Final Phase 1
Remedial Design Report

Site:
Norwich Former Manufactured Gas Plant Site (Site No. 7-09-011)
Birdsall Road
Norwich, Chenango County, New York

Submitted to:
New York State Department of Environmental Conservation
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404

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Date: May 6, 2010

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Title: Project Manager

Date: May 6, 2010

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Attachments

Appendices

List of Acronyms

ACGIH	American Congress of Government Industrial Hygienists
AS/SVE	Air Sparging and Soil Vapor Extraction
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylenes
CAMP	Community Air Monitoring Plan
CCR	Construction Certification Report
CFR	Code of Federal Regulations
cm/sec	centimeters per second
CQAP	Construction Quality Assurance Plan
CY	cubic yards
DOT	Department of Transportation
FS	Feasibility Study
IRM	Interim Remedial Measure
ISCO	In-Situ Chemical Oxidation
ISS	In-Situ Stabilization
HASP	Health and Safety Plan
MGP	manufactured gas plant
NAPL	non-aqueous phase liquid
NIOSH	National Institute for Occupational Safety & Health
NOI	Notice of Intent
NOT	Notice of Termination
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSEG	New York State Electric & Gas Corporation
OSHA	Occupational Safety and Health Act or Administration
PAHs	polycyclic aromatic hydrocarbons
PID	photo ionization detector
PPE	personal protective equipment
ppm	parts per million
psi	pounds per square inch
QC	Quality Control
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
ROD	Record of Decision
STEL	short-term exposure limits
SVOCs	semi-volatile organic compounds
TAGM	technical and administrative guidance memorandum
TCLP	toxicity characteristic leachate procedure
TEP	Technical Execution Plan
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

ENGINEERING CERTIFICATION

I hereby certify that the Phase 1 Remedial Design Report for the Norwich Former Manufactured Gas Plant 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 (DER10).

Respectfully submitted,
AECOM Technical Services Northeast, Inc.

May 6, 2010
Date

Scott Underhill
Registered Professional Engineer
New York License No. 075332

1.0 INTRODUCTION

This Remedial Design Report describes the site preparation, in-situ solidification/stabilization (ISS) of on-site source areas, removal of Non-Aqueous Phase Liquid (NAPL) from selected off-site areas, and site restoration associated with the Norwich Former Manufactured Gas Plant (MGP) site (Site No. 7-09-011) located in Norwich, Chenango 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) (Appendix A), and the Record of Decision (ROD) for the site dated March 2008.

The Norwich site remedy is being implemented in three phases. This Remedial Design Report describes the first phase (Phase 1) and includes:

- ISS of on-site soils and selected off-site soils. ISS will be preceded by pre-excavation to accommodate the volume expansion of soils during ISS;
- A clean soil cover and demarcation layer constructed in the on-site and off-site ISS areas following ISS; and
- Collection of mobile NAPL at off-site areas south of Front Street, with the goal of removing free-phase NAPL and reducing source material.

Following the completion of the first phase, the second phase (Phase 2), which includes In-Situ Chemical Oxidation (ISCO) treatment of remaining off-site source material, will begin.

Lastly, following ISCO treatment, the third phase (Phase 3) will include enhanced bioremediation of residual off-site groundwater impacts. The need for enhanced bioremediation will be evaluated following a sufficient period of monitoring subsequent to the ISCO treatment.

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

1.1 Site Location and Description

The NYSEG Norwich Former MGP site (Site) is located at 24 Birdsall Street, in the City of Norwich, Chenango County, New York. The former facility is approximately one acre in area and is bounded to the north by a plaza with retail shops, to the east by a NYSEG substation and private residences, to the south by the former Aero Products property (now owned by NYSEG), and to the west by the Lackawanna railroad tracks. The former plant is located on Birdsall Street, in Chenango River valley, west of the Chenango River and Rt. 32, south of Rt. 23, and east of Rt. 12.

The Site previously occupied approximately one acre of land located at 24 Birdsall Street. In the years following cessation of gas production, former MGP structures were razed and subsequently NYSEG used the site for equipment storage. Presently, much of the property is paved with asphalt or covered with compacted gravel. A NYSEG electric substation exists on the eastern portion of the site.

The northern part of the Site has been developed as a shopping plaza with retail shops. NYSEG purchased the former Aero Products facility located to the south and used the building for storage for several years. During the summer of 2006, NYSEG demolished the former Aero Products building. The off-site area that extends to the south of the former Aero Products building is comprised of mostly residential housing. NYSEG has purchased property at 37 and 41 Front Street and razed the structures located on these properties to allow for the ISS of the underlying soils.

1.2 Site History

The exact starting date of MGP operations at the Site is unknown; however, Sanborn fire insurance maps suggest that the plant operations started sometime between 1863 and 1887. By 1887 the Site began supplying manufactured gas to the City of Norwich under the name "Norwich Gas Lighting Company". Little is known about the generation and disposal practices of residues from the MGP; however, two tar storage vessels existed in the subsurface prior to their removal in 1997. In addition, a potential purifier waste disposal area was identified in 1990 through an interview with a former employee of the MGP.

Manufactured gas was produced at the Site using the coal gasification and carbureted water gas processes. In 1892 the name of the facility operator was changed to "Norwich Illuminating Company," which was later changed to "Norwich Gas and Electric Company" in 1917. Coal gas was produced on site until 1917 and then carbureted water gas was produced from 1917 to 1953. NYSEG acquired the property in 1939.

1.3 Previous Investigations and Remedial Actions

The following provides a brief chronology of the remedial history at the Site to date:

- 1990 – A Task I investigation was conducted by Engineering-Science, Inc. Seven subsurface samples were collected and analyzed by NUS Corporation, under contract to the United State Environmental Protection Agency (USEPA).
- July 1992 – A Task II Investigation Report determined that benzene, ethylbenzene, toluene, and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs) were present in on-site subsurface soils and that the most highly contaminated soils occurred at depths from one to six feet below ground surface downgradient of the former relief holder and distribution holder, the tar well, and former above ground oil tanks.
- March 1994 – The NYSDEC and NYSEG entered into a multi-site Order on Consent (#D0-0002-9309), which obligates NYSEG, the responsible party, to implement a full remedial program at 33 former MGP sites across the state, including the Norwich site.
- July 1997 – A Task III Investigation was performed to assess the potential presence of surface soil, subsurface soils, and groundwater contamination on Site and in backyards adjoining the Site and to determine the location and size of the former tar well and relief holder.
- 1997 – An Interim Remedial Measure (IRM) was performed by NYSEG to remove MGP residues from source areas at the Site to achieve a site-wide cleanup goal of 0.1 parts per million (ppm) for benzene and 500 ppm for total PAHs. Approximately 11,500 tons of soil was excavated and disposed off site during the IRM. Of this material approximately 6,800 tons were considered source materials. Underground structures and piping associated with the former MGP were removed during the IRM. An air sparging and soil vapor extraction (AS/SVE) system was installed to address the groundwater contamination.
- December 1999/January 2000 – The AS/SVE system started operation.
- June 2003 – The AS/SVE system was decommissioned.
- October 2006 – A Remedial Investigation (RI) was completed (ISH, Inc., 2006). Numerous soil borings, piezometers, and monitoring wells were installed during the RI for analysis of soils, groundwater, and hydrogeologic conditions.
- November 2007 – A Final Feasibility Study (FS) was prepared to evaluate remedial alternatives for the Norwich Former MGP site (Ish, 2007).
- March 2008 – The NYSDEC issued a ROD for the NYSEG Norwich Former MGP Site. The ROD presents the selected remedy for the site (NYSDEC, 2008).

2.0 REMEDIAL ACTION OBJECTIVES

The primary objectives of the remedial action, as required by the ROD issued March 2008, include:

- Remediate, to the extent practicable, areas containing source material;
- Eliminate potential exposure to source material;
- Control future migration of source material from on-site to off-site areas;
- Eliminate potential human exposure to subsurface soil containing MGP-related contamination; and
- Eliminate potential human exposure to groundwater containing MGP-related contamination.

Further, the remediation goals for the Site include attaining to the extent practicable:

- Ambient groundwater quality standards.

3.0 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITY

NYSEG and New York State regulatory agencies will participate jointly in this remedial action associated with the Norwich former MGP site. NYSEG has the ultimate responsibility for implementing the remedial action for the project, including the community air-monitoring program during construction (see Organization Structure in Appendix B). Approval of this Remedial Design Report by the NYSDEC and the NYSDOH will be secured prior to intrusive activities and site excavation. The NYSDEC and the 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 in Section 4.0, including: excavation safety and protection of adjacent structures and utilities; construction personnel health 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, excavation, and material handling activities associated with the remedial action; the soil sampling program associated with the remedial action; and documentation of the extent of the removal action. NYSEG will be responsible for implementing the community air monitoring plan (CAMP).

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 *Citizen Participation Plan* for the Norwich former MGP site included in Appendix C.

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

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4.0 REMEDIAL DESIGN

4.1 Introduction

This Remedial Design includes a chronological description and performance schedule of anticipated project activities for the Norwich site. Documents include design drawings, an ISS specifications, a citizen participation plan, an ISS stabilization bench-scale study, a Construction Quality Assurance Plan (CQAP), a Quality Assurance Project Plan (QAPP), a transportation of solid and/or liquid waste plan, a project schedule, an organizational structure, a vapor emission response plan, a Contingency Plan (CP), a CAMP, an Erosion and Sediment Control Plan, and a NYSDEC Remedial Design Report approval letter.

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 Norwich 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 7 p.m., Monday through Friday. Work on weekends will only be undertaken as necessary to meet the project completion schedule. If deviations from normal work hours are anticipated, then NYSEG will contact NYSDEC with as much advance warning as possible. The following sections describe the procedures to be used for remedial activities.

4.2 Summary of Remediation Activities

The primary activities covered under this remedial design include:

- Mobilization and site preparation;
- Community air monitoring;
- Collection of mobile NAPL and heavily contaminated groundwater at off-site areas south of Front Street, with the goal of removing free-phase NAPL and reduce source material prior to ISCO;
- Pre-excavation below existing ground surface to accommodate the generation of spoils during ISS processes. Of this excavated material, any MGP waste, coal tar, or contaminated soils containing visible tar or oil; sheens or odors, and/or has total PAHs over 500 ppm; or total BTEX concentrations above 10 ppm will be disposed of at an off-site treatment or disposal facility. Excavated materials below the criteria of 500 ppm total PAHs, 10 ppm total BTEX and free of visible tar or oil may be transported to NYSEG's Service Center in Norwich, stockpiled, and evaluated for reuse on site;
- ISS of the impacted soils by auger mixing;
- Management, transportation, and disposal of ISS spoils to an off-site permitted facility;
- ISS confirmation sampling to document compliance with design goals;
- A clean soil cover and demarcation layer will be constructed in the on-site and off-site ISS areas. The soil cover will be a minimum 12 inches thick on-site and 24 inches thick off-site. Areas intended to be vegetated will receive six inches of top-soil that is suitable to establish vegetation. Areas not intended to be vegetated will receive six inches of compacted gravel or asphalt cover (where necessary); and
- Surveying and site restoration.

The remainder of this section describes these activities and provides the information used as the basis for the design. Specific instructions to the ISS contractor are provided in the Specifications and Drawings.

4.3 Site Preparation

The contractor will prepare the Site for the required excavation and solidification work. The Site preparation activities include:

- Mobilization;
- Installation of erosion and sedimentation controls;
- Set-up of temporary site facilities;
- Surveying to establish baseline conditions and grades;
- Utility location, protection, and relocation, if necessary; and
- Set-up of traffic management at the project Site.

4.3.1 Mobilization

The contractor will mobilize to the Site all necessary manpower, equipment, and materials to initiate remediation 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 ISS work. The various components associated with mobilization and site preparation are illustrated in the design drawings. Prior to mobilization, a Notice of Intent (NOI) will be filed with the NYSDEC Division of Water.

4.3.2 Erosion and Sediment Controls

Erosion and sediment controls, including silt fences, will be installed prior to any disruption of site soil in accordance with the Erosion and Sediment Control Plan (Appendix N). The Erosion and Sediment Control Plan meets the requirements of the New York Standards and Specifications for Erosion and Sediment Control. Subsequently, NYSEG will submit a Notice of Intent (NOI) for a General Permit GP-02-01 for Stormwater Discharges from Construction Activities as required by 40 CFR Part 122. After completion of the work, NYSEG will submit a Notice of Termination (NOT) to cancel the construction permit. The erosion and sediment controls will be maintained throughout the duration of the work. Erosion and sediment controls are further described in Section 4.10.3.

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 provided during remedial construction:

- Construction offices;
- Utilities (electric, water, and telephone);
- 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 "Evergreen-hedge" type fencing and caution tape to ensure the safety of the facility workers, visitors, and 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). In addition, a project sign will be posted reading "NYSDEC Order on Consent No. DO-0002-9309" in compliance with the NYSDEC specifications.

Work zones will be established within the site boundaries in accordance with the site-specific Health and Safety Plan (HASP) and the Technical Execution Plan (TEP) that 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 and ISS limits. The contractor will use this initial survey to confirm and maintain horizontal and vertical limits as the work proceeds. NYSEG will provide a Pre-Construction Building Survey prior to the contractor's mobilization. The licensed surveyor will return to the Site as needed to document actual ISS work limits and to complete an as-built survey of the finished work.

4.3.5 Protection of Utilities and Monitoring Wells

The contractor will provide utility clearance for all work at the Site. The drawings identify known utilities that are active in the work areas and that must be protected. If necessary, these utilities will be removed and replaced if they interfere with the work or are too fragile to protect. In addition, there are several monitoring wells which will remain within the remediation area. The contractor will make all reasonable efforts to protect these wells.

