORARY WALKWAY WILL BISECT THE CONTRACTORS ENTRANCE INTO THE LAY-DOWN AND STOCKPILE AREA DURING THE COURSE OF THE WORK. THE CONTRACTOR SHALL PROTECT OR CLEAN TEMPORARY WALKWAY SURFACES AS NECESSARY TO ENSURE PEDESTRIANS DO NOT COME IN CONTACT WITH CONTAMINATED MATERIALS. PEDESTRIAN TRAFFIC SHALL NOT BE IMPEDED AND SHALL HAVE THE "RIGHT OF WAY" AT ALL TIMES.

SUGGESTED CONSTRUCTION SEQUENCE:

EXCAVATION AREA 1B

PHASE 1B-3

INSTALL TEMPORARY SECURITY FENCING AS SHOWN

ESTABLISH EMERGENCY ACCESS ROUTE TO HOUSE 418 NORTH PLAIN STREET AS SHOWN

EXCAVATE, INSTALL, AND BACKFILL NEW PORTION ON 24" PVC SANITARY SEWERMAIN USING APPROPRIATE COUPLERS, AS SHOWN IN DETAILS

REMOVE SANITARY SEWER BY-PASS PUMPING SYSTEM

EXCAVATE, INSTALL, AND BACKFILL NEW PORTION OF 6" D.I.WATERMAIN

EXCAVATE, INSTALL, AND BACKFILL NEW SANITARY SEWER AND WATER SERVICES FOR HOUSE 418 NORTH PLAIN STREET AND LOT 420 NORTH PLAIN STREET

INSTALL TEMPORARY EXCAVATION PROTECTION SYSTEM FOR CELL 1B-3

EXCAVATE CELL 1B-3 TO THE LIMITS SHOWN ON PLANS

BACKFILL CELL 1B-3 TO FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON PLANS AND DETAILS. COMPACT FILL USING A NON-VIBRATORY ROLLER.

RESTORE ALL DISTURBED PORTIONS OF NORTH PLAIN STREET TO THE FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN

REMOVE TEMPORARY MAINTENANCE AND PROTECTION OF TRAFFIC AND PEDESTRIAN CONTROLS AND, TEMPORARY SECURITY FENCING

OPEN NORTH PLAIN STREET TO TRAFFIC WITH THE APPROVAL OF THE CITY OF ITHACA

100% DESIGN
(NOT FOR BIDDING)

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

REMEDIATION AREA 1B
PHASE 1B-3
PLAN AND SECTION

PROJECT DATE (M / Y)	APRIL 2012
PROJECT NO.	60215637
FILENAME	60215637-ITHACA-COURT_ST.dwg
SHEET NO.	11 OF 21
DRAWING NO.	11

REV | DESCRIPTION | DRN | CHK | DATE (M/D/Y)

DRN BY: | DES BY: | CHK BY: | APP BY:

VERIFY SCALE IF PLAN SHEET IS REDUCED — 1 INCH

Plotted By: meisterk
Plot File Date Created: Apr/10/2012 11:43 AM
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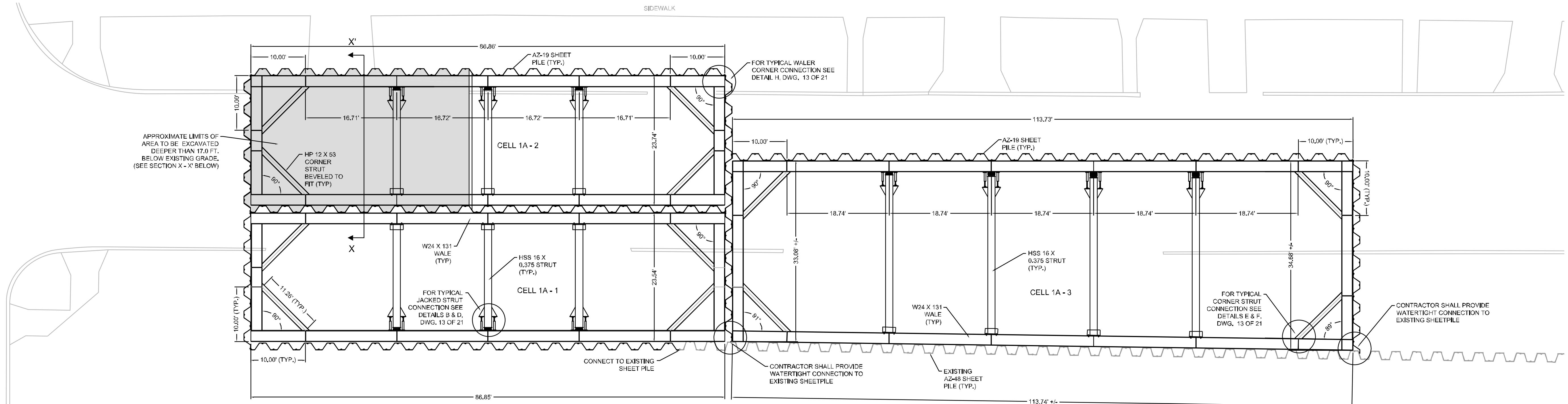
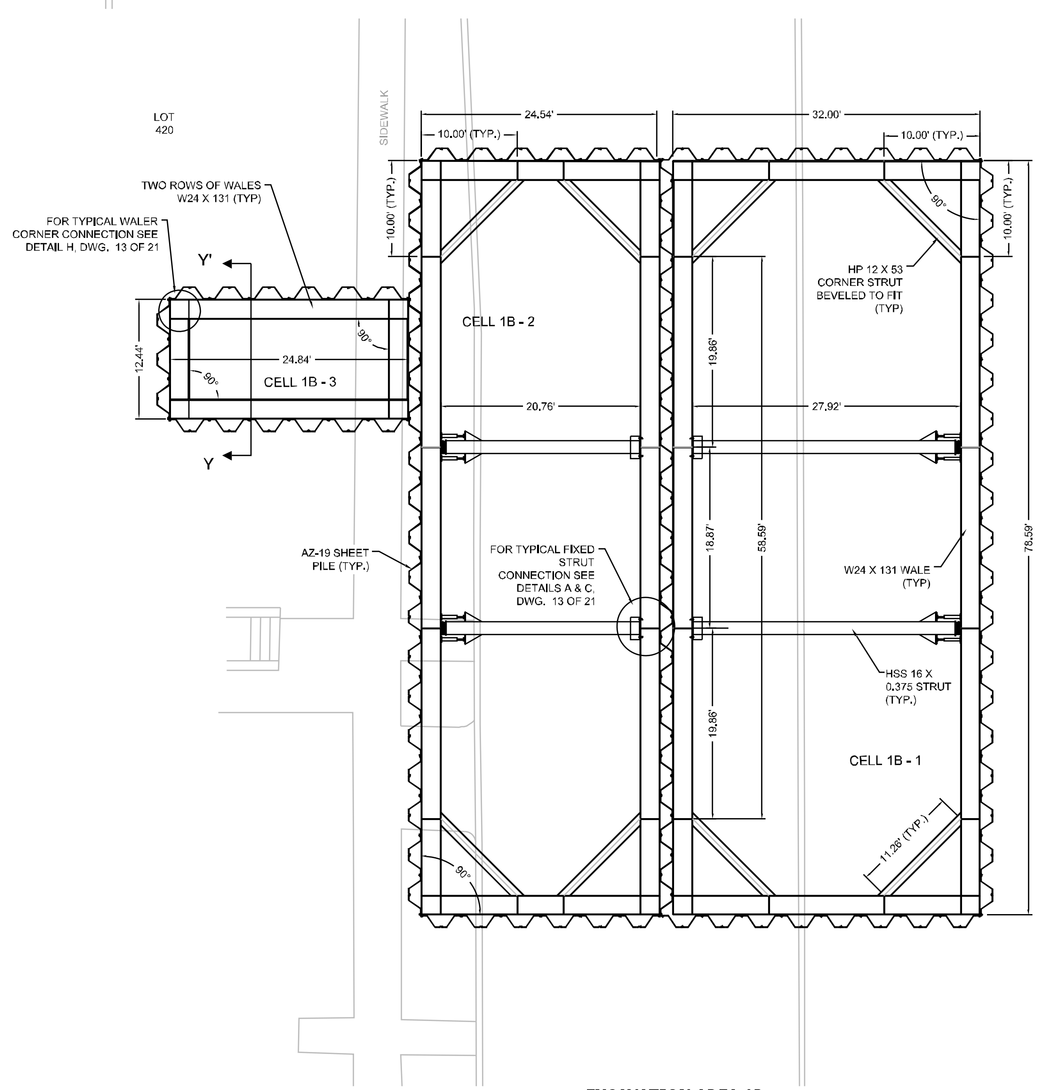


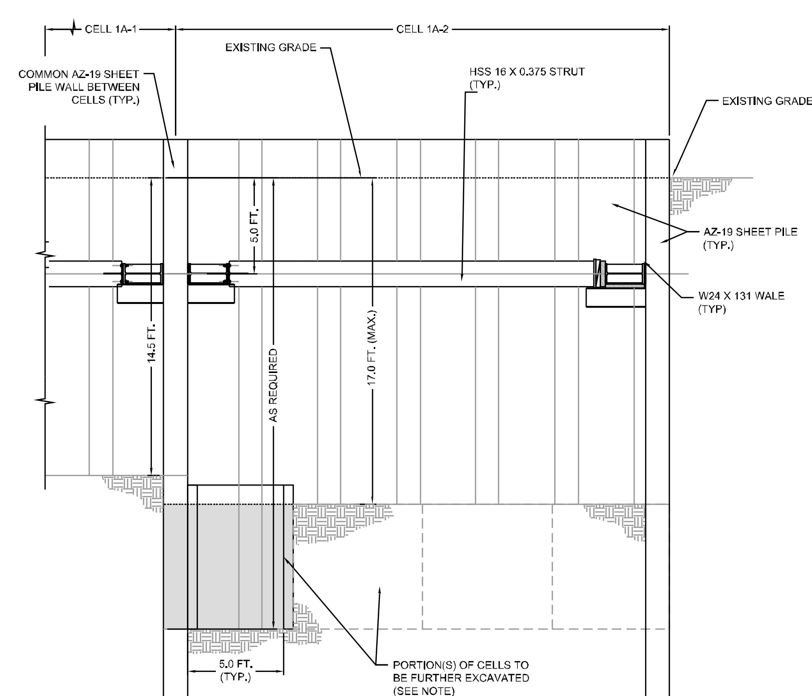
EXCAVATION AREA 1A

0' 5' 10' 20'



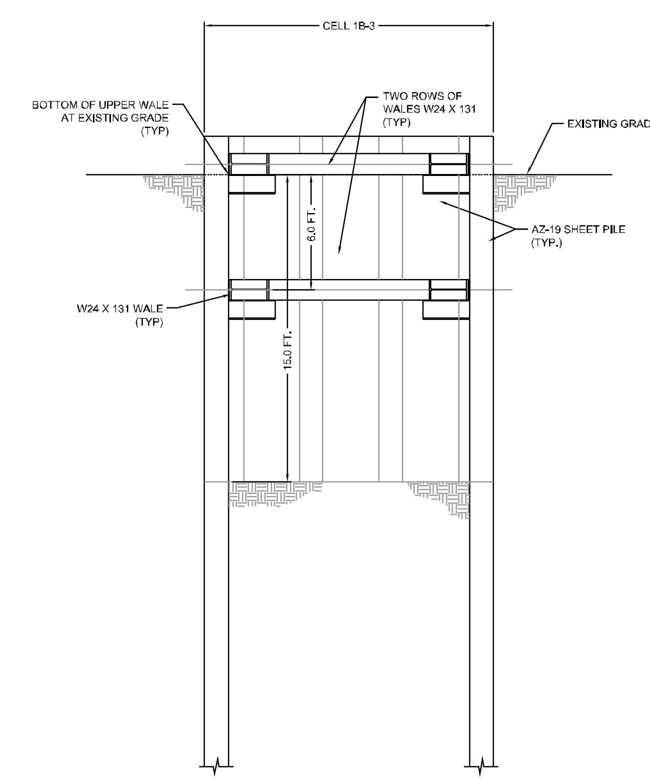
EXCAVATION AREA 1B

0' 5' 10' 20'



NOTE:
PORTION(S) OF CELLS TO BE FURTHER EXCAVATED IN SECTIONS USING AN APPROVED SHORING SYSTEM. EXCAVATED SECTIONS TO BE BACKFILLED PRIOR TO STARTING THE EXCAVATION OF NEXT ADJACENT SECTION. THE PROPOSED SHORING SYSTEM DESIGN AND SEQUENCING SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER.

SECTION X - X'
NOT TO SCALE



SECTION Y - Y'
NOT TO SCALE

CELL 1B-3 NOTES:

1) INSTALL BOTTOM OF UPPER WALER AT EXISTING GRADE. ONE FT. OF EXCAVATION MAY BE REQUIRED PRIOR TO INSTALLATION.

2) EXCAVATE CELL 1B-3 TO A MAXIMUM DEPTH OF 7.0 FT. BELOW GROUND SURFACE.

3) INSTALL LOWER WALER CENTERLINE AT 6.0 FT. BELOW GROUND SURFACE.

4) THE CONTRACTOR SHALL INCORPORATE SHEETPILE DEFLECTION WHEN CONSTRUCTING THE LOWER WALER.

5) HARDWOOD BLOCKING SHALL BE TIGHTLY INSTALLED AT EVERY SHEETPILE AND WALER GAP (TYP.).

100% DESIGN
(NOT FOR BIDDING)

Plotted By: melsterk Apr/10/2012 11:58 AM
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Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

VERIFY SCALE IF PLAN SHEET IS REDUCED — 1 INCH —

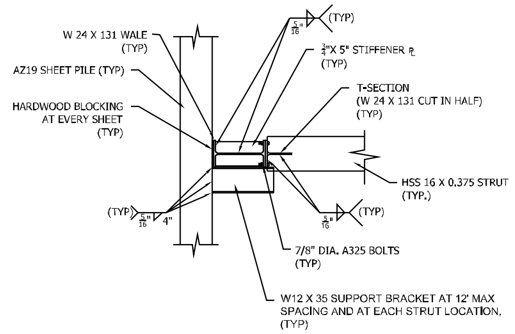
DRN BY: | DES BY: | CHK BY: | APP BY:

AECOM

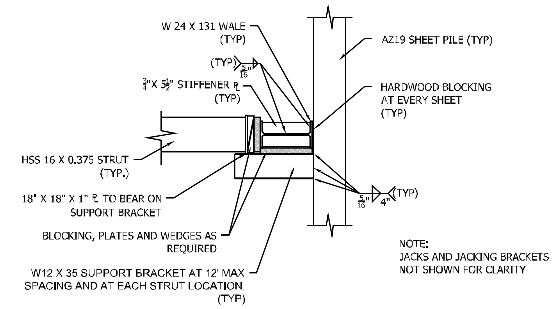
NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

EXCAVATION AREAS 1A & 1B
EXCAVATION SUPPORT SYSTEM
PLAN

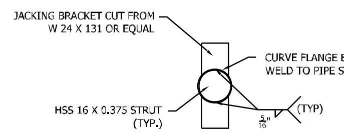
PROJECT DATE (M / Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 12 OF 21
DRAWING NO.: 12



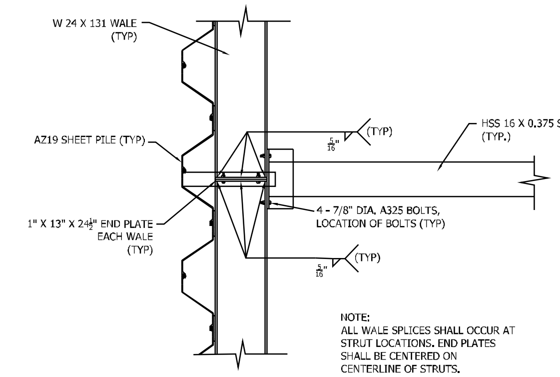
DETAIL A
STRUT CONNECTION
NOT TO SCALE



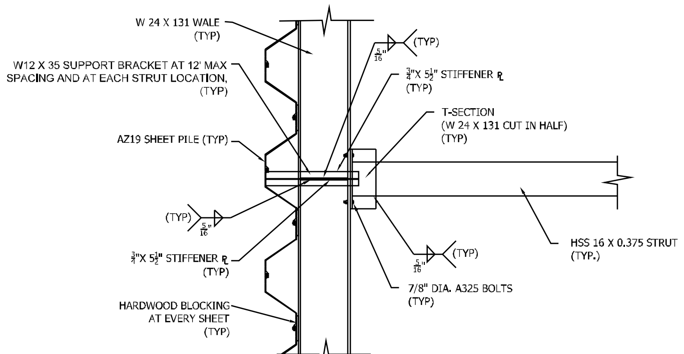
DETAIL B
STRUT CONNECTION
NOT TO SCALE



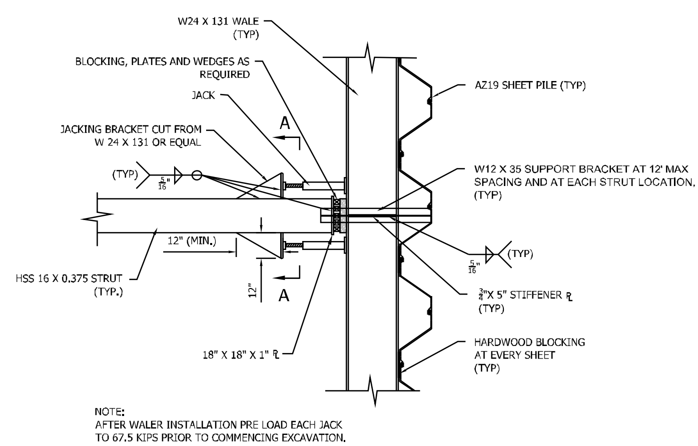
SECTION A - A
NOT TO SCALE



DETAIL G
WALER SPLICE CONNECTION
NOT TO SCALE

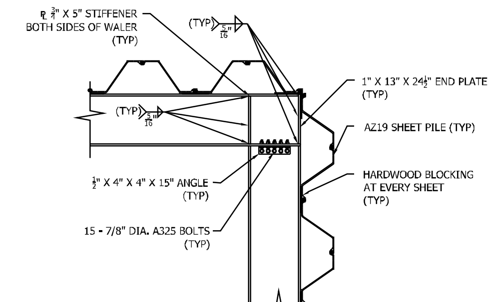


DETAIL C
STRUT CONNECTION
NOT TO SCALE

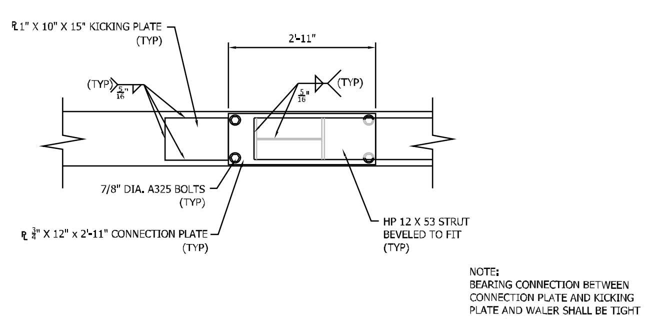


NOTE:
AFTER WALER INSTALLATION PRE LOAD EACH JACK TO 67.5 KIPS PRIOR TO COMMENCING EXCAVATION.

DETAIL D
STRUT CONNECTION
NOT TO SCALE

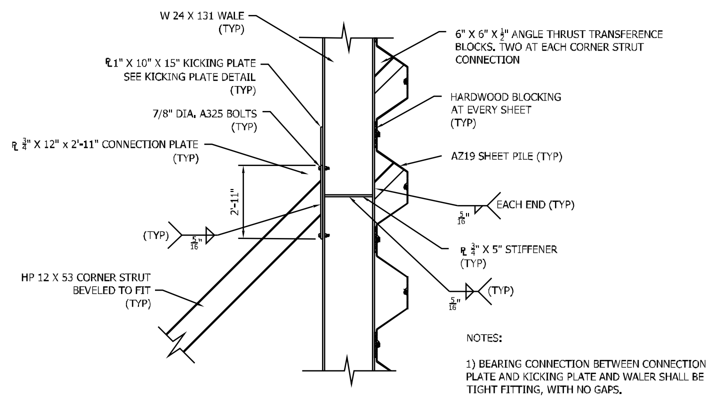


DETAIL H
WALER CORNER CONNECTION
NOT TO SCALE



NOTE:
BEARING CONNECTION BETWEEN CONNECTION PLATE AND KICKING PLATE AND WALER SHALL BE TIGHT FITTING, WITH NO GAPS.

DETAIL E
KICKING PLATE
NOT TO SCALE

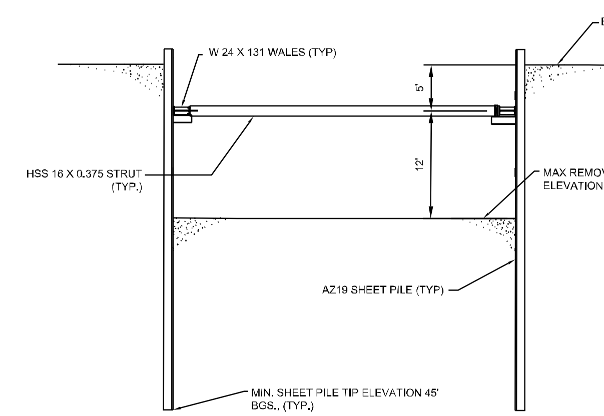


NOTES:

1) BEARING CONNECTION BETWEEN CONNECTION PLATE AND KICKING PLATE AND WALER SHALL BE TIGHT FITTING, WITH NO GAPS.

2) SUPPORT BRACKETS NOT SHOWN FOR CLARITY

DETAIL F
CORNER STRUT CONNECTION
NOT TO SCALE



CELLS 1A-1, 1A-2, 1A-3 & CELL 1B-1, 1B-2
TYPICAL EXCAVATION SUPPORT SYSTEM
SECTION
NOT TO SCALE

EXCAVATION SUPPORT SYSTEM NOTES:

1. ALL STEEL SHEET PILING SHALL BE AZ19 (OR EQUIVALENT) WITH MINIMUM YIELD STRENGTH OF 50 KSI AND A MINIMUM SECTION MODULUS OF 34.8 IN^3/FT.
2. SHEET PILE INTERLOCKS SHALL BE SEALED WITH DENEEF SWELLSEAL PRIOR TO INSTALLATION.
3. ALL WIDE FLANGE SHAPES AND STEEL PLATES SHALL BE NEW OR IN LIKE NEW CONDITION AND SHALL HAVE A MINIMUM YIELD STRENGTH OF 50KSI.
4. ALL PIPE STEEL SHALL BE NEW OR IN LIKE NEW CONDITION AND SHALL HAVE A MINIMUM YIELD STRENGTH OF 42KSI.
5. ALL WELDING SHALL BE PERFORMED WITH E70XX ELECTRODES IN ACCORDANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, 13TH EDITION.
6. ALL BOLT HOLES SHALL BE DRILLED OR PUNCHED WITH A MINIMUM OF 1.5 INCH EDGE DISTANCE. ALL BOLTING AND ERECTION SHALL BE PERFORMED IN ACCORDANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, 13TH EDITION.
7. THE EXCAVATION SHALL NOT BE PROGRESSED MORE THAN 1.0 FEET BELOW THE SPECIFIED BRACE ELEVATION UNTIL THE BRACING SYSTEM IS IN PLACE.
8. EXCAVATION DEPTH SHALL NOT EXCEED 17 FEET BELOW GROUND SURFACE WITHOUT FIRST NOTIFYING THE ENGINEER. EXCAVATION TO DEPTHS GREATER THAN 17 FEET SHALL NOT BE PERFORMED UNTIL THE CONTRACTOR'S PROCEDURE FOR EXCAVATING AND BACKFILLING HAS BEEN SUBMITTED AND APPROVED BY THE ENGINEER.
9. EXCAVATED SOILS SHALL NOT BE STOCKPILED WITHIN 20 FEET OF ANY OPEN EXCAVATION. NO EQUIPMENT SHALL BE ALLOWED WITHIN 5 FEET OF THE EDGES OF THE EXCAVATION.
10. THE WALER ELEVATION FOR EACH CELL SHALL BE LEVEL THROUGHOUT.

100% DESIGN
(NOT FOR BIDDING)

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

VERIFY SCALE IF PLAN SHEET IS REDUCED
1 INCH

DRN BY: -
DES BY: -
CHK BY: -
APP BY: -

AECOM

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

TYPICAL
EXCAVATION SUPPORT SYSTEM
DETAILS

PROJECT DATE (M / Y)
APRIL 2012
PROJECT NO.
60215637
FILENAME
60215637-ITHACA-COURT_ST.dwg
SHEET NO.
13 OF 21
DRAWING NO.
13

Plotted By: melsterk
Plot File Date Created: Apr/10/2012 11:59 AM
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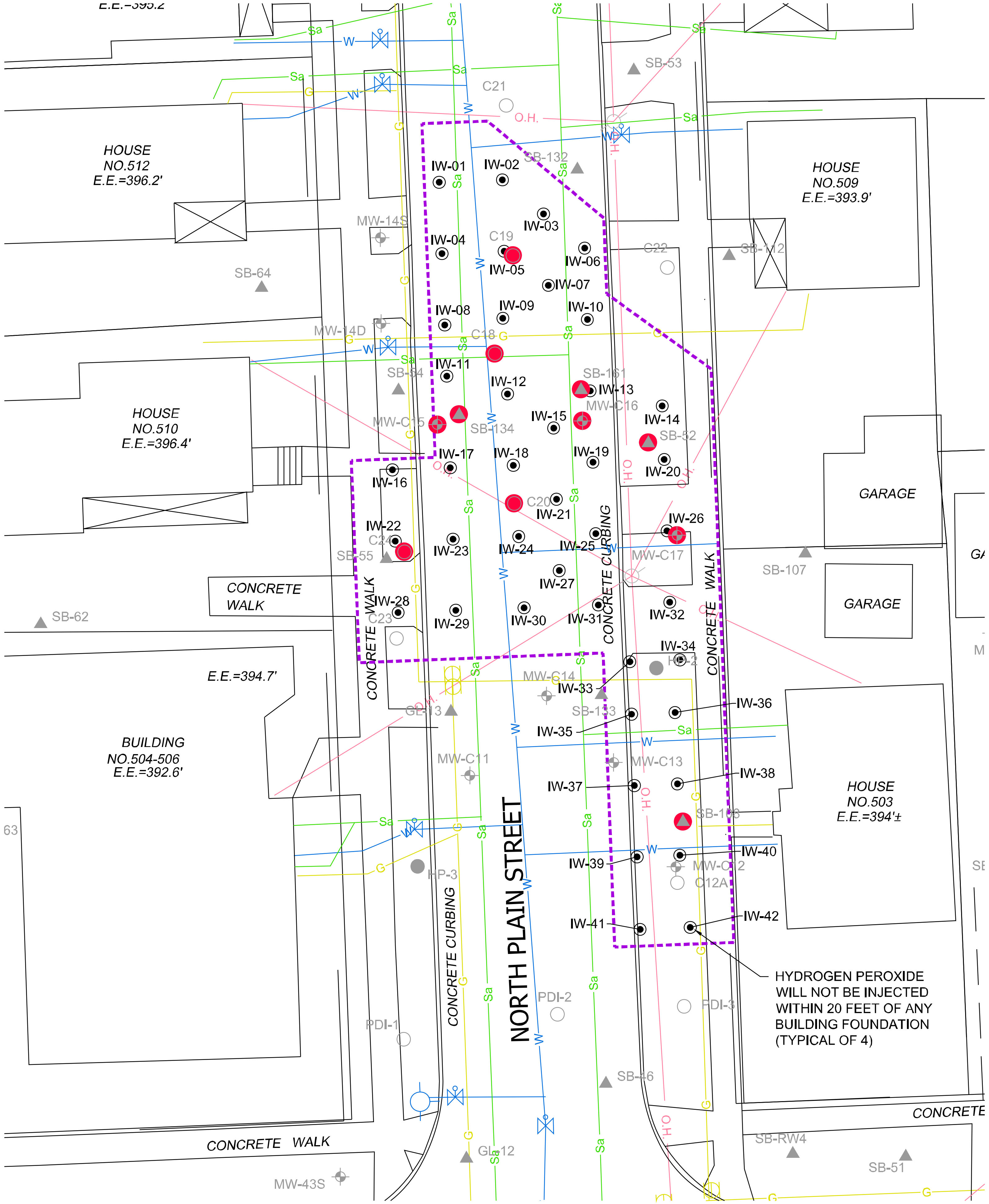
Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-



LEGEND

- EXISTING STRUCTURE
- ROADWAY
- SANITARY SEWER MAIN
- WATER MAIN
- GAS MAIN
- OVERHEAD UTILITIES
- STORM SEWER MAIN
- STORM MANHOLE
- WATER MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- WATER VALVE
- GAS VALVE
- FIRE HYDRANT
- UTILITY POLE
- LIGHT POLE
- PROPOSED AREA OF REMEDIATION
- IW-01 PROPOSED INJECTION WELL

SAMPLE

- MW-15 MONITORING WELL
- SB-18 SOIL BORING
- HP-24 HYDRO PUNCH
- PDI-21 C21 MW-C16 PREDESIGN INVESTIGATION SAMPLE (AECOM, JULY 2011)

KEY

- NAPL SATURATED SOILS AND/OR NON VISCOUS NAPL

NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR UNDERSTANDING ALL REQUIREMENTS WITHIN THE SPECIFICATIONS AND FOR PERFORMING IN SITU CHEMICAL OXIDATION IN ACCORDANCE WITH THOSE SPECIFICATIONS.
2. STORAGE AND STAGING AREA AT THE OPERABLE UNIT 1 (OU-1) PROPERTY OR A NYSEG OWNED PROPERTY IN CLOSE PROXIMITY WILL BE MADE AVAILABLE TO THE ISCO CONTRACTOR.
3. NO UNSECURED INJECTION CHEMICALS OR EQUIPMENT SHALL BE LEFT IN THE INJECTION AREA OVERNIGHT OR DURING THE UNATTENDED HOURS. EQUIPMENT USED FOR CONTINUOUS VAPOR EXTRACTION AND TREATMENT MAY REMAIN NEAR THE INJECTION AREA IF CONTAINED WITHIN A TEMPORARY FENCE. ANY SUCH EQUIPMENT SHALL BE SECURED AND LOCATED IN A MANNER THAT WILL NOT INTERFERE WITH EMERGENCY ACCESS TO ADJACENT RESIDENCES AND BUILDINGS.
4. ALL WELL LOCATIONS SHALL BE HAND-CLEARED TO A DEPTH OF AT LEAST THE DEPTH OF THE BOTTOM OF THE DEEPEST NEARBY UTILITY PIPE WITH A DIAMETER LARGER THAN THE DRILLER'S SUBSURFACE EQUIPMENT.
5. INJECTION WELLS SHALL BE INSTALLED NO CLOSER THAN FIVE (5) FEET FROM ANY OTHER WELL.
6. INJECTION WELLS SHALL BE OFF-SET FROM MARKED OUT UTILITIES BY A MINIMUM OF FOUR (4) FEET, OR TO THE MAXIMUM EXTENT PRACTICABLE.
7. FOR INJECTION WELL IW-43 LOCATION SEE DRAWING 15 OF 21, INJECTION WELL IW-43 LOCATION PLAN AND TYPICAL ISCO DETAILS.
8. FOR WELL INJECTION SCHEDULE TABLE AND INJECTION WELL CONSTRUCTION DETAILS SEE DRAWING 15 OF 21, INJECTION WELL IW-43 LOCATION PLAN AND TYPICAL ISCO DETAILS.
9. CONTRACTOR SHALL INSTALL AND OPERATE AN ACTIVE VAPOR CONTROL SYSTEM DURING ALL ISCO INJECTIONS. CONTRACTOR SHALL MONITOR VAPOR CONTROL SYSTEM TO DEMONSTRATE SATISFACTORY VAPOR CONTROL AND MEET ALL REQUIREMENTS OF THE SPECIFICATIONS.
10. CONTRACTOR SHALL INSTALL ADDITIONAL MONITORING POINTS AS NECESSARY AND UTILIZE EXISTING AND ADDITIONAL MONITORING POINTS TO MONITOR PERFORMANCE OF ISCO REMEDIATION.
11. MAINTENANCE AND UPKEEP OF THE INJECTION WELLS DURING ISCO WORK IN AREA 1C WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. AT THE COMPLETION OF ISCO REMEDIATION ACTIVITIES CONTRACTOR SHALL DECOMMISSION INJECTION WELLS AND ASSOCIATED VAPOR CONTROL WELLS/POINTS IN ACCORDANCE WITH NYSDEC GUIDANCE CP-43 "GROUNDWATER MONITORING WELL DECOMMISSIONING POLICY" (NYSDEC, 2009). FUTURE PERMANENT STREET RESTORATION WORK IN THIS AREA WILL BE PERFORMED BY OTHERS.
12. TEMPORARY LANE CLOSURES ARE ANTICIPATED FOR THE ISCO WORK WITHIN REMEDIATION AREA 1C. THE CONTRACTOR SHALL INSTALL FLAGGED LANE CLOSURES AS DIRECTED BY THE ENGINEER. FOR ADDITIONAL INFORMATION SEE PROTECTION OF THE TRAVELING PUBLIC SECTION ON DRAWING 2 OF 21, GENERAL NOTES.

0' 5' 10' 20'

100% DESIGN
(NOT FOR BIDDING)

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

REMEDIATION AREA 1C
CHEMICAL OXIDATION INJECTION PLAN

PROJECT DATE (M / Y)	APRIL 2012
PROJECT NO.	60215637
FILENAME	60215637-ITHACA-COURT_ST.dwg
SHEET NO.	14 OF 21
DRAWING NO.	14

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

DRN BY: | DES BY: | CHK BY: | APP BY: |

VERIFY SCALE IF PLAN SHEET IS REDUCED
1 INCH

Plotted By: melsterk
Plot File Date Created: Apr/10/2012 12:02 PM
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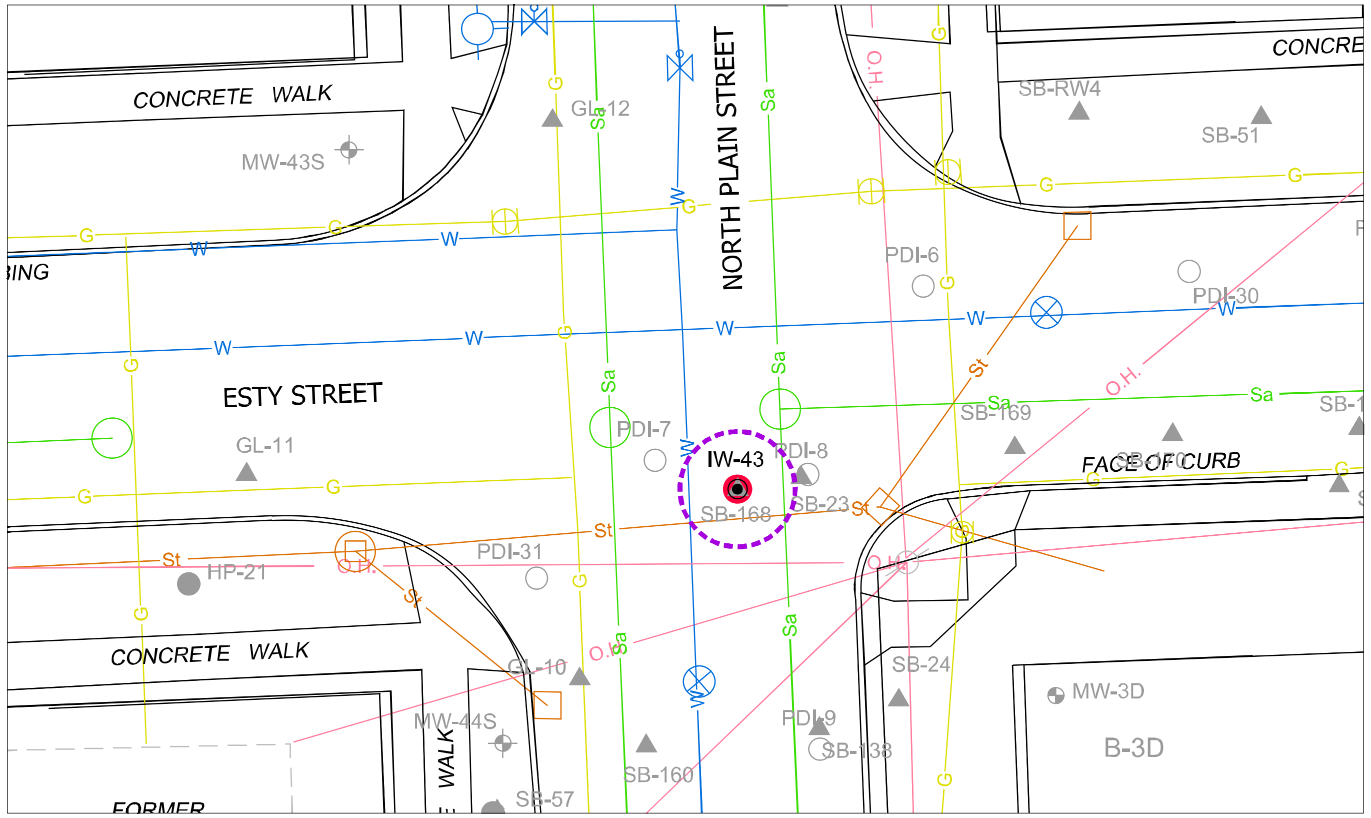

INJECTION WELL AC-50
LOCATION PLAN

0' 5' 10' 20'

LEGEND

	EXISTING STRUCTURE
	ROADWAY
	SANITARY SEWER MAIN
	WATER MAIN
	GAS MAIN
	OVERHEAD UTILITIES
	STORM SEWER MAIN
	STORM MANHOLE
	WATER MANHOLE
	SANITARY SEWER MANHOLE
	CATCH BASIN
	WATER VALVE
	GAS VALVE
	FIRE HYDRANT
	UTILITY POLE
	LIGHT POLE
	PROPOSED AREA OF REMEDIATION
IW-01	PROPOSED INJECTION WELL

SAMPLE

MW-1S	MONITORING WELL
SB-18	SOIL BORING
HP-24	HYDRO PUNCH
PDI-21 C21 MW-C16	PREDESIGN INVESTIGATION SAMPLE (AECOM, JULY 2011)

KEY

NAPL SATURATED SOILS AND/OR NON VISCOUS NAPL

NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR UNDERSTANDING ALL REQUIREMENTS WITHIN THE SPECIFICATIONS AND FOR PERFORMING IN SITU CHEMICAL OXIDATION IN ACCORDANCE WITH THOSE SPECIFICATIONS.
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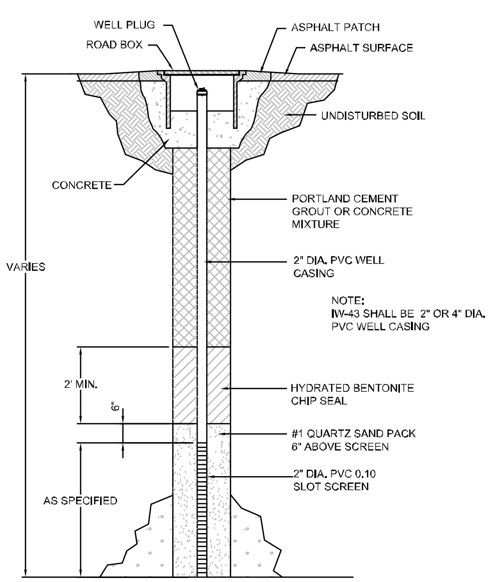
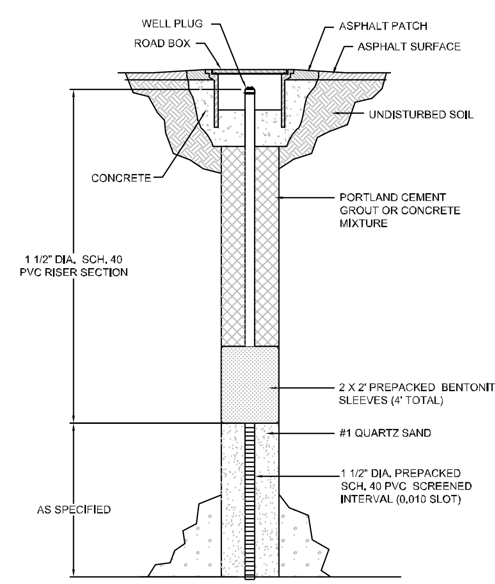
3. NO UNSECURED INJECTION CHEMICALS OR EQUIPMENT SHALL BE LEFT IN THE INJECTION AREA OVERNIGHT OR DURING THE UNATTENDED HOURS. EQUIPMENT USED FOR CONTINUOUS VAPOR EXTRACTION AND TREATMENT MAY REMAIN NEAR THE INJECTION AREA IF CONTAINED WITHIN A TEMPORARY FENCE. ANY SUCH EQUIPMENT SHALL BE SECURED AND LOCATED IN A MANNER THAT WILL NOT INTERFERE WITH EMERGENCY ACCESS TO ADJACENT RESIDENCES AND BUILDINGS.
4. ALL WELL LOCATIONS SHALL BE HAND-CLEARED TO A DEPTH OF AT LEAST THE DEPTH OF THE BOTTOM OF THE DEEPEST NEARBY UTILITY PIPE WITH A DIAMETER LARGER THAN THE DRILLER'S SUBSURFACE EQUIPMENT.
5. INJECTION WELLS SHALL BE INSTALLED NO CLOSER THAN FIVE (5) FEET FROM ANY OTHER WELL.
6. INJECTION WELLS SHALL BE OFF-SET FROM MARKED OUT UTILITIES BY A MINIMUM OF FOUR (4) FEET, OR TO THE MAXIMUM EXTENT PRACTICABLE.
7. TEMPORARY LANE CLOSURES ARE ANTICIPATED FOR THE ISCO WORK WITHIN REMEDIATION AREA 1C. THE CONTRACTOR SHALL INSTALL FLAGGED LANE CLOSURES AS DIRECTED BY THE ENGINEER. FOR ADDITIONAL INFORMATION SEE PROTECTION OF THE TRAVELING PUBLIC SECTION ON DRAWING 2 OF 21, GENERAL NOTES.

INJECTION WELL
SCHEDULE TABLE

DESC	NORTHING	EASTING	TOP OF SCREEN (ft bgs)	BOTTOM OF SCREEN (ft bgs)
IW-1	890414.32	841567.60	9	14
IW-2	890414.73	841578.22	9	14
IW-3	890409.00	841585.13	9	14
IW-4	890402.33	841568.06	9	14
IW-5	890402.74	841578.51	9	14
IW-6	890403.26	841592.04	9	14
IW-7	890397.02	841585.95	9	14
IW-8	890390.34	841568.52	10	16
IW-9	890391.49	841578.29	10	16
IW-10	890391.27	841592.50	10	16
IW-11	890381.75	841568.87	10	16
IW-12	890378.74	841579.08	10	16
IW-13	890379.28	841592.97	10	16
IW-14	890376.74	841605.07	11	17
IW-15	890373.03	841586.82	10	16
IW-16	890365.99	841559.74	10	16
IW-17	890366.36	841569.45	10	16
IW-18	890366.77	841580.04	10	16
IW-19	890367.28	841593.43	10	16
IW-20	890367.75	841605.42	11	17
IW-21	890361.04	841587.30	10	16
IW-22	890354.00	841560.21	10	16
IW-23	890354.37	841569.91	10	16
IW-24	890354.79	841580.95	10	16
IW-25	890355.29	841593.89	10	15
IW-26	890355.76	841605.88	10	15
IW-27	890349.05	841587.77	10	16
IW-28	890342.00	841560.68	10	16
IW-29	890342.38	841570.37	10	16
IW-30	890342.82	841581.86	10	16
IW-31	890343.30	841594.36	10	15
IW-32	890343.77	841606.35	10	15
IW-33	890333.73	841599.63	10	15
IW-34	890334.06	841608.05	10	15
IW-35	890324.91	841599.93	10	15
IW-36	890325.20	841607.24	10	15
IW-37	890312.92	841600.39	10	15
IW-38	890313.20	841607.64	10	15
IW-39	890300.93	841600.85	10	15
IW-40	890301.21	841608.04	10	15
IW-41	890288.76	841601.36	10	15
IW-42	890289.09	841609.79	10	15
IW-43	890211.88	841591.46	10	15



PVC INJECTION WELL
CONSTRUCTION DETAIL
NOT TO SCALE



PRE-PACKED PVC INJECTION
WELL CONSTRUCTION DETAIL
NOT TO SCALE

100% DESIGN
(NOT FOR BIDDING)

AECOM

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

INJECTION WELL IW-43 LOCATION PLAN
AND TYPICAL ISCO DETAILS

PROJECT DATE (M / Y)	APRIL 2012
PROJECT NO.	60215637
FILENAME	60215637-ITHACA-COURT_ST.dwg
SHEET NO.	15 OF 21
DRAWING NO.	15

REV | DESCRIPTION | DRN | CHK | DATE (M/D/Y)

DRN BY: | DES BY: | CHK BY: | APP BY:

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Plotted By: melsterk Apr/10/2012 12:07 PM
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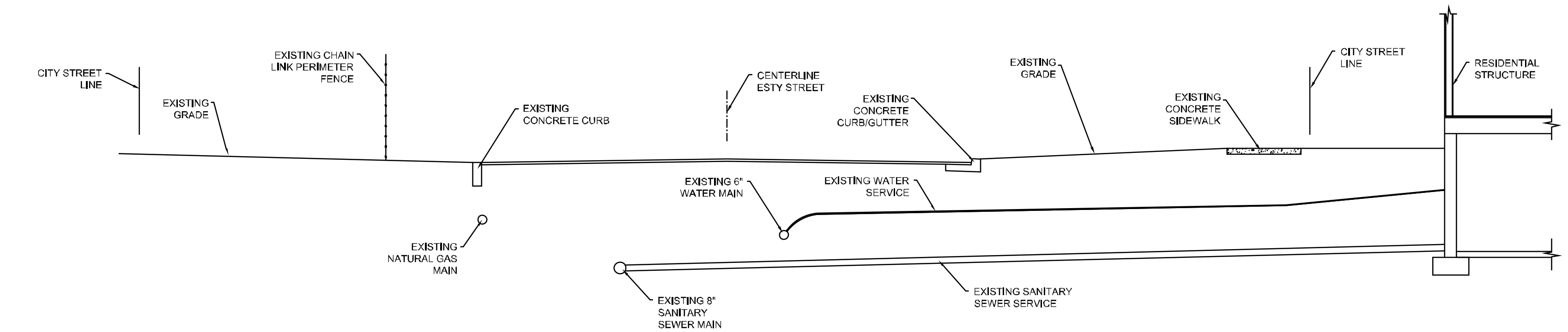
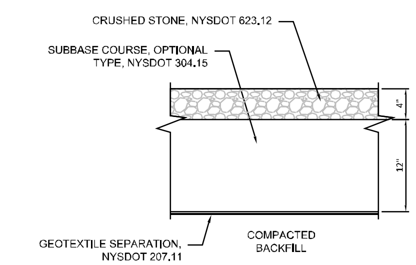
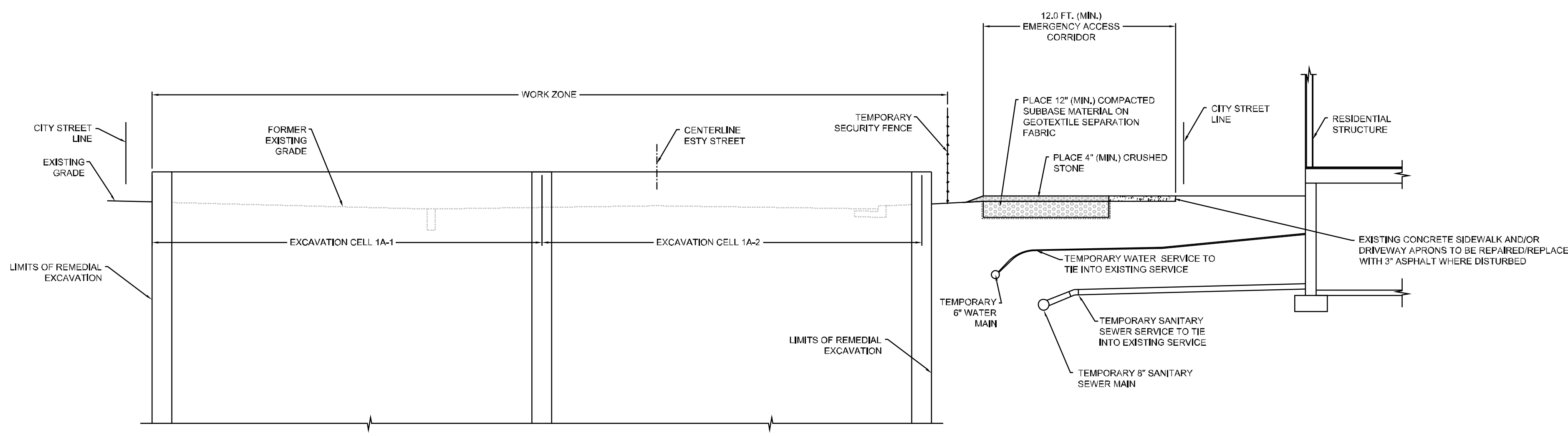


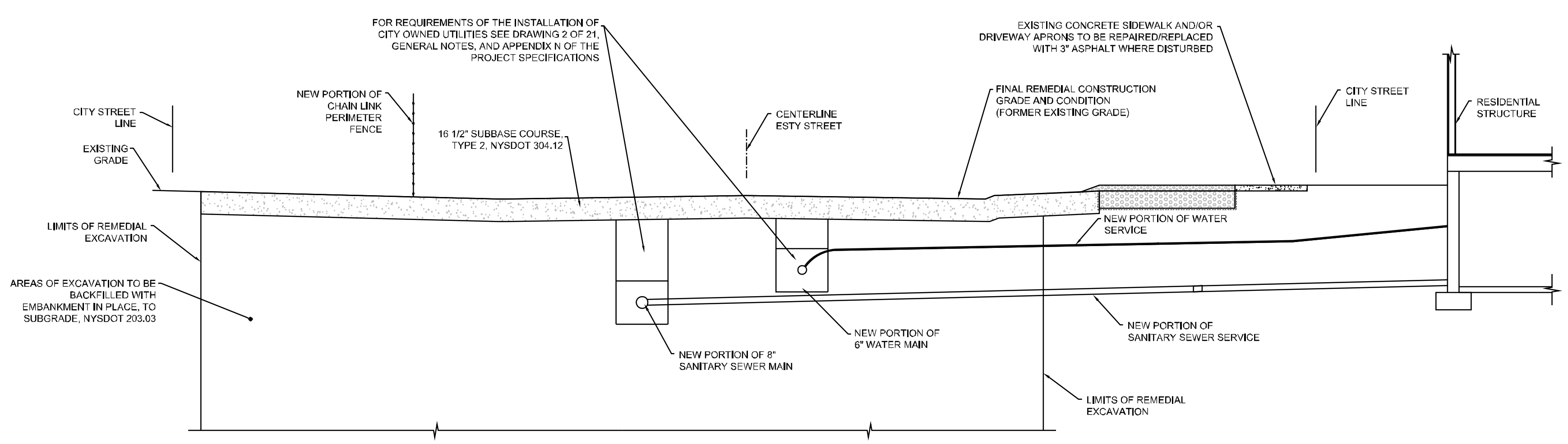
TYPICAL
EXISTING ROADWAY SECTION
NOT TO SCALE



EMERGENCY ACCESS CORRIDOR
NOT TO SCALE



TYPICAL
ROADWAY SECTION DURING
REMEDIAL CONSTRUCTION
NOT TO SCALE



TYPICAL
FINAL REMEDIAL CONSTRUCTION GRADE AND
CONDITION SECTION
NOT TO SCALE

NOTES:
1) TYPICAL ROADWAY PROFILES FOR ESTY STREET SHOWN. NORTH PLAIN STREET SIMILAR.

2) RELOCATION OF THE EXISTING NATURAL GAS MAINS AND GAS SERVICES WILL BE PERFORMED BY NYSEG PRIOR TO START OF THE PROJECT

100% DESIGN
(NOT FOR BIDDING)

AECOM

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

TYPICAL ROADWAY SECTIONS

PROJECT DATE (M / Y)	APRIL 2012
PROJECT NO.	60215637
FILENAME	60215637-ITHACA-COURT_ST.dwg
SHEET NO.	16 OF 21
DRAWING NO.	16

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

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|—1 INCH—| VERIFY SCALE IF PLAN SHEET IS REDUCED

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Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-

NOTES:

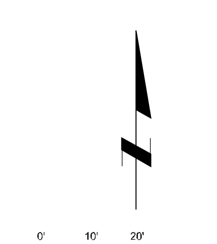
1) IF BACKFILL MATERIAL IS USED IN THE RIGHT-OF-WAY PORTION OF AREAS 1A AND 1B WHICH DOES NOT MEET RESIDENTIAL SOIL CLEANUP OBJECTIVES, A SOIL COVER WILL BE PROVIDED OVER ALL VEGETATED AREAS TO PREVENT EXPOSURE TO UNDERLYING SOILS. THE TWO FOOT THICK COVER WILL CONSIST OF CLEAN SOIL UNDERLAIN BY A DEMARCATION LAYER TO DELINEATE THE COVER SOIL FROM THE SUBSURFACE SOIL. THE TOP SIX INCHES OF SOIL MUST BE SUFFICIENT QUALITY TO SUPPORT VEGETATION. CLEAN SOIL IS SOIL THAT IS TESTED AND MEETS THE DIVISION OF ENVIRONMENTAL REMEDIATION'S CRITERIA FOR BACKFILL. NON-VEGETATED AREAS (BUILDINGS, ROADWAY, PARKING LOTS, ETC.) SHALL BE COVERED BY EITHER A PAVING SYSTEM OR CONCRETE AT LEAST 6 INCHES THICK.

2) BACKFILL ON THE RESIDENTIAL PROPERTY MUST MEET RESIDENTIAL SOIL CLEANUP OBJECTIVES.

3) REUSE SOIL SHALL BE PLACED IN THE BOTTOM OF THE EXCAVATION FOLLOWED BY IMPORTED BACKFILL MATERIAL.

LEGEND

- CITY STREET MONUMENT
- 393.5 CONTOUR (0.5 FT. INTERVAL)
- EXISTING STRUCTURE
- ROADWAY
- REMEDIAL EXCAVATION AREAS
- APPROXIMATE LIMITS OF DISTURBANCE WITHIN THE CITY R.O.W. FROM SITE ACTIVITIES
- VEGETATED AREA BACKFILL (SEE NOTE 1)
- NON-VEGETATED AREA BACKFILL (SEE NOTE 1
- RESIDENTIAL AREA BACKFILL (SEE NOTE 2)



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AECOM

NYSEG - REMEDIAL DESIGN FOR
FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

SITE SOIL MANAGEMENT PLAN
(EXCAVATION LIMITS)

PROJECT DATE (M / Y)	APRIL 2012
PROJECT NO.	60215637
FILENAME	60215637-ITHACA-COURT_ST.dwg
SHEET NO.	17 OF 21
DRAWING NO.	17

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

DRN BY: - DES BY: - CHK BY: - APP BY: -

1 INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

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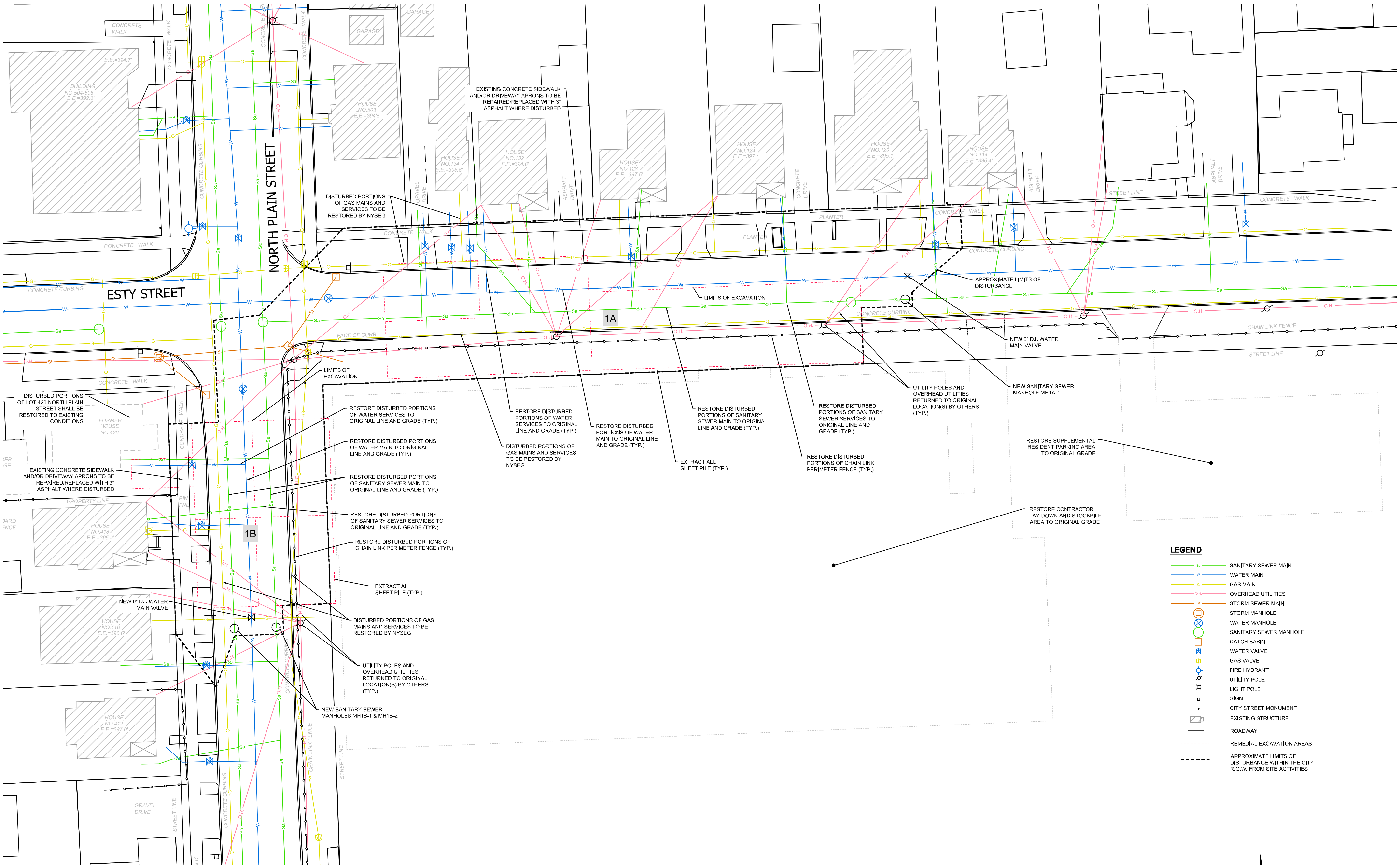

NOTE:

1) ALL DISTURBED AREAS AND UTILITIES SHALL BE RESTORED TO THE FINAL REMEDIAL CONSTRUCTION GRADE AND CONDITION, AS SHOWN ON DRAWING 16 OF 21, TYPICAL ROADWAY SECTIONS.

2) ADDITIONAL INFORMATION ON SITE RESTORATION AND UTILITY INSTALLATION CAN BE FOUND ON DRAWING 2 OF 21, GENERAL NOTES AND IN APPENDIX M OF THE PROJECT SPECIFICATIONS.

3) NYSEG OWNED SHEET PILE SHALL BE CLEANED, DELIVERED AND NEATLY STACKED AT LOCATION TO BE DETERMINED.

4) SHEET PILES PROVIDED BY CONTRACTOR SHALL REMAIN PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE UPON COMPLETION OF THE WORK.

100% DESIGN
(NOT FOR BIDDING)

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

1 INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

DRN BY: — DES BY: — CHK BY: — APP BY: —

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2 ITHACA, NEW YORK

SITE RESTORATION PLAN

PROJECT DATE (M / Y): APRIL 2012
PROJECT NO.: 60215637
FILENAME: 60215637-ITHACA-COURT_ST.dwg
SHEET NO.: 18 OF 21
DRAWING NO.: 18

Plotted By: melsterk
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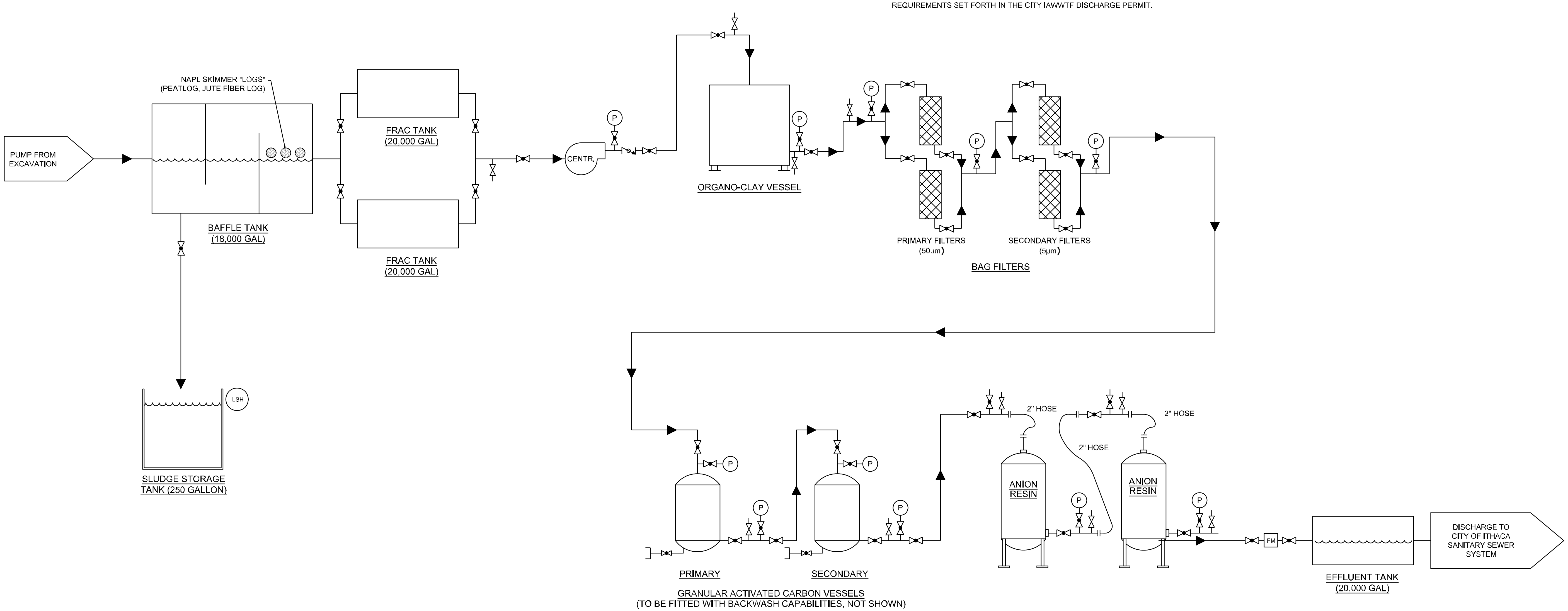
Filename: L:\WORK\60215637 NYSEG ITHACA, NY COURT ST. MGP OU-2 REMEDIAL DESIGN\7.0 DELIVERABLES\7.2 CADD\7.2.1 BASE MAP PREPARATION\60215637-

NOTES:

1. THE TEMPORARY WATER TREATMENT SYSTEM SHOWN ON THIS DRAWING IS COMPREHENSIVE AND MAY NOT NECESSARILY REPRESENT THE FINAL WATER TREATMENT SYSTEM THAT WILL BE IMPLEMENTED BY THE CONTRACTOR. THE CONTRACTOR MAY PROPOSE AN ALTERNATE WATER TREATMENT SYSTEM DESIGN, THAT AT A MINIMUM, SHALL MEET THE PERFORMANCE STANDARDS AND DESIGN, CONSTRUCTION, AND OPERATIONAL INTENT AS INDICATED ON THIS DRAWING.
2. THE TEMPORARY WATER TREATMENT SYSTEM SHALL BE CAPABLE OF PROCESSING A FLOW RATE OF AT LEAST 50 GALLONS PER MINUTE.
3. THE CONTRACTOR SHALL PROVIDE SECONDARY CONTAINMENT FOR ALL COMPONENTS AND PIPING OF THE WATER TREATMENT SYSTEM.
4. HIGH LEVEL ALARMS SHALL BE PROVIDED ON ALL TANKS AND SHALL MINIMALLY ACTIVATE VISUAL AND AUDIO ALERTS TO SYSTEM OPERATOR.
5. ALL PIPING SHOWN SHALL BE HOSES WITH QUICK DISCONNECT FITTINGS.
6. BACKWASH PIPING NOT SHOWN. BACKWASH WATER SHALL BE FILTERED PRIOR TO DISCHARGE.
7. THE CONTRACTOR SHALL OBTAIN FINAL CITY DISCHARGE PERMIT AND PAY DISCHARGE PERMIT FEES.
8. IF NECESSARY, ADDITIONAL TREATMENT COMPONENTS WILL BE PROVIDED BY THE CONTRACTOR TO ACHIEVE THE CITY SANITARY SEWER EFFLUENT LIMITS AND REQUIREMENTS SET FORTH IN THE CITY IAWWTF DISCHARGE PERMIT.

LEGEND:

- PRIMARY PROCESS PIPING
- SECONDARY PROCESS PIPING
- SAMPLE TAP
- P PRESSURE GAUGE
- BALL VALVE
- CHECK VALVE
- FM FLOW METER
- LSH LEVEL SWITCH HIGH
- LSHH LEVEL SWITCH HIGH-HIGH
- LSL LEVEL SWITCH LOW
- CENTR. CENTRIFUGAL PUMP



100% DESIGN
(NOT FOR BIDDING)

AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2 ITHACA, NEW YORK

GROUNDWATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM

PROJECT DATE (M / Y)	APRIL 2012
PROJECT NO.	60215637
FILENAME	60215637-ITHACA-COURT_ST.dwg
SHEET NO.	19 OF 21
DRAWING NO.	19

DRN BY: — DES BY: — CHK BY: — APP BY: —

REV | DESCRIPTION | DRN | CHK | DATE (M/D/Y)

1 INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

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Plot File Date Created: Apr/10/2012 12:21 PM
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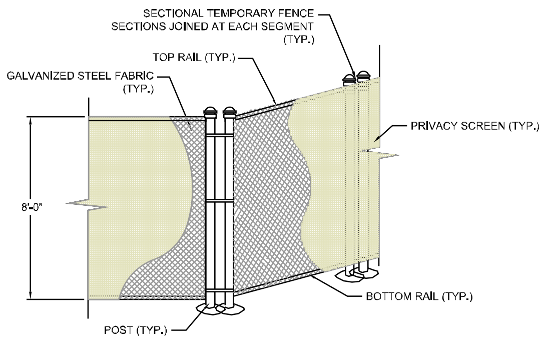
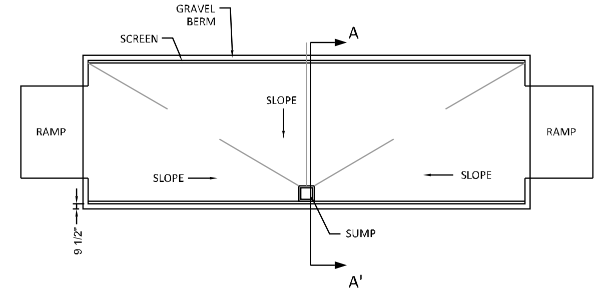


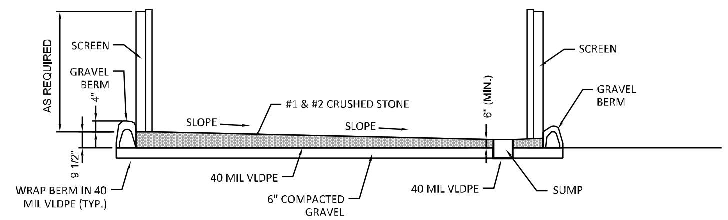
DETAIL

TEMPORARY SECURITY FENCE

NOT TO SCALE



PLAN

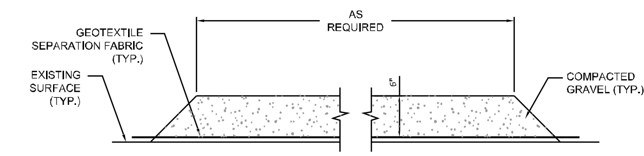


NOTE:
A SUBMERSIBLE PUMP WILL BE PLACED IN SUMP AS REQUIRED. THE PUMP WILL TRANSPORT WASTEWATER VIA HOSE TO DISPOSAL CONTAINERS.

SECTION A - A'

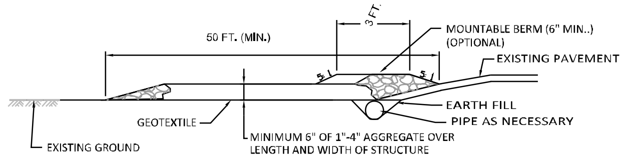
EQUIPMENT CONTAMINATION REDUCTION PAD

NOT TO SCALE

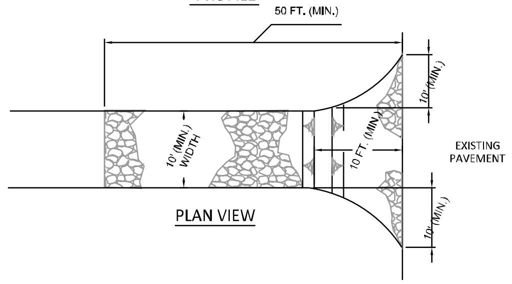


TEMPORARY HAUL ROUTE

NOT TO SCALE



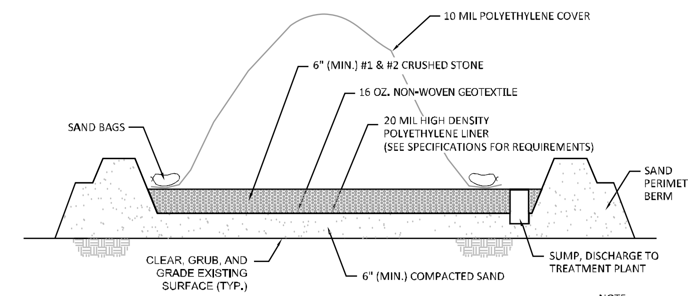
PROFILE



PLAN VIEW

STABILIZED CONSTRUCTION ENTRANCE

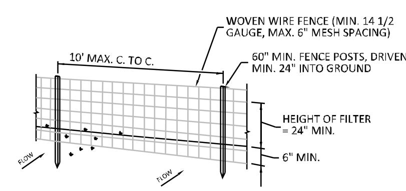
NOT TO SCALE



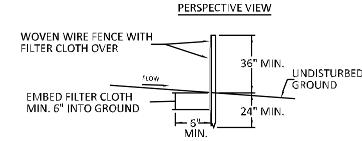
NOTE:
A SUBMERSIBLE PUMP WILL BE PLACED IN SUMP AS REQUIRED. THE PUMP WILL TRANSPORT WASTEWATER VIA HOSE OR PORTABLE CONTAINER TO PROJECT WATER TREATMENT SYSTEM.

STOCKPILE MANAGEMENT AREA AND CONSTRUCTION WATER TREATMENT SYSTEM PAD DETAIL

NOT TO SCALE



PERSPECTIVE VIEW



SECTION

SILT FENCE DETAILS

NOT TO SCALE

STABILIZED CONSTRUCTION ENTRANCE NOTES:

1) STONE SIZE - USE 1 - 4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE

2) LENGTH - NOT LESS THAN 50 FT.

3) THICKNESS - NOT LESS THAN 6 INCHES.

4) WIDTH - 12 FT. MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS, 24 FOOT MINIMUM IF SINGLE ENTRANCE TO SITE.

5) GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.

6) SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPE WILL BE PERMITTED.

7) MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHTS-OF-WAY OR ADJACENT PRIVATE, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO THESE AREAS SHALL BE REMOVED IMMEDIATELY.

8) WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

9) PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.

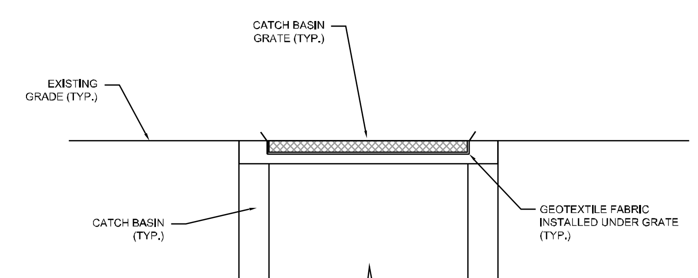
SILT FENCE NOTES:

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS:
TYPE OR 2" HARDWOOD.

FENCE:
WOVEN WIRE, 14 1/2 GA.
6" MAX. MESH OPENING.

FILTER CLOTH:
FILTER X. MIRAFI 100X.
STABILINKA T140N OR
APPROVED EQUAL.



SECTION

SEDIMENT CONTROL MEASURES AT EXISTING CATCH BASINS

NOT TO SCALE

100% DESIGN
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VERIFY SCALE IF PLAN SHEET IS REDUCED — 1INCH —

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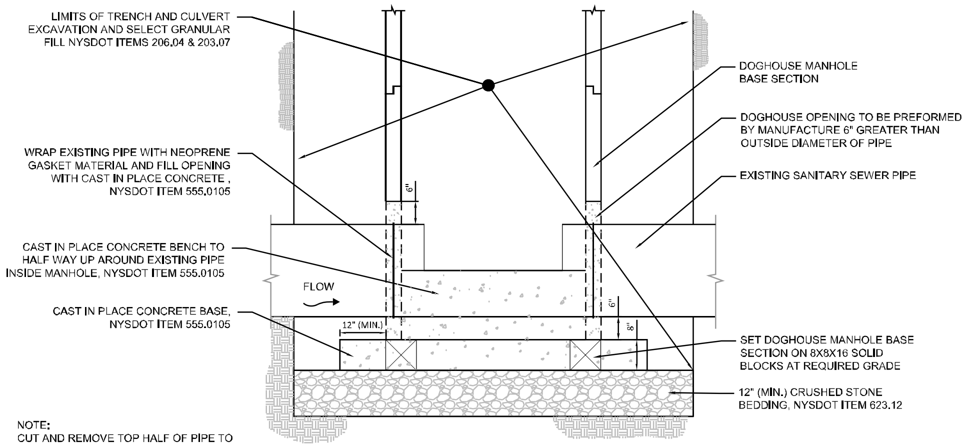
NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2
ITHACA, NEW YORK

TYPICAL DETAILS
1 OF 2

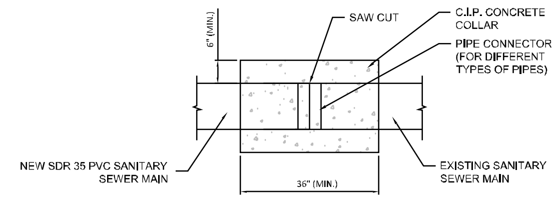
PROJECT DATE (M / Y) APRIL 2012
PROJECT NO. 60215637
FILENAME 60215637-ITHACA-COURT_ST.dwg
SHEET NO. 20 OF 21
DRAWING NO. 20



NOTE:
CUT AND REMOVE TOP HALF OF PIPE TO WITHIN 6" OF MANHOLE WALLS AFTER BENCH HAS BEEN INSTALLED.

INSTALLATION OF DOGHOUSE MANHOLE SECTION

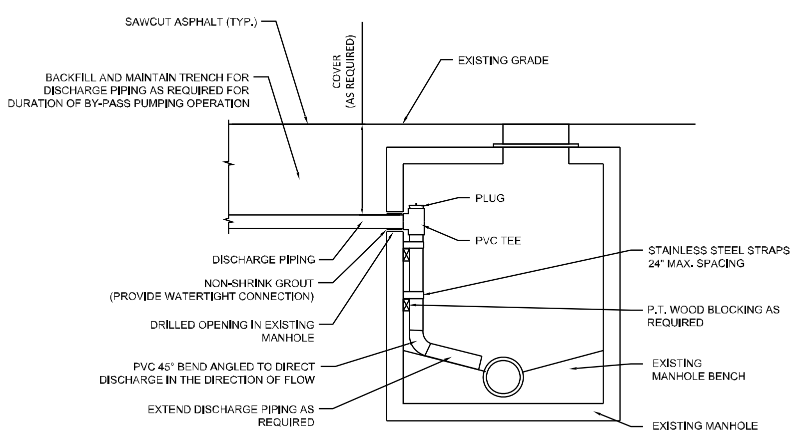
NOT TO SCALE



SANITARY SEWER CONNECTION DETAIL

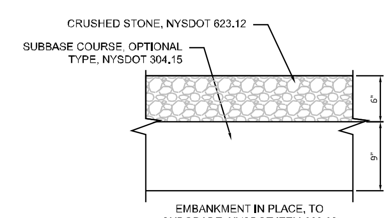
NOT TO SCALE

NOTE:
EXISTING 24" TRANSITE, 16" AND 8" TILE SANITARY SEWER MAINS TO BE REPLACED FROM THEIR NEW MANHOLE STRUCTURES TO THE LOCATION SHOWN ON THE PLANS. EACH PIPE IS TO BE CUT AND TEMPORARILY PLUGGED AT THESE LOCATIONS SHOWN. NEW 8", 16" AND 24" SDR35 PVC SANITARY SEWER PIPES TO BE INSTALLED AT THE SAME GRADE AND ALIGNMENT AS EXISTING BY CONTRACTOR. COUPLING OF THE DIFFERENT PIPE TYPES SHALL BE MADE WITH THE APPROPRIATE DEVICE AND ENCASED IN A CONCRETE COLLAR. TYPE OF COUPLING DEVICE USED TO BE DETERMINED IN FIELD UPON INSPECTION OF EXISTING PIPE. CONTRACTOR SHALL SUBMIT, FOR APPROVAL, THE TYPE OF COUPLER USED AT EACH CONNECTION.



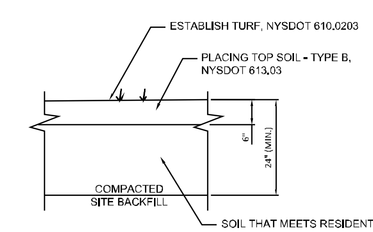
TYPICAL FORCEMAIN CONNECTION TO EXISTING MANHOLE

NOT TO SCALE



STONE DRIVEWAY / PARKING LOT

NOT TO SCALE



TOP SOIL

NOT TO SCALE

NOTE:
TO BE USED FOR RESTORATION OF RESIDENTIAL PROPERTIES

100% DESIGN
(NOT FOR BIDDING)

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1 INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

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AECOM

NYSEG - REMEDIAL DESIGN FOR FORMER COURT STREET MGP SITE - OU2 ITHACA, NEW YORK

TYPICAL DETAILS 2 OF 2

PROJECT DATE (M / Y) APRIL 2012

PROJECT NO. 60215637

FILENAME 60215637-ITHACA-COURT_ST.dwg

SHEET NO. 21 OF 21

DRAWING NO. 21

Plotted By: melsterk
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Attachment 2

Technical Specifications

SECTION 02260
EXCAVATION SUPPORT

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Hydraulic press installed and, where applicable, driven watertight sheet piling with sealed interlocks

2. Internal bracing of steel sheet piled excavation areas

3. Additional shoring system for excavations extending to depths greater than 17.0 feet below ground elevation.

4. Monitoring of excavation shoring support systems and adjacent structures for vibration and settlement.

5. Removing sheet pile wall and bracing

1.02 WORK DESCRIPTION AND GENERAL REQUIREMENTS

A. Provide all labor, equipment, supplies, and materials to install, operate, maintain, brace, and remove temporary sheet pile walls as shown on the Drawings and as required herein in order to excavate MGP impacted soils for offsite disposal.

B. OU-2: The proposed temporary sheet piles shall be installed and removed by a method of hydraulic pressing. The contractor shall provide sheets that can be installed through a process of pressing. NYSEG has AZ-48 sheet piles (54-foot lengths) available for use if the contractor provides a means and method of pressing the AZ-48 as per the Drawings.

C. OU-1 (Markles Flats): The proposed temporary sheet piles shall be installed and removed using either: a hydraulic press or; a variable moment vibratory hammer. The intent is to reuse the OU-2 sheetpiles for OU-1 (Markles Flats). The Contractor is advised, however, that NYSEG owned AZ-48 sheet piles are available for use in OU-2 at the Contractor's option.

D. The Contractor shall submit, for approval by the Engineer, as part of their Technical Execution Plan (TEP) a shoring system design to excavate and backfill in sections that extend below 17.0 feet below ground elevation. For excavations greater than 17.0 feet below ground elevation the contractor shall notify the Engineer 24 hours prior to

SECTION 02260
EXCAVATION SUPPORT

conducting these excavations. The Contractor is responsible for the materials, sequencing and methods of construction subject to this approved method of further excavation.

E. The Contractor is responsible for the materials, sequencing and methods of construction subject to the Drawings and Specifications.

F. Coordinate bracing installation with excavation and backfill staging.

1.03 SUBMITTALS

A. Shop Drawings:

1. Structural steel shop drawings.
2. Sheet pile interlocks sealant.
3. Pipe / Utilities penetration sleeves, if necessary
4. Additional Shoring System design

B. Miscellaneous Submittals:

1. Qualifications: Sheet pile contractor shall have a minimum of 10 years experience in sheet pile and foundation pile construction, which may include waterfront and bulkhead work.
2. Sheet pile driving methods, driving sequence, and driving equipment, including driving frame details.
3. Sheet pile hydraulic pressing system(s).
4. Variable Moment Vibratory Hammer (if used in OU-1).
5. Sheet pile installation Logs: Submit records daily. Installation logs shall include:

   a. Name of CONTRACTOR.
   b. Project name.

SECTION 02260
EXCAVATION SUPPORT

c. Date.
d. Pile location/number.
e. Name of hammer manufacturer/model.
f. Pile type and length.
g. Ground elevation.
h. Final tip elevation.
i. Pile deviation from plan location.
j. Notes on unusual phenomena.

6. Provide certificates of compliance to material requirements set forth in this section.

7. Proposed means and methods of shoring to facilitate excavation and backfill for depths greater than 17.0 feet below ground elevation. The proposed design and sequencing shall be submitted to the engineer for review and approval.

1.04 PROJECT/SITE CONDITIONS

A. Protect structures, underground utilities, and other construction from damage caused by pile installation operations.

B. Before commencing work provide surveyed elevation bench marks on all structures within 40 ft of pile installation operations and elsewhere as noted on the drawings. Record and report elevation of each bench mark after installing piles and at least twice daily while pile installation is in progress. Should bench mark readings indicate displacement, halt pile installation operations until corrective action has been provided and is acceptable to the Engineer.

C. Provide crack gauges on structures where required by the Engineer before commencing work for all structures within 40ft of pile installation operations and elsewhere as noted in the drawings. Record and report crack gauge measurements after installing piles, and at least twice daily while pile installation is in progress. Should crack gauge readings indicate displacement, halt installation operations until corrective action has been provided and is acceptable to the Engineer.

D. Install inclinometer directly behind the sheetpile wall or attached to the sheetpile wall to a minimum depth of 35 feet to monitor deflection of the wall during excavation activities. The inclinometer shall be installed in Cell 1B-3 at a

SECTION 02260
EXCAVATION SUPPORT

location adjacent to House No. 418 (identified in the Drawings), as approved by the Engineer. Use Shape-Accel-Array (SAA) inclinometer, manufactured by Measurand, Inc., Fredericton, New Brunswick. Install in accordance with the manufacture's requirements and recommendations. Provide readout device and software to produce a graphic representation of the lateral deflections. Monitoring daily during excavation activities in Cell 1B-3. Submit results daily.

E. Monitor vibrations of structures at locations approved by the Engineer. Should measurements indicate excessive vibration, halt installation operations until corrective action has been provided and is acceptable to the Engineer.

1. Monitor vibrations at nearest adjacent structures closest to the pile driving operations when installing sheetpiles with hydraulic press.

2. Monitor vibrations continuously at nearest adjacent structures when installing sheetpiles with vibratory hammer, regardless of distance.

1.05 QUALITY ASSURANCE

A. Qualify welders, welding processes and procedures in accordance with AWS D1.1.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Piling and Accessories (if provided by Contractor): ASTM A572 or A992, Grade 50

1. Piling shall be continuous interlock type.

2. Handling hole at top end of each section shall be located above final cutoff elevation. Provide sheeting with one standard handling hole at top end of sheeting. Prior to installation any holes in sheeting shall be patched with a steel plate with a minimum thickness the same as the section at the hole location. The patch shall be continuously welded around its entire perimeter.

3. Sheet pile plan length and section type shall be as noted on Drawings.

SECTION 02260
EXCAVATION SUPPORT

B. Structural Steel Shapes and Plates: ASTM A572 or A992, Grade 50

C. Welding Electrodes: AWS A5.1 or A5.5.

D. Bolts and Nuts: ASTM A325.

E. Turnbuckles: A668 Class A C1035

F. Sleeve Nuts: ASTM A29.

G. Plastic Pipe Sleeves: 3” diameter perforated plastic pipe.

2.02 FABRICATION

A. Fabricate in accordance with applicable AISC specifications, drawings, and approved Shop Drawings.

B. Welding shall be electric arc method in accordance with AWS D1.1, E70XX electrodes conforming to AWS A5.1 or A5.5 for shielded metal arc method and F7X-EXXX flux electrode combination conforming to AWS 5.17 for submerged arc method.

C. Mark and match-mark materials for field assembly.

D. Weld shop connections, bolt or weld field connections, unless otherwise noted or specified.

2.03 HYDRAULIC PRESSING EQUIPMENT

E. Provide pile pressing equipment of type generally used in standard steel sheet pressing practice, operated in accordance with the manufacturer's specifications and recommendations. Pile pressing equipment shall be capable of pressing sheet piles to the required depths without damage.

F. Provide a pressing system of sufficient capacity and size suitable for efficiently driving the sheet piles in the soils encountered at this site.

G. Provide sheet pile pressing template or frame suitable for aligning, supporting, and maintaining sheet piling in the correct position during setting and pressing.

SECTION 02260
EXCAVATION SUPPORT

Use a system of structural framing sufficiently rigid to resist lateral and driving forces and to adequately support the steel sheet piling until the design tip elevation is achieved. Templates shall be fixed so as to not move or shift as piles are pressed. Prevent sheet piles from warping or wandering from the alignment, or racking along the alignment.

2.04 VARIABLE MOMENT VIBRATORY HAMMER EQUIPMENT (OU-1 ONLY)

A. Provide variable moment vibratory hammer of type generally used in standard steel sheet practice, operated in accordance with the manufacturer's specifications and recommendations. Variable moment vibratory hammer equipment shall be capable of driving sheet piles to the required depths without damage.

B. Provide a variable moment hammer system of sufficient capacity and size suitable for efficiently driving the sheet piles in the soils encountered at this site.

C. Provide sheet pile driving template or frame suitable for aligning, supporting, and maintaining sheet piling in the correct position during setting and driving. Use a system of structural framing sufficiently rigid to resist lateral and driving forces and to adequately support the steel sheet piling until the design tip elevation is achieved. Templates shall be fixed so as to not move or shift as piles are driven. Prevent sheet piles from warping or wandering from the alignment, or racking along the alignment.

PART 3 – EXECUTION

3.01 GENERAL:

A. Install, maintain, and remove, excavation support (including any approved additional support for section excavation and backfill) in such a manner to prevent excessive movement, settlement, or loss of ground, removal of soil fines from the adjacent ground, or damage to or excessive movement of adjacent structures, utilities, roadways and other features.

3.02 PRESSING SHEET PILING

A. If NYSEG does not provide sheet piles and CONTRACTOR is required to provide piles, order length of piles shall be determined by CONTRACTOR and approved by the Engineer. Approval does not relieve CONTRACTOR from obligation to provide piles of sufficient length to achieve proper pile penetration.

B. Once pressing for pile group (typically, groups of 4 sheets, or a quad) is started, pile group shall be pressed to required penetration without stopping.

C. When high-resistant strata lying near surface must be penetrated, rotary drilling or pretrenching may be used to minimize hard driving of long piles during early stages of pressing operations, as approved by the Engineer. Augering and spudding shall not be allowed in the deeper, low permeability soils. Jetting is not allowed. The contractor shall have this equipment readily available onsite in case high-resistant strata are encountered. It will be the contractor’s responsibility to provide sufficient equipment and take appropriate actions to ensure that the sheets can be pressed to the design depth.

D. Backfill voids between pile and pre-excavated hole using satisfactory soil materials.

E. Observations shall be made to determine uplift of adjacent piles. Uplifted piles shall be pressed to original elevation, without additional cost to the Owner. It may be necessary to weld piles together to avoid uplift so that the interlock sealant is not damaged.

F. Press sheet piling by approved methods to not subject piles to serious damage and to ensure perfect interlocking with adjoining piles throughout length of piles. Take precautions to ensure piles are within specified tolerance to line and grade.

G. Pile ruptured in interlock or otherwise considered significantly damaged by the Contractor shall be pulled and new pile pressed in its place.

3.03 VIBRATING SHEET PILING (OU-1 ONLY)

A. Reuse sheetpiles from OU-2. Alternatively, Contractor may request to use NYSEG owned AZ 48 sheetpiles.

B. When high-resistant strata lying near surface must be penetrated, rotary drilling or pretrenching may be used to minimize hard driving of long piles during early stages of driving operations, as approved by the Engineer. Augering and

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spudding shall not be allowed in the deeper, low permeability soils. Jetting is not allowed. The contractor shall have this equipment readily available onsite in case high-resistant strata are encountered. It will be the contractor's responsibility to provide sufficient equipment and take appropriate actions to ensure that the sheets can be installed to the design depth.

C. Backfill voids between pile and pre-excavated hole using satisfactory soil materials.

D. Observations shall be made to determine uplift of adjacent piles. Uplifted piles shall be re-driven to original elevation, without additional cost to the Owner. It may be necessary to weld piles together to avoid uplift so that the interlock sealant is not damaged.

E. Take precautions to ensure piles are within specified tolerance to line and grade.

F. Pile ruptured in interlock or otherwise considered significantly damaged by the Contractor shall be pulled and new pile driven in its place.

3.04 WALES

A. Wales shall consist of steel structural shapes fabricated as shown on Drawings and be connected securely to steel piling at locations and elevations shown on Drawings.

B. Wales that are tilted, bent, or otherwise damaged during progress of construction shall be aligned, straightened or replaced as required by the Engineer at no additional cost to the Owner.

C. Wale splices shall be provided in accordance with details shown on Drawings.

D. Obtain tight bearing between wales and support wall and ample bearing area with steel or hardwood blocking at every sheet pile.

3.05 BOLTING

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EXCAVATION SUPPORT

A. Install bolts at proper location and set straight and square with connecting members.

B. Make holes in metal members by drilling or cutting by torch, using template, subject to approval of ENGINEER.

C. After drilling, holes which are too small or out of shape shall be reamed to required size.

D. Remove projecting metal and burrs.

E. Unless otherwise indicated or specified, holes shall be not more than 1/8 in. larger than diameter of item being installed.

F. Provide plain washers under nuts of bolts except where beveled washers are required or plate washers noted.

G. Nuts on bolts shall be drawn up tight and, where indicated, threads of bolt shall be peened or tack welded.

3.06 WELDING

A. Welded connections shall be as indicated on Drawings.

B. Weld in accordance with AWS D1.1.

C. Welding shall be performed by certified structural welders in accordance with AWS D1.1.

3.07 INTERLOCK SEALANT

A. Sealant shall be the Swellseal® WA system from DeNeef® Construction Chemicals, Inc. or approved equal.

B. Sealant shall be field applied the entire length of the sheet. Adhere to all manufacturer's specifications, recommendations, and guidelines for field application and protection of the sealant.

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EXCAVATION SUPPORT

C. When stored or transported, sealed interlocks shall always face down or covered with tarps to avoid contact with standing water to avoid premature swelling of the sealant.

D. When installing sheet piles with sealed interlocks, the leading edge shall always be the interlock without sealant.

E. Each interlock shall be cleaned during installation.

F. Interlocks with water-swelling product shall be lubricated with a commercial soap-based product just prior to installation.

G. The top of each untreated (leading) interlock shall be chamfered and free of burrs, so that the sealed interlock will not be damaged during installation.

H. Special attention shall be given to keep the piles plumb in order to minimize friction during driving. Special care shall be taken to ensure that the temperature of the interlock does not exceed 130^{o}C to avoid damaging the sealant (when vibratory hammer is used; requirement not applicable for pressing). The contractor shall have water readily available at all times to cool the interlock if specified temperatures are exceeded. Sheet piles in which the sealant has smoldered or burned shall be extracted and the defective sealant removed and replaced in accordance with the manufacturer's specifications.

I. Sheet piles with sealed interlocks must be installed to required depth within 2 hours after start to minimize premature swelling of sealant, or in accordance with the manufacturer's specifications.