4.3.6 Overhead Utility Relocation

During ISS work (described in Section 4.6) the overhead electrical lines and two power poles between the NYSEG substation and the western boundary of the Site will be moved in a step-wise operation coordinated between NYSEG and the ISS contractor. This will involve first conducting the excavation and ISS work north of the power lines up to the ten foot safe-distance point specified by NYSEG. New power poles will then be set in locations and depths as determined by NYSEG. If necessary, a caisson will be designed to hold the subsurface portion of the power pole and separate it from ISS material. The relocated power lines will be tested and energized. Excavation and ISS will then proceed in the area south of the relocated power lines.

4.3.7 Decommissioning of Monitoring Wells

Monitoring wells identified in the drawings will be properly abandoned prior to excavation. The wells will be abandoned in accordance with the NYSDEC commissioner Policy CP-43, "Groundwater Monitoring Well Decommissioning Policy" (NYSDEC, 2009).

4.3.8 Traffic Management

All site traffic is to follow the site transportation route (see Appendix D). Further instructions to the contractor regarding the means and methods of transportation of impacted soil and MGP waste is provided in Appendix D – Transportation of Solid and/or Liquid Material.

4.4 NAPL Recovery

Ten wells have been installed to test NAPL recovery methods and to aid in full-scale design of the NAPL recovery program. The wells were installed using standard means and methods, with the goal of optimizing the recovery of NAPL (well locations are shown in the design drawings). A NAPL recovery system will be installed in the spring of 2010 and operated until NAPL recovery diminishes. NAPL recovery will not be part of the work to be performed by the ISS contractor.

4.5 Excavation

4.5.1 Excavation Objectives

Excavation of shallow soils and subsurface obstructions will be conducted prior to starting the ISS work. The objectives of this excavation are to:

- Clear the area of readily removable obstructions in preparation for ISS;
- Clear shallow obstructions to permit ISS; and
- Create room for and manage spoils and expansion of solidified material (a swell volume of 20% is anticipated).

4.5.2 Limits of Excavation

The vertical limit of excavation will be to the elevation shown in the design drawings. The design provides for excavation of obstructions below the water table to the extent that it does not require dewatering or shoring and that sidewall stability can be safely maintained. The limits of excavation are shown in the design drawings. Excavation to clear deep obstructions will be conducted as needed to allow advancement of ISS augurs.

The horizontal limits of excavation are shown in the drawings, in accordance with the ROD. The on-site area covers approximately 52,200 square feet and the off-site area has a footprint of approximately 8,700 square feet. A total of 6,825 cubic yards (CY) of material is anticipated to be removed during the pre-excavation. Of this, 5,460 CY is estimated for the on-site portion and 1,365 CY for the off-site portion. Pre-excavation activities will include removal of some asphalt and the concrete slab from the former Aero Products building. NYSEG has purchased the off-site property located at 37 Front Street and 41 Front Street, therefore ISS (including pre-excavation) will be implemented at these locations.

Available information indicates that the excavation materials are not heavily impacted with MGP residuals (see Appendix E). However, NAPL was visually identified in four soil samples taken during pre-design activities (PDI-4, PDI-15, PDI-16, and PDI-25) and are summarized in *The Pre-Design Investigation Soil*

Sampling & Analysis and In-Situ Solidification Treatability Study (AECOM, 2009). Excavated materials below the site cleanup criteria set forth by the ROD (i.e., 500 mg/Kg of PAHs; 10 mg/Kg of BTEX) and not containing visible tar or oil may be transported to NYSEG's Service Center in Norwich, stockpiled, and evaluated for reuse on the Site in accordance with the QAPP. All stockpiled soils will be covered with poly sheeting and protected with soil erosion controls and dust controls as needed and as described in Sections 4.3.2 and 4.10.3. A stockpile storage plan will be submitted as part of the contractors TEP. Impacted soils will be staged in lined and bermed areas to contain runoff and dewatered fluids.

All foundations within the excavation area are to be removed and disposed of in accordance with Section 4.7 – Waste Management.

4.5.3 Excavation Sidewall Stability

Slopes shall comply with Occupational Safety and Health Administration (OSHA) requirements (29 CFR 1926.650 to 1926.652). The contractor will be responsible for providing support to all utilities, structures, etc., as needed to complete the work.

4.6 In-Situ Solidification

The contractor will conduct ISS in accordance with the design drawings and the technical specification In-Situ Solidification – Auger Mixed. This section presents the basis for the ISS design, including consideration of the horizontal and vertical limits and groundwater modeling and drainage design.

4.6.1 Horizontal Limits of ISS

The horizontal limits of ISS are shown in the drawings, in accordance with the ROD. The on-site area covers approximately 52,200 square feet and the off-site area has a footprint of approximately 8,700 square feet.

4.6.2 Vertical Limits of ISS

The augered ISS will extend vertically into the silt/clay layer (up to 26 feet bgs). *The Pre-Design Investigation Soil Sampling & Analysis and In-Situ Solidification Treatability Study* (AECOM, 2009) provides a summary of boring logs and total PAH and total BTEX data from the previous investigations and additional delineation borings completed in March/April 2009. Additional delineation borings were completed in October 2009. From these field observations and laboratory analytical results of soil samples, the maximum depth of impacts was approximately 26 feet bgs. The design drawings show the approximate design depth for each ISS area.

4.6.3 ISS by Auger Mixing

Soil will be solidified using an appropriately sized auger mixing rig. ISS columns will be installed in an overlapping sequence so that a monolithic solidified mass is created within the horizontal and vertical limits of ISS as shown on the design drawings. The auger size is anticipated to be between 6 and 8 feet, however, the contractor may propose other auger sizes not to exceed 10 feet. Quality Control (QC) testing of the solidified material will be conducted to confirm that the performance criteria have been met. Samples will be collected and tested for the performance criteria for every 500 CY of material solidified, or once per day at a minimum. If excessively wet subsurface conditions are observed, then additional samples will be collected. The contractor will recover the mixed soil samples at the direction of the on-site project coordinator. The contractor will form the sample cylinders and submit them for analysis. Extra sample cylinders will be formed to allow for repeat testing, as necessary.

A bench-scale ISS treatability study was conducted to aid in the design of the full-scale remediation at the Norwich site. The study indicated that ISS can be implemented successfully on site and indicated several design mixes that would allow the ISS to meet design criteria. Based on the study, AECOM recommends 7.5% cement and 1% bentonite. A summary table of the treatability study results is included in the specifications.

While the bench-scale tests provide a series of mixes that are anticipated to meet the project performance requirements, each contractor will have the ability to specify a different mix design during the bidding process. The contractor will be required to demonstrate that their mixture meets performance criteria on site soils prior to that mix being selected. The contractor is responsible for meeting the project performance requirements. The performance criteria for the solidified material include:

- Unconfined compressive strength greater than 50 pounds per square inch (psi) after 28 days of curing by ASTM D 2166 — Standard Test Method for Unconfined Compressive Strength of Cohesive Soil; and
- Hydraulic conductivity less than 1×10^{-6} centimeters per second (cm/sec) after 28 days of curing by ASTM D 5084 — Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

4.6.4 ISS Spoils Management

To the extent possible, excess ISS material ("spoils") will be used on site to raise the grade to within a maximum of four feet below final grade. Following ISS, additional backfill will be brought to the Site to restore final grades as shown on the drawings. Additional ISS spoils will need to be transported off site for appropriate disposal, as described in Section 4.5.

4.6.5 Groundwater Modeling and Drainage Considerations

A groundwater model was developed to evaluate the potential impact on the groundwater flow regime in response to ISS immediately upgradient and adjacent to the ISS treatment areas. The model concluded that ISS does not pose a substantial risk of disrupting the groundwater flow regime. A slight rise in the water table of less than 0.1 feet upgradient of the ISS treatment area was determined from the modeling results. The model and results are presented in Appendix F.

4.6.6 ISS Monolith Stability

The solidified material should form a stable monolith across the site. Experience at other sites indicates the unit weight of the solidified soil is similar or slightly higher than the existing soil. Therefore, loading from the increased weight of the solidified monolith to the underlying soils would be small and would result in a negligible load increase on the underlying soils.

4.7 Waste Management

The following potential waste streams have been identified that may be generated during the remedial action:

1. Impacted soil (non-hazardous soil containing visible tar or oil) excavated from the pre-excavation activities;
2. Non-impacted soil excavated from the pre-excavation activities that may not be stockpiled for reuse at the Norwich Service Center.
3. Excess solidified soil resulting from volume expansion during ISS;

4. Contaminated debris;
5. Non-contaminated debris;
6. Pre-treated wastewater; and
7. NAPL collected during NAPL Recovery.

All material that is excavated will be sent off-site for disposal (i.e., soils containing visible tar or oil) or transported to the NYSEG Service Center in Norwich and stockpiled for reuse. Excavated material to be sent off site will be sent to a disposal facility approved by NYSEG.

4.7.1 On-site Waste Management

Due to construction sequencing and off-site disposal facility scheduling issues, and in order to consolidate large amounts of waste material for bulk truck shipments, impacted material will be stored on site prior to loading and shipment. To the extent possible, impacted material generated during excavation will be loaded directly into trucks for off-site transportation. Generally, however, excavated soil will be transported by loader or on-site haul truck from the excavation areas to the on-site stockpile area. In addition, materials that appear to be reusable may be transported to NYSEG's Service Center in Norwich, stockpiled, and evaluated for reuse on site. To the extent practicable stockpile areas will be located over areas to be excavated. The use of liners and berms will be determined by the engineer based on whether the material underlying the stockpile area will eventually be excavated or stabilized. Material stockpiles will be sprayed with odor suppressing foam and/or covered as necessary in an attempt to mitigate the potential for odors in the surrounding community.

On-site storage will take place in accordance with all laws and regulations dealing with the type of waste being stored. Liquid wastes will be stored in appropriate tanks or drums. Other (non-soil) solid materials will be stored in roll-off containers or covered stockpiles.

Debris generated during demolition and excavation may require decontamination to meet disposal facility acceptance requirements. Decontamination will take place using brushes 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.

NAPL collected during NAPL recovery shall be stored on site in a non-corrosive container no longer than 90 days following generation. The container shall be placed on a double containment liner or shall have a double containment wall (i.e., a double containment steel tank or spill guard). Transportation of the recovered NAPL shall be performed by an approved contractor and shall follow all procedures outlined in Appendix D – Transportation of Solid and/or Liquid Material.

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 CAMP (provided in Appendix G).

Street cleaning by a motorized street sweeper will be provided by the contractor when determined necessary by the engineer and outlined in the Erosion and Sediment Control Plan (Appendix N).

4.7.2 Pre-Remediation Waste Characterization

The soils within the Norwich site were pre-characterized during a pre-design drilling and sampling program in spring of 2009. The results of the pre-remediation characterization are provided in Appendix E. Pre-characterization facilitates the profiling and pre-acceptance of the materials to the disposal facilities. The engineer will provide all relevant data to the contractor and the selected disposal facilities. Once the soils are accepted they can be direct loaded from the excavation into transport trucks or

stockpiled on the site so not to impede the progress of the excavation. Existing analytical data will be made available to the selected disposal facilities prior to commencing the work. Additional analytical results generated during the work will be made available as soon as practicable.

4.7.3 Off-site Transportation

The contractor will be responsible for loading, transporting, stockpiling, and disposing of the excavated material as described in the design drawings. 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, 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 way 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.

All waste shipments will be documented using standard non-hazardous and hazardous waste manifests as required by applicable 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. AECOM on site project coordinator will sign the transportation manifests prior to loads leaving the site.

Off-site trucking will follow the haul route shown in the transportation plan.

4.7.4 Off-site Disposal or Treatment

All impacted excavated materials not reused will be sent to an off-site disposal facility approved by NYSEG.

4.8 Water Management

Any water containing MGP constituents that may be generated during decontamination of debris and equipment will be collected, and contained. The volume of collected impacted water is expected to be minimal as excavation will take place primarily above the groundwater elevation. The use of proper run-on and run-off controls will further limit the amount of impacted water to be collected.

Collected water will be sent to an approved off-site disposal facility.

4.9 Site Restoration

Following excavation and ISS activities, the affected areas will be backfilled to finish grade with clean imported fill or reusable on-site materials, subject to the NYSDEC's approval. Pursuant to the ROD, the top 12 inches and 24 inches of the on-site and off-site area, respectively, will be backfilled with material that meets Part 375-6 Soil Cleanup Objectives – Unrestricted Use requirements for residential use and protection of groundwater.

At both on-site and off-site areas, the clean soil cover will be underlain by a demarcation layer (e.g., orange geotextile). The purpose of the demarcation layer is to distinguish between the cover soils and

soils exceeding the requirements for clean cover soils and/or solidified material. All areas of the Site will be graded to promote runoff without erosion. The contractor shall provide an appropriate vegetative cover or compact gravel layer to the Site as indicated in the design drawings.

The fencing in the area near the shopping plaza shall be restored as determined by NYSEG.

4.10 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.

4.10.1 Odor, Vapor, and Dust Control

Odor, vapor, and dust control will be conducted for this project due to the location of the Site and immediate proximity to residential and commercial buildings.

A variety of engineering controls will be available to control odors, vapors, and dust. 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, and spraying soils with Biosolve™. All odor and vapor control equipment and materials shall be approved by the engineer prior to use.

The contractor may propose alternative means and methods for controlling dust, odors, and vapors from site operations, particularly for activities such as excavation and in situ solidification activities. 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 cannot be used until approval by the engineer and the NYSDEC is received in writing.

Air monitoring will be performed in accordance with the CAMP. 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.

4.10.2 Air Monitoring

Air Monitoring will be conducted in accordance with Section 5, the site HASP, QAPP, and CAMP. Emergency response measures associated with air monitoring are presented in the site HASP, Vapor Emission Response Plan, and Section 5.3.6.

4.10.3 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 collected and transported off site to an approved water handling facility as discussed in Section 4.8. Hay bales, silt fence, stone, and/or rip rap will be used as necessary to prevent erosion of exposed soils. The erosion control structures will be inspected a minimum of once per week and after significant rainfall events (i.e., 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. Erosion and sediment requirements are provided in the Erosion and Sediment Control Plan (Appendix N).

On-site decontamination pads will be used to remove mud and soil from truck tires and prevent tracking of impacted soil onto the streets.

5.0 AIR-QUALITY MONITORING PLAN

5.1 Overview

The objective of this Air-Quality Monitoring Program is to provide direct measurement of VOCs and total suspended particulates that could potentially be released during any activities at the Site where contaminated or potentially contaminated soil is disturbed, including, but not limited to excavation, handling, or transportation of soil. The air-quality monitoring program consists of (1) Exclusion Zone air-monitoring for evaluating construction worker health and safety; and (2) community air-monitoring to determine the levels of VOCs and total suspended particulates at the perimeter of the Exclusion Zone.

This Air-Quality Monitoring Program meets or exceeds all criteria and guidance provided in the NYSDOH Generic CAMP. The provisions include real-time air-monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of the Exclusion Zone. The nearest receptor (regardless of its relationship to wind) will be an additional monitoring location. Real-time air-monitoring data will be used to guide appropriate action to reduce/minimize air emissions to acceptable levels. NYSEG has developed a Vapor Emission Response Plan for Norwich Former MGP site (see Appendix H) to address any exceedances of acceptable levels.

5.2 Exclusion Zone Air-Monitoring Program

The air quality within the Exclusion Zone, including inside transporter's trailer and/or roll-off container, will be monitored to ensure worker health and safety in accordance with requirements specified in 29 Code of Federal Regulations (CFR) 1910.120 as described in the HASP For Norwich Former MGP site.

5.3 Community Air-Monitoring Program

5.3.1 Overview

NYSEG will undertake a community air-monitoring program during the project to provide direct measurement of VOCs and total suspended particulate that may be released during excavation and handling of MGP structures and soils.

The air-monitoring program was established to address the following objectives:

- To insure concentrations of VOCs and total suspended particulates are minimized to protect human health and the environment;
- To provide an early warning system so engineering controls can be enacted to prevent unnecessary exposure of emissions resulting from project activities; and
- To measure and document the concentrations of VOCs and total suspended particulates for determining compliance with the established air-monitoring limits.

The community air-monitoring is intended to be a discrete program, which will be operated in conjunction with the Exclusion Zone air-monitoring program. The Exclusion Zone monitoring is established to protect worker health and safety during construction and materials handling. The community air-monitoring will include real time air quality data, which will be collected throughout the duration of all excavation activities and will include upwind, downwind, and nearest receptor measurements. Wind direction will be determined using a weather station or equivalent device.

5.3.2 Real-Time Air-monitoring – Volatile Organic Compounds

The total VOCs monitoring will be accomplished using a total volatile organic analyzer equipped with a photo ionization detector (PID) using a 10.2 eV lamp. Each day the analyzer will be calibrated to

benzene with a 100 ppm isobutylene air standard. The volatile organic analyzer will be capable of calculating a 15-minute running average of the measured VOCs concentrations. The 15-minute averages will be used to monitor air quality and will be recorded throughout the day.

Real-time VOC monitoring will start each day with an upwind measurement and immediately following any changes in wind direction. These measurements will be used for establishing baseline emissions due to natural and anthropogenic sources. The baseline value will be added to the air monitoring limits to compensate for the existing ambient conditions (i.e., VOC limit of 5 ppm + 1.2 ppm upwind: 6.2 ppm limit).

The total VOCs monitoring will operate continuously at the downwind perimeter of the Exclusion Zone. The nearest receptor (regardless of its relationship to wind) will be an additional monitoring location. Readings at each location will be accomplished by pointing the intake tube of the analyzer toward the likely emission source, generally at the height of 3 feet above grade. The instrument will measure concentrations continuously and calculate four 15-minute averages per hour throughout the day. Each 15-minute average will be recorded on log sheets along with the date, time, sampling locations, wind direction, and weather conditions. A daily community air-monitoring report will be maintained in the on-site project trailer. The weekly data will also be submitted at the end of each week in an electronic format to Melissa Menetti, the NYSDOH at mxm29@health.state.ny.us, Mr. Anthony Karwiel, the NYSDEC at alkarwie@gw.dec.state.ny.us and Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

Based on data published by OSHA, American Congress of Government Industrial Hygienists (ACGIH) and National Institute for Occupational Safety and Health (NIOSH), a short-term quality action level of 5 ppm for total VOCs has been established for air emissions action in the Exclusion Zone. NYSEG will use an action level of 2.5 ppm above the existing ambient conditions (background) in the Exclusion Zone. Engineering control measures will be initiated for VOCs levels greater than 2.5 ppm at the work zone. If actions to control total VOCs emissions are not effective and concentrations continue to increase to 5 ppm (above background), the excavation and waste handling activities will be halted and actions will be initiated as specified under the Vapor Emission Response Plan (Section 5.3.7).

The 5 ppm action level (above background) at the perimeter of the Exclusion Zone is based on an estimated concentration for benzene, which is one of the VOCs included in the volatile organic analyzer reading. Since the volatile organic analyzer detects volatile compounds other than benzene, the 5 ppm action level is considered to be conservative.

In addition an action level of 2.5 ppm above background will be used in the Exclusion Zone where workers have the potential for continuous exposure. The 2.5 ppm limit is OSHA's short-term exposure limits (STEL) for benzene, which was established to insure worker health and safety (29 CFR 1910.1028). If the total VOCs concentration exceeds 2.5 ppm, the worker PPE will be upgraded from modified Level D to Level C, which requires the use of respirators as specified in the HASP.

5.3.3 Odor Monitoring Plan

The nature of MGP site residues pose a concern regarding the generation of nuisance odors during excavation and material handling. As such, an odor control and monitoring plan has been developed for the project. For an odor complaint residents may speak with the NYSEG project coordinator or the NYSDEC on-site representative. A hot line staffed 24-hours per day will be established to allow registration of odor complaints. The hot-line operator will document the caller's concern and contact the appropriate project team members who will assess the reason for concern and apply the appropriate engineering controls.

A project fact sheet will be reviewed by the NYSDEC and the NYSDOH before distribution to adjacent property owners explaining the remediation work to occur at the Site, the potential for odors and how the phone system works. This will be distributed prior to beginning any excavation work.

If the site personnel detect significant odor or a complaint is received, engineering controls will be implemented as outlined in the Vapor Emission Response Plan (Section 5.3.6) to reduce odor-causing emissions. Once odors become non-discernable, normal operations may resume. This determination will be subject to the approval of the on-site NYSDEC representative. If in the opinion of the on-site NYSDEC representative, the concentration of the site related odors are unacceptable, the on-site NYSDEC representative will instruct the NYSEG project coordinator to implement odor control measures.

5.3.4 Real-Time Air-monitoring – Total Suspended Particulates

In conjunction with the real-time volatile emission monitoring, direct-reading monitoring equipment for particulate matter will be used to collect real-time airborne particulate data every 15-minute. The instrument to be used for this sampling is a personal DataRAM ™ (field modified for active sampling) or the Thermo Andersen ADR-1200S Ambient Particulate Monitoring System both of which operate on the principle of light scattering. Both units respond to particles in the size range of 0.1 to 10 micrometers and in the concentration range of 0.01 to 400 mg/m^3. Particulate measurements will be based on a 30-second, time-weighted average. The personal DataRAM ™ will be calibrated daily with a filtered air sample. Recorded measurements at the upwind and downwind monitoring locations will be logged by the technician every 15-minutes. Equivalent back-up real-time air-monitoring equipment will be available on-site in the event of an equipment malfunction.

The NYSDOH Generic CAMP recommended action level of 0.10 mg/m^3 above background for particulate matter less than 10 micrometers in size (PM-10) will be used to determine whether modifications to given processes are required. If the downwind particulate measurement of particles less than 10 micrometers in size (PM-10) is greater than 0.10 mg/m^3 above the upwind background level, or if dust is observed leaving the project area, dust suppression techniques (i.e., misting surfaces with water or covering open piles) will be implemented to reduce the generation of fugitive dust. If the action level of 0.15 mg/m^3 (above background) is exceeded, work activities will be ceased and the NYSEG and the NYSDEC on-site representatives and the NYSEG project manager will be notified.

The NYSEG project manager will notify the Division of Air Resources in writing within five working days in accordance with draft DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, November 2009).

5.3.5 Documentation for Air Quality Monitoring

An essential part of any sampling/analytical scheme is to ensure the integrity of the sample from collection to data reporting. Sample integrity includes the possession and handling of a sample that is traceable from the time of collection, through analysis and final disposition.

Sample Labels: Unique sample identification codes will be assigned at the time of collection to prevent misidentification of samples. The identification codes will include the following information:

- Project/name/number;
- Sample location;
- Date of collection;
- Time of collection;
- Initials of sampler; and
- Analytical method.

Field Log Book: All information pertinent to sampling will be recorded in a logbook. Sufficient information must be recorded so that the sampling event can be reconstructed without reliance on the collector's memory. Information will be entered into a bound notebook and at a minimum; entries will be include the following:

- Location of sampling point;
- Sample identification code;
- Sample collection date and time;
- Sample methodology;
- Sample analysis;
- Sampler's field observations, if any; and
- Field measurements, if any.

Dedicated field logbooks will be maintained on site to document the daily calibration of the real-time air-monitoring equipment.

5.3.6 Vapor Emission Response Plan

The Norwich Former MGP site Vapor Emission Response Plan (see Appendix H) will be triggered by either an exceedance of the 15-minute average VOCs concentration of 5 ppm (above background) at the perimeter of the Exclusion Zone or odor complaint. If the Vapor Emission Response Plan is triggered all excavation activities will be stopped and the following actions will be taken:

- Continue total VOCs monitoring at the perimeter of the work area. If the total VOCs level drops below 5 ppm (above background) then excavation activities can resume with the addition of engineering controls or modifications to the excavation process to minimize VOCs emissions. However, if the VOCs levels persist above 5 ppm, based on continual observance of the meter, then the construction supervisor will immediately implement engineering controls such as misting area with a vapor suppression solution of BioSolve®, covering, backfilling, etc., to reduce emissions and at the same time notify the site project manager, and the Project Health & Safety Coordinator.
- If the total VOCs levels drop below 5 ppm (above background), after the implementation of engineering controls at the perimeter of the Exclusion Zone, then the excavation activity can resume provided process and work activities were adjusted to reduce emission levels.
- If the total VOCs levels continue to be greater than 5 ppm (above background) at the perimeter of the Exclusion Zone after the implementation of engineering controls, then all site activities must be discontinued. When the work is shut down, downwind air-monitoring as directed by the Project Health & Safety Coordinator will be implemented to ensure that the emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan (Section 5.3.7).
- If the total VOCs levels are above 25 ppm at the perimeter of the Exclusion Zone, site activities must be shutdown and corrective measures taken.

Primary engineering controls, which may be implemented to reduce emission levels if the site personnel detect significant odor or when odor complaints are received, include:

- Adding a vapor suppression solution of BioSolve® to impacted media;
- Limiting excavation size and surface area of exposed coal tar impacted soil; and

- Covering coal tar impacted soil with polyethylene sheeting.

5.3.7 Major Vapor Emission Response Plan

If after the cessation of the work activities and implementation of engineering controls, total VOC levels exceed 5 ppm (above background) at the nearest receptor or at the perimeter of the Exclusion Zone, then the following actions will be immediately taken:

- Cover the excavated area with polyethylene sheeting or clean soil. Notify Norwich Police Department at (607) 334-1212, Norwich Volunteer Fire Department (860) 886-1378; NYSEG, Tracy Blazicek at (607) 762-8839; the NYSDEC, Mr. Anthony Karwiel at (518) 402-9662 and the NYSDOH, Melissa Menetti at (518) 402-7860.
- Total VOCs levels will be monitored at the nearest downwind residential or commercial structure.
- Continuously monitor air quality until VOCs levels drop below 5 ppm.

If total VOCs levels persist above the 5 ppm (above background), the construction supervisor, Project Health & Safety Coordinator, and NYSEG project manager will consult with each other and the Emergency Response agencies to determine the appropriate actions to be implemented. NYSEG project management personnel have ultimate authority during major vapor emissions emergencies.

Work shall not resume without approval of the NYSDEC.

6.0 DOCUMENTATION OF SITE ACTIVITIES

6.1 Daily Field Construction Report

A daily field construction report will be prepared by AECOM's 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 email to Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

6.2 Transportation Log

A transportation log will be prepared by AECOM's 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.

6.3 Daily Community Air-monitoring Report

A daily community air-monitoring report will be prepared by AECOM's 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 Melissa Menetti, the NYSDOH at mxm29@health.state.ny.us, Mr. Anthony Karwiel, the NYSDEC at alkarwie@gw.dec.state.ny.us, and Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com.

6.4 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.

6.5 Chain of Custody

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

6.6 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.

6.7 Incident Reporting

NYSEG's Public Liability Accident Report, NYSEG's Report of Employee Injury, and NYSEG's Incident Report forms will be used to document any accident occurring on site during the remedial project. The sheets will be attached to the HASP and located in the field project trailer.

6.8 Construction Completion Report

At the completion of the project the project engineer will prepare and submit a Construction Completion Report (CCR) 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 CCR will be signed and certified by a professional engineer that all activities were completed in full accordance with the NYSDEC approved Work Plan and the NYSDEC Order on Consent Index #DO-0002-9309.