J. Prevent unwanted movement between adjacent sheet piles that may cause failure of sealant that has previously set.

K. Cut off sheet piles in accordance with the sheet pile and sealant manufacturer's recommendations to prevent damage to the sealant. Use respirators as needed, as recommended by the sheet pile and sealant manufacturer.

3.08 MISCELLANEOUS STRUCTURAL SHAPES AND PLATES

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EXCAVATION SUPPORT

A. Where shown on Drawings, provide miscellaneous structural shapes and plates to complete Work.

3.09 FIELD QUALITY CONTROL

A. Install piles within following maximum tolerances:

1. Location: 3 in. from location indicated.

2. Plumbness: Maintain 1 in. in 10 ft from vertical or maximum of 4 in., measured when pile is above ground in leads.

3. Final pile cut-off elevation shall be within 1 in. of Drawing cut-off elevation.

B. Damaged piles and piles installed outside required driving tolerances will not be accepted. Withdraw piles rejected and replace with new piles.

3.10 MOVEMENT

A. Monitor the performance of components of the excavation support system for vertical and horizontal movements and for overstressing of structural members.

B. Limit movement to protect adjacent structures, utilities, roadways and other features.

C. Lateral Deflection of the sheetpile system shall not exceed ½ inch.

3.11 VIBRATION

A. Measure vibrations in structures adjacent to work areas as specified.

B. Prepare daily vibration monitoring reports and submit to Engineer the following work day.

C. Vibration Action Levels:

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EXCAVATION SUPPORT

1. 0.75 inches per second (ips): Notify Engineer
2. 1.00 ips: Immediately stop work and notify Engineer. Inspect structure for potential damage. Develop Action Plan to reduce vibration levels and minimize risk of damage. Do not continue sheet pile installation until the Action Plan is approved by the Engineer and Owner.

3.12 REMOVAL

A. Installed excavation support system(s) to be removed after area has been backfilled and compacted. Remove all components of the system(s).

B. Stop removal of sheetpiles if significant quantities of cohesive soil are found to adhere to the extracted sheetpiles. Notify Engineer and propose actions to minimize removal of soil with the extracted sheetpiles.

C. When removing the excavation support system(s), do not disturb or damage adjacent structures, utilities, roadways and other features. Fill voids immediately with well-graded cohesion less sand.

D. Remove all bracing including, wales, struts, and other temporary bracing elements after area has been backfilled to bracing elevation.

*** END OF SECTION ***

SECTION 02245
TEMPORARY WATER TREATMENT SYSTEM

PART 1 – GENERAL

SECTION INCLUDES:

A. Summary
B. Submittals
C. Project Description and Conditions
D. Primary Water Treatment Equipment and Controls
E. Discharge Limits
F. Testing and Startup Activities
G. Water Quality Testing
H. Routine Monitoring
I. Corrective Actions
J. Documentation

1.01 SUMMARY

A. The Contractor shall provide all manpower, equipment, and materials to execute all activities necessary to provide, operate, and maintain a temporary water treatment system at the former Manufactured Gas Plant (MGP) site located in Ithaca, New York.

B. This section covers the requirements for the functional design, performance, construction features, operation, and testing of the equipment described in the following sections.

C. The contractor may propose an alternate water treatment system design that, at a minimum, shall meet the effluent limits established by the City of Ithaca for discharge to the municipal sanitary sewer and design, construction, and operational intent established herein.

D. If necessary, additional treatment components will be provided by the contractor to achieve the City sanitary sewer effluent limits and requirements set forth in the City Ithaca Area Wastewater Treatment Facility (IAWWTF) Discharge Permit.

1.02 SUBMITTALS

A. Contractor shall submit a Technical Execution Plan with their bid. The Technical Execution Plan shall include:

1. Description of water treatment system, equipment (including size and capacity), processes, and monitoring.

SECTION 02245
TEMPORARY WATER TREATMENT SYSTEM

2. Contractor shall submit an Operation & Maintenance plan with their design of the WWTP to include regular maintenance, daily operating procedures and recording of performance parameters, logs, and record keeping.

3. Calculation and support documentation for treatment system design, component selection and sizing.

4. Description of the coordination with the excavation dewatering system.

5. Any proposed alterations from the minimum required system shown in the Drawings

Detailed plan shall outline all provisions and precautions to be taken by the Contractor regarding the collection, treatment and discharge of project wastewater. The plan must be specific and complete, including such items as schedules, locations, sizes, capabilities of equipment, materials and all other incidental items necessary and/or required to ensure proper treatment of the anticipated flows and compliance with the City discharge permit. No water handling or treatment shall begin until all this plan has been reviewed and approved by the Engineer.

1.03 PROJECT DESCRIPTION AND CONDITIONS

A. Excavation and dewatering, described in Specifications Section 02240 – Dewatering, will generate water impacted with MGP constituents.

B. Contractor shall provide and maintain a water treatment system that is capable of treating and discharging water in accordance with the City IAWWTF Discharge Permit Equivalent and the Specifications. The Contractor shall ensure continuous operation of treatment system throughout the duration of the project as directed by the Engineer.

C. Contractor shall prepare and submit a Technical Execution Plan in accordance with the procedures set forth in Specifications Section 01330 – Submittal Procedures. Contractor shall follow the approved water treatment plan, and be responsible for meeting the requirements of the discharge permit volume and constituent concentration limitations.

D. Contractor shall maintain Daily Discharge Volume Logs obtained from a continuously totalizing water meter, hours of treatment system operation, peak flow rates, and other pertinent data for the Engineer's verification

SECTION 02245
TEMPORARY WATER TREATMENT SYSTEM

and approval, in accordance with the discharge permit. Contractor's Daily Report of water treatment activities shall be in a format acceptable to the Engineer and shall include the results of daily system inspections.

E. Contractor is responsible for all fines and penalties associated with non-conformance of the system in meeting the discharge permit.

F. The contractor shall provide all manpower, equipment and materials to execute all activities necessary to provide, operate, and maintain a temporary water treatment system. Unless approved otherwise, the temporary water treatment system will include the following major components:

1. Berms and containment;
2. Influent tanks (two fractionation tanks and one baffle/oil-water separator tank);
3. Effluent storage tank (1 fractionation tank, 20,000 gallon capacity);
4. Double diaphragm pumps;
5. Oil/water separator;
6. Transfer tank;
7. Oil storage tank;
8. Transfer pumps;
9. Organo-clay vessels;
10. Bag filters;
11. Granular activated carbon (GAC) vessels;
12. Anion resin;
13. Piping and appurtenances;
14. Meters and gauges; and
15. Air compressor

G. The temporary water treatment system shall be capable of treating a flow rate of 50 gallons per minute (gpm).

H. Analytical results for groundwater samples collected from impacted material within adjacent remediation area 1C are provided in the PDI Summary Report for OU-2. The proposed temporary water treatment systems shall be capable of reducing the anticipated concentrations of these contaminants in the dewatering wastewater from the remedial excavations (i.e., influent characteristics) to the discharge treatment levels required by the City of Ithaca for discharge to the municipal sanitary sewer.

SECTION 02245
TEMPORARY WATER TREATMENT SYSTEM
PART 2 – PRODUCTS: PRIMARY WATER TREATMENT EQUIPMENT AND CONTROLS

2.01 WATER TREATMENT EQUIPMENT

This section specifies the minimum design and construction requirements for major treatment system components. Substitutions of system components other than those specified herein must be submitted for consideration and approval by the Engineer in accordance with the requirements of the Contract Documents.

A. The Contractor shall furnish, install and operate water treatment equipment of sufficient capacities to meet the requirements of the IAWWTF Discharge Permit and site dewatering needs.

B. Contractor shall keep on hand, or have immediate access to, additional pumps of sufficient capacity to maintain water treatment activities during any pump breakdown or maintenance.

C. Contractor shall provide freeze protection for all water treatment hoses, piping, and pumping equipment necessary to execute the work throughout the winter months, including but not limited to: insulation, heat wraps, heaters, and/or enclosures. Freeze protection chemicals or solutions shall not be used on site without prior approval of the Engineer.

D. Contractor shall repair or replace damaged pumps, piping, hoses, tanks, and all other water treatment equipment and materials within four working hours if damaged. Damage includes any pump and power failures, leaks, breaks, clogs or other conditions that adversely affect the water treatment system and subsequent discharge of treated water.

E. Contractor shall keep on hand, or have immediate access to, spare components to provide reasonably for any breakdown. Contractor shall maintain on site spare pumps during water treatment operations.

F. All water treatment equipment shall remain the property of the Subcontractor and shall be decontaminated in accordance with Specifications Section 02130 – Decontamination and removed from the Project site at the completion of the work.

2.02 BERMS AND CONTAINMENT

The temporary water treatment system, exclusive of influent and effluent tanks shall be constructed with a containment area complete with continuous 20-mil

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TEMPORARY WATER TREATMENT SYSTEM

HDPE liner and berms to provide containment volume equal to 110% of the largest container within the containment area.

2.03 INFLUENT SETTLING TANKS

A. The influent settling tanks shall be of steel construction and shall provide, at a minimum, enough storage capacity to store 60,000 gallons. The tanks shall allow the water level in the tank to be determined by visual inspection and the use of a stick level indicator.

B. Each tank shall be furnished with an inlet and outlet pipe connection. The tank shall be equipped with two, 4-inch valves at each end.

C. The tanks shall be a minimum of two 21,000 gallon Steel Manifold Fractionation Tanks, and one 18,000 gallon baffle tanks, manufactured by Baker Tanks, or equal.

D. The Contractor shall take such measures as are necessary to ensure that water does not freeze within the influent tanks.

2.04 EFFLUENT STORAGE TANKS

A. The treated water storage tanks shall be of steel construction with a total minimum storage capacity of 20,000 gallons.

B. Each tank shall be furnished with an 8" valve manifold with 4" outlets.

C. The tank shall be 21,000 gallon Steel Manifold Fractionation Tank, manufactured by Baker Tanks, or equal.

D. The Contractor shall take such measures as are necessary to ensure that water does not freeze within the final effluent tanks.

E. Additional tanks (if needed) shall be the responsibility of the Contractor.

2.05 DOUBLE DIAPHRAGM PUMPS

A. Double diaphragm pumps shall be rated for a combined pumping rate of 50 gallons per minute (gpm) at a pumping head to be determined by the contractor.

B. Controls for transfer pumps shall consist of level switches for low water level, high water level and high-high water levels.

C. The pumps shall be SA Series Sandpiper, manufactured by Warren Rupp, or equal.

2.06 OIL/WATER SEPARATOR

A. The oil/water separator shall be a gravity type - rectangular channel coalescing oil/water separator capable of removing gross free oil and similar floatable products and shall contain integral collection chambers for settleable sludge/solids recovery.

B. The oil/water separator shall be designed in accordance with Stokes Law and the American Petroleum Institute Publication 421, "Monographs on Refinery Environmental Control Management of Water Discharges, Design and Operation of Oil-Water Separators" and Stokes Law for an influent water flow rate up to 50 gpm. The effluent shall contain less than 10 milligrams per liter (mg/L) of oil droplets greater than 30 micrometers (microns) with a specific gravity of 0.9 or less at a flow rate of 50 gpm or less.

C. The oil/water separator shall be model TS036-F34 molded fiberglass or equivalent or TS036-S34 carbon steel, as manufactured by Hydro-Flo Technologies, Inc., or equal.

2.07 TRANSFER TANK

A. The transfer tank shall contain low, high, and high-high level switches for transfer pump operation.

B. The transfer tank shall be manufactured of one-piece, seamless, linear polyethylene that is translucent for viewing of interior water levels.

C. The transfer tank shall be a 1,000 gallon one-piece, seamless, linear polyethylene tank.

2.08 OIL STORAGE TANK

A. The oil storage tank shall be a 250 gallon auxiliary polyethylene tank to contain oil and sediment from oil water separator.

2.09 TRANSFER PUMPS

A. The transfer pumps shall be horizontal close-coupled, end suction centrifugal pumps of cast iron construction and rated for a combined pumping rate of 50 gpm (maximum allowable throughput to the temporary water treatment system) at a pumping head to be determined by the Contractor.

B. The pump motors shall be non-overloading of National Electrical Manufacturers Association (NEMA) standard design suitable for close-coupled pump mounting.

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TEMPORARY WATER TREATMENT SYSTEM

C. Controls for transfer pumps shall consist of level switches in tank for low water level, high water level and high-high water levels.

D. The transfer pumps shall be model type 3656, as manufactured by Goulds, or equal.

2.10 ORGANO-CLAY VESSEL

A. The organo-clay vessel shall have a loaded hydraulic capacity of 50 gpm. A minimum of 2,000 pounds of organo-clay shall be used upstream of the GAC Adsorption Units.

B. Based on performance specifications of the organo-clay media, the size of the reservoir should be between 5 square foot (minimum) and 8 square foot (maximum) with a bed thickness range between 3 feet (minimum) and 6 feet (maximum). The recommended contact time should be between 5 to 7 minutes.

C. Particle size for the organo-clay material shall be determined by U.S. Standard Sieve Size 8x30 mesh, with a packaged moisture content of 8 percent. Drained moisture retention capacity for organo-clay should be 10 percent with a density between 40 and 60 pounds per cubic foot.

D. The organo-clay vessel shall be model AF-2000, as manufactured by Tetrasolv Filtration, or equal. The organo-clay shall be MCM-830P, as supplied by Ecologix Environmental Systems, or equal.

2.11 BAG FILTERS

A. The bag filters (two total) shall have a loaded hydraulic capacity of up to 50 gpm. The bag filter housing shall be carbon steel, and shall be pressure rated to a maximum 150 pounds per square inch (psi).

B. The primary bag filters shall be model FSPN-85, as manufactured by FSI, or equal. The primary filter bags shall have a rating of a maximum of 50 micron opening.

C. The secondary bag filters shall be model FSPN-85, as manufactured by FSI, or equal. The secondary filter bags shall have a rating of a maximum of 5 micron opening.

2.12 GRANULAR ACTIVATED CARBON VESSELS

A. The Granular Activated Carbon (GAC) vessels (two total) shall have a loaded hydraulic capacity of 50 gpm. A minimum of 2,000 pounds of GAC shall be used. The vessels shall be provided with lifting supports suitable for lifting by a fork lift truck.

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TEMPORARY WATER TREATMENT SYSTEM

B. The vessels shall be designed for a downflow application, a carbon dryfill opening in the top and a carbon discharge connection in the unit bottom. All vessel fittings shall be installed by the GAC vessel manufacturer at the time and place of manufacturer. The Contractor shall not modify the GAC vessel in the field without written approval from the Manufacturer.

C. All water shall be routed through the GAC vessels in series during normal treatment system operations. When the primary GAC vessel becomes spent (breakthrough of constituents above permitted limits), a carbon change-out of the primary vessel shall occur. The secondary vessel shall be moved to the primary position and a new GAC vessel shall be placed in the secondary position. GAC units shall be equipped with backwash capabilities.

D. The GAC units shall be model AF-2000, as manufactured by Tetrasolv Filtration, or equal. The GAC shall be Westates Aquacarb 830 or Aquacarb 1240 carbon as supplied by US Filter or equal.

2.13 ANION RESIN

A. The contractor shall provide anion resin capable of treating 50 gpm of groundwater containing up to 5,000 ug/L. During the remedial investigation, the concentration of cyanide in groundwater ranged from non-detect to 1,800 ug/L, with an average of 110 ug/L. The discharge criteria is 200 ug/L (maximum concentration 30 day average) and 600 ug/L (maximum concentration 24 hour average) as defined in the IAWWTF discharge permit.

B. The anion resin vessel shall be DOT compliant, capable of processing 50 gpm at a pressure of 60 psi and have a capacity of sufficient resin to reduce concentrations to below discharge criteria.

C. The resin shall be USF A-284, as supplied by Siemens, DOWEX SBR, as supplied by Dow Chemical Company, or approved equal.

2.14 PIPING AND APPURTENANCES

A. The contractor shall provide all necessary piping and appurtenances required for operation of the temporary treatment system.

B. Influent piping from the excavation upstream of the influent tanks and outside the containment berm shall be double walled to ensure containment in the event of a leak. Effluent piping from the treatment system to the point of discharge may be single-wall pipe.

C. All piping and appurtenances shall conform to applicable American Society for Testing and Materials (ASTM) standards.

D. All exterior piping required for the treatment system shall be protected from vehicular traffic when placed on ground surface (e.g., influent pipe from excavation areas).

2.15 METERS AND GAUGES

The contractor shall provide all necessary meters and gauges to ensure proper monitoring of the entire treatment system.

A. Contractor shall provide adequate system controls to permit unattended operation with occasional operator checks for monitoring and adjustments.

B. The Contractor shall provide a notification system, such as pressure gages and alarms, to alert an operator if the system experiences conditions that will potentially cause the treatment system to shutdown.

C. Contractor shall provide high-level alarms on tanks to prevent overflow conditions. Alarms may cause automatic actions to relieve the condition or may warn the operator.

D. If an upset condition occurs, which may result in a release or nonconformance with the discharge permit, Contractor shall immediately suspend operation and notify the Engineer.

E. The water treatment system shall not be operated without onsite supervision.

Contractor shall provide and maintain at all times flow meters to record water discharged from both the treatment system to the effluent storage tank(s) and to the City of Ithaca for municipal sanitary sewer. The flow meters shall record instantaneous and totalized flow.

2.15 AIR COMPRESSOR

A. The air compressor shall be sized by the Contractor to supply air to the all diaphragm pumps.

B. The air compressor shall have two stage capability, rebuildable components, intake unloaders, and loadless starting.

C. The air compressor shall be a Qunicy Compressor, or equal.

PART 3 - EXECUTION

3.01 GENERAL

The Contractor shall provide, operate and maintain a temporary on-site water treatment system as described in this specification that shall treat liquid waste streams encountered during remedial work. The Contractor shall maintain lines of communication with the appropriate representative of the NYSEG and the NYSDEC and the City of Ithaca regarding all discharge issues. The Contractor shall ensure continuous operation of treatment system throughout the duration of the project.

3.02 DISCHARGE LIMITS

A. The Contractor shall at all times maintain the treatment system so as to not exceed the effluent limits established by the City of Ithaca for discharge to the municipal sanitary sewer.

B. The pH of the discharged effluent shall not be less than 5.5 or greater than 11.0.

3.03 TESTING AND STARTUP ACTIVITIES

A. After mobilization and setup of the water treatment system, the contractor shall perform system startup and testing activities and troubleshooting prior to initiating full scale (normal) operations.

B. Startup and testing activities shall be in accordance with the manufacturer's recommendations and as indicated in the Contractor-prepared O&M manual that has been reviewed by the Engineer. General startup and testing of the temporary water treatment system shall consist of treating a minimum of 20,000 gallons of water collected from the first proposed excavation area (i.e., water that has been in contact with soil/sediment to be removed). During the startup test, the water treatment system shall be operated at the 50 gpm peak flow rate until the entire 20,000 gallon batch is treated or at the maximum flow obtained from the dewatering. During this time, the Contractor shall continuously monitor and record readings (every 30 minutes minimum) from all gauges and meters as necessary in order to demonstrate that the system is operating as designed to the satisfaction of the Engineer. In addition, the Contractor shall make adjustments to the system as necessary to maintain a continuous flow rate of approximately 50 gpm while meeting the operating requirements of each system component.

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C. The Contractor shall assist the Engineer in the collection of start-up testing samples following treatment of approximately 10,000 gallons and 20,000 gallons of water. The entire 20,000 gallons of treated water shall be retained in the effluent storage tanks until analytical results obtained indicate that the Contractor may discharge the water to the Ithaca municipal sanitary sewer. Samples collected during start-up will be submitted by the Engineer for laboratory testing of the following parameters:

Parameter	Influent/Effluent
Volatile Organic Compounds	Yes
Semi Volatile Organic Compounds	Yes
Cyanide	Yes
pH	Yes
Total Suspended Solids	Yes
Metals	Yes
Pesticides/Herbicides	Yes
Total Petroleum Hydrocarbons	Yes

D. As required by the City temporary discharge permit, the Contractor shall assist the Engineer with collection of periodic samples of the discharge of the water treatment system. All samples shall be of the type (grab versus composite) required by the City discharge permit and shall be analyzed for the parameters identified in the City discharge permit. All analytical results shall be distributed to the Engineer, Contractor, NYSEG, and City of Ithaca.

3.04 WATER QUALITY TESTING

Treatment system water quality testing shall be conducted during normal operations for both treatment system influent and effluent. During the system operation, testing will be conducted on a schedule and frequency to meet the requirements of the City discharge permit. The Engineer will collect the water samples for analysis and arrange for laboratory analysis of these samples.

3.05 ROUTINE MONITORING

A. The temporary water treatment system will be manually operated and controlled through a series of valves, visual reading gauges, and pump controls as necessary to accommodate system operation. The Contractor shall provide for a water treatment system operator to be on-site at all times during system operation. The system will be manually controlled by the operator. At a minimum, the daily activities to be performed by the system operator (at least once per shift) include at a minimum:

1. Visual inspection of influent and effluent piping to and from the treatment system;
2. Visual inspection of all pumps, fittings and equipment for leakage;
3. Visual inspection of the waste oil and sludge storage tanks to document storage capacity;
5. Obtaining readings from the system pressure gauges associated with all treatment systems within the treatment train. Pressure gauge readings may be used to determine when a backwash event or filter replacement is required or that a particular treatment unit is not functioning properly;
6. Obtaining readings from the flow meter to monitor the system flow rate;
7. Obtaining readings from the flow totalizer to record the total system flow to date and calculate the daily flow- total; and
8. During the operation of the treatment system, the influent tanks shall be visually inspected each time they are emptied to determine the depth of the sediment in the bottom of the tank. If sediment is observed to be 4 inches deep (or if directed by the Engineer) the tank shall be cleaned. Liquids from the cleaning activities shall be treated using the temporary water treatment system, while solids shall be collected and placed into the staging area for subsequent disposal by Owner. The Contractor shall solidify material to make it suitable for off-site disposal as a solid waste.

3.07 CORRECTIVE ACTIONS

At the direction of the Owner or the Engineer, the Contractor shall take corrective actions as necessary to maintain specified treatment system performance in the event of an upset condition and/or operating conditions that result in non-compliant effluent water quality. During Corrective Actions, the Contractor may be required to mobilize additional effluent storage tanks and/or repeat start-up and testing procedures as specified herein.

3.08 DOCUMENTATION

The Contractor shall maintain a daily operations log (i.e., tabulated results) in which the process variables described above will be recorded at a minimum frequency of once per shift or more frequently if requested by the Engineer. In addition, all activities related to O&M of the treatment system will be documented in the daily log. The daily log will be kept on site and will be made available to the Engineer on demand. Copies of each daily log sheet will be submitted to the Engineer on a daily basis.

*** END OF SECTION ***

MATERIALS AND PERFORMANCE

IN SITU CHEMICAL OXIDATION

PART 1 – GENERAL

1.1 DESCRIPTION:

A. The CONTRACTOR shall provide all submittals, labor, equipment, material, and utilities, including but not limited to water and electricity, to complete the In Situ Chemical Oxidation (ISCO) of impacted soil and groundwater as specified in Remedial Design Report, Specifications and on the Drawings to treat groundwater contamination from a historic manufactured gas plant, including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), gasoline range organics (GRO) and diesel range organics (DRO).

B. The CONTRACTOR shall provide all labor, equipment, and materials to monitor for non-aqueous phase liquid (NAPL) in wells within the ISCO treatment area (Area 1C). If measurable NAPL is observed prior to or during remedial activities, the CONTRACTOR shall remove to the extent practicable by a method selected by the CONTRACTOR prior to commencing ISCO activities and immediately after observation throughout the project. Gauging for free NAPL in monitoring wells was performed on three separate occasions during the summer of 2011, and no measurable quantities were observed.

C. The CONTRACTOR shall be fully familiar with the existing and proposed injection well locations, conditions, and construction details as shown in the Remedial Design, Drawings and/or Appendices, and incorporate any modification necessary into the bid.

D. The CONTRACTOR is responsible for having complete and satisfactory knowledge of the expected subsurface conditions. NYSEG will attempt to assist the CONTRACTOR in making this determination if the request is specified in writing.

E. The Area to be treated by chemical oxidation (also referred to as Area 1C) is located on North Plain Street, immediately north of Esty Street in Ithaca, New York. The ISCO treatment area is approximately 4,900 square feet. Chemical oxidation treatment will be performed on impacted volumes of soil and groundwater generally located in a coarse gravel/fine sand layer located between two confining layers of silty clay (approximately 10 to 15 feet below existing ground surface). Impacts have also been noted in the top of the confining bottom layer of silty clay. Depth to water in this area is approximately 6 feet below ground surface. All injection work will be completed within the North Plain Street right of way, which is owned by the City of Ithaca.

1.2 DEFINITIONS:

A. The following definitions are used in this section:

1. Reagent Preparation – The mixing or batching of the chemical oxidant to produce the modified or activated form used prior to injection.
2. Injection – The addition of the chemical oxidant by pumping into the Injection Wells and/or Injection Points shown on the Drawings.
3. Injection Well – The well constructed to inject the chemical oxidant into the subsurface.
4. Direct-Push Injection Point – Injection of reagent through temporary rods advanced to the appropriate depth using a direct-push drill rig.
5. Daylighting – The visual observation of groundwater and/or injected solution above the ground or in utility structures (i.e., catch basins) as a result of injection activities.
6. Injection Well Head – Modified Tee fitting attached to the top portion of the well head to allow injection.

1.3 QUALIFICATIONS:

A. The CONTRACTOR or subcontractor shall have completed at least 3 ISCO remediation projects of similar size and scope in the past 3 years.

B. The CONTRACTOR or subcontractor shall have completed at least one ISCO remediation project specific to a former Manufactured Gas Plant site of similar size (greater than 5,000 square feet).

C. The CONTRACTOR or subcontractor shall have completed at least 2 ISCO remediation projects in New York State.

D. The CONTRACTOR's or subcontractor's on-site ISCO Field Supervisor shall have a minimum of 5 years of experience with ISCO projects, with a minimum of 2 of those years in the role of Field Supervisor.

E. The CONTRACTOR's or subcontractor's ISCO Field Personnel shall have a minimum of 2 years of experience with ISCO projects of similar scope. ISCO Field Personnel include technicians, supervisory engineering staff, and technical staff involved with the injection process.

1.4 SUBMITTALS:

A. CONTRACTOR shall provide an ISCO TECHNICAL EXECUTION PLAN (TEP) detailing the plan for conducting the oxidant injection and for monitoring during injection for the Site (see 1.5.B). The TEP shall specify anticipated volumes, concentrations, injection rates, allowable system pressures, and general timeframes for proposed oxidant injections. TEP shall specify performance monitoring to be conducted for ISCO activities including locations of existing and proposed monitoring points, field monitoring activities, sample collection and laboratory analysis, and timing and frequency of all ISCO performance monitoring. The TEP shall include a Vapor Control and Monitoring Plan that specifies the means and methods of providing active vapor control around and throughout the treatment area in accordance with the Specifications (Sections 2.5 and 3.3). Vapor Control and Monitoring Plan shall specify the locations and types of vapor collection points as well as the locations and types of treatment for air emissions from the active vapor control system. Vapor Control and Monitoring Plan shall also include location and type of monitoring points as well as the associated monitoring activities to demonstrate that active vapor control is being continuously provided during ISCO treatment. The TEP shall also include a Site-Specific Health and Safety Plan (HASP), a Spill Prevention and Response Plan, and Traffic Control Plan. The TEP shall include mitigation measures for potential spills, day-lighting, and other ISCO monitoring requirements specified in Section 3.3. The TEP shall be provided to NYSEG thirty (30) calendar days prior to the start of work for review and approval by NYSEG.

1. The CONTRACTOR shall prepare a TEP Addendum if ISCO activities will deviate from methods and oxidant dosages presented in the TEP. The TEP Addendum shall be provided to NYSEG thirty (30) business days prior to the start of work for review and approval by NYSEG.

B. CONTRACTOR shall provide chemical manufacturer product information for oxidant(s), activating agents, and any other chemicals to be injected into the subsurface. Product information and technical data sheets should include chemical quantity per shipping unit, chemical purity, hazard classification, and material safety data sheets (MSDS). CONTRACTOR shall maintain this information on site at all times during all field operations.

C. CONTRACTOR shall provide information on the source of potable water to be used in site activities, including the name of the company or other entity from which the water will be obtained and at least the two most recent water quality analytical results to confirm that source water is potable, including analysis for volatile organic compounds and metals.

D. CONTRACTOR shall prepare and submit DAILY REPORTS to NYSEG's on-site representative within one (1) working day of completion of the work. The logs shall provide, at a minimum, the following information:

1. Designation for each well and/or injection point where injection conducted;
2. Volume and quantity of chemical(s) and water injected into each injection point;
3. The injection rates;
4. The injection pressures;
5. Deliveries of water, chemicals, and major equipment;

6. Tabulated summary of field monitoring as required by Section 3.3;
7. Deviations from the TEP;
8. Duration and description of "any downtime" and a description of actions taken to recover production; and equipment/injection calibration reports.

E. CONTRACTOR shall prepare and submit to NYSEG an INTERIM ISCO SUMMARY REPORT after each mobilized injection which shall contain, at a minimum, the following information:

1. A tabular summary of injection activities, including quantities of chemicals injected into each injection point and total project totals;
2. Quantities of chemical oxidant constituents delivered to the Site and used during the Work with backup in the form of weight receipts, bills of lading, flow meter records, or equivalent;
3. A description of any unforeseen Site conditions or equipment problems that affected injection efforts;
4. A description of any modifications or deviations from the Contract Documents (Specifications and on the Drawings).
5. A summary of all field monitoring.

F. CONTRACTOR shall provide a FINAL ISCO CONSTRUCTION COMPLETION REPORT (CCR) after successfully meeting the criteria of this specification. The CCR shall meet the requirements of the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010). The CCR shall be submitted to the NYSEG within 60 days of meeting the performance criteria of this specification.

1.5 <u>CHEMICAL OXIDANT FORMULATION:</u>

A. The CONTRACTOR shall provide a chemical oxidant formulation in accordance with the Contract Documents. The oxidants selected based on the treatability study are catalyzed hydrogen peroxide (CHP) and alkaline-activated sodium persulfate.

B. The CONTRACTOR shall determine specific proportions and quantities of the activating and/or catalyzing agents and present this information in the TEP. The oxidant will be formulated using the information provided in the Contract Documents:

1. Hydrogen peroxide shall not be injected at concentrations greater than ten (10) percent.
2. Sodium persulfate shall not be injected at concentrations greater than twenty (20) percent.
3. The CONTRACTOR shall bear all costs associated with changes in the chemical oxidant formulation or construction means and methods needed to achieve injection volumes and comply with the progress schedule.

PART 2 – MATERIALS

2.1 CHEMICAL OXIDANT CONSTITUENTS:

A. The CONTRACTOR will provide chemical oxidant(s), and other oxidation reagents required for the Work.

B. The CONTRACTOR shall control all dust during offloading, storage, transportation, and use of the chemical oxidant.

C. CONTRACTOR shall coordinate the delivery of all chemical oxidant materials to the Site.

D. CONTRACTOR shall, at all times, maintain an adequate quantity of chemical oxidant materials so that the Work is completed without delay.

E. Containers and locations for materials storage shall be protected from precipitation, moisture, and other potential deleterious events. Spill prevention via secondary containment or other suitable method shall be employed around all mixing tanks, bulk storage areas, and pumps actively pumping chemical oxidant solutions.

F. Containers for materials storage shall be properly labeled per the supplier's requirements, and labeling shall also be compliant with local, federal, and state regulations.

   1. Oxidant storage area(s) shall be kept cool, well ventilated, out of direct sunlight, away from combustibles, and with ample separation from activation chemicals.
   2. Chemical storage area(s) shall be equipped with an eyewash and safety shower capable of a 15 minute flush and meeting all relevant OSHA requirements.
   3. All oxidant shall be stored in its original shipping container until it is used; oxidant removed from the original shipping container shall not be returned to it.

G. CONTRACTOR shall maintain technical data sheets and material safety data sheets for the oxidant and additive reagents on-site with the HASP. Product information and technical data sheets should include chemical quantity per shipping unit, chemical purity, and hazard classification.

H. CONTRACTOR shall notify, as appropriate or required, local, state, and/or Federal agencies of stored chemicals and quantities.

2.2 WATER:

A. CONTRACTOR shall use only potable water from a documented source in accordance with Section 1.4.C.

2.3 ISCO EQUIPMENT:

A. The ISCO equipment will be of sufficient size and capacity to meet the performance requirements of the design specifications within the proposed ISCO schedule. The equipment used shall be specified in the ISCO TEP.

B. Chemical oxidant transfer will be accomplished using a closed system transfer pump utilizing materials (hose and cam lock fitting) compatible with the reagents. Plastic fittings will not be allowed for reagent transfer of chemical oxidant above 10% concentration.

C. Chemical oxidant mixing system shall be capable of precisely proportioning the chemical oxidant constituents and blending them into a homogeneous consistency. Properly calibrated volumetric containers and scales required for proper calibration shall be provided by the CONTRACTOR.

D. All materials/equipment utilized in the injection system must be compatible with the chemical oxidant and rated for 100 percent of operating conditions achievable in the field. The chemical oxidant shall be staged in New York Department of Transportation approved interstate tank or drum(s).

E. All systems must be leak-checked daily prior to chemical injection by pressurizing the system with water.

F. CONTRACTOR'S equipment shall measure injection pressure, flows, and total flow for all individual injection wells, and these parameters shall be recorded and reported on the daily reports as specified in Section 1.4.D.

2.4 INJECTION WELL HEAD

A. CONTRACTOR shall provide equipment and materials to allow injection into the subsurface, including but not limited to hosing and well head connectors.

B. All well head materials must be minimum of schedule 40 based on the American Society of Standards and Testing (ASTM) 1785 requirements and compatible with chemical oxidants and contaminants that materials may come in contact with. Well materials must have strength exceeding the anticipated pressures and temperatures by a minimum of 100 percent.

C. Thread or mechanical fastening on well heads must be capable of achieving a seal that will ensure that the above are satisfied.

D. Injection well heads must be fitted with pressure gauge, pressure relief valve, and separate vent fittings for off-gas collection, measurement and treatment.

E. All well head connections shall be made such that the well can be securely closed and locked. Cutting the PVC riser will be allowed to lower the riser height.

F. The CONTRACTOR is to provide a description of injection well head completion requirements to ensure compatibility with their injection equipment.

G. Use of glue on injection well heads shall only be applied to outside of well risers to prevent contact between injected solutions and glue. If glue is used, a minimum of one (1) hour after application of glue shall elapse prior to injection.

2.5 OFF-GAS CONTROL AND TREATMENT:

A. CONTRACTOR shall supply a sufficient quantity of blowers, liquid knock-out drums, and vapor-phase carbon drums in order to collect and treat off-gases produced within the injection area to reduce injection well pressure and control gas migration during the Work in accordance with Section 3.3. Direct venting of off-gases to atmosphere to relieve excess injection well pressure shall not be permitted. Vapor treatment shall reduce VOC emissions to less than 0.5 pounds per hour.

B. CONTRACTOR can, if desired, propose alternative off-gas treatment process or equipment in the TEP. Direct venting of off-gases to atmosphere to relieve excess injection well pressure shall not be permitted.

PART 3 – EXECUTION

3.1 INJECTION OPERATORS

A. CONTRACTOR shall provide a minimum three (3) person crew [OSHA-trained per 29 CFR 1910.120(e)] for the field work. Modified Level D personal protection is anticipated but the Contractor must be able to upgrade to Level C protection if required by the Site Health and Safety Plan.

B. The CONTRACTOR is required to wear all applicable Personal Protective Equipment (PPE) while handling or coming in contact with the chemical solutions, including but not limited to face shield, tyvek coveralls, and chemical-resistant boots and gloves as specified in their site Health and Safety Plan. Under no condition shall leather work gloves, footwear, or rubber-soled footwear be used when mixing, transferring, or actively injecting oxidants or oxidant solutions.

3.2 CHEMICAL OXIDANT PREPARATION

A. CONTRACTOR shall add the calculated quantities determined by the chemical oxidant formulation based on the volume requirements. The oxidant shall be prepared as specified in the ISCO TEP. The CONTRACTOR shall determine and mix specific proportions and quantities of the activating and/or catalyzing agents.

B. CONTRACTOR shall thoroughly mix the water and other mixture constituents into a consistent and homogenous mixture.

C. CONTRACTOR shall ensure solid reagents are completely dissolved by mixing, including, but not limited to, by mixing paddles, recirculation pumps, and tank scouring. CONTRACTOR shall pump or deliver the chemical oxidant from the mixing area to the injection wells at an adequate pressure and flow rate for the injection process. Injection pressure at an injection well shall not exceed 15 (fifteen) pounds per square inch (PSI) unless allowed by the approved TEP.

D. Processed chemical oxidant that becomes contaminated or reacts within the mixing tank prior to injection shall be discarded at the CONTRACTOR's expense.

E. CONTRACTOR shall ensure that prepared chemical oxidant batches, including solutions of persulfate and diluted hydrogen peroxide, do not sit in the mixing tank for an excess of 8-hours prior to injection. The CONTRACTOR shall check pH of sodium persulfate batch solutions every two hours if the batch is not completely injected within 30 minutes of preparation.

F. Batching shall be performed at the project staging/support area. CONTRACTOR shall control batching process and housekeeping around batching area as well as transporting oxidant solutions to the injection area. Releases of high concentrations of chemical oxidant and its constituents will not be allowed. Costs associated with clean-up of any such releases will be borne by the CONTRACTOR.

G. No unsecured materials or equipment shall be left in the injection area (Area 1C) overnight or during the unattended hours.

H. CONTRACTOR shall maintain sufficient quantities of neutralizing solutions as detailed in the TEP.

3.3 INJECTION

A. All systems must be leak-checked daily prior to chemical injection by pressurizing the system with water.

B. Inject oxidant solutions in alternating batches where a fraction of the total volume proposed for a particular well will be injected at any one time to reduce mounding and improve delivery.

C. Perform injections to establish a generally consistent distribution of oxidants throughout the treatment area. Unless approved by NYSEG or their designated representative, injections shall not be performed at adjacent wells at the same time.

D. An exclusion zone of at least ten (10) feet shall be indicated around active injection points using caution tape, cones, and/or jersey barriers to the extent practicable to protect site workers and the public.

E. CONTRACTOR shall provide traffic control and protection during injection activities.

1. The proposed traffic control measures will be implemented in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), including both the federal version and the NYS supplement.
2. To the extent practicable, injection activities will be sequenced to maintain traffic flow and minimize neighborhood disturbance during injection activities. CONTRACTOR shall maintain at least one lane of traffic flow in the area unless full street closure is approved by NYSEG and City of Ithaca.
3. To ensure both worker and public safety, if the CONTRACTOR requests to close the entire street for certain periods during the injection the CONTRACTOR shall obtain a street closure permit from the Ithaca City Engineer's office. The CONTRACTOR must notify the City Engineer at least 30 calendar days prior to mobilization if street closure will be required.
4. At all times throughout the work, maintain emergency access to all residences and buildings in the area. The CONTRACTOR shall move all equipment, if directed by first responders, for emergency vehicles access to residences and buildings on North Plain Street.
5. Hose ramps or similar protective measures shall be used for above ground hoses used in the road.

F. A SPILL PREVENTION AND RESPONSE PLAN shall be included in the CONTRACTOR's TEP. The plan shall specify means and methods to detect and prevent the uncontrolled release of chemical oxidants to the environment and protect all structures and utilities in and around the injection area.

1. Spilled solid sodium persulfate will be collected into an inert container and disposed of as hazardous material, unless it can be screened of organic matter and foreign solids and used in solution. The CONTRACTOR is responsible for proper disposal of solid sodium persulfate waste.
2. The CONTRACTOR is responsible for preventing damage to existing utilities and structures (both above and below grade) and repairing any

damage that does occur. The plan shall specify the inspection schedule to ensure detections.

G. Hydrogen peroxide shall not be injected into any well located less than 20 feet from a building footprint.

H. The oxidant injection volumes for each individual well are to be determined and submitted as part of the TEP. CONTRACTOR shall not deviate from these volumes without approval from NYSEG or its designated representative. Deviations from the TEP must be documented in the DAILY REPORT as specified in Section 1.4.D.

I. Static formation pressure and baseline groundwater conditions, including but not limited to temperature, pH, dissolved oxygen, ORP, specific conductivity, depth to water, shall be measured prior to any injection in all monitoring wells, any vapor recovery/venting wells, and a minimum of ten percent (10%) of injection wells. Baseline lower explosive limit (LEL), carbon dioxide, and oxygen measurements shall also be recorded in each of these wells.

J. Formation pressure, groundwater conditions, including but not limited to temperature, pH, dissolved oxygen, ORP, specific conductivity, depth to water, and extracted vapors shall be monitored periodically as described in the TEP, at a frequency of no less than two times per day.

1. Pressure in any well shall not exceed 5 psi above the static formation pressure measured prior to injection in proximity to residential buildings (within 30 feet) or 15 psi in other areas. Excess pressure will be relieved via venting of off-gases through liquid knock-out drums followed by vapor phase carbon drums as specified in Section 2.5.
2. In-situ groundwater temperature measured in monitoring wells and/or non-active injection wells shall not exhibit a rise of greater than 20 degrees Centigrade above background nor shall in-situ groundwater temperature exceed 40 degrees Centigrade.
3. Extracted vapors shall meet the following criteria at all times: lower explosive limit (LEL) below 10 percent, carbon dioxide below 2500 ppm, and oxygen between 18.5 percent and 23.5 percent.
4. CONTRACTOR shall immediately STOP WORK and notify NYSEG's on-site representative if any condition specified in Section 3.3.I is exceeded. Modification to the injection sequence and/or dosages shall be proposed and approved by NYSEG or their designated representative.

K. The CONTRACTOR shall monitor catch basins, storm drains, or other utility outlets periodically as described in the TEP, at a frequency of no less than two times per day, for the observation of daylighting or damage during injection activities.

L. The CONTRACTOR shall STOP INJECTION activities at observation of day-lighting from the surface or utilities, which will require appropriate mitigation by the CONTRACTOR.

M. The CONTRACTOR shall provide active off-gas control and treatment around and throughout the ISCO treatment area to collect and control off-gas migration.

1. CONTRACTOR shall install monitoring system and perform monitoring to demonstrate adequate collection and control of off-gas.
2. Equipment used for continuous vapor extraction and treatment may remain near the injection area if contained within a temporary fence. Any such equipment shall be secured and located in a manner that will not interfere with emergency access to adjacent residences and buildings.

3.4 SITE CONTROL:

A. All investigative/remediation derived waste, decontamination liquids, and personal protective equipment will be placed in DOT-approved drums provided by the CONTRACTOR and will be moved to OU-1 pending final disposition. The CONTRACTOR will provide labeling for the containers and will be responsible for characterization and removal of wastes.

B. All work areas will be cleaned and left in the same condition as found. All damage to site structures and landscaping caused by the CONTRACTOR due to negligence or failure to exercise reasonable care will be repaired at the cost of the CONTRACTOR.

3.5 QUALITY CONTROL:

A. The CONTRACTOR shall use only potable water from a documented source.

B. The CONTRACTOR shall record gallons of stock liquid reagent or pounds solid reagent, and volume of potable water used in each batch of chemical solution prepared. The CONTRACTOR shall record the final solution volume for each batch and the solution volume injected into each location. This information shall be recorded and submitted in the DAILY REPORTS, INTERIM SUMMARY REPORTS and FINAL ISCO CONSTRUCTION COMPLETION REPORT.

+ + END OF SECTION + +

MATERIALS & PERFORMANCE

INJECTION, MONITORING AND VENT WELLS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Furnish labor, materials, tools and equipment and install groundwater monitoring wells, injection wells, and vent wells as required by the design documents and further specified by the Contractor in his ISCO TECHNICAL EXECUTION PLAN (TEP).

1.02 SUBMITTALS:

A. Provide log showing depth intervals of well components including well screen, casing, sand pack, bentonite seal(s), and surface finish for all wells. Typed logs shall be provided to NYSEG within 5 days of completion of work.
B. Provide typed log showing soil stratification for a minimum of ten (10) percent of injection wells, at locations indicated on the drawings. Typed logs shall be provided to the NYSEG within 5 days of completion of work.

1.03 QUALITY ASSURANCE:

A. Install in accordance with specifications and the drawings. Provide personnel licensed or qualified in accordance with New York regulations and laws, to drill and construct wells.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Sand: Clean, subangular to rounded quartz sand at least 99.0% SiO_2 by weight. To ensure freedom from organic impurities, loss on ignition (L.O.I.) should not exceed 0.1%. Sand grain shall be as indicated on the Drawings.

B. All well materials must be schedule 40 PVC or other approved material by NYSEG or their designated representative compatible with chemical oxidants, pH, and contaminants that materials may come in contact with. Well materials must have strength exceeding the anticipated pressures and temperatures by a minimum of 100 percent.

1. Well Screen: 5 and 10-foot (5 foot preferred) lengths of flush-jointed, threaded, 2-inch, 1.5-inch, and 1-inch inside diameter screen with .010-inch slots. Screen is to be capped at lower end. Thread or mechanical fastening must be capable of achieving a seal that will ensure that the above are satisfied.

2. Well Riser: 5 and10-foot lengths of flush jointed, threaded, 2-inch, 1.5-inch, and 1-inch inside diameter, pipe. Riser shall be completed with threaded caps where possible, else a non-threaded cap (J-plug or similar) shall be used. Thread or mechanical fastening must be capable of achieving a seal that will ensure that the above are satisfied. Do not cut vent hole in PVC riser.

C. Bentonite Chips: Pellets of compressed bentonite, maximum 3/8-inch [1 cm] diameter. Prepackaged bentonite sleeves may be used.

D. Flush-mount Casing: Flush-mount casings should be a minimum 8-inch diameter, traffic resistant, watertight, steel manhole with minimum 12-inch long galvanized skirt. The flush-mount casing cover shall be bolted down to the road box. Well riser shall be secured with a gasket security plug with a keyed-alike brass padlock that has a 5/16-inch diameter hardened steel shackle.

E. Protective Casing: No wells with (stick-up) protective casing are currently specified for the work; however, the Subcontractor should have six (6) available in the event of a field change. 5-foot length, nominal 4-inch diameter CPVC or steel pipe with vented locking steel cap. Cap shall slip over protective pipe a minimum of 3-inches and shall be secured with a keyed-alike brass padlock that has a 5/16-inch diameter hardened steel shackle. Smaller diameter protective casing may also be used for 1-inch wells provided that the smaller diameter protective casing meets the same specifications and provides a cost savings.

F. Concrete: A fine aggregate and cement premix blended with clean, potable water to form a thick concrete slurry.

G. Bentonite slurry (thick) for grout backfill.

H. Cement grout backfill.

I. **No solvents or glues shall be used during the construction of monitoring, injection, or vent wells.** Glue may be used to attach well head connectors in accordance with the IN SITU CHEMICAL OXIDATION Specification Section.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. All well locations shall be hand-cleared to a depth of at least the depth of the top of the deepest nearby utility pipe as shown on the Drawings with a diameter larger than the driller’s subsurface equipment.

B. Injection wells shall be installed no closer than five (5) feet from any monitoring well or vent well location.

C. Injection wells shall be off-set from marked out utilities by a minimum of four (4) feet (or to the extent practicable).

D. Install wells using material and equipment as shown on the Drawings and described in the Design and Specifications.

E. Place clean well screen and riser in borehole.

F. Remove casing simultaneously whenever material is placed down hole.

  1. Do not withdraw casing faster than material is placed to prevent collapse of hole.

  2. Do not withdraw casing too slowly so that sand will bridge inside and lift well screen.

G. Place sand pack, bentonite chips, and cement grout in accordance with the Drawings.

H. For flush-mount road boxes:

  1. Secure well with 2-inch diameter expandable security plug with brass lock.

  2. Install minimum 8-inch diameter manhole so that it is flush with the above ground surface.

  3. Place concrete around manhole extending from bottom of manhole and tapering to a 2-foot diameter concrete pad that slopes away from the well at the surface.

I. For boreholes where a well is not constructed, fill the vacant bore hole with hydrated bentonite chips to six inches below surface grade, with the remain void volume filled with clean sand (or other materials as directed by the City of Ithaca) and hot patch. .

J. Do not develop the injection wells, unless directed by NYSEG or their designated representative.

K. **No solvents or glues shall be used during the construction of monitoring, injection, or vent wells.** Glue may be used to attach well head connectors in accordance with the IN SITU CHEMICAL OXIDATION Specification Section.

*** END OF SECTION ***

SECTION 01501
TEMPORARY SANITARY SEWER BY-PASS

PART 1 GENERAL

1.01 SUMMARY

A. The work of this section includes the furnishing of all labor, equipment, tools, and materials necessary to provide temporary by-pass pumping of Sanitary Sewer, as specified herein, and/or as shown on the Drawings.

B. Daily flow rates as reported by the City of Ithaca – Water and Sewer Department, are 2 million gallons per day. Contractor shall for bidding purposes provide for a peak flow rate of 4,725 gallons per minute.

C. The design, installation and operation of the temporary pumping system shall be the Contractor’s responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the Engineer that he specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five references from projects of a similar size and complexity as this project performed by his firm within the past three years. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

D. Upon Mobilization to the Site, Contractor shall conduct monitoring of sanitary sewer flow rates as described in section 1.08. Upon completion of the flow metering Contractor shall revise and submit for approval by the Engineer, by-pass pumping of sanitary sewer design to account for actual flow rates.

1.02 REFERENCES

A. National Association of Sewer Service Companies

1.03 SUBMITTALS

A. Data regarding pump and motor characteristics and performance.

B. Shop Drawings

C. Manufacturer’s literature.

D. Operation and maintenance instructions and parts list.

E. Shop and field inspection reports.

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F. Qualifications of field service engineer.

G. Submit a detailed description of the proposed pumping system and the vendor's references with the bid proposal. Bid proposals without an acceptable detailed plan for the temporary bypass pumping system shall be rejected.

H. Submit detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. The plan must be specific and complete, including such items as schedules, locations, elevations, capabilities of equipment, materials and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to discharge flows, and the compliance with the requirements and permit conditions specified in these Contract Documents. No construction shall begin until all provisions and requirements have been reviewed by the Engineer.

I. Staging area locations for pumps.

J. Sewer plugging methods and types of plugs.

K. Number, size, materials, location and method of installation of suction piping.

L. Number, size, materials, method of installation and location of installation discharge piping.

M. Bypass pumping sizes, capacity, and number of each size to be on site and power requirements.

N. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).

O. Standby power generator size; location.

P. Downstream discharge plan.

Q. Method of protecting discharge manholes or structures from erosion and damage.

R. Thrust and restraint block sizes.

S. Sections showing suction and discharge pipe depth, embedment, selected fill sand special backfill.

T. Method of noise control for each pump and/or generator.

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U. Any temporary piping supports and anchoring required.

V. Design plans and computation for access to bypass pumping locations indicated on the drawings.

W. Calculations for selection of bypass pumping pump sizes.

X. Schedule for installation of and maintenance of bypass pumping lines.

Y. Drawing indicating proposed locations of bypass pumping lines.

1.04 BYPASS PUMPING

A. As required to maintain capacity in the sanitary sewer main during the work, the Contractor shall provide all temporary bypass pumping including fuel for the time necessary to complete the permanent Sanitary Sewer reinstallation. Bypass pumping shall include pumping capacity as described in Section 1.01 and shall also include a means to provide standby capacity. All temporary bypass pumping equipment shall be removed when the work is complete. If necessary to maintain operations, the Contractor shall also provide septage trucks or other means and methods to perform the work.

B. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

C. The Contractor shall submit a bypass operations plan for approval by NYSEG prior to beginning the work. Contractor shall provide an emergency response plan indicating responsible individuals, anticipated response times, and response procedures.

D. The Contractor shall furnish the necessary labor, equipment, tools and materials necessary to divert the flow of sewage to maintain sanitary sewer service at all times. The Contractor shall be responsible for the start up and continuous operation of the bypass pumping system.

E. Sanitary sewer service, including service connections and gravity sewers shall be maintained at all times. The Contractor shall provide all labor, equipment, tools and materials for the time necessary to complete the permanent replacement following excavation of Areas 1A and 1B. All temporary bypass pumping equipment shall be removed when work is completed. If necessary to maintain operations, the Contractor shall also provide septage trucks or other means and methods to perform this work.

F. The bypass pumping plan shall provide for 100% backup bypass pumping operations in case of prime bypass pumping failure.

G. The Contractor shall include sound attenuation procedures and all bypass pumping operations shall conform to the requirements of the State of New York and the City of Ithaca.

H. The bypass pumping system shall be equipped with automatic alarm facilities to simultaneously notify Contractor and Engineer of a malfunction of the bypass pumping equipment and a high wastewater level. Contractor shall make provisions as required to limit alarm response time to less than 15 minutes.

I. Contractor shall provide and pay for temporary telephone utility services including establishment, commodity and removal charges.

J. The Contractor shall conduct his work so as to not cause excessive surcharging of the sewer system and shall not cause damage to the existing sewer system. Contractor shall schedule his work so as to minimize the period of time that the sanitary sewer main is out of service. Any damage caused by the Contractor's operations shall be repaired to the complete satisfaction of the Engineer and at no additional cost to the NYSEG.

K. When bypass pumping equipment is no longer required, remove all temporary facilities and equipment. Permanently seal all temporary openings in manholes and structures. Restore all disturbed areas as indicated on the Drawings.

1.05 SYSTEM DESCRIPTION

A. Design requirements

1. Bypass pumping systems shall, for bidding estimates, have sufficient capacity to pump a peak flow as specified herein. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be removed and reinstalled due to excavation of contaminated soils. Bypass pumping system will be required to be operated 24 hours per day.

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2. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.

3. Bypass pumping system shall be capable of bypassing the flow around the work area and of releasing any amount of flow up to full available flow into the work area as necessary for satisfactory performances of work.

4. The Contractor shall make all arrangements for bypass pumping during the time when the main is shut down for any reason.

B. Performance Requirements

1. No interruption in the flow of sewage throughout the duration of the project will be acceptable. To this end, the Contractor shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work and return it to the existing sewer downstream of his work.

2. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

3. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.

4. The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

5. The Contractor shall protect water resources, wetlands and other natural resources.

1.06 FIELD QUALITY CONTROL AND MAINTENANCE

A. Test:

SECTION 01501
TEMPORARY SANITARY SEWER BY-PASS

1. The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. The Engineer and the Water and Sewer Department will be given 24 hours notice prior to testing.

B. Inspection:

1. Contractor shall inspect bypass pumping system every two hours to ensure that the system is working correctly.

C. Maintenance Service:

1. The contractor shall insure that the temporary pumping station is properly maintained and a responsible operator shall be available at all times when pumps are operating.

D. Extra Materials:

1. Spare parts for pumps and piping shall be kept on site as required.

2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

1.07 PREPARATION

A. Precautions:

1. Contractor is responsible for locating any existing utilities in the area the Contractor selects to locate the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the City of Ithaca and the Engineer. All costs associated with relocating utilities and obtaining all approvals shall be included in the Contractor's pricing.

2. During all bypass pumping operation, the Contractor shall protect the sewer main and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the sewer main and all local sewer lines caused by human or mechanical failure.

1.08 MONITORING

A. Flow Monitoring

SECTION 01501
TEMPORARY SANITARY SEWER BY-PASS

1. Mobilize personnel and equipment, perform site reconnaissance, install and calibrate one flow monitor for 8 continuous weeks. Flow monitors to be of the area-velocity type with pressure transducer. The flow monitors will be installed in round sewers up to 24 inches in diameter. Monitoring period will begin after all flow monitors are installed.

2. Perform data collection, flow monitor servicing, and take manual flow level and velocity readings on a weekly basis.

3. Submit flow monitoring data to Engineer on a weekly basis. Data will be provided in Excel spreadsheet form and will include date, time, flow depth, flow velocity, and flow rate readings at 15 minute intervals for each flow monitor. Flow monitor site sheets will also be submitted on a weekly basis.

4. Demobilize and remove flow monitoring equipment.

B. Rain Monitoring

1. Mobilize personnel and equipment, perform site reconnaissance, install and calibrate one tipping-bucket rain gage for 8 continuous weeks.

2. Perform data collection, and rain gage servicing during the flow monitoring period on a weekly basis.

3. Submit rain gage data to Engineer on a weekly basis. Data will be provided in Excel spreadsheet form and will include date, time, and rainfall readings at 15 minute intervals, and daily total rainfall.

1.09 INSTALLATION AND REMOVAL

A. The Contractor shall remove manhole sections or make connections to the existing sewer and construct temporary bypass pumping structures only at the access location indicated on the Drawings and as may be required to provide adequate suction conduits.

B. Plugging or blocking of sewage flows shall incorporate a primary and secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance of work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

SECTION 01501
TEMPORARY SANITARY SEWER BY-PASS

C. When working inside a manhole or sewer main, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.

D. The installation of the bypass pipelines is prohibited in all wetland areas. The pipeline must be located off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, the contractor must place the bypass pipelines in trenches and cover with temporary pavement. Where the bypass pipeline is within 15 feet of the streets Contractor shall provide temporary concrete barrier (i.e. “jersey barrier”) protection for the bypass pipeline. Upon completion of the bypass pumping operations, and after the receipt of written permission from the Engineer, the Contractor shall remove all the piping, restore all property to pre-construction condition and restore all pavement. The contractor is responsible for obtaining any approvals for placement of the temporary pipeline within public ways from the City of Ithaca.

PART 2 PRODUCTS

Not Applicable.

PART 3 EXECUTION

Not Applicable.

*** END OF SECTION ***

Appendix A

Organizational Chart

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY

April 2012

Organizational Chart
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

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Latham, NY

April 2012

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NYSDEC Site # 7-55-008

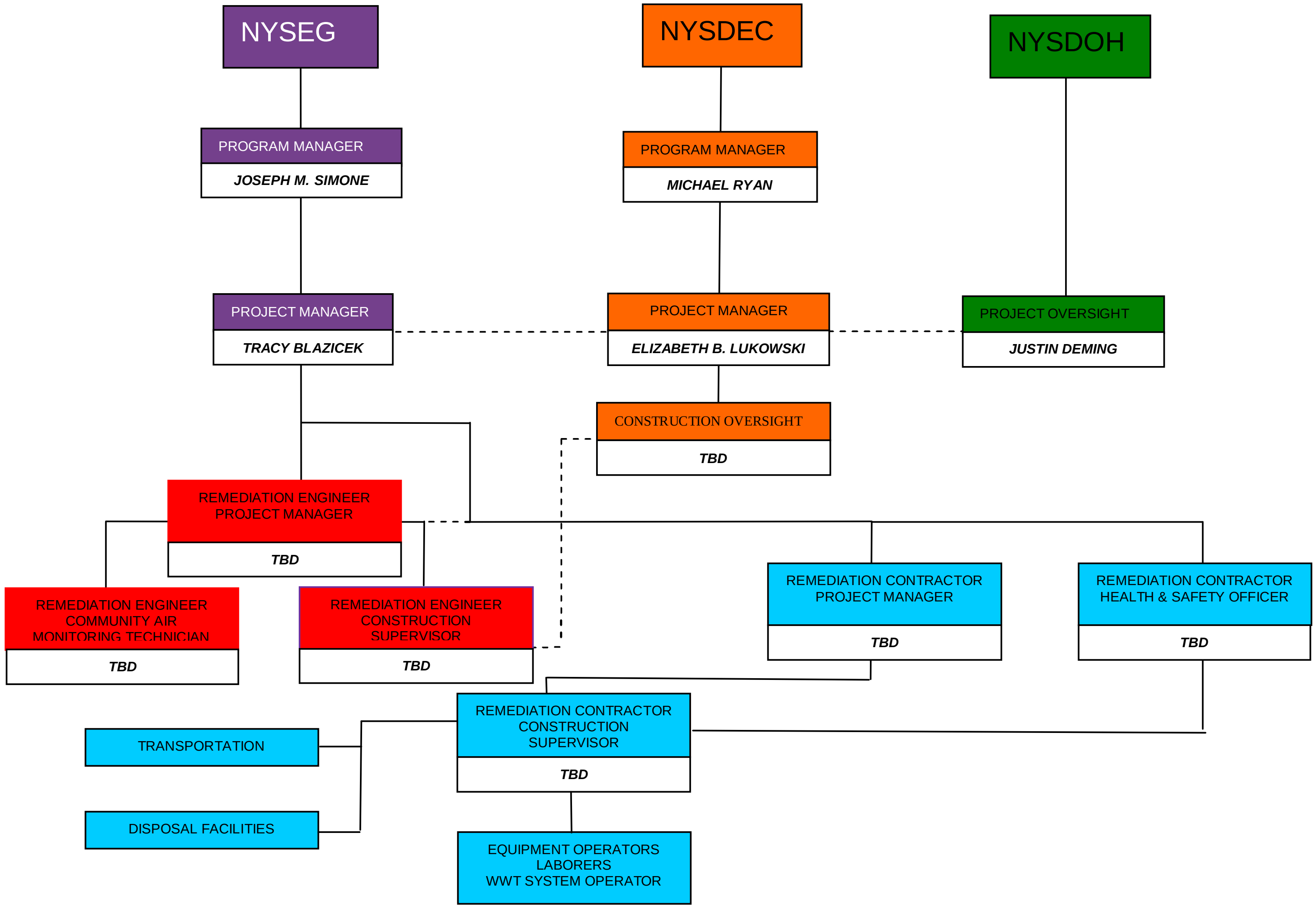
Patrick Gratton

Prepared By Patrick Gratton

Scott Underhill

Reviewed By Scott Underhill, PE

APPENDIX A
ORGANIZATIONAL CHART



Appendix B

Citizens Participation Plan

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Citizens Participation Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
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AECOM Environment

Prepared for:
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Binghamton, NY

Prepared by:
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Latham, NY 12110

April 2012

Citizens Participation Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Patrick Gratton

Prepared By Patrick Gratton

Scott Underhill

Reviewed By Scott Underhill, PE

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1.0 Introduction

New York State Electric & Gas Corporation (NYSEG) is preparing to implement a Remedial Action Design involving the excavation and off-site disposal of coal tar impacted soil and in-situ chemical oxidation (ISCO) treatment associated with Ithaca Court Street former manufactured gas plant site located at the intersection of North Plain Street and Esty Street in Ithaca, Tompkins County, New York. This *Citizen Participation Plan* will detail citizen participation activities that will be implemented for this remediation project.

A *Remedial Action Design For Removal And Off-site Disposal Of Coal Tar Impacted Soil and ISCO Treatment Associated With Ithaca Court Street Former Manufactured Gas Plant Site OU-2* has been developed. The proposed Remedial Action Design will involve excavation, removal and disposal of coal tar impacted soil and debris from Areas 1A and 1B. Area 1C and the area around SB-168 will involve pressurized injections of an oxidant into the ground. The Remedial Action Design will be conducted according to the requirements of an Order on Consent between NYSEG and the New York State Department of Environmental Conservation (NYSDEC) and the Record of Decision (ROD). The Order on Consent is a legal document that defines the obligations of each party for conducting site investigations and remediations. The Order on Consent requires that all work by NYSEG at the site be performed under the oversight of the NYSDEC and the New York State Department of Health (NYSDOH). The ROD presents the remedy for OU-2 of the Ithaca Court St. MGP site.

2.0 Project Objective

The primary objectives of the remedial action design, as required by the Record of Decision issued March 2011, include:

- Excavation of off-site soils in Areas designated as 1A and 1B. Excavation will be preceded by a pre-design investigation (PDI) in Areas 1A and 1B and their immediate vicinity to determine off-site treatment and disposal facility options. Soil which is not visibly impacted will be used as backfill in the right-of-way portion of OU-2.
- If backfill materials are used in the right-of-way portion of Areas 1A and 1B, which do not meet residential soil cleanup objectives, a soil or pavement cover will be provided to prevent exposure to underlying soils.
- ISCO of impacted soils in Area 1C and the area around SB-168. This remedy will be preceded by a treatability study to identify the appropriate oxidant(s) and catalyzing agent(s).
- Monitoring wells with sumps will be installed to collect and remove flowable NAPL if present in Area 1C.
- To the extent practicable, green remediation and sustainability in accordance with DER-31, will be considered in the design and implementation of the remedy.

3.0 Basic Site Information

The former NYSEG MGP site is in Ithaca, Tompkins County, New York. The former gas plant site was initially investigated by NYSEG in 1986. For remediation purposes, areas affected by the former gas plant operations have been separated into two different operable units. A full remedial investigation was initiated in October 2001. During the investigation, coal tar and associated contamination were identified beyond the boundaries of the site and tar conduits in West Court Street. The site was then organized into two Operable Units: OU-1 is the plant site and the conduits, and OU-2 is the off-site areas where contamination had migrated through the subsurface, away from the OU-1 area and into the surrounding residential community.

The remediation of the conduits in West Court Street started in the fall of 2002 and was completed in the fall of 2010. Remediation of the OU-1 gas plant site began in the fall of 2008 and was completed in January 2010, with the exception of the Markles Flats building. The construction completion report for that work was approved in December 2010. The Remedial Investigation Report for OU-2 was finalized in February 2011 and is currently available for public review in the document repositories established for this site, as is the Feasibility Study which was finalized in February 2011.

Based on communication between NYSEG and NYSDEC, it was acknowledged that a combination of remediation processes would likely be implemented for OU-2 due to the variability in the concentrations and distribution of site contamination. Several subareas were identified, and remediation alternatives have been developed and evaluated for each subarea. Area 1 is located at the intersection of North Plain Street and Esty Street with an area of approximately 47,425 square feet (~1.1 acre) to be addressed by remediation. Area 1 contains 3 subareas that are the focus of this remedial action design.

- Area 1A is located immediately north of OU-1 on Esty Street with an area of approximately 8,400 square feet.
- Area 1B is approximately 5,100 square feet in area located on North Plain Street, west of OU-1, and immediately south of Esty Street.
- Area 1C is approximately 4,900 square feet in area located on North Plain Street, northwest of OU-1, and immediately north of Esty Street.
- The Remainder of Area 1 has an area of approximately 29,025 square feet and is considered outside of Areas 1A, 1B, and 1C for this RDWP.

4.0 Previous Investigations and Reports

1. “Investigation of the Former Coal Gasification Site at West Court Street, Ithaca, New York; Task 1 Report, Preliminary Site Evaluation.” Prepared by E.C. Jordan Co., April 1986

2. “Investigation of the Former Coal Gasification Site at West Court Street, Ithaca, New York; Task 2 Report, Initial Field Investigation Program.” Prepared by E.C. Jordan Co., April 1987

3. Order on Consent, Index No. DO-0002-9309, between the Department and New York State Electric and Gas (NYSEG), executed on March 30, 1994.

4. “Interim Remedial Measures Final Engineering Report for Activities at Ithaca Cayuga Inlet Coal Tar Site, City of Ithaca, Tompkins County, New York”. NYSEG, June 1999

5. “Interim Remedial Measures Final Engineering Report for Activities at Ithaca Court Street Former Manufactured Gas Plant Site Subsurface Wooden Duct Extension, City of Ithaca, Tompkins County, New York”, prepared by NYSEG, August 2001.

6. "Ithaca Court Street MGP Site, Interim Draft Supplemental Remedial Investigation Report for Operable Unit-2", prepared by MWH for NYSEG, August 27, 2002.

7. "Interim Remedial Measures Work Plan for Removal of Coal Tar Impacted Soil on Washington Street Between W. Court and Cascadilla Streets Associated with Ithaca Court Street Former Manufactured Gas Plant Site City of Ithaca, Tompkins County, New York", prepared by NYSEG Environmental Compliance Site Investigation and Remediation, March 2005.

8. "Final Engineering Report Removal of the Subsurface Wooden Duct and Removal of Coal Tar Impacted Soil of Washington Street Between W. Court and Cascadilla Streets Associated with Ithaca Court Street Former manufactured Gas Plant Site, City of Ithaca, Tompkins County, New York", prepared by NYSEG Environmental Compliance Site Investigation and Remediation, April 2007.

9. "OU2 Interim Remedial Measure Work Plan for Wooden Duct Removal Project on W. Court Street Between Meadow and Fulton Streets, Ithaca Court Street Former manufactured Gas Plant Site, City of Ithaca, Tompkins County, New York, prepared by NYSEG, October 2010.

10. Proposed Remedial Action Plan for the NYSEG Ithaca Court St. MGP site, Operable Unit No. 2, prepared by NYSDEC, February 2011.

11. "Remedial Investigation Report Operable Unit 2 NYSEG's Court Street Former MGP Site, Ithaca, New York", prepared by AECOM for NYSEG, February 2011.

12. "Feasibility Study Report Operable Unit 2 NYSEG's Court Street Former MGP Site, Ithaca, New York, NYSDEC Site No: 7-55-008, Index No. D0-00029309", prepared by AECOM for NYSEG, February 2011.

13. "Remedial Design Work Plan Ithaca Court Street Former MGP Site OU-2 Ithaca, New York NYSDEC Site # 7-55-008", prepared by AECOM for NYSEG, July 2011.

5.0 Document Repository

All of the documents associated with these Investigation and Reports are available for public review at the following document repositories:

- New York State Department of Environmental Conservation
  Central Office, 625 Broadway 11th Floor
  Albany, New York 12233-7014
  Attn: Ms. Elizabeth B. Lukowski
  (866) 520-2334
  (By appointment only)

- Tompkins County Public Library
  101 E. Green Street
  Ithaca, NY 14850
  Mon-Thurs 10:00 AM – 8:15 PM
  Friday-Sat 10:00 AM – 5:00 PM
  Sunday 1:00 PM – 5:00 PM

- Coal Tar Advisory Committee
  106 Washington Street
  Ithaca, NY 14850
  (607) 272-1239
  Attn: Jutta Dotterweich
- City of Ithaca
  Office of the Mayor
  108 East Green Street
  (607) 274-6501

6.0 Interested/Affected Public

An electronic mailing list has been developed that includes adjacent property owners and businesses, local and State elected officials, local media, and other identified interested parties. All information will be disseminated to the public electronically via the NYSDEC's list serve. Interested public can join the List Serve by visiting www.dec.ny.gov/chemical/61092.html

7.0 Description of Citizen Participation Activities for Each Major Element of the Remedial Action Design Project

To facilitate the *Remedial Action Design* process, NYSEG in cooperation with NYSDEC and NYSDOH, will inform the public and local officials of planned remedial activities. Public participation will include at a minimum the following:

- Distribution to those identified in Section 6.0 of this document of a fact sheet prepared by either NYSDEC or NYSEG describing the planned remedial activities.
- A public availability session will be held by NYSDEC, in conjunction with NYSDOH and NYSEG, prior to *Remedial Action Design* finalization, to describe the planned activities at the site.
- Posting by NYSEG of a phone number for public to call 24-hours per day, with any questions or concerns that may arise during the project. A customer service representative will answer calls and contact a member of the project team who will contact the caller and/or initiate appropriate engineering controls to address the concern.
- Notice of the public availability session will be provided by either NYSDEC or NYSEG via mailing list and notices through the local media.

8.0 Additional Information

For additional information about this project, any of the following individuals may be contacted:

NYSEG: Mr. Robert Pass – Manager, Regional Outreach & Development
1387 Dryden Road
Ithaca, New York 14850-8810
Phone: (607) 762-6298
E-mail: rlpass@nyseg.com

Mr. Tracy Blazicek: Remediation Project Manager
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224
Binghamton, New York 13902
Phone: (607) 762-8839
E-mail: tlblazicek@nyseg.com

NYSDEC: Ms. Elizabeth B. Lukowski: Site Project Manager
NYSDEC
625 Broadway
Albany, New York 12233-7014
Phone: (866) 520-2334
E-mail: eblukows@gw.dec.state.ny.us

NYSDOH: Mr. Justin Deming: Bureau of Environmental Exposure Investigation – Central Section
NYSDOH
Flanigan Square, 547 River Street
Troy, New York 12180-2216
Phone: (518) 402-7860
E-mail: jhd01@health.state.ny.us

Appendix C

Transportation Plan

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Transportation Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Transportation Plan
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NYSDEC Site # 7-55-008

Patrick Gratton

Prepared By Patrick Gratton

Scott Underhill

Reviewed By Scott Underhill, PE

Contents

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1.0 Scope of Work

This Specification is for the transportation of solid or liquid non-hazardous and hazardous waste associated with the Ithaca Court Street OU-2 former manufactured gas plant (MGP) site in the City of Ithaca, Tompkins County, New York. All transportation must be in accordance with the Order on Consent Index Number D0-0002-9309 with New York State Department of Environmental Conservation (NYSEDC) and any other applicable Federal, State, and Local Laws.

2.0 Work by Transportation Contractor

The transporter contractor shall provide all necessary supervision, training, permits, hazardous waste manifest (when required), labor, personal protective equipment (PPE), tools, equipment, consumable materials, and expendable materials, to transport solid or liquid waste to a disposal facility as detailed herein.

3.0 General Work Conditions

3.1 The transporter shall comply with all applicable provisions of NYSDEC Regulation, 6 NYCRR Part 364 "Waste Transporters Permit", Title 6 of the Official Compilation of codes, Rules and Regulations.

3.2 The transporter shall comply with all applicable provisions of NYSDEC Regulation, 6 NYCRR Part 372 "Hazardous Waste Manifest System and Related Standards of Generators, Transporters and Facilities", Title 6 of the Official Compilation of codes, Rules and Regulations.

3.3 The transporter shall comply with all applicable provisions of New York State Department of Transportation (NYSDOT), the New York State Department of Motor Vehicle (NYSDMV), and/or any other applicable Federal, State, and Local Laws.

3.4 The transporter shall comply with all applicable provisions of Occupational Safety and Health Act or Administration (OSHA) 29 CFR 1910.120 "Hazardous Waste Operations Health & Emergency Response".

3.5 The transporter shall develop and implement a written Health & Safety Plan for their drivers that address potential exposure to manufactured gas plant site residuals.

3.6 The transporter shall adhere to the following rules while working on a manufactured gas plant site project and waste disposal facility:

3.6.1 Any truck found unacceptable by NYSEG project coordinator or Contractor health & safety officer will be rejected. Any cost for rejected trucks shall be incurred by the transporter. If the NYSDEC project oversight finds any truck unacceptable, they should bring it to the attention of NYSEG project coordinator.

3.6.2 The truck drivers will report their arrival to NYSEG project coordinator.

3.6.3 Truck drivers are generally restricted to their trucks and the designated waiting areas. Drivers are not permitted access to the manufactured gas plant site project without express permission from NYSEG project coordinator.

3.6.4 Trucks drivers will don HARD HATS, SAFETY GLASSES, SAFETY SHOES, and GLOVES, as a minimum for personal protection.

3.6.5 The drivers of all trucks and roll off containers transporting, non-hazardous MGP waste, hazardous solid waste or conditionally exempt manufactured gas plant site remediation waste will line the entire box (to top of side boards) with 6-mil thick polyethylene sheeting. Trucks transporting non-hazardous waste may be lined as previously stated. All trucks will have a watertight tailgate that has a gasket between the box and tailgate or driver will apply caulking between the box and tailgate.

3.6.6 All trucks require working audible and visual backup signals.

3.6.7 When loading or when directed by NYSEG project coordinator, the truck engine should be shut off. Truck may be restarted and driven away only after the “all clear” direction from the loading operator or a site representative.

3.6.8 In residential or other areas where the exhaust and/or noise could be a nuisance the truck engine should be shut off.

3.6.9 No truck will be loaded above the sideboards and no waste will be spilling out of the truck. Before trucks leave the loading areas the truck exterior and tires will be cleaned (by site workers) from waste being loaded.

3.6.10 NYSEG remedial workers will reposition the cover bars over the waste material. DRIVERS WILL NOT WALK OVER WASTE MATERIAL.

3.6.11 Drivers will cover loads before leaving the loading area with a solid fabric (i.e., vinyl, reinforced polyethylene) cover that covers the entire load.

3.6.12 Obey traffic signs and notices (obey the posted speed limit).

3.6.13 Obey rules posted on the site and/or any site specific Health & Safety Plan for all project personnel.

3.6.14 Report any accidents to the NYSEG project coordinator and cooperate with any subsequent accident investigation.

3.6.15 No children under 16 years of age are allowed on manufactured gas plant site projects.

3.6.16 No passengers are allowing in the Contamination Reduction Zone (loading area).

3.6.17 Slow down and be extra cautious during times of poor weather (i.e., rain, fog, snow).

3.6.18 Take extra care around blind corners (watch for pedestrians and construction equipment).

3.6.19 Smoking, eating, and/or drinking is not permitted within the Contamination Reduction Zone. Smoking, eating, and/or drinking are permitted in designate areas of the Support Zone.

3.6.20 After Disposal of waste, the transporter is responsible for properly decontaminating their truck or trailer, trailer or tanker, and roll off containers.

4.0 Truck Route

Truck route for arrival and departure at the Ithaca Court Street OU-2 former MGP site will be as direct as possible and will use interstate and state highways, and primary, well-travelled city streets to the maximum extent possible. Truck route shall avoid minor, congested and/or poorly maintained roads and streets. Contractor shall submit his proposed truck route for NYSEG review and approval prior to any actual trucking activity.

Appendix D

Pre-Design Investigation Summary Report

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Pre-Design Investigation Summary
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Pre-Design Investigation Summary
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Prepared By Keith Stahle

Reviewed By Scott Underhill, PE

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Attachment C Geotechnical Analytical Results

1.0 Introduction

This report summarizes the pre-design investigation performed by AECOM at the former Ithaca Court Street manufactured gas plant (MGP) OU-2 site in the summer of 2011. The work was conducted in general accordance with the approved "Remedial Design Work Plan" prepared by AECOM for NYSEG Environmental Compliance and dated July 2011. As specified in the work plan, the objectives of the sampling event included the following:

- Area 1A and Area 1B
  - Pre-excavation waste characterization of the soil to be removed and disposed of off-site;
  - Pre-excavation soil reuse analytical data for soil anticipated to be reused;
  - Focused supplemental horizontal and vertical delineation of impacted areas; and
  - Geotechnical testing to collect data for the project sheeting and dewatering design work.
- Area 1C
  - Evaluate potential in-situ chemical oxidation (ISCO) treatment options via bench scale testing;
  - Quantify baseline contaminant concentrations in soil and groundwater in Area 1C; and
  - Perform focused supplemental horizontal and vertical delineation of the impacted area.

1.1 Field Sampling Summary

AECOM and its contractor, Aquifer Drilling and Testing, Inc. (ADT), mobilized to the site and installed a total of 44 soil borings, 4 geotechnical borings and 7 new monitoring wells between July 26th and August 10th, 2011 using a truck-mounted mini-sonic rig and a truck-mounted Hollow Stem Auger (HSA) rig. Soil boring locations are depicted in Attachment A. All samples obtained using the mini-sonic rig were collected using a 3-inch diameter core sampler. Samples obtained using the HSA rig were collected using a 2-inch diameter split-spoon sampler. As specified in the "Remedial Design Work Plan", the site was separated into three distinct areas:

- Area 1A - located immediately north of OU-1 on Esty Street,
- Area 1B - located on North Plain Street, west of OU-1, and immediately south of Esty Street; and
- Area 1C - located on North Plain Street, northwest of OU-1, and immediately north of Esty Street.

2.0 Investigation Activities

2.1 Area 1A and Area 1B

Eight soil borings were advanced within Area 1A, seven soil borings within Area 1B, and 11 soil borings along the perimeters of Areas 1A and 1B. Soil borings were installed to an average depth of approximately 20-ft below ground surface (bgs) utilizing mini-sonic and 3-inch diameter core samplers to ensure sufficient sample recovery. Soil characteristics such as odor, photo ionization detector (PID) readings, and visual evidence of MGP impacts were noted on field documentation by an AECOM geologist. A summary of visual observations and boring logs were completed and are provided in Attachments A and B. The sample results are represented in the design drawings.

Thirteen soil samples representative of the upper zone of soil within Areas 1A and 1B were collected from soil which did not display visible MGP impacts based on field observations. Soil samples were submitted to Test America of Amherst, New York for laboratory analysis of the following soil reuse evaluation parameters: VOCs, SVOCs, metals, pesticides, and PCBs.

For soil within the street right-of-way, careful visual examinations were performed and recorded for all soil borings to further refine the delineation between the soil which does and does not contain visible MGP impacts in the soil borings. Visible MGP impacts were noted in one delineation boring, PDI-18, from 19 to 21.5 ft bgs. Visible MGP impacts were not observed in any other delineation borings within the street right-of-way. For soil outside of the street right-of-way, one sample, PDI-10 (10.5-12.5) was collected to assist with delineation of MGP impacts. This sample was submitted for laboratory analysis of VOCs, SVOCs, and cyanide. Visible MGP impacts were not observed in soil boring PDI-10.

Ten soil samples representative of the soil from soil borings within Areas 1A and 1B, which contained visible MGP impacts were collected to characterize this material for waste disposal purposes. Soil samples were submitted for laboratory analysis of the following waste disposal parameters: VOCs, SVOCs, RCRA metals, total cyanide, total petroleum hydrocarbons (TPH), total PCBs, % sulfur, BTU Content, TCLP VOCs, TCLP SVOCs, TCLP metals, TCLP herbicides, TCLP pesticides, ignitability, corrosivity (pH), reactive cyanide, reactive sulfide, % solids, and paint filter.

Four soil borings (two for each area) were installed to a depth of 60 feet each utilizing a HSA drill rig and 2-inch diameter split-spoon samples for geotechnical evaluation to support the sheeting and dewatering design. These soil borings included blow counts to assess soil strength and Shelby tubes were collected for laboratory analysis of geotechnical parameters. These soil borings were located in close proximity to Areas 1A and 1B, but outside of areas containing NAPL to protect the underlying aquifer. Geotechnical analysis of soil samples was performed by GeoTesting Express, inc. of Acton, Massachusetts. Seven samples of the fine grained cohesive materials were collected from soil borings and submitted for analysis of gradation, Atterberg limits, and moisture content. In addition, Shelby tube samples were collected of the clayey soils from representative soil borings and depths. Four of the Shelby tube samples were submitted for analysis of soil strength using Unconsolidated-Undrained (UU) triaxial compression tests and three of these samples were analyzed for hydraulic conductivity. The geotechnical analytical results are provided in Attachment C.

2.2 Area 1C

Seven new groundwater monitoring wells (MW-C11 through MW-C17) were installed, developed, and sampled in Area 1C. The monitoring wells include 2-ft sumps to allow for collection of potential NAPL. Soil and groundwater samples to conduct chemical oxidation bench scale testing were collected at the time of monitoring well installation. The necessary volume of site groundwater for the bench scale testing was collected from the new and existing monitoring wells (MW-14S).

Five soil samples were collected during monitoring well installation to establish baseline soil conditions in Area 1C. These soil samples were submitted for laboratory analysis of VOCs, SVOCs, TPH diesel range organics (DRO), TPH gasoline range organics (GRO), and cyanide.

Chemical oxidation bench scale testing was performed to evaluate both hydrogen peroxide (Modified Fenton's Reagent or MFR) and activated sodium persulfate as oxidants. The specific objectives of these tests included:

a. Quantify natural oxidant demand of site soils;
b. Demonstrate chemical oxidation of impacted soil in laboratory environment;
c. Determine the appropriate oxidant(s) and dosage for field injection;
d. Evaluate pH buffer capacity of site soils to evaluate activation and catalyst chemistries of the selected oxidant;
e. Baseline sampling will be performed for VOCs, SVOCs, TPH, DRO, TPH GRO and cyanide from reactor soil and VOCs, SVOCs, TPH DRO, TPH GRO, cyanide, and select metals (iron, arsenic, and chromium) from reactor water; and
f. Laboratory analyses of the treatability study reactors soil/groundwater slurry will be conducted at multiple stages of the study including after the second dosage (9 Days) for VOCs, SVOCs, TPH DRO and TPH GRO and after the third dosage (14 Days) for VOCs, SVOCs, cyanide, TPH DRO, TPH GRO, and metals (groundwater only) of oxidant(s).

Baseline groundwater sampling from new monitoring wells was conducted while bench scale tests were underway. The wells were gauged for measureable NAPL. No measureable NAPL was observed in any of the new monitoring wells. Laboratory analyses was performed on seven groundwater samples for VOCs, SVOCs, TPH DRO, TPH GRO, and cyanide. Four of the groundwater samples were also analyzed for select metals (As, Fe, Mn, and Cr).

Ten soil borings were advanced to a depth of 20-ft bgs in order to perform additional focused contamination delineation of Area 1C. Visible evidence of MGP impacts was noted in four of these borings. Six soil samples were collected from three of the Area 1C delineation borings (PDI-1, PDI-2, and PDI-3) and analyzed for VOCs, SVOCs, and cyanide.

3.0 Investigation Results

The observations and analytical results of this investigation are being used to characterize materials for reuse or disposal and to demonstrate the ability of the ISCO technology to meet the remedial goals for this site. As described in the approved work plan, excavated soils will be managed in accordance with the following categories:

- Subsurface Fill –Soil without visible MGP impacts per the ROD (NYSDEC, March 2011) may be stockpiled and used as backfill in the right-of-way portion of OU-2, following the completion of the excavation. If this soil does not meet residential soil cleanup objectives, a specific soil cover for (vegetated areas) or paving system/concrete for (non-vegetated areas) will be required.
- Non-hazardous Waste – Coal tar soil found not to exceed the toxicity characteristic leaching procedure (TCLP) limits or reactivity limits (Table 1 shows the limits).
- Conditionally Exempt Manufactured Gas Plant Remediation Waste – Material as defined per NYSDEC Department of Environmental Remediation (DER) Program Policy DER-4, Management of Coal Tar Wastes and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants.

- Hazardous Waste - Coal tar soil found to exceed the TCLP limits (except for benzene) or reactivity limits.

3.1 Area 1A and Area 1B

Thirteen soil samples collected from the upper zone of soil within Areas 1A and 1B which did not contain visible MGP impacts were submitted for analysis for the following soil reuse evaluation parameters:

- VOC TCL US EPA Method 8260B
- SVOC TCL US EPA Method 8270C
- Metals (8 RCRA) US EPA Method 6010B/7471A
- Total PCBs US EPA Method 8082
- Pesticides US EPA Method 8081B

The analytical results for soil reuse evaluation samples are summarized in Table 2 (Area 1A) and Table 3 (Area 1B). These analytical results are compared to the residential use soil cleanup objectives to help determine the material's reuse potential and the associated regulatory requirements. As shown on Tables 2 and 3, the results indicated that soil from varying intervals at all 13 sample locations meet residential cleanup objectives.

Ten soil samples collected from the soil within Areas 1A and 1B which contained visible MGP impacts were submitted for the following:

- VOC TCLP US EPA Method 8260B
- SVOC TCLP US EPA Method 8270C
- Metals (8 RCRA) US EPA Method 6010B/7471A
- Total Cyanide US EPA Method 9010
- TPH 8100 or 8015DRO
- Total PCBs US EPA Method 8082
- % Sulfur ASTM D129-64
- BTU Content ASTM D240-87
- TCLP VOCs US EPA Method 1311/8260B
- TCLP SVOCs US EPA Method 1311/8270C
- TCLP Metals US EPA Method 1311/6010B
- TCLP Pest/Herb US EPA Method 1311/8151A/8081A
- Flashpoint (Ignitability) US EPA Method 1010
- Percent solids
- pH US EPA Method 9045C
- Pain t Filter
- Reactivity

Analytical results, shown in Table 4 (Area 1A) and Table 5 (Area 1B), indicate that soils in Area 1A can be classified as a non-hazardous and soils in Area 1B can be classified as conditionally exempt

Manufactured Gas Plant remediation waste. Therefore the soil from both areas will be excavated and transported for disposal at an off-site disposal facility permitted to accept the waste.

3.2 Area 1B Residential Property

The analytical results for the samples taken outside the street right of ways and within private residential property in Area 1B are summarized in Table 6. This table includes the results of the impacted interval identified at PDI-11WC and the point observed as having no visible MGP impacts PDI-10. The samples were taken from similar intervals within both PDI-10 and PDI-11WC, which consisted of a fine to coarse gravel, with some fine to medium sand. The visible MGP impacts observed in the field at PDI-11WC are reflected in the analytical data, which classify the soil as conditionally exempt Manufactured Gas Plant remediation waste. PDI-10 was installed and sampled to further delineate the impacted area on the private properties. PDI-10 exhibited no visible MGP impacts in the field and the analytical results from this boring revealed no exceedances of the soil residential use cleanup objectives. As set forth in the ROD, the soil on the residential property must meet the residential soil criteria post excavation. This is confirmed by the results displayed in Table 6 for the horizontal limit established by PDI-10.

3.3 Area 1C

The analytical results for the groundwater samples collected in Area 1C are presented in Table 7. These results are compared to the groundwater criteria and analytes set forth in the ROD for OU-2. The baseline groundwater data collected will serve as a point of reference in relation to groundwater standards and will be used in calculating the percent reduction in groundwater concentrations after future performance monitoring. The analytical results for the soil samples collected in Area 1C are presented in Table 8 and served as another source of baseline reference information. Supplemental delineation points associated with Area 1C can be found in Table 9 and served as another measure in defining the limits of the remediation area.