7.0 PERMITTING AND REGULATORY REQUIREMENTS

7.1 Permitting

In addition to performance requirements established to ensure that the design of the remedial action meets the remedial action objectives set in the ROD (NYSDEC, 2009), the design will also be prepared to meet permitting and other regulatory requirements of local, state, and federal laws and regulations. As specified in Appendix 7B of the Draft DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, November 2009), the NYSDEC may grant exemption from most state permits required for completion of this remedial action, provided the substantive requirements of the permit programs are followed.

7.2 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 are included within this report.

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.

The engineer will provide a copy of the existing site-specific HASP to the contractor. 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 subjects covered in the HASP include:

- Health & Safety Risk Analysis;
- PPE;
- OSHA Air Monitoring & Action Levels;
- Site Control;
- Decontamination;
- Emergency Response Plan;
- Lockout/Tagout
- Heavy Equipment Operations;
- Excavation and Trenching;
- Material Safety Data Sheets; and
- Health and Safety Records and Reports.

The contractor shall prepare, as a bid submittal, their own HASP, which shall be at least as stringent as the engineer's. The contractor's HASP will be subject to the engineer's review and NYSEG's approval. 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.

7.3 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);
- Each vehicle or container shall be fully lined and covered with non-mesh material. Truck tailgates must be equipped with turnbuckles.
- 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.

8.0 QUALITY ASSURANCE

Quality assurance procedures will be implemented during the work to ensure 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.

8.1 General Quality Assurance Procedures

The following quality assurance procedures and tests will be implemented:

- 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 is non-contaminated;
- Surveying of the work limits as described in Section 4.3.4;
- Field verification by the engineer of excavation, ISS, and placed material depths, areas, and volumes; and
- Field observations and confirmation sampling by the engineer of excavation limits as described in Section 4.5.2.

8.2 ISS Quality Assurance Procedures

The contractor shall provide a specific ISS mix design with identification of the reagents and their sources. The primary means of quality assurance/quality control during the ISS process will be the observations of the ongoing process by the field construction manager. Samples will be collected and tested for the performance criteria at a rate of 500 CY or once per day at a minimum. If excessively wet subsurface conditions are observed, then additional samples may be collected. The contractor will recover the mixed soil samples at the direction of the engineer. The engineer will form the sample cylinders and submit them for analysis. Extra sample cylinders will be formed to allow for repeat testing should it be necessary. Solidified material that does not meet the performance criteria will be reprocessed until the performance criteria are met. The contractor is responsible for meeting the project's performance requirements. ISS quality assurance procedures and performance requirements are described in the specifications.

8.3 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 in accordance with the site Contingency Plan (Appendix I).

9.0 PROJECT REPORTING

During the course of the work, the contractor will regularly provide to the engineer:

- ISS Mix Reports; and
- Weigh tickets.

At the conclusion of each workday, the contractor and the on-site project coordinator 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 the NYSDEC and the NYSDOH, if needed.

Upon completion of the remedial activities, the engineer will prepare a CCR for Phase 1, 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.

10.0 SCHEDULE AND HOURS OF OPERATION

The remedial activities are planned to begin in October 2010 and be substantially completed by the end of June 2011. Weather-dependent site restoration activities, such as establishment of vegetative cover, are anticipated to continue periodically through September 2011.

Hours allowed for equipment operation during the remedial activities will be daylight hours between 7 AM and 7 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. Advance notice will be provided to the NYSDEC when any deviation from the normal work hours is anticipated.

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 the engineer's review and NYSEG's approval. It will describe:

- The materials, equipment, and methods to be used to perform the work;
- The proposed schedule for completing the work;
- Resumes of key project personnel;
- Proposed soil stockpile methods and monitoring;
- ISS mix characteristics; and
- The site HASP.

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

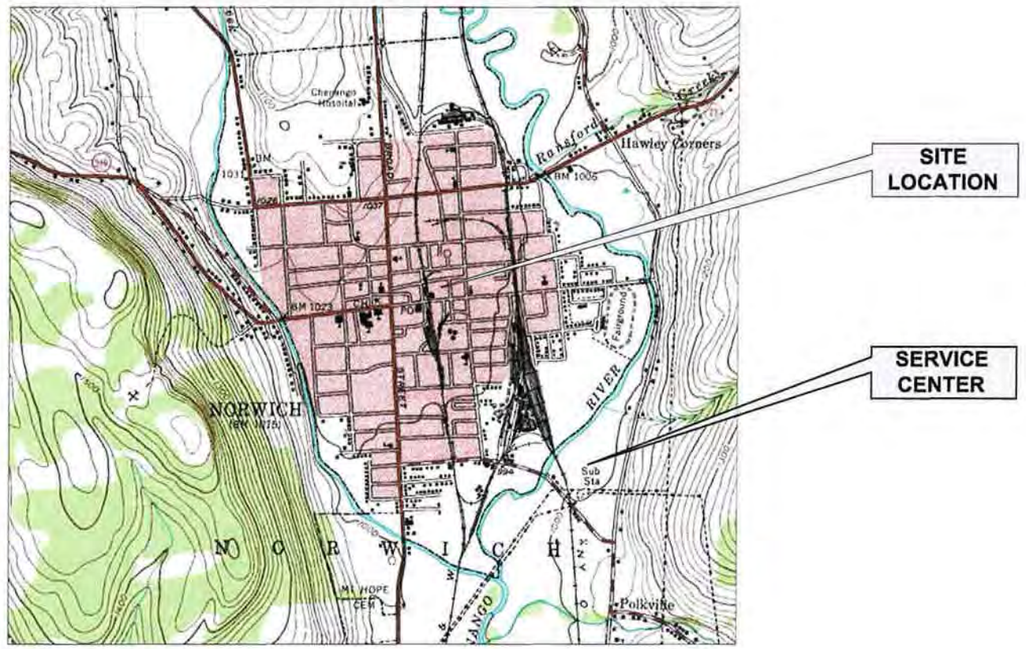
Attachments

Attachment 1

Design Drawings

NYSEG
REMEDIAL DESIGN FOR
FORMER NORWICH MGP SITE
(SITE NO. 7-09-011)
NORWICH, CHENANGO COUNTY, NEW YORK
MAY 2010

INDEX OF DRAWINGS



SOURCE: USGS MECHANICVILLE 7.5' QUADRANGLE

PROJECT LOCATION
Not To Scale

Prepared For:

NYSEG

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

Prepared By:

AECOM

AECOM Technical Services Northeast, Inc.
40 British American Blvd.
Latham, New York, 12110
(518) 951-2200

100% Design

STATE OF NEW YORK
CARSTEN H. FLOESS
061261
LICENSED PROFESSIONAL ENGINEER

5-05-2010

Carsten H. Floess, P.E. Date
NYSPE Lic. No. 061261

STATE OF NEW YORK
SCOTT ANDREW UNDERHILL
075332
LICENSED PROFESSIONAL ENGINEER

5-06-2010

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

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GENERAL SUBSURFACE CONDITIONS:

1) GENERAL SUBSURFACE CONDITIONS ARE SUMMARIZED IN THE FINAL SUPPLEMENTAL REMEDIAL INVESTIGATION (SRI) REPORT, NORWICH FORMER MGP SITE, NORWICH, NEW YORK, PREPARED BY ISH, INC., OCTOBER 2006. ADDITIONAL SUBSURFACE INFORMATION IS PROVIDED BY BORINGS MADE IN 2009 BY AECOM FOR WASTE CHARACTERIZATION, ISS TREATABILITY STUDIES, NAPL COLLECTION WELLS, AND TO DEFINE DEPTH TO THE TOP OF THE CLAY CONFINING LAYER.

2) AVAILABLE DATA INDICATE THAT OVERBURDEN COMPRISES FOUR GENERAL STRATA: 1) GRANULAR FILL, 2) SILTY SAND, 3) SAND AND GRAVEL, AND 4) CLAY.

3) THE FORMER GAS RELIEF HOLDER AND TAR TANK WERE REMOVED DURING IRM ACTIVITIES AT THE SITE AS DESCRIBED IN THE FINAL REPORT, PHASE III INTERIM REMEDIAL WORK PLAN FOR NORWICH FORMER MGP SITE, NORWICH, NEW YORK, PREPARED BY FLOUR DANIEL GTI, INC., OCTOBER 28, 1997. REMNANTS OF OTHER KNOWN AND UNKNOWN STRUCTURES, PIPING, DEBRIS, AND OBSTRUCTIONS SHOULD BE ANTICIPATED THROUGHOUT THE SITE.

GROUNDWATER CONDITIONS:

1) AVAILABLE DATA PROVIDED IN THE OCTOBER 2006 SRI INDICATE THAT GROUNDWATER RANGES FROM FOUR TO FOURTEEN FEET BELOW GRADE, WITH GROUNDWATER FLOW TRENDING TO THE SOUTHWEST.

UTILITIES:

1) LOCATE AND CLEAR UTILITIES PRIOR TO BEGINNING WORK.

2) EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE BASED ON THE BEST INFORMATION AVAILABLE WITHIN THE PROJECT LIMITS. LOCATE AND VERIFY ALL UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF WORK.

3) THE EXISTING GAS LINE AND GAS REGULATOR BUILDING WILL BE RELOCATED BY NYSEG PRIOR TO THE START OF WORK.

4) EXISTING POWER POLES WILL BE REMOVED BY NYSEG PRIOR TO THE START OF WORK.

5) PROMPTLY NOTIFY NYSEG IF UNMAPPED/UNKNOWN UTILITIES ARE FOUND. RELOCATE AND PROTECT ALL KNOWN AND UNKNOWN EXISTING UTILITIES, AS APPROVED BY NYSEG.

PRE-EXCAVATION AND SPOILS MANAGEMENT:

1) PRE-EXCAVATE SOIL WITHIN THE LIMITS OF PROPOSED ISS TREATMENT TO THE GRADES INDICATED (NOMINALLY A DEPTH OF 4 FEET +/-). THE INTENT OF THE PRE-EXCAVATION IS TO ALLOW SPACE FOR CONSTRUCTION OF A 4-FOOT SOIL CAP OVER THE COMPLETED ISS MONOLITH. THE CAP IS INTENDED TO PROVIDE ISOLATION OF THE ISS MONOLITH AND PROTECTION FROM FROST. PRE-EXCAVATION ALSO PROVIDES CONTAINMENT FOR ISS GENERATED SPOILS.

2) EXCAVATED SOILS THAT ARE SUITABLE FOR REUSE AS ISS MONOLITH CAP SOIL SHALL BE STOCKPILED AND STORED AT NYSEG'S NORWICH SERVICE CENTER. DISPOSE REMAINING SOILS OFFSITE AT A SUITABLE DISPOSAL FACILITY APPROVED BY NYSEG. WASTE CHARACTERIZATION DATA FOR THE PRE-EXCAVATION SOILS HAS BEEN PREFORMED BY AECOM, AS SUMMARIZED ON THE DRAWINGS AND PRESENTED IN THE REMEDIAL DESIGN REPORT.

3) MANAGE AND COLLECT ALL SPOILS GENERATED BY ISS TREATMENT.

4) CHARACTERIZE ISS SPOILS AND DISPOSE OFFSITE AT A SUITABLE DISPOSAL FACILITY APPROVED BY NYSEG.

IN-SITU SOLIDIFICATION (ISS):

1) IN SITU SOLIDIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.

2) EXCAVATE EXPLORATORY TEST PITS TO VERIFY LOCATIONS OF UTILITIES AND POTENTIAL OBSTRUCTIONS AND INTERFERENCES. REMOVE INTERFERING PORTIONS OF HOLDERS, FOUNDATION REMNANTS, AND OTHER OBSTRUCTIONS AS NECESSARY TO FACILITATE INSTALLATION OF ISS COLUMNS.

3) COBBLES, BOULDERS, CONCRETE, AND OTHER DEBRIS ARE ANTICIPATED IN THE FILL. PRE-EXCAVATE AS NECESSARY TO REMOVE DEBRIS AND OBSTRUCTIONS TO FACILITATE INSTALLATION OF ISS COLUMNS.

4) COBBLES AND BOULDERS MAY ALSO BE ENCOUNTERED IN THE NATURAL SAND AND GRAVEL SOILS, ALTHOUGH BORINGS INDICATE THAT THESE ARE NOT COMMON.

5) ISS COLUMNS SHALL BE CONSTRUCTED USING A SINGLE OR MULTIPLE AUGER MIXING SYSTEM SPECIFICALLY DESIGNED FOR ENVIRONMENTAL REMEDIATION PROJECTS.

6) ISS COLUMNS SHALL TYPICALLY TOE A MINIMUM OF 2-FEET INTO THE CLAY LAYER, WHICH IS GENERALLY FOUND AT A DEPTH ON THE ORDER OF 15 TO 20 FEET FROM EXISTING GRADE.

7) THE APPROXIMATE SURFACE ELEVATION CONTOURS OF THE TOP OF CLAY ARE INDICATED ON THE DRAWINGS.

IN-SITU STABILIZATION (ISS): (CON'T)

8) AS INDICATED ON THE DRAWINGS, THE ISS TREATMENT AREA IS SUBDIVIDED INTO GRID BOXES, EACH WITH AN ESTIMATED DEPTH OF TREATMENT EXTENDING 2-FEET INTO THE CLAY.

9) ISS COLUMNS ALONG THE PERIMETER OF THE TREATMENT AREA SHALL EXTEND A MINIMUM OF 4-FEET INTO THE CLAY TO PROVIDE A PERIMETER CUTOFF HAVING GREATER PROBABILITY OF ADEQUATE PENETRATION INTO THE CLAY ALONG THE ENTIRE PERIMETER.