PDI Summary Report Tables

Table 1. Hazardous Characteristic Regulatory Limits

TCLP Analyte	Regulatory Limit (mg/L)
Arsenic 5.0	
Barium 100.0	
Benzene 0.5	
Cadmium 1.0	
Carbon tetrachloride	0.5
Chlordane 0.03	
Chlorobenzene 100.0	
Chloroform 6.0	
Chromium 5.0	
Cresols (total of o, m, p)	200.0
2,4-D 10.0	
1,4-Dichlorobenzene 7.5	
1,2-Dichloroethane 0.5	
1,1-Dichloroethylene 0.7	
2,4-Dinitrotoluene 0.13	
Endrin 0.02	
Heptachlor 0.008	
Hexachlorobenzene 0.13	
Hexachlorobutadiene 0.5	
Lead 5.0	
Lindane 0.4	
Mercury 0.2	
Methoxychlor 10.0	
Methyl ethyl ketone	200.0
Nitrobenzene 2.0	
Pentachlorophenol 100.0	
Pyridine 5.0	
Selenium 1.0	
Silver 5.0	
Silvex 1	.0
Tetrachloroethylene 0.7	
Toxaphene 0.5	
Trichloroethylene 0.5	
2,4,5-Trichlorophenol 400.0	

TCLP Analyte	Regulatory Limit (mg/L)
2,4,6-Trichlorophenol 2.0	
Vinyl chloride	0.2
Corrosivity (pH)	Non- Corrosive (pH must be >2 or <12.5)
Ignitability	Must be > 60 deg. C
% SOLIDS	Must be > 20%
PCBS (Total) <50	mg/Kg

Table 2
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1A - Reuse Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1A PDI-22 8/3/2011 PDI-22R (0-10) 0-10	Area 1A PDI-23 8/3/2011 PDI-23R (0-10) 0-10	Area 1A PDI-24 8/3/2011 PDI-24R (0-9) 0-9	Area 1A PDI-25 8/3/2011 PDI-25R (0-8) 0-8	Area 1A PDI-26 8/3/2011 PDI-26R (0-7) 0-7	Area 1A PDI-28 8/3/2011 PDI-28R (0-6) 0-6
BTEX (mg/Kg)								
Benzene	71-43-2	2.9	<0.0061 U	**0.00095 J**	**0.00052 J**	<0.0062 U	<0.0062 U	<0.0060 U
Ethylbenzene	100-41-4	30	**0.0019 J**	**0.0012 J**	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Toluene	108-88-3	100	**0.00090 J**	**0.00079 J**	<0.0064 U	**0.00066 J**	<0.0062 U	<0.0060 U
Xylenes, Total	1330-20-7	100	<0.012 U	**0.0032 J**	<0.013 U	<0.012 U	<0.012 U	<0.012 U
Total BTEX	CALC-BTEX	NL	**0.0028**	**0.00614**	**0.00052**	**0.00066**	ND	ND
VOC (mg/Kg)								
1,1,1-Trichloroethane	71-55-6	100	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,1,2,2-Tetrachloroethane	79-34-5	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,1,2-Trichloroethane	79-00-5	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,1-Dichloroethane	75-34-3	19	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,1-Dichloroethene	75-35-4	100	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,2,4-Trichlorobenzene	120-82-1	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,2-Dibromo-3-chloropropane	96-12-8	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,2-Dibromoethane	106-93-4	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,2-Dichlorobenzene	95-50-1	100	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,2-Dichloroethane	107-06-2	2.3	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,2-Dichloropropane	78-87-5	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,3-Dichlorobenzene	541-73-1	17	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
1,4-Dichlorobenzene	106-46-7	9.8	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
2-Butanone	78-93-3	100	**0.0031 J**	**0.026 J**	**0.033**	<0.031 U	<0.031 U	<0.03 U
2-Hexanone	591-78-6	NL	<0.031 U	<0.03 U	<0.032 U	<0.031 U	<0.031 U	<0.03 U
4-Methyl-2-pentanone	108-10-1	NL	<0.031 U	<0.03 U	<0.032 U	<0.031 U	<0.031 U	<0.03 U
Acetone	67-64-1	100	**0.015 J**	**0.12**	**0.13**	**0.027 J**	<0.031 U	<0.03 U
Bromodichloromethane	75-27-4	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Bromoform	75-25-2	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Bromomethane	74-83-9	NL	<0.0061 UJ	<0.0059 UJ	<0.0064 UJ	<0.0062 UJ	<0.0062 UJ	<0.0060 UJ
Carbon Disulfide	75-15-0	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Carbon Tetrachloride	56-23-5	1.4	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Chlorobenzene	108-90-7	100	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Chloroethane	75-00-3	NL	<0.0061 UJ	<0.0059 UJ	<0.0064 UJ	<0.0062 UJ	<0.0062 UJ	<0.0060 UJ
Chloroform	67-66-3	10	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	**0.00088 J**
Chloromethane	74-87-3	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
cis-1,2-Dichloroethene	156-59-2	59	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
cis-1,3-Dichloropropene	10061-01-5	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Cyclohexane	110-82-7	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Dibromochloromethane	124-48-1	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Dichlorodifluoromethane	75-71-8	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Isopropylbenzene	98-82-8	NL	<0.0061 U	**0.0025 J**	**0.0071**	<0.0062 U	<0.0062 U	<0.0060 U
Methyl acetate	79-20-9	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Methylcyclohexane	108-87-2	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Methylene chloride	75-09-2	51	**0.0034 J**	**0.0034 J**	**0.0036 J**	**0.0029 J**	**0.0030 J**	**0.0029 J**
Methyl-t-Butyl Ether (MTBE)	1634-04-4	62	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Styrene	100-42-5	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Tetrachloroethene	127-18-4	5.5	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	**0.0016 J**	**0.0029 J**
trans-1,2-Dichloroethene	156-60-5	100	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
trans-1,3-Dichloropropene	10061-02-6	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Trichloroethene	79-01-6	10	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Trichlorofluoromethane	75-69-4	NL	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Vinyl chloride	75-01-4	0.21	<0.0061 U	<0.0059 U	<0.0064 U	<0.0062 U	<0.0062 U	<0.0060 U
Total VOCs	CALC-VOC	NL	**0.0243**	**0.15804**	**0.17422**	**0.03056**	**0.0046**	**0.00668**

Table 2
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1A - Reuse Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1A PDI-22 8/3/2011 PDI-22R (0-10) 0-10	Area 1A PDI-23 8/3/2011 PDI-23R (0-10) 0-10	Area 1A PDI-24 8/3/2011 PDI-24R (0-9) 0-9	Area 1A PDI-25 8/3/2011 PDI-25R (0-8) 0-8	Area 1A PDI-26 8/3/2011 PDI-26R (0-7) 0-7	Area 1A PDI-28 8/3/2011 PDI-28R (0-6) 0-6
PAH (mg/Kg)								
2-Methylnaphthalene	91-57-6	NL	**0.083 J**	**0.047 J**	**0.30**	**0.011 J**	<4.1 U	**0.017 J**
Acenaphthene	83-32-9	100	**0.45 J**	**0.52**	**1.9**	**0.15 J**	<4.1 U	**0.0057 J**
Acenaphthylene	208-96-8	100	**0.13 J**	**0.034 J**	<0.22 U	<0.21 U	<4.1 U	**0.030 J**
Anthracene	120-12-7	100	<1.1 U	**0.071 J**	**0.054 J**	**0.025 J**	<4.1 U	<0.21 U
Benzo(a)anthracene	56-55-3	1	<1.1 U	**0.042 J**	**0.079 J**	**0.028 J**	**0.36 J**	**0.032 J**
Benzo(a)pyrene	50-32-8	1	<1.1 U	**0.057 J**	**0.12 J**	**0.016 J**	**0.43 J**	**0.076 J**
Benzo(b)fluoranthene	205-99-2	1	<1.1 U	**0.051 J**	**0.13 J**	**0.015 J**	**0.43 J**	**0.066 J**
Benzo(ghi)perylene	191-24-2	100	<1.1 U	**0.045 J**	**0.10 J**	**0.010 J**	**0.34 J**	**0.049 J**
Benzo(k)fluoranthene	207-08-9	1	<1.1 U	**0.063 J**	**0.096 J**	**0.053 J**	**1.1 J**	**0.067 J**
Chrysene	218-01-9	1	<1.1 U	**0.032 J**	**0.079 J**	**0.026 J**	**0.27 J**	**0.034 J**
Dibenzo(a,h)anthracene	53-70-3	0.33	<1.1 U	**0.011 J**	**0.028 J**	<0.21 U	<4.1 U	**0.017 J**
Fluoranthene	206-44-0	100	<1.1 U	**0.15 J**	**0.17 J**	**0.053 J**	**0.36 J**	**0.041 J**
Fluorene	86-73-7	100	**0.19 J**	**0.30**	**0.45**	**0.28**	<4.1 U	<0.21 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	<1.1 U	**0.037 J**	**0.094 J**	**0.0069 J**	**0.35 J**	**0.042 J**
Naphthalene	91-20-3	100	**0.14 J**	**0.30**	**0.41**	**0.052 J**	<4.1 U	**0.039 J**
Phenanthrene	85-01-8	100	**0.045 J**	**0.22**	**0.33**	**0.042 J**	<4.1 U	**0.035 J**
Pyrene	129-00-0	100	**0.056 J**	**0.15 J**	**0.17 J**	**0.070 J**	**0.37 J**	**0.038 J**
Total PAHs	CALC-PAH	NL	**1.094**	**2.164**	**4.58**	**0.8379**	**4.01**	**0.5887**
SVOC (mg/Kg)								
1,1'-Biphenyl	92-52-4	NL	<1.1 U	**0.028 J**	**0.015 J**	**0.016 J**	<4.1 U	<0.21 U
2,2'-Oxybis(1-Chloropropane)	108-60-1	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2,4,5-Trichlorophenol	95-95-4	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2,4,6-Trichlorophenol	88-06-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2,4-Dichlorophenol	120-83-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2,4-Dimethylphenol	105-67-9	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2,4-Dinitrophenol	51-28-5	NL	<2.1 U	<0.39 U	<0.42 U	<0.40 U	<8.0 U	<0.40 U
2,4-Dinitrotoluene	121-14-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2,6-Dinitrotoluene	606-20-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2-Chloronaphthalene	91-58-7	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2-Chlorophenol	95-57-8	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2-Methylphenol	95-48-7	100	<1.1 U	**0.021 J**	<0.22 U	<0.21 U	<4.1 U	<0.21 U
2-Nitroaniline	88-74-4	NL	<2.1 U	<0.39 U	<0.42 U	<0.40 U	<8.0 U	<0.40 U
2-Nitrophenol	88-75-5	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
3,3'-Dichlorobenzidine	91-94-1	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
3-Nitroaniline	99-09-2	NL	<2.1 U	<0.39 U	<0.42 U	<0.40 U	<8 U	<0.40 U
4,6-Dinitro-2-methylphenol	534-52-1	NL	<2.1 U	<0.39 U	<0.42 U	<0.40 U	<8 U	<0.40 U
4-Bromophenyl phenyl ether	101-55-3	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
4-Chloro-3-methylphenol	59-50-7	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
4-Chloroaniline	106-47-8	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
4-Chlorophenyl phenyl ether	7005-72-3	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
4-Methylphenol	106-44-5	34	<2.1 U	**0.035 J**	<0.42 U	<0.40 U	<8.0 U	<0.40 U
4-Nitroaniline	100-01-6	NL	<2.1 U	<0.39 U	<0.42 U	<0.40 U	<8.0 U	<0.40 U
4-Nitrophenol	100-02-7	NL	<2.1 U	<0.39 U	<0.42 U	<0.40 U	<8.0 U	<0.40 U
Acetophenone	98-86-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Atrazine	1912-24-9	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Benzaldehyde	100-52-7	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Bis(2-chloroethoxy) methane	111-91-1	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Bis(2-chloroethyl) ether	111-44-4	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Bis(2-ethylhexyl) phthalate	117-81-7	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Butyl benzyl phthalate	85-68-7	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Caprolactam	105-60-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Carbazole	86-74-8	NL	<1.1 U	**0.018 J**	**0.070 J**	<0.21 U	<4.1 U	<0.21 U
Dibenzofuran	132-64-9	14	<1.1 U	**0.034 J**	**0.070 J**	<0.21 U	<4.1 U	<0.21 U
Diethyl phthalate	84-66-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Dimethyl phthalate	131-11-3	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Di-n-butyl phthalate	84-74-2	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Di-n-octyl phthalate	117-84-0	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Hexachlorobenzene	118-74-1	0.33	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Hexachlorobutadiene	87-68-3	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Hexachlorocyclopentadiene	77-47-4	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Hexachloroethane	67-72-1	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Isophorone	78-59-1	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Nitrobenzene	98-95-3	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
N-Nitroso-Di-n-propylamine	621-64-7	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
N-nitrosodiphenylamine	86-30-6	NL	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U
Pentachlorophenol	87-86-5	2.4	<2.1 U	<0.39 U	<0.42 U	<0.40 U	<8.0 U	<0.40 U
Phenol	108-95-2	100	<1.1 U	<0.20 U	<0.22 U	<0.21 U	<4.1 U	<0.21 U

Table 2
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1A - Reuse Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1A PDI-22 8/3/2011 PDI-22R (0-10) 0-10	Area 1A PDI-23 8/3/2011 PDI-23R (0-10) 0-10	Area 1A PDI-24 8/3/2011 PDI-24R (0-9) 0-9	Area 1A PDI-25 8/3/2011 PDI-25R (0-8) 0-8	Area 1A PDI-26 8/3/2011 PDI-26R (0-7) 0-7	Area 1A PDI-28 8/3/2011 PDI-28R (0-6) 0-6
Metals (mg/Kg)								
Aluminum	7429-90-5	NL	**8540**	**7970**	**10500**	**9060**	**12900**	**10400**
Antimony	7440-36-0	NL	<18.4 U	<19.3 U	<17.7 U	<19.0 U	<20.3 U	<15.8 U
Arsenic	7440-38-2	16	**3.1**	**9.6**	**5.8**	**3.6**	**5.3**	**5.1**
Barium	7440-39-3	350	**53.0**	**81.3**	**90.1**	**61.4**	**100**	**103**
Beryllium	7440-41-7	14	**0.39**	**0.43**	**0.51**	**0.41**	**0.58**	**0.50**
Cadmium	7440-43-9	2.5	**0.13 J**	**0.21 J**	**0.21 J**	**0.15 J**	**0.14 J**	**0.19 J**
Calcium	7440-70-2	NL	**3290**	**4540**	**18800**	**3490**	**3220**	**5000**
Chromium	7440-47-3	36	**13.2**	**12.0**	**15.8**	**13.5**	**18.3**	**15.5**
Cobalt	7440-48-4	NL	**7.5**	**9.7**	**9.4**	**8.1**	**10.3**	**9.1**
Copper	7440-50-8	270	**13.0**	**14.4**	**24.4**	**14.7**	**18.7**	**20.1**
Iron	7439-89-6	NL	**16600**	**24300**	**20000**	**18300**	**23100**	**20300**
Lead	7439-92-1	400	**9.0**	**10**	**57.0**	**9.5**	**15.2**	**25.6**
Magnesium	7439-95-4	NL	**4020**	**2940**	**4540**	**4010**	**4280**	**3440**
Manganese	7439-96-5	2000	**284**	**852**	**398**	**214**	**451**	**583**
Mercury	7439-97-6	0.81	<0.022 U	**0.020 J**	**0.051**	**0.017 J**	**0.035**	**0.082**
Nickel	7440-02-0	140	**18.1**	**19.4**	**23.4**	**20.7**	**26.7**	**23.1**
Potassium	7440-09-7	NL	**770**	**554**	**851**	**781**	**1250**	**889**
Selenium	7782-49-2	36	<4.9 U	<5.2 U	**0.81 J**	<5.1 U	<5.4 U	<4.2 U
Silver	7440-22-4	36	<0.61 U	<0.64 U	<0.59 U	<0.63 U	<0.68 U	<0.53 U
Sodium	7440-23-5	NL	**302**	**358**	**1210**	**479**	**1110**	**1900**
Thallium	7440-28-0	NL	<7.4 U	<7.7 U	<7.1 U	<7.6 U	<8.1 U	<6.3 U
Vanadium	7440-62-2	NL	**13.3**	**13.3**	**17.0**	**14.1**	**17.6**	**15.6**
Zinc	7440-66-6	2200	**49.8**	**50.1**	**83.1**	**51.7**	**67.8**	**63.3**
PCBs (mg/Kg)								
Aroclor 1262	37324-23-5	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor 1268	11100-14-4	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor-1016	12674-11-2	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor-1221	11104-28-2	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor-1232	11141-16-5	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor-1242	53469-21-9	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor-1248	12672-29-6	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor-1254	11097-69-1	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Aroclor-1260	11096-82-5	NL	<0.27 U	<0.25 U	<0.29 U	<0.25 U	<0.25 U	<0.21 U
Total PCB	CALC-PCB	1	ND	ND	ND	ND	ND	ND
Pesticides (mg/Kg)								
4,4'-DDD	72-54-8	2.6	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
4,4'-DDE	72-55-9	1.8	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
4,4'-DDT	50-29-3	1.7	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Aldrin	309-00-2	0.019	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
alpha-BHC	319-84-6	0.097	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
beta-BHC	319-85-7	0.072	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Chlordane	5103-71-9	0.91	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
delta-BHC	319-86-8	100	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Dieldrin	60-57-1	0.039	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Endosulfan I	959-98-8	4.8	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Endosulfan II	33213-65-9	4.8	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Endosulfan sulfate	1031-07-8	4.8	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Endrin	72-20-8	2.2	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	**0.049 J**	<0.010 U
Endrin aldehyde	7421-93-4	NL	<0.011 U	<0.0099 UJ	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Endrin ketone	53494-70-5	NL	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Gamma BHC - Lindane	58-89-9	0.28	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
gamma-Chlordane	12789-03-6	NL	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Heptachlor	76-44-8	0.42	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Heptachlor Epoxide	1024-57-3	NL	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Methoxychlor	72-43-5	NL	<0.011 U	<0.0099 U	<0.021 UJ	<0.0020 U	<0.10 UJ	<0.010 U
Toxaphene	8001-35-2	NL	<0.11 U	<0.099 U	<0.21 UJ	<0.020 U	<1.0 UJ	<0.10 U

Notes:

mg/Kg - milligrams per kilogram

NL = Not Listed

NA = Not Analyzed

J = The associated numerical value is an estimated quantity.

U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.

Bold indicates compound detected at a concentration greater than the reporting limit.

Yellow highlight indicates exceedance of the NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value.

Bold and Italics = non detected compound exceeds NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value

Table 3
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Reuse Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1B PDI-10 8/2/2011 PDI-10 (10.5-12.5) 10.5-12.5	Area 1B PDI-11 8/2/2011 PDI-11R (0-12) 0-12	Area 1B PDI-12 8/2/2011 PDI-12R (0-10) 0-10	Area 1B PDI-13 8/1/2011 PDI-13R (0-12) 0-12	Area 1B PDI-14 8/2/2011 PDI-14R (0-10) 0-10	Area 1B PDI-15 8/1/2011 PDI-15R (0-10) 0-10	Area 1B PDI-8 (0-10) 8/1/2011 PDI-8R (0-10) 0-10	Area 1B PDI-9 (0-13.5) 8/1/2011 PDI-9R (0-13.5) 0-13.5
BTEX (mg/Kg)										
Benzene	71-43-2	2.9	**0.0064**	**0.0047 J**	**0.017**	<0.0058 U	**0.0074**	<0.0061 U	<0.0063 U	<0.0062 U
Ethylbenzene	100-41-4	30	**0.00095 J**	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Toluene	108-88-3	100	**0.0024 J**	**0.0014 J**	**0.0026 J**	<0.0058 U	**0.0021 J**	**0.00068 J**	<0.0063 U	<0.0062 U
Xylenes, Total	1330-20-7	100	**0.0043 J**	**0.0014 J**	**0.0023 J**	<0.012 U	**0.0019 J**	<0.012 U	<0.013 U	**0.0011 J**
Total BTEX	CALC-BTEX	NL	**0.01405**	**0.0075**	**0.0219**	ND	**0.0114**	**0.00068**	ND	**0.0011**
VOCs (mg/Kg)										
1,1,1-Trichloroethane	71-55-6	100	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,1,2,2-Tetrachloroethane	79-34-5	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,1,2-Trichloroethane	79-00-5	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,1-Dichloroethane	75-34-3	19	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,1-Dichloroethene	75-35-4	100	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,2,4-Trichlorobenzene	120-82-1	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,2-Dibromo-3-chloropropane	96-12-8	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,2-Dibromoethane	106-93-4	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,2-Dichlorobenzene	95-50-1	100	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,2-Dichloroethane	107-06-2	2.3	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,2-Dichloropropane	78-87-5	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,3-Dichlorobenzene	541-73-1	17	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
1,4-Dichlorobenzene	106-46-7	9.8	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
2-Butanone	78-93-3	100	**0.0070 J**	<0.029 U	<0.025 U	<0.029 U	<0.026 U	<0.031 U	<0.031 U	<0.031 U
2-Hexanone	591-78-6	NL	<0.029 U	<0.029 U	<0.025 U	<0.029 U	<0.026 U	<0.031 U	<0.031 U	<0.031 U
4-Methyl-2-pentanone	108-10-1	NL	<0.029 U	<0.029 U	<0.025 U	<0.029 U	<0.026 U	<0.031 U	<0.031 U	<0.031 U
Acetone	67-64-1	100	**0.029 J**	<0.029 U	<0.025 U	<0.029 U	<0.026 U	<0.031 U	**0.012 J**	<0.031 U
Bromodichloromethane	75-27-4	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Bromoform	75-25-2	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Bromomethane	74-83-9	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 UJ	<0.0063 U	<0.0062 U
Carbon Disulfide	75-15-0	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Carbon Tetrachloride	56-23-5	1.4	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Chlorobenzene	108-90-7	100	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Chloroethane	75-00-3	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 UJ	<0.0063 U	<0.0062 U
Chloroform	67-66-3	10	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Chloromethane	74-87-3	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
cis-1,2-Dichloroethene	156-59-2	59	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
cis-1,3-Dichloropropene	10061-01-5	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Cyclohexane	110-82-7	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Dibromochloromethane	124-48-1	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Dichlorodifluoromethane	75-71-8	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Isopropylbenzene	98-82-8	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Methyl acetate	79-20-9	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Methylcyclohexane	108-87-2	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Methylene chloride	75-09-2	51	**0.0061**	**0.0036 J**	**0.0065**	**0.0052 J**	**0.0053**	**0.0035 J**	**0.0053 J**	**0.0060 J**
Methyl-t-Butyl Ether (MTBE)	1634-04-4	62	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Styrene	100-42-5	NL	<0.0058 U	<0.0057 U	**0.00078 J**	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Tetrachloroethene	127-18-4	5.5	**0.0012 J**	**0.0017 J**	**0.0036 J**	**0.0046 J**	**0.0014 J**	**0.0024 J**	**0.0028 J**	**0.0016 J**
trans-1,2-Dichloroethene	156-60-5	100	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
trans-1,3-Dichloropropene	10061-02-6	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Trichloroethene	79-01-6	10	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Trichlorofluoromethane	75-69-4	NL	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Vinyl chloride	75-01-4	0.21	<0.0058 U	<0.0057 U	<0.0051 U	<0.0058 U	<0.0053 U	<0.0061 U	<0.0063 U	<0.0062 U
Total VOCs	CALC-VOC	NL	**0.05735**	**0.0128**	**0.03278**	**0.0098**	**0.0181**	**0.00658**	**0.0201**	**0.0087**

Table 3
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Reuse Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1B PDI-10 8/2/2011 PDI-10 (10.5-12.5) 10.5-12.5	Area 1B PDI-11 8/2/2011 PDI-11R (0-12) 0-12	Area 1B PDI-12 8/2/2011 PDI-12R (0-10) 0-10	Area 1B PDI-13 8/1/2011 PDI-13R (0-12) 0-12	Area 1B PDI-14 8/2/2011 PDI-14R (0-10) 0-10	Area 1B PDI-15 8/1/2011 PDI-15R (0-10) 0-10	Area 1B PDI-8 (0-10) 8/1/2011 PDI-8R (0-10) 0-10	Area 1B PDI-9 (0-13.5) 8/1/2011 PDI-9R (0-13.5) 0-13.5
PAHs (mg/Kg)										
2-Methylnaphthalene	91-57-6	NL	**0.24**	**0.054 J**	**0.041 J**	<0.20 U	**0.15 J**	<0.21 U	<0.21 U	**0.0091 J**
Acenaphthene	83-32-9	100	**0.33**	**0.17 J**	**0.022 J**	**0.092 J**	**0.088 J**	**0.010 J**	**0.12 J**	**0.12 J**
Acenaphthylene	208-96-8	100	<0.20 U	**0.025 J**	**0.011 J**	<0.20 U	**0.034 J**	<0.21 U	**0.037 J**	**0.0076 J**
Anthracene	120-12-7	100	**0.011 J**	**0.031 J**	**0.0070 J**	<0.20 U	**0.053 J**	<0.21 U	<0.21 U	**0.0092 J**
Benzo(a)anthracene	56-55-3	1	<0.20 U	**0.17 J**	**0.033 J**	<0.20 U	**0.14 J**	<0.21 U	<0.21 U	<0.21 U
Benzo(a)pyrene	50-32-8	1	<0.20 U	**0.29**	**0.046 J**	<0.20 U	**0.18**	<0.21 U	<0.21 U	<0.21 U
Benzo(b)fluoranthene	205-99-2	1	<0.20 U	**0.32**	**0.037 J**	<0.20 U	**0.20**	<0.21 U	<0.21 U	<0.21 U
Benzo(ghi)perylene	191-24-2	100	<0.20 U	**0.27**	**0.041 J**	<0.20 U	**0.13 J**	<0.21 U	**0.067 J**	<0.21 U
Benzo(k)fluoranthene	207-08-9	1	<0.20 U	**0.14 J**	**0.065 J**	<0.20 U	**0.11 J**	<0.21 U	<0.21 U	<0.21 U
Chrysene	218-01-9	1	<0.20 U	**0.17 J**	**0.033 J**	<0.20 U	**0.14 J**	<0.21 U	<0.21 U	<0.21 U
Dibenzo(a,h)anthracene	53-70-3	0.33	<0.20 U	**0.052 J**	**0.011 J**	<0.20 U	**0.035 J**	<0.21 U	<0.21 U	**0.0070 J**
Fluoranthene	206-44-0	100	**0.011 J**	**0.25**	**0.049 J**	**0.027 J**	**0.30**	**0.015 J**	<0.21 U	**0.040 J**
Fluorene	86-73-7	100	**0.058 J**	**0.020 J**	<0.18 U	**0.027 J**	**0.056 J**	<0.21 U	<0.21 U	**0.047 J**
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	<0.20 U	**0.22**	**0.033 J**	**0.010 J**	**0.11 J**	**0.012 J**	**0.061 J**	**0.0076 J**
Naphthalene	91-20-3	100	**1.5**	<0.19 U	**0.32**	**0.0088 J**	**0.85**	<0.21 U	<0.21 U	**0.011 J**
Phenanthrene	85-01-8	100	**0.069 J**	**0.13 J**	**0.034 J**	**0.021 J**	**0.25**	<0.21 U	<0.21 U	**0.015 J**
Pyrene	129-00-0	100	**0.0091 J**	**0.21**	**0.037 J**	**0.025 J**	**0.22**	**0.015 J**	**0.046 J**	**0.054 J**
Total PAHs	CALC-PAH	NL	**2.2561**	**2.616**	**0.82**	**0.2834**	**3.065**	**0.124**	**0.71**	**0.3857**
SVOCs (mg/Kg)										
1,1'-Biphenyl	92-52-4	NL	**0.045 J**	<0.19 U	<0.18 U	<0.20 U	**0.031 J**	<0.21 U	<0.21 U	<0.21 U
2,2'-Oxybis(1-Chloropropane)	108-60-1	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2,4,5-Trichlorophenol	95-95-4	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2,4,6-Trichlorophenol	88-06-2	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2,4-Dichlorophenol	120-83-2	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2,4-Dimethylphenol	105-67-9	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2,4-Dinitrophenol	51-28-5	NL	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 U	<0.41 U
2,4-Dinitrotoluene	121-14-2	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2,6-Dinitrotoluene	606-20-2	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2-Chloronaphthalene	91-58-7	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2-Chlorophenol	95-57-8	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2-Methylphenol	95-48-7	100	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
2-Nitroaniline	88-74-4	NL	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 U	<0.41 U
2-Nitrophenol	88-75-5	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
3,3'-Dichlorobenzidine	91-94-1	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 UJ	<0.21 U
3-Nitroaniline	99-09-2	NL	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 UJ	<0.41 U
4,6-Dinitro-2-methylphenol	534-52-1	NL	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 U	<0.41 U
4-Bromophenyl phenyl ether	101-55-3	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
4-Chloro-3-methylphenol	59-50-7	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
4-Chloroaniline	106-47-8	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 UJ	<0.21 U
4-Chlorophenyl phenyl ether	7005-72-3	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
4-Methylphenol	106-44-5	34	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 U	<0.41 U
4-Nitroaniline	100-01-6	NL	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 U	<0.41 U
4-Nitrophenol	100-02-7	NL	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 U	<0.41 U
Acetophenone	98-86-2	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Atrazine	1912-24-9	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Benzaldehyde	100-52-7	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 UJ	<0.21 U
Bis(2-chloroethoxy) methane	111-91-1	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Bis(2-chloroethyl) ether	111-44-4	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Bis(2-ethylhexyl) phthalate	117-81-7	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Butyl benzyl phthalate	85-68-7	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Caprolactam	105-60-2	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Carbazole	86-74-8	NL	**0.0095 J**	**0.018 J**	<0.18 U	<0.20 U	**0.044 J**	<0.21 U	<0.21 U	<0.21 U
Dibenzofuran	132-64-9	14	**0.028 J**	**0.012 J**	<0.18 U	**0.0044 J**	**0.019 J**	<0.21 U	<0.21 U	<0.21 U
Diethyl phthalate	84-66-2	NL	<0.20 U	**0.030 J**	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Dimethyl phthalate	131-11-3	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Di-n-butyl phthalate	84-74-2	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Di-n-octyl phthalate	117-84-0	NL	<0.20 U	**0.14 J**	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Hexachlorobenzene	118-74-1	0.33	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Hexachlorobutadiene	87-68-3	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Hexachlorocyclopentadiene	77-47-4	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Hexachloroethane	67-72-1	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Isophorone	78-59-1	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Nitrobenzene	98-95-3	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
N-Nitroso-Di-n-propylamine	621-64-7	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
N-nitrosodiphenylamine	86-30-6	NL	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U
Pentachlorophenol	87-86-5	2.4	<0.38 U	<0.38 U	<0.34 U	<0.38 U	<0.35 U	<0.41 U	<0.41 U	<0.41 U
Phenol	108-95-2	100	<0.20 U	<0.19 U	<0.18 U	<0.20 U	<0.18 U	<0.21 U	<0.21 U	<0.21 U

Table 3
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Reuse Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1B PDI-10 8/2/2011 PDI-10 (10.5-12.5) 10.5-12.5	Area 1B PDI-11 8/2/2011 PDI-11R (0-12) 0-12	Area 1B PDI-12 8/2/2011 PDI-12R (0-10) 0-10	Area 1B PDI-13 8/1/2011 PDI-13R (0-12) 0-12	Area 1B PDI-14 8/2/2011 PDI-14R (0-10) 0-10	Area 1B PDI-15 8/1/2011 PDI-15R (0-10) 0-10	Area 1B PDI-8 (0-10) 8/1/2011 PDI-8R (0-10) 0-10	Area 1B PDI-9 (0-13.5) 8/1/2011 PDI-9R (0-13.5) 0-13.5
Metals (mg/Kg)										
Aluminum	7429-90-5	NL	NS	**8900**	**9120**	**9030**	**5640**	**6660**	**9140**	**9060**
Antimony	7440-36-0	NL	NS	<16.8 U	<16.2 U	<18.7 U	<16.6 U	<17.3 U	<17.5 U	<16.9 U
Arsenic	7440-38-2	16	NS	**6.3**	**5.4**	**9.0**	**3.1**	**2.5**	**15.6**	**3.2**
Barium	7440-39-3	350	NS	**95.7**	**49.6**	**103**	**24.2**	**31.2**	**93.4**	**41.9**
Beryllium	7440-41-7	14	NS	**0.44**	**0.32**	**0.39**	**0.20 J**	**0.29**	**0.43**	**0.34**
Cadmium	7440-43-9	2.5	NS	**0.26**	**0.14 J**	**0.16 J**	**0.11 J**	**0.083 J**	**0.16 J**	**0.16 J**
Calcium	7440-70-2	NL	NS	**6320**	**32100**	**3420**	**27900**	**1710**	**6130**	**2410**
Chromium	7440-47-3	36	NS	**13.8**	**12.4**	**13.0**	**7.6**	**9.4**	**13.3**	**12.8**
Cobalt	7440-48-4	NL	NS	**8.3**	**7.9**	**10.6**	**5.1**	**6.2**	**9.4**	**8.8**
Copper	7440-50-8	270	NS	**25.4**	**30.0**	**15.7**	**13.7**	**9.0**	**18.1**	**15.9**
Iron	7439-89-6	NL	NS	**17300**	**18700**	**21100**	**11700**	**11800**	**24600**	**17000**
Lead	7439-92-1	400	NS	**161**	**11.4**	**11.6**	**12.8**	**7.2**	**12.7**	**9.6**
Magnesium	7439-95-4	NL	NS	**3380**	**8230**	**3900**	**5630**	**2880**	**3620**	**3630**
Manganese	7439-96-5	2000	NS	**297**	**349**	**829**	**315**	**136**	**589**	**191**
Mercury	7439-97-6	0.81	NS	**0.59**	**0.011 J**	**0.020 J**	**0.043**	<0.025 U	**0.023 J**	<0.024 U
Nickel	7440-02-0	140	NS	**22.2**	**21.4**	**23.1**	**13.2**	**16.2**	**23.4**	**22.5**
Potassium	7440-09-7	NL	NS	**684**	**862**	**733**	**580**	**640**	**675**	**616**
Selenium	7782-49-2	36	NS	**0.78 J**	<4.3 U	<5.0 U	<4.4 U	<4.6 U	<4.7 U	<4.5 U
Silver	7440-22-4	36	NS	<0.56 U	<0.54 U	<0.62 U	<0.55 U	<0.58 U	<0.58 U	<0.56 U
Sodium	7440-23-5	NL	NS	**56.5 J**	**236**	**421**	**177**	**195**	**474**	**421**
Thallium	7440-28-0	NL	NS	<6.7 U	<6.5 U	<7.5 U	<6.6 U	<6.9 U	<7.0 U	<6.8 U
Vanadium	7440-62-2	NL	NS	**13.9**	**13.0**	**13.5**	**7.8**	**10.1**	**14.3**	**12.6**
Zinc	7440-66-6	2200	NS	**99.2**	**61.4**	**49.4**	**35.8**	**39.7**	**53.5**	**54.8**
Cyanide (mg/Kg)										
Total Cyanide	57-12-5	27	<1.1 U	NS	NS	NS	NS	NS	NS	NS
Pesticides (mg/Kg)										
4,4'-DDD	72-54-8	2.6	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
4,4'-DDE	72-55-9	1.8	NS	**0.014 J**	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
4,4'-DDT	50-29-3	1.7	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Aldrin	309-00-2	0.019	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
alpha-BHC	319-84-6	0.097	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
beta-BHC	319-85-7	0.072	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Chlordane	5103-71-9	0.91	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
delta-BHC	319-86-8	100	ND	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Dieldrin	60-57-1	0.039	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Endosulfan I	959-98-8	4.8	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Endosulfan II	33213-65-9	4.8	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Endosulfan sulfate	1031-07-8	4.8	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Endrin	72-20-8	2.2	NS	**0.018 J**	**0.015 J**	<0.0098 U	**0.043 J**	<0.041 UJ	<0.042 UJ	<0.010 U
Endrin aldehyde	7421-93-4	NL	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Endrin ketone	53494-70-5	NL	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Gamma BHC - Lindane	58-89-9	0.28	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
gamma-Chlordane	12789-03-6	NL	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Heptachlor	76-44-8	0.42	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Heptachlor Epoxide	1024-57-3	NL	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Methoxychlor	72-43-5	NL	NS	<0.038 UJ	<0.034 UJ	<0.0098 U	<0.088 UJ	<0.041 UJ	<0.042 UJ	<0.010 U
Toxaphene	8001-35-2	NL	NS	<0.38 UJ	<0.34 UJ	<0.098 U	<0.88 UJ	<0.41 UJ	<0.42 UJ	<0.10 U
PCBs (mg/Kg)										
Aroclor 1262	37324-23-5	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor 1268	11100-14-4	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor-1016	12674-11-2	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor-1221	11104-28-2	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor-1232	11141-16-5	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor-1242	53469-21-9	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor-1248	12672-29-6	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor-1254	11097-69-1	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Aroclor-1260	11096-82-5	NL	NS	<0.26 U	<0.24 U	<0.27 U	<0.20 U	<0.29 U	<0.29 U	<0.23 U
Total PCB	CALC-PCB	1	NS	ND	ND	ND	ND	ND	ND	ND

Notes:
mg/Kg - milligrams per kilogram
NL = Not Listed
NA = Not Analyzed
J = The associated numerical value is an estimated quantity.
U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.
Bold indicates compound detected at a concentration greater than the reporting limit.
Yellow highlight indicates exceedance of the NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value.
Bold and Italics = non detected compound exceeds NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value

Table 4
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1A - Waste Characterization Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Hazardous Waste Criteria	Area 1A PDI-22 40758.61111 PDI-22 WC 10-13	Area 1A PDI-23 40758.34722 PDI-23 WC 10-12	Area 1A PDI-24 40758.36806 PDI-24 WC 9-13	Area 1A PDI-25 40758.40625 PDI-25 WC 9-14	Area 1A PDI-26 40758.4375 PDI-26 WC 8-14.5	Area 1A PDI-28 40758.46181 PDI-28 WC 6-8
BTEX (mg/Kg)								
Benzene	71-43-2	NL	**0.0019 J**	<0.0064 U	<0.044 U	<1.1 U	**0.0019 J**	**0.0021 J**
Ethylbenzene	100-41-4	NL	**0.0019 J**	<0.0064 U	<0.044 U	**51**	**0.11**	<0.0060 U
Toluene	108-88-3	NL	**0.0036 J**	**0.00081 J**	**0.0049 J**	**7.0**	**0.0045 J**	**0.0043 J**
Xylenes, Total	1330-20-7	NL	**0.0052 J**	<0.013 U	<0.089 U	**66**	**0.085**	**0.0041 J**
Total BTEX	CALC-BTEX	NL	**0.0126**	**0.00081**	**0.0049**	**124**	**0.2014**	**0.0105**
BTEX-TCLP (mg/L)								
Benzene	71-43-2	0.5	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U
Ethylbenzene	100-41-4	NL	<0.010 U	<0.010 U	<0.010 U	**0.68**	<0.010 U	<0.010 U
Toluene	108-88-3	NL	<0.010 U	<0.010 U	<0.010 U	**0.099**	<0.010 U	<0.010 U
Xylenes, Total	1330-20-7	NL	<0.020 U	<0.020 U	<0.020 U	**0.92**	<0.020 U	<0.020 U
Total BTEX	CALC-BTEX	NL	ND	ND	ND	**1.699**	ND	ND
VOCs (mg/Kg)								
1,1,1-Trichloroethane	71-55-6	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,1,2,2-Tetrachloroethane	79-34-5	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,1,2-Trichloroethane	79-00-5	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,1-Dichloroethane	75-34-3	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,1-Dichloroethene	75-35-4	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,2,4-Trichlorobenzene	120-82-1	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,2-Dibromo-3-chloropropane	96-12-8	NL	<0.0063 U	<0.0064 U	<0.044 U	**1.1**	<0.0057 U	<0.0060 U
1,2-Dibromoethane	106-93-4	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,2-Dichlorobenzene	95-50-1	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,2-Dichloroethane	107-06-2	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,2-Dichloropropane	78-87-5	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,3-Dichlorobenzene	541-73-1	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
1,4-Dichlorobenzene	106-46-7	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
2-Butanone	78-93-3	NL	**0.012 J**	**0.021 J**	<0.22 U	<5.4 U	<0.029 U	<0.03 U
2-Hexanone	591-78-6	NL	<0.032 U	<0.032 U	<0.22 U	<5.4 U	<0.029 U	<0.03 U
4-Methyl-2-pentanone	108-10-1	NL	<0.032 U	<0.032 U	<0.22 U	<5.4 U	<0.029 U	<0.03 U
Acetone	67-64-1	NL	**0.044**	**0.11**	**0.047 J**	<5.4 U	**0.01 J**	<0.03 U
Bromodichloromethane	75-27-4	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Bromoform	75-25-2	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Bromomethane	74-83-9	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Carbon Disulfide	75-15-0	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Carbon Tetrachloride	56-23-5	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Chlorobenzene	108-90-7	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Chloroethane	75-00-3	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Chloroform	67-66-3	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	**0.0010 J**
Chloromethane	74-87-3	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
cis-1,2-Dichloroethene	156-59-2	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
cis-1,3-Dichloropropene	10061-01-5	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Cyclohexane	110-82-7	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Dibromochloromethane	124-48-1	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Dichlorodifluoromethane	75-71-8	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Isopropylbenzene	98-82-8	NL	<0.0063 U	<0.0064 U	**0.022 J**	**8.0**	**0.034**	<0.0060 U
Methyl acetate	79-20-9	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Methylcyclohexane	108-87-2	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Methylene chloride	75-09-2	NL	<0.0063 U	**0.0042 J**	**0.024 J**	<1.1 U	<0.0057 U	<0.0060 U
Methyl-t-Butyl Ether (MTBE)	1634-04-4	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Styrene	100-42-5	NL	**0.0012 J**	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	**0.0014 J**
Tetrachloroethene	127-18-4	NL	**0.0010 J**	**0.00089 J**	<0.044 U	<1.1 U	<0.0057 U	**0.0021 J**
trans-1,2-Dichloroethene	156-60-5	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
trans-1,3-Dichloropropene	10061-02-6	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Trichloroethene	79-01-6	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Trichlorofluoromethane	75-69-4	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Vinyl chloride	75-01-4	NL	<0.0063 U	<0.0064 U	<0.044 U	<1.1 U	<0.0057 U	<0.0060 U
Total VOCs	CALC-VOC	NL	**0.0708**	**0.1369**	**0.0979**	**133.1**	**0.2454**	**0.015**
PAHs (mg/Kg)								
2-Methylnaphthalene	91-57-6	NL	**0.0099 J**	**0.0068 J**	**0.053 J**	**230**	**1**	**0.027 J**
Acenaphthene	83-32-9	NL	**0.014 J**	**0.041 J**	**9.0**	**110**	**3.2**	**0.24**
Acenaphthylene	208-96-8	NL	<0.22 U	<0.22 U	**1.2**	**44**	**2.9**	**1**
Anthracene	120-12-7	NL	<0.22 U	**0.014 J**	**3.7**	**48**	**6.1**	**1.8**
Benzo(a)anthracene	56-55-3	NL	<0.22 U	**0.025 J**	**3.5**	**30**	**4.8**	**2**
Benzo(a)pyrene	50-32-8	NL	<0.22 U	**0.020 J**	**3.3**	**24**	**3.4**	**1.4**
Benzo(b)fluoranthene	205-99-2	NL	<0.22 U	**0.020 J**	**2.0**	**16**	**2.2**	**0.91**
Benzo(ghi)perylene	191-24-2	NL	<0.22 U	**0.017 J**	**1.7**	**8.8**	**1.1**	**0.5**
Benzo(k)fluoranthene	207-08-9	NL	<0.22 U	**0.0080 J**	**1.4**	**6.7**	**0.8 J**	**0.47**
Chrysene	218-01-9	NL	<0.22 U	**0.019 J**	**2.5**	**26**	**4.3**	**1.9**
Dibenzo(a,h)anthracene	53-70-3	NL	<0.22 U	**0.0076 J**	**0.38**	**2.9 J**	**0.45 J**	**0.18 J**
Fluoranthene	206-44-0	NL	**0.014 J**	**0.041 J**	**8.9**	**51**	**7.7**	**2.9**
Fluorene	86-73-7	NL	**0.012 J**	**0.016 J**	**5.5**	**67**	**5.8**	**0.95**
Indeno(1,2,3-cd)pyrene	193-39-5	NL	<0.22 U	**0.013 J**	**1.2**	**7.2**	**0.86 J**	**0.41**
Naphthalene	91-20-3	NL	**0.21 J**	<0.22 U	**0.10 J**	**260**	**0.76 J**	**0.032 J**
Phenanthrene	85-01-8	NL	**0.016 J**	**0.079 J**	**20**	**160**	**22**	**3.5**
Pyrene	129-00-0	NL	**0.022 J**	**0.055 J**	**12**	**72**	**11**	**4**
Total PAHs	CALC-PAH	NL	**0.2979**	**0.3824**	**76.873**	**1169.3**	**78.79**	**22.29**

Table 4
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1A - Waste Characterization Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Hazardous Waste Criteria	Area 1A PDI-22 40758.61111 PDI-22 WC 10-13	Area 1A PDI-23 40758.34722 PDI-23 WC 10-12	Area 1A PDI-24 40758.36806 PDI-24 WC 9-13	Area 1A PDI-25 40758.40625 PDI-25 WC 9-14	Area 1A PDI-26 40758.4375 PDI-26 WC 8-14.5	Area 1A PDI-28 40758.46181 PDI-28 WC 6-8
SVOCs (mg/Kg)								
1,1'-Biphenyl	92-52-4	NL	<0.22 U	<0.22 U	**0.41**	**31**	**1**	**0.051 J**
2,2'-Oxybis(1-Chloropropane)	108-60-1	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2,4,5-Trichlorophenol	95-95-4	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2,4,6-Trichlorophenol	88-06-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2,4-Dichlorophenol	120-83-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2,4-Dimethylphenol	105-67-9	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2,4-Dinitrophenol	51-28-5	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
2,4-Dinitrotoluene	121-14-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2,6-Dinitrotoluene	606-20-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2-Chloronaphthalene	91-58-7	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2-Chlorophenol	95-57-8	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2-Methylphenol	95-48-7	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
2-Nitroaniline	88-74-4	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
2-Nitrophenol	88-75-5	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
3,3'-Dichlorobenzidine	91-94-1	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
3-Nitroaniline	99-09-2	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
4,6-Dinitro-2-methylphenol	534-52-1	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
4-Bromophenyl phenyl ether	101-55-3	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
4-Chloro-3-methylphenol	59-50-7	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
4-Chloroaniline	106-47-8	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
4-Chlorophenyl phenyl ether	7005-72-3	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
4-Methylphenol	106-44-5	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
4-Nitroaniline	100-01-6	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
4-Nitrophenol	100-02-7	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
Acetophenone	98-86-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Atrazine	1912-24-9	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Benzaldehyde	100-52-7	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Bis(2-chloroethoxy) methane	111-91-1	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Bis(2-chloroethyl) ether	111-44-4	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Bis(2-ethylhexyl) phthalate	117-81-7	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Butyl benzyl phthalate	85-68-7	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Caprolactam	105-60-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Carbazole	86-74-8	NL	<0.22 U	<0.22 U	**0.027 J**	**0.71 J**	<0.96 U	<0.20 U
Dibenzofuran	132-64-9	NL	<0.22 U	<0.22 U	**0.44**	**5.7**	**0.42 J**	**0.071 J**
Diethyl phthalate	84-66-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Dimethyl phthalate	131-11-3	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Di-n-butyl phthalate	84-74-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Di-n-octyl phthalate	117-84-0	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Hexachlorobenzene	118-74-1	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Hexachlorobutadiene	87-68-3	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Hexachlorocyclopentadiene	77-47-4	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Hexachloroethane	67-72-1	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Isophorone	78-59-1	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Nitrobenzene	98-95-3	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
N-Nitroso-Di-n-propylamine	621-64-7	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
N-nitrosodiphenylamine	86-30-6	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Pentachlorophenol	87-86-5	NL	<0.42 U	<0.43 U	<0.39 U	<7.3 U	<1.9 U	<0.39 U
Phenol	108-95-2	NL	<0.22 U	<0.22 U	<0.20 U	<3.8 U	<0.96 U	<0.20 U
Volume Removed	Volume Removed	NL	NS	NS	NS	NS	NS	NS
SVOCs-TCLP (mg/L)								
1,4-Dichlorobenzene	106-46-7	7.5	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U
2,4,5-Trichlorophenol	95-95-4	400	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
2,4,6-Trichlorophenol	88-06-2	2	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
2,4-Dinitrotoluene	121-14-2	0.13	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
2-Methylphenol	95-48-7	NL	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
3-Methylphenol	108-39-4	NL	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U
4-Methylphenol	106-44-5	NL	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U
Hexachlorobenzene	118-74-1	0.13	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
Hexachlorobutadiene	87-68-3	0.5	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
Hexachloroethane	67-72-1	3	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
Nitrobenzene	98-95-3	2	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U	<0.0050 U
Pentachlorophenol	87-86-5	100	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U	<0.010 U
Pyridine	110-86-1	5	<0.025 U	<0.025 U	<0.025 U	<0.025 U	<0.025 U	<0.025 U

Table 4
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1A - Waste Characterization Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Hazardous Waste Criteria	Area 1A PDI-22 40758.61111 PDI-22 WC 10-13	Area 1A PDI-23 40758.34722 PDI-23 WC 10-12	Area 1A PDI-24 40758.36806 PDI-24 WC 9-13	Area 1A PDI-25 40758.40625 PDI-25 WC 9-14	Area 1A PDI-26 40758.4375 PDI-26 WC 8-14.5	Area 1A PDI-28 40758.46181 PDI-28 WC 6-8
Metals (mg/Kg)								
Aluminum	7429-90-5	NL	**8410**	**10700**	**8290**	**10300**	**10400**	**9210**
Antimony	7440-36-0	NL	<16.5 U	<19.9 U	<15.7 U	<17.8 U	<15.8 U	<18.6 U
Arsenic	7440-38-2	NL	**2.3**	**4.0**	**2.3**	**6.2**	**6.0**	**3.6**
Barium	7440-39-3	NL	**61.4**	**98.3**	**23.3**	**31.3**	**29.6**	**39.6**
Beryllium	7440-41-7	NL	**0.44 B**	**0.56 B**	**0.34 B**	**0.40 B**	**0.52 B**	**0.43 B**
Cadmium	7440-43-9	NL	**0.15 J**	**0.25 J**	**0.10 J**	**0.19 J**	**0.22**	**0.19 J**
Calcium	7440-70-2	NL	**4560 B**	**2740 B**	**2260 B**	**10500 B**	**5420 B**	**2710 B**
Chromium	7440-47-3	NL	**12.2**	**15.2**	**11.7**	**13.3**	**14.3**	**12.8**
Cobalt	7440-48-4	NL	**7.5**	**8.9**	**7.4**	**9.9**	**10.6**	**9.0**
Copper	7440-50-8	NL	**16.3**	**20.3**	**11.2**	**27.1**	**14.2**	**15.3**
Iron	7439-89-6	NL	**13600 B**	**18300 B**	**17300 B**	**24100 B**	**23900 B**	**20000 B**
Lead	7439-92-1	NL	**ND**	**11.8**	**7.7**	**7.9**	**8.8**	**8.4**
Magnesium	7439-95-4	NL	**4650**	**4180**	**3760**	**5160**	**5220**	**4180**
Manganese	7439-96-5	NL	**126**	**168**	**160**	**224**	**218**	**165**
Mercury	7439-97-6	NL	**0.029**	**0.027**	<0.023 U	<0.019 U	<0.024 U	<0.024 U
Nickel	7440-02-0	NL	**19.7**	**23.9**	**19.8**	**25.3**	**28.6**	**23.6**
Potassium	7440-09-7	NL	**912**	**988**	**691**	**831**	**665**	**861**
Selenium	7782-49-2	NL	<4.4 U	<5.3 U	<4.2 U	<4.7 U	<4.2 U	<5.0 U
Silver	7440-22-4	NL	<0.55 U	<0.66 U	<0.52 U	<0.59 U	<0.53 U	<0.62 U
Sodium	7440-23-5	NL	**83.9 JB**	**83.9 JB**	**123 JB**	**80.5 JB**	**66.8 JB**	**85.4 JB**
Thallium	7440-28-0	NL	<6.6 U	<8.0 U	<6.3 U	<7.1 U	<6.3 U	<7.4 U
Vanadium	7440-62-2	NL	**13.3**	**14.9**	**11.7**	**14.6**	**13.7**	**13.4**
Zinc	7440-66-6	NL	**47.0 B**	**62.1 B**	**51.8 B**	**62.6 B**	**74.4 B**	**65.3 B**
Metals-TCLP (mg/L)								
Arsenic	7440-38-2	5	<0.010 U	**0.0059 J**	<0.010 U	<0.010 U	<0.010 U	<0.010 U
Barium	7440-39-3	100	**1.2 B**	**1.5 B**	**0.42 B**	**0.65 B**	**0.52 B**	**0.50 B**
Cadmium	7440-43-9	1	**0.0019**	**0.0012**	**0.0015**	**0.00065 J**	**0.0013**	**0.0013**
Chromium	7440-47-3	5	**0.0021 JB**	**0.012 B**	**0.0026 JB**	<0.0040 U	**0.0039 JB**	**0.0023 JB**
Lead	7439-92-1	5	**0.018**	**0.022**	**0.025**	<0.0050 U	**0.016**	**0.0074**
Mercury	7439-97-6	0.2	<0.00020 U	<0.00020 U	<0.00020 U	<0.00020 U	<0.00020 U	<0.00020 U
Selenium	7782-49-2	1	<0.015 U	<0.015 U	<0.015 U	<0.015 U	<0.015 U	<0.015 U
Silver	7440-22-4	5	<0.0030 U	<0.0030 U	<0.0030 U	<0.0030 U	<0.0030 U	<0.0030 U
Cyanide (mg/Kg)								
Cyanide (Reactivity)	57-12-5-R	250	<10.0 U	<10.0 U	<10.0 U	<10.0 U	<10.0 U	<10.0 U
Total Cyanide	57-12-5	NL	<1.2 U	<1.2 U	<1.1 U	<1.0 U	<1.0 U	<1.0 U
Sulfides (mg/Kg)								
Sulfide (Reactivity)	18496-25-8-R	500	<10.0 U	**20.1**	**10.0**	<10.0 U	**10.0**	<10.0 U
Sulfur	7704-34-9	NL	<197 U	**341**	**272**	<188 U	<190 U	<195 U
DRO (mg/Kg)								
Diesel Range Organics [C10-C28]	DRO	NL	<21 U	**8.3 J**	**220**	**2800**	**200**	**82**
PCBs (mg/Kg)								
Aroclor 1262	37324-23-5	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor 1268	11100-14-4	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor-1016	12674-11-2	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor-1221	11104-28-2	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor-1232	11141-16-5	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor-1242	53469-21-9	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor-1248	12672-29-6	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor-1254	11097-69-1	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Aroclor-1260	11096-82-5	NL	<0.29 U	<0.31 U	<0.23 U	<0.24 U	<0.26 U	<0.23 U
Total PCB	CALC-PCB	NL	ND	ND	ND	ND	ND	ND
Pesticides-TCLP (mg/L)								
Chlordane (technical)	57-74-9	NL	<0.0020 U	<0.0020 U	<0.0020 U	<0.020 U	<0.0020 U	<0.0020 U
Endrin	72-20-8	0.02	<0.00020 U	<0.00020 U	<0.00020 U	<0.0020 U	<0.00020 U	<0.00020 U
Gamma BHC - Lindane	58-89-9	0.4	<0.00020 U	<0.00020 U	<0.00020 U	<0.0020 U	<0.00020 U	<0.00020 U
Heptachlor	76-44-8	0.008	<0.00020 U	<0.00020 U	<0.00020 U	<0.0020 U	<0.00020 U	<0.00020 U
Heptachlor Epoxide	1024-57-3	0.008	<0.00020 U	<0.00020 U	<0.00020 U	<0.0020 U	<0.00020 U	<0.00020 U
Methoxychlor	72-43-5	10	<0.00020 U	<0.00020 U	<0.00020 U	<0.0020 U	<0.00020 U	<0.00020 U
Toxaphene	8001-35-2	NL	<0.0020 U	<0.0020 U	<0.0020 U	<0.020 U	<0.0020 U	<0.0020 U
Herbicides-TCLP (mg/L)								
2,4-D	94-75-7	10	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U
Silvex	93-72-1	1	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U
Other								
pH	pH	NL	**7.42**	**7.10**	**8.06**	**7.70**	**8.36**	**7.90**
Free Liquid	FLIQUIDS	NL	**0 passed**	**0 passed**	**0 failed**	**0 passed**	**0 passed**	**0 passed**
Total Solids	TSO	NL	**76.1**	**75.8**	**82.5**	**84.9**	**92.3**	**87.6**
BTU	BTU	NL	**0 DNF**	**0 DNF**	**0 DNF**	**0 DNF**	**0 DNF**	**0 DNF**
Ignitability	Ignitability	NL	**> 176.0**	**> 176.0**	**> 176.0**	**> 176.0**	**> 176.0**	**> 176.0**

Notes:
mg/Kg - milligrams per kilogram
NL = Not Listed
NA = Not Analyzed
B = The associated numerical value is an estimated quantity between the method detection limit and reporting detection limit.
J = The associated numerical value is an estimated quantity.
U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.
Bold indicates compound detected at a concentration greater than the reporting limit.
Yellow highlight indicates exceedance of the Hazardous Waste Criteria.
Bold and Italics = non detected compound exceeds the Hazardous Waste Criteria.

Table 5
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Waste Characterization Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Hazardous Waste Criteria	Area 1B PDI-11 8/2/2011 PDI-11 WC 12-14	Area 1B PDI-12 8/2/2011 PDI-12 WC 10.5-12.5	Area 1B PDI-14 8/2/2011 PDI-14 WC 10.5-13.5	Area 1B PDI-15 8/1/2011 PDI-15 WC 10.5-12.5
BTEX (mg/Kg)						
Benzene	71-43-2	NL	**26**	**15**	**37**	**0.069**
Ethylbenzene	100-41-4	NL	**170**	**57**	**280**	**0.022 J**
Toluene	108-88-3	NL	**4.6 J**	**13**	**5.7**	<0.026 U
Xylenes, Total	1330-20-7	NL	**180**	**63**	**300**	**0.072**
Total BTEX	CALC-BTEX	NL	**380.6**	**148**	**622.7**	**0.163**
BTEX-TCLP (mg/L)						
Benzene	71-43-2	0.5	**0.79**	**0.40**	**0.66**	<0.010 U
Ethylbenzene	100-41-4	NL	**2.1**	**0.89**	**1.8**	<0.010 U
Toluene	108-88-3	NL	**0.11**	**0.35**	**0.068**	<0.010 U
Xylenes, Total	1330-20-7	NL	**2.1**	**1.3**	**1.9**	<0.020 U
Total BTEX	CALC-BTEX	NL	**5.1**	**2.94**	**4.428**	ND
Total VOCs	CALC-VOC	NL	**5.1**	**2.94**	**4.428**	ND
VOCs (mg/Kg)						
1,1,1-Trichloroethane	71-55-6	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,1,2,2-Tetrachloroethane	79-34-5	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,1,2-Trichloroethane	79-00-5	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,1-Dichloroethane	75-34-3	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,1-Dichloroethene	75-35-4	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,2,4-Trichlorobenzene	120-82-1	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,2-Dibromo-3-chloropropane	96-12-8	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,2-Dibromoethane	106-93-4	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,2-Dichlorobenzene	95-50-1	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,2-Dichloroethane	107-06-2	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,2-Dichloropropane	78-87-5	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,3-Dichlorobenzene	541-73-1	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
1,4-Dichlorobenzene	106-46-7	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
2-Butanone	78-93-3	NL	<30 U	<6 U	<27 U	<0.13 U
2-Hexanone	591-78-6	NL	<30 U	<6 U	<27 U	<0.13 U
4-Methyl-2-pentanone	108-10-1	NL	<30 U	<6 U	<27 U	<0.13 U
Acetone	67-64-1	NL	<30 U	<6 U	<27 U	**0.067 J**
Bromodichloromethane	75-27-4	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Bromoform	75-25-2	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Bromomethane	74-83-9	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Carbon Disulfide	75-15-0	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Carbon Tetrachloride	56-23-5	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Chlorobenzene	108-90-7	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Chloroethane	75-00-3	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Chloroform	67-66-3	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Chloromethane	74-87-3	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
cis-1,2-Dichloroethene	156-59-2	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
cis-1,3-Dichloropropene	10061-01-5	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Cyclohexane	110-82-7	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Dibromochloromethane	124-48-1	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Dichlorodifluoromethane	75-71-8	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Isopropylbenzene	98-82-8	NL	**12**	**3.1**	**21**	**0.025 J**
Methyl acetate	79-20-9	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Methylcyclohexane	108-87-2	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Methylene chloride	75-09-2	NL	<6 U	<1.2 U	<5.4 U	**0.027**
Methyl-t-Butyl Ether (MTBE)	1634-04-4	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Styrene	100-42-5	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Tetrachloroethene	127-18-4	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
trans-1,2-Dichloroethene	156-60-5	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
trans-1,3-Dichloropropene	10061-02-6	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Trichloroethene	79-01-6	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Trichlorofluoromethane	75-69-4	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Vinyl chloride	75-01-4	NL	<6 U	<1.2 U	<5.4 U	<0.026 U
Total VOCs	CALC-VOC	NL	**392.6**	**151.1**	**643.7**	**0.282**
PAHs (mg/Kg)						
2-Methylnaphthalene	91-57-6	NL	**610**	**98**	**440**	**0.052 J**
Acenaphthene	83-32-9	NL	**690**	**78**	**460**	**1.9**
Acenaphthylene	208-96-8	NL	**75 J**	**53**	**82**	**0.27 J**
Anthracene	120-12-7	NL	**220**	**41**	**190**	**0.9**
Benzo(a)anthracene	56-55-3	NL	**210**	**36**	**160**	**0.91 B**
Benzo(a)pyrene	50-32-8	NL	**220**	**37**	**180**	**0.89 B**
Benzo(b)fluoranthene	205-99-2	NL	**160 J**	**25**	**120**	**0.6 B**
Benzo(ghi)perylene	191-24-2	NL	**95 J**	**15 J**	**93**	**0.45**
Benzo(k)fluoranthene	207-08-9	NL	**97 J**	**17 J**	**69**	**0.42 B**
Chrysene	218-01-9	NL	**150 J**	**27**	**130**	**0.68 B**
Dibenzo(a,h)anthracene	53-70-3	NL	**16 J**	**3.5 J**	**20**	<0.39 U
Fluoranthene	206-44-0	NL	**570**	**100**	**370**	**2.4**
Fluorene	86-73-7	NL	**370**	**64**	**280**	**1.2**
Indeno(1,2,3-cd)pyrene	193-39-5	NL	**63 J**	**11 J**	**71**	**0.32 J**
Naphthalene	91-20-3	NL	**2700 B**	**370 B**	**2300 B**	**0.17 J**
Phenanthrene	85-01-8	NL	**1300**	**220**	**1200**	**4.8**
Pyrene	129-00-0	NL	**690**	**130**	**460**	**3.3**
Total PAHs	CALC-PAH	NL	**8284**	**1334**	**6665**	**19.432**

Table 5
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Waste Characterization Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Hazardous Waste Criteria	Area 1B PDI-11 8/2/2011 PDI-11 WC 12-14	Area 1B PDI-12 8/2/2011 PDI-12 WC 10.5-12.5	Area 1B PDI-14 8/2/2011 PDI-14 WC 10.5-13.5	Area 1B PDI-15 8/1/2011 PDI-15 WC 10.5-12.5
SVOCs (mg/Kg)						
1,1'-Biphenyl	92-52-4	NL	**170 J**	**29**	**140**	**0.21 J**
2,2'-Oxybis(1-Chloropropane)	108-60-1	NL	<210 U	<20 U	<18 U	<0.39 U
2,4,5-Trichlorophenol	95-95-4	NL	<210 U	<20 U	<18 U	<0.39 U
2,4,6-Trichlorophenol	88-06-2	NL	<210 U	<20 U	<18 U	<0.39 U
2,4-Dichlorophenol	120-83-2	NL	<210 U	<20 U	<18 U	<0.39 U
2,4-Dimethylphenol	105-67-9	NL	<210 U	<20 U	<18 U	<0.39 U
2,4-Dinitrophenol	51-28-5	NL	<400 U	<39 U	<35 U	<0.76 U
2,4-Dinitrotoluene	121-14-2	NL	<210 U	<20 U	<18 U	<0.39 U
2,6-Dinitrotoluene	606-20-2	NL	<210 U	<20 U	<18 U	<0.39 U
2-Chloronaphthalene	91-58-7	NL	<210 U	<20 U	<18 U	<0.39 U
2-Chlorophenol	95-57-8	NL	<210 U	<20 U	<18 U	<0.39 U
2-Methylphenol	95-48-7	NL	<210 U	<20 U	<18 U	<0.39 U
2-Nitroaniline	88-74-4	NL	<400 U	<39 U	<35 U	<0.76 U
2-Nitrophenol	88-75-5	NL	<210 U	<20 U	<18 U	<0.39 U
3,3'-Dichlorobenzidine	91-94-1	NL	<210 U	<20 U	<18 U	<0.39 U
3-Nitroaniline	99-09-2	NL	<400 U	<39 U	<35 U	<0.76 U
4,6-Dinitro-2-methylphenol	534-52-1	NL	<400 U	<39 U	<35 U	<0.76 U
4-Bromophenyl phenyl ether	101-55-3	NL	<210 U	<20 U	<18 U	<0.39 U
4-Chloro-3-methylphenol	59-50-7	NL	<210 U	<20 U	<18 U	<0.39 U
4-Chloroaniline	106-47-8	NL	<210 U	<20 U	<18 U	<0.39 U
4-Chlorophenyl phenyl ether	7005-72-3	NL	<210 U	<20 U	<18 U	<0.39 U
4-Methylphenol	106-44-5	NL	<400 U	<39 U	<35 U	<0.76 U
4-Nitroaniline	100-01-6	NL	<400 U	<39 U	<35 U	<0.76 U
4-Nitrophenol	100-02-7	NL	<400 U	<39 U	<35 U	<0.76 U
Acetophenone	98-86-2	NL	<210 U	<20 U	<18 U	<0.39 U
Atrazine	1912-24-9	NL	<210 U	<20 U	<18 U	<0.39 U
Benzaldehyde	100-52-7	NL	<210 U	<20 U	<18 U	<0.39 U
Bis(2-chloroethoxy) methane	111-91-1	NL	<210 U	<20 U	<18 U	<0.39 U
Bis(2-chloroethyl) ether	111-44-4	NL	<210 U	<20 U	<18 U	<0.39 U
Bis(2-ethylhexyl) phthalate	117-81-7	NL	<210 U	<20 U	<18 U	<0.39 U
Butyl benzyl phthalate	85-68-7	NL	<210 U	<20 U	<18 U	<0.39 U
Caprolactam	105-60-2	NL	<210 U	<20 U	<18 U	<0.39 U
Carbazole	86-74-8	NL	<210 U	**1.5 J**	**9.1 J**	**0.064 J**
Dibenzofuran	132-64-9	NL	**48 J**	**8.5 J**	**40**	**0.17 J**
Diethyl phthalate	84-66-2	NL	<210 U	<20 U	<18 U	<0.39 U
Dimethyl phthalate	131-11-3	NL	<210 U	<20 U	<18 U	<0.39 U
Di-n-butyl phthalate	84-74-2	NL	<210 U	<20 U	<18 U	<0.39 U
Di-n-octyl phthalate	117-84-0	NL	<210 U	<20 U	<18 U	<0.39 U
Hexachlorobenzene	118-74-1	NL	<210 U	<20 U	<18 U	<0.39 U
Hexachlorobutadiene	87-68-3	NL	<210 U	<20 U	<18 U	<0.39 U
Hexachlorocyclopentadiene	77-47-4	NL	<210 U	<20 U	<18 U	<0.39 U
Hexachloroethane	67-72-1	NL	<210 U	<20 U	<18 U	<0.39 U
Isophorone	78-59-1	NL	<210 U	<20 U	<18 U	<0.39 U
Nitrobenzene	98-95-3	NL	<210 U	<20 U	<18 U	<0.39 U
N-Nitroso-Di-n-propylamine	621-64-7	NL	<210 U	<20 U	<18 U	<0.39 U
N-nitrosodiphenylamine	86-30-6	NL	<210 U	<20 U	<18 U	<0.39 U
Pentachlorophenol	87-86-5	NL	<400 U	<39 U	<35 U	<0.76 U
Phenol	108-95-2	NL	<210 U	<20 U	<18 U	<0.39 U
SVOCs-TCLP (mg/L)						
1,4-Dichlorobenzene	106-46-7	7.5	<0.10 U	<0.10 U	<0.10 U	<0.010 U
2,4,5-Trichlorophenol	95-95-4	400	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
2,4,6-Trichlorophenol	88-06-2	2	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
2,4-Dinitrotoluene	121-14-2	0.13	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
2-Methylphenol	95-48-7	NL	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
3-Methylphenol	108-39-4	NL	<0.10 U	<0.10 U	<0.10 U	<0.010 U
4-Methylphenol	106-44-5	NL	<0.10 U	<0.10 U	<0.10 U	<0.010 U
Hexachlorobenzene	118-74-1	0.13	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
Hexachlorobutadiene	87-68-3	0.5	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
Hexachloroethane	67-72-1	3	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
Nitrobenzene	98-95-3	2	<0.050 U	<0.050 U	<0.050 U	<0.0050 U
Pentachlorophenol	87-86-5	100	<0.10 U	<0.10 U	<0.10 U	<0.010 U
Pyridine	110-86-1	5	<0.25 U	<0.25 U	<0.25 U	<0.025 U

Table 5
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Waste Characterization Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Hazardous Waste Criteria	Area 1B PDI-11 8/2/2011 PDI-11 WC 12-14	Area 1B PDI-12 8/2/2011 PDI-12 WC 10.5-12.5	Area 1B PDI-14 8/2/2011 PDI-14 WC 10.5-13.5	Area 1B PDI-15 8/1/2011 PDI-15 WC 10.5-12.5
Metals (mg/Kg)						
Aluminum	7429-90-5	NL	**9780**	**11500**	**6690**	**10400**
Antimony	7440-36-0	NL	<17.7 U	<16.8 U	<14.3 U	<16.9 U
Arsenic	7440-38-2	NL	**4.3**	**5.7**	**3.7**	**4.7**
Barium	7440-39-3	NL	**45.0**	**32.5**	**25.9**	**43.3**
Beryllium	7440-41-7	NL	**0.51**	**0.43**	**0.26**	**0.38**
Cadmium	7440-43-9	NL	**0.16 J**	**0.18 J**	**0.11 J**	**0.16 J**
Calcium	7440-70-2	NL	**3690 B**	**20800 B**	**7640 B**	**6360 B**
Chromium	7440-47-3	NL	**16.3**	**16.2**	**9.4**	**14.1**
Cobalt	7440-48-4	NL	**8.1**	**9.7**	**6.0**	**9.2**
Copper	7440-50-8	NL	**19.8**	**16.1**	**16.3**	**17.1**
Iron	7439-89-6	NL	**20500 B**	**26000 B**	**15200 B**	**21900 B**
Lead	7439-92-1	NL	**ND**	**9.4**	**7.1**	**8.1**
Magnesium	7439-95-4	NL	**6210**	**15700**	**4140**	**5290**
Manganese	7439-96-5	NL	**161 B**	**280 B**	**211 B**	**262**
Mercury	7439-97-6	NL	<0.026 U	<0.025 U	<0.023 U	<0.023 U
Nickel	7440-02-0	NL	**30.0**	**26.3**	**15.5**	**23.3**
Potassium	7440-09-7	NL	**1180**	**815**	**615**	**964**
Selenium	7782-49-2	NL	<4.7 U	<4.5 U	<3.8 U	<4.5 U
Silver	7440-22-4	NL	<0.59 U	<0.56 U	<0.48 U	<0.56 U
Sodium	7440-23-5	NL	**165**	**99.8 J**	**84.8 J**	**129 J**
Thallium	7440-28-0	NL	<7.1 U	<6.7 U	<5.7 U	<6.7 U
Vanadium	7440-62-2	NL	**22.4**	**15.4**	**9.5**	**14.7**
Zinc	7440-66-6	NL	**57.6 B**	**62.6 B**	**45.3 B**	**58.7 B**
Metals-TCLP (mg/L)						
Arsenic	7440-38-2	5	**0.0084 J**	**0.0058 J**	**0.011**	**0.0057 J**
Barium	7440-39-3	100	**0.41 B**	**0.39 B**	**0.90 B**	**1.4 B**
Cadmium	7440-43-9	1	**0.00065 J**	**0.00085 J**	**0.00098 J**	**0.00088 J**
Chromium	7440-47-3	5	**0.0030 JB**	**0.0034 JB**	**0.0028 JB**	**0.0041 B**
Lead	7439-92-1	5	**0.022**	**0.011**	**0.012**	**0.022**
Mercury	7439-97-6	0.2	<0.00020 U	<0.00020 U	<0.00020 U	<0.00020 U
Selenium	7782-49-2	1	<0.015 U	<0.015 U	<0.015 U	<0.015 U
Silver	7440-22-4	5	<0.0030 U	<0.0030 U	<0.0030 U	<0.0030 U
Cyanide (mg/Kg)						
Cyanide (Reactivity)	57-12-5-R	250	<10.0 U	<10.0 U	<10.0 U	**5.5 J**
Total Cyanide	57-12-5	NL	<1.2 U	<1.2 U	<1.1 U	**3.8**
Sulfides (mg/Kg)						
Sulfide (Reactivity)	18496-25-8-R	500	**10.0**	<10.0 U	**20.1**	<10.0 U
Sulfur	7704-34-9	NL	**593**	**913**	**889**	**1010**
DRO (mg/Kg)						
Diesel Range Organics [C10-C28]	DRO	NL	**4900**	**1700**	**6200**	**130**
PCBs (mg/Kg)						
Aroclor 1262	37324-23-5	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor 1268	11100-14-4	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor-1016	12674-11-2	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor-1221	11104-28-2	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor-1232	11141-16-5	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor-1242	53469-21-9	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor-1248	12672-29-6	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor-1254	11097-69-1	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Aroclor-1260	11096-82-5	NL	<0.29 U	<0.26 U	<0.23 U	<0.26 U
Total PCB	CALC-PCB	NL	ND	ND	ND	ND
Pesticides -TCLP (mg/L)						
Chlordane (technical)	57-74-9	NL	<0.020 U	<0.0040 U	<0.020 U	<0.0020 U
Endrin	72-20-8	0.02	<0.0020 U	<0.00040 U	<0.0020 U	<0.00020 U
Gamma BHC - Lindane	58-89-9	0.4	<0.0020 U	<0.00040 U	<0.0020 U	<0.00020 U
Heptachlor	76-44-8	0.008	<0.0020 U	<0.00040 U	<0.0020 U	<0.00020 U
Heptachlor Epoxide	1024-57-3	0.008	<0.0020 U	<0.00040 U	<0.0020 U	<0.00020 U
Methoxychlor	72-43-5	10	<0.0020 U	<0.00040 U	<0.0020 U	<0.00020 U
Toxaphene	8001-35-2	NL	<0.020 U	<0.0040 U	<0.020 U	<0.0020 U
Herbicides-TCLP (mg/L)						
2,4-D	94-75-7	10	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U
Silvex	93-72-1	1	<0.0020 U	<0.0020 U	<0.0020 U	<0.0020 U
Other						
pH	pH	NL	**7.56**	**8.26**	**8.42**	**7.97**
Free Liquid	FLIQUIDS	NL	**0 passed**	**0 passed**	**0 passed**	**0 passed**
Total Solids	TSO	NL	**83.6**	**84.4**	**87.4**	**89.0**
BTU	BTU	NL	**0 DNF**	**0 DNF**	**0 DNF**	**0 DNF**
Ignitability	Ignitability	NL	**> 176.0**	**> 176.0**	**> 176.0**	**> 176.0**
Volume Removed	Volume Removed	NL	NS	NS	NS	<0.39 U

Notes:
mg/Kg - milligrams per kilogram
NL = Not Listed
NA = Not Analyzed
B = The associated numerical value is an estimated quantity between the method detection limit and reporting detection limit.
J = The associated numerical value is an estimated quantity.
U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.
Bold indicates compound detected at a concentration greater than the reporting limit.
Yellow highlight indicates exceedance of the Hazardous Waste Criteria.
Bold and Italics = non detected compound exceeds the Hazardous Waste Criteria.

Table 6
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Residential Property Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1B PDI-10 8/2/2011 PDI-10 (10.5-12.5) 10.5-12.5	Area 1B PDI-11 8/2/2011 PDI-11 WC 12-14
BTEX (mg/Kg)				
Benzene	71-43-2	2.9	**0.0064**	**26**
Ethylbenzene	100-41-4	30	**0.00095 J**	**170**
Toluene	108-88-3	100	**0.0024 J**	**4.6 J**
Xylenes, Total	1330-20-7	100	**0.0043 J**	**180**
Total BTEX	CALC-BTEX	NL	**0.01405**	**380.6**
BTEX-TCLP (mg/L)				
Benzene	71-43-2	NL	NS	**0.79**
Ethylbenzene	100-41-4	NL	NS	**2.1**
Toluene	108-88-3	NL	NS	**0.11**
Total BTEX	CALC-BTEX	NL	NS	**5.1**
Total VOCs	CALC-VOC	NL	NS	**5.1**
Xylenes, Total	1330-20-7	NL	NS	**2.1**
VOC (mg/Kg)				
1,1,1-Trichloroethane	71-55-6	100	<0.0058 U	<6 U
1,1,2,2-Tetrachloroethane	79-34-5	NL	<0.0058 U	<6 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NL	<0.0058 U	<6 U
1,1,2-Trichloroethane	79-00-5	NL	<0.0058 U	<6 U
1,1-Dichloroethane	75-34-3	19	<0.0058 U	<6 U
1,1-Dichloroethene	75-35-4	100	<0.0058 U	<6 U
1,2,4-Trichlorobenzene	120-82-1	NL	<0.0058 U	<6 U
1,2-Dibromo-3-chloropropane	96-12-8	NL	<0.0058 U	<6 U
1,2-Dibromoethane	106-93-4	NL	<0.0058 U	<6 U
1,2-Dichlorobenzene	95-50-1	100	<0.0058 U	<6 U
1,2-Dichloroethane	107-06-2	2.3	<0.0058 U	<6 U
1,2-Dichloropropane	78-87-5	NL	<0.0058 U	<6 U
1,3-Dichlorobenzene	541-73-1	17	<0.0058 U	<6 U
1,4-Dichlorobenzene	106-46-7	9.8	<0.0058 U	<6 U
2-Butanone	78-93-3	100	**0.0070 J**	<30 U
2-Hexanone	591-78-6	NL	<0.029 U	<30 U
4-Methyl-2-pentanone	108-10-1	NL	<0.029 U	<30 U
Acetone	67-64-1	100	**0.029 J**	<30 U
Bromodichloromethane	75-27-4	NL	<0.0058 U	<6 U
Bromoform	75-25-2	NL	<0.0058 U	<6 U
Bromomethane	74-83-9	NL	<0.0058 U	<6 U
Carbon Disulfide	75-15-0	NL	<0.0058 U	<6 U
Carbon Tetrachloride	56-23-5	1.4	<0.0058 U	<6 U
Chlorobenzene	108-90-7	100	<0.0058 U	<6 U
Chloroethane	75-00-3	NL	<0.0058 U	<6 U
Chloroform	67-66-3	10	<0.0058 U	<6 U
Chloromethane	74-87-3	NL	<0.0058 U	<6 U
cis-1,2-Dichloroethene	156-59-2	59	<0.0058 U	<6 U
cis-1,3-Dichloropropene	10061-01-5	NL	<0.0058 U	<6 U
Cyclohexane	110-82-7	NL	<0.0058 U	<6 U
Dibromochloromethane	124-48-1	NL	<0.0058 U	<6 U
Dichlorodifluoromethane	75-71-8	NL	<0.0058 U	<6 U
Isopropylbenzene	98-82-8	NL	<0.0058 U	**12**
Methyl acetate	79-20-9	NL	<0.0058 U	<6 U
Methylcyclohexane	108-87-2	NL	<0.0058 U	<6 U
Methylene chloride	75-09-2	51	**0.0061**	<6 U
Methyl-t-Butyl Ether (MTBE)	1634-04-4	62	<0.0058 U	<6 U
Styrene	100-42-5	NL	<0.0058 U	<6 U
Tetrachloroethene	127-18-4	5.5	**0.0012 J**	<6 U
trans-1,2-Dichloroethene	156-60-5	100	<0.0058 U	<6 U
trans-1,3-Dichloropropene	10061-02-6	NL	<0.0058 U	<6 U
Trichloroethene	79-01-6	10	<0.0058 U	<6 U
Trichlorofluoromethane	75-69-4	NL	<0.0058 U	<6 U
Vinyl chloride	75-01-4	0.21	<0.0058 U	<6 U
Total VOCs	CALC-VOC	NL	**0.05735**	**392.6**
PAH (mg/Kg)				
2-Methylnaphthalene	91-57-6	NL	**0.24**	**610**
Acenaphthene	83-32-9	100	**0.33**	**690**
Acenaphthylene	208-96-8	100	<0.2 U	**75 J**
Anthracene	120-12-7	100	**0.011 J**	**220**
Benzo(a)anthracene	56-55-3	1	<0.2 U	**210**
Benzo(a)pyrene	50-32-8	1	<0.2 U	**220**
Benzo(b)fluoranthene	205-99-2	1	<0.2 U	**160 J**
Benzo(ghi)perylene	191-24-2	100	<0.2 U	**95 J**
Benzo(k)fluoranthene	207-08-9	1	<0.2 U	**97 J**
Chrysene	218-01-9	1	<0.2 U	**150 J**
Dibenzo(a,h)anthracene	53-70-3	0.33	<0.2 U	**16 J**
Fluoranthene	206-44-0	100	**0.011 J**	**570**
Fluorene	86-73-7	100	**0.058 J**	**370**
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	<0.2 U	**63 J**
Naphthalene	91-20-3	100	**1.5 B**	**2700 B**
Phenanthrene	85-01-8	100	**0.069 J**	**1300**
Pyrene	129-00-0	100	**0.0091 J**	**690**
Total PAHs	CALC-PAH	NL	**2.2561**	**8284**

Table 6
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Residential Property Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1B PDI-10 8/2/2011 PDI-10 (10.5-12.5) 10.5-12.5	Area 1B PDI-11 8/2/2011 PDI-11 WC 12-14
SVOC (mg/Kg)				
1,4-Dichlorobenzene	106-46-7	9.8	NS	<0.10 U
2,4,5-Trichlorophenol	95-95-4	NL	NS	<0.050 U
2,4,6-Trichlorophenol	88-06-2	NL	NS	<0.050 U
2,4-Dinitrotoluene	121-14-2	NL	NS	<0.050 U
2-Methylphenol	95-48-7	100	NS	<0.050 U
3-Methylphenol	108-39-4	100	NS	<0.10 U
4-Methylphenol	106-44-5	34	NS	<0.10 U
Hexachlorobenzene	118-74-1	0.33	NS	<0.050 U
Hexachlorobutadiene	87-68-3	NL	NS	<0.050 U
Hexachloroethane	67-72-1	NL	NS	<0.050 U
Nitrobenzene	98-95-3	NL	NS	<0.050 U
Pentachlorophenol	87-86-5	2.4	NS	<0.10 U
Pyridine	110-86-1	NL	NS	<0.25 U
SVOC (mg/Kg)				
1,1'-Biphenyl	92-52-4	NL	**0.045 J**	**170 J**
2,2'-Oxybis(1-Chloropropane)	108-60-1	NL	<0.2 U	<210 U
2,4,5-Trichlorophenol	95-95-4	NL	<0.2 U	<210 U
2,4,6-Trichlorophenol	88-06-2	NL	<0.2 U	<210 U
2,4-Dichlorophenol	120-83-2	NL	<0.2 U	<210 U
2,4-Dimethylphenol	105-67-9	NL	<0.2 U	<210 U
2,4-Dinitrophenol	51-28-5	NL	<0.38 U	<400 U
2,4-Dinitrotoluene	121-14-2	NL	<0.2 U	<210 U
2,6-Dinitrotoluene	606-20-2	NL	<0.2 U	<210 U
2-Chloronaphthalene	91-58-7	NL	<0.2 U	<210 U
2-Chlorophenol	95-57-8	NL	<0.2 U	<210 U
2-Methylphenol	95-48-7	100	<0.2 U	<210 U
2-Nitroaniline	88-74-4	NL	<0.38 U	<400 U
2-Nitrophenol	88-75-5	NL	<0.2 U	<210 U
3,3'-Dichlorobenzidine	91-94-1	NL	<0.2 U	<210 U
3-Nitroaniline	99-09-2	NL	<0.38 U	<400 U
4,6-Dinitro-2-methylphenol	534-52-1	NL	<0.38 U	<400 U
4-Bromophenyl phenyl ether	101-55-3	NL	<0.2 U	<210 U
4-Chloro-3-methylphenol	59-50-7	NL	<0.2 U	<210 U
4-Chloroaniline	106-47-8	NL	<0.2 U	<210 U
4-Chlorophenyl phenyl ether	7005-72-3	NL	<0.2 U	<210 U
4-Methylphenol	106-44-5	34	<0.38 U	<400 U
4-Nitroaniline	100-01-6	NL	<0.38 U	<400 U
4-Nitrophenol	100-02-7	NL	<0.38 U	<400 U
Acetophenone	98-86-2	NL	<0.2 U	<210 U
Atrazine	1912-24-9	NL	<0.2 U	<210 U
Benzaldehyde	100-52-7	NL	<0.2 U	<210 U
Bis(2-chloroethoxy) methane	111-91-1	NL	<0.2 U	<210 U
Bis(2-chloroethyl) ether	111-44-4	NL	<0.2 U	<210 U
Bis(2-ethylhexyl) phthalate	117-81-7	NL	<0.2 U	<210 U
Butyl benzyl phthalate	85-68-7	NL	<0.2 U	<210 U
Caprolactam	105-60-2	NL	<0.2 U	<210 U
Carbazole	86-74-8	NL	**0.0095 J**	<210 U
Dibenzofuran	132-64-9	14	**0.028 J**	**48 J**
Diethyl phthalate	84-66-2	NL	<0.2 U	<210 U
Dimethyl phthalate	131-11-3	NL	<0.2 U	<210 U
Di-n-butyl phthalate	84-74-2	NL	<0.2 U	<210 U
Di-n-octyl phthalate	117-84-0	NL	<0.2 U	<210 U
Hexachlorobenzene	118-74-1	0.33	<0.2 U	<210 U
Hexachlorobutadiene	87-68-3	NL	<0.2 U	<210 U
Hexachlorocyclopentadiene	77-47-4	NL	<0.2 U	<210 U
Hexachloroethane	67-72-1	NL	<0.2 U	<210 U
Isophorone	78-59-1	NL	<0.2 U	<210 U
Nitrobenzene	98-95-3	NL	<0.2 U	<210 U
N-Nitroso-Di-n-propylamine	621-64-7	NL	<0.2 U	<210 U
N-nitrosodiphenylamine	86-30-6	NL	<0.2 U	<210 U
Pentachlorophenol	87-86-5	2.4	<0.38 U	<400 U
Phenol	108-95-2	100	<0.2 U	<210 U
Metals (mg/Kg)				

Table 6
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1B - Residential Property Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1B PDI-10 8/2/2011 PDI-10 (10.5-12.5) 10.5-12.5	Area 1B PDI-11 8/2/2011 PDI-11 WC 12-14
Aluminum	7429-90-5	NL	NS	**9780**
Antimony	7440-36-0	NL	NS	<17.7 U
Arsenic	7440-38-2	16	NS	**4.3**
Barium	7440-39-3	350	NS	**45.0**
Beryllium	7440-41-7	14	NS	**0.51**
Cadmium	7440-43-9	2.5	NS	**0.16 J**
Calcium	7440-70-2	NL	NS	**3690 B**
Chromium	7440-47-3	36	NS	**16.3**
Cobalt	7440-48-4	NL	NS	**8.1**
Copper	7440-50-8	270	NS	**19.8**
Iron	7439-89-6	NL	NS	**20500 B**
Lead	7439-92-1	400	NS	**9.3**
Magnesium	7439-95-4	NL	ND	**6210**
Manganese	7439-96-5	2000	NS	**161 B**
Mercury	7439-97-6	0.81	NS	<0.026 U
Nickel	7440-02-0	140	NS	**30.0**
Potassium	7440-09-7	NL	NS	**1180**
Selenium	7782-49-2	36	NS	<4.7 U
Silver	7440-22-4	36	NS	<0.59 U
Sodium	7440-23-5	NL	NS	**165**
Thallium	7440-28-0	NL	NS	<7.1 U
Vanadium	7440-62-2	NL	NS	**22.4**
Zinc	7440-66-6	2200	NS	**57.6 B**
Metals-TCLP (mg/L)				
Arsenic	7440-38-2	NL	NS	**0.0084 J**
Barium	7440-39-3	NL	NS	**0.41 B**
Cadmium	7440-43-9	NL	NS	**0.00065 J**
Chromium	7440-47-3	NL	NS	**0.0030 JB**
Lead	7439-92-1	NL	NS	**0.022**
Mercury	7439-97-6	NL	NS	<0.00020 U
Selenium	7782-49-2	NL	NS	<0.015 U
Silver	7440-22-4	NL	NS	<0.0030 U
Pesticides-TCLP (mg/L)				
Chlordane (technical)	57-74-9	NL	NS	<0.020 U
Endrin	72-20-8	NL	NS	<0.0020 U
Gamma BHC - Lindane	58-89-9	NL	NS	<0.0020 U
Heptachlor	76-44-8	NL	NS	<0.0020 U
Heptachlor Epoxide	1024-57-3	NL	NS	<0.0020 U
Methoxychlor	72-43-5	NL	NS	<0.0020 U
Toxaphene	8001-35-2	NL	NS	<0.020 U
Herbicides-TCLP (mg/L)				
2,4-D	94-75-7	NL	NS	<0.0020 U
Silvex	93-72-1	NL	NS	<0.0020 U
PCBs (mg/Kg)				
Aroclor 1262	37324-23-5	NL	NS	<0.29 U
Aroclor 1268	11100-14-4	NL	NS	<0.29 U
Aroclor-1016	12674-11-2	NL	NS	<0.29 U
Aroclor-1221	11104-28-2	NL	NS	<0.29 U
Aroclor-1232	11141-16-5	NL	NS	<0.29 U
Aroclor-1242	53469-21-9	NL	NS	<0.29 U
Aroclor-1248	12672-29-6	NL	NS	<0.29 U
Aroclor-1254	11097-69-1	NL	NS	<0.29 U
Aroclor-1260	11096-82-5	NL	NS	<0.29 U
Total PCB	CALC-PCB	1	NS	ND
DRO				
Diesel Range Organics [C10-C28]	DRO	NL	NS	**4900**
Cyanide (mg/Kg)				
Cyanide (Reactivity)	57-12-5-R	NL	NS	<10.0 U
Total Cyanide	57-12-5	27	<1.1 U	<1.2 U
Sulfides (mg/Kg)				
Sulfide (Reactivity)	18496-25-8-R	NL	NS	**10.0**
Sulfur	7704-34-9	NL	NS	**593**
Other				
pH	pH	NL	NS	**7.56**
Free Liquid	FLIQUIDS	NL	NS	**passed**
Total Solids	TSO	NL	NS	**83.6**
BTU	BTU	NL	NS	**0 DNF**
Ignitability	Ignitability	NL	NS	**> 176.0**

Notes:

mg/Kg - milligrams per kilogram

NL = Not Listed

NA = Not Analyzed

B = The associated numerical value is an estimated quantity between the method detection limit and reporting detection limit.

J = The associated numerical value is an estimated quantity.

U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.

Bold indicates compound detected at a concentration greater than the reporting limit.

Yellow highlight indicates exceedance of the NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value.