10) CONSTRUCT ISS COLUMNS AROUND ENTIRE PERIMETER FIRST, PRIOR TO BEGINNING ISS TREATMENT IN THE INTERIOR OF THE AREA TO BE STABILIZED.

ISS MIX DESIGN:

1) TREATED SOIL SHALL HAVE A MINIMUM UNCONFINED COMPRESSION STRENGTH OF 50 PSI AT 28 DAYS AS DESCRIBED IN THE SPECIFICATIONS. THE 5O PSI UNCONFINED COMPRESSION STRENGTH CRITERION IS INTENDED TO BE A LOWER BOUND VALUE, WITH ALL TEST SAMPLES HAVING STRENGTH EQUAL TO OR GREATER THAN 50 PSI.

2) TREATED SOIL SHALL HAVE A MAXIMUM HYDRAULIC OCNDUCTIVITY OF 1X10-6 CM/S AT 28 DAYS AS DESCRIBED IN THE SPECIFICATIONS. THE 1X10-6 CM/S HYDRAULIC CONDUCTIVITY CRITERION IS INTENDED TO BE AN UPPER BOUND VALUE, WITH ALL TEST SAMPLES HAVING HYDRAULIC CONDUCTIVITIES LESS THAN OR EQUAL TO 1X10-6 CM/S.

3) AN ISS TREATABILITY STUDY WAS PERFORMED BY KEMRON ENVIRONMENTAL SERVICES. IT IS SUMMARIZED IN KEMRON'S NOVEMBER 10, 2009, FINAL REPORT TITLED IN SITU STABILIZATION/SOLIDIFICATION TREATABILITY STUDY. THE INTENT OF THIS TREATABILITY STUDY WAS TO VERIFY THE FEASIBILITY OF ISS AT THIS SITE AND TO DEMONSTRATE THAT ISS TREATED SOIL CAN MEET PROJECT REQUIREMENTS FOR STRENGTH AND HYDRAULIC CONDUCTIVITY.

4) CONTRACTOR MAY PERFORM AN INDEPENDENT TREATABILITY STUDY TO SUPPLEMENT AND/OR CONFIRM THE AVAILABLE TREATABILITY DATA.

5) CONTRACTOR SHALL SUBMIT FOR APPROVAL THE PROPOSED ISS MIX DESIGN IN ACCORDANCE WITH THE SPECIFICATIONS.

SUBMITTALS:

1) SUBMIT FOR APPROVAL A DETAILED WORK PLAN DESCRIBING PROPOSED ISS MIXING EQUIPMENT AND PROCEDURES. INCLUDE PROPOSED GROUT MIX DESIGN, FIELD DEMONSTRATION TEST, AND QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES.

2) PROVIDE DETAILED RECORDS OF ISS MIXING FOR EACH COLUMN, INCLUDING SURVEYED LOCATION, DIAMETER, GROUND SURFACE ELEVATION, OFFSET FROM THEORETICAL LOCATION, DEPTH (BOTTOM ELEVATION), GROUT MIX PROPORTIONS, QUANTITY OF GROUT INJECTED, MIXING TIMES, RATE OF AUGER ROTATION, RATE OF AUGER PENETRATION AND EXTRACTION, NUMBER OF PASSES, AND ALL OTHER PERTINENT DETAILS.

3) PROVIDE AS-BUILT DRAWINGS, IDENTIFYING AND SUMMARIZING LOCATIONS, DIAMETERS, AND TOP AND BOTTOM ELEVATIONS OF ALL ISS COLUMNS. ALSO INCLUDE LOCATIONS, DEPTHS AND NUMBER OF QA/QC SAMPLES, AND RESULTS OF QA/QC TESTS.

PROTECTION OF EXISTING FACILITIES

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

2) PROTECT ADJACENT STRUCTURES FROM DAMAGE. THESE INCLUDE THE ADJACENT SHOPPING PLAZA STRUCTURE AND ADJACENT HOMES.

3) BASED ON AVAILABLE INFORMATION, THE SOUTH END OF THE SHOPPING PLAZA IS REPORTED TO BE FOUNDED DIRECTLY ON THE FORMER ABOVE GROUND DISTRIBUTION HOLDER SLAB, AS SHOWN ON THE DRAWINGS. ACCORDINGLY, THE PORTION OF THE DISTRIBUTION HOLDER SLAB LOCATED UNDER THE SHOPPING PLAZA SHALL BE PROTECTED FROM DAMAGE.

4) SAW CUT THE DISTRIBUTION HOLDER SLAB AT THE INDICATED LIMITS OF ISS TREATMENT PRIOR TO REMOVING THE INTERFERING PORTION OF THE SLAB. THE INTENT IS TO ISOLATE AND PROTECT THE REMAINING PORTION OF THE DISTRIBUTION HOLDER SLAB THAT SERVES AS THE FOUNDATION OF THE SHOPPING PLAZA STRUCTURE.

5) REMOVE THE INTERFERING PORTION OF THE DISTRIBUTION HOLDER SLAB BY CHIPPING, CUTTING, OR OTHER MEANS ACCEPTABLE TO NYSEG THAT MINIMIZE VIBRATION AT THE SHOPPING PLAZA STRUCTURE.

6) MONITOR VIBRATIONS AT THE SHOPPING PLAZA STRUCTURE DURING DEMOLITION WORK. VIBRATIONS RESULTING FROM THE CONTRACTOR'S SLAB DEMOLITION OPERATIONS SHALL NOT EXCEED A PEAK PARTICLE VELOCITY OF 1 INCH PER SECOND (1 IPS). IF NECESSARY, THE CONTRACTOR SHALL MODIFY DEMOLITION OPERATIONS SO AS TO LIMIT MEASURED PEAK PARTICLE VELOCITY AT THE SHOPPING PLAZA TO 1 IPS.

Plotted By: MeisterK
Plot File Date Created: May/05/2010 2:50 PM
Layout-Sheet Name: GENERAL NOTES
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG

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DES BY:		
KAM		

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

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GENERAL NOTES

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
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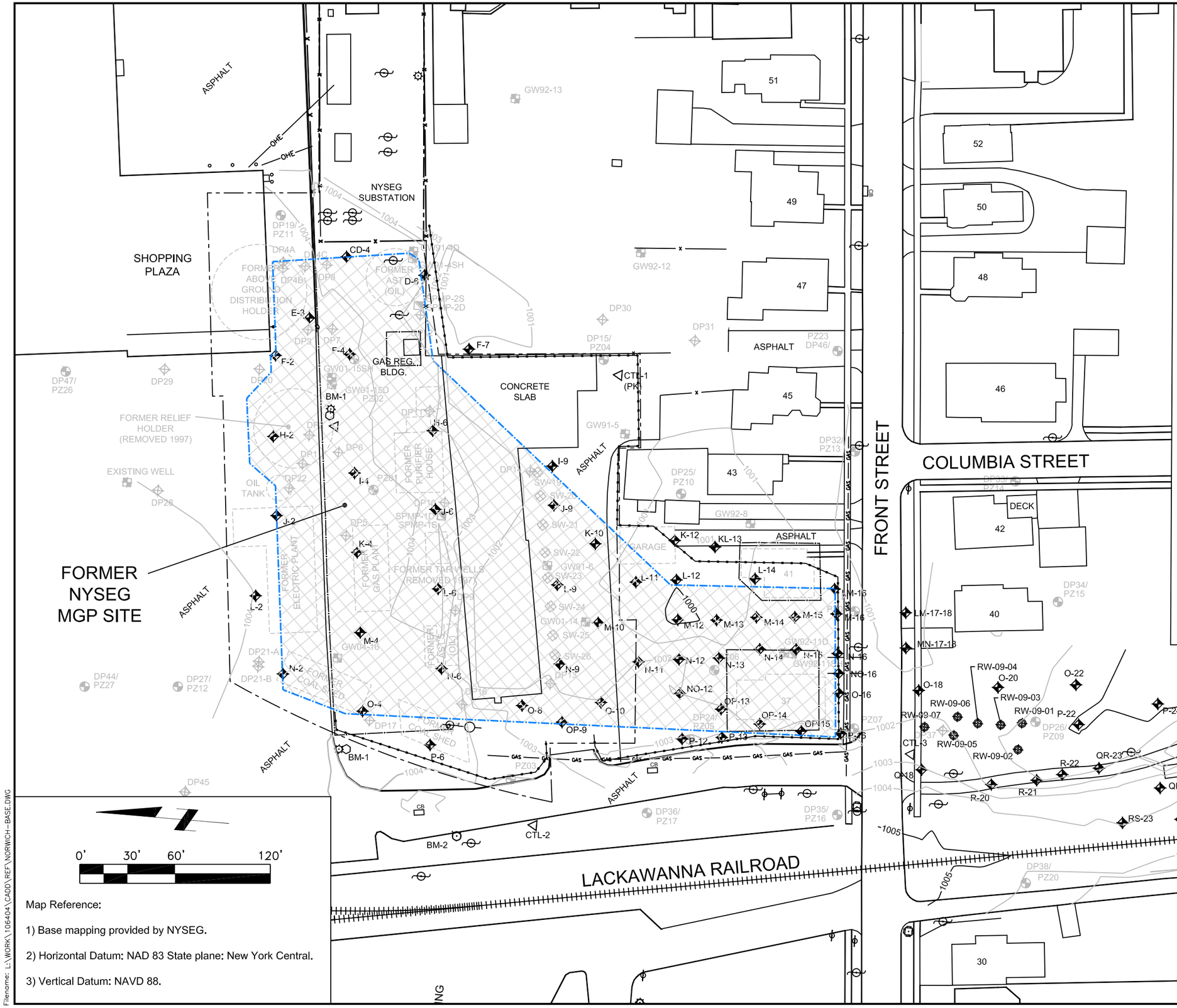
DRAWING NO.	02



Map Reference:

1) Base mapping provided by NYSEG.

2) Horizontal Datum: NAD 83 State plane: New York Central.

3) Vertical Datum: NAVD 88.

LEGEND

- 26 - BUILDING LINE / NUMBER
- - APPROX. PROPERTY BOUNDARY
- CONTROL POINT
- BENCHMARK
- UTILITY POLE W/GUY
- POWER POLE
- LIGHT POLE
- FIRE HYDRANT
- MH - MANHOLE
- CB - CATCH BASIN
- FENCE LINE
- FORMER STRUCTURE LOCATION (APPROX.)
- 1000' - CONTOUR (1 FT. INTERVAL)
- PROPOSED ISS WORK AREA

HISTORICAL SAMPLE KEY

- GROUND WATER WELL
- SPARGE POINT MONITORING POINT
- SPARGE WELL
- PIEZOMETER
- DIRECT PUSH (PRE-2009)
- RECOVERY WELL (2009)
- DIRECT PUSH (2009)

DESCRIPTION	DRN	CHK	DATE (M/D/Y)
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EXISTING CONDITIONS PLAN

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	03
DRAWING NO.	03

Plotted By: MeisterK
Plot File Date Created: May/05/2010 2:51 PM
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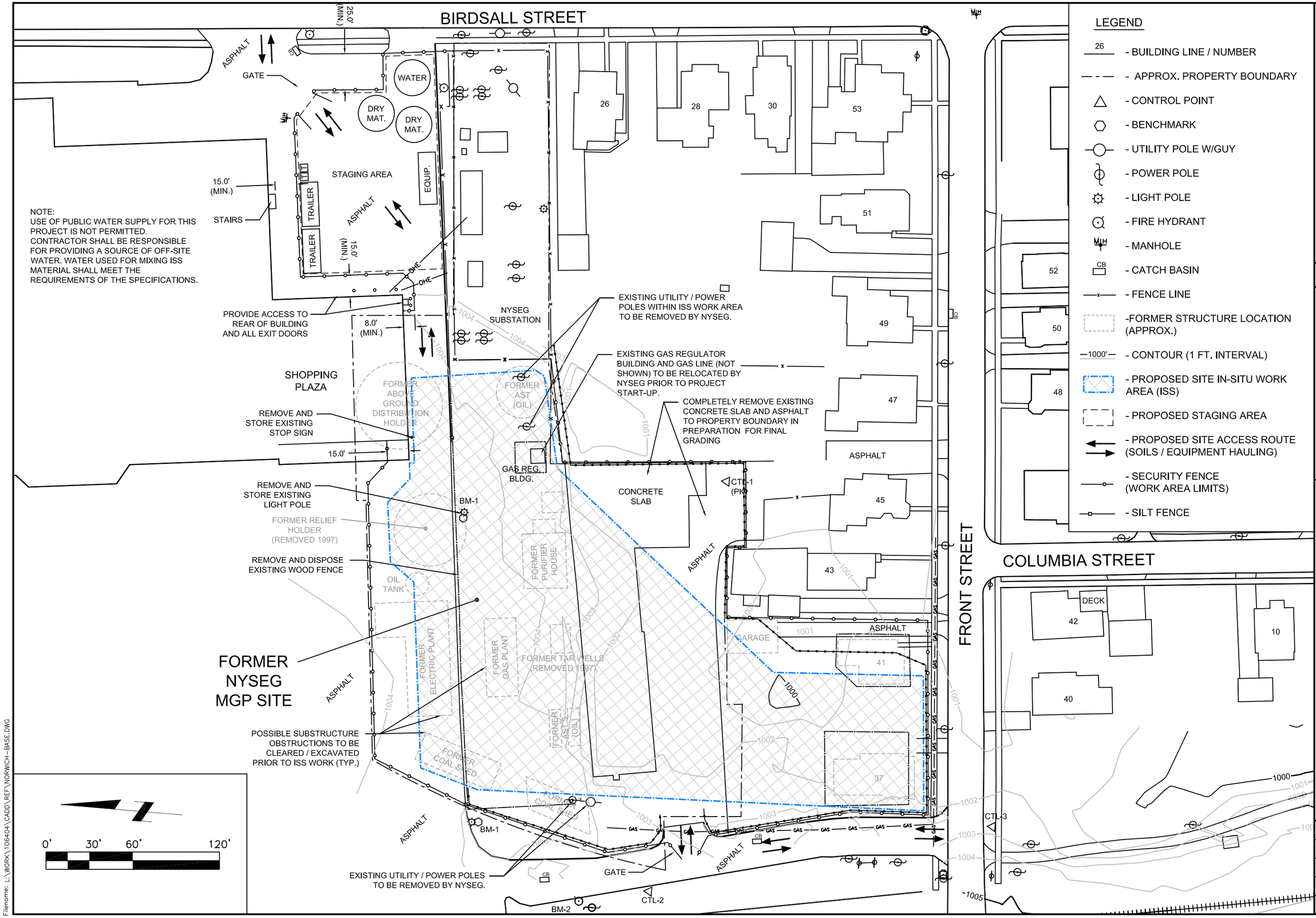