Bold and Italics = non detected compound exceeds NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value

Table 7
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1C - Baseline Groundwater Analytical Summary Table

Area Location ID Sample Date Sample ID	CAS #	Ambient Water Quality Standards and Guidance Values	 MW-14D 12/26/2007 MW-14D-122607	 MW-14S 12/27/2007 MW-14S-122707DUP	 MW-14S 12/27/2007 MW-14S-122707	Area 1C MW-C11 8/11/2011 MW-C11 081111	Area 1C MW-C12 8/11/2011 MW-C12 081111	Area 1C MW-C13 8/11/2011 MW-C13 081111	Area 1C MW-C14 8/11/2011 MW-C14 081111	Area 1C MW-C15 8/12/2011 MW-C15 081211	Area 1C MW-C16 8/12/2011 MW-C16 081211	Area 1C MW-C16 8/12/2011 MW-C116 081211	Area 1C MW-C17 8/12/2011 MW-C17 081211
BTEX (ug/L)													
Benzene	71-43-2	1	<1.0 U	<1.0 U	<1.0 U	<1.0 U	**230**	**3.2**	**8.4**	<1.0 U	**16**	**15**	**1.4**
Ethylbenzene	100-41-4	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	**1500**	<1.0 U	**1.7**	<1.0 U	**370**	**410**	**2.6**
Toluene	108-88-3	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U	**18**	<1.0 U	<1.0 U	<1.0 U	**11**	**12**	<1.0 U
Xylenes, Total	1330-20-7	5	<3.0 U	<3.0 U	<3.0 U	<2.0 U	**630**	<2.0 U	**2.0**	<2.0 U	**450**	**440**	**1.8 J**
Total BTEX	CALC-BTEX	NL	NS	NS	NS	ND	**2378**	**3.2**	**12.1**	ND	**847**	**877**	**5.8**
VOCs (ug/L)													
1,1,1-Trichloroethane	71-55-6		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1,2,2-Tetrachloroethane	79-34-5		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1,2-Trichloroethane	79-00-5		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1-Dichloroethane	75-34-3		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,1-Dichloroethene	75-35-4		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,2,4-Trichlorobenzene	120-82-1		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,2-Dibromo-3-chloropropane	96-12-8		<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ
1,2-Dibromoethane	106-93-4		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,2-Dichlorobenzene	95-50-1		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,2-Dichloroethane	107-06-2		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,2-Dichloropropane	78-87-5		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,3-Dichlorobenzene	541-73-1		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
1,4-Dichlorobenzene	106-46-7		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
2-Butanone	78-93-3		<5.0 UJ	<5.0 UJ	<5.0 UJ	<10 U	<10 U	<10 U	<10 U	<10 U	<10 U	<10 U	<10 U
2-Hexanone	591-78-6		<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U
4-Methyl-2-pentanone	108-10-1		<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U	<5.0 U
Acetone	67-64-1		<5.0 UJ	<5.0 UJ	<5.0 UJ	**3.5 J**	**4.1 J**	**4.6 J**	**9.1 J**	**3.2 J**	**7.6 J**	**8.1 J**	<10 U
Bromodichloromethane	75-27-4		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Bromoform	75-25-2		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Bromomethane	74-83-9		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Carbon Disulfide	75-15-0		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Carbon Tetrachloride	56-23-5		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Chlorobenzene	108-90-7		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Chloroethane	75-00-3		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Chloroform	67-66-3		<1.0 U	<1.0 U	<1.0 U	**0.57 J**	<1.0 U	<1.0 U	<1.0 U	<1.0 U	**2.0**	**1.8**	<1.0 U
Chloromethane	74-87-3		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
cis-1,2-Dichloroethene	156-59-2		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
cis-1,3-Dichloropropene	10061-01-5		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 U
Cyclohexane	110-82-7		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Dibromochloromethane	124-48-1		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Dichlorodifluoromethane	75-71-8		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Isopropylbenzene	98-82-8		<1.0 U	<1.0 U	<1.0 U	<1.0 U	**16**	<1.0 U	**2.9**	<1.0 U	**22**	**24**	<1.0 U
Methyl acetate	79-20-9		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Methylcyclohexane	108-87-2		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Methylene chloride	75-09-2		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Methyl-t-Butyl Ether (MTBE)	1634-04-4		<1.0 U	<1.0 U	<1.0 U	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 U
Styrene	100-42-5		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Tetrachloroethene	127-18-4		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	**2.9**	**2.8**	<1.0 U
trans-1,2-Dichloroethene	156-60-5		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
trans-1,3-Dichloropropene	10061-02-6		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 U
Trichloroethene	79-01-6		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Trichlorofluoromethane	75-69-4		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Vinyl chloride	75-01-4		<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U
Total VOCs	CALC-VOC		NS	NS	NS	**4.07**	**2398.1**	**7.8**	**24.1**	**3.2**	**881.5**	**913.7**	**5.8**
PAHs (ug/L)													
2-Methylnaphthalene	91-57-6		<5 U	<5 U	<5 U	<5.0 U	**19 J**	<4.7 U	<5.0 U	<5.0 U	**210**	**320**	<5.0 U
Acenaphthene	83-32-9	20	<5 U	<5 U	<5 U	<5.0 U	**7.7 J**	<4.7 U	**1.3 J**	<5.0 U	**130**	**140**	**89**
Acenaphthylene	208-96-8		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**7.9**	**9.0**	**4.8 J**
Anthracene	120-12-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**8.0**	**8.3**	**0.45 J**
Benzo(a)anthracene	56-55-3		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**0.50 J**	**0.41 J**	<5.0 U
Benzo(a)pyrene	50-32-8		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Benzo(b)fluoranthene	205-99-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Benzo(ghi)perylene	191-24-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Benzo(k)fluoranthene	207-08-9		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Chrysene	218-01-9		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**0.35 J**	**0.33 J**	<5.0 U
Dibenzo(a,h)anthracene	53-70-3		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Fluoranthene	206-44-0		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**3.5 J**	**3.8 J**	**5.5**
Fluorene	86-73-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**35**	**38**	**9.2**
Indeno(1,2,3-cd)pyrene	193-39-5		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Naphthalene	91-20-3	10	<5 U	<5 U	<5 U	<5.0 U	**590**	**1.0 J**	<5.0 U	<5.0 U	**43 J**	**1300 J**	<5.0 U
Phenanthrene	85-01-8		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**37**	**39**	<5.0 U
Pyrene	129-00-0		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**4.9**	**5.2**	**11**
Total PAHs	CALC-PAH		NS	NS	NS	ND	**616.7**	**1.0**	**1.3**	ND	**484.15**	**1868.14**	**120.79**

Table 7
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1C - Baseline Groundwater Analytical Summary Table

Area Location ID Sample Date Sample ID	CAS #	Ambient Water Quality Standards and Guidance Values	MW-14D 12/26/2007 MW-14D-122607	MW-14S 12/27/2007 MW-14S-122707DUP	MW-14S 12/27/2007 MW-14S-122707	Area 1C MW-C11 8/11/2011 MW-C11 081111	Area 1C MW-C12 8/11/2011 MW-C12 081111	Area 1C MW-C13 8/11/2011 MW-C13 081111	Area 1C MW-C14 8/11/2011 MW-C14 081111	Area 1C MW-C15 8/12/2011 MW-C15 081211	Area 1C MW-C16 8/12/2011 MW-C16 081211	Area 1C MW-C16 8/12/2011 MW-C116 081211	Area 1C MW-C17 8/12/2011 MW-C17 081211
SVOCs (ug/L)													
1,1'-Biphenyl	92-52-4		NS	NS	NS	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**26**	**28**	<5.0 U
1,2,4-Trichlorobenzene	120-82-1		<10 U	<9 U	<9 U	NS	NS	NS	NS	NS	NS	NS	NS
1,2-Dichlorobenzene	95-50-1		<10 U	<9 U	<9 U	NS	NS	NS	NS	NS	NS	NS	NS
1,3-Dichlorobenzene	541-73-1		<10 U	<9 U	<9 U	NS	NS	NS	NS	NS	NS	NS	NS
1,4-Dichlorobenzene	106-46-7		<10 U	<9 U	<9 U	NS	NS	NS	NS	NS	NS	NS	NS
2,2'-Oxybis(1-Chloropropane)	108-60-1		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2,4,5-Trichlorophenol	95-95-4		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2,4,6-Trichlorophenol	88-06-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2,4-Dichlorophenol	120-83-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2,4-Dimethylphenol	105-67-9		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2,4-Dinitrophenol	51-28-5		<10 U	<9 U	<9 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
2,4-Dinitrotoluene	121-14-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2,6-Dinitrotoluene	606-20-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2-Chloronaphthalene	91-58-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2-Chlorophenol	95-57-8		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2-Methylphenol	95-48-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
2-Nitroaniline	88-74-4		<10 U	<9 U	<9 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
2-Nitrophenol	88-75-5		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
3,3'-Dichlorobenzidine	91-94-1		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
3-Nitroaniline	99-09-2		<10 U	<9 U	<9 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
4,6-Dinitro-2-methylphenol	534-52-1		<10 U	<9 U	<9 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
4-Bromophenyl phenyl ether	101-55-3		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
4-Chloro-3-methylphenol	59-50-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
4-Chloroaniline	106-47-8		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
4-Chlorophenyl phenyl ether	7005-72-3		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
4-Methylphenol	106-44-5		<5 U	<5 U	<5 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
4-Nitroaniline	100-01-6		<10 U	<9 U	<9 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
4-Nitrophenol	100-02-7		<10 U	<9 U	<9 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
Acetophenone	98-86-2		NS	NS	NS	<5.0 U	<51 U	<4.7 U	**0.65 J**	<5.0 U	**8.0**	**7.6**	**2.2 J**
Aniline	62-53-3		<10 U	<9 U	<9 U	NS	NS	NS	NS	NS	NS	NS	NS
Atrazine	1912-24-9		NS	NS	NS	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Benzaldehyde	100-52-7		NS	NS	NS	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Benzoic acid	65-85-0		<140 U	<140 U	<140 U	NS	NS	NS	NS	NS	NS	NS	NS
Benzyl alcohol	100-51-6		<19 U	<19 U	<19 U	NS	NS	NS	NS	NS	NS	NS	NS
Bis(2-chloroethoxy) methane	111-91-1		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Bis(2-chloroethyl) ether	111-44-4		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Bis(2-ethylhexyl) phthalate	117-81-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Butyl benzyl phthalate	85-68-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Caprolactam	105-60-2		NS	NS	NS	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Carbazole	86-74-8		NS	NS	NS	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	**3.0 J**	**3.3 J**	<5.0 U
Dibenzofuran	132-64-9		<5 U	<5 U	<5 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	**4.0 J**	**4.1 J**	**0.84 J**
Diethyl phthalate	84-66-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Dimethyl phthalate	131-11-3		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Di-n-butyl phthalate	84-74-2		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	**0.54 J**	**1.0 J**	**0.96 J**	**0.46 J**
Di-n-octyl phthalate	117-84-0		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Hexachlorobenzene	118-74-1		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Hexachlorobutadiene	87-68-3		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Hexachlorocyclopentadiene	77-47-4		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Hexachloroethane	67-72-1		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Isophorone	78-59-1		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Nitrobenzene	98-95-3		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
N-Nitroso-Di-n-propylamine	621-64-7		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
N-nitrosodiphenylamine	86-30-6		<5 U	<5 U	<5 U	<5.0 U	<51 U	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	<5.0 U
Pentachlorophenol	87-86-5		<10 U	<9 U	<9 U	<10 U	<100 U	<9.4 U	<9.9 U	<10 U	<9.6 U	<9.4 U	<10 U
Phenol	108-95-2	1	<5 U	<5 U	<5 U	<5.0 U	**5.1 J**	<4.7 U	<5.0 U	<5.0 U	<4.8 U	<4.7 U	**1.0 J**
Metals (mg/L)													
Arsenic	7440-38-2		NS	NS	NS	<0.010 U	NS	NS	<0.010 U	NS	<0.010 U	<0.010 U	<0.010 U
Chromium	7440-47-3		NS	NS	NS	<0.0040 U	NS	NS	<0.0040 U	NS	**0.00092 J**	**0.0011 J**	**0.00095 J**
Iron	7439-89-6		NS	NS	NS	**10.8**	NS	NS	**0.11**	NS	**7.8**	**8.1**	**11.7**
Manganese	7439-96-5		NS	NS	NS	**2.2**	NS	NS	**1.2**	NS	**1.7**	**1.8**	**0.80**
Cyanide (mg/L)													
Total Cyanide	57-12-5	0.2	NS	NS	NS	**0.047**	**0.046**	**0.0054 J**	**0.013**	<0.010 U	**0.0057 J**	**0.0088 J**	**0.039**
Hydrocarbons													
Diesel Range Organics [C10-C28]	DRO	NL	NS	NS	NS	**0.47 J**	**2.6**	**0.57**	**1.1**	**0.39 J**	**4.3**	**4.2**	**2.1**
GRO (C6-C10)	8006-61-9	NL	NS	NS	NS	**24 J**	**3500**	**37**	**63**	**26**	**2500**	**2400**	**53**

Notes:
mg/Kg - milligrams per kilogram
NL = Not Listed
NA = Not Analyzed
J = The associated numerical value is an estimated quantity.
U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.
Bold indicates compound detected at a concentration greater than the reporting limit.

Table 8
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1C - Soil Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Area 1C MW-C12 7/27/2011 MW-C12 (10-12) 10-12	Area 1C MW-C12 7/27/2011 MW-C12 (13-15) 13-15	Area 1C MW-C15 7/28/2011 MW-C15 (6-7) 6-7	Area 1C MW-C16 7/26/2011 MW-C16 (10-12.5) 10-12.5	Area 1C MW-C17 7/26/2011 MW-C17 (11-13) 11-13
BTEX (mg/Kg)						
Benzene	71-43-2	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Ethylbenzene	100-41-4	**1.2**	**1.9**	<0.0063 U	**11**	<0.12 U
Toluene	108-88-3	<0.13 U	<0.14 U	<0.0063 U	**0.094 J**	<0.12 U
Xylenes, Total	1330-20-7	**1.1**	**0.87**	<0.013 U	**9.9**	<0.24 U
Total BTEX	CALC-BTEX	**2.3**	**2.77**	ND	**20.994**	ND
VOCs (mg/Kg)						
1,1,1-Trichloroethane	71-55-6	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,1,2,2-Tetrachloroethane	79-34-5	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,1,2-Trichloroethane	79-00-5	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,1-Dichloroethane	75-34-3	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,1-Dichloroethene	75-35-4	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,2,4-Trichlorobenzene	120-82-1	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,2-Dibromo-3-chloropropane	96-12-8	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,2-Dibromoethane	106-93-4	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,2-Dichlorobenzene	95-50-1	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,2-Dichloroethane	107-06-2	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,2-Dichloropropane	78-87-5	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,3-Dichlorobenzene	541-73-1	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
1,4-Dichlorobenzene	106-46-7	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
2-Butanone	78-93-3	<0.64 U	<0.68 U	<0.031 UJ	<0.67 U	<0.6 U
2-Hexanone	591-78-6	<0.64 U	<0.68 U	<0.031 U	<0.67 U	<0.6 U
4-Methyl-2-pentanone	108-10-1	<0.64 U	<0.68 U	<0.031 U	<0.67 U	<0.6 U
Acetone	67-64-1	<0.64 U	<0.68 U	<0.031 U	<0.67 U	<0.6 U
Bromodichloromethane	75-27-4	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Bromoform	75-25-2	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Bromomethane	74-83-9	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Carbon Disulfide	75-15-0	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Carbon Tetrachloride	56-23-5	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Chlorobenzene	108-90-7	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Chloroethane	75-00-3	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Chloroform	67-66-3	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Chloromethane	74-87-3	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
cis-1,2-Dichloroethene	156-59-2	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
cis-1,3-Dichloropropene	10061-01-5	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Cyclohexane	110-82-7	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Dibromochloromethane	124-48-1	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Dichlorodifluoromethane	75-71-8	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Isopropylbenzene	98-82-8	**0.068 J**	<0.14 U	<0.0063 U	**1.8**	<0.12 U
Methyl acetate	79-20-9	<0.13 U	<0.14 U	<0.0063 UJ	<0.13 U	<0.12 U
Methylcyclohexane	108-87-2	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Methylene chloride	75-09-2	<0.13 U	<0.14 U	**0.0036 J**	<0.13 U	<0.12 U
Methyl-t-Butyl Ether (MTBE)	1634-04-4	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Styrene	100-42-5	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Tetrachloroethene	127-18-4	<0.13 U	<0.14 U	**0.0023 J**	<0.13 U	<0.12 U
trans-1,2-Dichloroethene	156-60-5	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
trans-1,3-Dichloropropene	10061-02-6	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Trichloroethene	79-01-6	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Trichlorofluoromethane	75-69-4	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Vinyl chloride	75-01-4	<0.13 U	<0.14 U	<0.0063 U	<0.13 U	<0.12 U
Total VOCs	CALC-VOC	**2.368**	**2.77**	**0.0059**	**22.794**	ND
PAHs (mg/Kg)						
2-Methylnaphthalene	91-57-6	**0.013 J**	**0.40**	<4.3 U	**130**	**0.38 J**
Acenaphthene	83-32-9	**0.082 J**	**0.21 J**	<4.3 U	**70**	**23**
Acenaphthylene	208-96-8	**0.018 J**	<0.23 U	<4.3 U	**9.5**	**3.4**
Anthracene	120-12-7	**0.011 J**	**0.0058 J**	<4.3 U	**26**	**47**
Benzo(a)anthracene	56-55-3	**0.019 J**	<0.23 U	<4.3 U	**16**	**15**
Benzo(a)pyrene	50-32-8	<0.22 U	<0.23 U	<4.3 U	**14**	**13**
Benzo(b)fluoranthene	205-99-2	**0.018 J**	**0.011 J**	<4.3 U	**8.5**	**7.8**
Benzo(ghi)perylene	191-24-2	**0.017 J**	**0.011 J**	<4.3 U	**6.1**	**5.6**
Benzo(k)fluoranthene	207-08-9	**0.012 J**	**0.0063 J**	<4.3 U	**5.3**	**5.1**
Chrysene	218-01-9	**0.018 J**	<0.23 U	<4.3 U	**13**	**13**
Dibenzo(a,h)anthracene	53-70-3	**0.0054 J**	<0.23 U	<4.3 U	**1.4**	**1.6**
Fluoranthene	206-44-0	**0.025 J**	**0.0088 J**	<4.3 U	**28**	**26**
Fluorene	86-73-7	**0.017 J**	**0.021 J**	<4.3 U	**34**	**19**
Indeno(1,2,3-cd)pyrene	193-39-5	**0.013 J**	**0.0092 J**	<4.3 U	**4.3**	**4.1**
Naphthalene	91-20-3	**1.6**	**5.5**	<4.3 U	**270**	**0.36 J**
Phenanthrene	85-01-8	**0.034 J**	**0.021 J**	<4.3 U	**91**	**71**
Pyrene	129-00-0	**0.033 J**	**0.010 J**	**0.11 J**	**44**	**39**
Total PAHs	CALC-PAH	**1.9354**	**6.2141**	**0.11**	**774.4**	**295.84**
SVOCs (mg/Kg)						
1,1'-Biphenyl	92-52-4	<0.22 U	**0.021 J**	<4.3 U	**15**	**5.4**
2,2'-Oxybis(1-Chloropropane)	108-60-1	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2,4,5-Trichlorophenol	95-95-4	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2,4,6-Trichlorophenol	88-06-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2,4-Dichlorophenol	120-83-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2,4-Dimethylphenol	105-67-9	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2,4-Dinitrophenol	51-28-5	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
2,4-Dinitrotoluene	121-14-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2,6-Dinitrotoluene	606-20-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2-Chloronaphthalene	91-58-7	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2-Chlorophenol	95-57-8	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U

Table 8
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Area 1C - Soil Analytical Summary Table

Area Location ID Sample Date Sample ID Depth	CAS #	Area 1C MW-C12 7/27/2011 MW-C12 (10-12) 10-12	Area 1C MW-C12 7/27/2011 MW-C12 (13-15) 13-15	Area 1C MW-C15 7/28/2011 MW-C15 (6-7) 6-7	Area 1C MW-C16 7/26/2011 MW-C16 (10-12.5) 10-12.5	Area 1C MW-C17 7/26/2011 MW-C17 (11-13) 11-13
2-Methylphenol	95-48-7	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
2-Nitroaniline	88-74-4	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
2-Nitrophenol	88-75-5	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
3,3'-Dichlorobenzidine	91-94-1	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
3-Nitroaniline	99-09-2	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
4,6-Dinitro-2-methylphenol	534-52-1	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
4-Bromophenyl phenyl ether	101-55-3	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
4-Chloro-3-methylphenol	59-50-7	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
4-Chloroaniline	106-47-8	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
4-Chlorophenyl phenyl ether	7005-72-3	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
4-Methylphenol	106-44-5	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
4-Nitroaniline	100-01-6	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
4-Nitrophenol	100-02-7	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
Acetophenone	98-86-2	**0.012 J**	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Atrazine	1912-24-9	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Benzaldehyde	100-52-7	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Bis(2-chloroethoxy) methane	111-91-1	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Bis(2-chloroethyl) ether	111-44-4	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Bis(2-ethylhexyl) phthalate	117-81-7	**0.30**	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Butyl benzyl phthalate	85-68-7	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Caprolactam	105-60-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Carbazole	86-74-8	<0.22 U	<0.23 U	<4.3 U	**0.55 J**	<1.0 U
Dibenzofuran	132-64-9	<0.22 U	<0.23 U	<4.3 U	**3.3**	**1.5**
Diethyl phthalate	84-66-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Dimethyl phthalate	131-11-3	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Di-n-butyl phthalate	84-74-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Di-n-octyl phthalate	117-84-0	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Hexachlorobenzene	118-74-1	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Hexachlorobutadiene	87-68-3	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Hexachlorocyclopentadiene	77-47-4	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Hexachloroethane	67-72-1	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Isophorone	78-59-1	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Nitrobenzene	98-95-3	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
N-Nitroso-Di-n-propylamine	621-64-7	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
N-nitrosodiphenylamine	86-30-6	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Pentachlorophenol	87-86-5	<0.42 U	<0.44 U	<8.3 U	<2.2 U	<2.0 U
Phenol	108-95-2	<0.22 U	<0.23 U	<4.3 U	<1.1 U	<1.0 U
Cyanide (mg/Kg)						
Total Cyanide	57-12-5	<1.2 UJ	<1.3 UJ	<1.2 UJ	<1.2 U	<1.2 U
Hydrocarbons (mg/Kg)						
Diesel Range Organics [C10-C28]	DRO	**7.4 J**	**11 J**	**16 J**	**380**	**740 J**
GRO (C6-C10)	8006-61-9	**4.9**	**9.3**	**0.31 J**	**130**	**3.2**

Notes:
mg/Kg - milligrams per kilogram
NL = Not Listed
NA = Not Analyzed
B = The associated numerical value is an estimated quantity between the method detection limit and reporting detection limit.
J = The associated numerical value is an estimated quantity.
U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.
Bold indicates compound detected at a concentration greater than the reporting limit.

Table 9
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Supplemental Delineation Points

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1C PDI-1 7/29/2011 PDI-1 (10-12) 10-12	Area 1C PDI-1 7/29/2011 PDI-1 (12-14) 12-14	Area 1C PDI-1 7/29/2011 PDI-100 (12-14) 12-14	Area 1C PDI-2 7/29/2011 PDI-2 (10-12) 10-12	Area 1C PDI-2 7/29/2011 PDI-2 (12-14) 12-14	Area 1C PDI-3 7/28/2011 PDI-3 (11.5-13.5) 11.5-13.5	Area 1C PDI-3 7/28/2011 PDI-3 (14-16) 14-16
BTEX (mg/Kg)									
Benzene	71-43-2	2.9	<0.0060 U	<0.0065 U	**0.00098 J**	**0.0055 J**	<0.0061 U	**0.019**	**0.0042 J**
Ethylbenzene	100-41-4	30	<0.0060 U	<0.0065 UJ	<0.0055 U	<0.0065 U	<0.0061 U	**0.10**	**0.015 J**
Toluene	108-88-3	100	<0.0060 U	**0.00086 J**	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
Xylenes, Total	1330-20-7	100	<0.012 U	<0.013 U	<0.011 U	<0.013 U	<0.012 U	**0.017**	**0.0058 J**
Total BTEX	CALC-BTEX	NL	ND	**0.00086**	**0.00098**	**0.0055**	ND	**0.136**	**0.025**
VOCs (mg/Kg)									
1,1,1-Trichloroethane	71-55-6	100	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,1,2,2-Tetrachloroethane	79-34-5	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,1,2-Trichloroethane	79-00-5	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,1-Dichloroethane	75-34-3	19	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
1,1-Dichloroethene	75-35-4	100	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
1,2,4-Trichlorobenzene	120-82-1	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,2-Dibromo-3-chloropropane	96-12-8	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,2-Dibromoethane	106-93-4	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,2-Dichlorobenzene	95-50-1	100	<0.0060 U	<0.0065 UJ	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
1,2-Dichloroethane	107-06-2	2.3	<0.0060 U	<0.0065 UJ	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
1,2-Dichloropropane	78-87-5	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,3-Dichlorobenzene	541-73-1	17	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
1,4-Dichlorobenzene	106-46-7	9.8	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
2-Butanone	78-93-3	100	**0.0064 J**	**0.0051 J**	**0.0026 J**	**0.0079 J**	**0.0060 J**	<0.029 U	**0.013 J**
2-Hexanone	591-78-6	NL	<0.03 U	<0.033 U	<0.027 U	<0.033 U	<0.031 U	<0.029 U	<0.034 U
4-Methyl-2-pentanone	108-10-1	NL	<0.03 U	<0.033 U	<0.027 U	<0.033 U	<0.031 U	<0.029 U	<0.034 U
Acetone	67-64-1	100	**0.034**	**0.019 J**	**0.011 J**	**0.032 J**	**0.024 J**	**0.020 J**	**0.063**
Bromodichloromethane	75-27-4	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Bromoform	75-25-2	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Bromomethane	74-83-9	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Carbon Disulfide	75-15-0	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Carbon Tetrachloride	56-23-5	1.4	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Chlorobenzene	108-90-7	100	<0.0060 U	<0.0065 UJ	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
Chloroethane	75-00-3	NL	<0.0060 U	<0.0065 UJ	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Chloroform	67-66-3	10	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Chloromethane	74-87-3	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
cis-1,2-Dichloroethene	156-59-2	59	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
cis-1,3-Dichloropropene	10061-01-5	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Cyclohexane	110-82-7	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Dibromochloromethane	124-48-1	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Dichlorodifluoromethane	75-71-8	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Isopropylbenzene	98-82-8	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	**0.010**	<0.0068 U
Methyl acetate	79-20-9	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Methylcyclohexane	108-87-2	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Methylene chloride	75-09-2	51	<0.0060 U	**0.0041 J**	<0.0055 U	<0.0065 U	<0.0061 U	**0.0031 J**	**0.0031 J**
Methyl-t-Butyl Ether (MTBE)	1634-04-4	62	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Styrene	100-42-5	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Tetrachloroethene	127-18-4	5.5	**0.013**	<0.0065 UJ	<0.0084 U	<0.0094 U	<0.0079 U	<0.0059 U	<0.0068 UJ
trans-1,2-Dichloroethene	156-60-5	100	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
trans-1,3-Dichloropropene	10061-02-6	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Trichloroethene	79-01-6	10	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 UJ
Trichlorofluoromethane	75-69-4	NL	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Vinyl chloride	75-01-4	0.21	<0.0060 U	<0.0065 U	<0.0055 U	<0.0065 U	<0.0061 U	<0.0059 U	<0.0068 U
Total VOCs	CALC-VOC	NL	**0.0534**	**0.02906**	**0.01458**	**0.0454**	**0.030**	**0.1691**	**0.1041**
PAHs (mg/Kg)									
2-Methylnaphthalene	91-57-6	NL	<0.21 U	<0.22 U	**0.015 J**	<0.22 U	<0.21 U	**0.029 J**	**0.0068 J**
Acenaphthene	83-32-9	100	**0.50**	<0.22 U	**0.40**	**0.0099 J**	<0.21 U	**1.5**	**0.041 J**
Acenaphthylene	208-96-8	100	**0.093 J**	<0.22 U	**0.053 J**	<0.22 U	<0.21 U	**0.10 J**	<0.24 U
Anthracene	120-12-7	100	**0.01 J**	<0.22 U	**0.016 J**	<0.22 U	<0.21 U	**0.068 J**	<0.24 U
Benzo(a)anthracene	56-55-3	1	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.025 J**	<0.24 U
Benzo(a)pyrene	50-32-8	1	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Benzo(b)fluoranthene	205-99-2	1	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.0063 J**	<0.24 U
Benzo(ghi)perylene	191-24-2	100	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.0076 J**	**0.0071 J**
Benzo(k)fluoranthene	207-08-9	1	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.0030 J**	<0.24 U
Chrysene	218-01-9	1	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.016 J**	<0.24 U
Dibenzo(a,h)anthracene	53-70-3	0.33	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.0098 J**	**0.0058 J**
Fluoranthene	206-44-0	100	**0.052 J**	**0.0042 J**	**0.14 J**	<0.22 U	**0.0043 J**	**0.28**	<0.24 U
Fluorene	86-73-7	100	**0.19 J**	<0.22 U	**0.25**	<0.22 U	<0.21 U	**0.84**	**0.010 J**
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.0099 J**	<0.24 U
Naphthalene	91-20-3	100	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.12 J**	**0.51**
Phenanthrene	85-01-8	100	**0.020 J**	<0.22 U	**0.041 J**	<0.22 U	<0.21 U	**0.18 J**	**0.0095 J**
Pyrene	129-00-0	100	**0.046 J**	**0.0057 J**	**0.16 J**	<0.22 U	<0.21 U	**0.39**	**0.0099 J**
Total PAHs	CALC-PAH	NL	**0.965**	**0.0599**	**1.125**	**0.0531**	**0.0445**	**3.6006**	**0.6001**
SVOCs (mg/Kg)									
1,1'-Biphenyl	92-52-4	NL	**0.021 J**	<0.22 U	**0.026 J**	<0.22 U	<0.21 U	**0.048 J**	<0.24 U
2,2'-Oxybis(1-Chloropropane)	108-60-1	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2,4,5-Trichlorophenol	95-95-4	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2,4,6-Trichlorophenol	88-06-2	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2,4-Dichlorophenol	120-83-2	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2,4-Dimethylphenol	105-67-9	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2,4-Dinitrophenol	51-28-5	NL	<0.4 UJ	<0.44 UJ	<0.37 UJ	<0.43 UJ	<0.40 UJ	<0.39 U	<0.46 U
2,4-Dinitrotoluene	121-14-2	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2,6-Dinitrotoluene	606-20-2	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2-Chloronaphthalene	91-58-7	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2-Chlorophenol	95-57-8	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U

Table 9
Pre-Remediation Investigation
Ithaca Court Street Former MGP Site OU-2
Supplemental Delineation Points

Area Location ID Sample Date Sample ID Depth	CAS #	NYSDEC Part 375-6 Residential Use	Area 1C PDI-1 7/29/2011 PDI-1 (10-12) 10-12	Area 1C PDI-1 7/29/2011 PDI-1 (12-14) 12-14	Area 1C PDI-1 7/29/2011 PDI-100 (12-14) 12-14	Area 1C PDI-2 7/29/2011 PDI-2 (10-12) 10-12	Area 1C PDI-2 7/29/2011 PDI-2 (12-14) 12-14	Area 1C PDI-3 7/28/2011 PDI-3 (11.5-13.5) 11.5-13.5	Area 1C PDI-3 7/28/2011 PDI-3 (14-16) 14-16
2-Methylphenol	95-48-7	100	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
2-Nitroaniline	88-74-4	NL	<0.4 U	<0.44 U	<0.37 U	<0.43 U	<0.40 U	<0.39 U	<0.46 U
2-Nitrophenol	88-75-5	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
3,3'-Dichlorobenzidine	91-94-1	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
3-Nitroaniline	99-09-2	NL	<0.4 U	<0.44 U	<0.37 U	<0.43 U	<0.40 U	<0.39 U	<0.46 U
4,6-Dinitro-2-methylphenol	534-52-1	NL	<0.4 U	<0.44 U	<0.37 U	<0.43 U	<0.40 U	<0.39 U	<0.46 U
4-Bromophenyl phenyl ether	101-55-3	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
4-Chloro-3-methylphenol	59-50-7	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
4-Chloroaniline	106-47-8	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
4-Chlorophenyl phenyl ether	7005-72-3	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
4-Methylphenol	106-44-5	34	<0.4 U	<0.44 U	<0.37 U	<0.43 U	<0.40 U	<0.39 U	<0.46 U
4-Nitroaniline	100-01-6	NL	<0.4 U	<0.44 U	<0.37 U	<0.43 U	<0.40 U	<0.39 U	<0.46 U
4-Nitrophenol	100-02-7	NL	<0.4 U	<0.44 U	<0.37 U	<0.43 U	<0.40 U	<0.39 U	<0.46 U
Acetophenone	98-86-2	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Atrazine	1912-24-9	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Benzaldehyde	100-52-7	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Bis(2-chloroethoxy) methane	111-91-1	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Bis(2-chloroethyl) ether	111-44-4	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Bis(2-ethylhexyl) phthalate	117-81-7	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Butyl benzyl phthalate	85-68-7	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Caprolactam	105-60-2	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Carbazole	86-74-8	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.0068 J**	<0.24 U
Dibenzofuran	132-64-9	14	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	**0.016 J**	<0.24 U
Diethyl phthalate	84-66-2	NL	**0.023 J**	**0.015 J**	**0.015 J**	**0.017 J**	**0.015 J**	<0.20 U	<0.24 U
Dimethyl phthalate	131-11-3	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Di-n-butyl phthalate	84-74-2	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Di-n-octyl phthalate	117-84-0	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Hexachlorobenzene	118-74-1	0.33	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Hexachlorobutadiene	87-68-3	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Hexachlorocyclopentadiene	77-47-4	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Hexachloroethane	67-72-1	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Isophorone	78-59-1	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Nitrobenzene	98-95-3	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
N-Nitroso-Di-n-propylamine	621-64-7	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
N-nitrosodiphenylamine	86-30-6	NL	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Pentachlorophenol	87-86-5	2.4	<0.4 U	<0.44 U	<0.37 U	<0.43 U	<0.40 U	<0.39 U	<0.46 U
Phenol	108-95-2	100	<0.21 U	<0.22 U	<0.19 U	<0.22 U	<0.21 U	<0.20 U	<0.24 U
Cyanide (mg/Kg)									
Total Cyanide	57-12-5	27	<1.1 U	<1.3 U	<1.0 U	<1.3 U	<1.2 U	<1.1 UJ	<1.4 UJ

Notes:

mg/Kg - milligrams per kilogram

NL = Not Listed

NA = Not Analyzed

J = The associated numerical value is an estimated quantity.

U = The material was analyzed for but not detected at, or above, the reporting limit. The associated numerical value is the sample quantitation limit.

Bold indicates compound detected at a concentration greater than the reporting limit.

Yellow highlight indicates exceedance of the NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value.

Bold and Italics = non detected compound exceeds NYSDEC Part 375-6.8(b) Residential Use Soil Cleanup Objective value

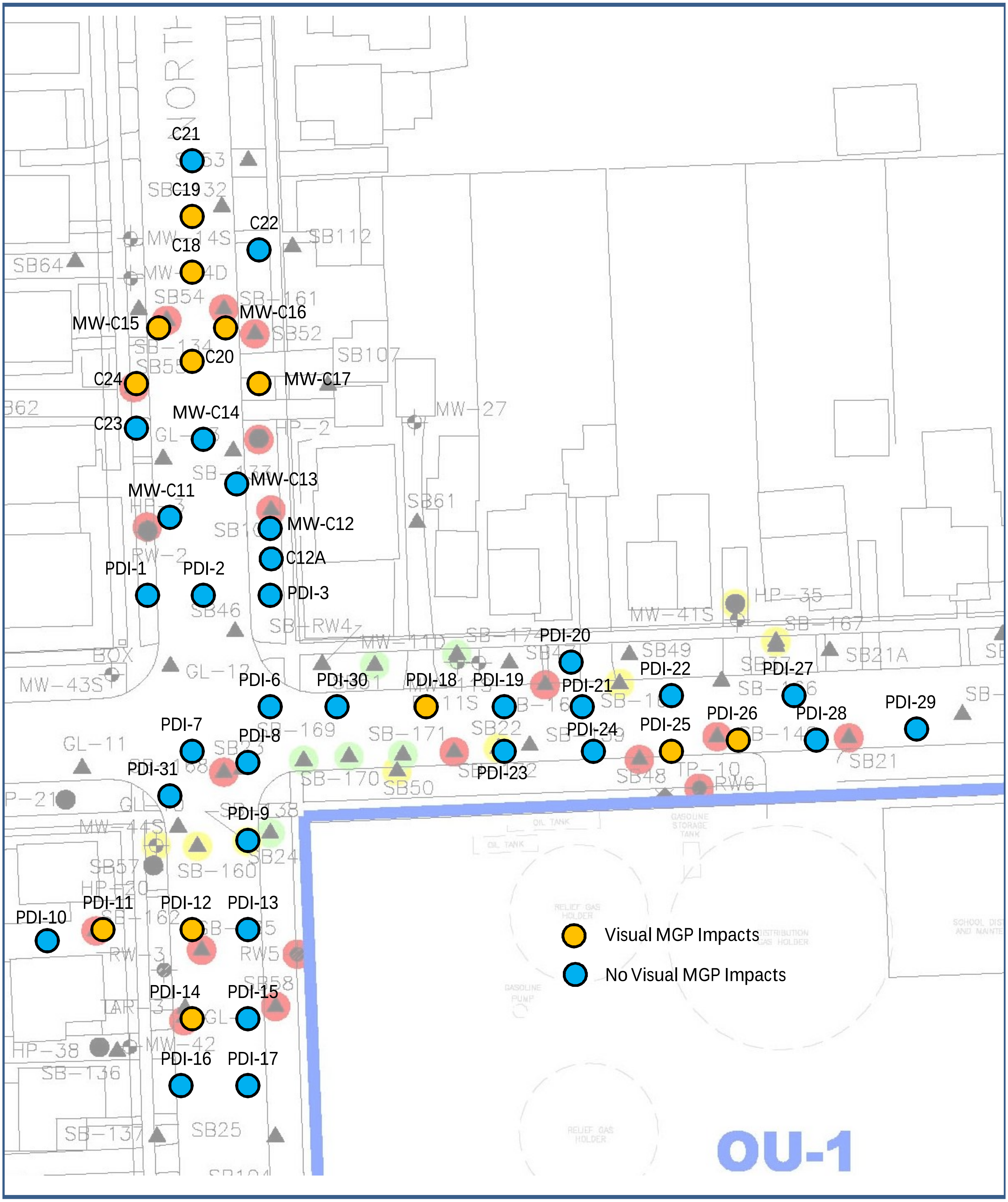
Attachment A

Visual Observations

PDI Boring Summary Table
Ithaca Court Street

Boring ID	Top of Clay	Gravel/Sand	Interval Impacts	Comments
C-12A	10	7.5-10, 13.5-14.5	None	
C-18	10	11-11.5	11-12, 12-14	Trace NAPL blebs within organic veins at 12-14.
C-19	7	9.8-12	11.6-12	
C-20	6	13.7-14	10-14	NAPL in organic veins at 10-13.5. NAPL saturated at 13.7-14.
C-21	4.7	NE	None	
C-22	8	NE	None	
C-23	9	NE	None	
C-24	7.5	10-14	11-14	
MW-C11	5	11.5-12	None	
MW-C12	10	NE	None	
MW-C13	6.3	6-6.3	None	
MW-C14	6	12-13	None	
MW-C15	7.5	NE	6.5	Little hardened tar at 6.5.
MW-C16	6	11-11.8	11.3-11.6	
MW-C17	7.5	11-11.5, 12-12.2	12-12.2	
PDI-1	10	10.5-10.7	None	
PDI-2	12	0-12	None	Possible utility corridor.
PDI-3	13.5	10.5-13.5	None	
PDI-6	7	13.5-15	None	
PDI-7	11	10-11	None	
PDI-8	7	10.5-11.5	None	
PDI-9	13.5	8.5-13.5	None	
PDI-10	12.5	9.5-12.5	None	
PDI-11	14	9.5-14	13.5-14	
PDI-12	12.5	11-12.5	11.5-12.5	
PDI-13	12	7.5-12	None	
PDI-14	13.5	10.5-13.5	10.5-13.5	
PDI-15	12.5	8-12.5	12-12.5	Trace NAPL blebs
PDI-16	12	0-12	None	Possible utility corridor.
PDI-17	12.5	8-12.5	None	
PDI-18	20.5	9-20.5	19-20.5	
PDI-19	9	4-9	None	
PDI-20	11.5	6-11.5	None	
PDI-21	12.5	7.5-12.5	11.5-12.5	Trace NAPL blebs
PDI-22	12.5	7.5-12.5	None	
PDI-23	12	9-12	None	
PDI-24	13	7-13	9.5-10, 12-13	Some NAPL blebs , Little NAPL Blebs
PDI-25	13.5	4.5-13.5	10-13.5	
PDI-26	13	5-13	11-13, 14-14.2	Some NAPL blebs within medium sand lens at 14-14.2.
PDI-27	12.5	8.5-12.5	None	
PDI-28	11	4.5-11	7-7.5	Trace NAPL blebs
PDI-29	7.5	NE	None	
PDI-30	7.5	NE	None	
PDI-31	9.5	9-9.5	None	

Note: Visibly MGP impacted material is considered NAPL saturated soil and non-viscous NAPL. It does not include staining, sheen, blebs and stringers.


C21
C19
C22
C18
MW-C15
MW-C16
C20
C24
MW-C17
C23
MW-C14
MW-C13
MW-C11
MW-C12
C12A
PDI-1
PDI-2
PDI-3
PDI-20
PDI-6
PDI-30
PDI-18
PDI-19
PDI-21
PDI-22
PDI-27
PDI-7
PDI-8
PDI-24
PDI-25
PDI-26
PDI-28
PDI-29
PDI-31
PDI-23
PDI-9
PDI-10
PDI-11
PDI-12
PDI-13
PDI-14
PDI-15
PDI-16
PDI-17
Visual MGP Impacts
No Visual MGP Impacts
OU-1

Attachment B

Boring Logs

AECOM
40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-1

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 8/8/11
Boring Location: Intersection of Esty and N. Plain Streets
Drilling Company: ADT
Drilling Method: Hollow stem auger
Sampling Method: Split spoon
Ground Elevation (ft/msl):
Total Depth: 60 ft bgs
Logged By: Keith Stahle

Depth (Feet): 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20, -22, -24, -26

Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
10 29 30 30	1.5	0.0				FILL		0-0.4 - Asphalt. 0.4-5 - Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
8 6 5 6	0.3	0.0				ML		Brown, SILT, some medium to coarse gravel; compact, dry.	
2 2 2 2	1.0	0.0				CL		Gray, silty CLAY; compact, moist.	
WH WH 2 3	2.0	0.0	Geo-1 (13-15)					Fine SAND lens at 14 - 14.2 ft bgs.	
			Shelby (15-17)					Gray, silty CLAY; compact, moist.	Shelby Tube (15-17)
1 1 1 2	2.0	0.0							
2 2 1 2	2.0	0.0							
			Shelby (25-27)						Shelby Tube (25-27)

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Samples collected at 13-15, 15-17, 37-39, 45-47, and 55-57 ft bgs.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-1

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 8/8/11
Boring Location: Intersection of Esty and N. Plain Streets
Drilling Company: ADT
Drilling Method: Hollow stem auger
Sampling Method: Split spoon
Ground Elevation (ft/msl):
Total Depth: 60 ft bgs
Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Description	Remarks
-27 to -29	1 1 1 2	1.5	0.0		SP	Brown; homogeneous medium SAND; loose, wet.	
-30 to -32	14 12 16 18	2.0	0.0				
-35 to -37	WH WH 4 5	2.0	0.0		CL	Gray, silty CLAY; compact, moist.	
-37 to -39				Shelby (37-39)			Shelby Tube (37-39)
-40 to -42	WH WH 2 2	1.8	0.0				
-45 to -47				Shelby (45-47)	CL		Shelby Tube (45-47)
-50 to -52	1 1 1 3	1.8	0.0			Gray, silty CLAY, trace fine sand; compact, moist.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Samples collected at 13-15, 15-17, 37-39, 45-47, and 55-57 ft bgs.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-1

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 8/8/11

Boring Location: Intersection of Esty and N. Plain Streets

Drilling Company: ADT

Drilling Method: Hollow stem auger

Sampling Method: Split spoon

Ground Elevation (ft/msl):

Total Depth: 60 ft bgs

Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
-54										
-56				Shelby (55-57)			CL		Gray, silty CLAY; compact, moist.	Shelby Tube (55-57)
-58	1 2 1 1	2.0	0.0							
-60									Boring terminated at 60 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Samples collected at 13-15, 15-17, 37-39, 45-47, and 55-57 ft bgs.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-2

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/10/11

Boring Location:

Drilling Company: ADT

Drilling Method: Hollow stem auger

Sampling Method: Split spoon

Ground Elevation (ft/msl):

Total Depth: 60 ft bgs

Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts		Remarks
0	5 5 5 5	1.2	0.0				FILL ML		0-1.4 - Brown, medium to coarse GRAVEL, some fine to medium sand; loose, dry. 1.4-5.0 - Brown SILT, trace medium to coarse gravel; compact, moist.	
-2										
-4										
-6	3 3 4 4	1.0	0.0						Becomes wet at 5 ft bgs.	
-8										
-10	2 1 1 2	1.5	0.0				CL		Gray silty CLAY, trace organics; compact, moist.	
-12										
-14										
-16	1 1 1 1	2.0	0.0							
-18										
-20	1 1 1 1	2.0	0.0				SP		Brown, homogeneous medium SAND; loose, wet.	
-22										
-24										
-26	1 1 5 5	1.2	0.0							

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected from this location.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-2

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/10/11

Boring Location:

Drilling Company: ADT

Drilling Method: Hollow stem auger

Sampling Method: Split spoon

Ground Elevation (ft/msl):

Total Depth: 60 ft bgs

Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
-28							SP		Brown, homogeneous medium SAND; loose, wet.	
-30	1 1 1 1	1.2	0.0							
-32									Brown, silt lens at 31.75 - 32.0 ft bgs.	
-34										
-36	1 1 1 1	2.0	0.0				CL		Gray, silty CLAY; compact, moist.	
-38										
-40	2 2 2 2	1.5	0.0							
-42										
-44										
-46	3 3 4 4	1.8	0.0						Some organic material at 46 ft bgs.	
-48							CL			
-50	1 1 1 1	1.2	0.0							
-52										
-54										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected from this location.

AECOM
40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-2

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/10/11
Boring Location:
Drilling Company: ADT

Drilling Method: Hollow stem auger
Sampling Method: Split spoon
Ground Elevation (ft/msl):
Total Depth: 60 ft bgs
Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
-54										
-56	1 2 1 1	1.2	0.0				CL		Gray, silty CLAY; compact, moist.	
-58										
-60									Boring terminated at 60 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected from this location.

AECOM
40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-3

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/09/11
Boring Location:
Drilling Company: ADT

Drilling Method: Hollow stem auger
Sampling Method: Split spoon
Ground Elevation (ft/msl):
Total Depth: 60 ft bgs
Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
0 to -2	5 16 16 17	1.0	0.0				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2 to -4							SP			
-5 to -7	9 12 12 16	0.2	0.0						Rock fragment in tip of spoon at 5 ft bgs.	
-10 to -12	3 3 5 9	0.1	0.0						Rock fragment in tip of spoon at 10 ft bgs.	
-15 to -17	3 3 2 2	1.0	0.0				CL		15-15.5 - Brown, medium SAND; loose, wet. 15.5-17 - Gray, SILTY CLAY; compact, moist.	
-18 to -20				Shelby (18-20)	18-20					Shelby Tube (18-20)
-20 to -22	2 2 1 1	1.5	0.0						Little organic material thoughout at 20-22 ft bgs.	
-25 to -27	3 3 2 2	0.75	0.0				SP		Brown, homogeneous medium SAND; loose, wet.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil samples collected at 18-20, 38-40, and 55-57 ft bgs.

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-3

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/09/11
Boring Location:
Drilling Company: ADT

Drilling Method: Hollow stem auger
Sampling Method: Split spoon
Ground Elevation (ft/msl):
Total Depth: 60 ft bgs
Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
-28							SP		Brown, homogeneous medium SAND; loose, wet.	
-30 to -32	WH WH 1 1	1.75	0.0							
-34										
-35 to -37	1 2 2 1	2.0	0.0							
-37							CL		Gray, silty CLAY; compact, moist.	
-38				Shelby (38-40)						Shelby Tube (38-40)
-40 to -42	1 1 1 1	1.5	0.0							
-44										
-45 to -47	1 1 1 1	2.0	0.0							
-48										
-50 to -52	1 1 1 1	2.0	0.0				CL		Little organic material at 50-52 ft bgs.	
-54										

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil samples collected at 18-20, 38-40, and 55-57 ft bgs.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-3

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/09/11

Boring Location:

Drilling Company: ADT

Drilling Method: Hollow stem auger

Sampling Method: Split spoon

Ground Elevation (ft/msl):

Total Depth: 60 ft bgs

Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts		Remarks
-54				Shelby (55-57)	55-57		CL		Gray, silty CLAY; compact, moist.	Shelby Tube (55-57)
-56										
-58	1 2 1 1	2.0	0.0						Boring terminated at 60 ft bgs.	
-60										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil samples collected at 18-20, 38-40, and 55-57 ft bgs.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-4

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/09/11

Boring Location:

Drilling Company: ADT

Drilling Method: Hollow stem auger

Sampling Method: Split spoon

Ground Elevation (ft/msl):

Total Depth: 60 ft bgs

Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
0	3 5 5 2	0.8	0.0				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, some silt, little brick fragments; loose, dry.	
-2										
-4										
-5	2 2 2 2	2.0	0.0				ML		Brown, SILT, trace fine sand, some orange staining; compact, moist.	
-7									Becomes wet at 6.8 ft bgs.	
-10	1 1 1 1	2.0	0.0				CL		Gray, silty CLAY, some organics; compact, moist.	
-12										
-15	2 2 2 2	2.0	0.0							
-17										
-20	8 9 10 10	1.5	0.0							
-21							SP		Brown, fine to medium SAND, some medium to coarse gravel, trace silt; loose, wet.	
-22										
-25	6 8 7 7	0.5	0.0							

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected from this location.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-4

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/09/11

Boring Location:

Drilling Company: ADT

Drilling Method: Hollow stem auger

Sampling Method: Split spoon

Ground Elevation (ft/msl):

Total Depth: 60 ft bgs

Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
-28							SP		Brown, fine to medium SAND, some medium to coarse gravel, trace silt; loose, wet.	
-30 to -32	1 1 1 1	0.5	0.0						Grades finer with depth. Brown, fine to medium SAND, some silt; loose, wet.	
-34										
-35 to -37	1 1 1 1	0.8	0.0							
-38										
-40 to -42	1 1 1 1	2.0	0.0				CL		Gray, silty CLAY; compact, moist. Some wood fragments at 41 ft bgs.	
-44										
-45 to -47	3 3 2 2	1.5	0.0							
-48										
-50 to -52	4 4 5 4	1.5	0.0						Some wood fragments at 50 ft bgs.	
-54										

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected from this location.

AECOM

40 British American Blvd
Latham, New York, 12110

Boring ID: Geo-4

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/09/11

Boring Location:

Drilling Company: ADT

Drilling Method: Hollow stem auger

Sampling Method: Split spoon

Ground Elevation (ft/msl):

Total Depth: 60 ft bgs

Logged By: Keith Stahle

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
-54 to -55.5							CL		Gray, silty CLAY; compact, moist.	
-55.5 to -57.5	2 2 3 4	2.0	0.0							
-57.5 to -60									Boring terminated at 60 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: No samples were collected from this location.

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: MW-C11

Project Name: Ithaca Court Street OU-2 PDI
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 07/28/11
Boring Location: Area 1C
Drilling Company: ADT

Sampling Method: Sonic Core Barrel
PVC Elevation (ft/msl, NAVD 88):
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	USCS	Visual Impacts	Geologic Description	Remarks
0–5	5.0	0.0 / 0.0			FILL		Brown medium to coarse GRAVEL, some fine to medium sand; dry, loose.	Flush mounted curb box; Grout from 1-7 ft bgs
5–10	2.5	0.0 / 0.0			CL		Gray, silty CLAY, little organic material; compact, moist.	Bentonite seal from 7-9 ft bgs; Sand pack from 9-15 ft bgs
10–15	2.5	0.0 / 0.0	MW-C11 (11.5-12)	11.5-12	SP / CL		Brown, medium SAND, some fine to medium gravel, trace silt; loose, wet. Gray, silty CLAY, little organic material; compact, moist.	2", 0.010 slotted PVC screen from 10-15 ft bgs
15–20	5.0	0.0 / 0.0			SP / CL		Fine to medium sand lens at 15.5-15.7 ft bgs. Boring terminated at 20 ft bgs.	Well sump with bentonite seal from 15-17 ft bgs

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil sample MW-C11 (11.5-12) was collected.

40 British American Blvd
Latham, New York, 12110

Well ID: MW-C12

Project Name: Ithaca Court Street OU-2 PDI
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 07/27/11
Boring Location: Area 1C
Drilling Company: ADT

Sampling Method: Sonic Core Barrel
PVC Elevation (ft/msl, NAVD 88):
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	2.5	0.0				FILL		Brown medium to coarse GRAVEL, some fine to medium sand; dry, loose.	Flush mounted curb box; Grout from 1-7 ft bgs
-2.5 to -10	2.5 / 2.5	0.0 / 0.1 / 0.2				ML		Brown, SILT, little fine sand, little organic material, some orange staining; compact moist.	Bentonite seal from 7-9 ft bgs; Sand pack from 9-15 ft bgs
-10 to -12.5	5.0	7.9	MW-C12 (10-12)			CL		Gray, silty CLAY, little organic material; compact, moist. Little medium sand at 11-11.5 ft bgs.	2", 0.010 slotted PVC screen from 10-15 ft bgs
-12.5 to -15		17.3	MW-C12 (13-15)			SP		Brown, fine SAND, some silt, some wood fragments; loose, wet. Slight hydrocarbon-like odors at 13.5-15.	
-15 to -20	5.0	0.7 / 0.3				CL		Gray, silty CLAY, little organic material; compact, moist. Boring terminated at 20 ft bgs.	Well sump with bentonite seal from 15-17 ft bgs

Depth scale: 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil samples MW-C12 (10-12) and (13-15) were collected.

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: MW-C13

Project Name: Ithaca Court Street OU-2 PDI

NYSEG/Project Number: NYSEG

Date Started/Date Completed: 07/27/11

Boring Location: Area 1C

Drilling Company: ADT

Sampling Method: Sonic Core Barrel

PVC Elevation (ft/msl, NAVD 88):

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20 ft bgs

Logged By: K. Stahle

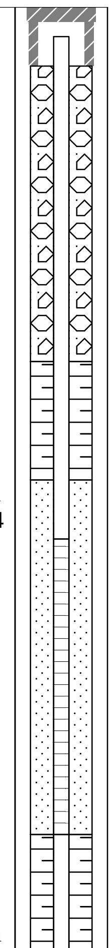
Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Geologic Description
0-5	5.0	0.0 / 0.0		FILL	Brown medium to coarse GRAVEL, some fine to medium sand; dry, loose.
5-6.3	5.0	0.0 / 0.0		ML	Brown, SILT, little fine sand, some organic material, trace gravel, some orange staining; compact moist.
6.3-11			MW-C13 (10-12)	CL	Gray, silty CLAY; compact, moist.
10-15	5.0	0.0 / 0.0			
11-12.2				SP	Brown, fine SAND; wet, loose.
12.2-20				CL	Gray, silty CLAY; compact, moist.
15-20	5.0	0.0 / 0.0			Boring terminated at 20 ft bgs.

Depth scale: 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20

Remarks:

- Flush mounted curb box
- Grout from 1-6 ft bgs
- Bentonite seal from 6-8 ft bgs
- Sand pack from 8-14 ft bgs
- 2", 0.010 slotted PVC screen from 9-14 ft bgs
- Well sump with bentonite seal from 14-16 ft bgs

Well Construction



Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil sample MW-C13 (10-12) was collected.

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: MW-C14

Project Name: Ithaca Court Street OU-2 PDI

NYSEG/Project Number: NYSEG

Date Started/Date Completed: 07/28/11

Boring Location: Area 1C

Drilling Company: ADT

Sampling Method: Sonic Core Barrel

PVC Elevation (ft/msl, NAVD 88):

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks	Well Construction
0 to -5	5.0	0.0, 0.0				FILL		Brown medium to coarse GRAVEL, some fine to medium sand; dry, loose.	Flush mounted curb box Grout from 1-7 ft bgs	
-5 to -6	5.0	0.3				ML		Brown, SILT, little fine sand, little coarse gravel, some orange staining; compact, dry.		
-6 to -12		0.3, 0.2				CL		Gray, silty CLAY; compact, moist.	Bentonite seal from 7-9 ft bgs Sand pack from 9-15 ft bgs 2", 0.010 slotted PVC screen from 10-15 ft bgs	
-12 to -13	5.0		MW-C14 (12-13)			SP		Brown, fine to medium SAND, some silt; loose, wet.		
-13 to -20	5.0	0.9, 0.0, 0.0				CL		Gray, silty CLAY, little organic material; compact, moist. Boring terminated at 20 ft bgs.	Well sump with bentonite seal from 15-17 ft bgs	

Depth scale: 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil sample MW-C14 (12-13) was collected.

AECOM

40 British American Blvd
Latham, New York, 12110

Well ID: MW-C15

Project Name: Ithaca Court Street OU-2 PDI

NYSEG/Project Number: NYSEG

Date Started/Date Completed: 07/28/11

Boring Location: Area 1C

Drilling Company: ADT

Sampling Method: Sonic Core Barrel

PVC Elevation (ft/msl, NAVD 88):

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Geologic Description	Remarks
0 – -5	5.0	0.0, 0.0		FILL	Pre-cleared to 5 ft bgs. Brown medium to coarse GRAVEL, some fine to medium sand; dry, loose.	Flush mounted curb box. Grout from 1-8 ft bgs
-5 – -7.5	5.0	0.0	MW-C15 (6-7)	ML	Brown, SILT, little fine sand, trace medium to coarse gravel, some orange staining; compact, moist. Little hardened tar at 6.5-6.7 ft bgs.	
-7.5 – -15		0.0, 0.1, 0.0	MW-C15 (13.5-15.5)	CL	Gray, silty CLAY; compact, moist.	Bentonite seal from 8-10 ft bgs. Sand pack from 10-16 ft bgs. 2", 0.010 slotted PVC screen from 11-16 ft bgs
-15 – -16	5.0			ML	Some silt at 15-16 ft bgs.	
-16 – -20	5.0	0.0, 0.0		CL	Boring terminated at 20 ft bgs.	Well sump with bentonite seal from 16-18 ft bgs

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil samples MW-C15 (6-7) and (13.5-15.5) were collected.

AECOM
40 British American Blvd
Latham, New York, 12110

Well ID: MW-C16

Project Name: Ithaca Court Street OU-2 PDI
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 07/26/11
Boring Location: Area 1C
Drilling Company: ADT

Sampling Method: Sonic Core Barrel
PVC Elevation (ft/msl, NAVD 88):
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Geologic Description	Remarks
0 to -5	5.0	0.0; 0.0		FILL	Pre-cleared to 5 ft bgs. Brown medium to coarse GRAVEL, some fine to medium sand; dry, loose.	Flush mounted curb box. Grout from 1-6 ft bgs
-5 to -6	5.0	0.0		ML	Brown, SILT, little fine sand, some orange staining; compact moist.	
-6 to -10		0.0; 0.0		CL	Gray, silty CLAY; compact, moist.	Bentonite seal from 6-8 ft bgs. Sand pack from 8-14 ft bgs
-10 to -11	5.0	41.3	MW-C16 (10-12.5)	CL		2", 0.010 slotted PVC screen from 9-14 ft bgs
-11 to -11.6				SP	Brown, fine SAND, little medium gravel; loose, wet. Little non-viscous NAPL at 11.3-11.6 ft bgs.	
-11.6 to -16		36.5		CL	Gray, silty CLAY; compact, moist.	
-16 to -17	5.0	4.8		SP	Some fine-medium sand at 16-17 ft bgs.	Well sump with bentonite seal from 14-16 ft bgs
-17 to -20		0.8		CL	Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil sample MW-C16 (10-12.5) was collected.

AECOM

40 British American Blvd
Latham, New York, 12110

Well ID: MW-C17

Project Name: Ithaca Court Street OU-2 PDI
NYSEG/Project Number: NYSEG
Date Started/Date Completed: 07/26/11
Boring Location: Area 1C
Drilling Company: ADT

Sampling Method: Sonic Core Barrel
PVC Elevation (ft/msl, NAVD 88):
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Geologic Description	Remarks
0 to -5	3.0	0.0, 0.0		FILL	Pre-cleared to 5 ft bgs. Brown medium to coarse GRAVEL, some fine to medium sand; dry, loose.	Flush mounted curb box; Grout from 1-7 ft bgs
-5 to -7	3.0	0.0		ML	Brown, SILT, little fine sand; compact, dry.	Bentonite seal from 7-9 ft bgs
-7 to -10		0.0		CL	Gray, silty CLAY; compact, moist.	Sand pack from 9-15 ft bgs
-10 to -11.5	5.0	5.1	MW-C17 (11-13)	GP	Brown medium GRAVEL, some fine to medium sand; wet, loose.	2", 0.010 slotted PVC screen from 10-15 ft bgs
-11.5 to -15		4.3	MW-C17 (13-15)	CL	Gray, silty CLAY; compact, moist. Some medium gravel at 12-12.2 ft bgs. Trace NAPL blebs at 12-12.2 ft bgs.	
-15 to -20	5.0	0.1, 0.1			Gray, silty CLAY; compact, moist. Boring terminated at 20 ft bgs.	Well sump with bentonite seal from 15-17 ft bgs

Depth scale: 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Soil samples MW-C17 (11-13) and (13-15) were collected.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: C-12A

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 07/27/11

Boring Location: Adjacent to MW-C12

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet): 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20

Recovery (Feet)	PID (ppm)
5.0	0.1
	0.3
5.0	0.1
	0.2
5.0	0.0
	0.0
5.0	0.1
	0.1

USCS	Geologic Description	Remarks
FILL	Brown, fine to medium SAND, some medium gravel, little ash; loose, dry.	
ML	Brown, SILT, trace fine sand, trace gravel, some orange staining; compact, dry.	
GP	Brown, medium to coarse GRAVEL, some fine to medium sand; loose, wet.	
CL	Gray, silty CLAY; compact, moist.	
SP	Brown, homogeneous medium SAND; loose, wet.	
CL	Gray, silty CLAY; compact, moist.	
SP	Homogeneous medium SAND at 15.5-16 ft bgs.	
CL	Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: C-18

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/04/11
Boring Location: Area 1 C
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	USCS	Geologic Description	Remarks
0 to -2.5	2.5	0.1			FILL	Brown, fine to coarse GRAVEL, some fine to medium sand; loose, dry.	
-2.5 to -5		0.2					
-5 to -7.5	2.5	0.5					
-7.5 to -10		0.8					
-10 to -11	5.0	117			CL	Gray, silty CLAY; compact, moist.	
-11 to -11.5					GP	Brown, medium to coarse GRAVEL, some fine sand, some silt; loose, wet.	
-11.5 to -12.5					CL	Gray, silty CLAY, little fine sand, little organics; compact, moist. Little NAPL stringers at 11-12 ft bgs. Trace NAPL blebs at 12-14 ft bgs. Some wood fragments at 14-15 ft bgs. Strong hydrocarbon-like odors at 14-15 ft bgs.	
-12.5 to -15		36.2					
-15 to -16	5.0	0.6					
-16 to -17					SP	Fine to medium SAND at 16-17 ft bgs.	
-17 to -17.5					CL	Gray, silty CLAY, trace organic material; compact, moist.	
-17.5 to -20		0.1				Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

40 British American Blvd
Latham, NY 12110

Boring ID: C-19

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/04/11

Boring Location: Area 1 C

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval
0 to -2.5	5.0	0.0		
-2.5 to -5		0.2		
-5 to -7.5	5.0	0.0		
-7.5 to -10		0.8		
-10 to -12.5	5.0	245		
-12.5 to -15		168		
-15 to -17.5	5.0	1.2		
-17.5 to -20		0.8		

Depth (Feet)	USCS	Geologic Description	Remarks
0 to -4	FILL	Brown, fine to coarse GRAVEL, some fine to medium sand, trace brick fragments; loose, dry.	
-4 to -7	ML	Brown, SILT, trace fine sand, little organic material, some orange staining; compact, moist at 5 ft bgs.	
-7 to -9.8	CL	Gray, silty CLAY; compact, moist.	
-9.8 to -12	GP	Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet. Trace NAPL blebs at 9.8-10 ft bgs. NAPL saturated at 11.6-12 ft bgs.	
-12 to -20	CL	Gray, silty CLAY, some organic material; compact, moist. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: C-20

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/04/11

Boring Location: Area 1 C

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2	5.0	0.0				FILL		Brown, fine to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2 to -6		0.0				ML		Brown, SILT, trace fine sand, some orange staining; compact, moist at 5 ft bgs.	
-6 to -13.7	5.0	0.0, 0.0				CL		Gray, silty CLAY, some organic material; compact, moist. Some hydrocarbon-like odors within organic material at 6-10 ft bgs.	
	5.0	41.9, 367						Little NAPL in organic material at 10-13.2 ft bgs.	
-13.7 to -14						SP		Fine sand lens at 13.7-14 ft bgs. NAPL saturated at 13.7-14 ft bgs.	
-14 to -20	5.0	26.1, 0.8				CL		Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: C-21

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/04/11

Boring Location: Area 1C

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -1.33	5.0	0.0				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, dry.	
-1.33 to -4.67		0.0 / 0.1				ML		Brown, SILT, some fine sand, trace fine gravel, some orange staining; compact, moist at 5 ft bgs.	
-4.67 to -20		0.1				CL		Gray, silty CLAY, trace organic material; compact, moist.	
	5.0	0.1 / 0.2							
	5.0	0.2 / 0.1							
	5.0	0.0 / 0.0						Boring terminated at 20 ft bgs.	

Depth scale: 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: C-22

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/04/11

Boring Location: Area 1C

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	4.0	0.1				FILL		Brown, fine to medium GRAVEL, some fine to medium sand, little ash; loose, dry.	
-2.5 to -5		0.0				ML		Brown, SILT, little fine sand, little organic material; compact, dry.	
-5 to -7.5	5.0	0.1						Becomes moist at 6 ft bgs.	
-7.5 to -10		0.2				CL		Gray, silty CLAY, trace organic material; compact, moist.	
-10 to -12.5	5.0	0.0				SP		Some fine sand at 10-10.5 ft bgs.	
-12.5 to -15		0.2				CL			
-15 to -17.5	5.0	0.0							
-17.5 to -20		0.0						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

Boring ID: C-23

AECOM
40 British American Blvd
Latham, NY 12110

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/04/11

Boring Location: Area 1C

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	4.0	0.1			FILL		Brown, fine to medium GRAVEL, some fine to medium sand, little ash; loose, dry.	
-2.5 to -5		0.0			ML		Brown, SILT, trace fine sand, little organic material, little orange staining; compact, dry.	
-5 to -7.5	4.0	0.1						
-7.5 to -9		0.2					Becomes moist at 8.5 ft bgs.	
-9 to -10					CL		Gray, silty CLAY, trace organic material; compact, moist.	
-10 to -12.5	5.0	0.0						
-12.5 to -15		0.2						
-15 to -17.5	5.0	0.0						
-17.5 to -20		0.0					Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

40 British American Blvd
Latham, NY 12110

Boring ID: C-24

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/04/11
Boring Location: Area 1C
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0	4.0	0.0				FILL		Brown, fine to medium GRAVEL, some fine to medium sand, trace silt, little ash; loose, dry.	
-2 / -4		0.2				ML		Brown, SILT, trace organic material, little orange staining; compact, dry.	
-6	4.0	0.2							
-8		0.8				CL		Gray, silty CLAY; compact, moist. Some fine sand at 9.8-10 ft bgs. Slight hydrocarbon-like odors at 9.8-10 ft bgs.	
-10	5.0	56				GP		Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet. Some NAPL blebs at 11-13.5 ft bgs.	
-12 / -14		261						NAPL saturated at 13.5-14 ft bgs.	
-14						CL		Gray, silty CLAY; compact, moist.	
-16	5.0	1.2							
-18 / -20		0.8						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

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40 British American Blvd
Latham, NY 12110

Boring ID: PDI-1

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 07/29/11
Boring Location: South of Area 1C
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -5	3.0	0.0; 0.0				FILL		Brown, fine to coarse GRAVEL, some fine to medium sand; loose, dry.	
-5 to -10	4.0	0.0; 0.0				ML		Brown, SILT, some fine sand, some orange staining, some organic material; compact, moist.	
-10 to -12	5.0	0.4	PDI-1 (10-12)	10-12		CL		Gray, silty CLAY; compact, moist.	
-12 to -12.5		0.1	PDI-1 (12-14)	12-14		SP		Brown, homogeneous medium SAND; loose, wet.	Duplicate sample PDI-100 (12-14)
-12.5 to -20	5.0	0.0; 0.0				CL		Gray, silty CLAY; compact, moist. Fine sand lens at 17-17.2 ft bgs. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-1 (10-12) and (12-14) collected. Duplicate sample PDI-100 (12-14) collected.

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Boring ID: PDI-2

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 07/29/11
Boring Location: South of Area 1C
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5		0.0				FILL		Pre-cleared to 5 ft bgs on 7/26/11.	
-2.5 to -5		0.0							
-5 to -7.5	2.0	0.0						Brown, fine to medium SAND, some medium to coarse gravel, trace silt; loose, wet.	
-7.5 to -10		0.0							
-10 to -12.5	5.0	0.0	PDI-2 (10-12)	10-12					
-12.5 to -15		0.0	PDI-2 (12-14)	12-14		CL		Gray, silty CLAY; compact, moist.	
-15 to -17.5	5.0	0.0							
-17.5 to -20		0.0						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-2 (10-12) and (12-14) collected.
Possible utility corridor.

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Latham, NY 12110

Boring ID: PDI-3

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 07/29/11
Boring Location: South of Area 1C
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID
0 to -2.5		0.0	
-2.5 to -5		0.0	
-5 to -7.5	3.0	0.0	
-7.5 to -10		0.0	
-10 to -12.5	5.0	1.6	PDI-3 (11.5-13.5)
-12.5 to -15		0.8	PDI-3 (14-16)
-15 to -17.5	5.0	0.0	
-17.5 to -20		0.0	

Depth (Feet)	USCS	Visual Impacts	Geologic Description	Remarks
0 to -8	FILL		Pre-cleared to 5 ft bgs on 7/26/11. Brown, medium to coarse GRAVEL, some fine to medium sand; loose, dry.	
-8 to -10.5	ML		Brown, SILT, some fine sand, some orange staining, trace gravel; compact, moist.	
-10.5 to -13.5	GP		brown, medium to coarse GRAVEL, some fine to medium sand, trace wood fragments; loose, wet. Moderate hydrocarbon-like odors at 10.5-13.5 ft bgs.	
-13.5 to -18	CL		Gray, silty CLAY; compact, moist.	
-18 to -18.5	GP		Some gravel at 18-18.5 ft bgs.	
-18.5 to -20	CL		Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-3 (11.5-13.5) and (14-16) collected.

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Latham, NY 12110

Boring ID: PDI-6

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/01/11

Boring Location: North of Area 1B

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	5.0	0.0				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace ash; loose, dry.	
-2.5 to -5		0.1				ML		Brown, SILT, little fine sand, trace organic material, trace orange staining; compact, dry.	
-5 to -7	5.0	0.2						Becomes moist at 6.5 ft bgs.	
-7 to -10		0.1				CL		Gray, silty CLAY, trace fine sand; compact, moist.	
-10 to -12.5	5.0	0.6							
-12.5 to -13.5		22.3							
-13.5 to -15			PDI-6 (13.5-15)	13.5-15		GP		Brown, fine to coarse GRAVEL, some medium to coarse sand, some wood fragments; loose, wet. Moderate hydrocarbon-like odors at 13.5-15 ft bgs.	
-15 to -17.5	5.0	0.8	PDI-6 (15-17)	15-17		CL		Gray, silty CLAY; compact, moist.	
-17.5 to -20		0.3						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-6 (13.5-15) and (15-17) collected.

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Latham, NY 12110

Boring ID: PDI-7

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/02/11

Boring Location: Area 1B

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	2.0	0.3			FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, little rock fragments up to 4 inch diameter; loose, dry.	
-2.5 to -5		0.1						
-5 to -7.5	3.0	0.4			ML		Brown, SILT, some fine to medium gravel, little clay; compact, moist.	
-7.5 to -10		1.2					Slight hydrocarbon-like odors at 9-10 ft bgs.	
-10 to -11	4.5	0.0			GP		Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet.	
-11 to -12.5					CL		Gray, silty CLAY; compact, moist.	
-12.5 to -15		1.7						
-15 to -17.5	4.5	0.1					Little fine sand at 15-15.3 ft bgs	
-17.5 to -20		0.2					Boring terminated at 20 ft bgs.	

Depth scale: 0, -2, -4, -6, -8, -10, -12, -14, -16, -18, -20

Legend:

Red	Coal Tar or Coal Tar NAPL Saturated Soil
Green	Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location.

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Boring ID: PDI-8

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/01/11

Boring Location: Area 1B

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Geologic Description	Remarks
0 to -2.5	5.0	0.1	PDI-8R (0-10)	FILL	Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2.5 to -5		0.3		ML	Brown, SILT, trace fine sand, some orange staining; compact, dry.	
-5 to -7.5	5.0	0.2			Becomes moist at 6.0 ft bgs.	
-7.5 to -10		0.3		CL	Gray, silty CLAY, trace organic material; compact, moist.	
-10 to -12.5	5.0	0.1		GP	Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet.	
-12.5 to -15		0.6		CL	Gray, silty CLAY, trace organic material; compact, moist.	
-15 to -17.5	5.0	0.3			Fine sand lens at 16-16.2 ft bgs.	
-17.5 to -20		0.2			Fine sand lens at 18.2-18.4 ft bgs. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil sample PDI-8R (0-10) collected.

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Latham, NY 12110

Boring ID: PDI-9

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI	**Drill Rig:** Mini-Sonic
Client/Project Number: NYSEG	**Sampling Method:** Sonic Core Barrel
Date Started/Completed: 08/01/11	**Ground Elevation (ft/msl, NAVD 88):**
Boring Location: Area 1B	**Total Depth:** 20.0 ft bgs
Drilling Company: ADT	**Logged By:** K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	4.0	0.2	PDI-9R (0-13.5)	0-13.5	FILL (0 to -2)		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2.5 to -5		0.1			ML (-2 to -8.5)		Brown, SILT, little fine sand, trace medium gravel; compact, dry.	
-5 to -7.5	5.0	0.4					Becomes moist at 6.5 ft bgs.	
-7.5 to -10		0.3			GP (-8.5 to -13.5)		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet.	
-10 to -12.5	5.0	0.1						
-12.5 to -15		0.2			CL (-13.5 to -20)		Gray, silty CLAY; compact, moist.	
-15 to -17.5	5.0	0.1						
-17.5 to -20		0.1					Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil — Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil sample PDI-9R (0-13.5) collected.

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Latham, NY 12110

Boring ID: PDI-10

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/02/11
Boring Location: Area 1B/420 N. Plain St
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	USCS	Visual Impacts	Geologic Description	Remarks
0 to -3.5	5.0 (0-5)	0.1 (0-2.5); 0.1 (2.5-5)			FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt, little organic material; loose, dry.	
-3.5 to -9.5	5.0 (5-10)	0.3 (5-7.5); 0.1 (7.5-10)			ML		Brown, SILT, little fine sand, trace organic material; compact, dry. Becomes moist at 7.0 ft bgs.	
-9.5 to -12.5	5.0 (10-15)	0.2 (10-12.5)	PDI-10 (10.5-12.5)	10.5-12.5	GP		Brown, fine to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet.	
-12.5 to -20		0.4 (12.5-15)			CL		Gray, silty CLAY; compact, moist.	
	5.0 (15-20)	0.3 (15-17.5); 0.2 (17.5-20)					Fine sand lens at 17-17.2 ft bgs. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil sample PDI-10 (10.5-12.5) collected.

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Latham, NY 12110

Boring ID: PDI-11

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/02/11
Boring Location: Area 1B/420 N. Plain St
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Visual Impacts	Geologic Description	Remarks
0 to -5	5.0	0.1, 0.2	PDI-11R (0-12)	FILL (0–3)		Brown, medium to coarse GRAVEL, some fine to medium sand, some root material; loose, dry.	
				ML (3–9.5)		Brown, SILT, trace fine sand; compact, dry.	
-5 to -10	5.0	0.3, 0.3				Becomes moist at 7.0 ft bgs.	
-10 to -15	5.0	2.1, 161.7	PDI-11 WC	GP (9.5–14)	Coal Tar or Coal Tar NAPL Saturated Soil (13.5–14)	Brown, fine to coarse GRAVEL, some fine to medium sand, some silt; loose, wet. NAPL saturated at 13.5-14 ft bgs.	
-15 to -20	5.0	4.6, 0.8		CL (14–20)		Gray, silty CLAY; compact, moist. Fine sand lens at 18.2-18.4 ft bgs. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-11R (0-12) and PDI-11 WC collected.

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Boring ID: PDI-12

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/02/11
Boring Location: Area 1B
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	3.5	0.1	PDI-12R (0-10)	FILL		Brown, fine to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2.5 to -5		0.2					
-5 to -7.5	4.5	0.3					
-7.5 to -10		0.1		ML		Brown, SILT, little fine gravel, little fine sand; compact, moist.	
-10 to -12.5	5.0	167.6	PDI-12 WC	GP	Coal Tar or Coal Tar NAPL Saturated Soil (11.5-12.5)	Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet. Some non-viscous NAPL at 11.5-12.5 ft bgs.	
-12.5 to -15		39.2		CL		Gray, silty CLAY, some organic material; compact, moist.	
-15 to -17.5	5.0	1.1					
-17.5 to -20		0.8				Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-12R (0-10) and PDI-12 WC collected.

Possible utility corridor.

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Latham, NY 12110

Boring ID: PDI-13

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI	**Drill Rig:** Mini-Sonic
Client/Project Number: NYSEG	**Sampling Method:** Sonic Core Barrel
Date Started/Completed: 08/01/11	**Ground Elevation (ft/msl, NAVD 88):**
Boring Location: Area 1B	**Total Depth:** 20.0 ft bgs
Drilling Company: ADT	**Logged By:** K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2	4.0 (0 to -5)	0.1	PDI-13R (0-12)	0-12		FILL		Brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt; loose, dry.	
-2 to -7.5		0.2				ML		Brown, SILT, little organic material, trace fine sand, trace orange staining; compact, dry. Becomes moist at 6.5 ft bgs.	
	5.0 (-5 to -10)	0.2							
-7.5 to -12		0.3				GP		Brown, medium to coarse GRAVEL, some fine to coarse sand, trace silt; loose, wet.	
	4.5 (-10 to -15)	0.1							
-12 to -20		0.2				CL		Gray, silty CLAY; compact, moist. Boring terminated at 20 ft bgs.	
	5.0 (-15 to -20)	0.1							
		0.1							

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil sample PDI-13R (0-12) collected.

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Boring ID: PDI-14

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/02/11

Boring Location: Area 1B

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -5	4.0	0.3; 0.2				FILL		Brown, fine to coarse GRAVEL, some fine to medium sand, trace silt, trace brick fragments; loose, dry.	
-5 to -10.5	5.0	0.1; 0.2	PDI-14R (0-10)			ML		Brown, SILT, little fine to medium gravel, little fine sand; compact, becomes moist at 6.0 ft bgs.	
-10.5 to -13.5	5.0	45.6; 232	PDI-14 WC			GP		Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet. Little NAPL at 10.5-12.5 ft bgs. NAPL saturated at 12.5-13.5 ft bgs.	
-13.5 to -20	5.0	1.6; 0.8				CL		Gray, silty CLAY, trace organic material; compact, moist. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-14R (0-10) and PDI-14 WC collected.

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Boring ID: PDI-15

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/01/11

Boring Location: Area 1B

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	5.0	0.1	PDI-15R (0-10)	FILL		Brown, medium to coarse GRAVEL, some fine to coarse sand, trace silt; loose, dry.	
-2.5 to -5		0.3		ML		Brown, SILT, little fine sand, trace orange staining; compact, dry.	
-5 to -7.5	5.0	0.3				Becomes moist at 6.5 ft bgs.	
-7.5 to -10		0.2		GP		Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet.	
-10 to -12.5	5.0	0.4	PDI-15 WC		Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers (12-12.5)	Trace NAPL blebs at 12-12.5 ft bgs.	
-12.5 to -15		17.2		CL		Gray, silty CLAY; compact, moist.	
-15 to -17.5	5.0	1.2					
-17.5 to -20		0.6				Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-15R (0-10) and PDI-15 WC collected.

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Boring ID: PDI-16

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/01/11

Boring Location: Area 1B

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval
0 – 2.5	3.0	0.1		
2.5 – 5		0.1		
5 – 7.5	5.0	0.2		
7.5 – 10		0.3		
10 – 12.5	5.0	0.3		
12.5 – 15		0.3		
15 – 17.5	5.0	0.4		
17.5 – 20		0.1		

Depth (Feet)	USCS	Visual Impacts	Geologic Description	Remarks
0 – 12	FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt, trace brick fragments; loose, dry.	
10			Becomes wet at 10 ft bgs.	
12 – 16	CL		Gray, silty CLAY; compact, moist.	
16 – 16.3	SP		Medium sand lens at 16-16.3 ft bgs.	
16.3 – 20	CL			
20			Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location.
Possible utility corridor.

Boring ID: PDI-17

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Latham, NY 12110

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/01/11

Boring Location: Area 1B

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0	4.5	0.2				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2		0.2				ML		Brown, SILT, little fine sand, trace orange staining; compact, dry.	
-4		0.4							
-6	5.0	0.3						Becomes moist at 6.0 ft bgs.	
-8		0.6				GP		Brown, medium to coarse GRAVEL, some fine to coarse sand, little silt; loose, wet.	
-10	5.0	0.6							
-12		0.4				CL		Gray, silty CLAY; compact, moist.	
-14		0.4							
-16	5.0	0.3						Fine sand lens at 15-15.2 ft bgs.	
-18		0.2						Boring terminated at 20 ft bgs.	
-20									

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-18

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 07/29/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 25.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	3.0	0.1			FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2.5 to -5		0.0			ML		Brown, SILT, some fine sand, some orange staining, trace organic material; compact, dry.	
-5 to -7.5	5.0	0.2						
-7.5 to -9		0.1					Becomes moist at 8.0 ft bgs.	
-9 to -10					GP		Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet.	
-10 to -12.5	3.0	0.3						
-12.5 to -15		0.2						
-15 to -17.5	3.0	0.8						
-17.5 to -20		26.7				Red (19-20.5)	Little non-viscous NAPL at 19-20 ft bgs. NAPL saturated at 20-20.5 ft bgs.	
-20 to -22.5	5.0	167.2			CL	Green (20.5-21.5)	Gray, silty CLAY; compact, moist. Trace NAPL in coarser grained material within the clay unit at 20.5-21.5 ft bgs.	
-22.5 to -25		3.6					Boring terminated at 25 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil (red)
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers (green)

Comments: No samples were collected from this location.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-19

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/04/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -1	5.0	0.2	PDI-19R (0-10)	0-10		FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-1 to -4		0.2, 0.4				ML		Brown, SILT, little fine sand, trace clay; compact, dry.	
-4 to -9	5.0	0.1, 0.3				GP		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet at 4.8 ft bgs.	
-9 to -11	3.0	0.4	PDI-19 WC	10-12		CL		Gray, silty CLAY; compact, moist.	
-11 to -11.5						SP		Fine sand lens at 11-11.5 ft bgs.	
-11.5 to -20	5.0	0.3, 0.2, 0.1				CL		Slight hydrocarbon-like odors at 11-11.5 ft bgs. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-19R (0-10) and PDI-19 WC were collected.

AECOM
40 British American Blvd
Latham, NY 12110

Boring ID: PDI-20

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/04/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	0.2	0.0				FILL		Tree root stuck in core at 0.2 ft bgs.	Fill estimated to 2.5 ft bgs.
-2.5 to -5		0.0							
-5 to -6	4.0					ML		Brown, SILT, trace fine sand, some orange staining; compact, dry.	
-6 to -7.5		0.1				GP		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet.	
-7.5 to -10		0.2							
-10 to -11.5	4.5	0.3							
-11.5 to -12.5						CL		Gray, silty CLAY; compact, moist.	
-12.5 to -15		0.4				SP		Fine sand lens at 14.5-14.7 ft bgs.	
-15 to -17.5	5.0	0.1				CL			
-17.5 to -20		0.1						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil — Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this locaiton

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-21

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/04/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Visual Impacts	Geologic Description	Remarks
0 to -5	5.0	0.2; 0.3		FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, dry.	Pre-cleared to 5 ft bgs.
-5 to -7.5	5.0	0.3	PDI-21R (0-10)	ML		Brown, SILT, some fine sand, some orange staining; compact, wet at 6.5 ft bgs.	
-7.5 to -12.5	5.0; 5.0	0.4; 2.3	PDI-21 WC	GP	Green (11.5-12.5)	Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet. Trace NAPL blebs at 11.5-12.5 ft bgs.	
-12.5 to -20	5.0; 5.0	0.8; 0.1; 0.2		CL		Gray, silty CLAY; compact, moist. Some organic material at 16-16.5 ft bgs. Boring terminated at 20 ft bgs.	

Depth interval (ft)	Recovery (Feet)	PID (ppm)
0-2.5	5.0	0.2
2.5-5		0.3
5-7.5	5.0	0.3
7.5-10		0.4
10-12.5	5.0	2.3
12.5-15		0.8
15-17.5	5.0	0.1
17.5-20		0.2

Coal Tar or Coal Tar NAPL Saturated Soil
Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-21R (0-10) and PDI-21 WC were collected.

AECOM
40 British American Blvd
Latham, NY 12110

Boring ID: PDI-22

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/05/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	5.0	0.0	PDI-22R (0-10)			FILL		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, dry.	
-2.5 to -5		0.1				ML		Brown, SILT, some fine sand; compact, wet.	
-5 to -7.5	5.0	0.1							
-7.5 to -10		0.1				GP		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, wet.	
-10 to -12.5	5.0	0.1	PDI-22 WC						
-12.5 to -15		0.0				CL		Gray, silty CLAY; compact, moist.	
-15 to -17.5	5.0	0.0							
-17.5 to -20		0.0						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-22R (0-10) and PDI-22 WC were collected.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-23

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/03/11

Boring Location: Area 1A

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID
0 to -2.5	4.0	0.1	PDI-23R (0-10)
-2.5 to -5		0.0	
-5 to -7.5	4.0	0.1	
-7.5 to -10		0.4	
-10 to -12.5	5.0	0.3	PDI-23 WC
-12.5 to -15		2.4	
-15 to -17.5	5.0	0.8	
-17.5 to -20		0.6	

Depth (Feet)	USCS	Visual Impacts	Geologic Description	Remarks
0 to -3	FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, some brick fragments; loose, dry.	
-3 to -9	ML		Brown, SILT, little fine sand, trace orange staining; compact, dry. Becomes moist at 7.0 ft bgs.	
-9 to -12	GP		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet. Some hydrocarbon-like odors at 11-12 ft bgs.	
-12 to -20	CL		Gray, silty CLAY; compact, moist. Some wood fragments at 15-15.5 and 17-17.5 ft bgs. Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-23R (0-10) and PDI-23 WC were collected.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-24

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/03/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2	4.0 (0-5)	0.4	PDI-24R (0-9)	FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, trace brick fragments; loose, dry.	
-2 to -7		0.3		ML		Brown, SILT, little fine sand, trace fine gravel; compact, dry.	
	5.0 (5-10)	0.4					
-7 to -13		4.6	PDI-24 WC	GP		Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet.	
					Hydrocarbon (9.5-10)	Some NAPL blebs at 9.5-10 ft bgs.	
	5.0 (10-15)	14.7					
		8.6			Hydrocarbon (12-13)	Little NAPL blebs, staining, and sheen at 12-13 ft bgs.	
-13 to -20				CL		Gray, silty CLAY; compact, moist.	
	5.0 (15-20)	0.1					
		0.2				Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-24R (0-9) and PDI-24 WC were collected.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-25

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/03/11

Boring Location: Area 1A

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Geologic Description	Remarks
0	4.5	0.2	PDI-25R (0-9)	FILL	Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, dry.	
-2		0.3		ML	Brown, SILT, trace fine sand, some orange staining; compact, dry.	
-4						
-6	5.0	7.3		GP	Brown, medium to coarse GRAVEL, some fine to medium sand, trace silt; loose, wet.	
-8		8.9	PDI-25 WC		Trace sheen at 8-9 ft bgs.	
-10	5.0	184			Some NAPL blebs at 10-12 ft bgs.	
-12		34			Some non-viscous NAPL at 12-13 ft bgs. NAPL saturated at 13-13.5 ft bgs.	
-14				CL	Gray, silty CLAY, little organic material; compact, moist.	
-16	5.0	1.2				
-18		0.8			Boring terminated at 20 ft bgs.	
-20						

Legend: Coal Tar or Coal Tar NAPL Saturated Soil (red); Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers (green)

Comments: Soil samples PDI-25R (0-9) and PDI-25 WC were collected.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-26

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/03/11

Boring Location: Area 1A

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Geologic Description	Remarks
0 to -2.5	5.0	0.2	PDI-26R (0-6)	FILL	Brown, medium to coarse GRAVEL, some fine to coarse sand, trace silt; loose, dry.	
				ML	Brown, SILT, trace fine sand, some orange staining; compact, dry.	
-2.5 to -5		0.1				
-5 to -7.5	2.0	0.3		GP	Brown, medium to coarse GRAVEL, some medium to coarse sand; loose, wet at 6 ft bgs.	
-7.5 to -10		5.1	PDI-26 WC		NAPL observed on drill rods at 8 ft bgs.	
-10 to -12.5	5.0	10.2			Some NAPL blebs at 11-13 ft bgs.	
-12.5 to -15		8.6		CL	Gray, silty CLAY; compact, moist.	
				SP	Medium sand lens at 14-14.2 ft bgs.	
				CL	Some NAPL blebs at 14-14.2 ft bgs.	
-15 to -17.5	5.0	0.6				
-17.5 to -20		0.8			Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: Soil samples PDI-26R (0-6) and PDI-26 WC were collected.

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-27

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/03/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2	5.0	0.0				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, dry.	
-2 to -8.2		0.0				ML		Brown, SILT, some fine sand, trace medium to coarse gravel; compact, dry. Becomes moist at 5.0 ft bgs.	
	5.0	0.0							
		0.1							
-8.2 to -12.2						GP		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, wet.	
	5.0	0.0							
-12.2 to -20		0.0				CL		Gray, silty CLAY; compact, moist.	
	5.0	0.0							
		0.0						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-28

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/03/11

Boring Location: Area 1A

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2	5.0 (0 to -5)	0.1	PDI-28R (0-6)	FILL		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, dry.	
-2 to -4.5		0.3		ML		Brown, SILT, little fine sand, some orange staining; compact, dry.	
-4.5 to -11	5.0 (-5 to -10)	0.1; 3.4	PDI-28 WC	GP; ML (-7.5 to -8.5); GP	Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers (-7 to -7.5)	Brown, medium to coarse GRAVEL, some fine to medium sand, little silt; loose, wet at 4.9 ft bgs. Trace NAPL blebs at 7-7.5 ft bgs. Brown, SILT at 7.5-8.5 ft bgs.	
-11 to -20	5.0 (-10 to -15); 5.0 (-15 to -20)	0.2; 0.3; 0.0; 0.1		CL		Gray, silty CLAY, some organic material; compact, moist. Boring terminated at 20 ft bgs.	

Legend: Coal Tar or Coal Tar NAPL Saturated Soil (red) — Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers (green)

Comments: Soil samples PDI-28R (0-6) and PDI-28 WC were collected.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-29

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI

Client/Project Number: NYSEG

Date Started/Completed: 08/03/11

Boring Location: Area 1A

Drilling Company: ADT

Drill Rig: Mini-Sonic

Sampling Method: Sonic Core Barrel

Ground Elevation (ft/msl, NAVD 88):

Total Depth: 20.0 ft bgs

Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	5.0	0.1				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand, some wood fragments; loose, dry.	
-2.5 to -5		0.2				ML		Brown, SILT, trace fine sand, some orange staining; compact, dry.	
-5 to -7.5	5.0	0.1						Becomes moist at 6.5 ft bgs.	
-7.5 to -10		0.0				CL		Gray, silty CLAY; compact, moist.	
-10 to -12.5	5.0	0.1							
-12.5 to -15		0.2							
-15 to -17.5	5.0	0.3						Some organic material at 15-20 ft bgs.	
-17.5 to -20		0.4						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-30

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/02/11
Boring Location: Area 1A
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 25.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	2.5	0.0				FILL		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, dry.	
		0.0				ML		Brown, SILT, little fine sand, some orange staining; compact, dry. Becomes moist at 7.0 ft bgs.	
-5 to -10	3.5	0.1							
		1.0				CL		Gray, silty CLAY, some organic material; compact, moist.	
-10 to -15	5.0	0.1				SP		Some fine sand at 11-12 ft bgs.	
		0.1							
-15 to -20	5.0	0.2				CL		Gray, silty CLAY, some organic material; compact, moist.	
		0.3				SP		Some fine sand at 19-19.3 ft bgs.	
-20 to -25	5.0	0.1				CL		Some wood fragments at 22-23 ft bgs.	
		0.0				SP		Brown, homogeneous medium SAND, loose, wet. Boring terminated at 25 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil — Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location.