LEGEND

- 26 — BUILDING LINE / NUMBER
- APPROX. PROPERTY BOUNDARY
- CONTROL POINT
- BENCHMARK
- UTILITY POLE W/GUY
- POWER POLE
- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- FENCE LINE
- FORMER STRUCTURE LOCATION (APPROX.)
- 1000' — CONTOUR (1 FT. INTERVAL)
- PROPOSED SITE IN-SITU WORK AREA (ISS)
- PROPOSED STAGING AREA
- PROPOSED SITE ACCESS ROUTE (SOILS / EQUIPMENT HAULING)
- SECURITY FENCE (WORK AREA LIMITS)
- SILT FENCE

0' 30' 60' 120'

REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)
1	REVISED STAGING AREA LAYOUT	KAM	SAU	4/14/2010

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PROJECT LAYOUT PLAN

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	04
DRAWING NO.	04

Plotted By: MeisterK
Plot File Date Created: May/05/2010 2:54 PM
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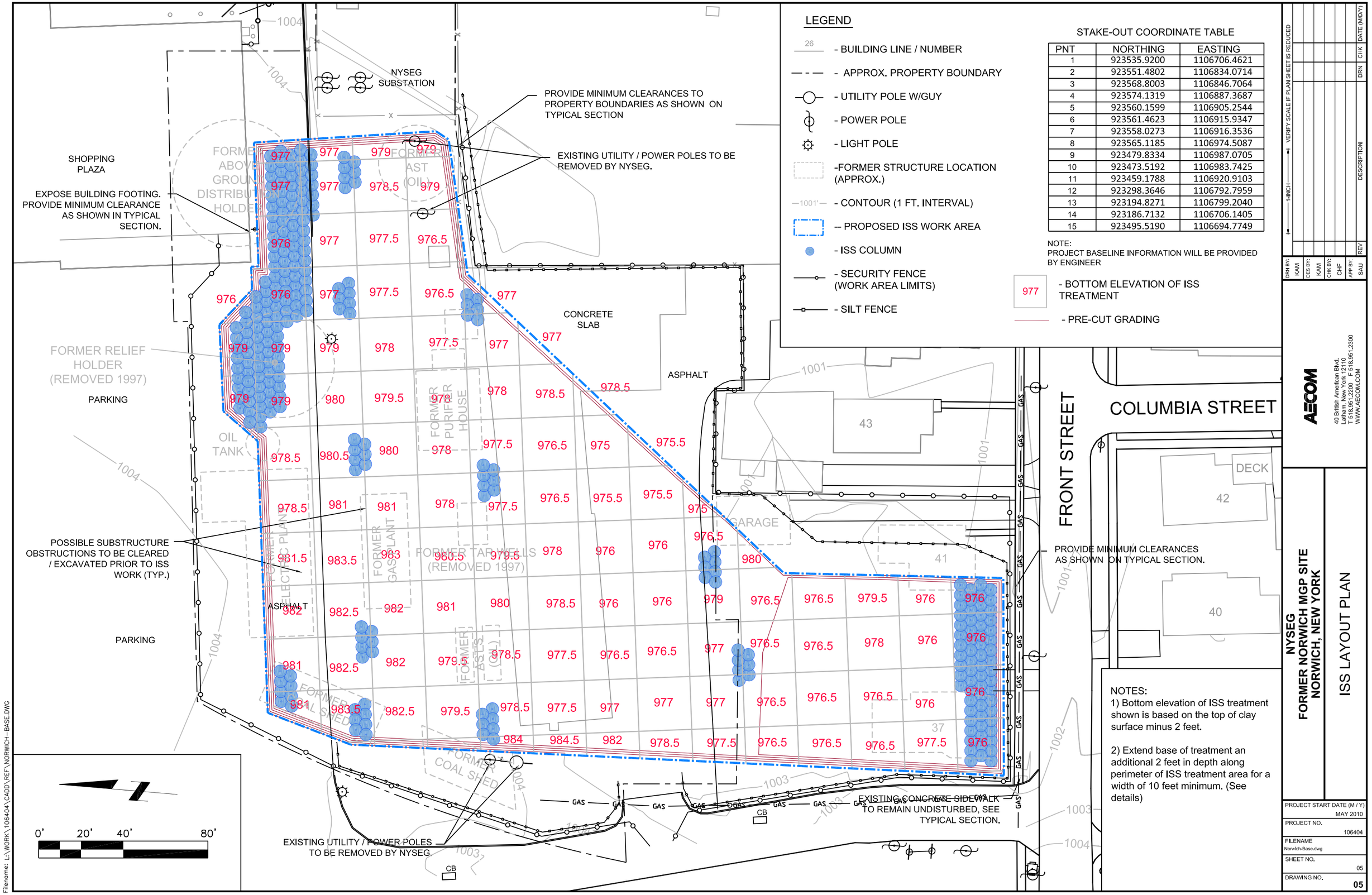
LEGEND
26 - BUILDING LINE / NUMBER
- APPROX. PROPERTY BOUNDARY
- UTILITY POLE W/GUY
- POWER POLE
- LIGHT POLE
-FORMER STRUCTURE LOCATION (APPROX.)
1001' - CONTOUR (1 FT. INTERVAL)
-- PROPOSED ISS WORK AREA
- ISS COLUMN
- SECURITY FENCE (WORK AREA LIMITS)
- SILT FENCE
977 - BOTTOM ELEVATION OF ISS TREATMENT
- PRE-CUT GRADING
STAKE-OUT COORDINATE TABLE
PNT | NORTHING | EASTING
1 | 923535.9200 | 1106706.4621
2 | 923551.4802 | 1106834.0714
3 | 923568.8003 | 1106846.7064
4 | 923574.1319 | 1106887.3687
5 | 923560.1599 | 1106905.2544
6 | 923561.4623 | 1106915.9347
7 | 923558.0273 | 1106916.3536
8 | 923565.1185 | 1106974.5087
9 | 923479.8334 | 1106987.0705
10 | 923473.5192 | 1106983.7425
11 | 923459.1788 | 1106920.9103
12 | 923298.3646 | 1106792.7959
13 | 923194.8271 | 1106799.2040
14 | 923186.7132 | 1106706.1405
15 | 923495.5190 | 1106694.7749
NOTE:
PROJECT BASELINE INFORMATION WILL BE PROVIDED BY ENGINEER
NYSEG SUBSTATION
PROVIDE MINIMUM CLEARANCES TO PROPERTY BOUNDARIES AS SHOWN ON TYPICAL SECTION
EXISTING UTILITY / POWER POLES TO BE REMOVED BY NYSEG.
SHOPPING PLAZA
EXPOSE BUILDING FOOTING. PROVIDE MINIMUM CLEARANCE AS SHOWN IN TYPICAL SECTION.
FORMER ABOVE GROUND DISTRIBUTION HOLDER
FORMER AST (OIL)
FORMER RELIEF HOLDER (REMOVED 1997)
PARKING
CONCRETE SLAB
ASPHALT
FORMER PURIFIER HOUSE
OIL TANK
FORMER GAS PLANT
FORMER TAR WELLS (REMOVED 1997)
FORMER COAL SHED
GARAGE
POSSIBLE SUBSTRUCTURE OBSTRUCTIONS TO BE CLEARED / EXCAVATED PRIOR TO ISS WORK (TYP.)
EXISTING UTILITY / POWER POLES TO BE REMOVED BY NYSEG.
EXISTING CONCRETE SIDEWALK TO REMAIN UNDISTURBED, SEE TYPICAL SECTION.
PROVIDE MINIMUM CLEARANCES AS SHOWN ON TYPICAL SECTION.
FRONT STREET
COLUMBIA STREET
DECK
42
43
41
40
37
CB
GAS
0' 20' 40' 80'
NOTES:
1) Bottom elevation of ISS treatment shown is based on the top of clay surface minus 2 feet.
2) Extend base of treatment an additional 2 feet in depth along perimeter of ISS treatment area for a width of 10 feet minimum. (See details)
VERIFY SCALE IF PLAN SHEET IS REDUCED 1-INCH
DESCRIPTION
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DES BY: KAM
CHK BY: CHF
APP BY: SAU
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ISS LAYOUT PLAN
PROJECT START DATE (M / Y) MAY 2010
PROJECT NO. 106404
FILENAME Norwich-Base.dwg
SHEET NO. 05
DRAWING NO. 05
Plotted By: MeisterK
Plot File Date Created: May/05/2010 2:56 PM
Layout-Sheet Name: ISS-LAYOUT
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG

TOP OF CLAY CONTOUR PLAN

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NOTE: TOP OF CLAY SURFACE DEFINED USING 2009 DIRECT PUSH POINTS. SEE DRAWING NO. 3 - EXISTING CONDITIONS PLAN FOR LOCATIONS.

LEGEND

- 26 - BUILDING LINE / NUMBER
- - APPROX. PROPERTY BOUNDARY
- CONTROL POINT
- BENCHMARK
- UTILITY POLE W/GUY
- POWER POLE
- LIGHT POLE
- FIRE HYDRANT
- MH - MANHOLE
- CB - CATCH BASIN
- FENCE LINE
- FORMER STRUCTURE LOCATION (APPROX.)
- 990 / 989 - TOP OF CLAY SURFACE CONTOUR (1 FT.)
- PROPOSED ISS WORK AREA
- A A' - CROSS SECTION LOCATION

SHOPPING PLAZA
FORMER ABOVE GROUND DISTRIBUTION HOLDER
NYSEG SUBSTATION
FORMER AST (OIL)
BM-1
CTL-1 (PK)
FORMER RELIEF HOLDER (REMOVED 1997)
PARKING
OIL TANK
FORMER ELECTRIC PLANT
FORMER GAS PLANT
FORMER TAR WELLS (REMOVED 1997)
FORMER PURIFIER HOUSE
FORMER COAL SHED
ASPHALT
PARKING
GARAGE
FRONT STREET
CTL-3
CB
GAS
49
47
45
43
41
39
37

A
A'
B
B'
C
C'

0' 30' 60' 120'

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PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	06
DRAWING NO.	06

Plotted By: MeisterK
Plot File Date Created: May/05/2010 3:08 PM
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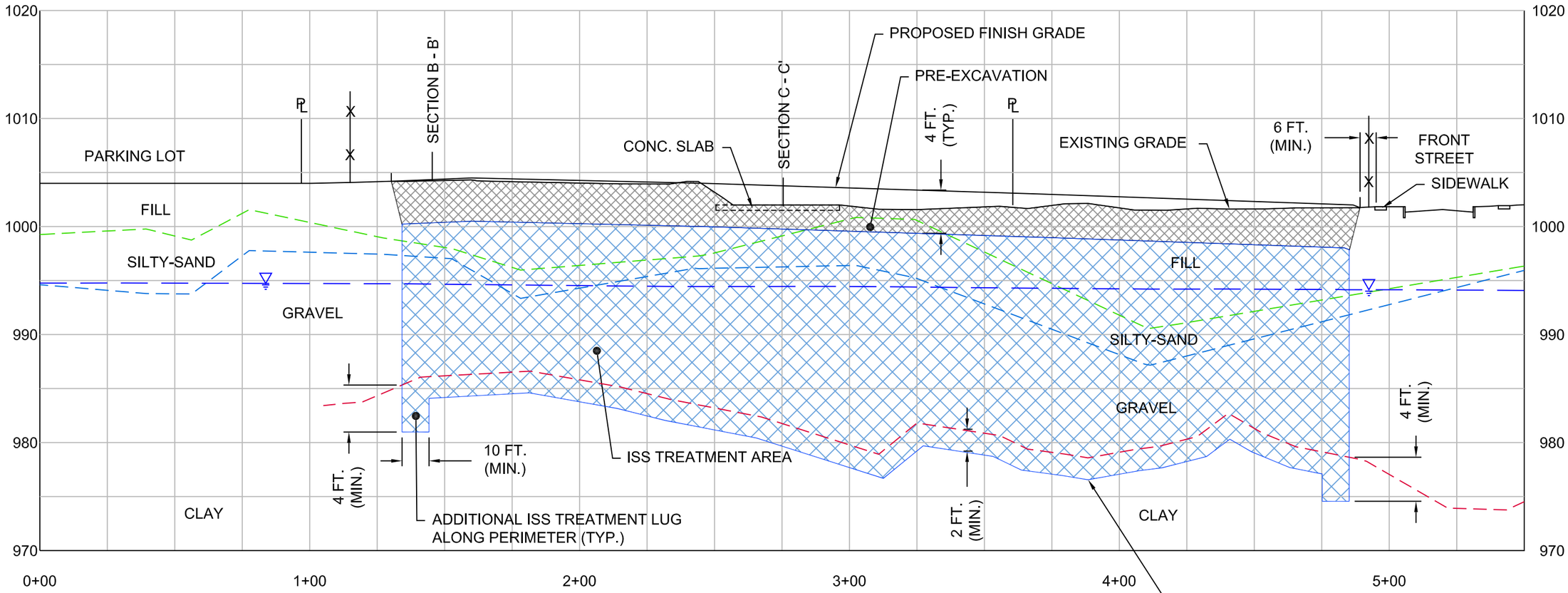