AECOM

40 British American Blvd
Latham, NY 12110

Boring ID: PDI-31

Project Name: NYSEG Ithaca Court St MGP OU-2 PDI
Client/Project Number: NYSEG
Date Started/Completed: 08/04/11
Boring Location: Intersection of N. Plain and Esty Streets
Drilling Company: ADT

Drill Rig: Mini-Sonic
Sampling Method: Sonic Core Barrel
Ground Elevation (ft/msl, NAVD 88):
Total Depth: 20.0 ft bgs
Logged By: K. Stahle

Depth (Feet)	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Geologic Description	Remarks
0 to -2.5	5.0	0.1				FILL		Brown, fine to coarse GRAVEL, some fine to medium sand, little brick fragments; loose, dry.	
-2.5 to -5		0.3				ML		Brown, SILT, little fine sand, some orange staining, trace organic material; compact, dry.	
-5 to -7.5	5.0	0.1							
-7.5 to -10		0.3							
-9 to -9.5						GP		Brown, medium to coarse GRAVEL, some fine to medium sand; loose, wet.	
-9.5 to -12.5	5.0	0.0				CL		Gray, silty CLAY; compact, moist. Little organic material at 11-11.5 ft bgs.	
-12.5 to -15		0.0							
-15 to -17.5	5.0	0.1							
-17.5 to -20		0.2						Boring terminated at 20 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Sheen, NAPL Blebs, or NAPL Stringers

Comments: No samples were collected from this location

Attachment C

Geotechnical Analytical Results

GeoTesting EXPRESS

Client:	AECOM				
Project:	NYSEG Ithaca Court Street				
Location:	Ithaca, NY			Project No:	GTX-11071
Boring ID: ---		Sample Type: ---		Tested By:	jef
Sample ID:---		Test Date:	08/31/11	Checked By:	jdt
Depth : ---		Sample Id:	---		

Moisture Content of Soil - ASTM D 2216-05

Boring ID	**Sample ID**	**Depth**	**Description**	**Moisture Content,%**
---	GEO-1	15-17 ft	Wet, olive brown sandy silty clay	27.6
---	GEO-1	37-39 ft	Moist, olive brown silt	45.2
---	GEO-1	45-47 ft	Moist, olive brown silt	44.4
---	GEO-1	55-57 ft	Moist, dark olive brown silt	28
---	GEO-3	18-20 ft	Moist, olive sandy silt	54.1
---	GEO-3	38-40 ft	Moist, olive brown silt with sand	40.1
---	GEO-3	55-57 ft	Moist, olive silt with sand	26.3

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	AECOM				
Project:	NYSEG Ithaca Court Street				
Location:	Ithaca, NY			Project No:	GTX-11071
Boring ID:	---	Sample Type:	---	Tested By:	jbr
Sample ID:	---	Test Date:	08/31/11	Checked By:	jdt
Depth :	---	Test Id:	215221		

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GEO-1	15-17 ft	Sandy silty clay	CL-ML	0.0	48.3	51.7
---	GEO-1	37-39 ft	silt	ML	0.0	1.3	98.7
---	GEO-1	45-47 ft	elastic silt	MH	0.0	2.9	97.1
---	GEO-1	55-57 ft	silt	ML	0.0	1.9	98.1

Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

GeoTesting EXPRESS

Client:	AECOM				
Project:	NYSEG Ithaca Court Street				
Location:	Ithaca, NY			Project No:	GTX-11071
Boring ID:	---	Sample Type:	---	Tested By:	jbr
Sample ID:	---	Test Date:	08/31/11	Checked By:	jdt
Depth :	---	Test Id:	215224		

USCS Classification - ASTM D 2487-06

Boring ID	Sample ID	Depth	Group Name	Group Symbol	Gravel, %	Sand, %	Fines, %
---	GEO-3	18-20 ft	Sandy elastic silt	MH	0.3	35.7	64.0
---	GEO-3	38-40 ft	silt with sand	ML	0.0	15.8	84.2
---	GEO-3	55-57 ft	silt with sand	ML	0.0	17.7	82.3

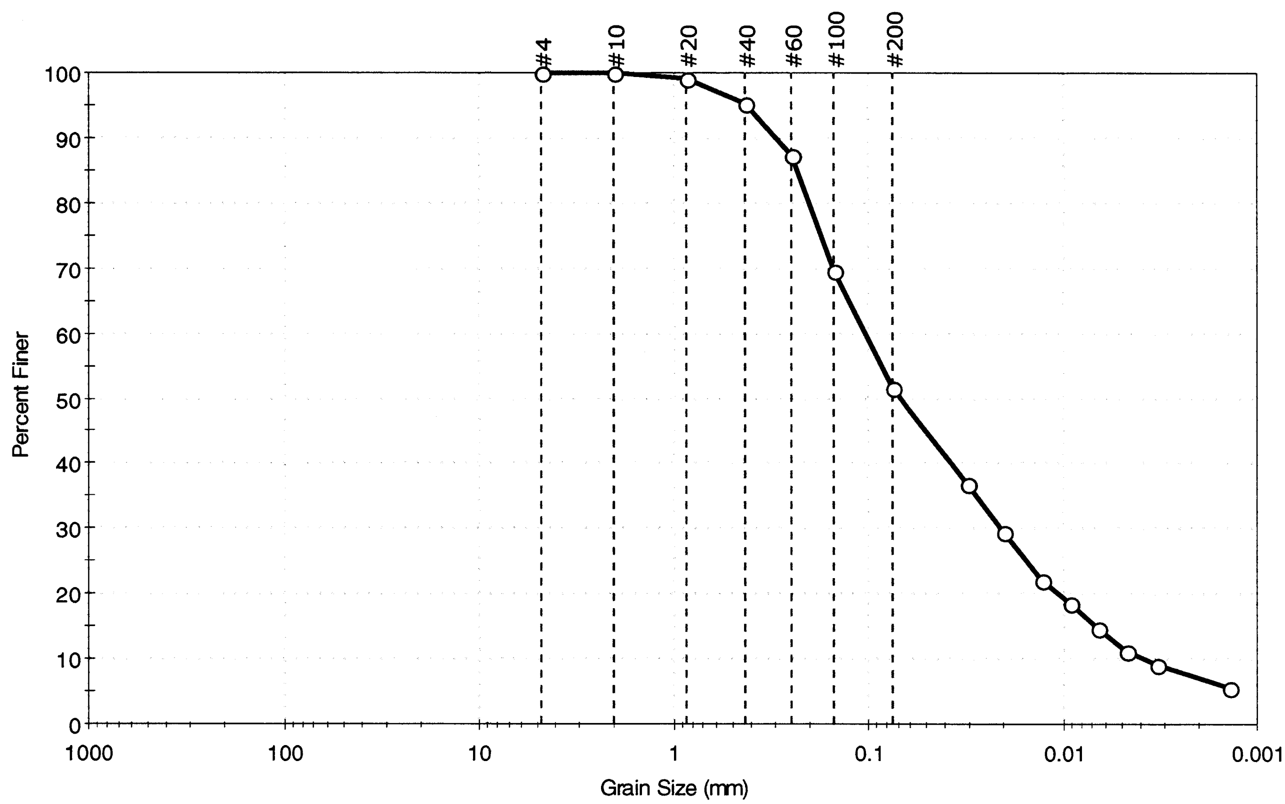
Remarks: Grain Size analysis performed by ASTM D422, results enclosed
Atterbeg Limits performed by ASTM 4318, results enclosed

GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	jbr
Sample ID:GEO-1	Test Date: 08/25/11	Checked By:	jdt
Depth : 15-17 ft	Test Id: 215225		

Test Comment: ---
Sample Description: Wet, olive brown sandy silty clay
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	48.3	51.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	95		
#60	0.25	87		
#100	0.15	70		
#200	0.075	52		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0310	37		
---	0.0202	30		
---	0.0127	22		
---	0.0092	18		
---	0.0065	15		
---	0.0047	11		
---	0.0033	9		
---	0.0014	6		

Coefficients

D_{85} =0.2339 mm　D_{30} =0.0207 mm
D_{60} =0.1033 mm　D_{15} =0.0066 mm
D_{50} =0.0676 mm　D_{10} =0.0038 mm
C_u =N/A　C_c =N/A

Classification

ASTM　Sandy silty clay (CL-ML)

AASHTO　Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---

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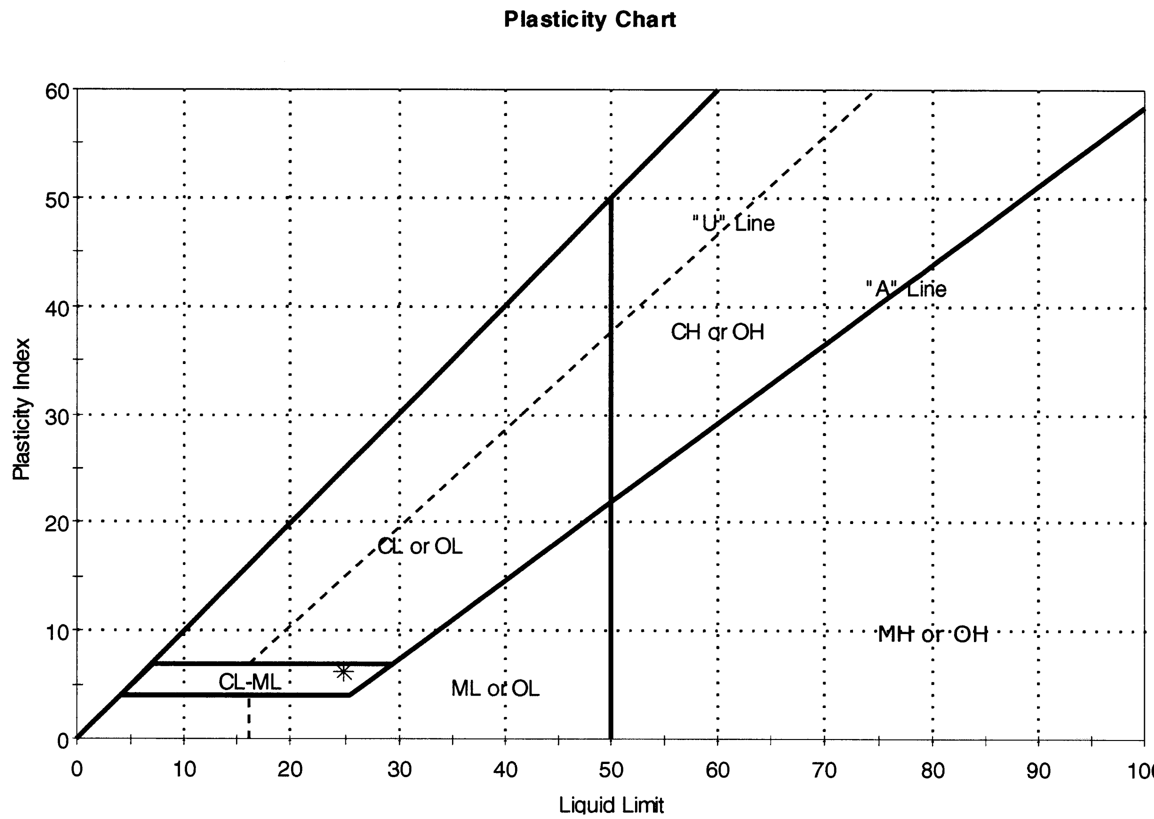
GeoTesting
EXPRESS

Client:	AECOM		
Project:	NYSEG Ithaca Court Street		
Location:	Ithaca, NY	Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	GA
Sample ID:GEO-1	Test Date: 08/19/11	Checked By:	jdt
Depth : 15-17 ft	Test Id: 215211		
Test Comment:	---		
Sample Description:	Wet, olive brown sandy silty clay		
Sample Comment:	---		

Atterberg Limits - ASTM D 4318-05



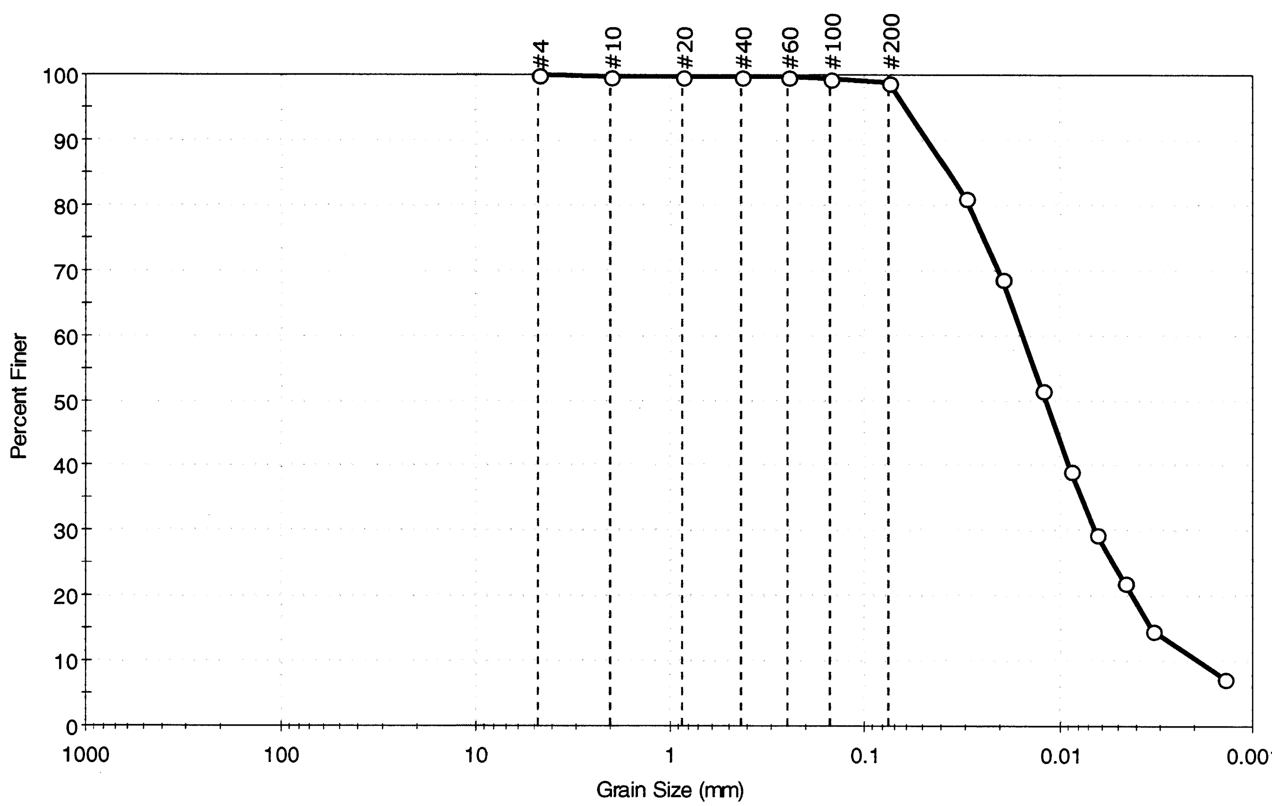
Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	GEO-1	---	15-17 ft	28	25	19	6	1	Sandy silty clay (CL-ML)

Sample Prepared using the WET method
5% Retained on #40 Sieve
Dry Strength: MEDIUM
Dilentancy: SLOW
Toughness: MEDIUM

GeoTesting EXPRESS

Client:	AECOM				
Project:	NYSEG Ithaca Court Street				
Location:	Ithaca, NY			Project No:	GTX-11071
Boring ID:	---	Sample Type:	tube	Tested By:	jbr
Sample ID:	GEO-1	Test Date:	08/25/11	Checked By:	jdt
Depth :	37-39 ft	Test Id:	215226		
Test Comment:	---				
Sample Description:	Moist, olive brown silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	1.3	98.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#200	0.075	99		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0302	81		
---	0.0197	69		
---	0.0121	52		
---	0.0088	39		
---	0.0064	30		
---	0.0046	22		
---	0.0033	15		
---	0.0014	7		

Coefficients

D_{85} =0.0369 mm — D_{30} =0.0065 mm

D_{60} =0.0153 mm — D_{15} =0.0033 mm

D_{50} =0.0116 mm — D_{10} =0.0019 mm

C_u =N/A — C_c =N/A

Classification

ASTM silt (ML)

AASHTO Clayey Soils (A-7-5 (20))

Sample/Test Description

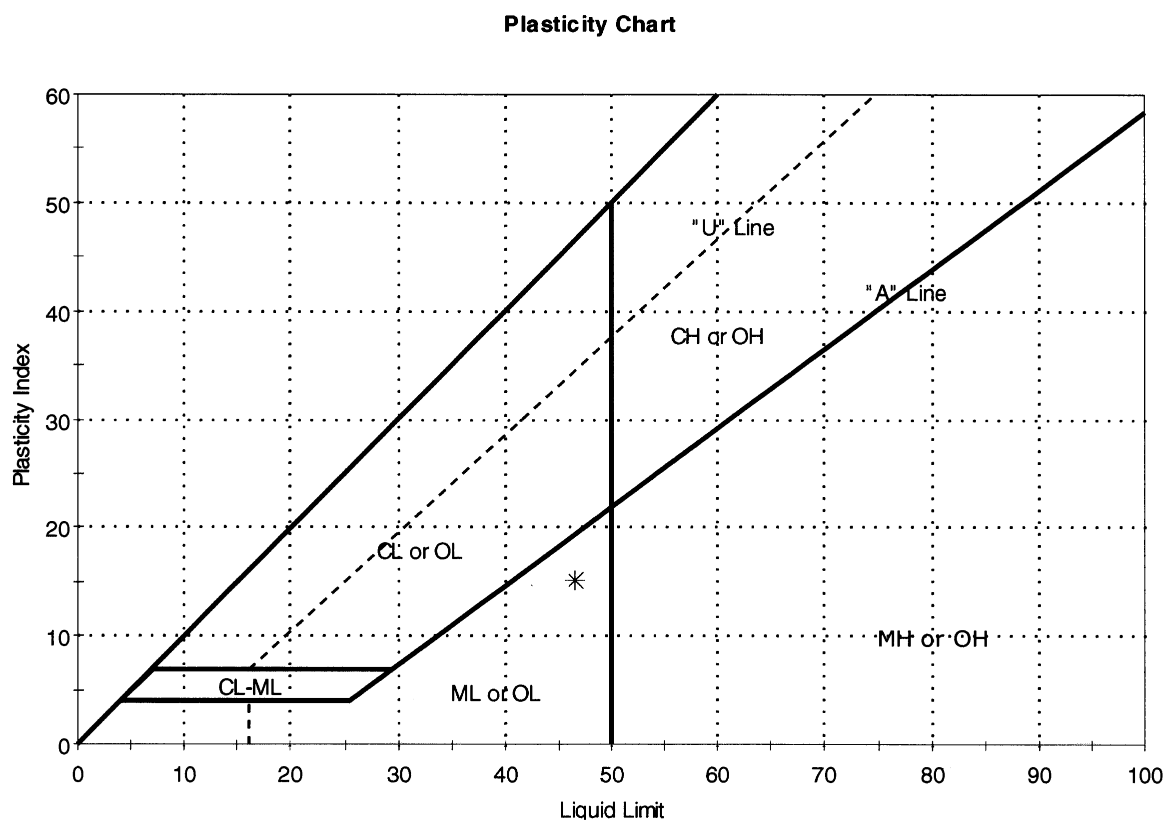
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	AECOM		
Project:	NYSEG Ithaca Court Street		
Location:	Ithaca, NY	Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	GA
Sample ID:GEO-1	Test Date: 08/19/11	Checked By:	jdt
Depth : 37-39 ft	Test Id: 215212		
Test Comment:	---		
Sample Description:	Moist, olive brown silt		
Sample Comment:	---		

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	GEO-1	---	37-39 ft	45	46	31	15	1	silt (ML)

Sample Prepared using the WET method

0% Retained on #40 Sieve

Dry Strength: MEDIUM

Dilentancy: SLOW

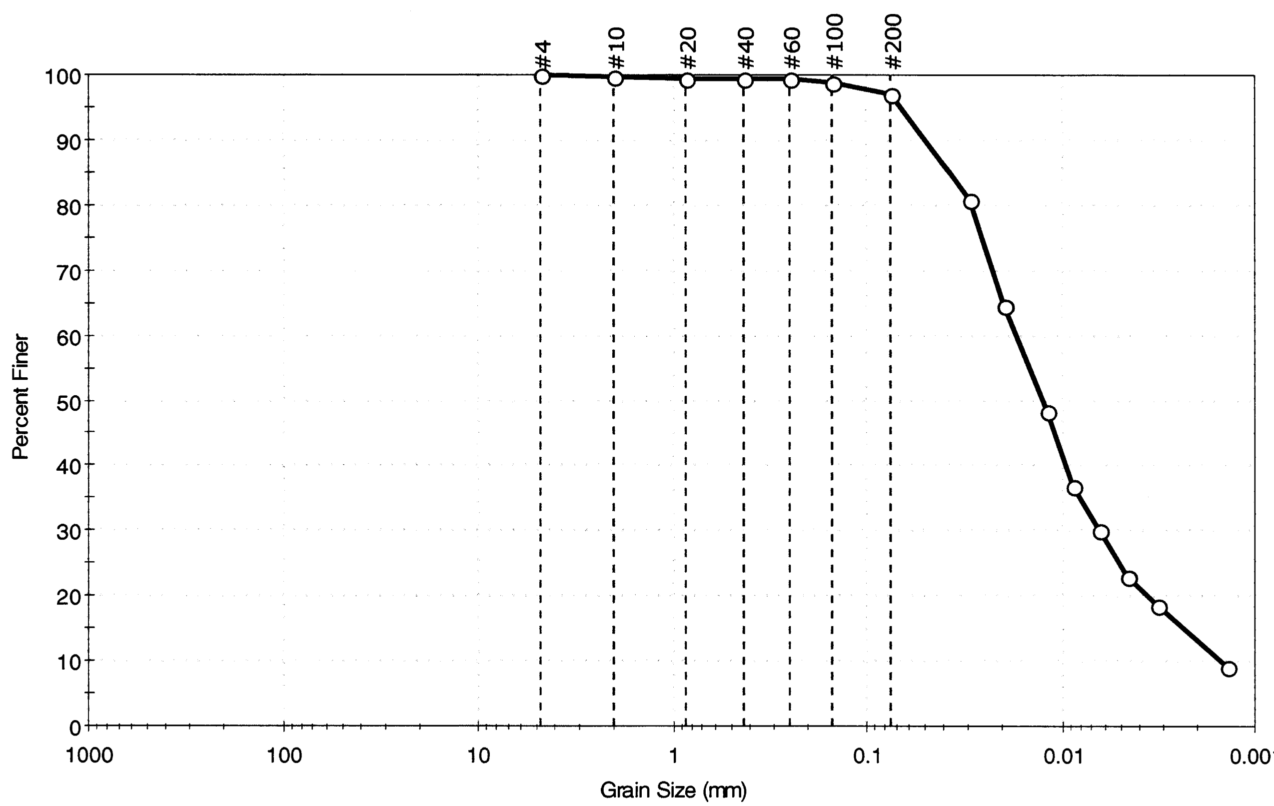
Toughness: LOW

GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	jbr
Sample ID:GEO-1	Test Date: 08/25/11	Checked By:	jdt
Depth : 45-47 ft	Test Id: 215227		

Test Comment: ---
Sample Description: Moist, olive brown silt
Sample Comment: ---

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	2.9	97.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	99		
#100	0.15	99		
#200	0.075	97		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0299	81		
---	0.0195	65		
---	0.0121	48		
---	0.0088	37		
---	0.0064	30		
---	0.0046	23		
---	0.0033	18		
---	0.0014	9		

Coefficients

D_{85} =0.0380 mm D_{30} =0.0064 mm
D_{60} =0.0170 mm D_{15} =0.0024 mm
D_{50} =0.0127 mm D_{10} =0.0015 mm
C_u =N/A C_c =N/A

Classification

ASTM   elastic silt (MH)

AASHTO   Clayey Soils (A-7-5 (29))

Sample/Test Description

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---

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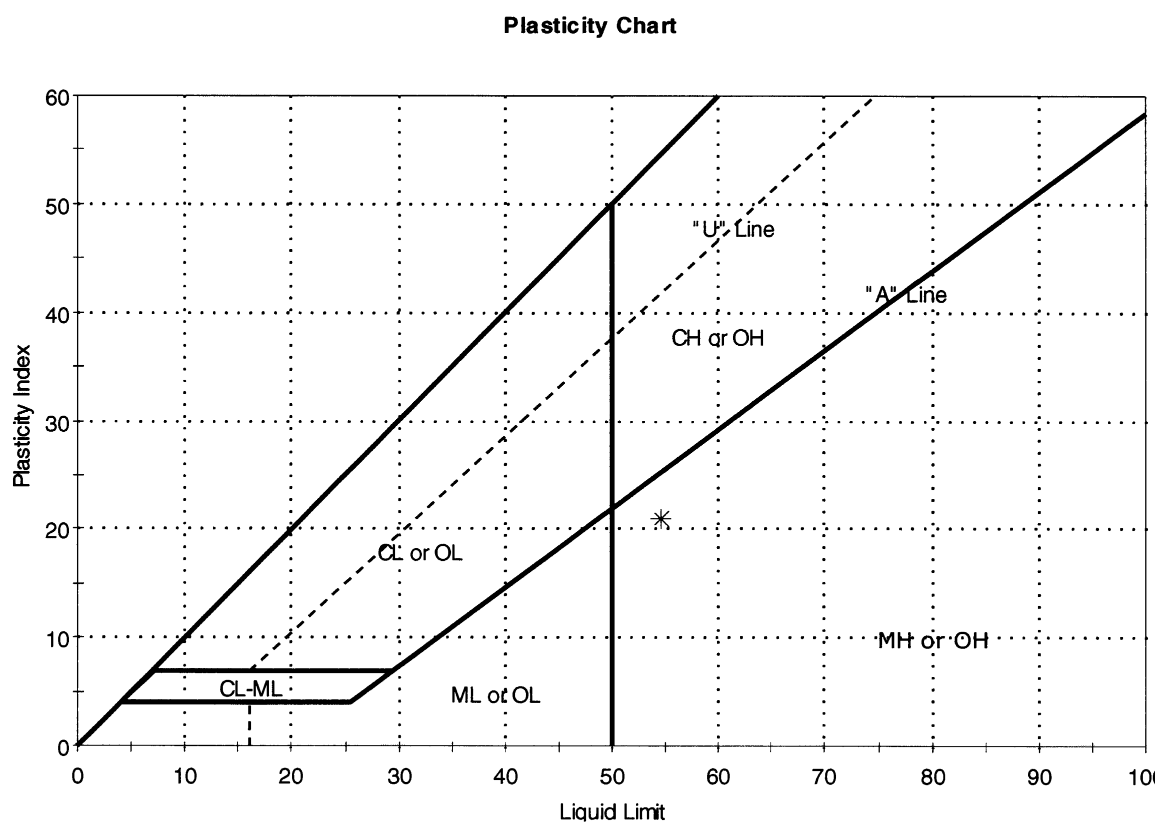
GeoTesting EXPRESS

Client: AECOM				
Project: NYSEG Ithaca Court Street				
Location: Ithaca, NY			Project No:	GTX-11071
Boring ID: ---	Sample Type:	tube	Tested By:	GA
Sample ID: GEO-1	Test Date:	08/19/11	Checked By:	jdt
Depth : 45-47 ft	Test Id:	215213		
Test Comment: ---				
Sample Description: Moist, olive brown silt				
Sample Comment: ---				

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	GEO-1	---	45-47 ft	44	55	34	21	1	elastic silt (MH)

Sample Prepared using the WET method

1% Retained on #40 Sieve

Dry Strength: MEDIUM

Dilentancy: SLOW

Toughness: MEDIUM

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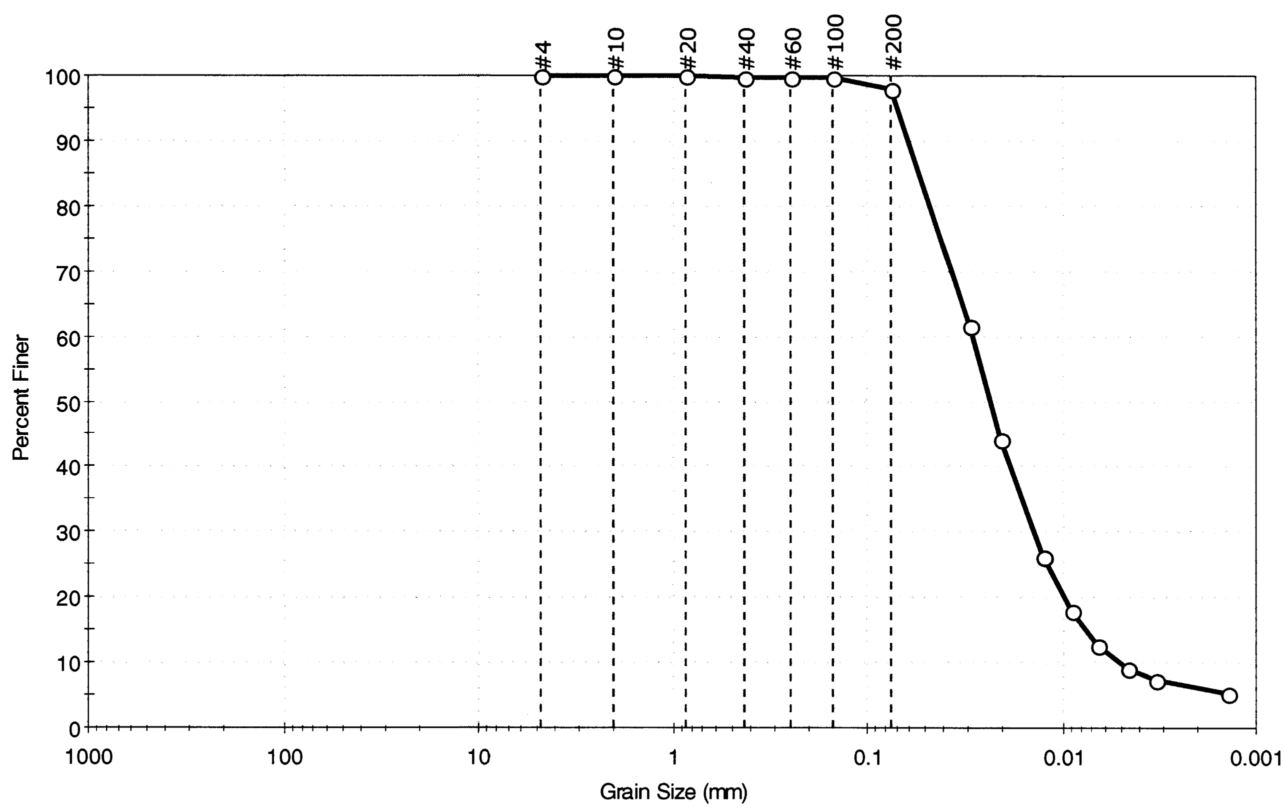
GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	jbr
Sample ID: GEO-1	Test Date: 08/25/11	Checked By:	jdt
Depth : 55-57 ft	Test Id: 215228		
Test Comment: ---			
Sample Description: Moist, dark olive brown silt			
Sample Comment: ---			

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	1.9	98.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#200	0.075	98		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0297	62		
---	0.0207	44		
---	0.0126	26		
---	0.0091	18		
---	0.0065	13		
---	0.0047	9		
---	0.0033	7		
---	0.0014	5		

Coefficients

D_{85} =0.0538 mm	D_{30} =0.0140 mm
D_{60} =0.0287 mm	D_{15} =0.0075 mm
D_{50} =0.0233 mm	D_{10} =0.0051 mm
C_u =N/A	C_c =N/A

Classification

ASTM silt (ML)

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	GA
Sample ID:GEO-1	Test Date: 08/19/11	Checked By:	jdt
Depth : 55-57 ft	Test Id: 215214		
Test Comment: ---			
Sample Description: Moist, dark olive brown silt			
Sample Comment: ---			

Atterberg Limits - ASTM D 4318-05

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	GEO-1	---	55-57 ft	28	n/a	n/a	n/a	n/a	silt (ML)

0% Retained on #40 Sieve

Dry Strength: NONE

Dilentancy: RAPID

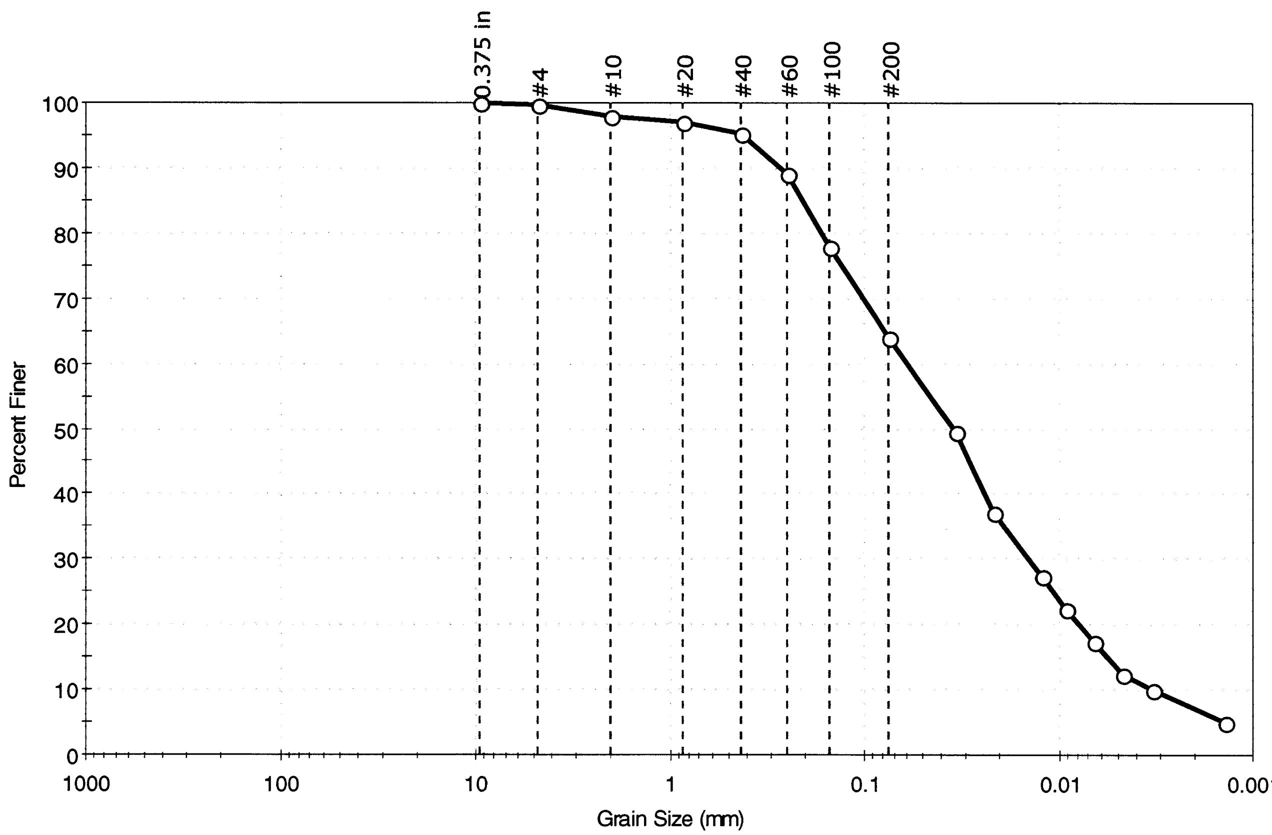
Toughness: n/a

The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	AECOM				
Project:	NYSEG Ithaca Court Street				
Location:	Ithaca, NY			Project No:	GTX-11071
Boring ID: ---		Sample Type:	tube	Tested By:	jbr
Sample ID:GEO-3		Test Date:	08/25/11	Checked By:	jdt
Depth :	18-20 ft	Test Id:	215229		
Test Comment:	---				
Sample Description:	Moist, olive sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.3	35.7	64.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	98		
#20	0.85	97		
#40	0.42	95		
#60	0.25	89		
#100	0.15	78		
#200	0.075	64		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0343	50		
---	0.0220	37		
---	0.0124	27		
---	0.0092	22		
---	0.0066	17		
---	0.0047	12		
---	0.0033	10		
---	0.0014	5		

Coefficients

D_{85} =0.2073 mm	D_{30} =0.0144 mm
D_{60} =0.0602 mm	D_{15} =0.0056 mm
D_{50} =0.0349 mm	D_{10} =0.0034 mm
C_u =N/A	C_c =N/A

Classification

ASTM Sandy elastic silt (MH)

AASHTO Clayey Soils (A-7-5 (11))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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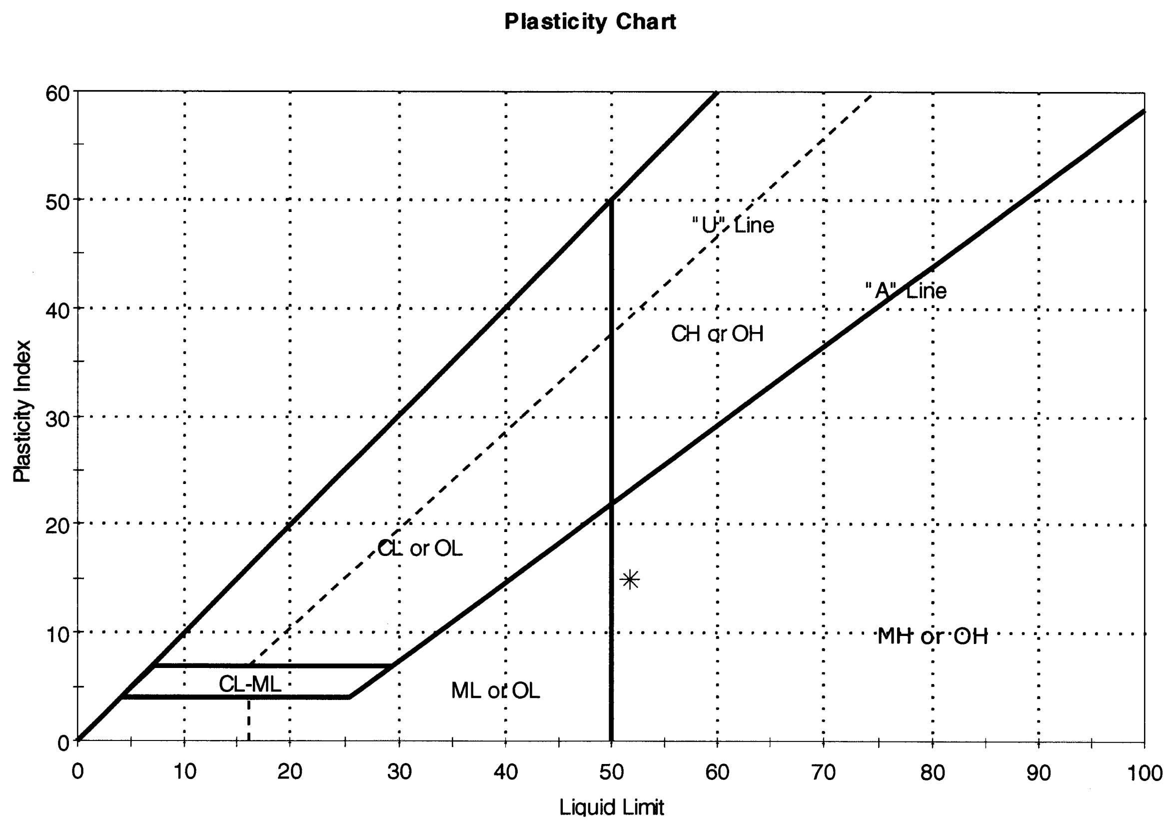
GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	GA
Sample ID:GEO-3	Test Date: 08/19/11	Checked By:	jdt
Depth : 18-20 ft	Test Id: 215215		
Test Comment: ---			
Sample Description: Moist, olive sandy silt			
Sample Comment: ---			

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	GEO-3	---	18-20 ft	54	52	37	15	1	Sandy elastic silt (MH)

Sample Prepared using the WET method

5% Retained on #40 Sieve

Dry Strength: MEDIUM

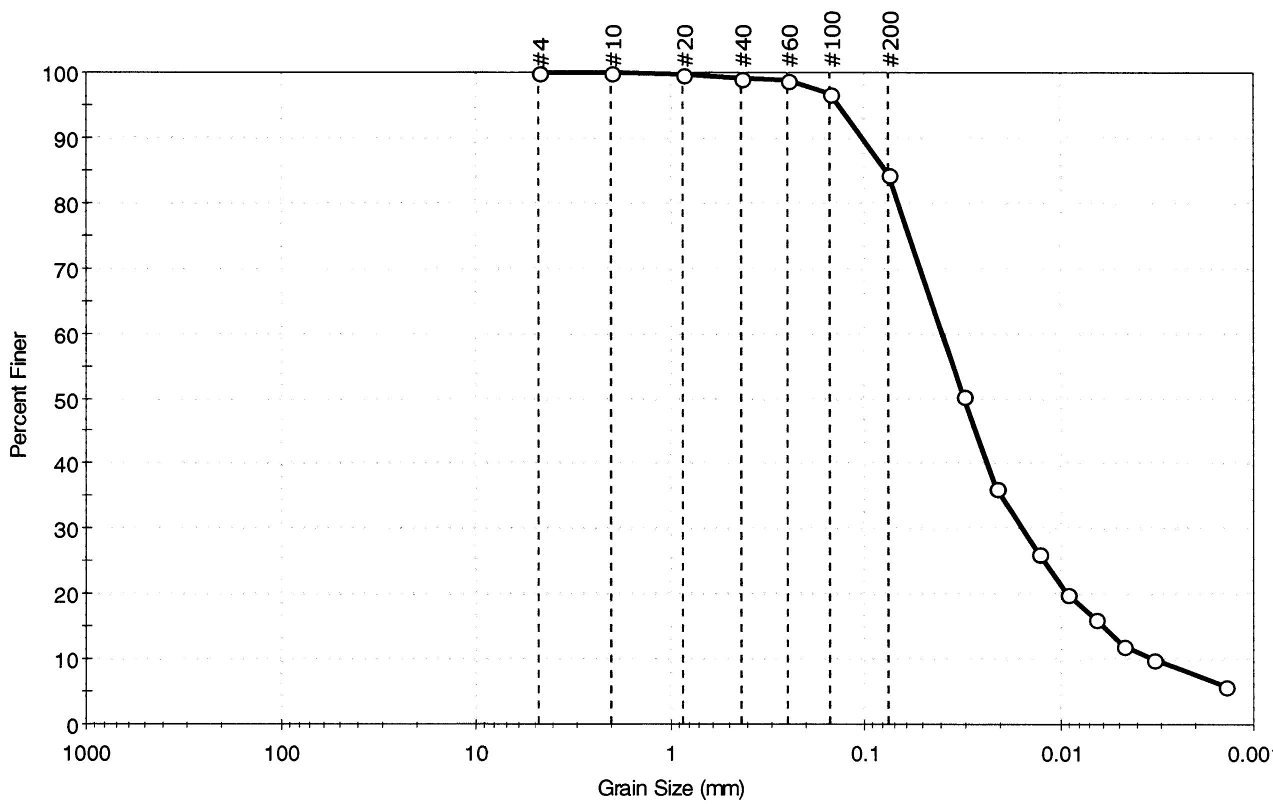
Dilentancy: SLOW

Toughness: MEDIUM

GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	jbr
Sample ID:GEO-3	Test Date: 08/25/11	Checked By:	jdt
Depth : 38-40 ft	Test Id: 215230		
Test Comment: ---			
Sample Description: Moist, olive brown silt with sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	15.8	84.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	99		
#100	0.15	97		
#200	0.075	84		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0313	50		
---	0.0212	36		
---	0.0127	26		
---	0.0092	20		
---	0.0065	16		
---	0.0047	12		
---	0.0033	10		
---	0.0014	6		

Coefficients

D_{85} =0.0783 mm	D_{30} =0.0154 mm
D_{60} =0.0401 mm	D_{15} =0.0060 mm
D_{50} =0.0310 mm	D_{10} =0.0033 mm
C_u =N/A	C_c =N/A

Classification

ASTM silt with sand (ML)

AASHTO Silty Soils (A-5 (8))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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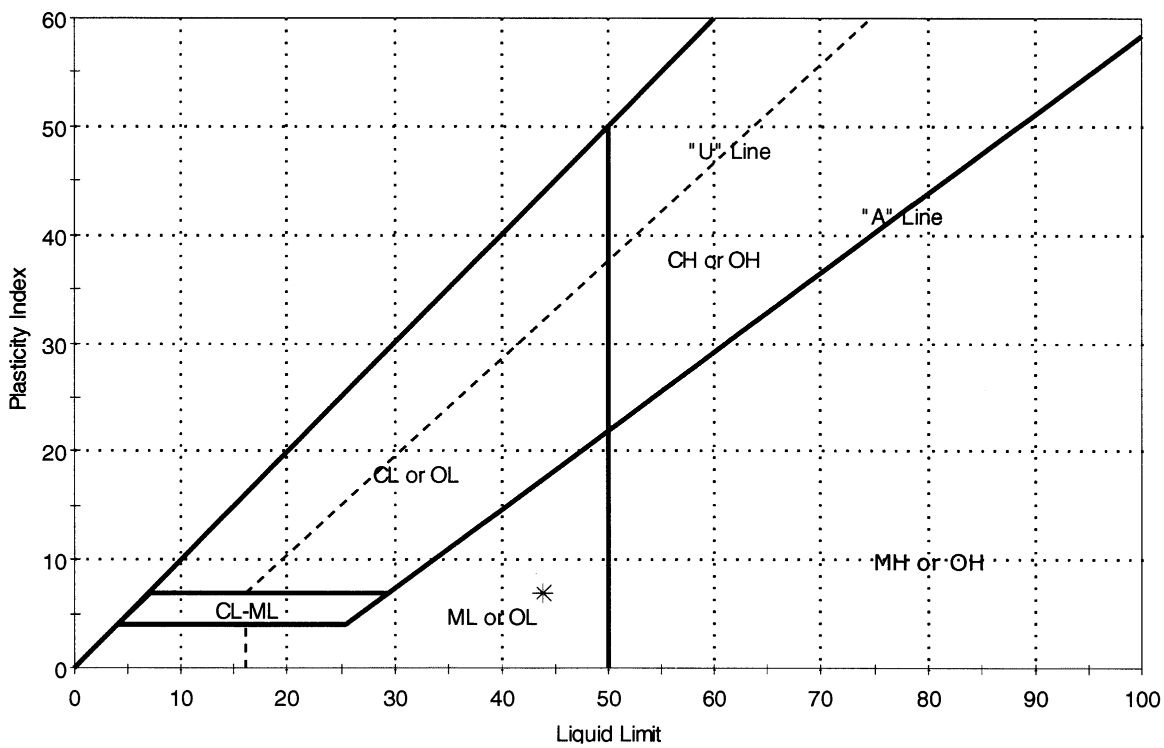
GeoTesting EXPRESS

Client:	AECOM				
Project:	NYSEG Ithaca Court Street				
Location:	Ithaca, NY			Project No:	GTX-11071
Boring ID:	---	Sample Type:	tube	Tested By:	GA
Sample ID:	GEO-3	Test Date:	08/19/11	Checked By:	jdt
Depth :	38-40 ft	Test Id:	215216		
Test Comment:	---				
Sample Description:	Moist, olive brown silt with sand				
Sample Comment:	---				

Atterberg Limits - ASTM D 4318-05

Plasticity Chart



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
✳	GEO-3	---	38-40 ft	40	44	37	7	0	silt with sand (ML)

Sample Prepared using the WET method

1% Retained on #40 Sieve

Dry Strength: LOW

Dilentancy: RAPID

Toughness: MEDIUM

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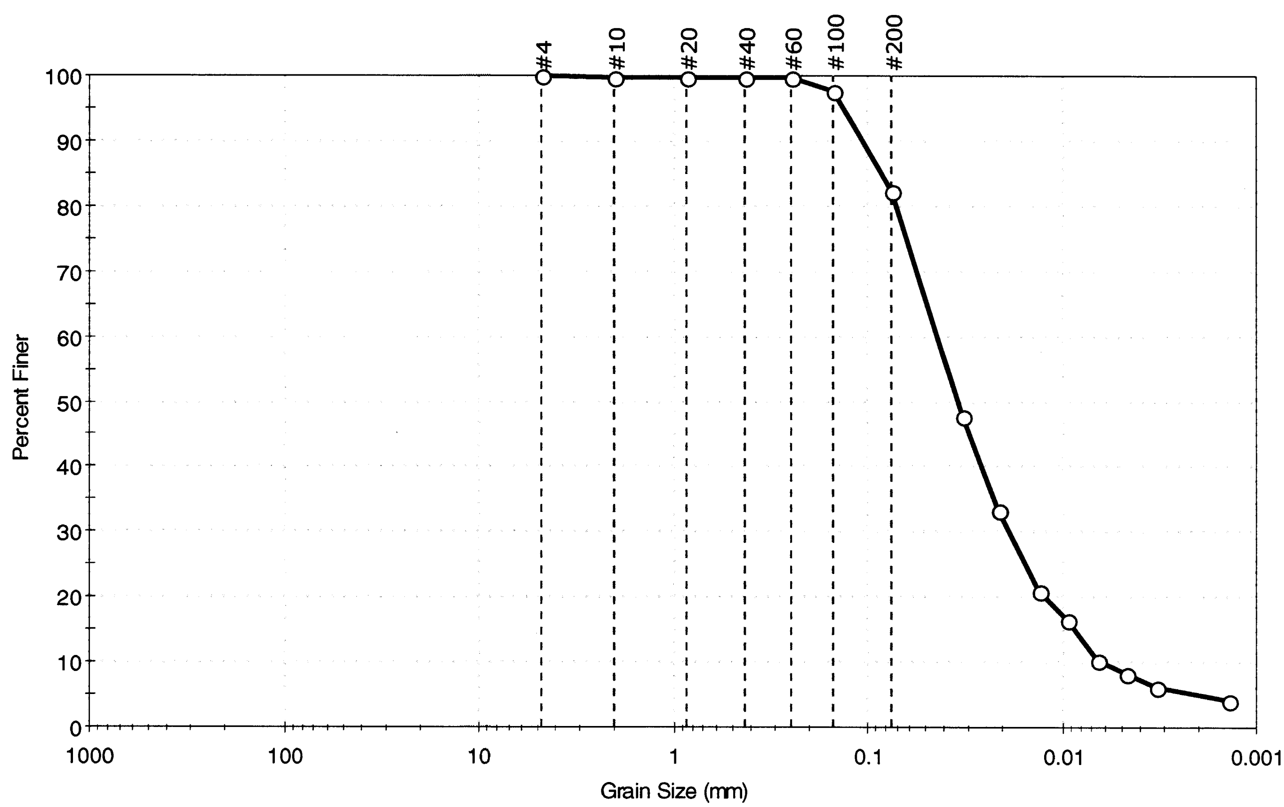
GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	jbr
Sample ID: GEO-3	Test Date: 08/25/11	Checked By:	jdt
Depth : 55-57 ft	Test Id: 215231		
Test Comment: ---			
Sample Description: Moist, olive silt with sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D 422-63 (reapproved 2002)



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	17.7	82.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	98		
#200	0.075	82		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0328	48		
---	0.0214	33		
---	0.0130	21		
---	0.0093	17		
---	0.0066	10		
---	0.0047	8		
---	0.0033	6		
---	0.0014	4		

Coefficients

D_{85} =0.0848 mm	D_{30} =0.0187 mm
D_{60} =0.0439 mm	D_{15} =0.0085 mm
D_{50} =0.0345 mm	D_{10} =0.0062 mm
C_u =N/A	C_c =N/A

Classification

ASTM silt with sand (ML)

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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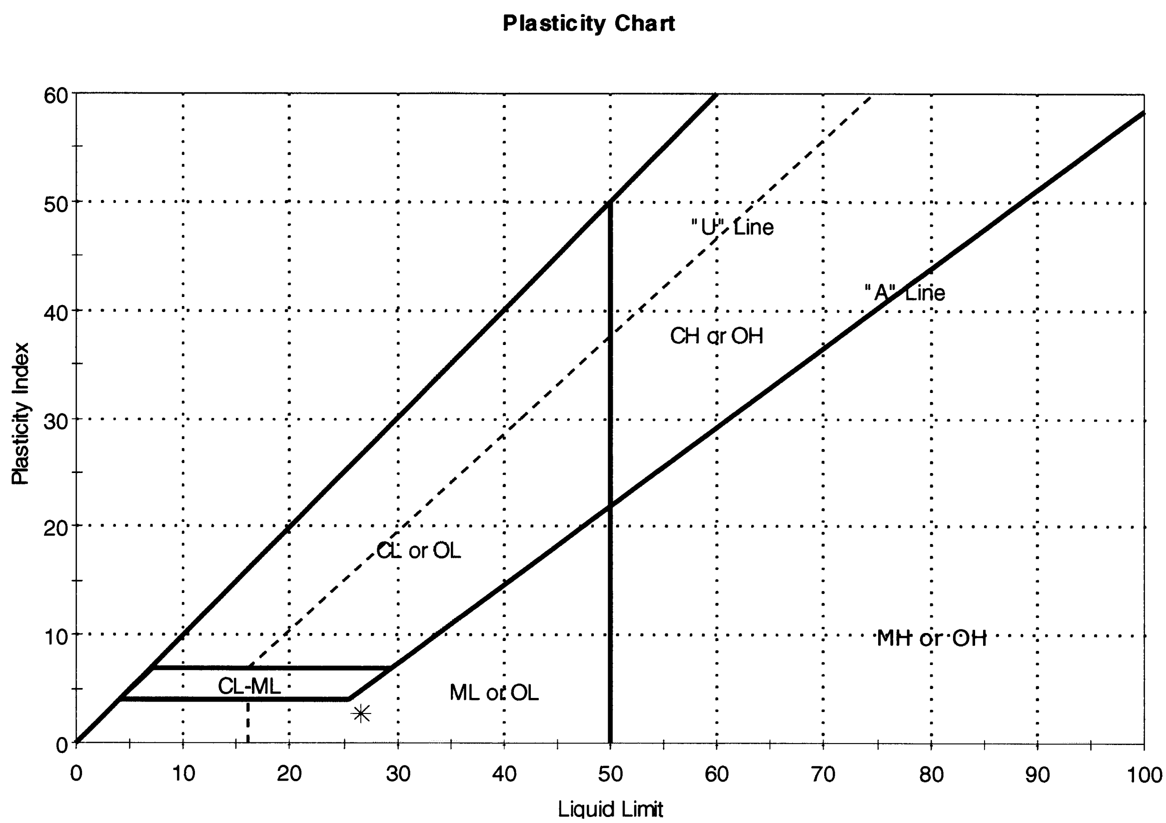
GeoTesting EXPRESS

Client: AECOM			
Project: NYSEG Ithaca Court Street			
Location: Ithaca, NY		Project No:	GTX-11071
Boring ID: ---	Sample Type: tube	Tested By:	GA
Sample ID:GEO-3	Test Date: 08/19/11	Checked By:	jdt
Depth : 55-57 ft	Test Id: 215217		

Test Comment: ---
Sample Description: Moist, olive silt with sand
Sample Comment: ---

Atterberg Limits - ASTM D 4318-05



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
*	GEO-3	---	55-57 ft	26	27	24	3	1	silt with sand (ML)

Sample Prepared using the WET method
0% Retained on #40 Sieve
Dry Strength: NONE
Dilentancy: SLOW
Toughness: LOW

GeoTesting EXPRESS

Client:	AECOM		
Project Name:	NYSEG Ithaca Court Street		
Project Location:	Ithaca, NY		
GTX #:	11071		
Start Date:	8/19/2011	Tested By:	ema
End Date:	8/23/2011	Checked By:	jdt
Boring #:	---		
Sample #:	GEO-1		
Depth:	15-17 ft.		
Visual Description:	Wet, olive brown sandy silty clay		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D 5084
Constant Volume

Sample Type:	tube	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	3/9

Sample Preparation: Extruded from tube, cut, trimmed and placed into permeameter at as-received density and moisture content. Trimmings moisture content = 30.2%.

Parameter	Initial	Final
Height, in	3.03	2.96
Diameter, in	2.87	2.85
Area, in^2	6.47	6.38
Volume, in^3	19.6	18.9
Mass, g	615	607
Bulk Density, pcf	119	122
Moisture Content, %	30.1	28.4
Dry Density, pcf	92	95
Degree of Saturation, %	---	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	95.1	Pressure Increment, psi:	4.97
Sample Pressure, psi:	90.0	B Coefficient:	0.95

FLOW DATA

Date	Trial #	Pressure, psi		Manometer Readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	Z_1	Z_2	Z_1-Z_2						
8/22	1	90	85	9.0	8.5	0.5	74	15.1	3.5E-07	20	1.000	3.5E-07
8/22	2	90	85	9.0	8.5	0.5	76	15.1	3.4E-07	20	1.000	3.4E-07
8/22	3	90	85	9.0	8.5	0.5	76	15.1	3.4E-07	20	1.000	3.4E-07
8/22	4	90	85	9.0	8.5	0.5	76	15.1	3.4E-07	20	1.000	3.4E-07

PERMEABILITY AT 20° C: 3.5×10^{-7} cm/sec (@ 5 psi effective stress)

GeoTesting EXPRESS

Client:	AECOM		
Project Name:	NYSEG Ithaca Court Street		
Project Location:	Ithaca, NY		
GTX #:	11071		
Start Date:	8/19/2011	Tested By:	ema
End Date:	8/23/2011	Checked By:	jdt
Boring #:	---		
Sample #:	GEO-1		
Depth:	37-39 ft.		
Visual Description:	Moist, olive brown silt		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D 5084
Constant Volume

Sample Type: tube
Orientation: Vertical
Permeant Fluid: de-aired tap water
Cell #: 16/5/12

Sample Preparation: Extruded from tube, cut, trimmed and placed into permeameter at as-received density and moisture content. Trimmings moisture content = 42.0%.

Parameter	Initial	Final
Height, in	2.78	2.55
Diameter, in	2.88	2.75
Area, in^2	6.51	5.94
Volume, in^3	18.1	15.1
Mass, g	493	462
Bulk Density, pcf	103	116
Moisture Content, %	43.6	34.5
Dry Density, pcf	72.0	86.1
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi: 95.1
Sample Pressure, psi: 90.2
Pressure Increment, psi: 5.05
B Coefficient: 0.97

FLOW DATA

Date	Trial #	Pressure, psi		Manometer Readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	Z_1	Z_2	Z_1-Z_2						
8/22	3	90	85	8.0	7.5	0.5	12	15.6	2.3E-06	20	1.000	2.3E-06
8/22	4	90	85	8.0	7.5	0.5	12	15.6	2.3E-06	20	1.000	2.3E-06
8/22	5	90	85	8.0	7.5	0.5	12	15.6	2.3E-06	20	1.000	2.3E-06
8/22	6	90	85	8.0	7.5	0.5	12	15.6	2.3E-06	20	1.000	2.3E-06

PERMEABILITY AT 20° C: 2.3×10^{-6} cm/sec (@ 5 psi effective stress)

GeoTesting EXPRESS

Client:	AECOM		
Project Name:	NYSEG Ithaca Court Street		
Project Location:	Ithaca, NY		
GTX #:	11071		
Start Date:	8/19/2011	Tested By:	ema
End Date:	8/23/2011	Checked By:	jdt
Boring #:	---		
Sample #:	GEO-1		
Depth:	45-47 ft.		
Visual Description:	Moist, olive brown silt		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D 5084
Constant Volume

Sample Type:	tube	Permeant Fluid:	de-aired tap water
Orientation:	Vertical	Cell #:	8/9/3

Sample Preparation: Extruded from tube, cut, trimmed and placed into permeameter at as-received density and moisture content. Trimmings moisture content = 41.8%.

Parameter	Initial	Final
Height, in	2.93	2.90
Diameter, in	2.88	2.87
Area, in^2	6.51	6.47
Volume, in^3	19.1	18.8
Mass, g	541	534
Bulk Density, pcf	108	108
Moisture Content, %	43.5	41.7
Dry Density, pcf	75.0	76.3
Degree of Saturation, %	---	95

B COEFFICIENT DETERMINATION

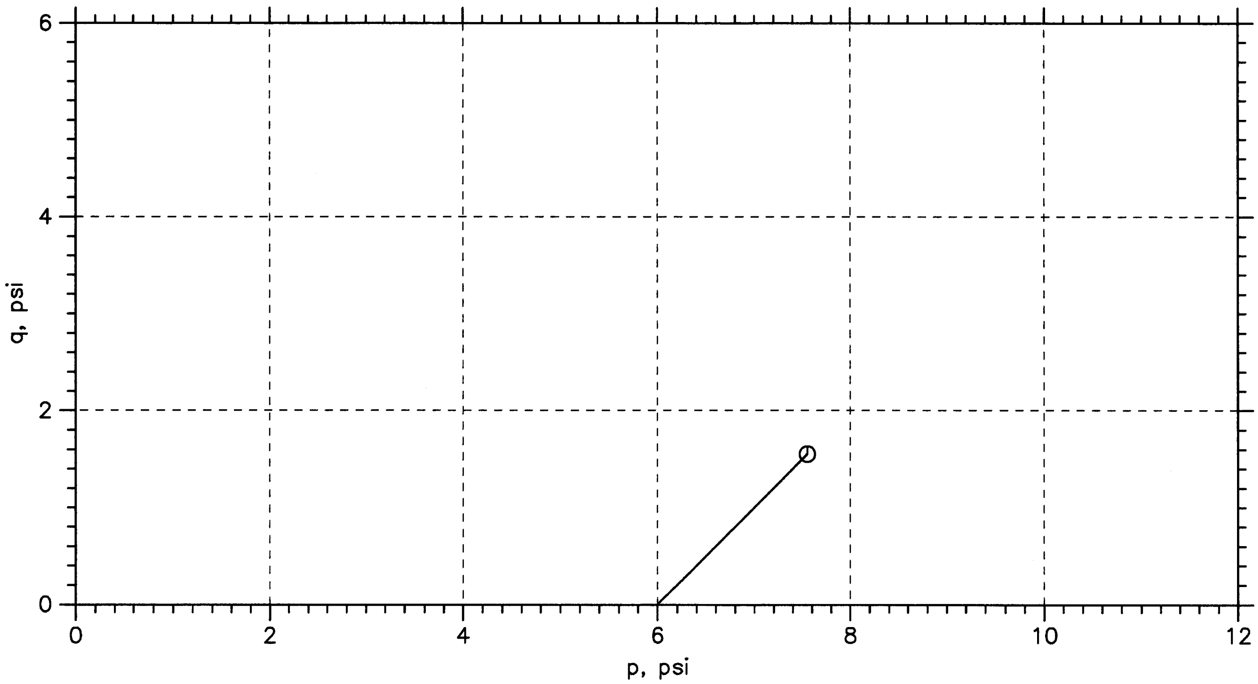
Cell Pressure, psi:	95.0	Pressure Increment, psi:	5.00
Sample Pressure, psi:	90.2	B Coefficient:	0.98

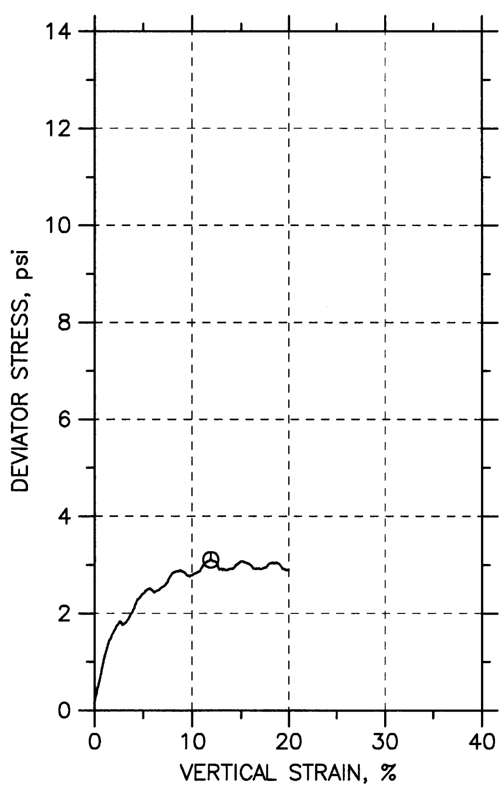
FLOW DATA

Date	Trial #	Pressure, psi		Manometer Readings			Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
		Cell	Sample	Z_1	Z_2	Z_1-Z_2						
8/22	2	90	85	9.0	8.5	0.5	55	15.4	4.6E-07	20	1.000	4.6E-07
8/22	3	90	85	9.0	8.5	0.5	56	15.4	4.5E-07	20	1.000	4.5E-07
8/22	4	90	85	9.0	8.5	0.5	56	15.4	4.5E-07	20	1.000	4.5E-07
8/22	5	90	85	9.0	8.5	0.5	57	15.4	4.4E-07	20	1.000	4.4E-07

PERMEABILITY AT 20° C: 4.5×10^{-7} cm/sec (@ 5 psi effective stress)

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	⦶			
Sample No.	GEO-1			
Test No.	UU-3			
Depth	15-17 ft			
Tested by	md			
Test Date	08/18/11			
Checked by	jdt			
Check Date	08/31/11			
Diameter, in	2.87			
Height, in	6			
Water Content, %	27.5			
Dry Density, pcf	95.67			
Saturation, %	95.2			
Void Ratio	0.794			
Confining Stress, psi	6			
Undrained Strength, psi	1.554			
Max. Dev. Stress, psi	3.107			
Strain at Failure, %	11.9			
Strain Rate, %/min	1			
Estimated Specific Gravity	2.75			
Liquid Limit	25			
Plastic Limit	19			
Plasticity Index	6			

GeoTesting EXPRESS

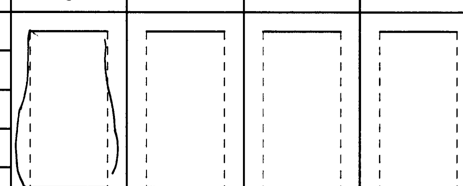
Project: NYSEG Ithaca

Location: Ithaca, NY

Project No.: GTX-11071

Boring No.: ---

Sample Type: tube



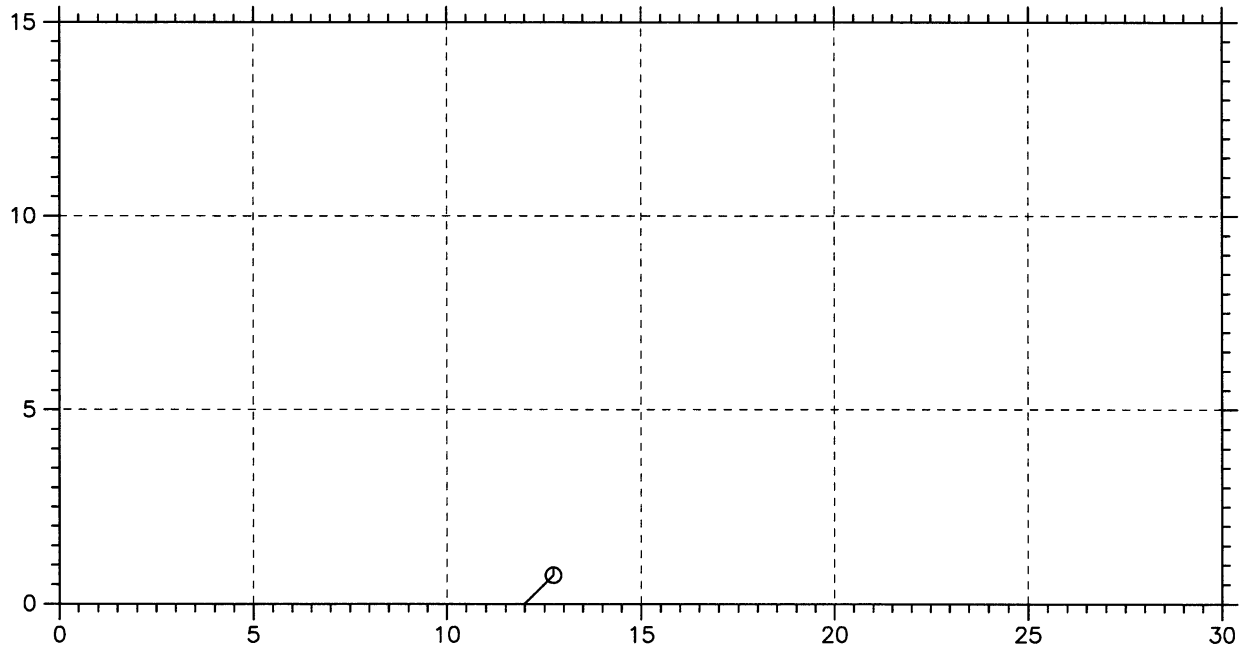
Description: Wet, olive brown sandy silty clay

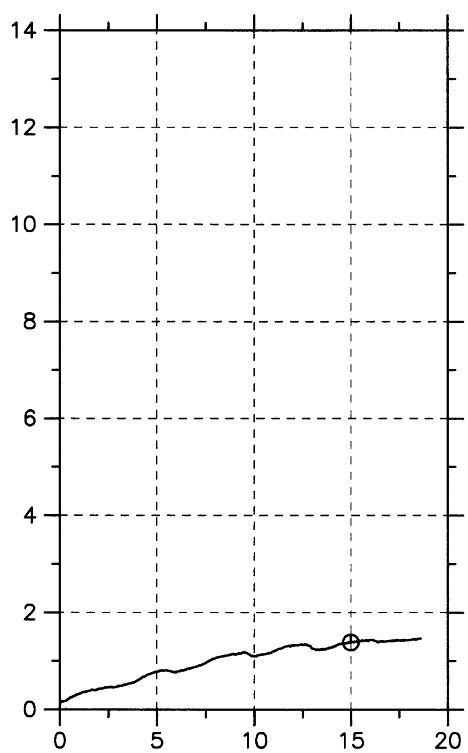
Remarks: System W

Phase calculations based on start and end of test.

Wed, 31-AUG-2011 06:50:43

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

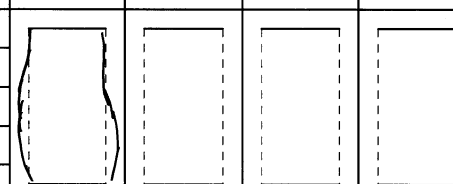




Symbol	⦶			
Sample No.	GEO-1			
Test No.	UU-1			
Depth	37-39 ft			
Tested by	md			
Test Date	08/18/11			
Checked by	jdt			
Check Date	08/31/11			
Diameter, in	2.88			
Height, in	5.8			
Water Content, %	41.9			
Dry Density, pcf	78.25			
Saturation, %	96.4			
Void Ratio	1.19			
Confining Stress, psi	12			
Undrained Strength, psi	0.694			
Max. Dev. Stress, psi	1.388			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Estimated Specific Gravity	2.75			
Liquid Limit	46			
Plastic Limit	31			
Plasticity Index	15			

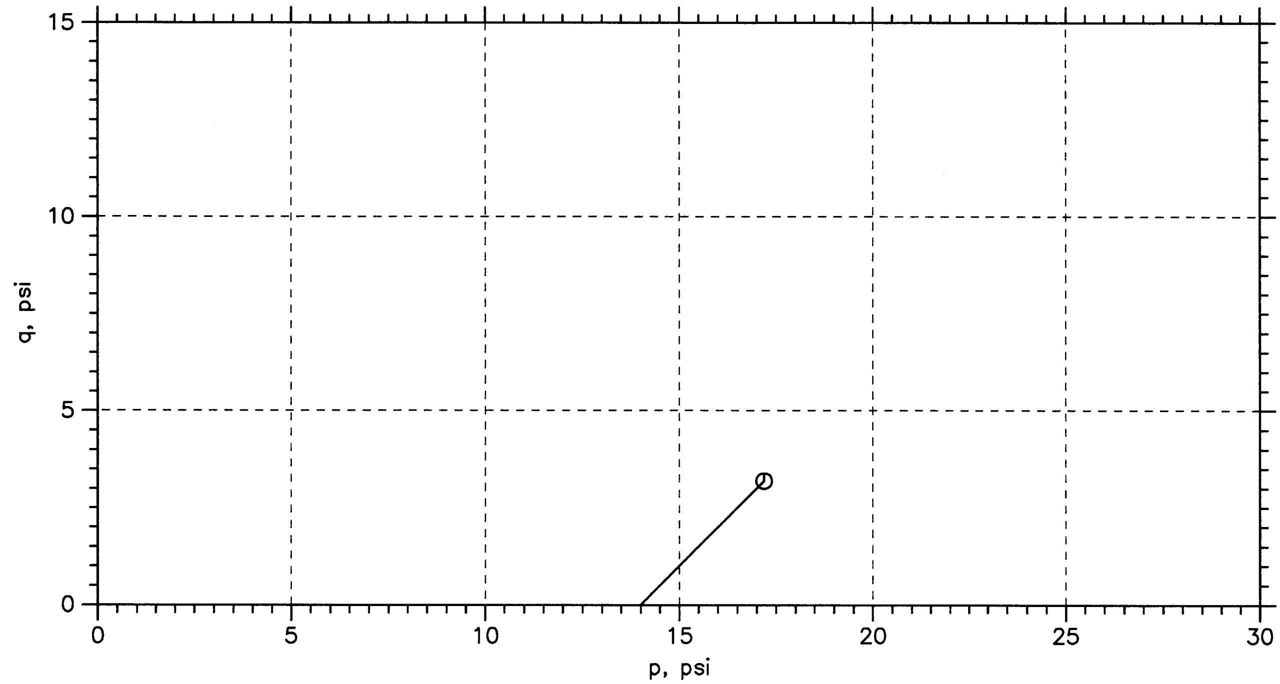
GeoTesting EXPRESS

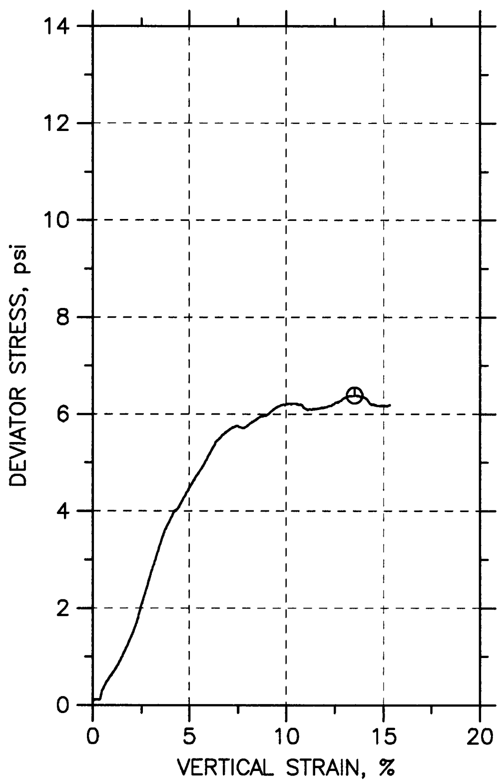
Project: NYSEG Ithaca
Location: Ithaca, NY
Project No.: GTX-11071
Boring No.: ---
Sample Type: tube
Description: Moist, olive brown silt
Remarks: System W
Phase calculations based on start and end of test.



Wed, 31-AUG-2011 06:46:22

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850





Symbol	⊙			
Sample No.	GEO-1			
Test No.	UU-2			
Depth	45-47 ft			
Tested by	md			
Test Date	08/18/11			
Checked by	jdt			
Check Date	08/31/11			
Diameter, in	2.87			
Height, in	6.09			
Water Content, %	43.9			
Dry Density, pcf	75.01			
Saturation, %	93.6			
Void Ratio	1.29			
Confining Stress, psi	14			
Undrained Strength, psi	3.195			
Max. Dev. Stress, psi	6.39			
Strain at Failure, %	13.5			
Strain Rate, %/min	1			
Estimated Specific Gravity	2.75			
Liquid Limit	55			
Plastic Limit	34			
Plasticity Index	21			

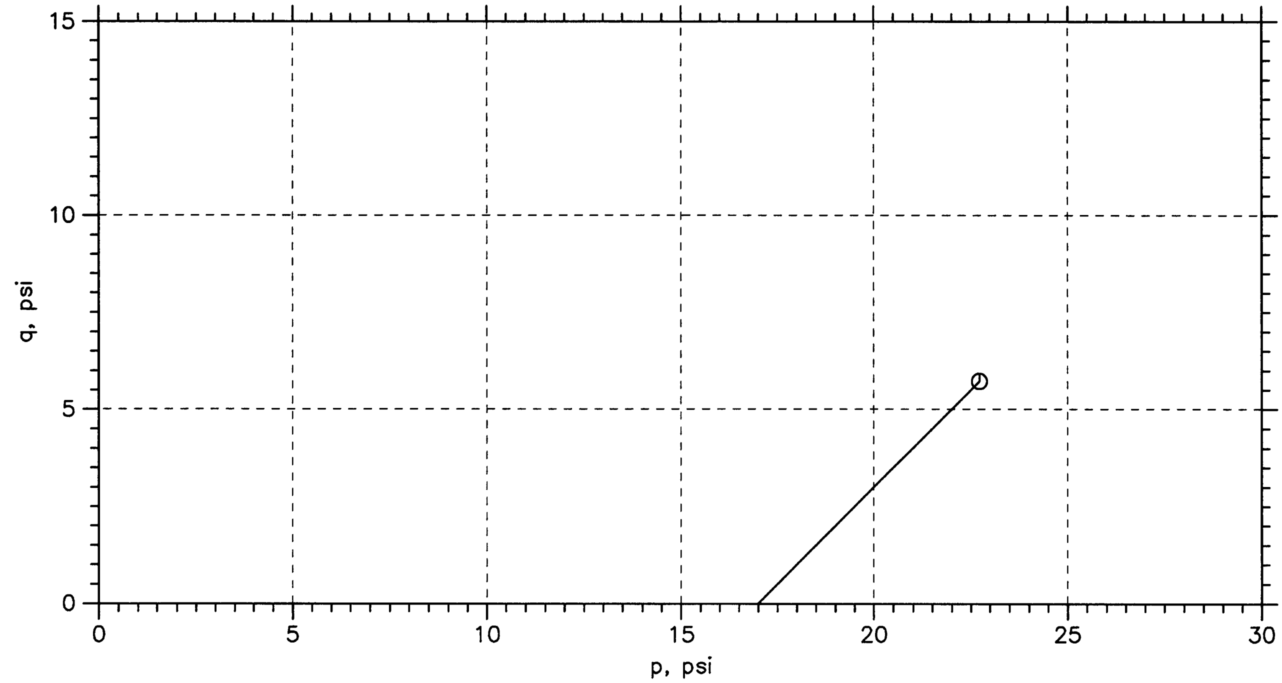
GeoTesting EXPRESS

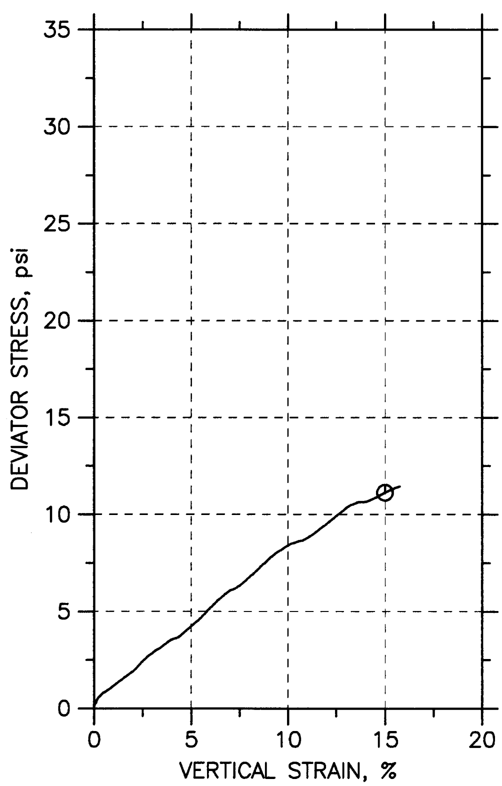
Project: NYSEG Ithaca	
Location: Ithaca, NY	
Project No.: GTX-11071	
Boring No.: ---	
Sample Type: tube	
Description: Moist, olive brown silt	
Remarks: System W	

Phase calculations based on start and end of test.

Wed, 31-AUG-2011 06:48:44

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D2850

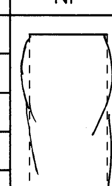




Symbol	⦶			
Sample No.	GEO-1			
Test No.	UU-4			
Depth	55-57 ft			
Tested by	md			
Test Date	08/18/11			
Checked by	jdt			
Check Date	08/31/11			
Diameter, in	2.87			
Height, in	6.08			
Water Content, %	31.0			
Dry Density, pcf	90.13			
Saturation, %	94.2			
Void Ratio	0.905			
Confining Stress, psi	17			
Undrained Strength, psi	5.57			
Max. Dev. Stress, psi	11.14			
Strain at Failure, %	15			
Strain Rate, %/min	1			
Estimated Specific Gravity	2.75			
Liquid Limit	NP			
Plastic Limit	NP			
Plasticity Index	NP			

GeoTesting EXPRESS

Project: NYSEG Ithaca	
Location: Ithaca, NY	
Project No.: GTX-11071	
Boring No.: ---	
Sample Type: tube	
Description: Moist, dark olive brown silt	
Remarks: System W	



Phase calculations based on start and end of test.

Wed, 31-AUG-2011 06:53:07

Appendix E

Community Air Monitoring Plan

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Community Air Monitoring Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Community Air Monitoring Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Prepared By Keith A. Stahle, Project Geologist

Reviewed By Scott Underhill, PE

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Attachment A Vapor suppression information

1.0 Introduction

This document presents the Community Air Monitoring Plan (CAMP) that will be implemented during remedial activities – excavation at Areas 1A and 1B and in-situ chemical oxidation (ISCO) at Area 1C – of the New York State Electric and Gas Corporation (NYSEG) former manufactured gas plant (MGP) site, located in the City of Ithaca, New York. The location and layout of the site is shown in Attachment 1 – Design Drawings.

Area 1 is located at the intersection of North Plain Street and Esty Street and is considered a part of Operable Unit 2 (OU-2) of the Ithaca former MGP site. Area 1 is located in a residential neighborhood and contains three subareas that are the focus of this CAMP. This CAMP presents methods and procedures that will be used to provide protection to potential receptors by assuring that the remediation work activities do not spread constituents off site through the air.

This CAMP specifically applies to the remedial activities to take place within Areas 1A, 1B, 1C and around SB-168 for the Ithaca MGP site as described in the document "*Remedial Design Report, Ithaca Court Street Former MGP Site, Operable Unit 2, Ithaca, New York".*

The remedial activities involve the re-location of utilities, installation of shoring and excavation of MGP impacted soils from Areas 1A and 1B, and well installation and associated treatment of Area 1C utilizing ISCO.

The objectives of this CAMP are to:

- Ensure that the airborne concentrations of constituents of concern (COC) are minimized to protect human health and the environment;
- Provide an early warning system so that potential emissions can be controlled on site at the source; and,
- Measure and document the concentrations of airborne COC to confirm compliance with regulatory limits.

The community air monitoring will be performed around the work zone perimeter, and will measure the concentrations of organic vapors and dust during all ground-intrusive activities (utility relocation, sheet pile installation, soil boring and/or well installation and soil excavation). It is anticipated that a modified CAMP (VOC monitoring only) will be performed in Area 1C during oxidant injection due to the potential for steam generation and VOC off-gassingReal time air quality will include upwind, down wind, and nearest receptor measurements.

This CAMP is a companion document to AECOM's site-specific Health and Safety Plan (HASP). The HASP is a separate document and is directed primarily toward protection of AECOM on-site workers within the designated work zones.

2.0 Constituents of concern and action levels

The Ithaca Court Street former MGP site is known to have coal tar impacts dating from the site's historical use as a MGP. As such, the COCs are volatile and semi-volatile organic compounds (VOCs and SVOCs). VOCs are more volatile than SVOCs and are generally of greater concern when monitoring the air quality during MGP remedial activities.

Total suspended particulates (airborne dust) are also a concern and must be monitored and controlled due to its ability to co-transport adsorbed constituents and because of its nuisance properties.

Odors, though not necessarily indicative of high constituent concentrations, could create a nuisance and will be monitored and controlled to the extent practicable.

State and federal regulatory agencies have provided action levels for many of these constituents. The action levels are the allowable airborne concentrations above which respiratory protection or other health and safety controls are required. For work at the Ithaca-Court Street former MGP site OU-2, the following levels should not be exceeded for more than 15 consecutive minutes at the downwind perimeter or nearest receptor of the site:

- Total VOCs 5.0 ppm
- Dust 0.15 milligrams per cubic meter (mg/m^3)

The action levels cited here are concentrations measured above (i.e., in addition to) the background ambient (upwind) concentration.

3.0 Air monitoring equipment and methods

Air quality monitoring will be performed for total VOCs,and dust as outlined below.

A minimum of three perimeter locations will be established each day and an air monitoring technician will check the instrumentation at each of these locations frequently during the completion of field activities. Typically, there will be monitoring locations at the upwind and downwind perimeter locations along with at least one perimeter station at the nearest receptor. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. Field personnel will be prepared to monitor multiple locations in the event that there is little wind or if the wind direction changes frequently. If ground-intrusive activities are being conducted in multiple areas (Areas 1A, 1B, and 1C) of the site on the same day, separate perimeter locations and monitoring will be established for each area.

The monitoring instruments will be calibrated at the start of each workday, and again during the day if the performance of an instrument is in question.

3.1 Volatile Organic Compounds

3.1.1 Ambient air monitoring

Real-time VOC monitoring will be performed using a photo- ionization detector (PID). The equipment will be calibrated each day to a 100 ppm isobutylene air standard. The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements recorded. The PIDs will be equipped with an audible alarm to indicate an exceedance of the action level.

The equipment used will be capable of calculating 15-minute running average concentrations as necessary. If requested by the New York State Department of Environmental Conservation (NYSDEC) on-site, 15-minute running average concentrations may be calculated, which can then be compared to the action levels.

Real-time monitoring will be initiated one day prior to any intrusive work. Prior to the start of each work day, and immediately following any change in wind schedule, up wind measurements will be taken. Baseline emissions due to natural and anthropogenic sources will be established from these measurements. In order to compensate for the existing ambient conditions, the baseline value will be added to the air monitoring limits.

3.2 Total Suspended Particulate (dust) monitoring)

Total suspended particulate (dust) monitoring will be performed during intrusive activities at the site. Particulate monitors (TSI DustTrak$^{(TM)}$ or equivalent) will be used at the site perimeter (upwind, downwind and at least one for the closest receptor) for continuous real-time dust monitoring. The monitors will respond to particles in the size range of 0.1 to 10 micrometers within a concentration range of 0.01 to 400 mg/m^3. The monitoring instruments will be checked by a technician every 15 minutes, and the real-time measurements recorded. The equipment used will be capable of calculating 15-minute running average concentrations which may be compared to the action levels. The data will be downloaded at the end of each day, and monitoring records will be kept at the site during the work in case there is an inquiry or complaint.

In addition, fugitive dust migration will be visually assessed during all work activities, and the observations recorded. Dust suppression techniques will be implemented throughout project activities as further discussed in Section 4.

4.0 Emission control plan

4.1 Ambient air

Odor, vapor, and dust control will be required for this project due to the close proximity to residential buildings, public roadways, and sidewalks. The attached Table 1 provides a response chart for the monitoring and control of vapor emissions. Table 2 provides a list of emergency contacts.

- If ambient air concentration of total VOC levels at the downwind perimeter of the work area or exclusion zone exceeds 5.0 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor levels readily decreases (per instantaneous readings) below 5.0 ppm over background, work activities can resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5.0 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions until the concentrations drop below the action levels, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5.0 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

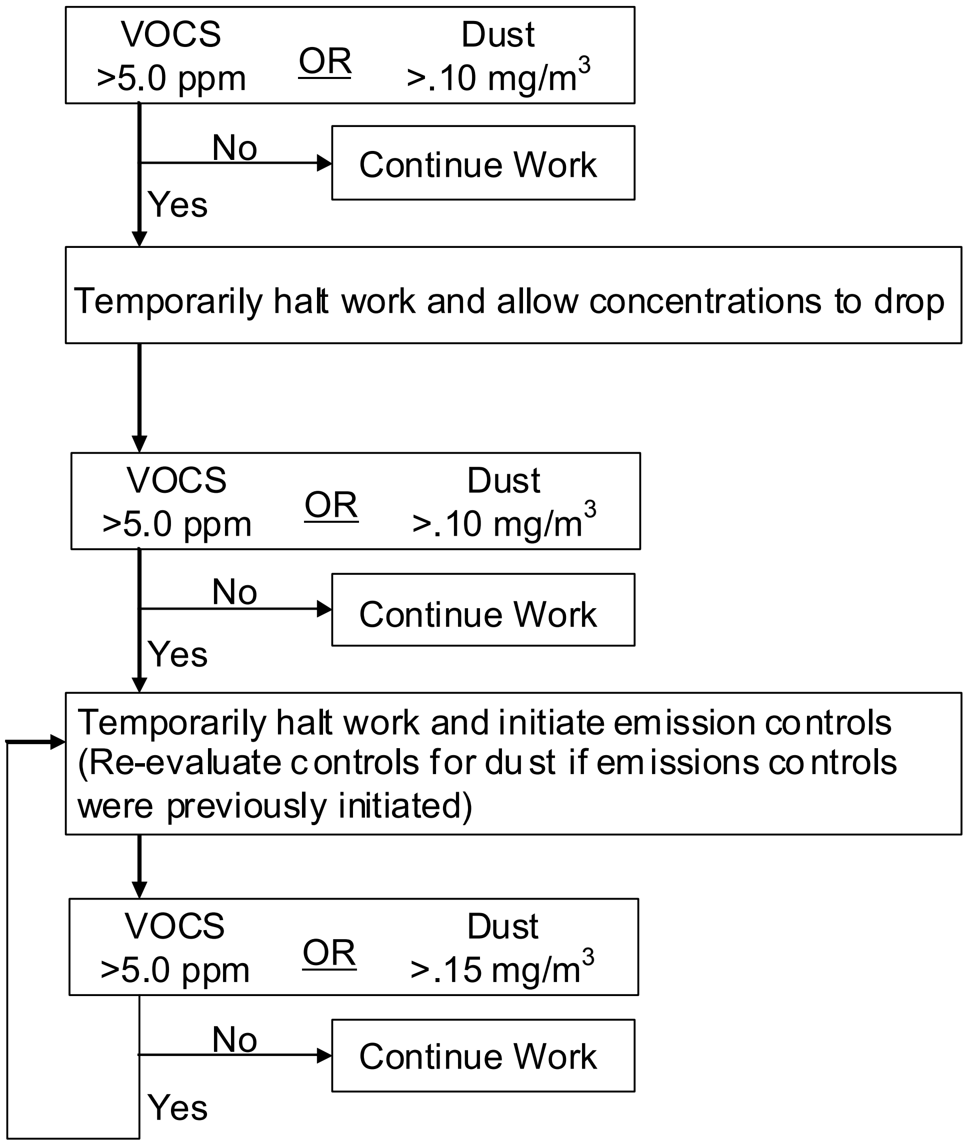
Site perimeter dust concentrations will also be monitored continuously. In addition, dust migration will be visually assessed during all work activities.

- If the downwind dust level is 0.10 mg/m^3 greater than the background (upwind perimeter) level for a 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind dust levels do not exceed 0.15 mg/m^3 above the background (upwind perimeter) 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 0.15 mg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind particulate concentration to within 0.15 mg/m^3 of the upwind level and in preventing visible dust migration.

Typical emission control measures may include:

- Apply water for dust suppression;
- Relocate operations, if applicable; and
- Reassess the existing control measures.

Table 1 Vapor emission response chart



Notes:
ppm – parts per million
mg/m^3 – milligrams per cubic meter
VOCs – volatile organic compounds
Please note all limits should take into account background concentrations

Table 2 Emergency contacts and telephone numbers

Fire:	911	
Police:	911	
Ambulance:	911	
Engineer:	To Be Determined	
NYSEG Contact	Tracy Blazicek	(607) 237-5325 (cellular)

5.0 Odor control procedures

This section outlines the procedures to be used to control odors that may be generated during the remedial field activities. The remediation program will include a number of activities that may generate odors: utility re-location, sheet pile installation, excavation and pressurized injections. The remainder of this section is intended to provide site managers, representatives of NYSDEC and NYSDOH, and the public with information summarizing typical odor control options, and to provide some guidance for their implementation. A description of potential sources of odors and methods to be used for odor control is presented in the following sections.

5.1 Potential sources of odors

Generally, the residuals encountered at former MGP sites are well defined. They are related to residual coal tar-like materials and petroleum, and principally contain VOCs, polycyclic aromatic hydrocarbons (PAHs), and a number of inorganic constituents, including metal-complexed cyanide compounds, and metals. Constituents of MGP tar or petroleum products can produce odor emissions during intrusive activities when they are unearthed during the relocation of utilities and excavation of impacted soils. When this occurs, VOCs and light-end SVOCs can volatilize into the ambient air. Some MGP residuals can cause distinctive odors that are similar to mothballs, roofing tar, or asphalt driveway sealer. However, the constituent concentrations generally associated with these odors are typically less than levels that might pose a potential health risk. It is important to note that the CAMP will provide for continual monitoring of VOCs and dust (intrusive activities only) during the fieldwork to monitor for any potential release of constituents which may pose a threat to health.

5.2 Odor monitoring

The field investigation personnel will record observations of odors generated during the implementation of the work. When odors attributable to the uncovering of impacted media are generated in the work area during intrusive activities such as relocation of utilities and excavation of impacted soils, observations will also be made at the downwind limit and nearest receptor location of the work area in order to assess the potential for off-site odors. The odor monitoring will be performed in conjunction with the PID and dust monitoring program described in this CAMP.

Upon detection of odors at the work zone perimeter, site controls, starting in the work area, will be implemented. The site controls described in the following sections will be used to assist with odor mitigation. Note that the goal of the odor mitigation is to minimize and to prevent, where practicable, the off-site migration of odors. Due to the short distances between any work area and off-site receptors, site controls will be implemented proactively when odors are detected in the breathing zone at any work area.

5.3 General site controls

Several general excavation or intrusive procedure site controls that will be implemented include:

- Every effort will be made to minimize the amount of time that impacted material is exposed to ambient air at the site.
- For the excavation within Areas 1A and 1B, soil with visible MGP impacts will primarily be direct loaded and transported off-site for proper disposal.
- Drill cuttings generated from the soil borings in Area 1C to install injection, vent and monitoring wells, will be containerized as soon as possible during completion of each soil boring.

- Loading of excavated debris or soil that has been found by the site manager to be unsuitable material to reuse on-site as backfill may generate odors. Every effort will be made to complete this work as quickly as possible and to keep these materials covered at all times.
- Meteorological conditions are also a factor in the generation and migration of odors. Some site activities may be limited to times when specific meteorological conditions prevail, such as when winds are blowing away from a specific receptor.

5.4 Secondary site controls

If substantial odors still present an issue following implementation of the above procedures, secondary controls will be enacted. The site manager will work through the applicable list of secondary controls until the perimeter odor issues are resolved. The site manager will work closely with NYSEG and NYSDEC during this task. Final selection of controls will be dependent on field conditions encountered. Secondary controls include the following:

- For stockpiled impacted soil, temporary tarps or polyethylene covers will be used to control odors.
- Two agents that can be sprayed over impacted soil have been determined to be effective in controlling emissions. They include odor suppressant solution (BioSolve™), and Rusmar foam. These agents may be used where tarps cannot be effectively deployed over the source material, or where tarps are ineffective in controlling odors:
  - BioSolve™ can provide immediate, localized control of odor emissions. Information regarding the preparation and use of BioSolve™ is provided in Attachment A.
  - Rusmar foam - Although it is unlikely that it will be necessary, Rusmar foam may be used to cover inactive sources for extended periods of time (up to several days). Rusmar foam creates a uniform, flexible, and impenetrable mechanical barrier that may be utilized to contain odors, volatile organic compounds (VOCs), and dust.
- A temporary structure may be placed over the excavation area and an air handling system with off-gas controls will be used to keep the structure under negative pressure and discharge treated vapors.

5.5 Record keeping and communication

Similar to readings recorded during the monitoring specified in the CAMP, all odor monitoring results will be recorded in the field log book or other air monitoring forms, and be available for review by the agencies.

The site supervisor will also provide information on odor monitoring and odor management to residents of the neighborhood should they inquire. In the event that odors persist after these efforts, work will be temporarily discontinued until a mutually agreeable solution with NYSEG, NYSDEC, and NYSDOH staff can be worked out which allows the work to be completed while minimizing the off-site transport of nuisance odors.