SECTION A - A'

HORIZ. 0' 20' 40' 80'

VERT. 0' 10' 20'

DRN BY:	DES BY:	CHK BY:	APP BY:	REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)
KAM	KAM	CHF	SAU					

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CROSS SECTION A - A'

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	08
DRAWING NO.	08

Plotted By: MeisterK
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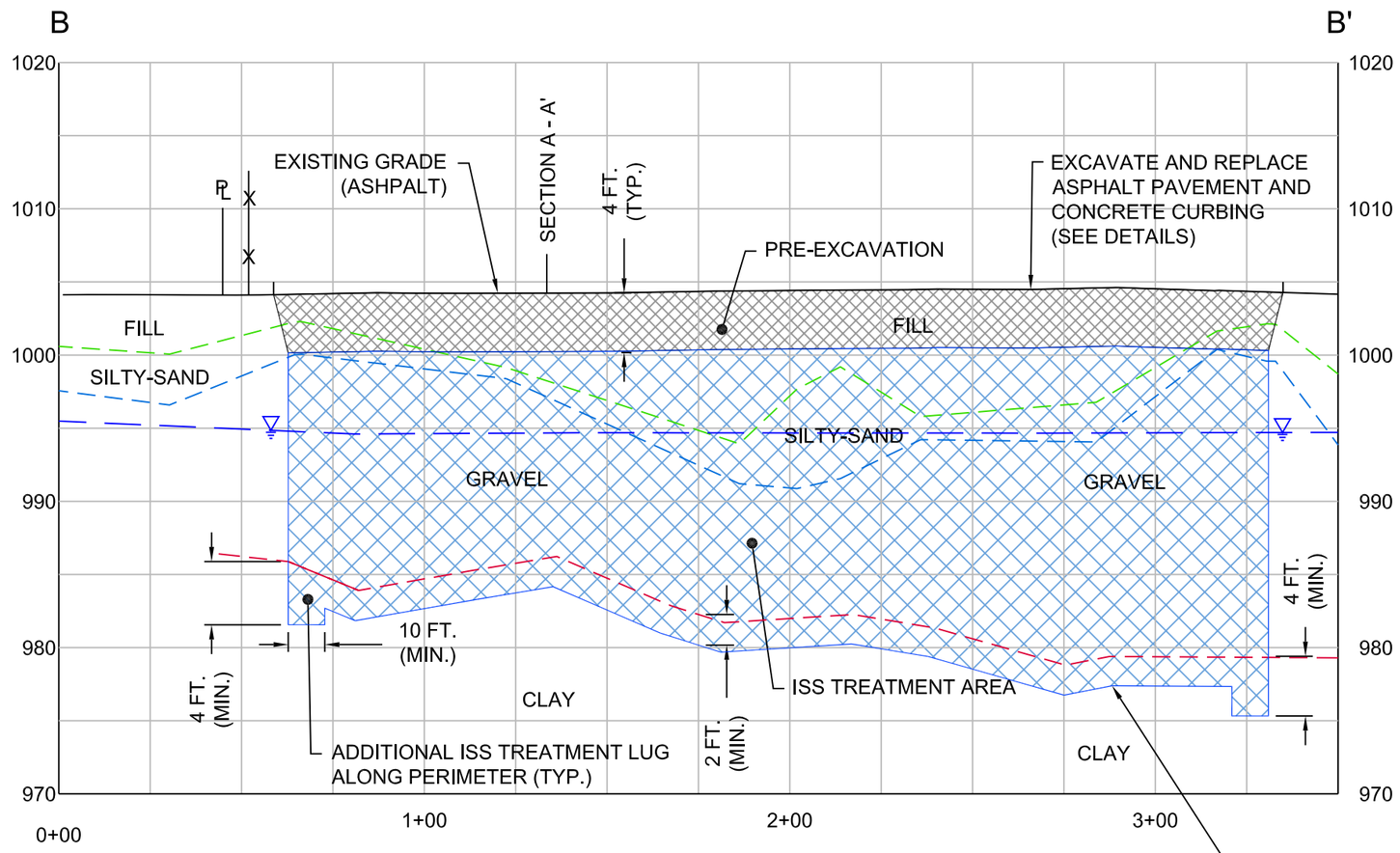
Layout-Sheet Name: SECTION A - A'
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG



SECTION B - B'

HORIZ. 0' 20' 40' 80'

VERT. 0' 10' 20'

Plotted By: MeisterK
Plot File Date Created: May/05/2010 3:11 PM
Layout-Sheet Name: SECTION B - B'
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG

1-INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

DESCRIPTION	DRN	CHK	DATE (M/D/Y)

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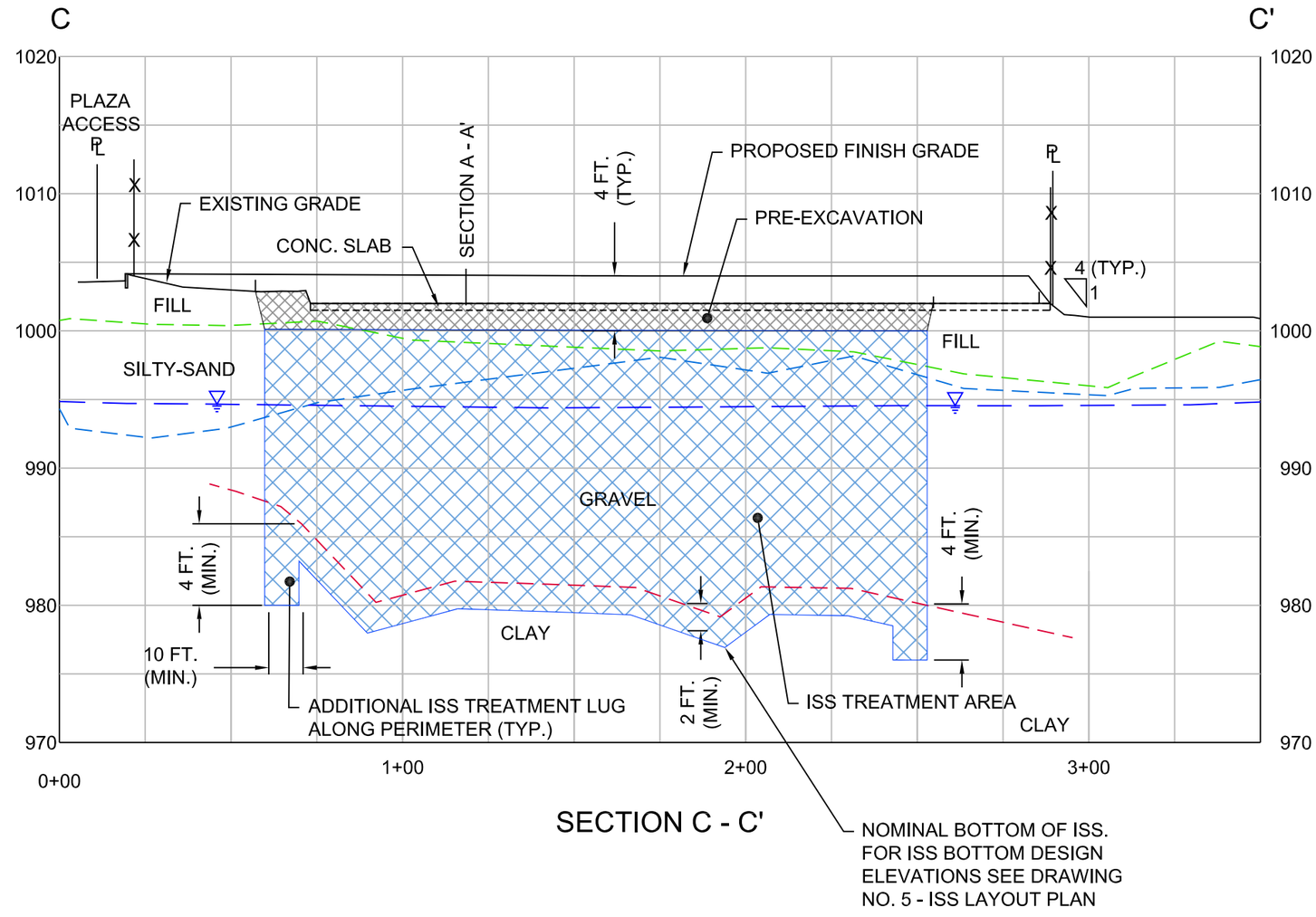
CROSS SECTION B - B'

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	09
DRAWING NO.	**09**



SECTION C - C'

NOMINAL BOTTOM OF ISS. FOR ISS BOTTOM DESIGN ELEVATIONS SEE DRAWING NO. 5 - ISS LAYOUT PLAN

HORIZ. 0' 20' 40' 80'

VERT. 0' 10' 20'

1-INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

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

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CROSS SECTION C - C'

PROJECT START DATE (M / Y): MAY 2010
PROJECT NO.: 106404
FILENAME: Norwich-Base.dwg
SHEET NO.: 10
DRAWING NO.: 10

Plotted By: MeisterK
Plot File Date Created: May/05/2010 3:12 PM
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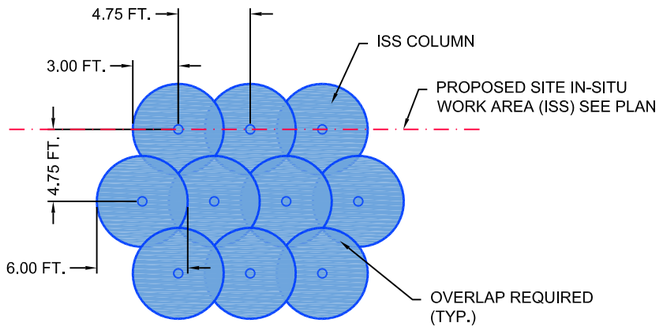
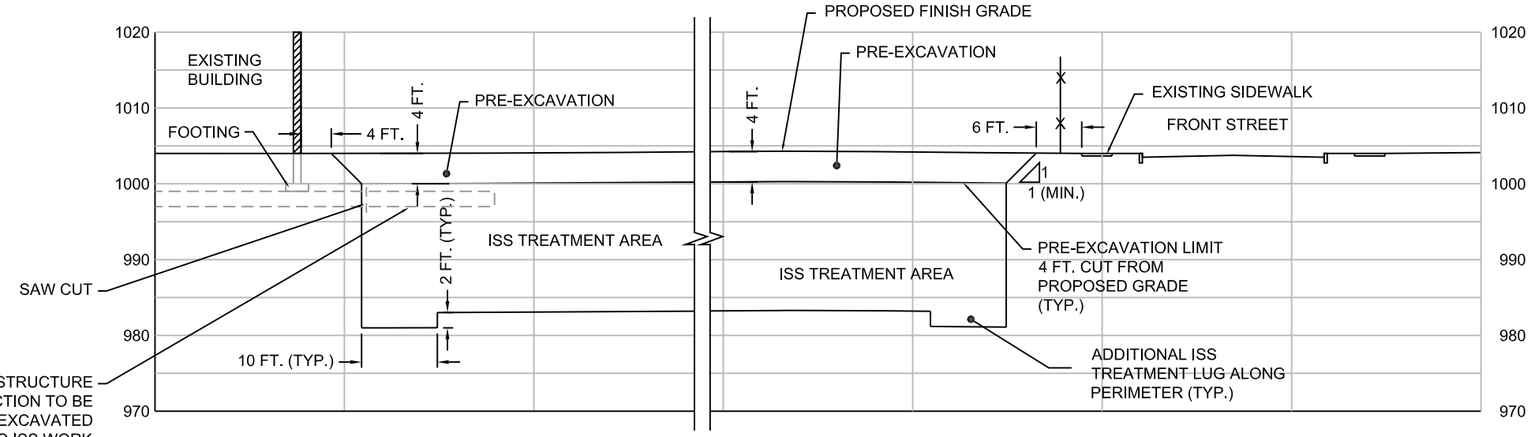


TYPICAL ISS COLUMN LAYOUT

NOT TO SCALE

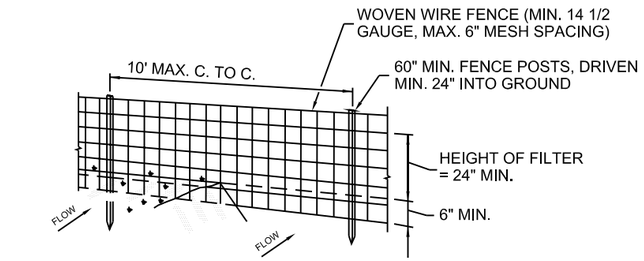
NOTE:
6 FT. DIAMETER ISS COLUMN SHOWN. ACTUAL DIMENSIONS AND LAYOUT TO BE DETERMINED BY ISS CONTRACTOR TO ENSURE ENTIRE SITE IS SOLIDIFIED, WITH NO GAPS BETWEEN COLUMNS.



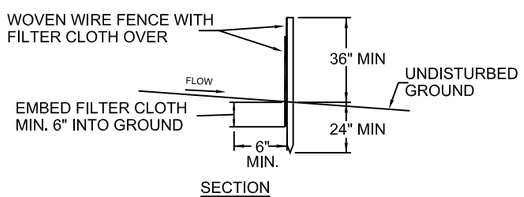
NOTE: POSSIBLE SUBSTRUCTURE OBSTRUCTIONS TO BE CAREFULLY REMOVED AND EXCAVATED PRIOR TO ISS WORK.