6.0 Documentation and reporting

Data generated during perimeter air monitoring will be recorded in field logs and summarized daily in spreadsheets. The electronic measurements from the PIDs and dust meters will be downloaded each day, reviewed, and archived and summarized in a daily community air-monitoring report. Exceedances of the action levels, if any, and the actions to be taken to mitigate the situations, will be discussed immediately with the on-site representatives and carefully documented. The daily community air-monitoring report will be submitted at the end of each week in an electronic format to Mr. Svante L. Myrick, City of Ithaca Mayor at asherman@cityofithaca.org (Annie Sherman – Executive Assistant to the Mayor), Mr. Justin Deming, NYSDOH at jhd01@health.state.ny.us, Ms. Elizabeth B. Lukowski, NYSDEC at eblukows@gw.dec.state.ny.us, and Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

Attachment A

Vapor suppression information

VAPOR SUPPRESSION / ODOR CONTROL

BioSolve® offers a relatively simple and cost effective method of suppressing Odors and VOC release from soils, during excavation, loading, stockpiling, etc. The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% BSW solution (1 part **BioSolve®** concentrate to 33 parts water) will be adequate to keep vapor emissions within acceptable limits and control fugitive odor problems on contact. Although, some sites may only require a 2% solution, up to a 6% solution may be recommended on sites with elevated levels or particularly difficult/ mixed stream contaminants are present.

The **BioSolve®** solution should be applied evenly to the soil surface in sufficient quantity to saturate the surface area. As a general rule, use 1-3 litres of **BioSolve®** solution to 1 square metre of surface area. (1 gallon of **BioSolve®** per solution will cover approximately 4-sq. yd. of soil surface area) **BioSolve®** is a water-based surfactant that will apply like water.

BioSolve®, in its concentrated form, is a viscous liquid material that must be diluted with water. A fluorescent red tracing dye is present in the formula allowing **BioSolve®** to be detected during application. Once diluted, **BioSolve®** can be applied with virtually any equipment that can spray water. **BioSolve®** will not harm equipment or clog pipes. For large sites, applicators such as water truck, portable agricultural sprayers, foam inductors & pressure sprayers can be used. For smaller jobs, garden sprayers, water extinguishers or a garden hose with a fertiliser attachment on the nozzle can be used effectively. This characteristic makes **BioSolve®** very adaptable and much most convenient to use in almost any situation. **BioSolve®** is equally effective when used with all types of water (soft, hard, salt or potable).

On stockpiled soil or other soil that will be left undisturbed, a single application of **BioSolve®** to the exposed surfaces may last up to 10 to 14 days or more (depending on environmental conditions). **BioSolve®,** when applied, will form a "cap" of clean soil. If the soil is not disturbed, via weather, movement, etc. this "cap" will remain functional. During excavation, loading or other movement of the soil, it may be required to spray an additional amount of **BioSolve®** to the freshly exposed surface area to keep emissions at an acceptable level.

In case of an extremely high level of emissions, or if the soil is heavily contaminated, it may be necessary to increase the strength of the **BioSolve®** solution or apply more solution per square metre to reduce emissions adequately. It is important that the site be monitored regularly and that the **BioSolve®** solution be reapplied if and when necessary to insure that VOC emissions and odors remain under control.

BioSolve® is packaged and readily available in 55 gallon (208 liter) drums, 5 gallon (19 liter) pails and in 4X1 gallon (3.8 liter X 4) cases. Contact The Westford Chemical Corporation® Toll Free @ 1-800-225-3909, via e-mail at info@biosolve.com or your Local BioSolve distributor for pricing.

BioSolve® should only be used in accordance with all regulatory rules and regulations.

SOIL VAPOR SUPPRESSION UTILIZING BIOSOLVE

BioSolve is being utilized by numerous environmental consultants, response contractors, and fire departments to suppress VOC's & LEL's as well as problem odors. BioSolve encapsulates the source of the vapor rather than temporarily blanketing it like a foam or other physical barrier. Vapor reduction is so fast and effective that BioSolve is used to comply with the tough emission standards regulated by each State.

BioSolve offers a relatively simple and cost effective method of suppressing VOC vapor release from soils during excavation, loading, stockpiling… The following guidelines will apply to the most common situations encountered on site.

In most cases a 3% solution of BioSolve will be adequate to keep vapor emissions within acceptable limits. Dilute BioSolve concentrate with water at a ratio of 1 part BioSolve to 33 parts water to make a 3% solution.

The BioSolve solution should be applied evenly to the soil surface in sufficient quantity to dampen the surface well, (as a general rule, 1 gallon of BioSolve solution will cover approximately 4 sq. yd. of soil surface area). BioSolve is not a foam, it is a surfactant based product that will apply like water. The solution may be applied with a hand sprayer, high pressure power sprayer, water truck, etc., whichever method best suits the site and/or conditions.

NOTE: In the case of extremely high emission levels and/or very porous soil it may be necessary to increase the strength of the BioSolve solution (6%) or apply more per sq. yd. to reduce emissions adequately. On stockpiled soil or other soil that will be undisturbed, a single application of BioSolve to the exposed surfaces may last 10-14 days or more. During excavation, loading, or other movement of soil it may be necessary or required to spray each freshly exposed surface to keep emissions below acceptable levels.It is important that the site be monitored regularly and the BioSolve solution be reapplied if/when necessary to insure that vapor emissions remain at or below acceptable standards.

MATERIAL SAFETY DATA SHEET

THE WESTFORD CHEMICAL CORPORATION®
P.O. Box 798
Westford, Massachusetts 01886 USA

Ref. No.: 2001
Date: 1/1/2002

Phone: (978) 392-0689
Phone: (508) 878-5895
Emergency Phone-24 Hours: 1-800-225-3909
Fax: (978) 692-3487
Web Site: http://www.BioSolve.com
E-Mail: info@BioSolve.com

SECTION I - IDENTITY

Name:	**BioSolve®**
CAS #:	138757-63-8
Formula:	Proprietary
Chemical Family:	Water Based, Biodegradable, Wetting Agents & Surfactants
HMIS Code:	Health 1, Fire 0, Reactivity 0
HMIS Key:	4 = Extreme, 3 = High, 2 = Moderate, 1 = Slight, 0 = Insignificant

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SECTION II - HAZARDOUS INGREDIENTS

Massachusetts Right to Know Law or 29 C.F.R. (Code of Federal Regulations) 1910.1000 require listing of hazardous ingredients.

This product does not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California's Prop. 65.

SECTION III - PHYSICAL - CHEMICAL CHARACTERISTICS

Boiling Point	: 265°F	Specific Gravity	: 1.00 +/-.01
Melting Point	: 32°F	Vapor Pressure mm/Hg	: Not Applicable
Surface Tension- 6% Solution	: 29.1 Dyne/cm at 25°C	Vapor Density Air = 1	: Not Applicable
Reactivity with Water	: No	Viscosity - Concentrate	: 490 Centipoise
Evaporation Rate	: >1 as compared to Water	Viscosity - 6% Solution	: 15 Centipoise
Appearance	: Clear Liquid unless Dyed	Solubility in Water	: Complete
Odor	: Pleasant Fragrance	pH	: 9.1+/-.3
Pounds per Gallon	: 8.38		

SECTION IV - FIRE AND EXPLOSION DATA

Special Fire Fighting Procedures	: None	Flammable Limit	: None
Unusual Fire and Explosion Hazards	: None	Auto Ignite Temperature	: None
Solvent for Clean-Up	: Water	Fire Extinguisher Media	: Not Applicable
Flash Point	: None		

SECTION V - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be taken in Handling and Storage: Use good normal hygiene.
Precautions to be taken in case of Spill or Leak -

Small spills, in an undiluted form, contain. Soak up with absorbent materials.
Large spills, in an undiluted form, dike and contain. Remove with vacuum truck or pump to storage/salvage vessel. Soak up residue with absorbent materials.

Waste Disposal Procedures -

Dispose in an approved disposal area or in a manner which complies with all local, state, and federal regulations.

SECTION VI - HEALTH HAZARDS

Threshold Limit Values: Not applicable
Signs and Symptoms of Over Exposure-

Acute : Moderate eye irritation. Skin: Causes redness, edema, drying of skin.
Chronic: Pre-existing skin and eye disorders may be aggravated by contact with this product.

Medical Conditions Generally Aggravated by Exposure: Unknown
Carcinogen: No
Emergency First Aid Procedures -

Eyes: Flush thoroughly with water for 15 minutes. Get medical attention.
Skin: Remove contaminated clothing. Wash exposed areas with soap and water. Wash clothing before reuse. Get medical attention if irritation develops.
Ingestion: Get medical attention.
Inhalation: None considered necessary.

SECTION VII - SPECIAL PROTECTION INFORMATION

Respiratory Protection	: Not necessary	Local Exhaust Required	: No
Ventilation Required	: Normal	Protective Clothing	: Gloves, safety glasses Wash clothing before reuse.

SECTION VIII - PHYSICAL HAZARDS

Stability	: Stable	Incompatible Substances	: None Known
Polymerization	: No	Hazardous Decomposition Products	: None Known

---

SECTION IX - TRANSPORT & STORAGE

DOT Class	: Not Regulated/Non Hazardous		
Freeze Temperature	: 28°F	Storage	: 35°F-120°F
Freeze Harm	: None (thaw & stir)	Shelf Life	: Unlimited Unopened

---

SECTION X - REGULATORY INFORMATION

The Information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application, which is not described on the Product label or in this Material Safety Data Sheet, is the sole responsibility of the user. This Material Safety Data Sheet was prepared to comply with the OSHA Hazardous Communication Regulation and Massachusetts Right to Know Law.

Appendix F

Construction Contingency Plan

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Construction Contingency Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Environment

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Binghamton, NY

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Latham, NY 12110

April 2012

Construction Contingency Plan
100% Submittal
Ithaca Court Street Former MGP Site
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Ithaca, New York
NYSDEC Site # 7-55-008

Patrick Gratton

Prepared By Patrick Gratton

Scott Underhill

Reviewed By Scott Underhill, PE

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1.0 Introduction

This construction contingency plan (CCP) has been developed for personnel to follow during the performance of the remediation project at the NYSEG Ithaca Court Street Site, in the Ithaca, Tompkins County, New York. The focus of the work is to remove impacted soil from Areas 1A and 1B and to conduct in-situ chemical oxidation (ISCO) in Area 1C and IW-43. The project will consist of mobilization, temporary sheetpiling installation, temporary water treatment installation, utility relocation, excavation of contaminated soils, injection of ISCO amendment(s), material handling, staging, loading, restoration, along with equipment decontamination and demobilization. Soils contain contaminants that may be characterized as non-RCRA and RCRA hazardous waste. This CCP provides procedures and guidelines that will be implemented in the event of a spill, release, fire, explosion, or other emergency. The CCP includes information necessary to prevent or minimize hazards to human health and the environment.

This CCP was prepared in accordance with United State Environmental Protection Agency (USEPA) and Occupational Health and Safety Administration (OSHA) guidance documents. This CCP supplements the Health and Safety Plan (HASP) that will be prepared for the stated field activities. Reasonable precautions will be taken by the Contractor and its subcontractors to prevent an emergency situation. However, in the event that an emergency occurs, this CCP will be carried out immediately and will govern the procedures to be followed. Subcontractors will be provided with copies of this CCP and will be required to follow the CCP.

2.0 Known Contaminants of Concern

Based on previous site activities and the site history, the contaminants of concern are MGP related chemicals anticipated to be encountered. These include volatile organic compounds and semi-volatile organic compounds (polycyclic aromatic hydrocarbons).

3.0 Planned Field Activities

The planned field activities include the following:

- Site preparation (installation of support facilities).
- Temporary Sheetpiling Installation.
- Construction of decontamination pad.
- Temporary Water Treatment System.
- Construction of staging areas.
- Utility Relocation.
- Construction of Emergency Access.
- Excavation of soils.
- Injection of chemical oxidation amendment(s).
- Material Handling and dewatering activities.
- Water disposal.

- Loading of soils.
- Equipment Decontamination.
- Demobilization.

4.0 Responsibilities and Designation of Emergency Coordinator

The emergency coordinator (EC) or his alternate is responsible for implementing this CCP during an emergency. The EC will also act as the site health safety officer (HSO) to maintain continuity in the lines of authority during an emergency. The site HSO/EC reports to the project superintendent, who reports to the project manager on a daily basis. An alternative EC, who will act in the absence of the project HSO/EC, will be designated in case of the primary EC absence. All site employees must be familiar with the procedures in this plan and are responsible for implementing the plan should the EC or the alternate be unavailable.

At the beginning of the site activities, the EC/HSO will designate one or more employees of the project team in conjunction with any subcontractor, to serve as part of a rescue team. At a minimum, the rescue team will consist of two persons. The rescue team will communicate with the project manager on a daily basis.

The rescue team will respond to emergencies, as needed, and will be under the direction of the EC/HSO. The members of the team must be certified in cardiopulmonary resuscitation (CPR) and emergency first aid.

A list of off-site emergency personnel is provided at the back of this plan. The EC/HSO will either notify off-site personnel or designate someone to do so. The first responders consist of police, fire, ambulance, and possibly the New York State Department of Environmental Conservation (NYSDEC). They will be alerted as to the type of emergencies that may arise and the types of hazards at the site.

5.0 Communications

Communications will be by voice where possible. As a backup, visual signals will be used. Hand signals will be as follows:

Hand gripping throat:	**Can't breathe.**
Grip partner's wrist or place hands around waist:	**Leave work area immediately.**
Hand on top of head:	**Need assistance.**
Thumbs up:	**OK. I'm all right.**
Thumbs down:	**No. Negative.**

Alternatively, hand-held radios may be used, if they are available and are intrinsically safe. In an emergency, and if necessary, a compressed air horn will be used to notify all workers that an emergency situation exists. The signals shall be as follows:

One long blast:	**Evacuate the area by nearest exit.**
Two short blasts:	**Evacuate by normal exit procedures.**

The EC/HSO will notify emergency personnel or designate an alternate to do so. A portable telephone will be used for this purpose. The portable telephone will be located in the clean zone. As a backup, telephones are located in the temporary office facility located within the project staging / support area. Emergency telephone numbers are included at the back of this plan.

6.0 Evacuation

In the event that the air horn is sounded, employees will evacuate the area. Emergency evacuation routes will be designated at the site, prior to initiating field activities. As field activities progress, it will be necessary to modify the evacuation routes, in accordance with site conditions and layout. Evacuation routes must be clear of obstructions. Evacuation routes will be from the work area to a designated meeting location at the project staging / support area, depending on the location of the site activities at the time of the emergency. Evacuation maps will be drawn on site layout maps to outline evacuation routes. These maps will be discussed with site personnel to familiarize them with site conditions.

7.0 Safe Distances and Refuge

The following minimum safe distances have been established. Depending upon the nature of the incident, the EC may increase these distances. Arrangements will be made with the local police department to evacuate nearby neighbors. Any decisions on the need for and distances of evacuation will be made in conjunction with the fire and police department and the NYSDEC:

Minor Spills:	**Not established**
Major Spills:	**Evacuate non-essential personnel to clean zone or 1,000 feet, whichever is greater.**
Minor Fire:	**Evacuate non-essential personnel to clean zone.**
Fire involving a container:	**Evacuate all personnel 1/2 mile in all directions**
Explosion:	**Evacuate all personnel 1/2 mile in all directions.**

8.0 Emergency Response Procedures

In the event of any releases of materials the CCP shall be immediately activated. The equipment to respond to an emergency will be on-site and activated already. There are additional measures to be taken in the event of an emergency. Emergency equipment that will be present is described in the sections that follow. In addition to this CCP, all responses to releases are subject to controls designated in the site HASP.

9.0 Minor Spills During Drum Handling and Removal

For purposes of the CCP, minor spills would be those that consist of 1 gallon or less. Minor spills will be remediated by removing spill debris with any underlying or surrounding contaminated soil. The spilled material will be handled as hazardous waste. If leaking, the container will be placed in an overpack drum. Additional emergency measures would not be implemented, unless needed. The Contractor will have empty drums, speedi-dri, miscellaneous hand tools, fire extinguishers absorbent pads and booms to deal with minor spills that may occur on-site.

10.0 Minor Spills in the Drum Staging or Storage Areas

Minor spills onto soil will be cleaned up as discussed above. Minor spills that occur in other areas will need to be collected using absorbent material such as absorbent pads and/or speedi-dri.

11.0 Major Spills

For purposes of this CCP, a major spill is defined as those that involve greater than 1 gallon of material. In the event of a major spill, communication and notification procedures will be implemented. The response will depend on the nature of the release. Attempts will be made to control the release by diking and draining the area. Absorbent pads, Oil Dry, or soil will be used to absorb the release. The removed material will be placed into appropriate drums and sealed to prevent hazards. Employees should note that absorbents solidify the liquid, but do not remove the fire or exposure hazards. Solvents will volatilize from the absorbent and can ignite. Therefore, a fire extinguisher will be brought to the area of the release by the emergency response team, until the material is secured inside a drum. In the event that the release is of sufficient magnitude and can not be controlled by diking, damming, absorbing, or other method, the local fire department, NYSDEC, and National Response Center shall be notified.

The local responders will be notified through 911. The Ithaca Fire Department will be the first responders. The Ithaca Fire Department has a Hazardous Materials Team and has capabilities of performing Level A, Level B, and Level C response actions. The Ithaca Fire Department will control and mitigate the spill, but the contractor will have the ultimate responsibility for cleaning up the area. If the incident requires Haz Mat response, 911 should be called and the appropriate emergency response personnel will be contacted.

12.0 Confined Space Emergencies

Any confined space entries will follow applicable OSHA regulations. Any personnel performing a confined space entry will be appropriately trained and certified for this activity. Each employee entering a confined space will wear a safety harness equipped with a lifeline for evacuation purposes in the case of an emergency, unless the lifeline creates more of a hazard for the individual in the space. Emergency equipment such as lifelines, breathing equipment, fire extinguishers and harnesses will be ready for immediate response in case an emergency situation arises.

13.0 Fire

A fire extinguisher will be used on minor fires where a container is not involved. If the fire can not be extinguished immediately or a container is involved, the area must be evacuated immediately and the fire department notified from a safe location. Extinguishing methods include CO2 or a dry chemical. A water spray can also be used (not a direct hose stream). Foam, water spray, or fog can be used on larger spills.

14.0 Explosion

In the event of an explosion, the area shall immediately be evacuated and the fire department notified. The cause of the explosion should be assessed and corrected prior to reentry.

15.0 Medical

Medical emergencies are addressed in the HASP. Appropriate first aid will be administered, and if necessary, the injured individual will be sent to the designated medical facility. An ambulance will be summoned, if needed. The cause of the accident will be determined and corrected, prior to continuing operations. A first aid kit will be maintained in the office trailer at all times.

When possible, injured personnel will be decontaminated or partially decontaminated in accordance with HASP. Based upon the anticipated toxicity of the contaminants, personnel decontamination procedures may be eliminated in a life-threatening situation. Emergency medical personnel will be notified as to the lack of decontamination. Emergency medical personnel will wash with soap and potable water after handling the victim. Appropriate documentation should be completed in accordance with the HASP.

16.0 Training

All employees working on-site will attend an initial 40 hour health and safety training course, annual 8-hour refresher training, and 8-hour training for managers for conducting work at hazardous waste sites. These courses satisfy the initial and follow-up training requirements of 29 CFR 1910.120 (OSHA regulation of hazardous waste site activities). Individuals working in confined spaces are all confined space entry trained with rescue and recovery training

Prior to initiating site work, site personnel will be required to attend a training session given by the EC/HSO. This session will include, but is not limited to, the following topics:

- Site history
- Specific hazards
- Hazard recognition
- Standard operation procedures
- Decontamination (personnel and equipment)
- Emergency procedures

17.0 Severe Weather Conditions

When a hurricane, flood, freeze-up or other severe weather-related threat is detected, all site personnel will immediately be notified. Each Severe Weather Alert will require last-minute preventative measures to minimize potential damage to facilities and equipment. For example, steps such as checking drains, removing electrical material from open yards, protecting soil piles and excavations and managing sheet flow of water will have to be evaluated depending on weather conditions.

18.0 Emergency Telephone Numbers

Emergency telephone numbers and directions to the nearest medical facility are shown below and will be kept by field personnel while on-site. These telephone numbers should be posted next to the closest telephone.

Name	**Telephone Number**
NYSEG Site	TBD
Ithaca Fire Department	911
Ambulance	911
Police Departments	911 (607) 272-3245
Tompkins County Sheriff	911 (607) 272-2444
Cayuga Medical Center 101 Dates Drive Ithaca, NY 14850	(607) 274-4011
National Response Center	(800) 424-8802
New York Department of Environmental Conservation	(800) 457-7362
Chemtrec (Emergency Technical Information)	(800) 424-9300

mapquest

Trip to:

101 Dates Dr

Ithaca, NY 14850-1342

2.99 miles / 7 minutes

Notes

You can type personal notes here to include on your printed page.

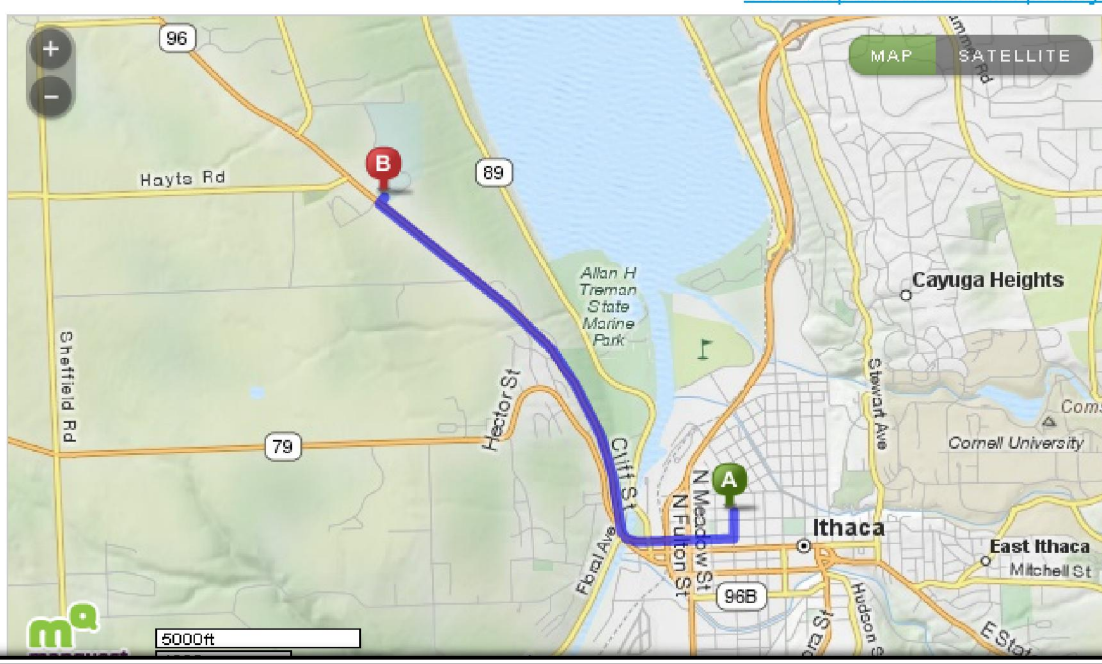
420 N Plain St, Ithaca, NY 14850-4055

1. Start out going **south** on **N Plain St** toward **W Court St**. Map	**0.1 Mi** *0.1 Mi Total*	
2. Take the 2nd **right** onto **W Buffalo St**. Map	**0.6 Mi** *0.7 Mi Total*	
96 3. **W Buffalo St** becomes **RT-96**. Map	**2.2 Mi** *2.9 Mi Total*	
4. Turn **right** onto **Harris B Dates Dr**. Map	**0.05 Mi** *3.0 Mi Total*	
5. Take the 1st **left** to stay on **Harris B Dates Dr**. Map	**0.01 Mi** *3.0 Mi Total*	
6. **101 DATES DR** is on the **right**. Map		

101 Dates Dr, Ithaca, NY 14850-1342

Total Travel Estimate: **2.99 miles - about 7 minutes**

Is the map not visible or not printing?



Appendix G

Construction Quality Assurance Plan

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Construction Quality Assurance Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Construction Quality Assurance Plan 100% Submittal Ithaca Court Street Former MGP Site OU-2 Ithaca, New York NYSDEC Site # 7-55-008

Patrick Gratton

Prepared By Patrick Gratton

Scott Underhill

Reviewed By Scott Underhill, PE

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1.0 Introduction

This *Construction Quality Assurance Plan (CQAP)* is designed to assure the quality of the project by monitoring, inspecting, and testing the processes and materials associated with the remediation to be completed at New York State Electric and Gas Corporation's (NYSEG's) Ithaca Court Street OU-2 manufactured gas plan (MGP) site, City of Ithaca, Tompkins County, New York. This Construction Quality Assurance Plan supplements the Remedial Design.

1.1 Construction Quality Assurance Plan Objectives

The objective of this *CQAP* is to identify and standardize measures to provide confidence that activities in all phases of the project will be completed in accordance with the *Remedial Action Design*, applicable local, state and federal regulations and appropriate industry standards. The *CQAP* will be implemented through inspection, sampling, testing, review of services, workmanship, and materials. Specific objectives of this plan establish protocols and procedures for the following components:

1. Responsibility and Authority - The responsibility and authority of the key personnel involved in the completion of the project.
2. Inspection and Testing Activities - Establish the observations and implement inspections and tests that will be used to ensure that the construction activities for the project meet or exceed all design criteria, (i.e., Remedial Design, and local, state and federal regulations).
3. Sampling Strategies - Establish responsibility for sampling activities and methods including frequency and acceptance criteria for ensuring that sampling meets criteria in the Remedial Design, local, state and federal regulations.
4. Documentation and Reporting - Establish appropriate field documents (i.e. daily field construction reports, photographic log, sampling log, and variances to the Remedial Design).

2.0 Responsibility and Authority

Responsibilities of each member of the construction project team are described below.

2.1 Contractor: (To Be Determined)

The contractor is responsible for coordinating field operations for the remediation, including coordination of subcontractors, to comply with the requirements of the *Remedial Action Design* and permitting agencies. The Contractor is responsible for completing and submitting documentation required by the *CQAP* and also has the authority to accept or reject the materials and workmanship of any subcontractors at the site.

The contractor is also responsible to ensure a functional construction quality control organization is active during the project and provide support for the construction quality control system to perform inspections, tests and retesting in the event of failure of any item of work, including that of the subcontractors, and to assure compliance with the contract provisions. The construction quality control system includes, but is not limited to, the inspections and tests required in the technical provisions of the *Remedial Action Design*, and will cover all project operations.

2.2 Construction Quality Assurance Officer: (To Be Determined)

The responsibility of the construction quality assurance officer is to perform those activities in this *CQAP* deemed necessary to assure the quality of construction and support quality control efforts. The construction quality assurance officer will be on-site as required during construction activities. The responsibility of the construction quality assurance officer is to ensure the quality of construction meets or exceeds that defined by the *Remedial Action Design* and identified in the *Quality Assurance Project Plan (QAPP)*. Specific responsibilities of the construction quality assurance officer include:

- Directing and supporting the construction quality control representative inspection personnel in performing observations and tests by verifying that the data are properly recorded, validated, reduced, summarized, and inspected.
- Evaluating the construction activities and the construction quality control representative's efforts
- Evaluating sampling activities and efforts of the sampling quality assurance officer
- Educating construction quality control inspection personnel on construction quality control requirements and procedures
- Scheduling and coordinating construction quality assurance inspection activities

2.3 Sampling Quality Assurance Officer: (To Be Determined)

The responsibility of the sampling quality assurance officer is to perform those activities in this *CQAP*, *Remedial Action Design* and *QAPP* deemed necessary to assure the quality of sampling and testing and support quality control efforts.

The sampling quality assurance officer provides the permitting agency an assurance that all sampling efforts, for both field and laboratory analysis, meet or exceed that defined by the *Remedial Action Design* and identified in the *CQAP*. The sampling quality assurance officer will be on-site as required during the project. The sampling quality assurance officer will report directly to the construction quality assurance officer.

Specific responsibilities of the sampling quality assurance officer include:

- confirming that the test data are properly recorded and maintained (this may involve selecting reported results and back tracking them to the original observation and test data sheets);
- confirming that the testing equipment, personnel, and procedures do not change over time or making sure that any changes do not adversely impact the inspection process;
- confirming that regular calibration of testing equipment occurs and is properly recorded; and
- Providing the construction quality control officer with up to date sampling results.

2.4 Construction Quality Control Representative: (To Be Determined)

A construction quality control representative, supplemented as necessary by additional personnel, is to be on the work site during the construction process, with complete authority to take any action necessary to ensure compliance with the *Remedial Action Design* as necessary to achieve quality in the constructed facility. The construction quality control representative will be the field engineer. Specific responsibilities of the construction quality control representative include:

- Reviewing the *Remedial Action Design* for clarity and completeness so that the construction activities can be effectively implemented.
- Observe and document contractor's construction quality for compliance with this *CQAP*.
- Verifying that a contractor's construction quality is in accordance with *CQAP*.
- Performing on-site inspection of the work in progress to assess compliance with the *Remedial Action Design*.
- Prepare daily field construction reports to document daily on-site activities. The Daily Field Construction Reports will be submitted at the end of each week in an electronic format to Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.
- Prepare transportation manifests for the transportation of non-hazardous waste, hazardous waste, and conditionally exempt materials (i.e., soil, water, debris).
- Prepare a transportation log documenting all loads of solid or liquid waste that are transported off-site. The Transportation Log will be submitted at the end of each week in electronic format to Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.
- Perform the duties of the health & safety officer.
- Reporting the results of all observations and tests as the work progresses, modify materials and work to comply with *Remedial Action Design*. This includes:
  - Providing reports on daily field construction, material shipments, and inspection results.
  - Review and interpretation of all data sheets and reports.
  - Identification of work that should be accepted, rejected, or uncovered for observation, or that may require special testing, inspection, or approval.
  - Rejection of defective work and verification that corrective measures are implemented.
  - Make observations and records that will aid in finalization of the Final Report.
- Reporting to the construction quality assurance officer results of all inspections including work that is not of acceptable quality or that fails to meet the *Remedial Action Design*.
- Verifying that the equipment used in testing meets the test requirements and that the test are conducted according to the proper standardized procedures.
- Verifying that materials are installed as specified, except where necessary field modifications were required.
- Serves as the overall Project Emergency Coordinator and have ultimate authority in specifying and facilitating any contingency action during any potential emergencies when the Contingency Plan is implemented.

The construction quality control representative will report directly to the quality assurance officer.

2.5 Sampling Representative: (To be Determined)

A sampling representative, supplemented as necessary by additional personnel, is to be on the work site at all times during the construction process. The sampling representative reports directly to the sampling quality assurance officer. Specific responsibilities of the sampling representative include:

- Set up and operation of the weather station.
- Daily recording of meteorological data.
- Daily calibration and operation of real time total volatile organic compound (VOCs), and suspended particulate monitoring equipment.
- Daily recording of real time air quality data. Informs project coordinator and on-site New York State Department of Health (NYSDOH) representatives when concentration of air contaminants approaches or exceeds action levels specified in the Remedial Design. The daily community air-monitoring report will be submitted at the end of each week in an electronic format to Mr. Svante L. Myrick, City of Ithaca Mayor at asherman@cityofithaca.org (Annie Sherman – Executive Assistant to the Mayor), Mr. Justin Deming, NYSDOH at jhd01@health.state.ny.us, Ms. Elizabeth B. Lukowski, NYSDEC at eblukows@gw.dec.state.ny.us, and Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.
- Daily calibration and operation of the field monitoring equipment per manufacturers recommendations, guidelines specified in the *Quality Assurance Project Plan* and Remedial Design. Compiling calibration and results data onto spreadsheets. E-mailing compiled data along with supporting documentation to Sampling Quality Assurance Officer daily.
- Collection, packaging and shipment soil and water samples per guidelines specified in the *QAPP* and Remedial Design. Maintaining master log of all air, water and soil samples collected. Faxing copies of the chain of custody sheets to the Sampling Quality Assurance Officer daily. Tracking confirmation sample points and maintaining a map depicting confirmation sample point locations.
- Consultation with Sampling Quality Assurance Officer for all technical questions, problems, considerations, or requests for supplies or equipment.
- Consultation with Sampling Quality Assurance Officer for all technical questions, problems, considerations, or requests for supplies or equipment.
- Maintaining and organizing on-site field specialist equipment and supplies storage area.
- Performing the duties of Assistant Health & Safety Officer.

3.0 Field Quality Control Inspections, Testing, and Sampling Requirements

The definable features of work identified below are described in the Remedial Design. This section of the *CQAP* describes the anticipated inspection, testing, and sampling requirements of these definable feature works.

3.1 Site Preparation

Elements of the site preparation, including clearing, grubbing, temporary fence installation, erosion control measures will be inspected as they occur to assure compliance with the Remedial Design. Inspection of the siltation fence shall confirm that it's contiguous and its skirt is embedded along its length.

3.2 Equipment Set-up

All materials and equipment are designed to meet specific project needs. Each delivery of materials and/or equipment will be inspected upon arrival by the construction quality control representative and stored at a designated area of the site. Equipment will be set-up per the Remedial Design and drawings.

3.3 Staging of Materials

Material will be managed at the excavation area and directly loaded for transport when possible. If necessary, stockpiles will be inspected a minimum of once per day to assure that covers are in place and intact, and standing water is removed from the liner as needed. Covers will be replaced as needed to prevent precipitation from contacting the material and dust from being generated by the material.

3.4 Excavation of Existing MGP Residue

Excavation activities will comply with Occupational Safety and Health Administration's (OSHA's), "Hazardous Waste Operations and Emergency Response" (29 CFR 1910.120) and Safety and Health Regulations for Construction - Excavations (29 CFR 1926 Subpart P). Excavation activities will be conducted in accordance with the *Remedial Action Design*. Limits of the excavation will be measured by the construction quality control representatives upon completion of the excavation for documentation drawings. Confirmation Sampling is covered in the *Quality Assurance Project Plan*.

3.5 Loading of Materials for Transportation

Materials will be loaded with an excavator into dump trailers for transportation to permitted disposal facility. Polyethylene sheeting will be placed between the stockpile or excavation and the truck to retain any material spilled. The spilled material will be added back to the excavation following completion of loading of each truck. The loading area will be visually inspected to confirm that material remains within the sheetpile containment wall and not tracked onto truck tires.

3.6 Relocation and Restoration of the Utility Corridor

All utility corridor relocation/restoration activities will be inspected to ensure that the relevant utility company requirements (details and specifications) have been properly addressed and coordinated. This will require extensive communication to ensure notices are given prior to the start of utility relocation and restoration activities.

3.7 Emergency Access Construction

Construction of emergency access ways will be inspected to ensure conformance with the contract drawings and design. Communication and notification with the local emergency responders (i.e. police, ambulance and fire) shall be a continuing focus throughout the project phases.

3.8 Wastewater Treatment and Discharge

All associated wastewater treatment and discharge activities will be inspected and subject to the requirements found in the temporary discharge permit.

3.9 Site Restoration

Site restoration will be observed by the construction quality control representative. The remedial excavations will be backfilled as specified in the Remedial Design, and the surface will match the drawings in the *Remedial Action Design*. If necessary, clean imported fill material will be brought on-site. This material will be analytically tested prior to arrival and will also be inspected upon arrival. Backfilling and compacting of the excavation will be observed and documented by the construction quality control representative. All liners will be removed and disposed. No stockpiles will remain on-site at the end of the project.

Temporary restoration within the public street right of way will be in accordance with the *Remedial Action Design*. Future final restoration within public street right of ways (pavement, sidewalk, etc) will be performed bv the City and will be in accordance with the City of Ithaca requirements. Restoration of affected utilities will be in accordance with the relevant utility company requirements. Disturbed private properties will be restored to the conditions set forth in the *Remedial Action Design*. All affected areas will be graded to match the specification in the *Remedial Action Design*. The finished surface will be as defined in the *Remedial Action Design*. Visual inspections will confirm that the various site restoration activities meet the relevant requirements.

4.0 Documentation and Reporting Requirements for *CQAP* Activities

The value of the *CQAP* will be assured by proper documentation techniques. The construction quality assurance plan inspection team will be guided by data sheets, schedules and checklists. The documentation of the inspection activities will facilitate the adherence to the design documents and maintain the level of reporting required by the parties involved in the project.

4.1 Daily Field Construction Report

A Daily Field Construction Report shall be prepared identifying work force and their labor hours, location, and description of work performed, lost time accidents, equipment left on job site, equipment/materials received and if applicable, submittal status, non-compliance notices received, errors and/or omission in plans and specifications, visitors to the job site, weather conditions and temperatures, and any other pertinent information. The Daily Field Construction Report will be submitted at the end of the week in an electronic format to Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

4.2 Transportation Log

A Transportation Log will remain in the field office to record all loads of solid or liquid waste that are transported off-site. The Transportation Log will be submitted at the end of the week in an electronic format to Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

4.3 Photographic Log

The photographic log is designed to document construction activities by still photos. Photographic log may also be used to photographically record activities recorded in a daily construction log or an as-built sketch log. The construction quality control representative will collect photographs.

4.4 Daily Field Construction Report

The construction quality control representative shall prepare a Daily Field Construction Report (DFCR) identifying work force and their labor hours, location and description of work performed, lost time accidents, equipment left on the job site, equipment/materials received and if applicable, submittal status, non-compliance notices received, errors and/or omission in plans and specifications, visitors to the job site, weather conditions and temperatures, and any other pertinent information.

4.5 Daily Community Air-monitoring Report

The Daily Community Air-monitoring Report is designed to document all sampling activities and how they correspond to the Remedial Design. All observations, field and/or laboratory tests will be recorded on a daily sampling log. It is important to note recorded field observations may take the form of notes, charts, sketches, or photographs. The daily community air-monitoring report will be submitted at the end of each week in an electronic format to Mr. Svante L. Myrick, City of Ithaca Mayor at asherman@cityofithaca.org (Annie Sherman – Executive Assistant to the Mayor) , Mr. Justin Deming, NYSDOH at jhd01@health.state.ny.us, Ms. Elizabeth B. Lukowski, NYSDEC at eblukows@gw.dec.state.ny.us, and Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

4.6 Master Sample Log

The daily notebook will remain in the field office to record every sample collected. The sample technician will log in all samples collected and those sent to the off-site analytical laboratory. Waybill numbers will be logged at the end of each day.

4.7 Chain-of-Custody

A Chain-of-Custody form will document custody of all samples from the field to the laboratory.

4.8 Waybill

A waybill receipt will be obtained at the time of accepted sample shipment by Federal Express or courier and will be attached to the Master Sample Log.

4.9 NYSEG's Public Liability Accident Report, NYSEG's Report of Employee Injury, and NYSEG's Incident Report

The above-mentioned report forms will be used to document any accident occurring on-site during the remedial project. The sheets shall be attached to the Health and Safety Plan and will be located in the field project trailer.

4.10 Variances to Remedial Design

Required changes to the Remedial Design will be processed through the use of a variance log. Approval from the NYSEG project manager is required to recommend a change to the Remedial

Design. An amendment to the Remedial Design will be developed for acceptance and the approval by NYSDEC and NYSDOH.

4.11 Construction Completion Report

At the completion of the project the Project Manager/Construction Quality Assurance Officer will prepare and submit a Construction Completion Report to the NYSDEC. This report will include a summary of all of the Daily Field Construction Report's, Daily Community Air-monitoring Report's, Photographic Log, Sampling log, Material Disposition Log, and Variances to Remedial Design. The Construction Completion Report will be signed and certified by a professional engineer that all activities that comprised in full accordance with NYSDEC approved Remedial Design and the NYSDEC Order on Consent Index #DO-0002-9309.

Appendix H

Quality Assurance Project Plan

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Quality Assurance Project Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Quality Assurance Project Plan
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Patrick Gratton

Prepared By Patrick Gratton

Scott Underhill

Reviewed By Scott Underhill, PE

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1.0 Introduction

This *Quality Assurance Project Plan (QAPP)* provides a description of the sampling and laboratory procedures/protocols to be used in support of the *Remedial Design* associated with the Ithaca Court Street former manufactured gas plant OU-2 site located in the City of Ithaca, Tompkins County, New York. The fundamental purpose of the *QAPP* is to ensure that quality analytical data will be generated to support the project in a manner consistent with the Data Quality Objectives as specified herein. This *QAPP* is designed to be used in conjunction with a New York State Department of Environmental Conservation (NYSDEC) approved *Remedial Design* with regards to specific project objectives and field sampling activities. To the extent that discrepancies exist between this *QAPP* and the *Remedial Design*, the *Remedial Design* shall control.

2.0 Data Quality Objectives

Data quality objectives (DQOs) are statements, expressed in either qualitative or quantitative terms, which address the appropriate level of data quality for a project. The quality of data generated must be suitable to support the decisions used to achieve the overall goals as delineated in the *Remedial Design*. The general project data quality objectives are summarized in this section, with detailed information given throughout this *QAPP* and associated sections of the *Remedial Design*. The overall data quality objectives of the project are:

- To ensure that samples collected are representative of the sample population.
- To provide detection limits for the selected analytical methods, which are below the established cleanup objectives or regulatory limits.
- To measure and document precision and accuracy using procedures established by the laboratories, the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) and U.S. Environmental Protection Agency (EPA) approved analytical methods.
- To ensure that a NYSDOH ELAP and NYSDOH ELAP CLP certified laboratory will conduct all soil/residues and wastewater analyses.
- To ensure that all final site verification samples (confirmatory samples) are reported with ASP Category B deliverables.

3.0 Sample Collection

3.1 Soils

Soil samples will be collected as described in the appropriate sections of the *Remedial Design Work Plan*. These sections describe the collection procedures, sampling equipment, locations and frequencies for the soil samples.

All sampling equipment will be properly disposed or decontaminated before being reused. Samples will be collected and placed in pre-cleaned sample containers provided by the laboratory performing the analysis. All necessary preservatives will be added to the sample containers at the laboratory prior to being shipped to the site. Samples will be stored at 4o Celsius until delivered to, and analyzed by the laboratory. This will be accomplished by utilization of an on-site refrigerator and/or coolers with ice. (When collecting composite samples for toxicity characteristic leachate procedure

(TCLP) volatile analysis, volatilization will be minimized by covering the sample compositing container and placing it within a cooler filled with ice between grab sample additions.)

3.2 Water and Wastewater Sampling

Water and wastewater samples will be collected as described in the appropriate sections of the *Remedial Design*. These sections describe the collection procedures, sampling equipment, locations and frequencies for the wastewater samples. Samples of wastewater will be analyzed before the wastewater is discharged to the city sanitary sewer.

Samples will be transferred directly into pre-cleaned sample collection containers, which are supplied by the laboratory performing the analyses. All necessary preservatives will be added to the sample containers at the laboratory prior to being shipped to the site. Samples will be stored at 4o Celsius until delivered to, and analyzed by the laboratory. This will be accomplished by utilization of an on-site refrigerator and/or coolers with ice.

3.3 Sample Containers and Preservatives

Sample containers and preservatives will be provided by the contracted laboratories and stored on-site in a clean and dry location. Sample containers and preservatives by matrix and analysis are listed in Table A (next page).

Table A. Sample Containers and Preservatives

Analysis	Matrix	Container	Preservative
TCLP Semivolatiles	Soil	500 ml glass*	4o Celsius
TCLP Metals	Soil	500 ml glass*	4o Celsius
TCPL Pesticides/Herbicides	Soil	500 ml glass*	4o Celsius
Reactive Cyanide	Soil	500 ml glass*	4o Celsius
Reactive Sulfide	Soil	500 ml glass*	4o Celsius
TCLP Volatiles	Soil	20 ml glass	4o Celsius
Total PAHs	Soil	250 ml glass	4o Celsius
Total BTEX (benzene, toluene, ethylbenzene, xylenes)	Soil	125 ml glass	4o Celsius
Total Metals	Soil	250 ml glass**	4o Celsius
Percent Sulfur	Soil	250 ml glass**	4o Celsius
PCBs	Soil	500 ml glass***	4o Celsius
Ignitability	Soil	500 ml glass***	4o Celsius
BTU/lb	Soil	500 ml glass***	4o Celsius
Flashpoint	Soil	500 ml glass***	4o Celsius
Percent Solids	Soil	500 ml glass***	4o Celsius
pH	Soil	500 ml glass***	4o Celsius
Reactivity Soil/Water		500 ml glass***	4o Celsius
Corrosivity	Soil/Water	500 ml glass***	4o Celsius

Analysis	Matrix	Container	Preservative
Total Metals	Water	500 ml Plastic	HNO3 to pH < 2
Semivolatiles	Water	1000 ml amber glass	4o Celsius
Pesticides/Herbicides	Water	1000 ml amber glass	4o Celsius
Volatiles	Water	40 ml glass	4o Celsius or HCl to pH > 12
Paint Filter	Water	500 ml glass	4o Celsius
Total Cyanide	Water	500 ml Plastic	4o Celsius NaOH to pH > 12
* May be analyzed from same sample container and/or extract. ** May be analyzed from same container. *** May be analyzed from same container. Note: All glass containers will be sealed with Teflon liner caps. All water samples for organic fractions will be collected in duplicate.			

3.4 Sampling Holding Times

The following tables identify samples by type and matrix and their related holding times.

Table B. Waste Characterization and Backfill Reuse Samples

Sample Type	Matrix	Holding Time*
TCLP Pesticides/Herbicides Soil		5 days (extraction) 40 days (after extraction)
TCLP Semivolatiles	Soil	5 days (extraction) 40 days (after extraction)
TCLP Mercury	Soil	5 days (extraction) 28 days (after extraction)
TCLP Metals	Soil	180 days
TCLP Volatiles	Soil	14 days
Reactive Sulfide	Soil	7 days
Reactive Cyanide	Soil	14 days
VOCs Soil		7 days
SVOCs Soil		14 days
Metals Soil		180 days
Pesticides Soil		14 days (extraction) 40 days (after extraction)
PCBs Soil		14 days (extraction) 40 days (after extraction)
Ignitability Soil		NA
Reactivity	Soil	Cyanide 14 days

Sample Type	Matrix	Holding Time*
Sulfide 7 days		
Corrosivity Soil		2 days
Percent solids	Soil	NA
Modified Static Leaching Test	Soil	As soon as possible, but not more than 5 days.
* Samples will be analyzed on a priority basis and reported within 10 days of collection or the maximum holding time, whichever is less.		

Table C. Water/Wastewater Samples

Sample Type	Matrix	Holding Time*
Total Petroleum Hydrocarbons	Water	14 days
pH Water		ASAP
Total Suspended Solids	Water	7days
Pesticides/Herbicides Water		NA
VOCs Water		7 days
SVOCs Water		14 days
Cyanide Water		14 days
Select Metals	Water	14 days
* Samples will be analyzed on a priority basis and reported within 5 days or the maximum holding time, whichever is less.		

4.0 Sample Custody, Identification and Tracking

4.1 Holding Times and Sample Transport

Since the samples will be analyzed with a priority turn around, no exceedance of holding time is expected. Holding times will be calculated from the time the sample is collected to the subsequent extraction, if necessary, or analysis. All samples will be delivered to the laboratory by same day courier or overnight delivery in sealed coolers with ice.

4.2 Chain-of-Custody

A Chain-of-Custody will accompany all samples from the point of sampling to delivery of the samples to the laboratory. The Chain-of-Custody will be a record of the location where the sample was collected, the data and time collected, number of containers collected, type(s) of analyses requested, special remarks or requests, and the signature of each custodian of the samples. The complete Chain-of-Custody will be included in all hard copies of reports. See Attachment A for sample Chain-of-Custody Form.

Upon sample receipt, laboratory personnel will be responsible for sample custody. The laboratory sample custodian will verify sample integrity and compare the cooler contents against the field Chain-of-Custody. If a sample container is broken or leaking it will be noted on the Chain-of-Custody form and NYSEG project personnel will be immediately notified. If the sample custodian observes any labeling or descriptive errors, NYSEG project personnel will be contacted immediately to resolve any discrepancies. After all discrepancies (if any) are resolved, the laboratory will acknowledge receipt of the samples (i.e., by signing and dating the Chain-of-Custody) and the completed Chain-of-Custody will be included in all hard copies of reports and become a permanent part of the project records.

4.2.1 Sample Identification

Each sample collected during the project will have a unique identification number. This number, date of collection and type of analysis will be placed on each sample container after the sample is collected. See Attachment B for sample identification naming convention for air, water, and confirmatory samples. A site map will be used throughout the project to denote the area or point that a confirmatory sample represents.

4.3 Laboratory Sample Tracking

Each laboratory has an internal tracking mechanism to ensure that each sample received has a unique identification number and that results generated and reported for each sample correspond to the identification number assigned at the laboratory.

5.0 Calibration Procedures

Each analysis will be performed in accordance with NYSDOH ELAP (environmental Laboratory Approval Program) sanctioned methods or equivalent U.S. EPA analytical procedures. Each procedure specifies the method of frequency of calibration necessary to perform accurate and precise analyses. Each analytical instrument verifies the Minimum Detection Limit at least every six months as prescribed by the NYSDOH ELAP. The calibration of the instruments is verified at the beginning and end of each auto sampler run.

All field equipment, for real time air analyses will be calibrated daily, in accordance with manufacturer's recommendations. Equipment will be calibrated more frequently if conditions warrant. A photo ionization detector (PID) will be used to measure volatile organic vapors and will be calibrated to a 100 ppm isobutylene air standard. A digital dust meter will be used to measure particulates and will be calibrated to zero with filtered air sample.

6.0 Analytical Procedures

6.1 Laboratory Analyses

The following Table D shows the analytical method to be used for each analyte or group of analytes for the Project.

Table D. Analytical Methods

Analyte	Analytical Method
TCLP Extractions	SW 846 Method 1311
TCLP Volatiles	SW 846 Method 8260
TCLP Semivolatiles	SW 846 Method 8270

Analyte	Analytical Method
TCLP Metals	SW 846 Method 6000/7000 Series
TCLP Pesticides/Herbicides	SW846 Method 8080/8151
Polycyclic Aromatic Hydrocarbons (Table E)	SW 846 Method 8270
Total Volatiles	SW 846 Method 8260
Total Semivolatiles	SW 846 Method 8270
Total Metals	SW 846 Method 6000/7000 Series
PCBs	SW 846 Method 8082
Reactive Sulfide	SW 846 Chapter 7.3.3.2
Reactive Cyanide	SW 846 Section 7.3.3.2
Percent Sulfur	ASTM D-129
BTU/lb ASTM	D-215
Flashpoint ASTM	D-93
Ignitability	SW 846 Method 1030
Reactivity	SW 846 Section 7
Corrosivity	SW 846 Section 7
Percent Solids	ASP Method D-V-Section IX
pH	SW 846 Method 9045
Total Cyanide	SW 846 9012
Paint Filter Test	SW 846 9095

Table E. Polycyclic Aromatic Hydrocarbon (PAH) Analyte List

Parameter
Naphthalene
2-Methylnaphthalene
Acenaphthalene
Acenaphthylene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Dibenzofuran
Pyrene
Benzo (g,h,i) perylene
Benzo (a) anthracene*
Chrysene*

Parameter
Benzo (b) fluoranthene*
Benzo (k) fluoranthene*
Benzo (a) pyrene*
Indeno (1,2,3 cd) pyrene*
Dibenzo (a,h) anthracene*
*Carcinogenic PAHs (cPAHs)

6.2 Laboratory Selection

The laboratory chosen for the project must be certified, and maintain certification, under the NYSDOH ELAP and NYSDOH ELAP CLP for analyses of solid and hazardous waste. Only analytical laboratories that have experience in MGP projects or similar projects will be considered for use. NYSEG will contract directly with an analytical laboratory meeting these requirements to perform laboratory services for this *Remedial Design*.

7.0 Data Reduction Validation and Reporting

7.1 Data Reduction

7.1.1 Field Data Collection

Real time field data collected during sampling events will include qualitative information regarding the texture, appearance, odors, and any other observations made while soil and water samples are being collected. Meteorological data and current site activity will be noted while collecting data for real time air monitoring. These observations will be recorded in the field logbook.

7.1.2 Laboratory Data Collection and Reduction

A significant portion of the analyses performed requires the use of automated laboratory instrumentation. Raw data collected from the instruments detectors will be converted to standard units of mg/Kg for solid matrices and mg/L for water. All raw data will be stored in electronic form and in laboratory notebooks, in case the analysis needs to be recreated. Raw data for all analyses will be archived for a minimum of four years.

7.2 Data Review

All analytical data will be verified for precision and accuracy utilizing the laboratory's in-house Quality Assurance/Quality Control programs. In addition, all data packages will be reviewed by NYSEG project personnel to insure that all data deliverables have been properly provided.

7.3 Full Data Validation

The full data validation process consists of a formal systematic review of analytical results and quality control documentation with regards to the parameters cited in Section 8.3. On the basis of this review, a data validator will make judgments and express concerns on the quality and limitations of the specific data and the validity of the data package as a whole. The data validator prepares documentation of his or her review using the standard USEPA Inorganics Regional Assessment and

Organics Regional Assessment forms to summarize deficiencies and general laboratory performance. These forms are accompanied by appropriate supplementary documentation, which identifies specific problems.

Since a full data validation would typically be used for the purposes of litigation, this level of review may surpass the scope of work necessary for the project. Therefore, any full data validation for analytical results of confirmatory samples will be performed at NYSEG's discretion. Confirmatory sampling data will be archived in the event that it becomes necessary to perform a full data validation at a future date.

7.4 Data Usability Summary Report

A Data Usability Summary Report provides a thorough review and evaluation of analytical data without the formality of a full third party data validation. A Data Usability Summary Report for the analytical results of confirmatory samples will be generated in lieu of a full data validation to verify that the proper data deliverables and procedures have been rendered in accordance with the data quality objectives of the Remedial Action Design.

7.5 Reporting

Final reports for analytical data will be reviewed and accepted by NYSEG prior to submission to the NYSDEC. Reports for analyses performed under the ELAP protocol will contain results sheets for the sample analyzed. These reports must include the following information at a minimum:

- NYSEG Sample ID number;
- Laboratory sample ID number;
- Sample collection date;
- Extraction or digestion date (if applicable);
- Date analyzed;
- Analytical method;
- Analytical results (with units clearly identified);
- Results of laboratory blank and field blanks;
- Results of spikes, matrix spikes, and duplicates;
- Surrogate recoveries (if applicable);
- Complete Chain-of-Custody forms; and
- File log sheets (if available).

8.0 Quality Control Checks

8.1 Field Quality Control

8.1.1 Decontamination Procedures for Sampling

The following decontamination procedure will be followed for all non-disposal (confirmation and potential re-use/imported backfill soil samples) sampling equipment before being reused.

- Equipment will be washed thoroughly with a non-phosphate detergent.
- The equipment will then be rinsed with analyte-free water.
- The equipment will be rinsed with a reagent grade methanol solution diluted with analyte-free water.
- If the equipment is being used for the collection of samples for metals analyses it will then be rinsed with a 10% reagent grade nitric acid solution.
- The equipment will be rinsed with analyte-free water.

After decontamination, equipment will be carefully stored to avoid contamination between sampling events.

8.2 Laboratory Quality Control

Each laboratory is NYSDOH Certified for the analyses they will perform. Each analyst must complete a start-up proficiency procedure to demonstrate their capability to perform accurate and precise analyses on each type of instrument they operate. In addition, each laboratory must accurately analyze samples provided by NYSDOH on a semi-annual basis to maintain certification. The laboratories have internal quality control officers that review all methodologies and implement corrective action, including reanalyzing samples, which do not pass, established laboratory quality control criteria.

Laboratory quality control procedures are specified in the analytical methods. These specifications include the type of laboratory quality control check required, compounds, and concentrations to be used, and laboratory quality control acceptance criteria.

Laboratory quality control checks will include (where specified by method):

- Calibration Standards
- Methods Blanks
- Matrix Spike/Matrix Spike Duplicates
- Surrogate Spikes
- Interna l Standards
- Laboratory Duplicates
- Calibration Check Standards
- Laboratory Control Samples

9.0 Preventative Maintenance

9.1 Field Instruments and Equipment

Equipment instruments, tools, gauges, and other items requiring preventative maintenance will be serviced in accordance with the manufacturer's specified recommendations or written procedures developed by the operators. All field equipment service will be conducted by qualified personnel. Prior to any field sampling, each piece of field equipment will be inspected to ensure that it is operational. If the equipment is not operational, it must be repaired prior to use. All equipment which requires charging or batteries will be fully charged or have fresh batteries at the start of the project. An equipment repair/maintenance log will be kept for each field instrument. Any non-operational/non-repairable field equipment will be replaced.

9.2 Laboratory Instruments and Equipment

Each laboratory has an instrument/equipment maintenance program, which includes procedures for daily, weekly, monthly, or annual routine maintenance. In addition, maintenance is performed if the accuracy and/or precision of the instrument are in question.

9.2.1 Instrument Maintenance

Preventative maintenance of laboratory instruments will be conducted in accordance with the manufacturer's guidelines or written procedures developed by the operators. All instrument service will be performed by qualified personnel. To minimize potential downtime, the laboratory will maintain a sufficient supply of critical spare parts for its instruments and, where practical, maintain a service contract for rapid instrument repair. Wherever possible, the laboratory will retain backup instrumentation. An instrument repair/maintenance log will be maintained for each instrument.

9.2.2 Equipment Monitoring

On a daily basis, the operation of the laboratory equipment (i.e., balances, ovens, refrigerators, water purification systems, etc.) will be checked and documented. Any discrepancies will be immediately reported to the appropriate laboratory personnel for resolution.

Attachment A

Sample Chain of Custody Form

AECOM

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name:	Project Location:		Analysis Requested	Container Type P – Plastic A – Amber Glass G – Clear Glass V – VOA Vial O – Other E – Encore	Preservation 1 – HCl, 4° 2 – H2SO4, 4° 3 – HNO3, 4° 4 – NaOH, 4° 5 – NaOH/ZnAc, 4° 6 – Na2S2O3, 4° 7 – 4°
Project Number:	Field Logbook No.:			Matrix Codes: DW – Drinking Water WW – Wastewater GW – Groundwater SW – Surface Water ST – Storm Water W – Water	S – Soil SL – Sludge SD – Sediment SO – Solid A – Air L – Liquid P – Product
Sampler (Print Name)/(Affiliation):	Chain of Custody Tape Nos.:				
Signature:	Send Results/Report to:	TAT:			

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered											Lab I.D.	Remarks

Relinquished by: (Print Name)/(Affiliation)	Date: / Time:	Received by: (Print Name)/(Affiliation)	Date: / Time:	Analytical Laboratory (Destination):	
Signature:		Signature:			
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:		
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	Sample Shipped Via: UPS FedEx Courier Other	Temp blank Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_Oct-2010.doc

Serial No. ____________

Attachment B

Sample Identification Naming Convention

SAMPLE IDENTIFICATION

NAMING CONVENTION FOR SOIL AND WATER SAMPLES

SYSTEM CODING

First & Second = Site	Ithaca Court Street	IC
Third & Fourth = Source	Excavation	EX
	Stockpile	SP
	Frac Tank	FT
	Poly Container	PC
	Metal Barrel	MB
	Roll Off Container	RO
	Waste Wrangler	WW
	Test Pit	TP
	Boring	BO
	Geoprobe	GP
Fifth & Sixth = Location	Sidewall Sample	SW
	Bottom Sample	BM
	Waste Soil	WS
	Wastewater	WW
	Debris	DB
Seventh & Eighth = Relative Depth	Surface Soil	00
	Depth below Ground	02
	Non-Applicable	NA
Ninth, Tenth & Eleventh =	Sample Number	005

EXAMPLE: Ithaca Court Street; Excavation; Sidewall; 2 ft below ground; and sample number:

SAMPLE IDENTIFICATION: ICEXSW02005

Appendix I

Summary of Chemical Oxidation Bench Scale Testing

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY

April 2012

Summary of Chemical Oxidation Bench Scale Testing
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY

April 2012

Summary of Chemical Oxidation Bench Scale Testing
100% Submittal
Ithaca Court Street Former MGP Site OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Prepared By Paul Dombrowski, PE

Reviewed By Scott Underhill, PE

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Memorandum

To	Tracy Blazicek	Page	1
CC	Will Baker, Luke Hellerich, Scott Underhill, Patrick Gratton, Scott Pittenger		
Subject	**Chemical Oxidation Treatability Study Summary – Area 1C Ithaca, New York (NYSDEC Site # 7-12-005)**		
From	Paul M. Dombrowski		
Date	January 12, 2012		

AECOM completed an in-situ chemical oxidation (ISCO) treatability study to evaluate different oxidants for field application at the Former Ithaca Court Street MGP OU-2 Site (the "site"). The objective of the test was to select the most appropriate oxidant(s) and activating/catalyst agents for use at the site.

Soil and groundwater samples were collected from the site. All bench scale testing was performed by the AECOM Treatability Studies Laboratory in Orlando, Florida. A summary of the tests performed and results is provided in this memorandum.

Phase 1 – Titration Testing

The initial phase of the ISCO treatability study consisted of short-term (four to seven day) tests to estimate natural oxidant demand and to evaluate buffer capacity of the site soil to aid in selecting dosages for the oxidant catalyst chemistries. Three different titration tests were conducted to assist in determining dosages for the oxidants and their appropriate activating/catalyzing agents. Table 1 summarizes the types of tests, number of replicates, and the quantities of soil and groundwater included for each of these tests.

Table 1. Phase 1 – Titration Testing Summary

Test	Number of Samples	Replicates	Media Tested
Phase IA: Base Buffer Capacity	1 (homogenized at the lab)	3	Total of 50g of soil 50 mL of DI water
Phase IB: Acid Buffer Capacity	1 (homogenized at the lab)	3	Total of 50g of soil 50 mL of DI water
Phase IC: Total Oxidant Demand	2 (1 heavily impacted & 1 less impacted)	2	400g of soil each from 2 borings 600 mL DI water

Phase IA: Base Buffer Capacity Test

Alkaline (or base) activation is one of the more commonly applied approaches for persulfate activation, and the base buffer capacity test quantifies the amount of base as sodium hydroxide (NaOH) required to raise the pH above 10.5 standard units (s.u.) for greater than one hour in a vessel with a known quantity of site soil and groundwater. The pH was measured after two days of reaction, and then additional NaOH was titrated to again raise the pH to greater than 10.5 s.u. for one hour. The vessels then were allowed to react for two more days (total reaction time of four days), and a final pH reading was taken. Base buffer capacity testing was completed in triplicate using a single homogenized soil sample.

The soil slurry had an initial pH between 7.47 and 7.55. To initially raise the pH to above 11, 4 to 6 milliequivalents per kilogram (meq/kg) of base were required. After reacting for two days the pH in all three triplicates ranged between 9.5 and 10.0. Additional NaOH was then added to raise the pH of each reactor to 11.5, and after an additional two days of reaction, the soil slurry pH ranged between 10.4 and 10.8 in the three triplicates. These observations suggest the site soils would not inhibit the use of alkaline activation for sodium persulfate. Plots and work sheets providing titration quantities and associated pH responses for each reactor from the base buffer capacity test are included in Appendix A to this memorandum.

Phase IB: Acid Buffer Capacity Test

Modified Fenton's reaction involves reaction of peroxide with ferrous iron (Fe(II)). Under oxidizing conditions Fe(II) precipitates becoming unavailable for reaction with peroxide. Groundwater pH can be lowered as a method to maintain dissolved iron to react with the peroxide. The acid buffer capacity determines the amount of acid as hydrochloric acid (HCl) required to lower the pH below 3.5 s.u. for greater than one hour in a vessel with a known quantity of site soil and groundwater. The pH was measured after two days of reaction, and then additional HCl was titrated to again lower the pH to less than 3.5 s.u. for one hour. The vessels were allowed to react for 2 more days (total reaction time of four days), and a final pH reading was taken. Acid buffer capacity testing was completed in triplicate, using a single homogenized soil sample.

Like the base buffer tests, the initial soil slurry had a pH between 7.47 and 7.55. The acid buffer capacity tests indicated that site soils are well buffered against acidic change. To lower the slurry pH to below 4.5, 12 to 24 meq/kg of acid were required, and after 24 hours of reaction the slurry pH increased by more than one pH unit. Additional HCl was added to the reactor triplicates to lower the pH below 4.5 and after 24 hours reaction slurry pH increased 0.25 to >1 pH unit. These acid buffer capacity test results suggest that implementing Modified Fenton's Reagent by lowering the pH would be very difficult in-situ. Alkalinity of the soil slurries was measured to range between 449 and 899 mg $CaCO_3$/kg (average 681.7 mg/kg), which corresponds with the acid buffering capacity and the difficulty in lowering the pH and maintaining acidic conditions. Plots and work sheets providing titration quantities and associated pH responses for each reactor from the acid buffer capacity test are included in Appendix B to this memorandum.

Phase IC: Total Oxidant Demand Test

Total oxidant demand (TOD) testing provides an estimate of the combined effects of natural demand due to the soil and demand due to the contaminant. A wide range of naturally occurring reactants other than the target contaminant(s), including organic matter and reduced metals species, also react with and exert a demand on the chemical oxidants. The TOD reactors were prepared with a known quantity of site soil and groundwater and were dosed with sodium persulfate. The TOD value represents the total persulfate mass consumed per unit mass of soil after seven days of reaction. TOD tests were comparatively evaluated using sodium persulfate alone and with alkaline activation since the activation chemistry exerts a demand on the oxidant. Soil oxidant demand can be highly variable, and analysis for TOD testing was completed in duplicate on soil collected from two different soil borings: one soil boring that was visually observed to be heavily impacted by MGP contamination and one soil boring that was observed to have a lesser amount of MGP contamination.

TOD evaluation tests were performed using a persulfate dosage of 15 g persulfate per kg soil (g/kg). The TOD reactors were allowed to react for 72 hours. The non-activated results had average TOD values of 10.4 and 11.6 g/kg for low-impact and high-impact soils, respectively. The activated persulfate TOD was 14.6 and 14.5 g/kg for low-impact and high-impact soils, respectively. The base activated results are 3 to 4 g/kg higher than the non-activated which is consistent with AECOM experience in measuring total oxidant demand using persulfate. In these reactors, the pH remained >12 for the entire reaction period, which was consistent with the observations of the base buffer capacity test. TOD test results are summarized in Table 2.

Phase II - Soil Slurry Oxidation Reactor Testing

The objective of the second phase of the treatability study was to evaluate chemical oxidation effectiveness using different dosages and combinations of oxidants using groundwater and heavily impacted soil from the site. This phase of testing consisted of a control (no oxidants added) and four different test reactors in duplicate as summarized in Table 3. Each of the four oxidation test reactors received a series of three different chemical oxidant applications.

1. Residual tar associated with MGP contamination has been visually observed in soil borings advanced in Area 1C, and therefore, all four ISCO reactors received an initial dosage of Modified Fenton's Reagent (hydrogen peroxide with ferrous iron catalyst). Two different hydrogen peroxide dosages were applied to two reactor tests each: a lower dosage with a pore volume concentration of approximately 5% hydrogen peroxide and a higher dosage with a pore volume concentration of approximately 12% hydrogen peroxide.
2. The second chemical oxidation dosage was applied approximately two days after the initial dosage, since reaction persistence of hydrogen peroxide is generally several hours to one day. Two reactors received the same hydrogen peroxide dosage applied (low and high) during the first application. Two reactors (one each of the low and high peroxide dosages) were dosed with base-activated sodium persulfate (to achieve a pore water concentration of approximately 15%). Sodium hydroxide (NaOH) was the basic compound used for activation.
3. The third chemical oxidant application was completed on Day 10 of the soil slurry testing. Each reactor received the same hydrogen peroxide dosage applied (low and high) during the first application.

A stabilized hydrogen peroxide (obtained from ISOTEC of Lawrenceville, NJ) was used. In addition, ISOTEC also provided a chelated iron solution for use, based on the results of acid buffer testing not being able to lower the pH of site soils. ISOTEC is the patent holder for use of chelated iron catalysts for use with MFR under circum-neutral pH conditions.

Table 2. Phase 1 – Total Oxidant Demand Results

Sample ID	TOD (g/kg)	Average TOD (g/kg)
Low Impact Sample - C13 (10-12' bgs)		
Persulfate A (72 hrs)	9.5	10.4
Persulfate B (72 hrs)	11.3	
Persulfate + Base A (72 hrs)	14.5	14.6
Persulfate + Base B (72 hrs)	14.6	
Heavily Impacted Sample – C18 (11-13' bgs)		
Persulfate A (72 hrs)	11.5	11.6
Persulfate B (72 hrs)	11.7	
Persulfate + Base A (72 hrs)	14.5	14.5
Persulfate + Base B (72 hrs)	14.5	

Prior to any chemical oxidation testing, baseline sampling and analysis of target contaminants was performed soil and water from a control reactor. Individual reactors were sequentially sampled over the course of the study, and soil and water samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH) diesel range organics (DRO), and TPH gasoline range organics (GRO). The baseline and final samples were also analyzed for cyanide. In addition, analysis for metals was performed on water samples from the baseline and final samples to evaluate changes in metal mobility as a result of temporary changes in aquifer pH and oxidation-reduction potential (ORP), from the added chemical oxidants.

The control reactor was set up with approximately 3,100 grams of soil, and then the baseline sample was collected which removed approximately 1,000 grams of soil. The four test reactors were set up with approximately 2,100 grams of soil each. Following addition of soil, approximately 3.5 L groundwater was added to each treatment reactor. Laboratory sampling after the second and third oxidant applications each collected approximately 1,000 grams of soil and up to 3.24 L groundwater. An additional aliquot of approximately 3,3 L groundwater was used to replace the removed aqueous volume to provide adequate sample volume for subsequent sampling events.. A summary of quantities of site soil and groundwater used in each reactor is provided in Appendix C.

Table 3. Phase 2 – Soil Slurry Reactors

Reactor	First Oxidant Application	Second Oxidant Application	Third Oxidant Application
#1	Low Dose Peroxide	Low Dose Peroxide	Low Dose Peroxide
#2	Low Dose Peroxide	Base-Activated Persulfate	Low Dose Peroxide
#3	High Dose Peroxide	High Dose Peroxide	High Dose Peroxide
#4	High Dose Peroxide	Base-Activated Persulfate	High Dose Peroxide
#5 (Control)	DI Water	DI Water	DI Water

The attached Table 4 provides a summary of the changes in concentrations for groups of analytes (total BTEX, total PAHs, DRO, and GRO). All detected laboratory analytical results from the Phase II soil slurry testing are provided as Table 5. Bench scale laboratory screening parameters and photographs are included as Appendix C. For the bench scale testing, sequential dosing and sampling were completed from the same reactor vessels, and reactors vessels were not sacrificial. Therefore, separate estimates of mass removal were calculated for before and after the first two oxidant dosages and before and after the third oxidant dosage. Table 6 presents soil-water mass estimates during the bench scale testing.

The major conclusions and observations of the Phase II testing are as follows:

- The bench scale reactors needed to be quite large to accommodate the laboratory volume requirements, so there is some degree of heterogeneity that likely impacted results.
- Following the first application of hydrogen peroxide, the reactor temperatures increased by approximately 3 degrees Centigrade (^{o}C) in the low peroxide reactors and between 7.8 to 8.6 ^{o}C in the high peroxide reactors. Following the second oxidant application, no temperature increase was observed except in the high peroxide reactor which increased 0.6 ^{o}C. After the final dosage of peroxide, temperature in all of the oxidant reactors increased (2.0 to 5.8^{o}C from the Day 9 readings), with the largest increase noted in the low dose peroxide-persulfate reactor (see Appendix C).
- The stabilized hydrogen peroxide used for the Phase II testing resulted in significantly less visible off-gasing and temperature increases than past experience by the AECOM Treatability Laboratory using non-stabilized hydrogen peroxide.
- Contaminant concentration and mass reductions were approximately the same or greater in reactors with the low dosage hydrogen peroxide, compared to the high dosage hydrogen peroxide, for BTEX, total PAHs, and GRO. Hydrogen peroxide reactions are more vigorous at high concentrations. The low dosage likely allowed oxidation reactions to occur for a longer period of time and to allow time for desorbed contaminants to be oxidized.
- Following the second oxidant application in the bench tests, contaminant concentration reductions were approximately the same or greater, with the exception of total PAHs, in reactors treated with hydrogen peroxide followed by sodium persulfate, compared with

reactors treated with two dosages of hydrogen peroxide. The longer persistence of the sodium persulfate compared to the hydrogen peroxide likely allowed more oxidation reaction time.

- Following the second oxidant application in the bench tests, contaminant concentration and mass reductions for total PAHs were greater in reactors treated with two dosages of hydrogen peroxide. PAHs are less volatile than other contaminants (i.e., BTEX and GRO); therefore, PAHs required more aggressive and non-specific peroxide oxidation reactions to oxidize natural organic materials in order to desorb more PAHs, and to directly oxidize the PAHs.
- Following the third oxidant application (hydrogen peroxide in all reactors), a significant decrease in pH was measured in all sodium persulfate reactors. AECOM has previously observed acidification of sodium persulfate systems (in situ and bench scale) following the addition of iron catalysts. The iron catalyst is acidic in nature, and the added iron also likely reacted with persulfate to generate additional sulfuric acid.
- The bench scale reactors were dosed with a much larger oxidant dosage than would be applied in the field. The bench scale slurry reactors were sequentially dosed to have peroxide concentration of 5 or 12% (aqueous) or persulfate concentration of 15% (aqueous) in the water of the reactors. For field injections, solutions of 5-10% hydrogen peroxide and 10-20% persulfate are generally prepared (diluted) and then injected such that when injected the concentrations of oxidant in the groundwater are lower due to dilution (by a factor of 3 to 6 times). The higher oxidant dosages demonstrated that reductions in soil concentrations could be achieved, and the reactor tests did not simply oxidize only the dissolved phase contaminants in the slurry.
- Oxidant dosage did mobilize/desorb contaminants from soil/NAPL. This was observed from visible sheens (see Photograph 4) as well as aqueous concentrations being higher in the oxidant reactors than in the control reactor as the oxidants also destroy natural organic matter that contaminants can sorb to. Aqueous phase equilibrium re-established itself fairly quickly after the oxidant additions, especially for PAHs and GRO. Following the first 2 dosages of oxidant (peroxide only or peroxide with persulfate), the aqueous Total PAH and GRO concentrations in the oxidant reactors were 25-57 ug/L (average 40 ug/L) and 74-340 ug/L (average 224 ug/L), respectively. Following an additional dosage of peroxide the soil concentrations of Total PAH and GRO were further reduced; however, the detected aqueous total PAH and GRO concentrations were relatively unchanged 35-67 ug/L (average 47 ug/L) and 190-230 ug/L (average 213 ug/L), respectively (note Total PAHs were not detected in water in the high peroxide reactor and GRO was not detected in water in the high peroxide with persulfate reactor) (see Tables 4 and 6).
- Cyanide concentrations were generally non-detect or slightly greater than detection limits in bench scale samples. The bench scale tests indicated that oxidant addition did not increase cyanide concentrations in water samples, and the bench scale tests were inconclusive about the ability of chemical oxidants to reduce cyanide concentrations.
- Metals concentrations in aqueous samples did increase with application of oxidant, and metals increases were greater in the test reactors where pH decrease occurred.

<u>Summary of Chemical Oxidation Bench Scale Testing</u>

The completed ISCO treatability study concluded that chemical oxidants can reduce concentrations and mass of organic contaminants associated with residual MGP waste in Area 1C. A combination of catalyzed hydrogen peroxide and activated sodium persulfate was more effective at reducing concentrations for most contaminant types and is recommended for field-scale injections. The bench scale testing also provided information about oxidant dosages and appropriate methods to catalyze the oxidation reactions.

Tables

Table 1	Phase 1 – Titration Testing Summary	(within the text)
Table 2	Phase 1 – Total Oxidant Demand Results	(within the text)
Table 3	Phase 2 – Soil Slurry Reactors	(within the text)
Table 4	Bench Scale Treatability Study – Analytical Results Summary	(attached)
Table 5	Bench Scale Treatability Study – Complete Analytical Results	(attached)
Table 6	Bench Scale Treatability Study - Reactor Mass Balance	(attached)

Appendices

Appendix A	Phase 1A - Base Buffer Capacity Worksheets and Plots
Appendix B	Phase 1B - Acid Buffer Capacity Worksheets and Plots
Appendix C	Phase 2 Soil Slurry Reactor Test Worksheets and Photographs

Table 4
Chemical Oxidation Bench Scale Treatability Study - Analytical Results Summary
Ithaca Court Street Former MGP Site OU-2

Total BTEX						
	Soil (ug/kg)			Aqueous (ug/L)		
	Baseline	2ND Application	3rd Application	Baseline	2ND Application	3rd Application
Control	2196	91	72	121	ND	11
Low Dose Peroxide, Peroxide	--	2	13	--	ND	ND
Low Dose Peroxide, Persulfate	--	9	1	--	ND	ND
High Dose Peroxide, Peroxide	--	1564	1	--	110	ND
High Dose Peroxide, Persulfate	--	172	ND	--	ND	ND

Total PAHs						
	Soil (ug/kg)			Aqueous (ug/L)		
	Baseline	2ND Application	3rd Application	Baseline	2ND Application	3rd Application
Control	60090	54540	40920	1119	19	3
Low Dose Peroxide, Peroxide	--	19780	11986	--	42	38
Low Dose Peroxide, Persulfate	--	30950	18708	--	37	35
High Dose Peroxide, Peroxide	--	48607	12064	--	57	ND
High Dose Peroxide, Persulfate	--	54170	38033	--	25	67

GRO						
	Soil (mg/kg)			Aqueous (ug/L)		
	Baseline	2ND Application	3rd Application	Baseline	2ND Application	3rd Application
Control	22	2	5	420	15	66
Low Dose Peroxide, Peroxide	--	1	1	--	250	230
Low Dose Peroxide, Persulfate	--	1	1	--	74	190
High Dose Peroxide, Peroxide	--	17	ND	--	340	220
High Dose Peroxide, Persulfate	--	3	ND	--	230	ND

DRO						
	Soil (mg/kg)			Aqueous (mg/L)		
	Baseline	2ND Application	3rd Application	Baseline	2ND Application	3rd Application
Control	190	90	130	2	0	ND
Low Dose Peroxide, Peroxide	--	75	52	--	0	ND
Low Dose Peroxide, Persulfate	--	53	56	--	0	ND
High Dose Peroxide, Peroxide	--	46	46	--	1	ND
High Dose Peroxide, Persulfate	--	35	84	--	ND	ND

ND = Not Detected

Table 5
Chemical Oxidation Bench Scale Treatability Study - Complete Analytical Results
Ithaca Court Street Former MGP Site OU-2

Sample ID	CAS #	Control Day 0 CONTROL-DAY 0	Control Application 2 CONTROL-E2	Control Application 3 CONTROL-E3	Low Dose Peroxide 2 Applications) LOW-P-ONLY-E2	Low Dose Peroxide (3 Applications) LOW-P-ONLY-E3	Low Dose Peroxide + Persulfate LOW-P-SPS-E2	Low Dose Peroxide + Persulfate + Low Dose Peroxide LOW-P-SPS-E3	High Dose Peroxide 2 Applications) HIGH-P-ONLY-E2	High Dose Peroxide (3 Applications) HIGH-P-ONLY-E3	High Dose Peroxide + Persulfate HIGH-P-SPS-E2	High Dose Peroxide + Persulfate + High Dose Peroxide HIGH-P-SPS-E3
BTEX (ug/Kg)												
Benzene	71-43-2	**6.1**	<6.6	<7.4	<7.7	<7.1	**1.4**	<6.6	**2.7**	<6.7	**1.5**	<7.8
Ethylbenzene	100-41-4	**1400**	**41**	**25**	**2**	**7.2**	**3.2**	**1**	**940**	**0.77**	**100**	<7.8
Toluene	108-88-3	**100**	**3.1**	**2.1**	<7.7	**0.57**	**0.62**	<6.6	**61**	<6.7	**2.8**	<7.8
Xylenes, Total	1330-20-7	**690**	**47**	**45**	<15	**5.5**	**3.6**	<13	**560**	<13	**68**	<16
Total BTEX	**CALC-BTEX**	**2196.1**	**91.1**	**72.1**	**2**	**13.27**	**8.82**	**1**	**1563.7**	**0.77**	**172.3**	
VOC (ug/Kg)												
2-Butanone	78-93-3	**3.5**	<33	<37	**4.4**	**4.3**	**19**	**27**	**4.9**	**2.5**	**33**	**12**
Acetone	67-64-1	**21**	**8.6**	**8.1**	**130**	**260**	**200**	**500**	**71**	**330**	**620**	**200**
Bromomethane	74-83-9	<6.8	<6.6	<7.4	<7.7	<7.1	<6.0	**6.8**	<6.9	<6.7	**10**	<7.8
Carbon Disulfide	75-15-0	<6.8	<6.6	<7.4	<7.7	<7.1	<6.0	**20**	<6.9	<6.7	**6.7**	<7.8
Chloromethane	74-87-3	<6.8	<6.6	<7.4	<7.7	<7.1	**3.4**	**71**	<6.9	<6.7	**140**	<7.8
Isopropylbenzene	98-82-8	**39**	**5.7**	**4.4**	<7.7	<7.1	<6.0	<6.6	**28**	<6.7	**6.4**	<7.8
Methyl acetate	79-20-9	<6.8	<6.6	<7.4	<7.7	<7.1	<6.0	<6.6	<6.9	<6.7	**6.5**	<7.8
Methylene chloride	75-09-2	<6.8	<6.6	**4**	**3.6**	**4.9**	<6.0	**4.8**	**3.5**	**7.1**	**4.5**	**6.8**
Total VOCs	**CALC-VOC**	**2259.6**	**107.6**	**88.6**	**140**	**282.47**	**231.22**	**630.6**	**1241.1**	**340.37**	**999.4**	**218.8**
BTEX (ug/L)												
Benzene	71-43-2	**1.2**	<1.0	<1.0	<10	<1.0	<10	<10	**0.62**	<4.0	<1.0	<10
Ethylbenzene	100-41-4	**59**	<1.0	**5.4**	<10	<1.0	<10	<10	**49**	<4.0	<1.0	<10
Toluene	108-88-3	**11**	<1.0	<1.0	<10	<1.0	<10	<10	**12**	<4.0	<1.0	<10
Xylenes, Total	1330-20-7	**50**	<2.0	**5.8**	<20	<2.0	<20	<20	**48**	<8.0	<2.0	<20
Total BTEX	**CALC-BTEX**	**121.2**		**11.2**					**109.62**			
VOC (ug/L)												
1,2-Dichloroethane	107-06-2	<1.0	<1.0	<1.0	<10	<1.0	<10	<10	<1.0	<4.0	**2.6**	<10
2-Butanone	78-93-3	<10	<10	<10	**81**	**20**	**23**	<100	**10**	**49**	**2.9**	<100
Acetone	67-64-1	**13**	<10	**5.6**	**1900**	**1500**	**360**	**470**	**450**	**3000**	**470**	**300**
Bromomethane	74-83-9	<1.0	<1.0	<1.0	<10	<1.0	<10	<10	<1.0	<4.0	**32**	<10
Carbon Disulfide	75-15-0	<1.0	<1.0	<1.0	<10	<1.0	**11**	<10	<1.0	<4.0	**4.7**	<10
Chloroethane	75-00-3	<1.0	<1.0	<1.0	<10	<1.0	<10	<10	<1.0	<4.0	**1.2**	<10
Chloroform	67-66-3	<1.0	<1.0	<1.0	<10	<1.0	<10	<10	<1.0	<4.0	**2.7**	<10
Chloromethane	74-87-3	<1.0	<1.0	<1.0	<10	<1.0	<10	<10	**0.4**	<4.0	**820**	<10
Cyclohexane	110-82-7	<1.0	<1.0	<1.0	<10	<1.0	<10	<10	**0.36**	<4.0	<1.0	<10
Isopropylbenzene	98-82-8	**1.8**	<1.0	<1.0	<10	<1.0	<10	<10	**1.1**	<4.0	<1.0	<10
Methylene chloride	75-09-2	<1.0	<1.0	<1.0	<10	<1.0	<10	<10	<1.0	<4.0	**13**	<10
Total VOCs	**CALC-VOC**	**136**		**16.8**	**1981**	**1520**	**394**	**470**	**600.48**	**3049**	**1349.1**	**300**
PAH (ug/Kg)												
2-Methylnaphthalene	91-57-6	**8200**	**3700**	**5500**	**330**	**220**	**460**	**1300**	**1300**	**240**	**5500**	**300**
Acenaphthene	83-32-9	**1900**	**1600**	**810**	**420**	**180**	**230**	**100**	**370**	**99**	**270**	**86**
Acenaphthylene	208-96-8	**4400**	**3000**	**3400**	**1200**	**630**	**910**	**710**	**2900**	**830**	**1700**	**1800**
Anthracene	120-12-7	**2900**	**4100**	**2100**	**1700**	**990**	**4800**	**1400**	**5700**	**1300**	**2700**	**4300**
Benzo(a)anthracene	56-55-3	**2000**	**2900**	**1500**	**1400**	**1100**	**1600**	**1200**	**4300**	**1300**	**3000**	**4000**
Benzo(a)pyrene	50-32-8	**1600**	**2800**	**1200**	**1700**	**990**	**1700**	**1300**	**4700**	**1500**	**3000**	**4500**
Benzo(b)fluoranthene	205-99-2	**970**	**1700**	**900**	**1200**	**720**	**1500**	**1200**	**3100**	**1000**	**2200**	**3800**
Benzo(ghi)perylene	191-24-2	**730**	**1100**	**290**	**1100**	**380**	**890**	**470**	**2000**	**470**	**1300**	**1200**
Benzo(k)fluoranthene	207-08-9	**640**	**1100**	**390**	**550**	**450**	**590**	**470**	**1500**	**590**	**1000**	**1300**
Chrysene	218-01-9	**1600**	**2600**	**1200**	**1300**	**1100**	**2300**	**1500**	**4000**	**1100**	**3100**	**4200**
Dibenzo(a,h)anthracene	53-70-3	<1200	**350**	<250	**260**	<250	**300**	<230	**600**	<250	**360**	**460**
Fluoranthene	206-44-0	**3500**	**5100**	**2200**	**1600**	**950**	**3000**	**1300**	**3600**	**720**	**4000**	**3000**
Indeno(1,2,3-cd)pyrene	193-39-5	**530**	**820**	**320**	**810**	**370**	**710**	**440**	**1500**	**430**	**1000**	**980**
Naphthalene	91-20-3	**13000**	**2200**	**7000**	**570**	**320**	**600**	**1500**	**1800**	**390**	**10000**	**520**
Phenanthrene	85-01-8	**9700**	**11000**	**7600**	**2600**	**1600**	**8400**	**4000**	**4200**	**630**	**8700**	**3600**
Pyrene	129-00-0	**4900**	**7100**	**4300**	**2400**	**1700**	**2400**	**1400**	**6000**	**1300**	**4800**	**3700**
Dibenzofuran	132-64-9	**320**	**270**	**210**	**50**	**26**	**140**	**78**	**97**	**15**	**240**	**47**
Fluorene	86-73-7	**3200**	**3100**	**2000**	**590**	**260**	**420**	**340**	**940**	**150**	**1300**	**240**
Total PAHs	**CALC-PAH**	**60090**	**54540**	**40920**	**19780**	**11986**	**30950**	**18708**	**48607**	**12064**	**54170**	**38033**
SVOC (ug/Kg)												
1,1'-Biphenyl	92-52-4	**1200**	**810**	**820**	**150**	**100**	**450**	**320**	**250**	**62**	**880**	**160**
Acetophenone	98-86-2	<1200	<1100	<250	<260	<250	<1100	**42**	<1200	<250	**120**	<280
Bis(2-ethylhexyl) phthalate	117-81-7	<1200	**430**	<250	**330**	**130**	<1100	**130**	**420**	**120**	<1100	**290**
Carbazole	86-74-8	<1200	**50**	**74**	<260	**7.3**	<1100	**14**	**43**	<250	<1100	<280
Total SVOCs	**CALC-SVOCs**	**61290**	**55830**	**41814**	**20260**	**12223.3**	**31400**	**19214**	**49320**	**12246**	**55170**	**38483**

Table 5
Chemical Oxidation Bench Scale Treatability Study - Complete Analytical Results
Ithaca Court Street Former MGP Site OU-2

Sample ID	CAS #	Control Day 0 CONTROL-DAY 0	Control Application 2 CONTROL-E2	Control Application 3 CONTROL-E3	Low Dose Peroxide 2 Applications) LOW-P-ONLY-E2	Low Dose Peroxide (3 Applications) LOW-P-ONLY-E3	Low Dose Peroxide + Persulfate LOW-P-SPS-E2	Low Dose Peroxide + Persulfate + Low Dose Peroxide LOW-P-SPS-E3	High Dose Peroxide 2 Applications) HIGH-P-ONLY-E2	High Dose Peroxide (3 Applications) HIGH-P-ONLY-E3	High Dose Peroxide + Persulfate HIGH-P-SPS-E2	High Dose Peroxide + Persulfate + High Dose Peroxide HIGH-P-SPS-E3
PAH (ug/L)												
2-Methylnaphthalene	91-57-6	**160**	<4.8	<4.9	**0.97**	**0.61**	<5.0	**1.2**	<5.1	<5.9	<4.9	<5.4
Acenaphthene	83-32-9	**24**	<4.8	<4.9	**0.83**	**0.68**	<5.0	**0.43**	**2.9**	<5.9	<4.9	<5.4
Acenaphthylene	208-96-8	**63**	<4.8	<4.9	**1.8**	**0.59**	**0.79**	**0.73**	**1.8**	<5.9	**1.1**	**2.5**
Anthracene	120-12-7	<4.8	**2.4**	<4.9	**3.4**	**0.75**	**2.7**	**1.1**	**5.7**	<5.9	**0.81**	**20**
Benzo(a)anthracene	56-55-3	**0.53**	**0.4**	<4.9	**1.4**	**3.3**	**1.3**	**1.4**	**2.8**	<5.9	**2.3**	**0.68**
Benzo(a)pyrene	50-32-8	<4.8	**2.9**	<4.9	**4.4**	**4.7**	**3.9**	**3.8**	**2.5**	<5.9	**2.1**	**6.2**
Benzo(b)fluoranthene	205-99-2	<4.8	<4.8	<4.9	**1.1**	**2.3**	**1**	**1.7**	**1.6**	<5.9	**3.2**	**4.3**
Benzo(ghi)perylene	191-24-2	<4.8	<4.8	<4.9	**1.4**	**0.88**	**0.86**	**0.66**	**1.3**	<5.9	**1.8**	**2.1**
Chrysene	218-01-9	**0.44**	<4.8	<4.9	**1.1**	**2.1**	**1.7**	**1.6**	**2.3**	<5.9	**2.6**	**5.3**
Dibenzo(a,h)anthracene	53-70-3	<4.8	**3.7**	<4.9	**4.1**	<5.0	**3.8**	<5.0	**0.6**	<5.9	**0.67**	<5.4
Fluoranthene	206-44-0	**3.4**	**3**	**2.7**	**3.8**	**4.7**	**4.1**	**3.8**	**4.8**	<5.9	**2.3**	**6**
Fluorene	86-73-7	**28**	<4.8	<4.9	**3.2**	**0.72**	**2.4**	**0.61**	**11**	<5.9	<4.9	<5.4
Indeno(1,2,3-cd)pyrene	193-39-5	<4.8	**3.3**	<4.9	**4.1**	**3.2**	**3.6**	**3**	**1.1**	<5.9	**1.4**	**4.2**
Naphthalene	91-20-3	**800**	<4.8	<4.9	**1.8**	**0.94**	**1.1**	**5.3**	<5.1	<5.9	<4.9	**0.96**
Phenanthrene	85-01-8	**33**	<4.8	<4.9	**2.3**	**4.1**	**5.5**	**4.2**	**11**	<5.9	**2.8**	**5.4**
Pyrene	129-00-0	**4**	**0.34**	**0.72**	**1.7**	**5.2**	**1**	**2.1**	**5.9**	<5.9	**2.5**	**5.5**
Total PAHs	**CALC-PAH**	**1119.27**	**19.44**	**3.42**	**41.5**	**38.07**	**37.45**	**34.53**	**56.6**		**24.52**	**66.94**
SVOC (ug/L)												
1,1'-Biphenyl	92-52-4	**18**	<4.8	<4.9	<5.3	<5.0	**1**	**0.85**	**7**	<5.9	<4.9	<5.4
2,4-Dimethylphenol	105-67-9	<4.8	<4.8	<4.9	<5.3	<5.0	<5.0	<5.0	**3.8**	<5.9	<4.9	<5.4
2,4-Dinitrotoluene	121-14-2	**6**	<4.8	<4.9	<5.3	<5.0	<5.0	<5.0	<5.1	<5.9	<4.9	<5.4
2,6-Dinitrotoluene	606-20-2	<4.8	<4.8	**2**	<5.3	<5.0	<5.0	<5.0	<5.1	<5.9	<4.9	<5.4
3,3'-Dichlorobenzidine	91-94-1	<4.8	**3**	<4.9	<5.3	<5.0	<5.0	<5.0	<5.1	<5.9	<4.9	<5.4
3-Nitroaniline	99-09-2	<9.6	**39**	<9.7	<11	<9.9	<9.9	<10	<10	<12	<9.7	<11
4-Chloroaniline	106-47-8	<4.8	**75**	<4.9	<5.3	<5.0	<5.0	<5.0	<5.1	<5.9	<4.9	<5.4
4-Chlorophenyl phenyl ether	7005-72-3	<4.8	**2.7**	<4.9	<5.3	<5.0	<5.0	<5.0	<5.1	<5.9	<4.9	<5.4
4-Methylphenol	106-44-5	<9.6	<9.7	<9.7	<11	<9.9	<9.9	<10	**2.5**	<12	<9.7	<11
4-Nitroaniline	100-01-6	<9.6	**5.9**	<9.7	<11	<9.9	<9.9	<10	<10	<12	<9.7	<11
Acetophenone	98-86-2	**3**	<4.8	<4.9	<5.3	<5.0	**2.6**	**3.5**	**3.1**	<5.9	**1.3**	<5.4
Atrazine	1912-24-9	<4.8	**2.9**	<4.9	<5.3	<5.0	<5.0	<5.0	<5.1	<5.9	<4.9	<5.4
Benzaldehyde	100-52-7	<4.8	<4.8	<4.9	**1.1**	<5.0	**1.9**	**3.4**	<5.1	**1.2**	**0.95**	<5.4
Benzo(k)fluoranthene	207-08-9	<4.8	**3.4**	<4.9	**4.1**	**3.3**	**3.7**	**2.9**	**1.3**	<5.9	**0.94**	**3.8**
Caprolactam	105-60-2	<4.8	**13**	<4.9	<5.3	<5.0	<5.0	<5.0	<5.1	<5.9	<4.9	<5.4
Carbazole	86-74-8	**2.2**	<4.8	<4.9	<5.3	<5.0	<5.0	<5.0	**1.4**	<5.9	<4.9	<5.4
Dibenzofuran	132-64-9	**2.9**	<9.7	<9.7	<11	<9.9	<9.9	<10	<10	<12	<9.7	<11
Diethyl phthalate	84-66-2	**1.2**	**0.33**	<4.9	<5.3	<5.0	<5.0	<5.0	**0.48**	<5.9	<4.9	<5.4
Di-n-butyl phthalate	84-74-2	**0.64**	**0.4**	<4.9	<5.3	<5.0	**0.34**	<5.0	**0.41**	<5.9	<4.9	<5.4
Nitrobenzene	98-95-3	**400**	<4.8	**1.4**	**0.74**	<5.0	**0.61**	<5.0	<5.1	<5.9	<4.9	<5.4
Total SVOCs	**CALC-SVOCs**	**1553.21**	**165.07**	**6.82**	**47.44**	**41.37**	**47.6**	**45.18**	**76.59**	**1.2**	**27.71**	**70.74**
Cyanide (mg/Kg)												
Total Cyanide	57-12-5	NS	<1.2	NS	<1.4	NS	**3.6**	NS	NS	NS	NS	NS
Cyanide (mg/L)												
Total Cyanide	57-12-5	**0.014**	NS	<0.010	NS	<0.010	NS	**0.012**	NS	<0.010	NS	**0.018**
Metals (mg/L)												
Arsenic	7440-38-2	<0.010	NS	<0.010	NS	**0.015**	NS	**0.1**	NS	**0.05**	NS	**0.4**
Chromium	7440-47-3	**0.0015**	NS	**0.0013**	NS	**0.09**	NS	**0.17**	NS	**0.046**	NS	**0.71**
Iron	7439-89-6	**0.99**	NS	**2.2**	NS	**1.9**	NS	**202**	NS	**2**	NS	**1000**
Manganese	7439-96-5	**0.39**	NS	**0.11**	NS	**1.1**	NS	**3.9**	NS	**0.71**	NS	**14.2**
Hyrdocarbons (mg/Kg)												
Diesel Range Organics [C10-C28]	DRO	**190**	**90**	**130**	**75**	**52**	**53**	**56**	**46**	**46**	**35**	**84**
GRO (C6-C10)	8006-61-9	**22**	**1.7**	**5**	**1.1**	**0.97**	**1**	**0.53**	**17**	<1.8	**2.9**	<2.1
Hyrdocarbons (mg/L)												
Diesel Range Organics [C10-C28]	DRO	**1.9**	**0.43**	<0.49	**0.34**	<0.48	**0.33**	<0.51	**0.97**	<0.67	<0.53	<0.51
GRO (C6-C10)	8006-61-9	**420**	**15**	**66**	**250**	**230**	**74**	**190**	**340**	**220**	**230**	<250

Notes:

mg/Kg - milligrams per kilogram

NL = Not Listed

Bold indicates compound detected at a concentration greater than the reporting limit.

Low dose peroxide columns (shaded) are being used for full-scale design.

Table 6
Chemical Oxidation Bench Scale Treatability Study - Reactor Mass Balance
Ithaca Court Street Former MGP Site OU-2

	Before First Dosage	After Second Dosage	% Reduction	Before Third Dosage	After Third Dosage	% Reduction
Total BTEX Mass (mg)						
Control	5.0	0.2	96.2%	0.10	0.12	-20.8%
Low Dose Peroxide, Peroxide	5.1	0.0	99.9%	0.00	0.01	no change
Low Dose Peroxide, Persulfate	5.1	0.0	99.6%	0.01	0.00	no change
High Dose Peroxide, Peroxide	5.1	3.8	25.4%	2.11	0.00	100%
High Dose Peroxide, Persulfate	5.1	0.4	92.7%	0.19	0.00	100%
Total PAH Mass (mg)						
Control	128.6	113.2	11.9%	57.6	43.2	25.0%
Low Dose Peroxide, Peroxide	132.8	42.7	67.9%	22.5	13.7	39.2%
Low Dose Peroxide, Persulfate	132.8	66.7	49.8%	35.1	21.3	39.4%
High Dose Peroxide, Peroxide	132.3	104.7	20.8%	55.1	13.6	75.3%
High Dose Peroxide, Persulfate	132.3	116.6	11.9%	61.3	43.2	29.5%
Total GRO Mass (mg)						
Control	47.1	3.6	92.4%	1.8	5.5	-203.9%
Low Dose Peroxide, Peroxide	48.6	3.3	93.3%	2.1	1.9	7.5%
Low Dose Peroxide, Persulfate	48.6	2.4	95.0%	1.4	1.3	7.1%
High Dose Peroxide, Peroxide	48.5	37.8	22.0%	20.3	0.8	96.1%
High Dose Peroxide, Persulfate	48.5	7.1	85.4%	4.0	0.0	100%
Total DRO Mass (mg)						
Control	400.9	188.3	53.0%	95.5	137.2	-43.6%
Low Dose Peroxide, Peroxide	414.6	162.5	60.8%	85.9	58.8	31.6%
Low Dose Peroxide, Persulfate	414.6	115.1	72.2%	61.0	63.3	-3.8%
High Dose Peroxide, Peroxide	413.8	102.5	75.2%	55.0	52.0	5.5%
High Dose Peroxide, Persulfate	413.8	75.3	81.8%	39.6	94.9	-140.0%

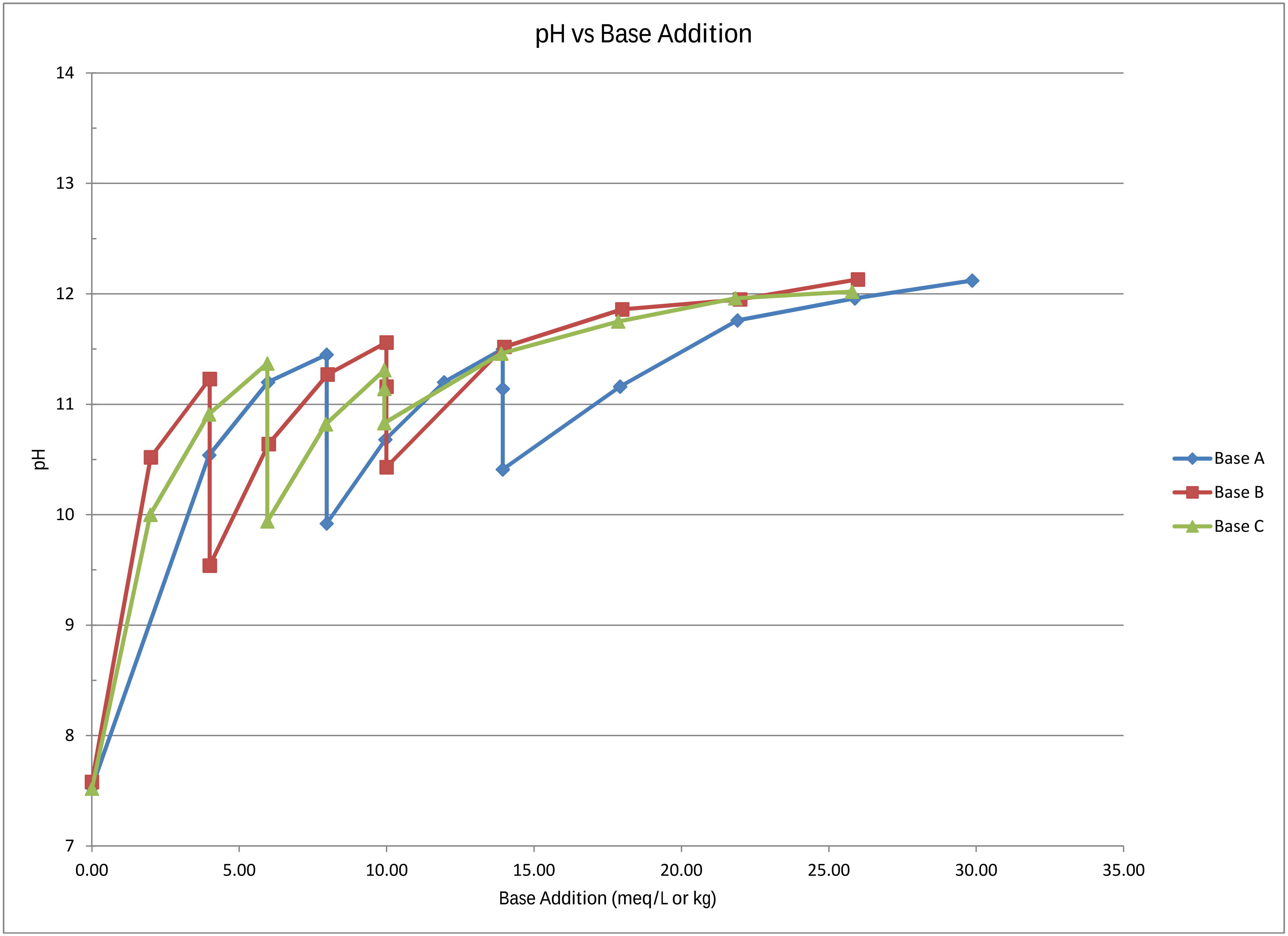
Notes:

1. Total mass consists of contaminant mass in soil and aqueous phases in the reactor vessel.

2. Percent reduction values evaluate the change in contaminant mass between sequential laboratory analytical samples. Contaminant mass has been corrected for soil removed for laboratory analysis; this is the reason that the contaminant mass "Before Third Dosage" is approximately one-half of the contaminant mass "After Second Dosage."

Appendix A

Phase IA
Base Buffer Capacity
Worksheets and Plots


pH vs Base Addition
14
13
12
11
10
9
8
7
pH
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
Base Addition (meq/L or kg)
Base A
Base B
Base C

Alkaline Buffering Capacity Data Sheet

Project Ithaca MGP - Court Street

Date 8/3/2011

Project No 60215637

Sample ID Composite Base A

Sample Weight 50.23 g

Reagent / DI Water Volume (mL) 50

Base Reagent / Conc. NaOH 1 N

Reading No.	Time	Base Add'n	Total Vol Base (mL)	Base meq. Per Kg Soil	pH		Comments
1		0	0	0.00	7.53	target pH	
2		0.2	0.2	3.98	10.54	11.0	
3		0.1	0.3	5.97	11.2	meq Base/kg	
4		0.1	0.4	7.96	11.45	13.94	
5		0	0.4	7.96	9.92		Day 2 - 24 hrs
6		0.1	0.5	9.95	10.68	target pH	
7		0.1	0.6	11.95	11.2	12	
8		0.1	0.7	13.94	11.5	meq Base/kg	
9		0	0.7	13.94	11.14	27.87	Day 3 - 48 hrs
10		0	0.7	13.94	10.41		Day 4 - 72 hrs
11		0.2	0.9	17.92	11.16		
12		0.2	1.1	21.90	11.76		
13		0.2	1.3	25.88	11.96		
14		0.2	1.5	29.86	12.12		
15							
16							
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26							

Alkaline Buffering Capacity Data Sheet

Project Ithaca MGP - Court Street Date 8/3/2011

Project No 60215637

Sample ID Composite Base B
Sample Weight 50.03 g

Reagent / DI Water
Volume (mL) 50

Base Reagent / Conc. NaOH 1 N

Reading No.	Time	Base Add'n	Total Vol Base (mL)	Base meq. Per Kg Soil	pH		Comments
1		0	0	0.00	7.58	target pH	
2		0.1	0.1	2.00	10.52	11.0	450
3		0.1	0.2	4.00	11.23	meq Base/kg	
4		0	0.2	4.00	9.54	8.99	Day 2 - 24 hrs
5		0.1	0.3	6.00	10.64		
6		0.1	0.4	8.00	11.27		
7		0.1	0.5	9.99	11.56		Day 3 - 48 hrs
8		0	0.5	9.99	11.16		Day 4 - 72 hrs
9		0	0.5	9.99	10.43		
10		0.2	0.7	13.99	11.52	target pH	
11		0.2	0.9	17.99	11.86	12.0	
12		0.2	1.1	21.99	11.95	meq Base/kg	
13		0.2	1.3	25.98	12.13	23.99	
14							
15							
16							
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22							
23							
24							
25							
26							

Alkaline Buffering Capacity Data Sheet

Project Ithaca MGP - Court Street

Date 8/3/2011

Project No 60215637

Sample ID Composite Base C

Sample Weight 50.41 g

Reagent / DI Water Volume (mL) 50

Base Reagent / Conc. NaOH 1 N

Reading No.	Time	Base Add'n	Total Vol Base (mL)	Base meq. Per Kg Soil	pH		Comments
1		0	0	0.00	7.52	target pH	
2		0.1	0.1	1.98	10.00	11.0	496
3		0.1	0.2	3.97	10.91	meq Base/kg	
4		0.1	0.3	5.95	11.37	9.92	
5		0	0.3	5.95	9.94		Day 2 - 24 hrs
6		0.1	0.4	7.93	10.82		
7		0.1	0.5	9.92	11.31		
8		0	0.5	9.92	11.14	target pH	Day 3 - 48 hrs
9		0	0.5	9.92	10.83	12.0	Day 4 - 72 hrs
10		0.2	0.7	13.89	11.46	meq Base/kg	
11		0.2	0.9	17.85	11.75	23.80	
12		0.2	1.1	21.82	11.96		
13		0.2	1.3	25.79	12.02		
14							
15							
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17							
18							
19							
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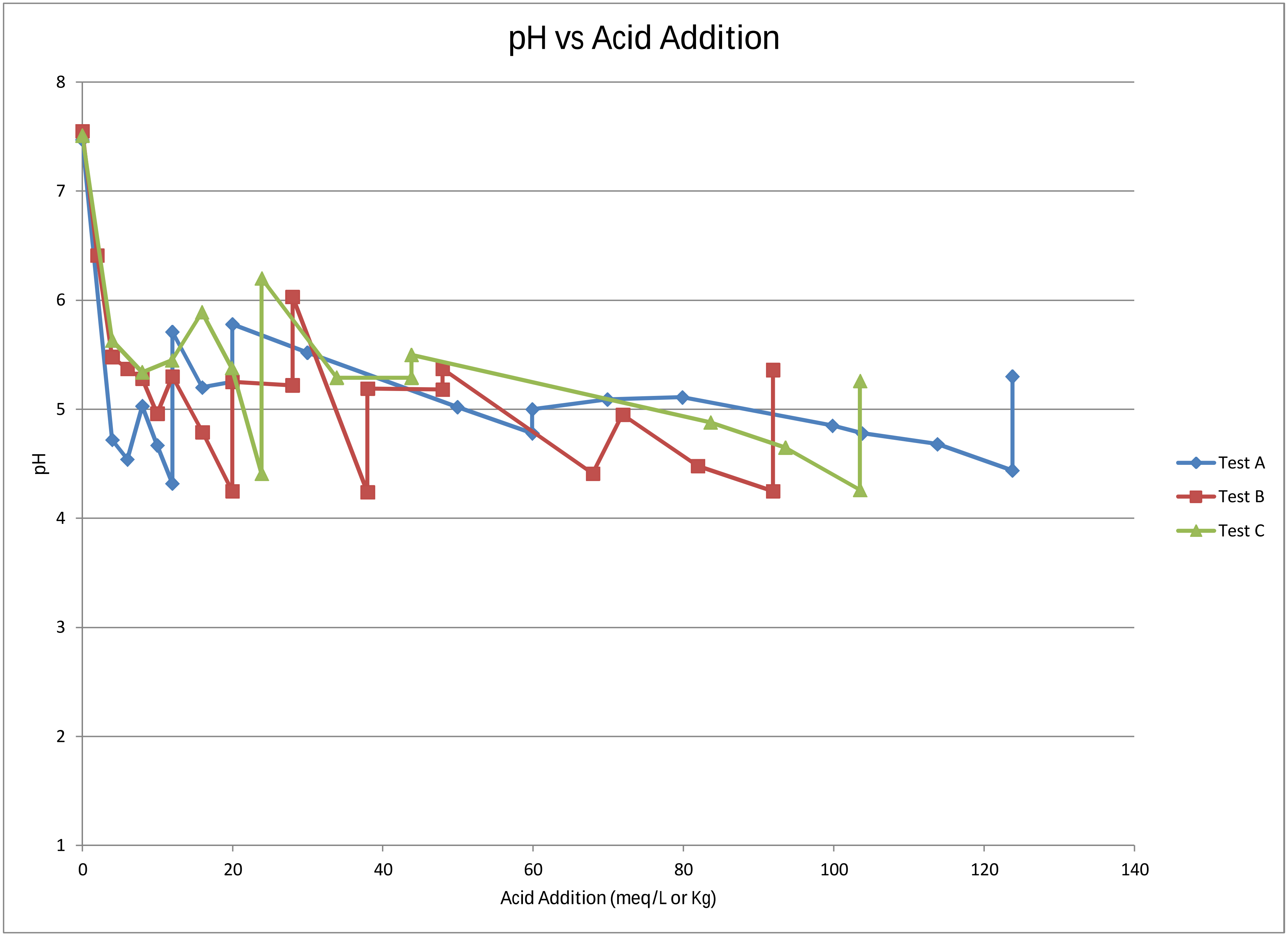
22							
23							
24							
25							
26							

Appendix B

Phase IB
Acid Buffer Capacity
Worksheets and Plots



pH vs Acid Addition
8
7
6
5
4
3
2
1
pH
0
20
40
60
80
100
120
140
Acid Addition (meq/L or Kg)
Test A
Test B
Test C

Acid Buffering Capacity Data Sheet

Project Ithaca MGP - Court Street

Date 8/3/2011

Project No 60215637

Sample ID Composite Acid A

Sample Weight 50.1 g

Reagent / DI Water Volume (mL) 50

Base Reagent / Conc. HCl 1 N

Reading No.	Time	Acid Add'n	Total Vol Acid (mL)	Acid meq. Per Kg Soil	pH		Comments
1		0	0	0.00	7.47	target pH	Alkalinity (mg CaCo3)/kg
2		0.2	0.2	3.99	4.72	4.5	449
3		0.1	0.3	5.99	4.54	meq Acid/Kg soil	
4		0.1	0.4	7.98	5.03	8.98	
5		0.1	0.5	9.98	4.67		
6		0.1	0.6	11.98	4.32		
7		0	0.6	11.98	5.71		Day 1 - 24 hrs
8		0.2	0.8	15.97	5.2		
9		0.2	1	19.96	5.25		
10		0	1	19.96	5.78		Day 2 - 48 hrs
11		0.5	1.5	29.94	5.52		
12		1	2.5	49.90	5.02		
13		0.5	3	59.88	4.78		
14		0	3	59.88	5		Day 3 - 72 hrs
15		0.5	3.5	69.86	5.09		
16		0.5	4	79.84	5.11		
17		1	5	99.80	4.85		
18		0.2	5.2	103.79	4.78		
19		0.5	5.7	113.77	4.68		
20		0.5	6.2	123.75	4.44		
21		0	6.2	123.75	5.3		Noted ocassional woody organic matter (<2mm) present
22							
23							
24							
25							
26							

Acid Buffering Capacity Data Sheet

Project Ithaca MGP - Court Street

Date 8/3/2011

Project No 60215637

Sample ID Composite Acid B

Sample Weight 50.05 g

Reagent / DI Water Volume (mL) 50

Base Reagent / Conc. HCl 1 N

Reading No.	Time	Acid Add'n	Total Vol Acid (mL)	Acid meq. Per Kg Soil	pH		Comments
1		0	0	0.00	7.55	target pH	Alkalinity (mg CaCo3)/kg
2		0.1	0.1	2.00	6.41	4.5	899
3		0.1	0.2	4.00	5.48	meq Acid/Kg soil	
4		0.1	0.3	5.99	5.37	17.98	
5		0.1	0.4	7.99	5.28		
6		0.1	0.5	9.99	4.96		
7		0.1	0.6	11.99	5.3		
8		0.2	0.8	15.98	4.79		
9		0.2	1	19.98	4.25		
10		0	1	19.98	5.25		Day 1 - 24 Hrs
11		0.4	1.4	27.97	5.22		
12		0	1.4	27.97	6.03		
13		0.5	1.9	37.96	4.24		
14		0	1.9	37.96	5.19		Day 2 - 48 Hrs
15		0.5	2.4	47.95	5.18		
16		0	2.4	47.95	5.37		
17		1	3.4	67.93	4.41		
18		0.2	3.6	71.93	4.95		
19		0.5	4.1	81.92	4.48		
20		0.5	4.6	91.91	4.25		
21		0	4.6	91.91	5.36		
22							
23							
24							
25							
26							

Acid Buffering Capacity Data Sheet

Project Ithaca MGP - Court Street | Date 8/3/2011

Project No 60215637

Sample ID Composite Acid C | Reagent / DI Water
Sample Weight 50.24 g | Volume (mL) 50

Base Reagent / Conc. HCl 1 N

Reading No.	Time	Acid Add'n	Total Vol Acid (mL)	Acid meq. Per Kg Soil	pH		Comments
1		0	0	0.00	7.51	target pH	Alkalinity (mg CaCo3)/kg
2		0.2	0.2	3.98	5.63	4.5	697
3		0.2	0.4	7.96	5.34	meq Acid/Kg soil	
4		0.2	0.6	11.94	5.45	13.93	
5		0.2	0.8	15.92	5.89		
6		0.2	1	19.90	5.38		
7		0.2	1.2	23.89	4.41		
8		0	1.2	23.89	6.20		
9		0.5	1.7	33.84	5.29		
10		0.5	2.2	43.79	5.29		
11		0	2.2	43.79	5.50		
12		2	4.2	83.60	4.88		
13		0.5	4.7	93.55	4.65		
14		0.5	5.2	103.50	4.26		
15		0	5.2	103.50	5.26		
16							
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Appendix C

Phase II
Soil Slurry Reactor Test
Worksheets and Photographs

Summary of Phase II Volumes / Masses / Sampling Volumes

All volumes following the initial setups are estimated (approx) where indicated

Soil: Total Avail Impacted Soil (Composited)	12,930	grams

Control Vessel - Setup with "excess" soil, mixed, then sampled for control baseline sampling event

Action	Process	Qty	Units		
Create Control reactor	soil add	3,095	grams	3,095	grams
Collect: Anaytical baseline (Event 1)	soil remove (approx)	1,020			
dose 1 - GW water added	soil remain (approx)	2,075			
	RUN mass	2,075			
dose 2 - DI water added	soil added	0			
	RUN mass	2,075			
Collect: Anaytical Event 2	soil remove (approx)	1,020			
	soil remain (approx)	1,055			
dose 3 - DI water added	soil added	0			
	RUN mass	1,055			
Collect: Anaytical Event 3	soil remove (approx)	1,020			
	soil remain (approx)	35			

Treatment Vessel(s) - Setup with maximum available soil, mixed, then dosed

Action	Process	Qty	Units		
Create Treatment reactor(s)	soil add (per)	2,150	grams	8,600	grams
dose 1 - 50% H2O2 + DI H2O	soil remain (approx)	2,150			
	RUN mass	2,150			
dose 2 - 50% H2O2 (re-establish low dose peroxide) or DI water+SPS (match dilution volume)	soil added	0			
	RUN mass	2,150			
Collect: Anaytical Event 2	remove (approx)	1,020			
	Mass remain (approx)	1,130			
dose 3 - 50% H2O2	Mass added	0			
	RUN mass	1,130			
Collect: Anaytical Event 3	remove (approx)	1,020			
	Mass remain (approx)	110			

Water: Total Avail Water 90 liters (approximately)

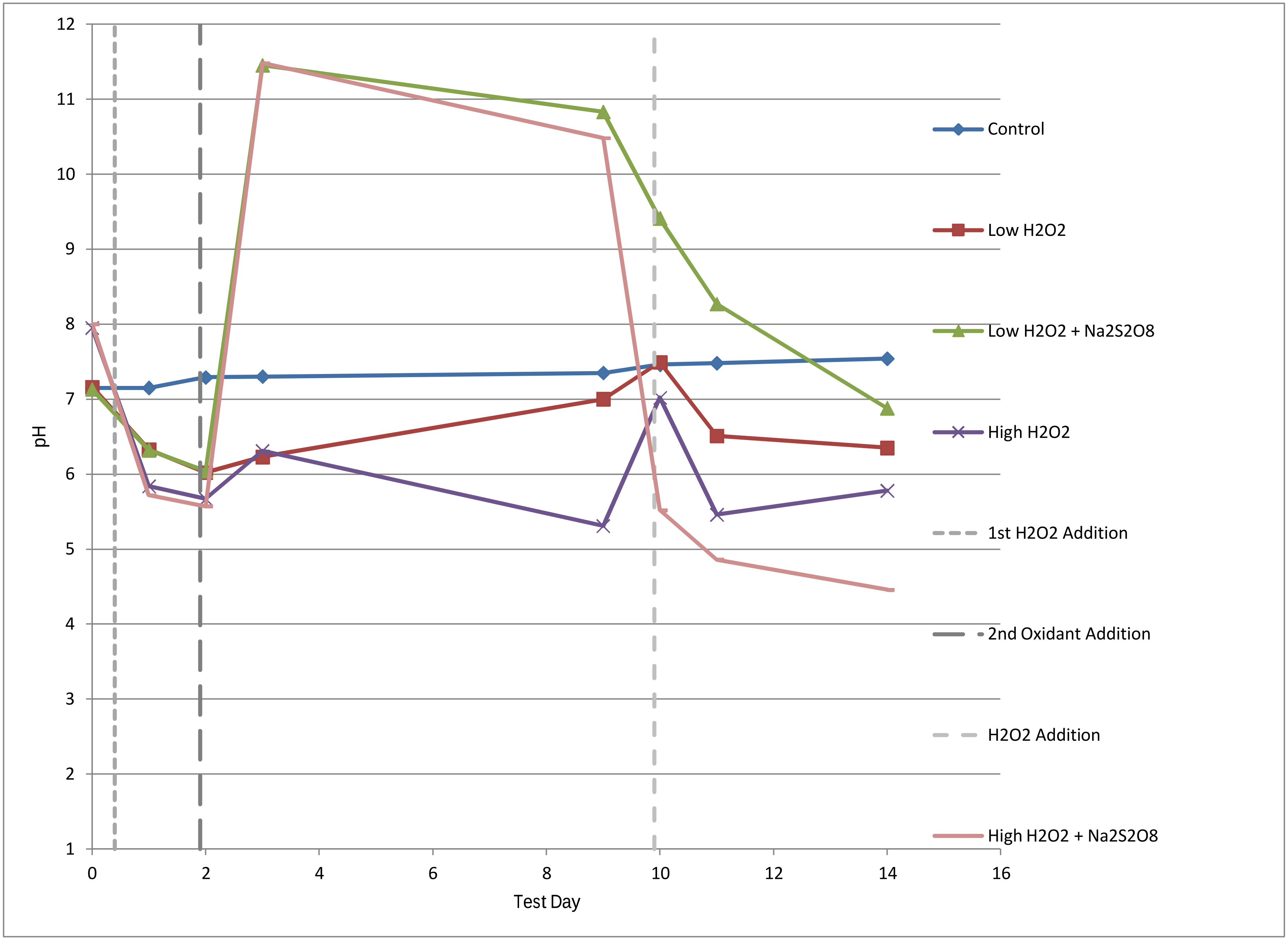
Control Vessel - Setup with "excess" soil, mixed, then sampled for control baseline sampling event

Action	Process	Qty	Units
Create Control reactor	gw add	6240	mL
Collect: Anaytical baseline (Event 1)	gw removed (aaprox	2740	
dose 1 - GW water added	gw remaining (appro	3500	
	RUN volume	3500	
dose 2 - DI water added	gw add	65	
	RUN volume	3565	
Collect: Anaytical Event 2	gw remove (approx)	2240	
	gw remain (approx)	1325	
dose 3 - DI water added	gw add		
	DI water	248	mL
	DI water	2010	mL
	RUN volume	3583	
Collect: Anaytical Event 3	gw remove (approx)	2740	
	gw remain (approx)	843	

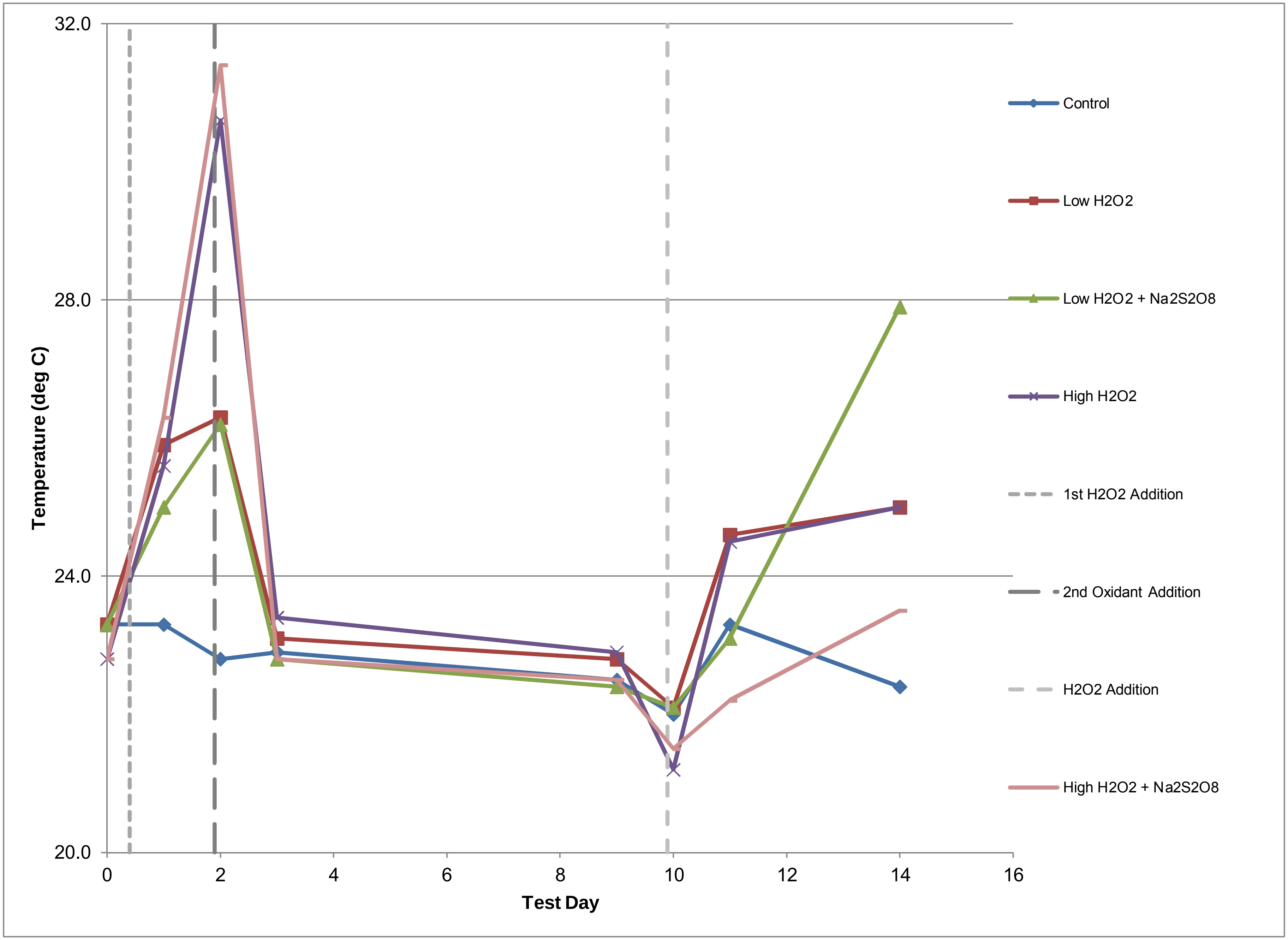
P/P/P Treatment Vessel(s) - Setup with maximum available soil, mixed, then dosed

Action	Process	Qty	Units	Action	Process	Qty	Units
Create 5% H2O2 Dose reactor(s)	gw add	3206		Create 12% H2O2 Dose Reactor	gw add	2776	
dose 1 - 50% perox added		297				732	
	RUN volume	3503			RUN volume	3508	
dose 2 - 50% perox added		65		to return peroxide to target conc.		238	
	RUN volume	3568			RUN volume	3746	
Collect: Anaytical Event 2	gw remove (approx)	2240			gw remove (approx)	2240	
	Vol remain (approx)	1328			Vol remain (approx)	1506	
dose 3 - 50% perox added	Vol added as below:	2246			Vol added as below:	2073	
	50% H2O2	248		to return peroxide to target conc.	50% H2O2	484	
	DI water	1998			DI water	1589	
	RUN volume	3574			RUN volume	3579	
	gw remove (approx)	2740			gw remove (approx)	2740	
	Vol remain (approx)	834		not free-water	Vol remain (approx)	839	

Action	Process	Qty	Units	Action	Process	Qty	Units
Create 5% H2O2 Dose reactor(s)	gw add	3206		Create 12% H2O2 Dose Reactor	gw add	2776	
dose 1 - 50% perox added		297				732	
	RUN volume	3503			RUN volume	3508	
dose 2 - 50% perox added		0		to return peroxide to target conc.		0	
	RUN volume	3503			RUN volume	3508	
Collect: Anaytical Event 2	gw remove (approx)	2240			gw remove (approx)	2240	
	Vol remain (approx)	1263			Vol remain (approx)	1268	
dose 3 - 50% perox added	Vol added as below:	2312			Vol added as below:	2307	
	50% H2O2	304		to return peroxide to target conc.	50% H2O2	684	
	DI water	2008			DI water	1623	
	RUN volume	3575			RUN volume	3575	
Collect: Anaytical Event 3	gw remove (approx)	2740			gw remove (approx)	2740	
	Vol remain (approx)	835		not free-water	Vol remain (approx)	835	



12
11
10
9
8
7
6
5
4
3
2
1
pH
0
2
4
6
8
10
12
14
16
Test Day
Control
Low H2O2
Low H2O2 + Na2S2O8
High H2O2
1st H2O2 Addition
2nd Oxidant Addition
H2O2 Addition
High H2O2 + Na2S2O8



32.0
28.0
24.0
20.0
Temperature (deg C)
0
2
4
6
8
10
12
14
16
Test Day
Control
Low H2O2
Low H2O2 + Na2S2O8
High H2O2
1st H2O2 Addition
2nd Oxidant Addition
H2O2 Addition
High H2O2 + Na2S2O8

Chemical Oxidation Bench Scale Treatability Study
Ithaca Court Street Former MGP Site OU-2

	pH	delta baseline	delta from last	ORP (mV)	Temp (oC)	delta baseline	delta from last	Headspace (ppm)
Baseline								
Control	7.15			-115	23.3			1.5
Low P-Only	7.16			-111	23.3			1.5
Low P-SPS	7.13			-104	23.3			1.5
High P-Only	7.95			-45	22.8			1.5
High P-SPS	8.00			-107	22.8			1.5
DOSE 1								
Immediate								
Control	7.15	0.00	0.00	-115	23.3	0.00	0.00	1.5
Low P-Only	6.33	-0.83	-0.83	297	25.9	2.60	2.60	1.5
Low P-SPS	6.32	-0.81	-0.81	308	25.0	1.70	1.70	1.5
High P-Only	5.84	-2.11	-2.11	324	25.6	2.80	2.80	1.5
High P-SPS	5.72	-2.28	-2.28	320	26.3	3.50	3.50	1.5
Day 1								
Control	7.29	0.14	0.14	-102	22.8	-0.50	-0.50	0
Low P-Only	6.02	-1.14	-0.31	305	26.3	3.00	0.40	0
Low P-SPS	6.04	-1.09	-0.28	310	26.2	2.90	1.20	0
High P-Only	5.67	-2.28	-0.17	330	30.6	7.80	5.00	0
High P-SPS	5.57	-2.43	-0.15	326	31.4	8.60	5.10	0
DOSE 2								
Immediate								
Control	7.30	0.15	0.01	-103	22.9	-0.40	0.10	0
Low P-Only	6.23	-0.93	0.21	293	23.1	-0.20	-3.20	0
Low P-SPS	11.45	4.32	5.41	318	22.8	-0.50	-3.40	0
High P-Only	6.31	-1.64	0.64	320	23.4	0.60	-7.20	0
High P-SPS	11.48	3.48	5.91	323	22.8	0.00	-8.60	0
Day 3	pH	delta baseline	delta from last	ORP (mV)	Temp (oC)	delta baseline	delta from last	Headspace (ppm)
Control	7.35	0.20	0.05	-98	22.5	-0.80	-0.40	0
Low P-Only	7.00	-0.16	0.77	268	22.8	-0.50	-0.30	0
Low P-SPS	10.83	3.70	-0.62	261	22.4	-0.90	-0.40	0
High P-Only	5.31	-2.64	-1.00	594	22.9	0.10	-0.50	0
High P-SPS	10.48	2.48	-1.00	381	22.5	-0.30	-0.30	0
Day 9	pH	delta baseline	delta from last	ORP (mV)	Temp (oC)	delta baseline	delta from last	Headspace (ppm)
Control	7.46	0.31	0.11	-75	22.0	-1.30	-0.50	0
Low P-Only	7.49	0.33	0.49	241	22.1	-1.20	-0.70	0
Low P-SPS	9.41	2.28	-1.42	323	22.1	-1.20	-0.30	0
High P-Only	7.02	-0.93	1.71	179	21.2	-1.60	-1.70	0
High P-SPS	5.52	-2.48	-4.96	582	21.5	-1.30	-1.00	0

	pH	delta baseline	delta from last	ORP (mV)	Temp (oC)	delta baseline	delta from last	Headspace (ppm)
DOSE 3								
Immediate								
Control	7.48	0.33	0.02	-63	23.3	0.00	1.30	0
Low P-Only	6.51	-0.65	-0.98	297	24.6	1.30	2.50	0
Low P-SPS	8.27	1.14	-1.14	148	23.1	-0.20	1.00	0
High P-Only	5.46	-2.49	-1.56	340	24.5	1.70	3.30	0
High P-SPS	4.86	-3.14	-0.66	413	22.2	-0.60	0.70	0
Day 11								
Control	7.54	0.39	0.06	-45	22.4	-0.90	-0.90	0
Low P-Only	6.35	-0.81	-0.16	291	25.0	1.70	0.40	0
Low P-SPS	6.88	-0.25	-1.39	253	27.9	4.60	4.80	0
High P-Only	5.78	-2.17	0.32	319	25.0	2.20	0.50	0
High P-SPS	4.46	-3.54	-0.40	395	23.5	0.70	1.30	0
Day 14								
Control	7.68	0.53	0.14	20	22.4	-0.90	0.00	0
Low P-Only	7.23	0.07	0.88	224	22.3	-1.00	-2.70	0
Low P-SPS	1.69	-5.44	-5.19	468	22.2	-1.10	-5.70	0
High P-Only	5.44	-2.51	-0.34	296	25.5	2.70	0.50	0
High P-SPS	1.23	-6.77	-3.23	533	27.2	4.40	3.70	0

Photograph 1. Field samples provided to the AECOM Treatability Laboratory consisted of a range of soil types including silty clay, sand, and gravel.

Photograph 2. Non-aqueous phase liquid was observed in field soil samples.

Photograph 3. Due to the large aqueous and soil sample volumes required, Phase II bench scale testing was performed in new five-gallon buckets. Off-gassing of oxygen gas was observed immediately following the addition of hydrogen peroxide to the soil slurry.

Photograph 4. Non-aqueous phase liquid was observed to be released from the soil after application of hydrogen peroxide during the testing.

ISCO Performance Criteria for Oxidant Dosage

AECOM

Ithaca Court Street Former MGP Site OU-2, Ithaca, New York

Subject: Establishing ISCO Performance Criteria for Oxidant Dosage

Performed by Patrick Gratton	Date 12/7/2011
Checked by Paul Dombrowski, PE	Date 12/13/2011

Summary: The ISCO performance criteria for Area 1C is to apply a pre-determined mass of oxidant to Area 1C. The purpose of this calculation is to establish the total oxidant to be specified as the Performance Criteria.

Chemical oxidation bench scale testing was performed by AECOM using highly-impacted soils from Area 1C, and soil-slurry reactors were dosed to achieve a 5% aqueous concentration of hydrogen peroxide and then added a second oxidant dosage to achieve 15% concentration of sodium persulfate. Through this combination of oxidants, aqueous concentrations of BTEX, PAHs, GRO, and DRO were reduced by greater than 80 percent in the reactor vessel, along with reductions in soil concentrations.

This calculation extrapolates the bench test dosages to determines the quantity of oxidant required to deliver the equivalent oxidant dosage to the pore volume within the targeted treatment zone of Area 1C.

Assumptions:

1) The MGP impacts are typically located in a coarse gravel/fine sand layer that is approximately 0.5 to 2.0 feet thick located between two confining layers of silty clay. It is anticipated that injection wells will be screened across the bottom of the upper clay, the coarse gravel/fine sand layer, and the top of the lower clay. However, it is assumed that the gravel/sand layer is where a significant fraction of the MGP impacts have traveled and are located and where a significant portion of the injected volumes will travel. For this calculation, the average treatment thickness of the sand/gravel layer (1.3 feet within 15 borings across Area 1C) with a 25% safety factor will be used for determining pore volume in the treatment area.

2) Porosity assumed to be 0.3 based off the vertical treatment thickness consisting of gravel (0.25 -0.40) and sand (0.25-0.50) having the associated porosity ranges

2) Treatment area for Area 1C is 4,900 square feet. Treatment area around boring SB-168 is assumed to be approximately 115 square feet (6' ROI)

3) For the treatment area around boring SB-168, 100% Remedial Design assumes only activated persulfate will be applied.

Peroxide (5% Pore Volume Concentration)

Total ISCO Area	4900	sq ft	
Average Thickness [1]	1.62	ft	
Porosity [2]	0.3		
Pore Water Volume	2381	cu ft	
Pore Water Volume	17813	gallons	
Pore Water Weight	148381	lbs	
Oxidant Concentration (mass/mass) =	Mass Oxidant / (Mass Water + Mass Oxidant)		
Desired Peroxide Concentration	5%		Mass Basis
Mass Peroxide Required	7810	lbs	
Assumed Peroxide Concentration Shipped	27%		
Mass 27% Peroxide (w/w) Required	28924	lbs	
Density of 27% Peroxide	9.3	lb/gal	
Volume of 27% Peroxide Required	3110	gals	

Persulfate (15% Pore Volume Concentration)

Total ISCO Area	5015	sq ft	
Average Thickness [1]	1.62	ft	
Porosity [2]	0.3		
Pore Water Volume	2437	cu ft	
Pore Water Volume	18231	gallons	
Pore Water Weight	151864	lbs	
Oxidant Concentration (mass/mass) =	Mass Oxidant / (Mass Water + Mass Oxidant)		
Desired Persulfate Concentration	15%		Mass Basis
Mass Persulfate Required	26799	lbs	

Note: persulfate is shipped in 2,200 lb super-sacks. Therefore the performance criteria will be 26,400 lbs (12 super-sacks)

Vertical Treatment Intervals Based on Observed MGP Impacts

Table 4-1
Vertical ISCO Treatment Intervals in Area 1C From Observed MGP Impacts
Ithaca Court Street Former MGP Site OU-2
Ithaca, New York

Boring/ Monitoring Well	Depth to Groundwater (ft)[1]	Top of Gravel/ Sand Layer (ft bgs)	Top of Lower Clay Layer (ft bgs)	Coarse Sand/Gravel Layer Thickness (ft)	Visible Tar/Blebs (ft bgs)	Description of MGP Impact	Max PID in Gravel/Sand (ppmv)	PID in lower clay (ppmv)	Injection Interval (ft bgs)	Injection Points
MW-C12	6.59	12.5	15	2.5	None	High groundwater concentrations (GRO=3500 ug/L, DRO=2600 ug/L, BTEX=2378 ug/L); Soil exceeds Residential SCGs for Ethylbenzene at 10-12' & 13-15' 5" of black staining and spots of coal tar noted at 10 feet in adjacent boring SB-108	17.3	0.7		
HP-2	NM	No Boring Log Prepared				NYSDEC field notes indicated NAPL on drilling rods.				
MW-C13	6.50	11	12	1	None	DRO in groundwater = 570 ug/L	0	0	10-15'	AC-25, AC-26, AC-31 to AC-42
MW-C14	5.90	12	13	1	None					
SB-133	NM	12.25	13.5	1.25	None		2.5	1		
MW-C17	6.59	10	11.5 (gravel lens noted at 12-12.2 ft bgs)	1.5	12-12.2	Trace NAPL blebs noted in gravel lens Soil concentrations exceed Residential SCGs (11-13')	5.1	4.3		
SB-52	NM	15.2	15.9	0.7	15-16	Trace fine gravel with NAPL	83.2	NM	11-17'	AC-14, AC-20
C20	NM	A distinct gravel/sand layer between clay was not observed at this location, with the exception of a thin fine sand lens observed at 13.7 ft bgs.			10-14	NAPL observed in organic veins between 10 to 13.7' bgs Saturated NAPL observed at 13.7-14' bgs	367	26.1		
C24	NM	9.8	14	4.2	11-14	Some NAPL Blebs (11-13.5') & NAPL Saturated (13.5-14')	261	1.2	10-16'	AC-8 to AC-13 AC-15 to AC-19 AC-21 to AC-24 AC-27 to AC-30
C18	NM	11	11.5	0.5	11-12, 12-14	Little NAPL Stringers (11-12) & Trace NAPL Blebs (12-14)	117	36.2		
MW-C16	6.09	11	11.75	0.75	11.3-11.6	Little non-viscous NAPL	41.3	36.5		
SB-161	NM	13	13.5	0.5	13-13.5	Non-viscous black NAPL	66.4	3.5		
C19	NM	9.8	12	2.2	9.8-10; 11.6-12	Trace NAPL Blebs (9.8-10) & NAPL Saturated (11.6-12)	245	168		
C22	NM	10	10.5	0.5	None				9-14'	AC-1 to AC-7
SB-132	NM	20	22	2	None		0.2	0.1		

Notes:
1. Depth to water measurements taken from top of PVC riser within flushmounted roadboxes on August 11, 2011.
NM - Not Measured
NE- Not Encountered

Appendix J

Chemical Oxidation Supporting Materials

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

Chemical Oxidation Supporting Materials
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

MATERIAL SAFETY DATA SHEET

Hydrogen Peroxide (20 to 40%)

MSDS Ref. No.: 7722-84-1-3
Date Approved: 06/03/2008
Revision No.: 11

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200 and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Hydrogen Peroxide (20 to 40%)
ALTERNATE PRODUCT NAME(S):	Durox® Reg. & LR 35%, Oxypure® 35%, Standard 27.5 & 35%, Super D® 25 & 35, Technical 35%, HTP 35%, OHP 35%, Chlorate Grade, 20%, Semiconductor Reg, Seg, RGS, RGS 2, RGS 3, 31%
GENERAL USE:	Durox® 35% Reg. & LR - meets the Food Chemical Codex requirements for aseptic packaging and other food related applications. Oxypure® 35% - certified by NSF to meet NSF/ANSI Standard 60 requirements for drinking water treatment. Standard 27.5 and 35% - most suitable grade for industrial bleaching, processing, pollution abatement and general oxidation reactions. Semiconductor Reg, Seg, RGS, RGS 2, RGS 3, 31% - conform to ACS and Semi Specs. for wafer etching and cleaning, and applications requiring low residues. Super D® 25 and 35% - meets US Pharmacopoeia specifications for 3% topical solutions when diluted with proper quality water. While manufactured to the USP standards for purity and to FMC's demanding ISO 9002 quality standards, FMC does not claim that it's Hydrogen Peroxide is manufactured in accordance with all pharmaceutical cGMP conditions. Technical 35% - essentially free of inorganic metals suitable for chemical synthesis. HTP 35% - specially formulated for aerospace equipment conditioning. OHP 35% - specially formulated for OHP process, advanced oxidation, and activated peroxide applications Chlorate Grade 20% - specially formulated for use in chlorate manufacture or processing.

MANUFACTURER

FMC CORPORATION
FMC Peroxygens
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)
msdsinfo@fmc.com (Email - General Information)

FMC of Canada Ltd.
FMC Peroxygens
PG Pulp Mill Road
Prince George, BC V2N2S6
(250) 561-4200 (General Information)

EMERGENCY TELEPHONE NUMBERS

(281) 474-8750 (Plant: Pasadena, TX, US - Call Collect)
(250) 561-4221 (Plant: Prince George, BC, Canada - Call Collect)
(303) 595-9048 (Medical - U.S. - Call Collect)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A.)
(613) 996-6666 (CANUTEC - Canada)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Clear, colorless, odorless liquid
- Oxidizer.
- Contact with combustibles may cause fire.
- Decomposes yielding oxygen that supports combustion of organic matters and can cause overpressure if confined.
- Corrosive to eyes, nose, throat, lungs and gastrointestinal tract.

POTENTIAL HEALTH EFFECTS: Corrosive to eyes, nose, throat and lungs. May cause irreversible tissue damage to the eyes including blindness. May cause skin irritation.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Hydrogen Peroxide	7722-84-1	20 - 40	231-765-0	O, C, Xn; R5- R8-R35-R20/22
Water	7732-18-5	60 - 80	231-791-2	Not classified

4. FIRST AID MEASURES

EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: Hydrogen peroxide at these concentrations is a strong oxidant. Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the unlikelihood of systemic effects, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Flood with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire.

FIRE FIGHTING PROCEDURES: Any tank or container surrounded by fire should be flooded with water for cooling. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: No data available

SENSITIVITY TO STATIC DISCHARGE: No data available

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Dilute with a large volume of water and hold in a pond or diked area until hydrogen peroxide decomposes. Hydrogen peroxide may be decomposed by adding sodium metabisulfite or sodium sulfite after diluting to about 5%. Dispose according to methods outlined for waste disposal.

Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed with large amounts of water to ensure that all hydrogen peroxide is removed. Residual hydrogen peroxide that is allowed to dry (upon evaporation hydrogen peroxide can concentrate) on organic materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

7. HANDLING AND STORAGE

HANDLING: Wear chemical splash-type monogoggles and full-face shield, impervious clothing, such as rubber, PVC, etc., and rubber or neoprene gloves and shoes. Avoid cotton, wool and leather. Avoid excessive heat and contamination. Contamination may cause decomposition and generation of oxygen gas which could result in high pressures and possible container rupture. Hydrogen peroxide should be stored only in vented containers and transferred only in a prescribed manner (see FMC Technical Bulletins). Never return unused hydrogen peroxide to original container, empty drums should be triple rinsed with water before discarding. Utensils used for handling hydrogen peroxide should only be made of glass, stainless steel, aluminum or plastic.

STORAGE: Store drums in cool areas out of direct sunlight and away from combustibles. For bulk storage refer to FMC Technical Bulletins.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of vapor or mist into the work environment.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Hydrogen Peroxide	1 ppm (TWA)	1 ppm (PEL) 1.4 mg/m^3 (PEL)	

ENGINEERING CONTROLS: Ventilation should be provided to minimize the release of hydrogen peroxide vapors and mists into the work environment. Spills should be minimized or confined immediately to prevent release into the work area. Remove contaminated clothing immediately and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use chemical splash-type monogoggles and a full-face shield made of polycarbonate, acetate, polycarbonate/acetate, PETG or thermoplastic.

RESPIRATORY: If concentrations in excess of 10 ppm are expected, use NIOSH/DHHS approved self-contained breathing apparatus (SCBA), or other approved atmospheric-supplied respirator (ASR) equipment (e.g., a full-face airline respirator (ALR)). DO NOT use any form of air-purifying respirator (APR) or filtering facepiece (AKA dust mask), especially those containing oxidizable sorbants such as activated carbon.

PROTECTIVE CLOTHING: For body protection wear impervious clothing such as an approved splash protective suit made of SBR Rubber, PVC (PVC Outershell w/Polyester Substrate), Gore-Tex (Polyester trilaminate w/Gore-Tex), or a specialized HAZMAT Splash or Protective Suite (Level A, B, or C). For foot protection, wear approved boots made of NBR, PVC, Polyurethane, or neoprene. Overboots made of Latex or PVC, as well as firefighter boots or specialized HAZMAT boots are also permitted. DO NOT wear any form of boot or overboots made of nylon or nylon blends. DO NOT use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

GLOVES: For hand protection, wear approved gloves made of nitrile, PVC, or neoprene. DO NOT use cotton, wool or leather for these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Thoroughly rinse the outside of gloves with water prior to removal. Inspect regularly for leaks.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Odorless
APPEARANCE:	Clear, colorless liquid
AUTOIGNITION TEMPERATURE:	Non-combustible
BOILING POINT:	103ºC/218ºF (20%); 107ºC/225ºF (31%); 108ºC/226ºF (35%)
COEFFICIENT OF OIL / WATER:	Not available
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	> 1 (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
FREEZING POINT:	-15ºC/6ºF (20%); -26ºC/-15ºF (31%); -33ºC/-27ºF (35%)
ODOR THRESHOLD:	Not available
OXIDIZING PROPERTIES:	Strong oxidizer
PERCENT VOLATILE:	100
pH:	<= 3.7 5.0 - 6.0 @ 25 °C (1% solution)
SOLUBILITY IN WATER:	100 %
SPECIFIC GRAVITY:	1.07 @ 20ºC/4ºC (20%); 1.11 @ 20ºC/4ºC (31%); 1.13 @ 20ºC/4ºC (35%)
VAPOR DENSITY:	(Air = 1): Not available
VAPOR PRESSURE:	28 mmHg @ 30ºC (20%); 24 mmHg @ 30ºC (31%); 23 mmHg @ 30ºC (35%)

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat or contamination could cause product to become unstable.
STABILITY:	Stable (heat and contamination could cause decomposition)
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Reducing agents, wood, paper and other combustibles, iron and other heavy metals, copper alloys and caustic.
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxygen which supports combustion.

COMMENTS: Materials to Avoid : Dirt, organics, cyanides and combustibles such as wood, paper, oils, etc.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: 35% hydrogen peroxide: Extremely irritating/corrosive (rabbit) [FMC Study Number: I83-748]

SKIN EFFECTS: 35% hydrogen peroxide: Mildly irritating after 4-hour exposure (rabbit) [FMC Study Number: I83-747]

DERMAL LD_{50}: 35% hydrogen peroxide: > 2,000 mg/kg (rabbit) [FMC Study Number: I83-746]

ORAL LD_{50}: 35% hydrogen peroxide: 1,193 mg/kg (rat) [FMC Study Number: I83-745]

INHALATION LC_{50}: 50% hydrogen peroxide: > 0.17 mg/l (rat) [FMC Study Number: I89-1080]

TARGET ORGANS: Eyes, nose, throat and lungs

ACUTE EFFECTS FROM OVEREXPOSURE: Extremely irritating/corrosive to eyes and gastrointestinal tract. May cause irreversible tissue damage to the eyes including blindness. Inhalation of mist or vapors may be severely irritating to nose, throat and lungs. May cause skin irritation.

CHRONIC EFFECTS FROM OVEREXPOSURE: The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for carcinogenicity of hydrogen peroxide in humans, but limited evidence in experimental animals (Group 3 - not classifiable as to its carcinogenicity to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that hydrogen peroxide is a 'Confirmed Animal Carcinogen with Unknown Relevance to Humans' (A3).

CARCINOGENICITY:

Chemical Name	IARC	NTP	OSHA	Other
Hydrogen Peroxide	Not listed	Not listed	Not listed	(ACGIH) Listed (A3, Animal Carcinogen)

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: Channel catfish 96-hour LC_{50} = 37.4 mg/L
Fathead minnow 96-hour LC_{50} = 16.4 mg/L
Daphnia magna 24-hour EC_{50} = 7.7 mg/L
Daphnia pulex 48-hour LC_{50} = 2.4 mg/L
Freshwater snail 96-hour LC_{50} = 17.7 mg/L
For more information refer to ECETOC "Joint Assessment of Commodity Chemicals No. 22, Hydrogen Peroxide." ISSN-0773-6339, January 1993

CHEMICAL FATE INFORMATION: Hydrogen peroxide in the aquatic environment is subject to various reduction or oxidation processes and decomposes into water and oxygen. Hydrogen peroxide half-life in freshwater ranged from 8 hours to 20 days, in air from 10-20 hrs. and in soils from minutes to hours depending upon microbiological activity and metal contaminants.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: An acceptable method of disposal is to dilute with a large amount of water and allow the hydrogen peroxide to decompose followed by discharge into a suitable treatment system in accordance with all regulatory agencies. The appropriate regulatory agencies should be contacted prior to disposal.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Hydrogen peroxide, aqueous solutions with not less than 20% but not more than 40% hydrogen peroxide
PRIMARY HAZARD CLASS / DIVISION:	5.1 (Oxidizer)
UN/NA NUMBER:	UN 2014
PACKING GROUP:	II
LABEL(S):	Oxidizer, Corrosive
PLACARD(S):	5.1 (Oxidizer)

ADDITIONAL INFORMATION:

DOT Marking: Hydrogen Peroxide, aqueous solution with not less than 20%, but not more than 40% Hydrogen Peroxide, UN 2014

Hazardous Substance/RQ: Not applicable

49 STCC Number: 4918775

DOT Spec: stainless steel/high purity aluminum cargo tanks and rail cars. UN Spec: HDPE drums. Contact FMC for specific details.

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME:

Hydrogen peroxide, aqueous solutions with not less than 20%, but not more than 60% hydrogen peroxide.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME:

Hydrogen peroxide, aqueous solutions with not less than 20%, but not more than 40% hydrogen peroxide (*).

OTHER INFORMATION:

(*) Air regulations permit shipment of Hydrogen Peroxide (20 - 40%) in non-vented containers for Air Cargo Only aircraft, as well as for Passenger and Cargo aircraft. HOWEVER, all FMC Hydrogen Peroxide containers are vented and therefore, air shipments of FMC H_20_2 is not permitted. IATA air regulations state that venting of packages containing oxidizing substances is not permitted for air transport.

Protect from physical damage. Keep drums in upright position. Drums should not be stacked in transit. Do not store drum on wooden pallets.

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):

Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):

Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.: None, (conc. <52%)

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Unlisted (Hydrogen Peroxide 20-40%); RQ = 100 lbs.; Ignitability, Corrosivity

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):
Waste Number: D001, D002

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Hazard Classification / Division:	C E D2B
Product Identification Number:	2014
Ingredient Disclosure List:	Listed
Domestic Substance List:	All components listed

INTERNATIONAL LISTINGS

Hydrogen peroxide:

China: Listed
Japan (ENCS): (1)-419
Korea: KE-20204
Philippines (PICCS): Listed

HAZARD AND RISK PHRASE DESCRIPTIONS:

EC Symbols:	O	(Oxidizer)

	C	(Corrosive)
	Xn	(Harmful)
EC Risk Phrases:	R5	(Heating may cause an explosion.)
	R8	(Contact with combustible material may cause fire)
	R35	(Causes severe burns.)
	R20/22	(Harmful by inhalation and if swallowed.)

16. OTHER INFORMATION

HMIS

Health	3
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	H

Protection = H (Safety goggles, gloves, apron, the use of a supplied air or SCBA respirator is required in lieu of a vapor cartridge respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	3
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA (National Fire Protection Association)

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
This MSDS replaces Revision #10, dated April 27, 2006.

Changes in information are as follows:
Section 1 (Product and Company Identification)
Section 3 (Composition / Information on Ingredients)
Section 15 (Regulatory Information)
Section 16 (Other Information)

Durox, Oxypure, Super D and FMC Logo - FMC Trademarks

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KLOZUR

FMC

Technical data

Klozur™

Environmental grade persulfate
CAS No. 7775-27-1

Typical formula by weight percent	$Na_2S_2O_8$	99% MW 238.1 g/mol
Active oxygen content		6.7%
pH of solution strength	**wt%**	**pH**
	20%	5.9
	Note: pH of solution will decrease over time.	

Typical properties

Odor	none
Appearance	white crystals
Melting point	decomposes
Solubility @ 25°C	73 grms/100 grms H_2O
Loose bulk density, lb/ft^3	69.9
Crystal density, g/cc	2.59

Typical metallic impurity concentrations (ppm)

Iron	2
Copper	<0.2
Chromium	<0.15
Lead	<0.2

Uses

Chemical oxidation of organic contaminants in conjunction with FMC Activation Chemistries

Shipment/container information:

DOT Classification: 5.1 (Oxidizer), yellow Oxidizer label.
55 lb (25 kg) polyethylene bag;
225 lb (102.3 kg) fiber drum with polyethylene liner;
2,200 lb (1,000 kg) woven polypropylene sack with polyethylene liner

HMIS classification:

Health	1
Flammability	0
Physical hazard	1
Personal protection	J

FMC Corporation Active Oxidants Division 1735 Market Street Philadelphia, Pennsylvania 19103 215-299-6000

MATERIAL SAFETY DATA SHEET

Klozür™

MSDS Ref. No.: 7775-27-1-12
Date Approved: 02/22/2005
Revision No.: 1

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Klozür™
SYNONYMS:	Sodium Persulfate, Sodium Peroxydisulfate; Disodium Peroxydisulfate
GENERAL USE:	In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications.

MANUFACTURER

FMC CORPORATION
Active Oxidants Division
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)

EMERGENCY TELEPHONE NUMBERS

(800) 424-9300 (CHEMTREC - U.S.)
(303) 595-9048 (Medical - Call Collect)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- White, odorless, crystals
- Oxidizer.
- Decomposes in storage under conditions of moisture (water/water vapor) and/or excessive heat causing release of oxides of sulfur and oxygen that supports combustion. Decomposition could form a high temperature melt. See Section 10 ("Stability and Reactivity").

POTENTIAL HEALTH EFFECTS: Airborne persulfate dust may be irritating to eyes, nose, lungs, throat and skin upon contact. Exposure to high levels of persulfate dust may cause difficulty in breathing in sensitive persons.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Sodium Persulfate	7775-27-1	>99	231-892-1	Not classified as hazardous

4. FIRST AID MEASURES

EYES: Flush with plenty of water. Get medical attention if irritation occurs and persists.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: This product has low oral toxicity and is not irritating to the eyes and skin. Flooding of exposed areas with water is suggested, but gastric lavage or emesis induction for ingestions must consider possible aggravation of esophageal injury and the expected absence of system effects. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Deluge with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire. Presence of water accelerates decomposition.

FIRE FIGHTING PROCEDURES: Do not use carbon dioxide or other gas filled fire extinguishers; they will have no effect on decomposing persulfates. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: No data available

SENSITIVITY TO STATIC DISCHARGE: Not available

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Spilled material should be collected and put in approved DOT container and isolated for disposal. Isolated material should be monitored for signs of decomposition (fuming/smoking). If spilled material is wet, dissolve with large quantity of water and dispose as a hazardous waste. All disposals should be carried out according to regulatory agencies procedures.

7. HANDLING AND STORAGE

HANDLING: Use adequate ventilation when transferring product from bags or drums. Wear respiratory protection if ventilation is inadequate or not available. Use eye and skin protection. Use clean plastic or stainless steel scoops only.

STORAGE: Store (unopened) in a cool, clean, dry place away from point sources of heat, e.g. radiant heaters or steam pipes. Use first in, first out storage system. Avoid contamination of opened product. In case of fire or decomposition (fuming/smoking) deluge with plenty of water to control decomposition. For storage, refer to NFPA Bulletin 430 on storage of liquid and solid oxidizing materials.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of dust into work environment. Spills should be collected into suitable containers to prevent dispersion into the air.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Sodium Persulfate	0.1 mg/m^3 (TWA)		

ENGINEERING CONTROLS: Provide mechanical local general room ventilation to prevent release of dust into the work environment. Remove contaminated clothing immediately and wash before reuse.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use cup type chemical goggles. Full face shield may be used.

RESPIRATORY: Use approved dust respirator when airborne dust is expected.

PROTECTIVE CLOTHING: Normal work clothes. Rubber or neoprene footwear.

GLOVES: Rubber or neoprene gloves. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

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9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	None
APPEARANCE:	White crystals
AUTOIGNITION TEMPERATURE:	Not applicable. No evidence of combustion up to 800°C. Decomposition will occur upon heating.
BOILING POINT:	Not applicable
COEFFICIENT OF OIL / WATER:	Not applicable
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	Not applicable (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
MELTING POINT:	Decomposes
ODOR THRESHOLD:	Not applicable
OXIDIZING PROPERTIES:	Oxidizer
PERCENT VOLATILE:	Not applicable
pH:	typically 5.0 - 7.0 @ 25 °C (1% solution)
SOLUBILITY IN WATER:	73 % @ 25 °C (by wt.)
SPECIFIC GRAVITY:	2.6 (H_2O=1)
VAPOR DENSITY:	Not applicable (Air = 1)
VAPOR PRESSURE:	Not applicable

---

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Heat, moisture and contamination.
STABILITY:	Stable (becomes unstable in presence of heat, moisture and/or contamination).
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Acids, alkalis, halides (fluorides, chlorides, bromides and iodides), combustible materials, most metals and heavy metals, oxidizable materials, other oxidizers, reducing agents, cleaners, and organic or carbon containing compounds. Contact

with incompatible materials can result in a material decomposition or other uncontrolled reactions.

HAZARDOUS DECOMPOSITION PRODUCTS: Oxygen that supports combustion and oxides of sulfur.

COMMENTS: PRECAUTIONARY STATEMENT: Pumping and transport of Klozür persulfate requires appropriate precautions and design considerations for pressure and thermal relief.

Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.

Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

SKIN EFFECTS: Non-irritating (rabbit) [FMC Study Number: ICG/T-79.029]

DERMAL LD_{50}: > 10 g/kg [FMC Study Number: ICG/T-79.029]

ORAL LD_{50}: 895 mg/kg (rat) [FMC Study Number: ICG/T-79.029]

INHALATION LC_{50}: 5.1 mg/l (rat) [FMC I95-2017]

SENSITIZATION: May be sensitizing to allergic persons. [FMC Study Number: ICG/T-79.029]

TARGET ORGANS: Eyes, skin, respiratory passages

ACUTE EFFECTS FROM OVEREXPOSURE: Dust may be harmful and irritating. May be harmful if swallowed.

CHRONIC EFFECTS FROM OVEREXPOSURE: Sensitive persons may develop dermatitis and asthma [Respiration 38:144, 1979]. Groups of male and female rats were fed 0, 300 or 3000 ppm sodium persulfate in the diet for 13 weeks, followed by 5000 ppm for 5 weeks. Microscopic examination of tissues revealed some injury to the gastrointestinal tract at the high dose (3000 ppm) only. This effect is not unexpected for an oxidizer at high concentrations. [Ref. FMC I90-1151, Toxicologist 1:149, 1981].

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	ACGIH: Not listed

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

Bluegill sunfish, 96-hour LC_{50} = 771 mg/L [FMC Study I92-1250]
Rainbow trout, 96-hour LC_{50} = 163 mg/L [FMC Study I92-1251]
Daphnia, 48-hour LC_{50} = 133 mg/L [FMC Study I92-1252]
Grass shrimp, 96-hour LC_{50} = 519 mg/L [FMC Study I92-1253]

CHEMICAL FATE INFORMATION: Biodegradability does not apply to inorganic substances.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Dispose as a hazardous waste in accordance with local, state and federal regulatory agencies.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Sodium Persulfate
PRIMARY HAZARD CLASS / DIVISION:	5.1 (Oxidizer)
UN/NA NUMBER:	UN 1505
PACKING GROUP:	III
LABEL(S):	5.1 (Oxidizer)
PLACARD(S):	5.1 (Oxidizer)
MARKING(S):	Sodium Persulfate, UN 1505
ADDITIONAL INFORMATION:	Hazardous Substance/RQ: Not applicable

49 STCC Number: 4918733

This material is shipped in 225 lb. fiber drums, 55 lb. poly bags and 1000 - 2200 lb. IBC's (supersacks).

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME: Sodium Persulfate

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME: Sodium Persulfate

OTHER INFORMATION:

Protect from physical damage. Do not store near acids, moisture or heat.

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not applicable

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.: None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Unlisted, RQ = 100 lbs., Ignitability

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):

Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):

Waste Number: D001

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number: 1505
Hazard Classification / Division: Class C (Oxidizer), Class D, Div. 2, Subdiv. B. (Toxic)
Ingredient Disclosure List: Listed

INTERNATIONAL LISTINGS

Sodium persulfate:
Australia (AICS): Listed
China: Listed
Japan (ENCS): (1)-1131
Korea: KE-12369
Philippines (PICCS): Listed

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

EC Symbols: (Not classified as hazardous)

EC Risk Phrases: (Not classified as hazardous)

EC Safety Phrases: (Not classified as hazardous)

16. OTHER INFORMATION

HMIS

Health	1
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	J

Protection = J (Safety goggles, gloves, apron & combination dust & vapor respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe

3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	1
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA = National Fire Protection Association

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:
New MSDS

Klozür and FMC Logo - FMC Trademarks

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FMC

Environmental Solutions

KLOZUR™
Power. Stability. Versatility.

Safe Handling, Use and Storage

Technical Bulletin

Background

Klozur™ sodium persulfate is a stable, highly soluble, crystalline material, which upon activation is capable of oxidizing a broad range of recalcitrant compounds. When properly handled and stored, sodium persulfate does not present a serious health hazard. However, as with all oxidizing chemicals, Klozur™ sodium persulfate requires careful attention to all aspects of handling and use. This bulletin covers the basic safe handling, use and storage practices for Klozur™ sodium persulfate. For more information, please refer to the Material Safety Data Sheet (MSDS), which is available from FMC.

Personal Protective Equipment

Eye protection – wear chemical goggles or a face shield whenever splashing, spraying or eye contact is possible.

Respiratory – use dust respirator approved by NIOSH/MSA whenever exposure may exceed the established standard listed in the MSDS.

Hands – wear general purpose neoprene gloves

Clothing – wear ordinary work close with long sleeves and full-length pants.

Footwear – wear shoes with chemical resistant soles (neoprene)

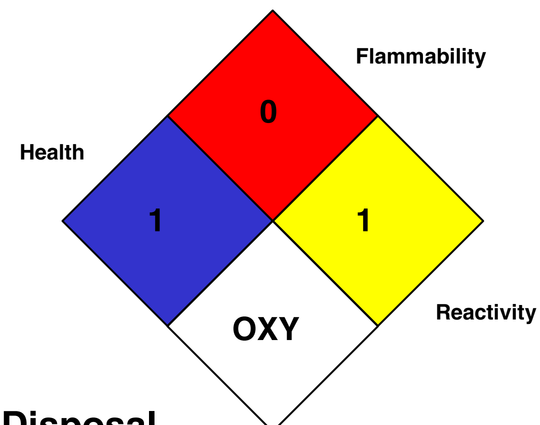
First Aid

Eye Contact – flush with water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

Skin Contact – wash with plenty of soap and water. If irritation occurs and persists, obtain medical attention. Wash clothing before reuse.

Inhalation – get fresh air. If breathing difficulty or discomfort occurs, call a physician.

Ingestion – drink one to two glasses of water. Do not induce vomiting. Call a physician immediately.



Disposal

Klozur™ persulfate crystals should never be discarded in trash bins. Contact with moisture, contaminants, and / or reducing agents can initiate a chemical reaction or persulfate decomposition. Persulfate crystals that become waste material are classified as hazardous waste, because they are oxidizers. Persulfate that is spilled on the floor, or otherwise contaminated, is best dissolved in copious amounts of water. Do not return spilled persulfate back to the original container.

Document: 01-03-AOD-DD. For questions, please contact the Environmental Industry Team (EIT) at 866-860-4760.

An acceptable disposal method for spent Klozur™ persulfate solutions is to dilute with large quantities of water and dispose via a treatment system. Any disposal method must be in full accordance with all local, state and federal agencies.

Neutralization of Klozur™ persulfate solutions may be performed, but must be done slowly with mild alkali (example: bicarbonate) with ample heat sink or cooling to prevent rapid temperature increases and gas release.

Materials Compatibility

304 and 316 stainless steel are recommended for mixing, conveyance and storage equipment (tanks, pipes, etc.) Other compatible materials include: polyvinyl chloride, polyethylene, Plexiglas®, Teflon®, chemical stoneware and glass.

Metals other than 304 and 316 stainless steel may cause persulfate decomposition, and in turn may be corroded by the persulfate. This is particularly true of Monel, copper, brass and iron. The pH of Klozur™ persulfate solutions will decrease over time, and may drop below a pH of 2.

Storage

Klozur™ persulfate should be kept in a cool, dry storage area. If stored in bulk, NFPA 430 guidelines should be followed.

Do not store or process Klozur™ persulfate solutions in sealed or closed containers or vessels. Normal solution decomposition will release oxygen gas, which may over-pressurize a sealed container and cause rupture.

Decomposition Hazard of Klozur™ Persulfate Crystals

Overheating or contamination of persulfate can lead to a self-accelerating decomposition. Persulfate decomposes to form solid sulfate salts and emit noxious fumes of SO_x. Oxygen and heat released from persulfate decomposition may induce combustion in flammable materials.

The only way to halt a decomposition event is to apply large quantities of water. One gallon of water per pound of decomposing material is recommended. Do not use less than a quart of water per pound of material, as this may intensify the decomposition.

Observe the following precautions to prevent decomposition:

Do not expose Klozur™ persulfate or their containers to moisture. Moisture reduces the decomposition temperature.

Do not store Klozur™ persulfate near incompatible materials: reducing agents, acids, bases, ammoniacal solutions, or alkaline cleaners.

Do not store near point sources of heat (steam pipes, electrical appliances, heating vents, gas flames radiant heaters, etc). Do no store in ambient temperatures above 113 ºF or 45 ºC

Do not return spilled or unused portions to the original container.

Do not use on hydrocarbon free product.

MSDS Number: **S4040** * * * * * *Effective Date:* ***01/25/06*** * * * * * *Supercedes:* ***07/07/04***

MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYDROXIDE SOLUTIONS AND CONCENTRATES

1. Product Identification

Synonyms: Sodium hydroxide, 0.2 to 2.0 normal volumetric solutions; DILUT-IT® analytical concentrates; Sodium Hydroxide Concentrate Solution StandARd®
CAS No.: 1310-73-2
Molecular Weight: 40.00
Chemical Formula: NaOH in water
Product Codes:
J.T. Baker: 0328, 0329, 0387, 0388, 0389, 0390, 3726, 4687, 4691, 4715, 5633, 5634, 5635, 5636, 5638, 5665, 5667
Mallinckrodt: 4693, H361, H380

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hydroxide	1310-73-2	0.8 - 8%	Yes
Water	7732-18-5	92 - 99%	No

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. HARMFUL IF SWALLOWED OR INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: White Stripe (Store Separately)

Potential Health Effects

The health effects from exposure to diluted forms of this chemical are not well documented. They are expected to be less severe than those for concentrated forms which are referenced in the descriptions below.

Inhalation:
Severe irritant. Effects from inhalation of mist vary from mild irritation to serious damage of the upper respiratory tract, depending on severity of exposure. Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.
Ingestion:
Corrosive! Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appears days after exposure.
Skin Contact:
Corrosive! Contact with skin can cause irritation or severe burns and scarring with greater exposures.
Eye Contact:
Corrosive! Causes irritation of eyes, and with greater exposures it can cause burns that may result in permanent impairment of vision, even blindness.
Chronic Exposure:
Prolonged contact with dilute solutions or dust has a destructive effect upon tissue.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician, immediately. Wash clothing before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Adding water to caustic solution generates large amounts of heat.
Special Information:
Use protective clothing and breathing equipment appropriate for the surrounding fire.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Do not flush caustic residues to the sewer. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.
US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRACIT®-2 or BuCAIM® caustic neutralizers are recommended for spills of this product.

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7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Protect from freezing. Always add the caustic to water while stirring; never the reverse. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do not store with aluminum or magnesium. Do not mix with acids or organic materials.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Sodium hydroxide:
-OSHA Permissible Exposure Limit (PEL):
2 mg/m3 Ceiling
-ACGIH Threshold Limit Value (TLV):
2 mg/m3 Ceiling

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Physical data is displayed for a 5% solution of sodium hydroxide.
Appearance:
Clear, colorless solution.
Odor:
Odorless.
Solubility:
Miscible in water.
Density:
5% solution: 1.05
pH:
14.0
% Volatiles by volume @ 21C (70F):
No information found.
Boiling Point:
102C (216F) (5% solution)
Melting Point:
-4C (25F) (5% solution)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
No hazardous decomposition products.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Sodium hydroxide in contact with acids and organic halogen compounds, especially trichloroethylene, may causes violent reactions. Contact with nitromethane and other similar nitro compounds causes formation of shock-sensitive salts. Contact with metals such as aluminum, magnesium, tin, and zinc cause formation of flammable hydrogen gas. Sodium hydroxide, even in fairly dilute solution, reacts readily with various sugars to produce carbon monoxide. Precautions should be taken including monitoring the tank atmosphere for carbon monoxide to ensure safety of personnel before vessel entry.
Conditions to Avoid:
Heat, moisture, incompatibles.

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11. Toxicological Information

Sodium hydroxide: irritation data: skin, rabbit: 500 mg/24H severe; eye rabbit: 50 ug/24H severe. Investigated as a mutagen.

```
--------\Cancer Lists\------------------------------------------------------
                                           ---NTP Carcinogen---
Ingredient                                 Known    Anticipated    IARC Category
------------------------------------       -----    -----------    -------------
Sodium Hydroxide (1310-73-2)                No          No             None
Water (7732-18-5)                           No          No             None
```

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12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM HYDROXIDE SOLUTION
Hazard Class: 8
UN/NA: UN1824
Packing Group: II
Information reported for product/size: 460LB

International (Water, I.M.O.)

Proper Shipping Name: SODIUM HYDROXIDE SOLUTION
Hazard Class: 8
UN/NA: UN1824
Packing Group: II
Information reported for product/size: 460LB

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15. Regulatory Information

```
 --------\Chemical Inventory Status - Part 1\---------------------------------
 Ingredient                                       TSCA  EC   Japan  Australia
 -----------------------------------------------  ----  ---  -----  ---------
 Sodium Hydroxide (1310-73-2)                      Yes  Yes   Yes      Yes
 Water (7732-18-5)                                 Yes  Yes   Yes      Yes

 --------\Chemical Inventory Status - Part 2\---------------------------------
                                                        --Canada--
 Ingredient                                       Korea  DSL   NDSL  Phil.
 -----------------------------------------------  -----  ---   ----  -----
 Sodium Hydroxide (1310-73-2)                      Yes   Yes   No     Yes
 Water (7732-18-5)                                 Yes   Yes   No     Yes

 --------\Federal, State & International Regulations - Part 1\----------------
                                            -SARA 302-    ------SARA 313------
 Ingredient                                 RQ    TPQ     List  Chemical Catg.
 -----------------------------------------  ---   -----   ----  --------------
 Sodium Hydroxide (1310-73-2)               No    No      No         No
 Water (7732-18-5)                          No    No      No         No

 --------\Federal, State & International Regulations - Part 2\----------------
                                                       -RCRA-    -TSCA-
 Ingredient                                 CERCLA     261.33     8(d)
 -----------------------------------------  ------     ------    ------
 Sodium Hydroxide (1310-73-2)               1000       No         No
 Water (7732-18-5)                          No         No         No


Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: No   Fire: No  Pressure: No
Reactivity: No          (Pure / Liquid)
```

Australian Hazchem Code: 2R
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
DANGER! CORROSIVE. HARMFUL IF SWALLOWED OR INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe mist.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, give several glasses of water or milk to drink. Vomiting may occur spontaneously, but DO NOT INDUCE! Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Photograph 1 – Active injection points were surrounded by caution tape, cones, and/or barriers.

Photograph 2 – Hose ramps were used in the street to protect hoses from passing traffic.

Photograph 3 – Close up view of hose ramps used in the street.

Appendix K

Draft Temporary Discharge Permit

April 2012

To be finalized with City by Contractor prior to remedial activities

ITHACA AREA WASTEWATER TREATMENT FACILITY

TOWN OF ITHACA   CITY OF ITHACA   TOWN OF DRYDEN   OWNERS
525 THIRD STREET
ITHACA, NEW YORK 14850

(607)273-8381
FAX (607)273-8433

TEMPORARY WASTEWATER DISCHARGE PERMIT

PERMIT NO. TP-2012, 02, 03

DATE: February 3, 2012

ISSUED TO: New York State Electric & Gas Corporation
James a Carrigg Center, 18 Link Drive
Binghamton, NY 13902-5224

BILL TO: Joseph M. Simone
New York State Electric & Gas Corporation
18 Link Drive, P.O. Box 5224
Binghamton, NY 13902-5224

PROJECT SITE: NYSEG Ithaca Court Street MGP Site #755008

CONTRACTOR: NYSEG

CONTACTS:	NYSEG Tracy Blazicek Remediation Project manager	office 607-762-8839 mobile 607-237-5325 fax 607-762-8451
	TBD (Wastewater Treatment)	office TBD mobile TBD fax TBD
	TBD (H & S Officer)	office TBD mobile TBD fax TBD
	TBD (Sample testing)	office TBD mobile TBD fax TBD

CONSIDERATIONS:

1. This temporary discharge is authorized by special permit in accordance with the City of Ithaca, Town of Ithaca and Town of Dryden Sewer Use Law. The cited law authorizes the undersigned to grant such permits.

2. The purpose of this discharge into the sanitary sewer is to support the site in the disposal of groundwater encountered during excavation operations.

3. The Remedial Design Work Plan, which describes the treatment and sampling of the collected water was well prepared and indicates a sound understanding of the regulations and the required protocol for this project.

PERMIT OBJECTIVES:

This permit is intended to meet the four major objectives of the General Pretreatment Regulations.

1. Prevent the introduction of substances in concentrations that would cause the POTW to violate its discharge permit. This is referred to as a pass through violation.

2. Prevent the introduction of substances in concentrations that would contaminate the resulting biosolids (sludge) and preventing beneficial reuse.

3. Prevent the introduction of substances in concentrations that would inhibit treatment processes.

4. Prevent the introduction of substances in concentrations that would be harmful to workers.

CONDITIONS:

1. The attached figures are from the record of decisions issued by NYSDEC for OU-1 and OU-2. Figure 2, for OU-1, shows the plant site located in the southwest corner of the site, which is currently known as the Markles Flats building. The area under and around this building will be excavated to approximately 17’. This area is within the gray colored block in the lower right of Figure 6. Figure 6, for OU-2, displays the areas 1A and 1B, which will be excavated to approximately 17'. Area 1C will receive in-situ soil treatment. No water will be removed from 1C. The approximate sizes of the areas to be excavated are noted below (these numbers are subject to change):
   Area 1A: 7,600 square feet;
   Area 1B: 3,700 square feet;
   Markles Flats Building Area: 9,300 square feet
   MGP impacted soil will be removed from the excavation areas. It is anticipated that groundwater will enter the open excavations. This groundwater will be removed by sump pumps and sent to

portable storage tanks located in the northwest corner of OU-1- before being treated, stored, tested and, if shown to meet standards, discharged into the sanitary sewer system.

2. Pretreatment will be done in the manner described in the Remedial Design Work Plan for the Ithaca Court Street Former Manufactured Gas Plant Site.

3. The treated water will be discharged into the sanitary sewer system at a manhole near the remediation site at a rate of no more than 100 gallons per minute.

4. The IAWWTF will be contacted prior to starting the treatment process and prior to discharging to the sanitary sewer. The anticipated start of work is October 2012.

5. IAWWTF personnel may inspect and/or sample during the process at anytime.

6. All other conditions of the sewer use laws are applicable.

7. The contractor is responsible for ensuring that no substance of concern enters the sanitary sewer in concentrations that would adversely affect the IAWWTF property or processes, cause pass through, or cause concern for worker safety.

8. All water discharged into the sanitary sewers will first be pumped through a totalization meter. This meter will provide an accurate measure of discharged waters for billing and permitting purposes. The contractor will record the amount of water discharged to the sanitary sewer on a daily basis and report the total flow for the month to the IAWWTF.

9. The contractor will arrange for samples to be collected, following EPA approved methods, for the following contaminants and have them analyzed, by an independent, certified laboratory, using EPA approved methods.

Parameter	**Sample type**	**Frequency**
Total Petroleum Hydrocarbons (EPA Method 1664)	Composite *	**
pH	Grab	**
Total suspended solids	Composite *	**
Pesticides/Herbicides (EPA Method 608)	Composite *	***
Volatile organics (EPA Method 624)	Grab	**
Semi volatile organics (EPA Method 625)	Composite *	**
Metals:	Composite *	**

Arsenic, Barium, Cadmium, Chromium (total), Chromium (hexavalent), Copper, Cyanide, Iron, Lead, Manganese, Nickel, Silver, Zinc (EPA Method 200.7) & Mercury (EPA Method 245.1)

* When batch tanks of treated wastewater are being individually discharged, 1 grab sample taken from a well mixed tank will substitute for a composite sample.

** The frequency of this sampling and analysis will be:

- During the first week of operations for each excavation area, every treated water batch tank or, if continuous flow conditions exist, 4 grab samples every other day.
- Once per tank or once per week (whichever is less) for the next three weeks;
- Once per tank or every other week (whichever is less) after four weeks of operation.

*** If the results of the first test for Pesticides/Herbicides from the treated water coming from any excavation site is non-detect, then this test does not need to be repeated for additional treated wastewater from that excavation site. This test must be done again when wastewater from a different excavation site is first treated.

A. This is the minimum analysis required and may be increased by the IAWWTF at the discretion of the Chief Operator or their designee.

B. Samples are to be taken from the batch tank after mixing or, when heavy use necessitates continuous discharge; composite samples must be collected at a minimum rate of one sample every 30 minutes at the point of discharge into the treated water holding tank for the duration of the discharge or 24 hours (whichever is less.)

C. The contractor shall pay for all cost associated with the above sampling and testing.

D. Laboratory reports must include chain of custody, quality assurance and quality control information.

E. Results of analysis shall be submitted to the IAWWTF within 24 hours of their receipt.

10. The contractor will inform this facility if any changes are made either in the form of operations or in the quantity or quality of the wastewater discharged to the collection system that might affect the characteristics of the wastewater.

11. Accidental Discharges: This facility must be notified immediately upon the contractor becoming aware of any spill or accidental discharge that might change the characteristics of the wastewater.

12. Any waste material generated as a result of the wastewater pretreatment process shall be disposed of in such a manner so as to prevent entry of such materials into navigable waters, ground water, storm drains, the POTW's Sewer System and the POTW's trucked waste receiving facilities. Detailed records of off-site shipment of such wastes shall be kept and a copy sent to the IAWWTF.

13. Detailed records of any maintenance done to the pretreatment system shall be kept.

14. This permit may be amended by the IAWWTF as conditions dictate.

PROHIBITED DISCHARGES:

1. NYSEG may not introduce into the IAWWTF any pollutant(s) which causes Pass Through or Interference. In addition, the following discharges to the IAWWTF by NYSEG are specifically prohibited:

   A. Storm- and surface waters, roof runoff, and subsurface drainage. These discharges shall be made only to such sewers as are specifically designated by the Chief Operator as storm sewers, or directly to waters of the state, as may be permitted under an applicable SPDES permit.

   B. Any liquids, solids, or gases which by reason of their nature or quantity are, or may be, sufficient, either alone or by interaction with other substances, to cause a fire or explosion hazard in the IAWWTF or be injurious in any other way to the IAWWTF, its operation, or the health or safety of the IAWWTF's workers. At no time shall a user discharge a waste stream with a closed cup flashpoint of less than 140º Fahrenheit or 60º Centigrade using the test methods specified in 40 CFR 261.21. Unless specifically authorized to do so by permit, no user shall discharge any quantity of the following materials: gasoline, kerosene, naphtha, benzene, toluene, xylene, fuel oil, ethers, ketones, aldehydes, chlorates, perchlorates, bromates, carbides, hydrides and sulfides, dry cleaning fluids, and any other substance which the Chief Operator, DEC, or the EPA has notified the user is a fire hazard or explosive hazard to the system. The preceding list of substances is not a comprehensive list of prohibited substances. If a substance meets the general criteria set out in the first two sentences of this subsection, it is prohibited.

   C. Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in plant piping or other interference with the proper operation of the IAWWTF, including, but not limited to: grease, garbage with particles greater than 1/2 inch in any dimension, animal guts or tissues, paunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, cinders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent grains, spent hops, waste paper, wood, plastics, rubber, tar, asphalt residues, residues from refining or processing of fuel or lubricating oil, mud, or glass grinding or polishing wastes.

   D. Wastewater having a pH less than 5.5 standard units, or greater than 11.0 standard units, or wastewater having any other corrosive or caustic property capable of causing damage or hazard to structures, equipment, and/or personnel at the IAWWTF.

   E. Wastewater containing pollutants in sufficient quantity or concentration to cause the discharge of toxic pollutants in toxic amounts from the IAWWTF into its receiving waters, or to exceed the limitations set forth in a national pretreatment standard, in a pretreatment requirement, including the pollutant limitations referenced at § 216-6 (local limits), or in this wastewater discharge permit.

F. Any pollutants which, either singly or by interaction with other wastes, result in the presence of toxic gases, vapors, or fumes within the IAWWTF in a quantity that may cause IAWWTF worker health and safety problems, or which create a public nuisance, or which create conditions sufficient to prevent entry into the piping or other portions of the IAWWTF for maintenance and repair.

G. Any substance which may cause the IAWWTF's effluent or other product of the IAWWTF, such as residues, sludges, or scums, to be unsuitable for disposal in any manner permitted by law or for reclamation and reuse, or to interfere with the reclamation process. In no case shall a substance discharged to the IAWWTF cause the IAWWTF to be in noncompliance with sludge use or disposal criteria, guidelines, or regulations developed under Section 405 of the Act; or with any criteria, guidelines, or regulations affecting sludge use or disposal developed pursuant to the Solid Waste Disposal Act, the Clean Air Act, or state criteria applicable to the sludge management method being used.

H. Any pollutants, including oxygen-demanding pollutants (BOD), released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the IAWWTF.

I. Any wastewater with objectionable color not removed in the treatment process, such as, but not limited to, dye wastes and vegetable tanning solutions.

J. Heat in amounts which will inhibit biological activity in the IAWWTF resulting in Interference, but in no case heat in such quantities that the temperature at the IAWWTF treatment plant exceeds 40°C (104°F.). In addition, the batch discharge temperature at the discharge point shall not exceed 140°F.

K. Any wastewater containing any radioactive wastes or isotopes of such half-life or concentration as may exceed limits necessary to comply with applicable state or federal regulations.

L. Any sludges or deposited solids resulting from an industrial pretreatment process. Sludges from food processing pretreatment processes may be discharged only if specifically allowed by permit.

M. Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass-through.

N. Any other trucked or hauled pollutants, except for those which are specifically permitted by the IAWWTF in discharge areas designated by the IAWWTF.

2. Except where expressly authorized to do so by an applicable Pretreatment Standard or Pretreatment Requirement, no Industrial User shall ever increase the use of process water or in any other way attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with either a Pretreatment Standard or Pretreatment Requirement.

3. In addition to the discharge prohibitions set forth above, the IAWWTF has developed specific discharge limitations, hereafter referred to as local limits, to prevent Pass Through and Interference and to protect the safety and health of IAWWTF workers. In no case shall a User's discharge to the IAWWTF violate the local limits, as they may be amended from time to time, and which are set forth in separate laws adopted by the municipalities (§ 216-50) and are listed in Section IV of this permit.

4. Applicable Categorical Pretreatment Standards which EPA has promulgated for specific industrial subcategories are hereby incorporated by reference. Where applicable Categorical Pretreatment Standards are more stringent than the local limits, Industrial Users in those subcategories shall comply with the more stringent Categorical Pretreatment Standards in accordance with the compliance timetables for each Categorical Pretreatment Standard mandated by EPA. If EPA modifies an existing Categorical Pretreatment Standard or promulgates a new Categorical Pretreatment Standard for a particular industrial subcategory, and that modified or new Categorical Pretreatment Standard contains limitations more stringent than the local limits, then upon its effective date the modified or new Categorical Pretreatment Standard shall immediately supersede, for Industrial Users in that subcategory, the local limits. The Chief Operator shall notify all affected Industrial Users of the applicable requirements under the Act, as well as of all requirements imposed by subtitles C and D of the Resource Conservation and Recovery Act.

DISCHARGE LIMITATIONS:

In addition to the discharge prohibitions set forth above, the POTW has developed specific discharge limitations, hereafter referred to as local limits (Table 1), to prevent Pass Through and Interference and to protect the safety and health of POTW workers. In no case shall a User's discharge to the POTW violate the local limits, as they may be amended from time to time, and which are set forth in separate laws adopted by the municipalities.

Table I: Local Discharge Limitations (§ 216-50)

Pollutant	Maximum Concentration 30 Day Average (mg/L)	Maximum Concentration 24 Hour Average (mg/L)	Instantaneous Concentration (mg/L)
Arsenic	n/a	0.6	n/a
Barium	80	240	n/a
Cadmium	2.5	7.5	n/a
Chromium, total	8	24	n/a
Chromium, hexavalent	1	3	n/a
Copper	2	6	n/a
Cyanide	0.2	0.6	n/a
Iron	180	540	n/a
Lead	n/a	20	n/a
Manganese	8	24	n/a
Mercury	1.5	4.5	n/a
Nickel	n/a	10	n/a
Silver	6	18	n/a
Zinc	20	35	n/a
pH (S.U.)	n/a	n/a	5.5-11.0 S.U.
Total Petroleum Hydrocarbons *	n/a	n/a	50

* EPA Method 1664

FEE:

1. The disposal fee for wastewater, pretreated to acceptable levels and approved for discharge to the sanitary sewer, will be $10.00 per 1,000 gallons. The amount of water discharged will be determined from the on-site totalization meter.

2. NYSEG will be billed directly, on a monthly basis.

DURATION:

This permit is effective immediately and expires on December 31, 2013. This permit may be amended by the IAWWTF as conditions dictate. This permit may be revoked due to the failure of the contractor to abide by the conditions of this permit. This permit may be revoked by the owners of this facility or their representative without notice or cause.

Permit issued by:

____________________________ Date: _____________________

Daniel Ramer
IAWWTF Chief Operator

Appendix L

NYSEG Overhead Electric and Underground Gas Relocation Plans

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY

April 2012

NYSEG Overhead Electric and Underground Gas Relocation Plans 100% Submittal Ithaca Court Street Former MGP Site OU-2 Ithaca, New York NYSDEC Site # 7-55-008

To be inserted when received and completely coordinated with NYSEG

Appendix M

City of Ithaca – Water and Sewer Details and Specifications

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY 12110

April 2012

City of Ithaca Water and Sewer Details and Specifications
100% Submittal
Ithaca Court Street Former MGP Site OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Water Specifications & Details

Specifications:

<u>Water Mains & Services</u>

<u>Water Pipe Class 52 Ductile Iron Push Joint Pipe</u>: Pipe shall be centrifugally cast for water conforming to ANSI/AWWA A21.5/C151, The asphaltic outside coating shall be in accordance with ANSI/AWWA A21.51/ C151. The cement-mortar lining and inside coating shall be in accordance with ANSI/AWWA A21.4/C104 and ANSI/NSF 61. Rubber Gaskets furnished shall be in accordance with ANSI/AWWA A21.11/C111. All coatings, sealants and linings shall be listed by NSF International and conform to the requirements of ANSI/NSF 61, Drinking Water System Components-Health Effects.

Retainer glands shall be Uni-Flange Series 1400 as manufactured by Ford or an approved equal. Retainer glands shall be wedge action type with gland body of high strength ductile iron per ASTM A536, Grade 65-45-12. Gland shall be compatible with all mechanical joints conforming to ANSI/AWWA A21.11/C111. Ductile iron wedge actuating screw heads shall be of break-away type when design torque is attained. Wedges shall be ductile iron, heat treated and hardened to 370 BHN minimum. Retainer Glands shall be provided packaged with all accessories, mechanical joint gasket, T-bolts and nuts.

<u>Ductile-Iron Mechanical Joint Compact Fittings for Water Service</u>: Fittings shall be ductile iron Class 350 and shall conform to all the requirements of ANSI/AWWA A21.53/C153. Fittings shall have protective asphaltic seal-coat and cement-mortar lining in accordance with ANSI/AWWA A21.4/C104. Rubber-Gasket Joints for Ductile Iron Pressure Pipe, Fittings, Accessories (glands, bolts and rubber gaskets) are to conform to ANSI/AWWA A21.11/C111.

Hydrant Tees shall be anchor type with rotating split anchor gland. Hydrant anchor pipe shall be Class 52 ductile iron mechanical joint pipe with rotating follower gland on each end.

<u>Hydrants:</u> Hydrants shall be Guardian as manufactured by Kennedy, Model #K-81-D. Hydrants shall have 5'-0" bury depth, a 5-1/4" valve opening, two 2-1/2" hose nozzles and one 4-1/2" steamer nozzle. Color shall be orange. Hydrants shall conform to the following; Hydrants shall be UL listed and FM approved. Hydrants shall conform to AWWA Standard C-502 latest revision. Hydrants shall be of the compression type, closing with line pressure. Hydrants shall be of the traffic model breakaway type. Hydrant cap and stuffing box shall be of a utilized, one piece design creating a water tight cavity without the use of gaskets. The combination of O-rings to a crimped brass ferrule around the stem shall seal the cavity from contact with water. An alemite fitting shall be supplied for periodic lubrication of the operating threads with grease. Operating nut shall be of one piece bronze construction. A dirt shield shall be provided to protect the operating mechanism from grit buildup and corrosion due to moisture. A thrust washer shall be supplied between the operating nut and stem lock nut to facilitate operation. Nozzles shall be of the tamper resistant, 1/4 turn type with O-ring seals and stainless steel retaining screws. An O-ring shall be provided to seal between the upper and lower barrels. The main valve shall be of synthetic rubber reinforced with steel. The seat shall be of a bronze ring threaded to a bronze insert in the hydrant shoe, with O-rings to seal the drainway and barrel from leakage of water in the shoe. Hydrant drain valve shall momentarily force flush with each operation. Drainway shall be of bronze. Drain valve facing shall be of synthetic rubber with a stainless steel retaining pin.

Hydrant extension kit shall be the model #K-8150 as manufactured by Kennedy.

Street Valve Boxes: (5 ¼”) shall be the 3-piece screw-type valve box as manufactured by Bingham & Taylor, Figure 4906, or approved equal. Individual components are as follows:

- #6 (11”) Round base
- 5 ¼” Drop in Lid (“WATER”)
- #55 (15”) Short Top Section
- #56 (26”) Long Top Section
- #58 (18”) Short Middle Section
- #59 (24”) Long Middle Section

Gate Valves; Gate valves shall be as manufactured by Kennedy, (#8571 regular valves, #8950 tapping valves, and #8576 cut-in valves) Kenseal II R/W valve with SMJ ends or approved equal conforming to the following; Valves shall open left. Valves shall conform to the latest revision of AWWA Resilient Seated gate valve Standard C-509, be UL listed and FM approved for service to 250 PSI, cold water, non-shock water works service and 200 PSI fire protection service. Flanges drilled to ANSI B-16.1 (125#). All internal parts shall be accessible without removing the body from the line. The wedge shall be of cast iron completely encapsulated with resilient material. The resilient sealing material shall be permanently bonded to the cast iron wedge with a rubber tearing bond to meet ASTM D 429. NRS stems shall be cast bronze with internal collars in compliance with AWWA. OS&Y stems shall be bronze. There shall be two "O" Ring seals above the thrust collar and one "O" Ring below the thrust collar. The two "O" Rings above the thrust collar shall be field replaceable without removing the valve from service. The third "O" Ring below facilitates such field replacement. There shall be low friction thrust bearings above and below the stem collar. The stem nut shall be independent of the wedge and of solid bronze. The waterway in the seat area shall be smooth, unobstructed and free of cavities. Stuffing box shall be attached to the bonnet and bonnet to the body with bolts and nuts. Blind bolts threaded directly into the body or bonnet will not be acceptable. The body and bonnet shall be coated interior and exterior with fusion bonded thermosetting plastic. Each valve shall be hydrostatically tested at 500 PSI.

Tapping Sleeves: Tapping sleeves shall be the FAST style sleeves as manufactured by Ford Meter Box Company or approved equal. Sleeves shall be constructed of Type 304 stainless steel with ASTM A36 carbon steel flange. Flange shall conform to AWWA C207 Class D ANSI 150# drilling. Studs, nuts, and washers shall be Type 304 stainless steel. Outlet gasket shall be gridded virgin Buna-N compounded for water service. Full gasket shall be gridded virgin SBR compounded for water service.

Copper Tubing for water service pipe shall conform to the specifications of ASTM B-88 Type K Copper. Copper tubing shall be supplied in 60-foot rolls for ¾” and 1” diameter and 40-foot rolls for 2” diameter.

Corporation valves shall be as manufactured by Ford, # FB1000Q, ballcorp corporation stop with CC x Comp. inlet/outlet for CTS O.D. tubing, or approved equal.

Water Service Curb Box (2-1/2") shall be as manufactured by Bingham & Taylor Figure 4901 Size Number 94-E (54") with optional top labeled "WATER" Figure Number 4901-B, or approved equal.

Sewer Laterals

SDR 35 PVC Sanitary Sewer Lateral Pipe: Pipe shall meet the requirements of the latest ASTM Standard D-3034. The pipe shall conform to the requirements of CSA B-182.2. Integral gasketed bell ends shall be provided on the pipe, the pipe joint must meet the requirements of ASTM Standard D-3212 and the sealing gasket meet the requirements of ASTM F-477. The D-3034 normal pipe length will be 14'+/-1".

Cast iron soil pipe and fittings: and shall conform to the requirements of CISPI Standard 301, ASTM A 888 or ASTM A 74 for all pipe and fittings. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute or approved equal. CI soil pipe shall be supplied in 5-foot lengths.

Sewer Lateral Clean-Out

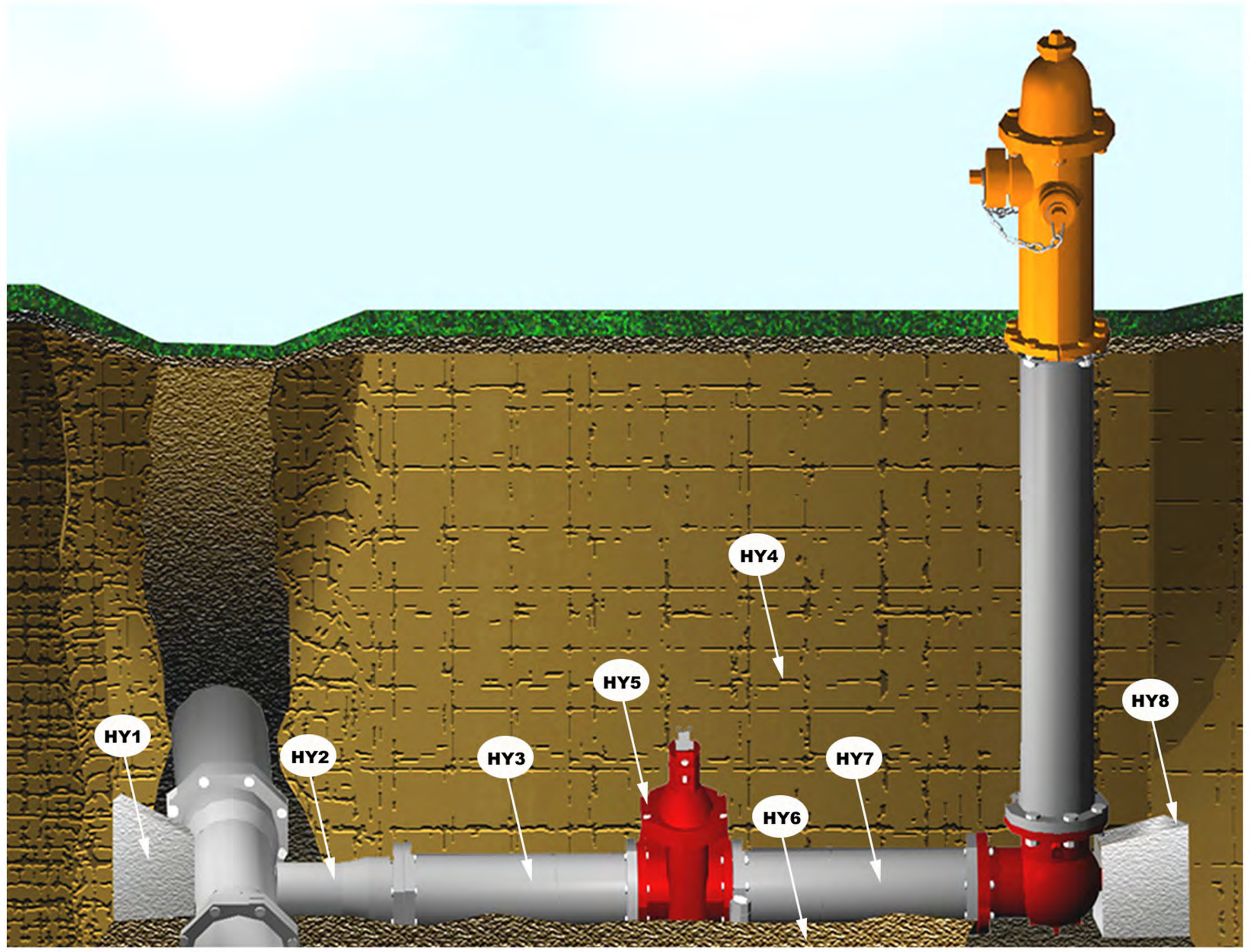
4" SDR-35 PVC Hub Adapter & Rubber Donut Seal: as manufactured by GPK Products Inc. part number 239-0004 or approved equal. Hub adapter with one hub connection for extra heavy cast iron and the other end a spigot connection for SDR-35 PVC. Sanitary Sewer Pipe SDR-35 PVC Fittings shall conform to ASTM D-3034, rubber sleeves and gaskets to conform to ASTM F477. Each hub adapters to be supplied with one 4" Multi-Tite riser donut rubber seal as manufactured by SERCO conforming to ASTM C564.

4" Cleanout Top Cast Iron with Brass Plug: as manufactured by Jumbo Manufacturing part number 185PACS or approved equal. Cleanout shall be Panella Type for use on extra heavy CI soil pipe riser end. Cleanout shall have a countersunk 3-1/2" brass plug.

DEPARTMENT OF PUBLIC WORKS
WATER & SEWER DIVISION
510 FIRST ST.
ITHACA, N.Y. 14850

SCALE: NONE
DATE: DEC 15, 2003
DRAWN BY: M.A.O.
CHECKED BY: E.W.
REVISED: ____

CITY OF ITHACA, N.Y. WATER DETAILS



HY1
FORMED CONC. THRUST BLOCK AGAINST UNDISTURBED SOIL.

HY2
CLASS 52 D.I. ANCHOR TEE.

HY3
CLASS 52 D.I. ANCHOR PIPE 6" MIN. DIAMETER.

HY4
BINGHAM & TAYLOR 3 PC. STREET VALVE BOX #6 ROUND BASE, #58 OR #59 MIDDLE SECTION, #55 OR #56 TOP SECTION AND #53 COVER (NOT SHOWN).

HY5
KENNEDY RESILIENT SEAT M.J. GATE VALVE.

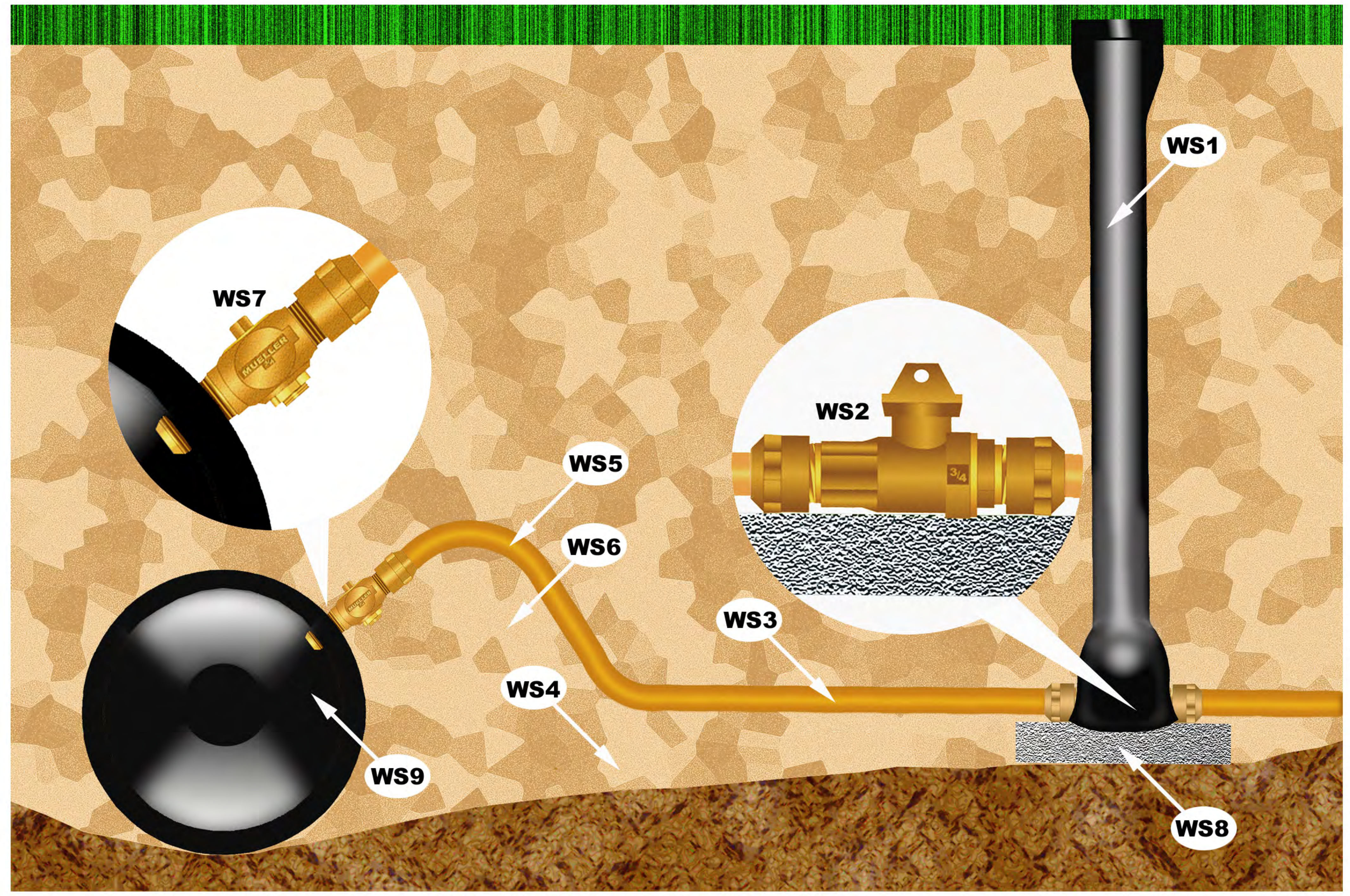
HY6
6" OF #2 STONE SURRONDING PIPE (NOT SHOWN).

HY7
CLASS 52 6" DIA. D.I. ANCHOR PIPE.

HY8
FORMED CONC. THRUST BLOCK AGAINST UNDISTURBED SOIL.

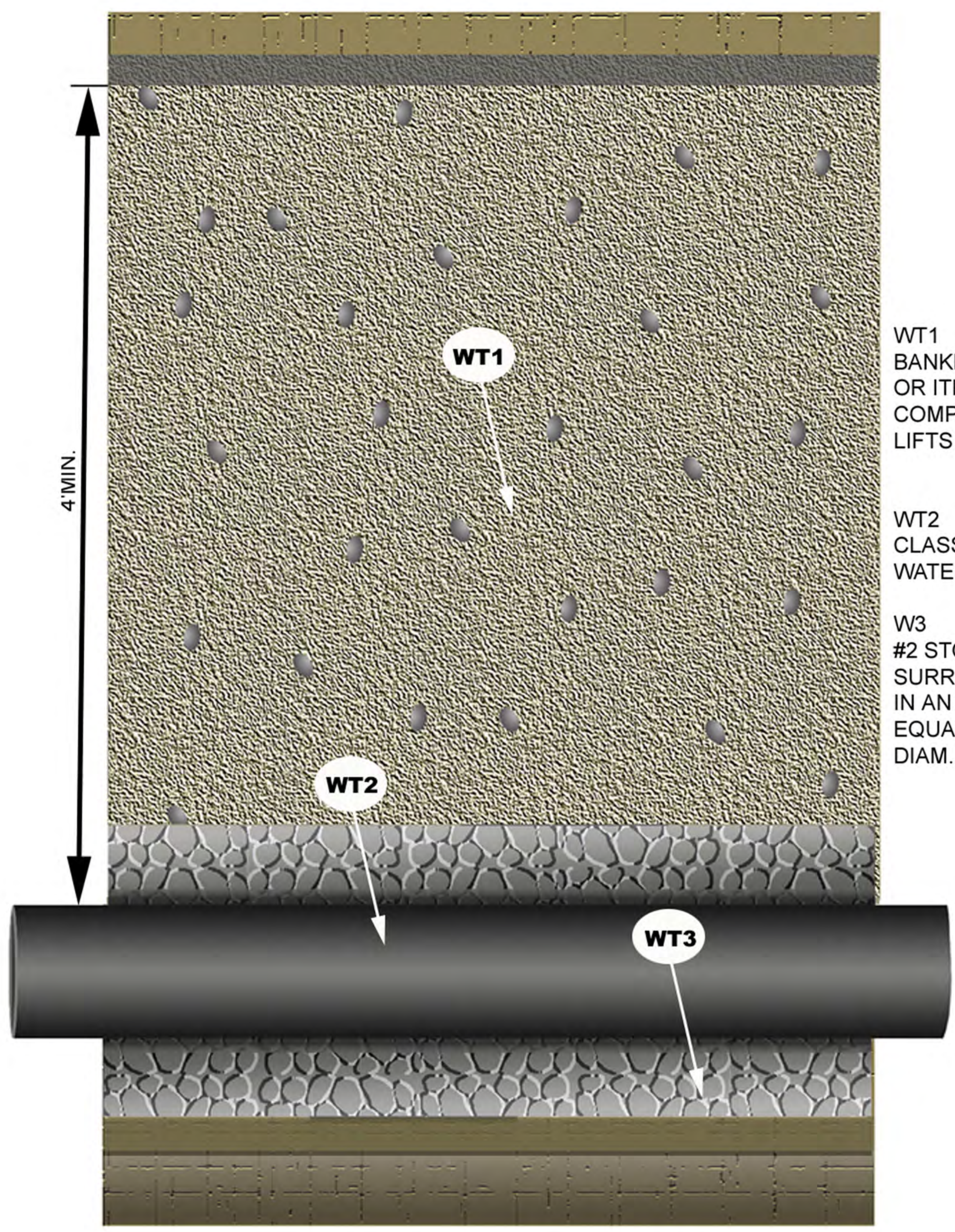
HY9
HYDRANT TYPE KENNEDY K810.

HYDRANT DETAIL



WS1
BUFFALO STYLE CURB BOX WITH OUT OP. ROD.
WS2
MUELLER COMPRESSION STOP
WS3
MIN. 3/4"TYPE "K" COPPER PIPE.
WS4
SEE WATER SERVICE TRENCH DETAIL THIS SHEET.
WS5
GOOSE NECK.
WS6
GOOSE NECK TO BE SUPPORTED BY #2 STONE UNDER & OVER PIPE (NOT SHOWN).
WS7
MUELLER COMPRESSION CORPORATION STOP.
WS8
FLAT STONE OR CONC. BRICK FOR CURB BOX TO REST ON.
WS9
CLASS 52 D.I. WATERMAIN.

WATER SERVICE DETAIL

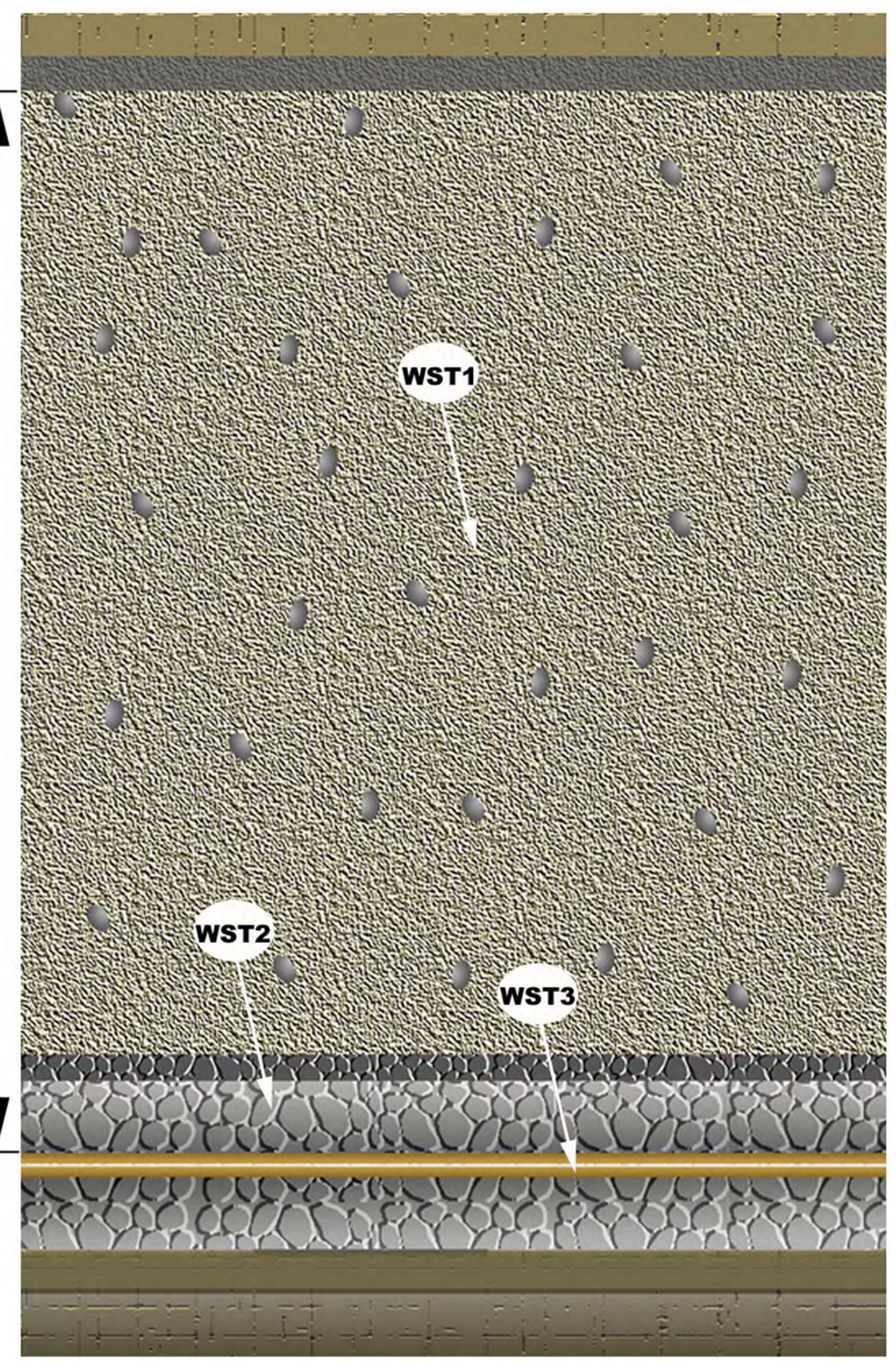


WT1
BANKRUN GRAVEL OR ITEM #4 COMPACTED IN 12" LIFTS MAX.

WT2
CLASS 52 D.I. WATERMAIN.

W3
#2 STONE BEDDING SURROUNDING PIPE IN AN AMOUNT EQUAL TO PIPE DIAM.

WATERMAIN TRENCH DETAIL

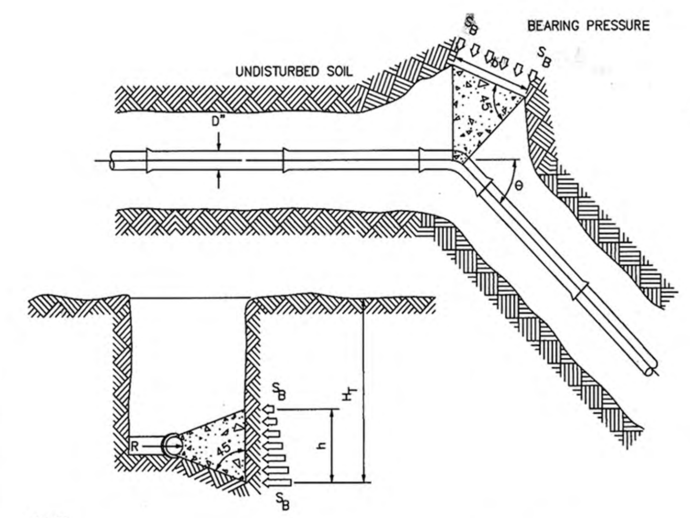


WST1
BANKRUN GRAVEL OR ITEM #4 COMPACTED IN 12" LIFTS MAX.

WST2
#2 STONE BEDDING AROUND PIPE 6" MIN. ON ALL SIDES.

WST3
"K" COPPER WATER SERVICE PIPE

WATER SERVICE TRENCH DETAIL



NOTES:

1. BEARING SURFACE SHOULD, WHERE POSSIBLE, BE PLACED AGAINST UNDISTURBED SOIL. WHERE IT IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90% STANDARD PROCTOR DENSITY.
2. BLOCK HEIGHT(h) SHOULD BE EQUAL TO OR LESS THAN ONE-HALF THE TOTAL DEPTH TO THE BOTTOM OF THE BLOCK, (Ht), BUT NOT LESS THAN THE PIPE DIAMETER (D').
3. BLOCK HEIGHT(h) SHOULD BE CHOSEN SUCH THAT THE CALCULATED BLOCK WIDTH(b) VARIES BETWEEN ONE AND TWO TIMES THE HEIGHT.

BEARING BLOCK DETAILS

REQUIRED BEARING AREAS –b (SQFT) FOR BEARING BLOCKS*

PIPE SIZE (INCHES)	TEE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	2.0	2.8	1.5	0.8	0.4
6	4.2	5.9	3.2	1.6	0.8
8	7.2	10.1	5.5	2.8	1.4
10	10.9	15.4	8.3	4.2	2.1
12	15.4	21.8	11.8	6.0	3.0
14	20.6	29.1	15.8	8.0	4.0
16	26.8	37.9	20.5	10.4	5.2
18	33.6	47.5	25.7	13.1	6.6
20	41.2	58.2	31.5	16.1	8.1
24	58.8	83.1	45.0	22.9	11.5
30	90.5	128.0	69.2	35.3	17.7
36	129.6	183.3	99.1	50.5	25.4

*FACTOR OF SAFETY=1.5
SOIL BEARING OF 3,000 PSF
225 PSI DESIGN PRESSURE

THRUST REACTIONS–R(LB) PER 100PSI INTERNAL PRESSURE

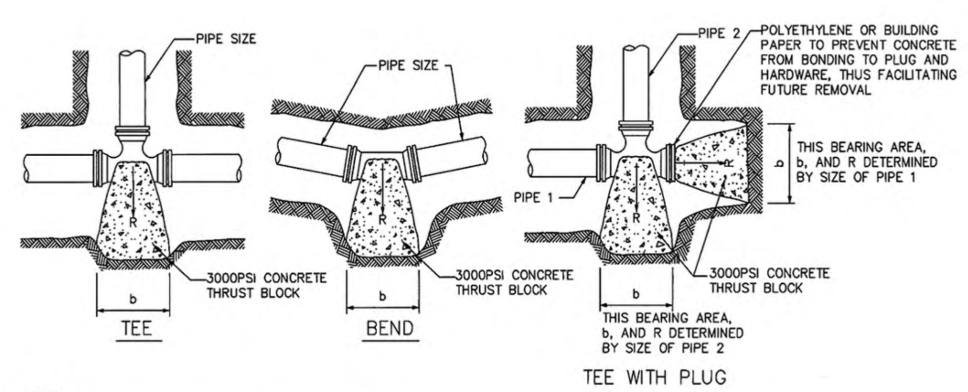
NOM PIPE DIA IN.	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	1,810	2,559	1,385	706	355
6	3,739	5,288	2,862	1,459	733
8	6,433	9,097	4,923	2,510	1,261
10	9,677	13,685	7,406	3,776	1,897
12	13,685	19,353	10,474	5,340	2,683
14	18,385	26,001	14,072	7,174	3,604
16	23,779	33,628	18,199	9,278	4,661
18	29,865	42,235	22,858	11,653	5,855
20	36,644	51,822	28,046	14,298	7,183
24	52,279	73,934	40,013	20,398	10,249
30	80,425	113,738	61,554	31,380	15,766
36	115,209	162,931	88,177	44,952	22,585

NOTES:

1. VALUES FOR TEE APPLY TO TEES, END PLUGS, CAPS, AND TAPPING SLEEVES.
2. REQUIRED BEARING AREAS ARE DUE TO THRUSTS CAUSED BY 150PSI WORKING PRESSURE PLUS 50%(75 PSI) SURGE ALLOWANCE RESULTING IN 225 PSI TOTAL INTERNAL PRESSURE.
3. REQUIRED BEARING AREAS ARE BASED ON ALLOWABLE SOIL BEARING CAPACITY OF 3,000 POUNDS PER SQUARE FOOT. DUE TO OTHER SOIL CONDITIONS ENCOUNTERED, BEARING AREAS MAY BE MODIFIED BY THE ENGINEER.

SOIL	BEARING STRENGTH S_B (LB/SQ FT)
MUCK	0
SOFT CLAY	1,000
SILT	1,500
SANDY SILT	3,000
SAND	4,000
SANDY CLAY	6,000
HARD CLAY	9,000

4. IN MUCK, PEAT, OR RECENTLY PLACED FILL ALL THRUSTS SHALL BE RESISTED BY PILES OR TIE RODS TO SOLID FOUNDATIONS, OR BY REMOVAL OF SUCH UNSTABLE MATERIAL AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THE THRUSTS, ALL AS REQUIRED BY THE ENGINEER.



NOTES:

1. CONCRETE NOT TO OVERLAP ANY JOINT.
2. CONCRETE TO BE PLACED SO AS NOT TO INTERFERE WITH REMOVING OR INSTALLING ANY OF THE JOINTING HARDWARE.
3. FOR REDUCERS USE MECHANICAL JOINT FITTINGS WITH RETAINER GLANDS.

TYPICAL CONC. THRUST BLOCK DETAILS

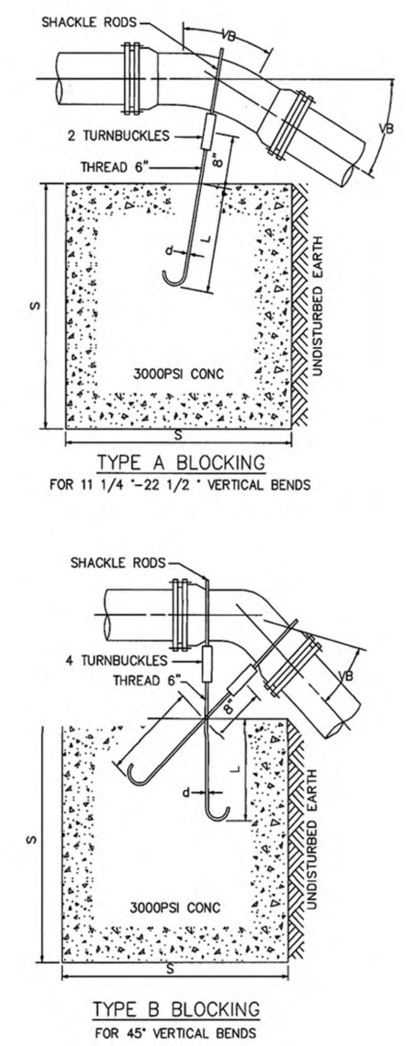
TYPE A BLOCKING FOR 11 1/4 – 22 1/2 VERT BENDS

	VB		S	d	L
PIPE SIZE NOM DIA(INCHES)	VERTICAL BEND DEGREES	NO. OF CUFT OF CONC BLOCKING	SIDE OF CUBE (FEET)	DIA OF SHACKLE RODS(2)* (INCHES)	DEPTH OF RODS IN CONC (FEET)
4"	11 1/4	8	2.0	3/4 "	1.6
	22 1/2	16	2.5		
6"	11 1/4	16	2.5	3/4 "	1.6
	22 1/2	32	3.2		
8"	11 1/4	28	3.0	3/4 "	1.6
	22 1/2	55	3.8		
10	11 1/4	42	3.5	3/4 "	1.6
	22 1/2	83	4.4		
12"	11 1/4	60	3.9	3/4 "	1.6
	22 1/2	118	4.9	7/8 "	2.2
14	11 1/4	81	4.3	7/8 "	2.2
	22 1/2	158	5.4		
16"	11 1/4	104	4.7	7/8 "	2.2
	22 1/2	205	5.9	1 1/8"	3.7
18	11 1/4	131	5.1	7/8 "	2.2
	22 1/2	257	6.4	1 1/8"	3.7
20"	11 1/4	161	5.4	7/8 "	2.2
	22 1/2	316	6.8	1 1/4"	4.6
24"	11 1/4	229	6.1	1"	2.9
	22 1/2	450	7.7	1 3/8"	5.7

* FOR 60KSI THREADED REBAR

TYPE B BLOCKING FOR 45° VERTICAL BENDS

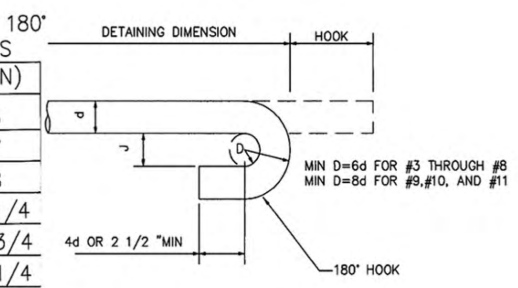
		S	d	L
PIPE SIZE NOM DIA(INCHES)	NO. OF CUFT OF CONC BLOCKING	SIDE OF CUBE (FEET)	DIA OF SHACKLE RODS(2) (INCHES)	DEPTH OF RODS IN CONC (FEET)
4"	29	3.1	3/4 "	1.6
6"	59	3.9		
8"	102	4.7		
10"	154	5.4		
12"	218	6.0		
14"	292	6.6	7/8 "	2.2
16"	378	7.2	1 1/8"	3.7
18"	478	7.8		
20"	583	8.3	1 1/4"	4.6
24"	832	9.4	1 3/8"	5.7



GRAVITY THRUST BLOCK DETAILS

RECOMMENDED 180° END HOOK DIMS

BAR SIZE	J (IN)
#6	6
#7	7
#8	8
#9	11 1/4
#10	12 3/4
#11	14 1/4



ACI STANDARD HOOKS

THRUST RESTRAINT DETAILS

Sewer Specifications & Details

SECTION 33 31 00
SANITARY SEWER PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. CONTRACTOR shall furnish and install underground sanitary sewer piping and laterals as specified on the Contract Drawings and as described herein.

1.02 RELATED SECTIONS

A. 33 39 13 – SANITARY SEWER MANHOLES

1.03 REFERENCED STANDARDS

A. ASTM D3034 85b – Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings

B. ASTM F78 85 – Type PS 46 Poly (Vinyl Chloride) (PVC) Plastic Gravity Flow Sewer Pipe and Fittings

C. ASTM F679 86 – Type Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings

1.04 SUBMITTALS

A. Submit shop drawings and catalog cuts for pipe and miscellaneous appurtenances specified in this Section.

1.05 EXISTING FACILITIES

A. CONTRACTOR shall conduct his/her operations such that no interruptions to the existing utility system shall occur. Where existing sanitary sewers are being replaced or interrupted, CONTRACTOR shall provide temporary bypass pumping or temporary piping to maintain flow around the work site such that no backups occur in these sewer systems.

B. Existing sanitary sewer laterals damaged in the work or temporarily disconnected shall be restored to operation by the end of each work day. Existing sanitary sewer laterals, where crossing over new pipelines, to be restored in accordance with details shown on the Contract Drawings.

C. CONTRACTOR shall maintain existing manholes, catch basins, and other utility structures in their pre-work condition. Should any material or debris enter active sanitary sewer manholes, contact the Water & Sewer Division immediately.

1.06 LINES AND GRADES

A. Pipes shall be laid to the lines and grades shown on the Contract Drawings and shall be straight between manholes. When replacing sewers, the new sewer shall follow the existing line and grade as closely as practicable. The grade of the sewer between manholes and from pipe length to pipe length shall not vary from the design grade shown on the Contract Drawings by more than 0.15 times the design grade, unless a change in grade has been ordered by ENGINEER, in which case the same tolerance shall apply. In addition, invert elevations at any location shall not vary from the design elevations by more than 0.05 feet, unless a change in invert elevation has been ordered by ENGINEER, in which case the same tolerance shall apply. Any sewer grade or invert elevation which exceeds these tolerances shall be corrected by CONTRACTOR at CONTRACTOR's own expense.

B. The method used to install the sewer shall be consistent with standard practice of establishing line and grade and sufficiently accurate to ensure that the above requirements are met. The final alignment of the sewer shall be such that a clear and unobstructed line of sight exists between manholes.

C. In the event the CONTRACTOR uses laser beam method to establish line and grade, the CONTRACTOR shall check the grade of pipe at not more than 50 foot intervals by use of level instrument and tripod.

D. The CONTRACTOR shall furnish all labor, materials, surveying instruments, and tools to establish and maintain all lines and grades. The CONTRACTOR shall have personnel on duty or on standby call, at all times, who are qualified to set and check grades of sewers and manholes as they are installed.

E. Location of required elevations to be of the pipe invert at a point where the pipe enters or exits a structure.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Polyvinyl Chloride (PVC) Sanitary Sewer Pipe

1. All PVC pipe and fittings shall be SDR-35 and meet or exceed all of the requirements of ASTM D3034 85b, ASTM F78 85, or ASTM F679 86.
2. All pipe shall be suitable for use as a gravity sewer conduit with integral bell and elastomeric gasket joints. The gasket shall meet the requirements of ASTM F477. The bell shall consist of an integral wall section which securely locks the solid cross section elastomeric rubber ring into position. Standard lengths shall be 12'-6" and 20' +/- 1 inch.
3. Fittings: All fittings and accessories shall be as manufactured and furnished by the pipe supplier, and have bell and/or spigot configurations identical to that of the pipe to which they are connected.

PART 3 - EXECUTION

3.01 INSPECTION

A. All pipe, fittings, and specials shall be carefully inspected in the field before lowering into the trench. Cracked, broken, warped, out of round, damaged joints, or otherwise defective pipe, fittings or specials, as determined by ENGINEER, shall be culled out and not installed. Such rejected pipe shall be clearly tagged in such manner as not deface or damage it, and the pipe shall then be removed from the job Site by CONTRACTOR at CONTRACTOR's own expense.

3.02 INSTALLATION

A. Ends of pipe which terminate at manholes or other structures shall be cut cleanly and trimmed to a neat, sheared edge which comes flush with the inside wall of the structure unless shown otherwise.

B. The pipe, fittings and specials shall be installed to the required line and grade, and shall be firmly bedded in the trench so that the pipe barrel is uniformly supported and cradled throughout its length, consistent with the requirements of the pipe foundation used. Blocking will not be permitted under the pipe, except where the pipe is to be installed in concrete encasement or concrete cradle. Holes and depressions in the pipe foundation shall be provided to receive bells, couplings, or similar projections to assure proper bedding of the pipe barrel. When the pipe is in proper position, it shall be joined or coupled to the mating end of the previously laid pipe, using the required joint and using the manufacturer's recommended assembly procedure. The completed assembly of pipe sections shall form a sewer with uniform slope. Manufactured pipe plugs or temporary bulkheads shall be placed in the open ends of sewer lines whenever pipe laying is stopped overnight, over weekends, or whenever dirt or debris could enter the pipeline during construction.

3.03 BEDDING

A. All pipes and fittings to be installed in the open trench excavation shall be properly bedded in, and uniformly supported on pipe foundations of the various types specified herein and shown on the Contract Drawings.

B. Unless shown otherwise in the Contract Drawings, all pipe shall be supported as follows: The trench shall be excavated from four to eight inches deeper than the bottom of the pipe, depending on the diameter of the pipe. No. 2 Stone standard bedding shall be furnished, placed and compacted in the trench for its full width. Suitable holes shall be provided in the trench bottom to permit adequate bedding of bells, couplings, or similar projections. The stone shall extend upward to a point 12 inches over the top of the pipe. Minimum width of pipe foundation shall be outside diameter of pipe plus 2'-0".

3.04 TRENCH EXCAVATION

A. If CONTRACTOR utilizes a prefabricated, mobile shield, the bottom of the shield shall be maintained as high as possible (preferably at or above the top of the pipe) so as to prevent disturbance of the pipe foundation material and to avoid forces which would tend to pull pipe joints apart when the shield is dragged forward. Gouged openings or troughs left by the shield shall be filled with additional pipe foundation material and thoroughly compacted.

3.05 CONNECTION TO EXISTING STRUCTURES

A. Where sewers are to be connected to existing manholes or other structures, and where no stub or opening has been provided for the connection, CONTRACTOR shall cut an opening of minimum diameter through the side wall of the structure for inserting the pipe, at the required location. After inserting the pipe, the annular space remaining outside the pipe shall be completely filled and covered with non shrinking watertight mortar and such joint made watertight so that leakage of water into the structure is prevented. Unless otherwise shown, the pipe shall be positioned so that the finished or trimmed end of the pipe is flush with the inside wall surface of the structure. The mortar filler shall be struck off neatly to form a smooth, dense surface flush with the inside wall surface of the structure. For PVC pipe, furnish and install a rubber donut or waterstop ring around exterior of pipe or provide a/c manhole adaptor to make a watertight manhole connection as manufactured by Fernco Type "CMA" adaptor, the General Engineering Co. Type "CT" adaptor, Certainteed, Johns Manville, or equal.

B. Benchwalls in existing structures shall be altered to form a new trough so that the new connection will enter the existing flow channel at a 45 degree angle in the direction of flow.

3.06 SERVICE CONNECTIONS AND SEWER LATERALS

A. When replacing an active sanitary sewer line, all active service connections shall be replaced from the main up to and including the existing clean-out. Verify the status of service connections with ENGINEER.

B. Sanitary sewer lateral service pipe shall be minimum 4-inch SDR 35 PVC. Pipe shall meet the requirements of the latest ASTM Standard D-3034. The pipe shall conform to the requirements of CSA B-182.2. Integral gasketed bell ends shall be provided on the pipe, the pipe joint must meet the requirements of ASTM Standard D-3212 and the sealing gasket meet the requirements of ASTM F-477.

C. Service laterals shall be connected to the main using a wye connection or using Inserta Tees as manufactured by Inserta Fittings Co./Fowler Manufacturing Co. or approved equal. SDR-35 PVC Sanitary Sewer Pipe Fittings shall conform to ASTM D-3034, rubber sleeves and gaskets to conform to ASTM F477.

D. Unless otherwise shown on the Contract Drawings, sewer lateral pipe shall conform to the following: (a) lateral pipe installed on same pipe foundation as main; (b) pipe shall be laid at a uniform slope of not less than 1/8 inch per foot and to the invert elevation shown on the Contract Drawings; and (c) in straight alignment to the property line or other point of termination.

E. Each installed sewer lateral shall not be covered with the pipe foundation material until the installation has been approved by ENGINEER.

F. No connections shall be made to existing sewer laterals until the main sewer has been successfully tested by the CONTRACTOR and approved by the ENGINEER.

3.07 LEAKAGE TESTING

A. All gravity sanitary sewers, including manholes, service connections and sewer laterals constructed under this Contract, shall be tested for leakage and shall satisfactorily meet the test requirements prior to final acceptance of the Work. The CONTRACTOR shall furnish all labor, testing materials, and equipment and shall perform the tests described herein to the satisfaction of the ENGINEER. The CONTRACTOR shall re excavate the pipe or lateral and make all necessary repairs or replacements, and shall repeat the final leakage test(s), until the leakage requirements are met. Testing shall be completed prior to final paving and restoration.

B. Leakage tests shall be performed on all new sewers and laterals and new manholes using low pressure air testing.

C. <u>Low Pressure Air Testing of Installed Gravity Sewer Pipe:</u> Low pressure testing of main sewer and sewer laterals shall conform to the test procedure described in ASTM C 828 80, except as modified by the, Uni Bell Plastic Pipe Association publication UNI B 6 79 for Low Pressure Air Testing of Installed Sewer Pipe.

1. The CONTRACTOR shall furnish all necessary equipment and be responsible for conducting all low pressure air tests.
2. All pressurizing equipment used for low pressure air testing shall include a regulator or relief valve set no higher than 9 psig to avoid over pressurizing and displacing temporary or permanent plugs. In no case should the starting pressure exceed 9.0 psig. If the average vertical height of groundwater above the pipe invert is more than 15 feet, the section so submerged is to be tested by the infiltration method as described above for manholes.
3. Either mechanical or pneumatic plugs may be used. All plugs shall be designed to resist internal testing pressures without the aid of external bracing or blocking. If pneumatic plugs are utilized, a separate hose shall also be required to inflate the pneumatic plugs from above ground control panel. Plug the upstream end of the line first to prevent any upstream water from collecting in the test line. This is particularly important in high groundwater situations. When plugs are being placed, the pipe adjacent to the manhole shall be visually inspected to detect any evidence of shear in pipe due to differential settlement between the pipe and the manhole. A probable point of leakage is at the junction of the manhole and the pipe, and this fault may be covered by the pipe plug, and thus not revealed by the air test.
4. To facilitate test verification by the ENGINEER, all air used shall pass through a single, above ground control panel. The above ground air control equipment shall include a shut-off, pressure regulating valve, pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge having a pressure range from 0 to at least 10 psi. The continuous monitoring gauge shall have minimum divisions of 0.10 psi and an accuracy of + 0.04 psi. The equipment to include a separate certified test gauge for periodic checking of the accuracy of the basic equipment gauges.
5. Two separate hoses shall be used to: (1) connect the control panel to the sealed line for introducing low pressure air, and (2) a separate hose connection for constant monitoring of air pressure build-up in the line. Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of groundwater above the pipe, but not greater than 9.0 psig. After a constant pressure of 4.0 psig is reached, the air supply shall be throttled to maintain that internal pressure for at least 2 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall. When temperatures have been equalized and

the pressure stabilized at 4.0 psig, the air hose from the control panel to the air supply shall be shut off or disconnected. The continuous monitoring pressure gauge shall then be observed while the pressure is decreased to no less than 3.5 psig (greater than the average back pressure of any groundwater over the pipe). At a reading of 3.5 psig, timing shall commence with a stop watch or other timing device that is at least 99.8% accurate.

6. If the time shown in Table I (refer to table at the end of this Section) for the designated pipe size and length elapses before the air pressure drops 0.5 psig, the section undergoing test shall have passed the leakage test. The test may be discontinued once the prescribed time has elapsed even though the 0.5 psig drop has not occurred.
7. If the pressure drops 0.5 psig before the appropriate time shown in Table 1 has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.
8. If the section fails to meet these requirements, the CONTRACTOR shall determine at the CONTRACTOR's own expense the source, or sources of leakage, and the CONTRACTOR shall repair or replace all defective materials and/or workmanship to the satisfaction of the ENGINEER. The extent and type of repair as well as results, shall be subject to the approval of the ENGINEER. The completed pipe installation shall then be retested and required to meet the requirements of this test. The times shown in Table I are for the length of main sewer tested. For lengths other than those shown, the time is to be interpolated. Further, the tables do not have any reduction of time for length of laterals connected to the section of sewer being tested since it normally is not significant. For an accurate calculation of time allowance including laterals, refer to UNI Bell publication previously referenced for the appropriate formula (shown on the back of the referenced tables).

3.08 FINAL INSPECTION

A. Each section of installed sewer between manholes or structures will be inspected by the ENGINEER before final acceptance. Such inspection will be visual by traversing the inside of the pipe, or by sighting through the line from manhole to manhole with the aid of artificial light when the pipe is too small to be entered. The pipe and fittings shall be true to both line and grade, shall show no leaks, shall show no obstruction to flow, shall have no projections of connecting pipe into the line, shall be free from cracks and protruding joint materials, and shall contain no deposits of dirt, debris or other material which will in any way reduce the full cross sectional area of the pipe.

B. Any section of sewer, or portions, thereof, which do not comply with the inspection criteria defined above, shall be promptly corrected or repaired by the CONTRACTOR at the CONTRACTOR's own expense. Pipe which is cracked or collapsed shall be dug up and replaced with new pipe; pipe which is out of line or grade shall be dug up and relaid to the correct line and grade. Connecting pipes that protrude into the line shall be dug up and the connection remade, or the protruding portion of the connecting pipe shall be trimmed back flush with the wall of the main sewer, if the main line can be entered. Deposits of dirt and debris shall be flushed with water through to the downstream manhole and removed. At points of leakage, the pipe shall be dug up and replaced or repaired with approved repair clamp couplings (stainless steel Type 304 with stainless steel bolts and nuts or cast iron coupling with stainless steel bolts and nuts) so as to permanently stop the leak in a manner which shall receive the prior approval of the ENGINEER.

END OF SECTION

UNI-B-6-98

MINIMUM SPECIFIED TIME REQUIRED FOR A 0.5 PSIG PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

1 Pipe Diameter (in.)	2 Minimum Time (min: sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7.05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54
30	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23
42	19:54	57	20.942 L	34:54	52:21	69:49	87:15	104:42	122:10	139:37	157:04
48	22:47	50	27.352 L	45:35	68:23	91:11	113:58	136:46	159:33	182:21	205:09
54	25:31	44	34.618 L	57:42	86:33	115:24	144:15	173:05	201:56	230:47	259:38
60	28:20	40	42.738 L	71:14	106:51	142:28	178:05	213:41	249:18	284:55	320:32

Note: If there has been no leakage (zero psig drop) after one hour of testing, the test section shall be accepted and the test complete. (See Section 7.5.)

SECTION 33 39 13
SANITARY SEWER MANHOLES

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install sanitary sewer manholes as shown on the Contract Drawings and as specified herein.

B. Work shall include inlet and outlet pipe connections, frames and covers, concrete, special pipe fittings, precast units, and all other materials, tools and equipment necessary to produce complete manholes. Associated work such as excavation, backfilling, grading, paving, etc., is specified elsewhere.

1.02 RELATED SECTIONS

A. SECTION 33 31 00 – SANITARY SEWER PIPING

1.03 REFERENCE STANDARDS

A. ASTM C-478 – Precast Reinforced Concrete Manhole Sections

B. ASTM C-923 – Resilient Connectors Between Reinforced Concrete Manhole Structures And Pipes

1.04 SUBMITTALS

A. Submit shop drawings and catalog cuts for manholes and miscellaneous appurtenances specified in this Section. Shop drawings shall include typical design, reinforcing, and manufacturing details.

B. Submit plan and/or elevation views of each manhole showing dimension, orientation, and elevation of pipe openings.

C. Submittal shall include product data indicating conformance to referenced standards and this Section.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Precast Concrete Bases

1. Manhole bases shall be precast concrete. The bases shall conform to the basic dimensions shown on the Contract Drawings. The horizontal joint at the top of the base shall be compatible with that of the precast wall sections.
2. The precast bases shall be manufactured to contain openings in the wall, of minimum size, to receive the ends of the pipe, such openings being accurately set to conform to line and grade of sewer. For replacement manholes, CONTRACTOR shall field verify the dimensions and layout of all openings.
3. All precast concrete bases shall be free from cracks, damaged joints, exposed reinforcing, aggregate pockets, spalls, and dimensional distortions or other irregularities.

B. Pipe Connections

1. Connections between manholes and pipes shall be made with Star Seal gaskets as manufactured by the Hail Mary Rubber Company, Warminster, PA, or equal. Flexible connectors shall conform to the requirements of ASTM C-923.

C. Precast Concrete Walls and Manhole Tops

1. Precast concrete walls shall be made up using circular sections. All joints shall be sealed with butyl joint sealant rope material. The total height of precast wall required for each manhole shall be determined in the field, and shall be such that the vertical distance between the top of the assembled precast units and the bottom of the installed cast iron manhole frame is a minimum of four (4) inches and a maximum of twelve (12) inches, to allow for precast concrete grade rings.
2. All precast units shall be laid up plumb and level. Minimum longitudinal and circumferential reinforcing steel shall be in conformance with ASTM C-478.
3. All precast concrete sections shall be free from cracks, damaged joints, exposed reinforcing, aggregate pockets, spalls, dimensional distortions, or other irregularities.
4. Precast reinforced concrete flat slab tops for manholes shall be manufactured in accordance with ASTM C 478. Opening shall be concentric and of the proper diameter to receive the frame specified.

D. Masonry Work and Grade Rings

1. The manhole frame shall be supported and adjusted to finished grade using precast concrete grade rings. Grade rings shall conform to ASTM C 478, and shall be set in a full bed of mortar.
2. Materials shall conform to the following requirements:

Item	ASTM	Remarks
Portland Cement	C 150	Type I or III
Sand	C 144	-
Lime	C 207	Type "N"
Water	-	Clear and free from all deleterious materials
Mortar Mix	C 207	Type "M", 1 part cement, 1/4 part hydrated lime, 3 parts sand

3. Weather Conditions No masonry work shall be done during heavy rains; or when the temperature is below 40 degrees F; or when in the ENGINEER's judgment a satisfactory job cannot be accomplished. The CONTRACTOR shall protect the work with coverings, plastic envelopes, etc., and shall maintain the air temperature within these coverings at a minimum of 45 degrees F for a period of three days after the masonry has been laid.

E. Bench Walls

1. The flow channels in each manhole shall be shaped to match the inverts and size of pipes that connect to the manhole, creating a channel of gradual slope and curvature to promote smooth, uninterrupted flow through the manhole. The bench surface shall extend laterally to the manhole walls, pitching slightly toward the flow channel.
2. Concrete used for bench walls and all exposed surfaces shall receive a steel troweled finish. Horizontal surfaces shall then be brush finished.

F. Frames and Covers

1. Frames and covers shall have nominal 30 inch opening, unless otherwise specified. Castings shall be as manufactured by Neenah Foundry, Neenah, WI, Type 1557-A; Syracuse Castings, Cicero, NY, Model 1016A; or equal with non penetrating pickholes and machined horizontal bearing surfaces and shall conform to the following general requirements:
   a. Material shall be gray cast iron conforming to ASTM A 48, Class 30; or shall be ductile cast iron conforming to ASTM A 536, Grade 60 40 18.
   b. Sanitary manholes shall have the words "SANITARY SEWER" cast in the covers.
2. When specified on the Contract Drawings, frame and cover shall be the PAMREX 32 hinged ductile iron cover as manufactured by CertainTeed Corporation, Valley Forge, PA. Frame shall be oriented such that the hinged cover opens towards the curb.
3. Frames shall be firmly seated in full bed of mortar and be positioned to conform to the adjacent finished grade or to the specific elevation shown on the Contract Drawings. Frames to be set parallel to surface slopes. Covers shall seat uniformly in any position in the frame without rocking.

G. Drop Sections

1. Whenever the invert of a pipe entering a manhole is 24 inches or more in height above the invert of the lowest pipe leaving the manhole, it shall be connected to the manhole with an inside drop section for pipe sizes 12 inches and smaller and an outside drop section for 15 inch pipes and larger unless otherwise shown on the Contract Drawings. A drop manhole shall be a minimum of 6 feet in diameter and be constructed in the normal manner, except that the concrete base shall be extended for outside drop pipes and a straight clean out pipe shall be connected through the wall, all as detailed on the Contract Drawings.
2. Fittings, and special adapters required for the outside drop section shall be of the same material and class as the sewer pipe entering the manhole. After installation of the outside drop section and pipe connections in to the manhole, the entire vertical, outside assembly shall be encased in concrete, as shown, using concrete mix "C". For inside drop pipes, use polyvinyl chloride (PVC) sewer pipe and fittings (SDR Class 35) with PVC mechanical plug and stainless steel straps as shown on the Contract Drawings.

H. Manhole Steps

1. Manhole steps shall be copolymer polypropylene plastic with 1/2 inch Grade 60 steel reinforcement as manufactured by M.A. Industries, Inc., Peachtree City, GA, or equal.
2. Steps are to be cast in or grouted solid into the precast units at intervals of 12 inches. Steps shall be in conformance with OSHA requirements having drop front or equivalent. Bolted on types are not acceptable.

I. Existing Manholes

1. The flow channels and bench walls shall be reconstructed at existing manholes with new pipe connections.

J. Waterproofing

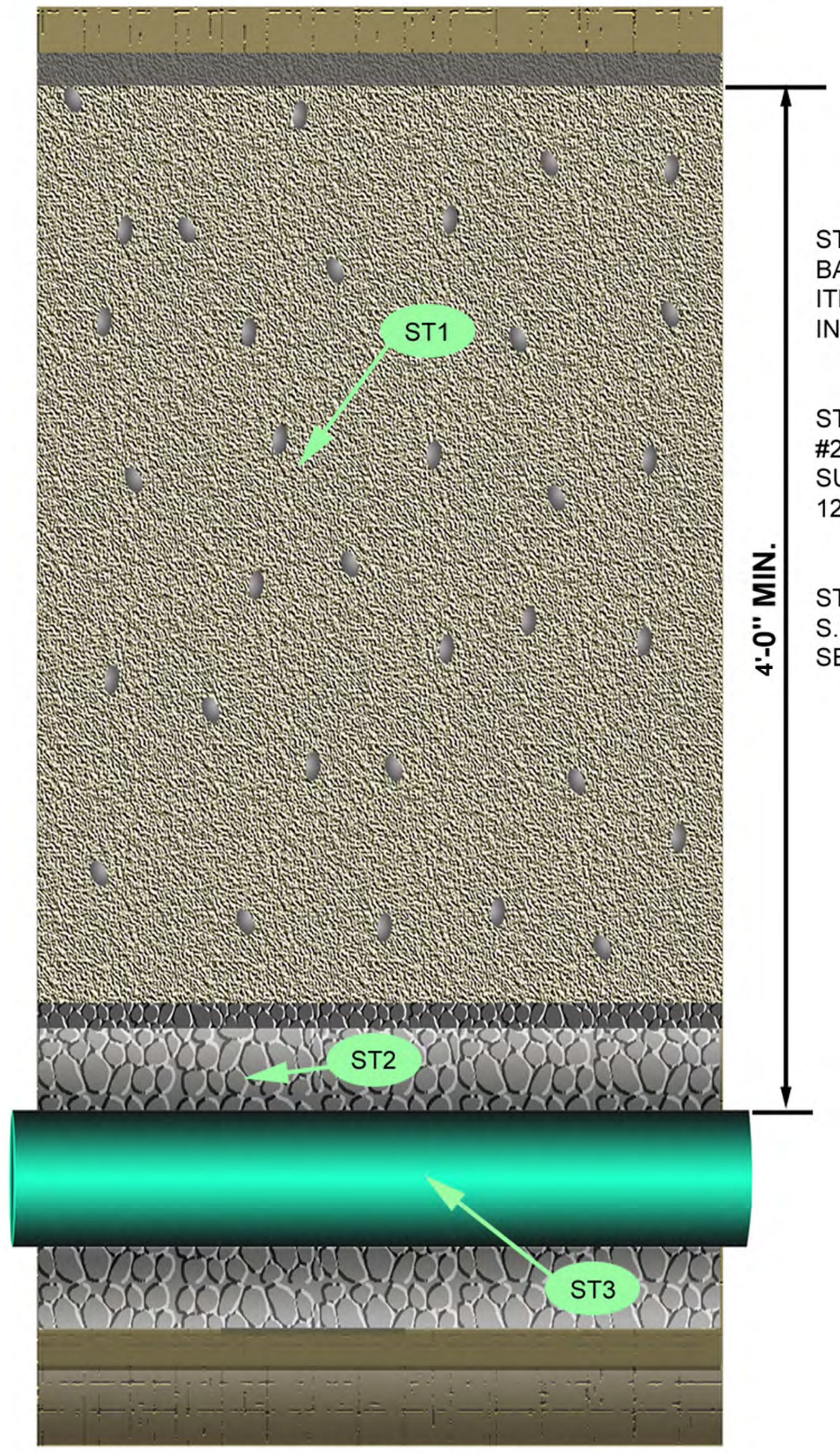
1. Manholes shall receive a two-coat application of Koppers Bitumastic Super Service Black; Tnemec Heavy Duty Black 46 449; Preco Nitoproof 600; or equal, applied according to manufacturer's specifications. Total thickness shall not be less than 16 mils.

PART 3 - EXECUTION

3.01 TESTING

1. Manholes shall be watertight. All visible leaks shall be permanently sealed. Leakage tests on sanitary manholes shall be conducted in accordance with Section 33 31 00 - Sanitary Sewer Piping.

END OF SECTION

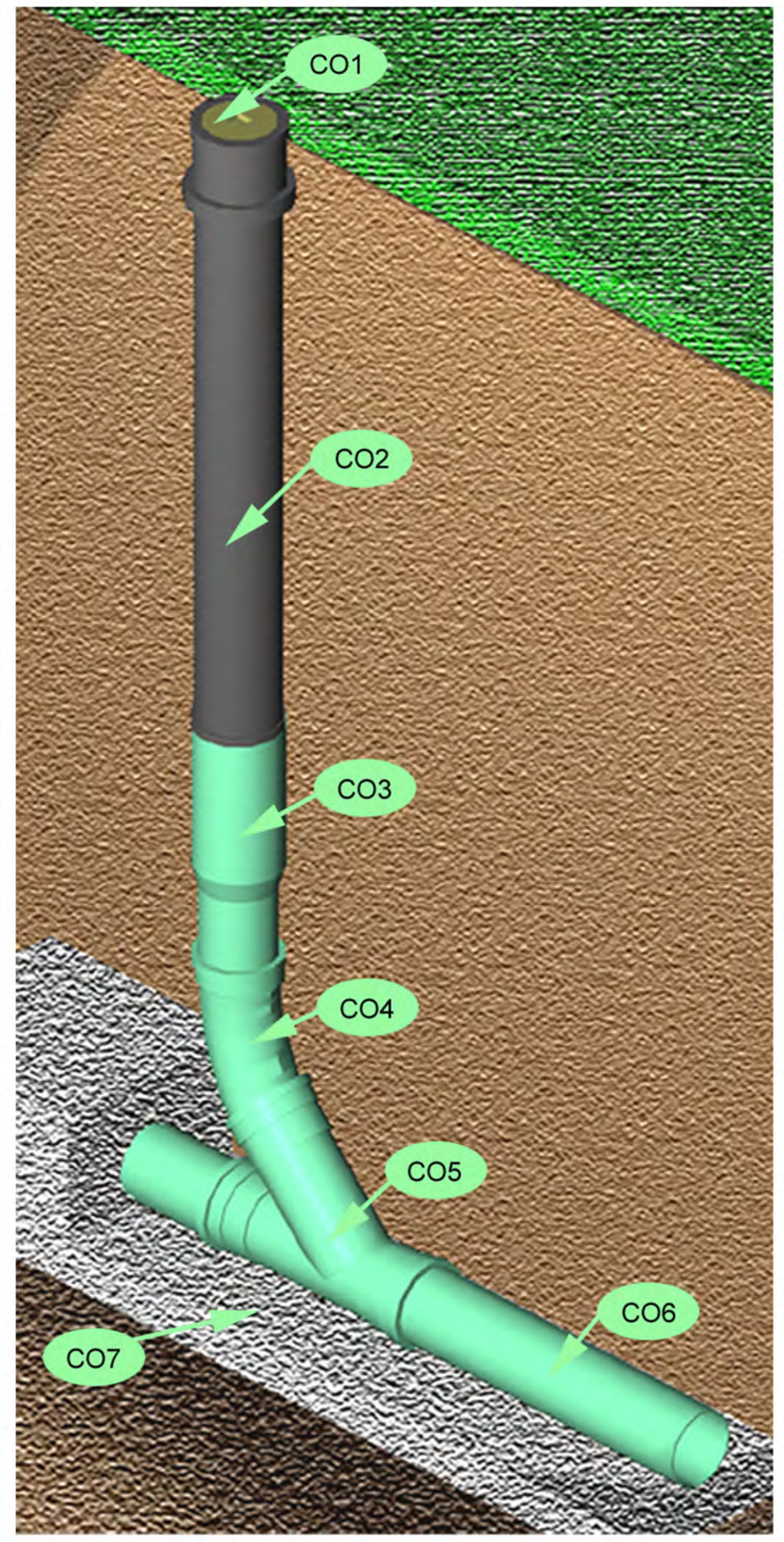


SEWER MAIN TRENCH DETAIL

ST1
BANKRUN GRAVEL OR ITEM #4 COMPACTED IN 12" LIFTS MAX.

ST2
#2 STONE BEDDING SURRONDING PIPE 12" MIN. ALL SIDES.

ST3
S.D.R. 35 P.V.C. SEWER MAIN.



SEWER SERVICE CLEAN OUT (IN YARD)

CO1
CLEAN OUT BRASS SCREW PLUG

CO2
4" CAST IRON SEWER CLEAN OUT.

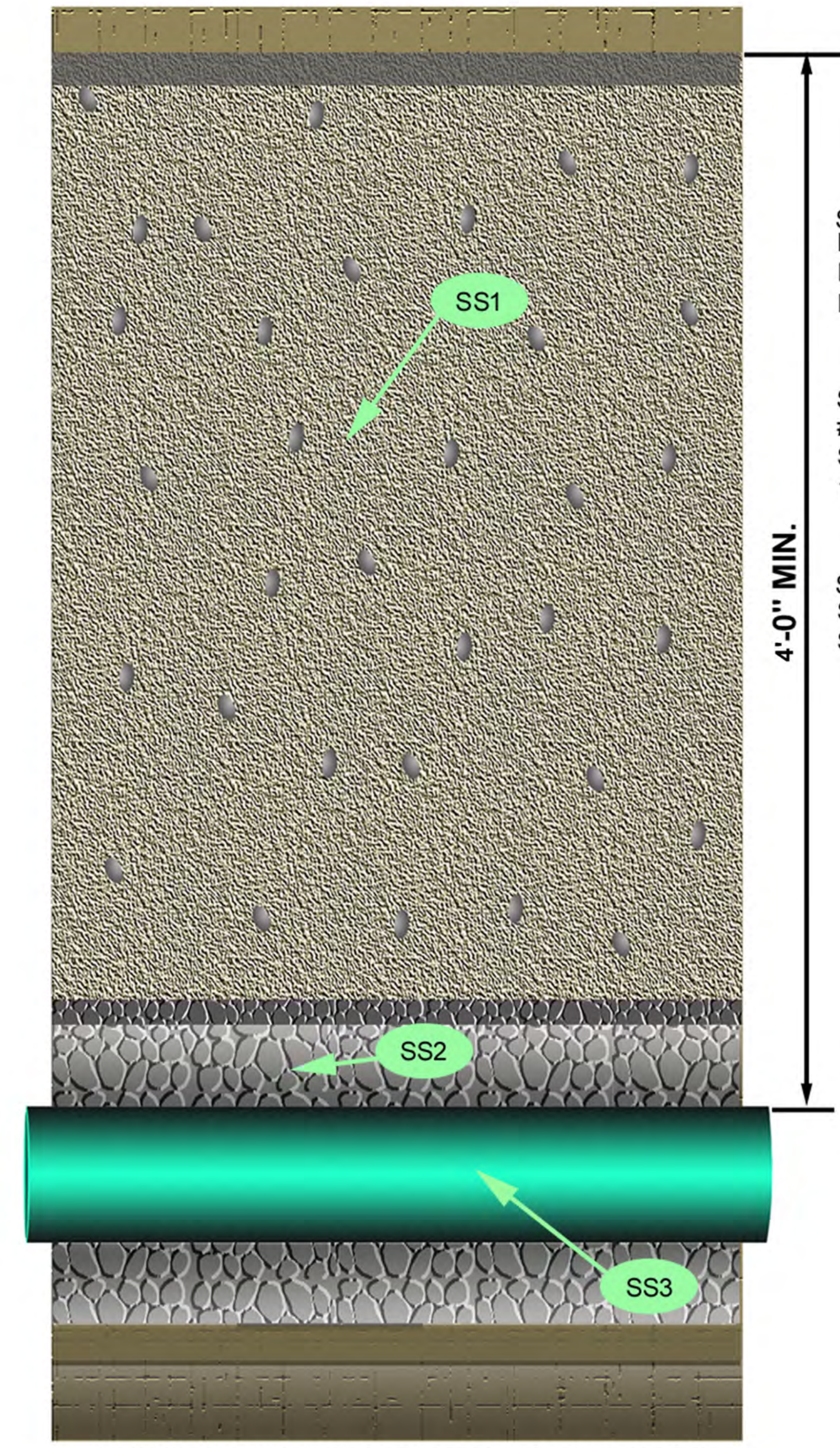
CO3
4"X4" C.I. X S.D.R. 35 ADAPTOR.

C04
4" 45 DEGREE S.D.R. 35 STREET BEND.

CO5
4"X4"X4" S.D.R. 35 P.V.C. WYE.

CO6
4" S.D.R. 35 P.V.C. PIPE.

CO7
SEE SEWER ERVICE TRENCH DETAIL ON THIS SHEET.

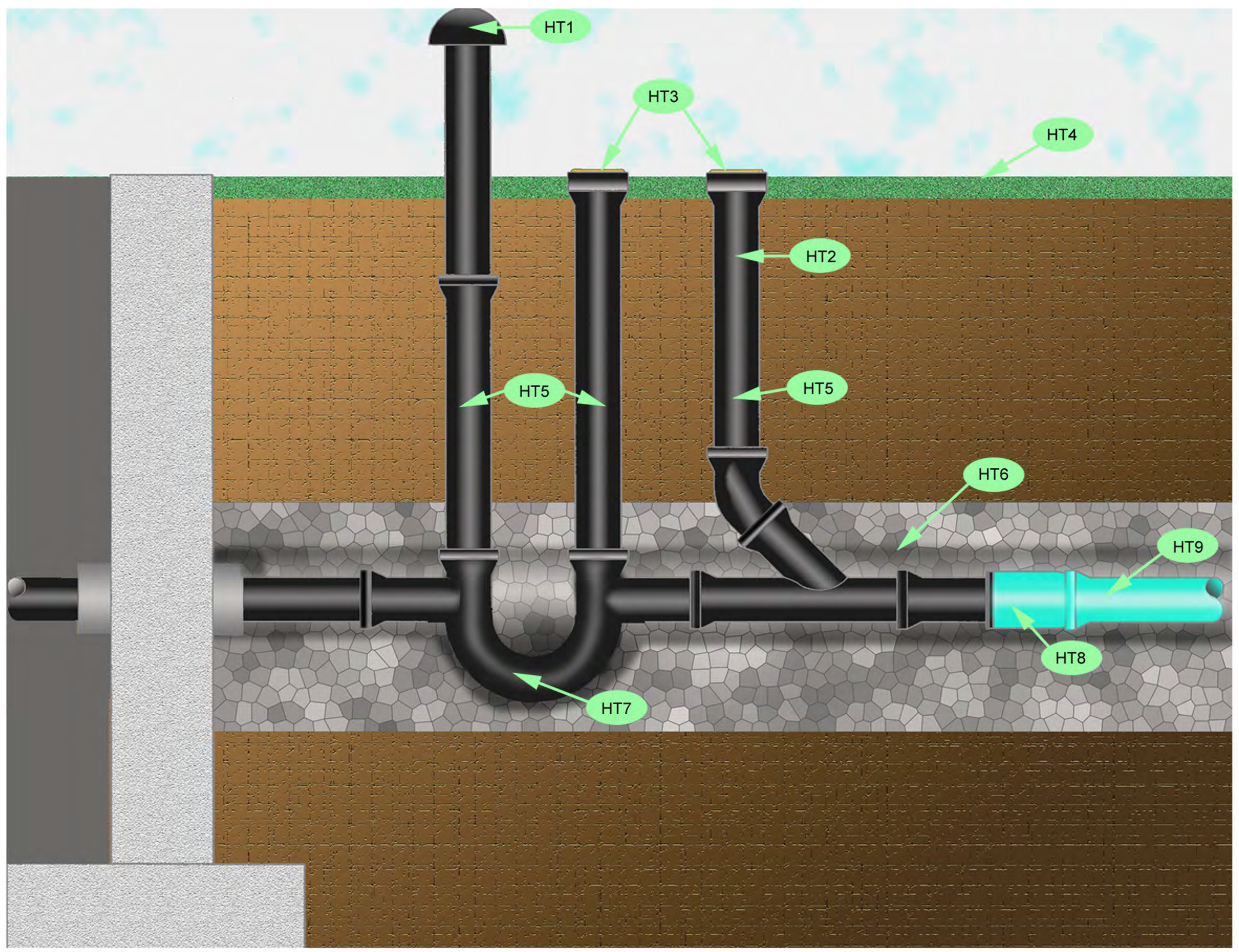


SEWER SERVICE TRENCH DETAIL

SS1
BANKRUN GRAVEL OR ITEM #4 COMPACTED IN 12" LIFTS MAX.

SS2
#2 STONE BEDDING SURRONDING PIPE 12" MIN. ALL SIDES.

SS3
S.D.R. 35 P.V.C. SEWER MAIN.



4" HOUSE TRAP ARRANGEMENT WITH FRESH AIR INLET

HT1
FRESH AIR INLET

HT2
CLEAN OUT

HT3
BRASS SCREW PLUGS.

HT4
GRADE LEVEL

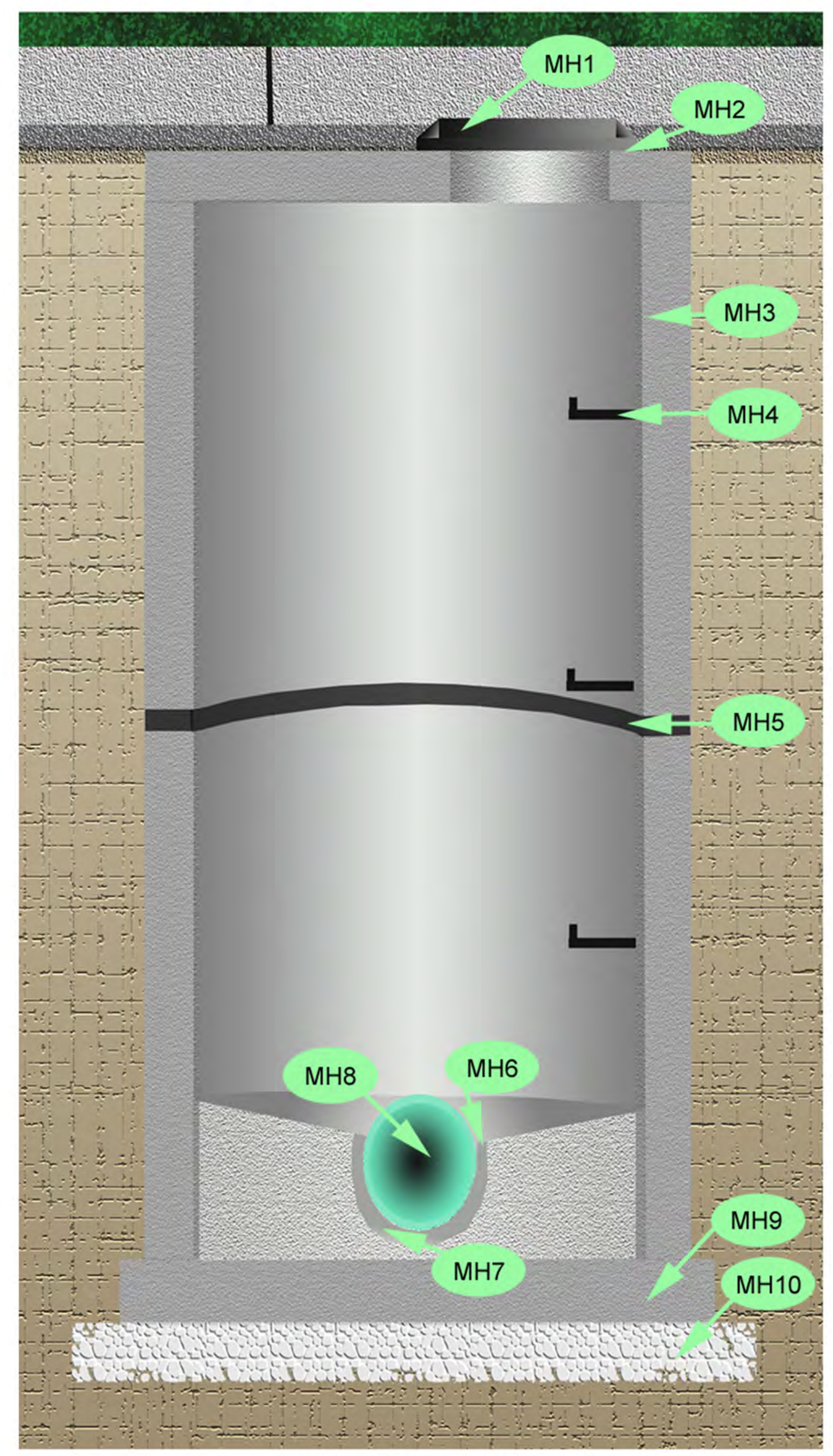
HT5
4" S.V., C.I.

HT6
#2 STONE 6" MIN. ON ALL SIDES OF PIPE.

HT7
4"X4"X4"X4" DOUBLE HUB RUNNING TRAP S.V., C.I.

HT8
4"X4" C.I. TO S.D.R. 35 ADAPTOR.

HT9
S.D.R. 35 PUSH JOINT PIPE.



MAN HOLE DETAIL

MH1
CAST IRON FRAME & COVER WITH 30" OPEN-ING A.S.T.M. 48-83 C.L. 30B, H20-S16 WHEEL LOAD.

MH2
ADJUST TO GRADE WITH GRADE RINGS (NOT SHOWN). GROUT FRAME & GRADE RINGS WITH CEMENT MORTAR INSIDE & OUT A.S.T.M. C-150.

MH3
PRECAST REINFORCED CONC. FLAT SLAB TOP MAN HOLE A.A.S.H.T.O. HS-20 ACI-318. 2 COATS OF BITUMINOUS MATERIAL A.S.T.M. C-478.

MH4
MAN HOLE STEPS A.S.T.M. 2146-82.

MH5
"O" RUBBER RING GASKET A.S.T.M. C-443, A.S.T.M. C-361 OR BUTYL ROPE SEALANT.

MH6
ALOCK MAN HOLE PIPE CONNECTOR A.S.T.M. C-923 (NOT SHOWN).

MH7
FORM SMOOTH CONC. INVERT A.S.T.M. C-94.

MH8
SLOPE 1/2" PER FOOT.

MH9
8" TO 10" PRECAST CONC. BASE.

MH10
6" OF #1 OR #2 STONE.

DEPARTMENT OF PUBLIC WORKS WATER & SEWER DIVISION
510 FIRST ST. ITHACA, N.Y. 14850

SCALE: NONE
DATE: DEC 15, 2003
DRAWN BY: M.A.O.
CHECKED BY: E.W.
REVISED:

CITY OF ITHACA, N.Y.
SEWER DETAILS

Appendix N

Project Schedule

Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY

April 2012

Project Schedule
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

AECOM Environment

Prepared for:
NYS Electric & Gas Corporation
Binghamton, NY

Prepared by:
AECOM
Latham, NY

April 2012

Project Schedule
100% Submittal
Ithaca Court Street Former MGP Site
OU-2
Ithaca, New York
NYSDEC Site # 7-55-008

Patrick Gratton

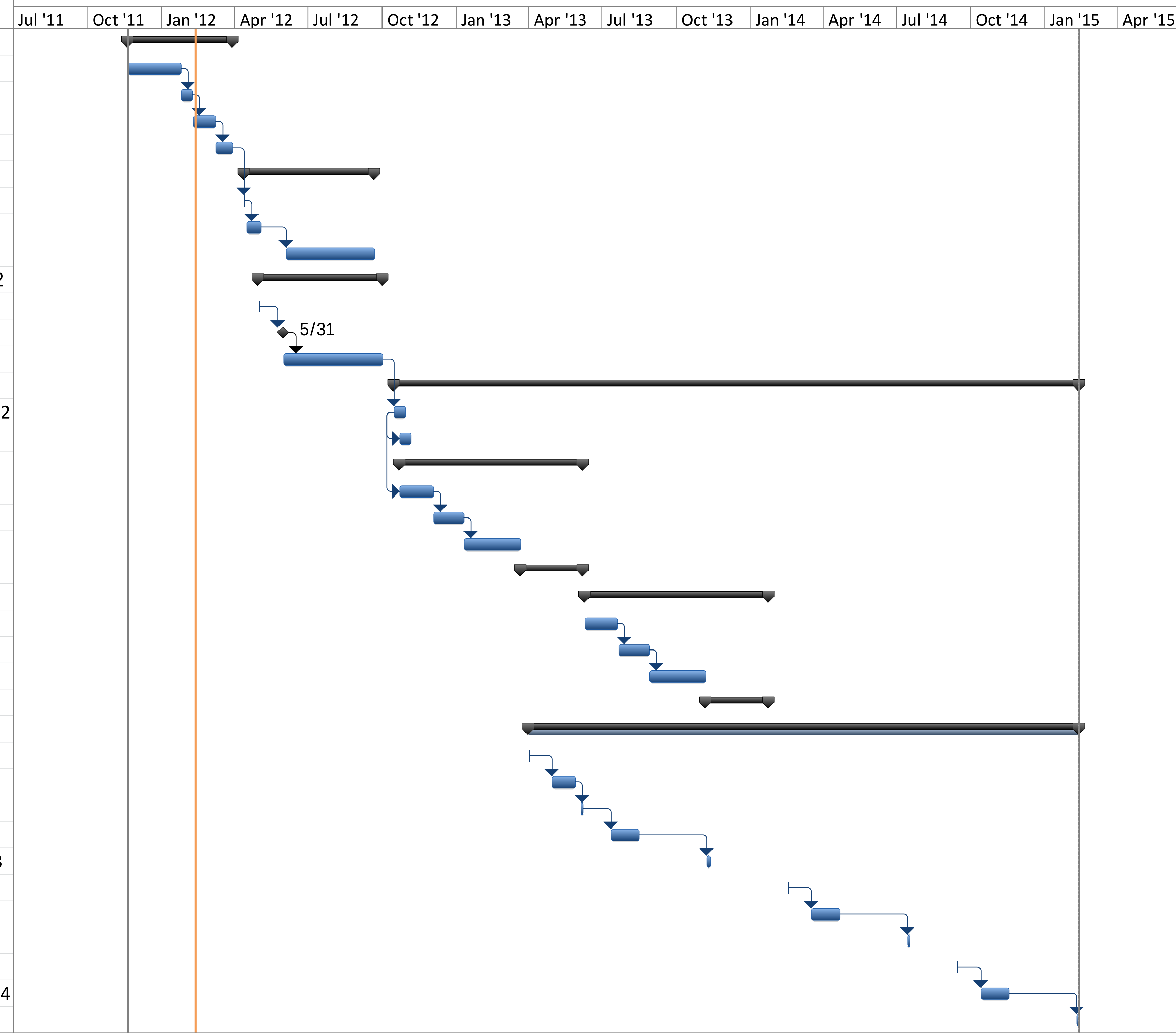
Prepared By Patrick Gratton

Scott Underhill

Reviewed By Scott Underhill, PE

Ithaca Court Street Former MGP OU-2 Remediation
100% Remedial Design Report
Draft Project Schedule

ID		Task Mode	Task Name	Duration	Start	Finish
1			Remedial Design	94 days	Mon 11/21/11	Thu 3/29/12
2			95% Remedial Design	48 days	Mon 11/21/11	Wed 1/25/12
3			NYSEG Review of 95% Design	10 days	Thu 1/26/12	Wed 2/8/12
4			NYSDEC Review of 95% Design	20 days	Fri 2/10/12	Thu 3/8/12
5			Final Design	15 days	Fri 3/9/12	Thu 3/29/12
6			NYSEG Activties	116 days	Fri 4/13/12	Fri 9/21/12
7			NYSEG Public Notice Meeting	1 day	Fri 4/13/12	Fri 4/13/12
8			NYSEG Tree Removal	14 days	Mon 4/16/12	Thu 5/3/12
9			NYSEG Gas and Electric Relocation	80 days	Mon 6/4/12	Fri 9/21/12
10			General	110 days	Tue 5/1/12	Mon 10/1/12
11			RFP Released	1 day	Tue 5/1/12	Tue 5/1/12
12			Bids Due	0 days	Thu 5/31/12	Thu 5/31/12
13			Evaluation and Approval	87 days	Fri 6/1/12	Mon 10/1/12
14			All Project Activities	608 days	Tue 10/16/12	Thu 2/12/15
15			Mobilization	10 days	Tue 10/16/12	Mon 10/29/12
16			Temp. Water Treatment Plant	10 days	Tue 10/23/12	Mon 11/5/12
17			Area 1A	164 days	Tue 10/23/12	Fri 6/7/13
18			Utility Re-location - Area 1A	30 days	Tue 10/23/12	Mon 12/3/12
19			Sheet Pile Install and Bracing - Area 1A	28 days	Tue 12/4/12	Thu 1/10/13
20			Excavation - Area 1A	50 days	Fri 1/11/13	Thu 3/21/13
21			Work Area Restoration	56 days	Fri 3/22/13	Fri 6/7/13
25			Area 1B	164 days	Mon 6/10/13	Thu 1/23/14
26			Utility Re-location - Area 1B	30 days	Mon 6/10/13	Fri 7/19/13
27			Sheet Pile Install and Bracing - Area 1B	28 days	Mon 7/22/13	Wed 8/28/13
28			Excavation - Area 1B	50 days	Thu 8/29/13	Wed 11/6/13
29			Work Area Restoration	56 days	Thu 11/7/13	Thu 1/23/14
33			Area 1C	489 days	Mon 4/1/13	Thu 2/12/15
34			Submit TEP	1 day	Mon 4/1/13	Mon 4/1/13
35			Well Install & Boring Clearing	21 days	Tue 4/30/13	Tue 5/28/13
36			Baseline Sampling	3 days	Wed 6/5/13	Fri 6/7/13
37			ISCO Activities (Mob&Inj)	25 days	Fri 7/12/13	Thu 8/15/13
38			Performance Monitoring (Round 1)	3 days	Fri 11/8/13	Tue 11/12/13
39			Submit TEP Addendum	1 day	Mon 2/17/14	Mon 2/17/14
40			ISCO Activities (Mob&Inj)	25 days	Tue 3/18/14	Mon 4/21/14
41			Performance Monitoring (Round 2)	3 days	Tue 7/15/14	Thu 7/17/14
42			Submit TEP Addendum #2	1 day	Mon 9/15/14	Mon 9/15/14
43			ISCO Activities (Mob&Inj)	25 days	Tue 10/14/14	Mon 11/17/14
44			Performance Monitoring (Round 3)	3 days	Tue 2/10/15	Thu 2/12/15



Project Schedule 100 % Submittal
Date: Mon 2/13/12

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

Notes: Schedule assumes one ISCO event in the first calendar year; however, the timing of ISCO injections may vary based on weather, performance monitoring results, field conditions, and sequencing of site activities.

Appendix O

NYSDEC Remedial Action Design Approval Letter

lew York State Department of Environmental Conservation
ivision of Environmental Remediation
emedial Bureau C, 11th Floor
25 Broadway, Albany, New York 12233-7014
hone: (518) 402-9662 • Fax: (518) 402-9679
'ebsite: www.dec.ny.gov

Joe Martens
Commissioner

April 9, 2011

Tracy L. Blazicek
NYSEG
P.O. Box 5224
Binghamton, NY 13902-5224

Re: Ithaca Court Street Former MGP Site OU-2 (Area 1)
Remedial Design Report
Site # 755008

Dear Mr. Blazicek,

The New York State Departments of Environmental Conservation (Department) and the New York State Department of Health have reviewed the 95% Remedial Design for the above referenced site and find it acceptable. The Design Report is hereby approved.

Please notify the Department as to the schedule for remedial action as it is developed.

If you have any questions, please feel free to contact me at (518)402-9564 or email me at eblukows@gw.dec.state.ny.us.

Sincerely,

Elizabeth B. Lukowski
Engineering Geologist
Remedial Action Bureau C
Division of Environmental Remediation

ec: Tracy Blazicek, NYSEG
J. Deming, NYSDOH
G. Cross
M. Ryan
E. Lukowski