TYPICAL SECTION

NOT TO SCALE



PERSPECTIVE VIEW



SECTION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

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.

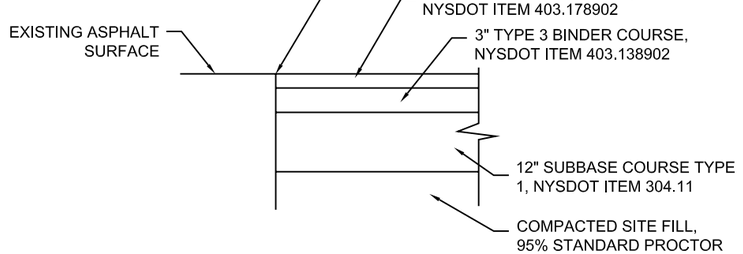
POSTS:
TYPE OR 2" HARDWOOD.

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

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

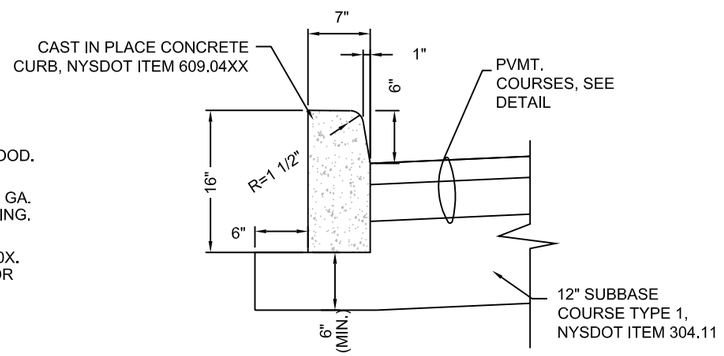
SILT FENCE DETAILS

NTS



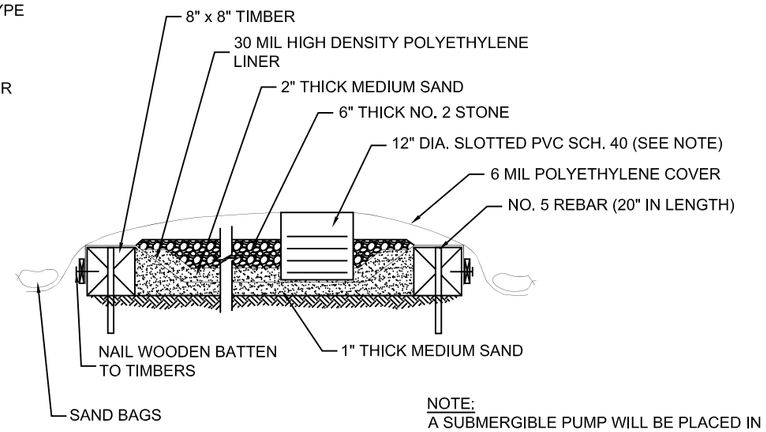
TYPICAL ASPHALT DETAIL

NTS



TYPICAL CONCRETE CURB DETAIL

NTS



SECTION A-A

NOT TO SCALE

NOTE:
A SUBMERGIBLE PUMP WILL BE PLACED IN SUMP AS REQUIRED. THE PUMP WILL TRANSPORT WASTEWATER VIA HOSE TO 1,500 GALLON WATER TANKS.

EQUIPMENT CONTAMINATION REDUCTION PAD

NTS

	DRN	CHK	DATE (M/D/Y)
1 INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED			
DESCRIPTION			
REV			
DRN BY: KAM	DES BY: KAM	CHK BY: CHF	APP BY: SAU

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DETAILS

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	13
DRAWING NO.	13

Plotted By: MeisterK
Plot File Date Created: May/05/2010 3:17 PM
Layout-Sheet Name: DETAILS
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG

TOTAL AREA OF ISS TREATMENT = 61,848 SF
TOTAL VOLUME OF PRE-CUT SOILS = 6,825 CY

NOTE: VOLUMES SHOWN ARE FOR ESTIMATING PURPOSES ONLY. ACTUAL VOLUMES MAY VARY.

COMPLETELY REMOVE EXISTING CONCRETE SLABS, FOUNDATIONS (WHERE ENCOUNTERED), AND ASPHALT SURFACES TO PROPERTY BOUNDARY LIMITS.

SAWCUT ASPHALT (TYP.)

POSSIBLE SUBSTRUCTURE OBSTRUCTIONS TO BE CLEARED / EXCAVATED PRIOR TO ISS WORK (TYP.)

ON-SITE AREA = 49,550 SF (80% OF TOTAL)
VOLUME = 5,460 CY

ON-SITE / OFF-SITE BOUNDARY

OFF-SITE AREA = 12,300 SF (20% OF TOTAL)
VOLUME = 1,365 CY

FORMER RELIEF HOLDER (REMOVED 1997)

FORMER ABOVE GROUND DISTRIBUTION HOLDER

FORMER AST (OIL)

FORMER PURIFIER HOUSE

OIL TANK

FORMER ELECTRIC PLANT

FORMER GAS PLANT

FORMER TAR WELLS (REMOVED 1997)

FORMER COAL SHED

GARAGE

CTL-1 (PK)

CTL-2

PDI-1 PDI-2 PDI-4 PDI-5 PDI-6 PDI-7 PDI-8 PDI-9 PDI-10 PDI-11 PDI-12 PDI-13 PDI-14 PDI-15 PDI-16 PDI-17 PDI-18 PDI-19 PDI-20 PDI-21 PDI-22 PDI-23 PDI-24 PDI-25 PDI-26 PDI-27 PDI-28 PDI-29 PDI-30 PDI-31 PDI-32 PDI-33

ISS-1 ISS-2 ISS-3 ISS-4

0' 20' 40' 80'

LEGEND

- 26 - BUILDING LINE / NUMBER
- - APPROX.. PROPERTY BOUNDARY
- CONTROL POINT
- BENCHMARK
- UTILITY POLE W/GUY
- POWER POLE
- LIGHT POLE
- FIRE HYDRANT
- MH - MANHOLE
- CB - CATCH BASIN
- FORMER STRUCTURE LOCATION (APPROX.)
- 1001' - EXISTING CONTOUR (1 FT. INTERVAL)
- 999 - PRE-CUT CONTOUR (1 FT. INTERVAL)
- SITE IN-SITU WORK AREA (ISS)
- SOIL PRE-CHARACTERIZATION SAMPLE LOCATION
- ISS TREATABILITY SOIL SAMPLE LOCATION
- LOCATION OF PRE-CUT SOILS CONTAINING VISUAL NAPL. SOILS TO BE EXCAVATED AND DISPOSED OF OFF SITE AT AN APPROVED FACILITY WITHOUT ADDITIONAL TESTING. LOCATION OF SOILS SHOWN ARE APPROXIMATE. ACTUAL LIMITS TO BE DETERMINED VISUALLY AT TIME OF EXCAVATION.
- LOCATION OF PRE-CUT SOILS CONTAINING COMPOUNDS WHICH EXCEED PART 375 COMMERCIAL USE CLEANUP CRITERIA. SOILS TO BE EXCAVATED AND DISPOSED OF OFF SITE AT AN APPROVED FACILITY WITHOUT ADDITIONAL TESTING.

NOTE: ALL PRE-CUT SOILS NOT IDENTIFIED ABOVE ARE TO BE TRANSPORTED TO THE NORWICH SERVICE CENTER, STOCKPILED, AND SAMPLED FOR REUSE. ALL SUBSTRUCTURES AND OTHER DEBRIS ARE TO BE DISPOSED OF AT AN APPROVED OFFSITE FACILITY.

DESCRIPTION	DRN	CHK	DATE (M/D/Y)

VERIFY SCALE IF PLAN SHEET IS REDUCED 1 INCH

REV	APP BY:	CHK BY:	DES BY:	DRN BY:
SAU	CHF	KAM	KAM	KAM

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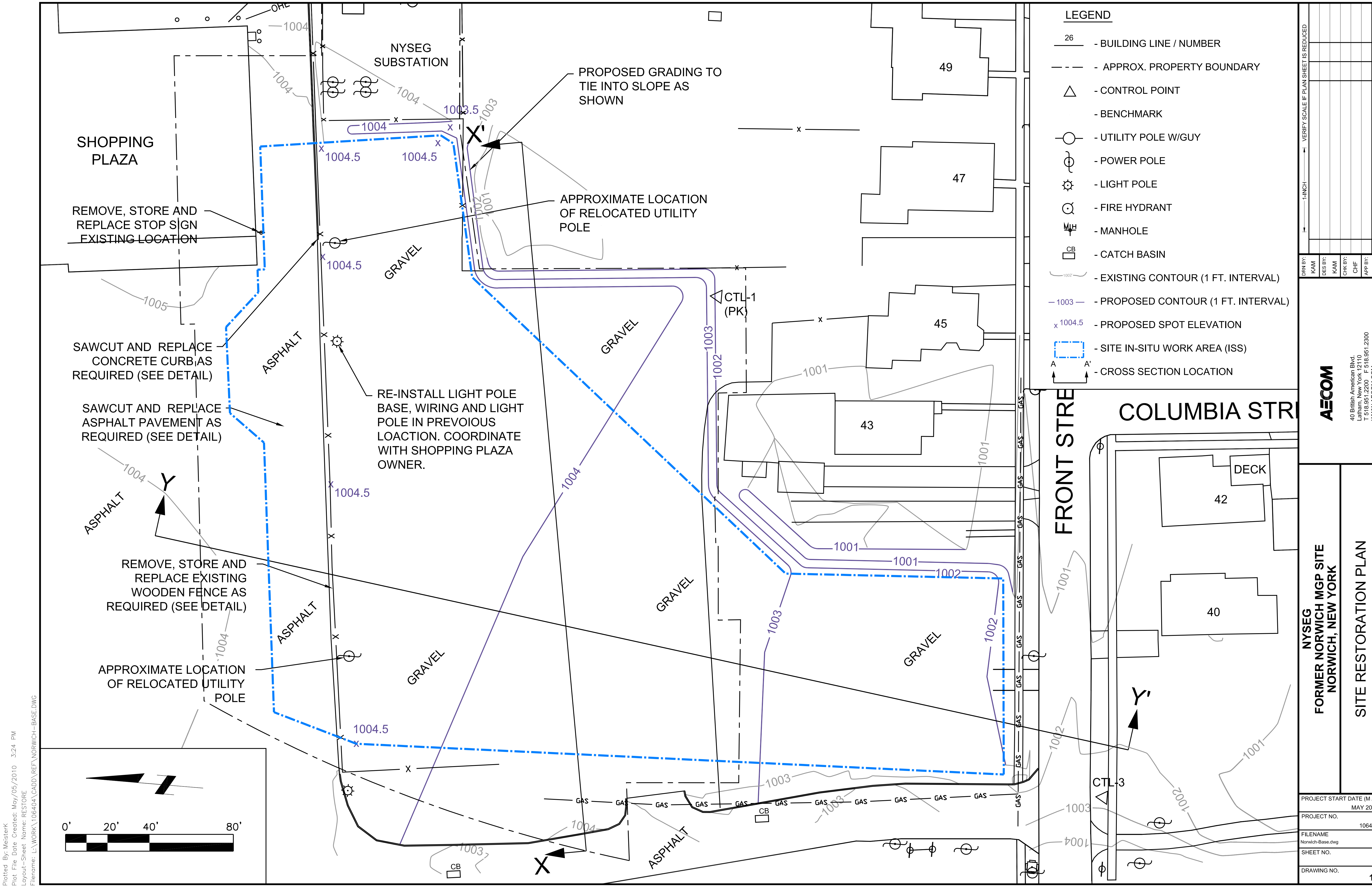
PRE-CUT EXCAVATION PLAN

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	07
DRAWING NO.	07

Plotted By: MeisterK
Plot File Date Created: May/05/2010 3:20 PM
Layout-Sheet Name: PRE-CUT
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG



SHOPPING PLAZA
NYSEG SUBSTATION
PROPOSED GRADING TO TIE INTO SLOPE AS SHOWN
REMOVE, STORE AND REPLACE STOP SIGN EXISTING LOCATION
APPROXIMATE LOCATION OF RELOCATED UTILITY POLE
SAWCUT AND REPLACE CONCRETE CURB AS REQUIRED (SEE DETAIL)
SAWCUT AND REPLACE ASPHALT PAVEMENT AS REQUIRED (SEE DETAIL)
RE-INSTALL LIGHT POLE BASE, WIRING AND LIGHT POLE IN PREVOIOUS LOACTION. COORDINATE WITH SHOPPING PLAZA OWNER.
REMOVE, STORE AND REPLACE EXISTING WOODEN FENCE AS REQUIRED (SEE DETAIL)
APPROXIMATE LOCATION OF RELOCATED UTILITY POLE
GRAVEL
ASPHALT
CTL-1 (PK)
CTL-3
CB
GAS
X
X'
Y
Y'
49
47
45
43
42
40
DECK
FRONT STRE
COLUMBIA STRI
0' 20' 40' 80'
LEGEND
- BUILDING LINE / NUMBER
- APPROX. PROPERTY BOUNDARY
- CONTROL POINT
- BENCHMARK
- UTILITY POLE W/GUY
- POWER POLE
- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- EXISTING CONTOUR (1 FT. INTERVAL)
- PROPOSED CONTOUR (1 FT. INTERVAL)
- PROPOSED SPOT ELEVATION
- SITE IN-SITU WORK AREA (ISS)
- CROSS SECTION LOCATION
VERIFY SCALE IF PLAN SHEET IS REDUCED
1-INCH
REV
DESCRIPTION
DRN
CHK
DATE (M/D/Y)
DRN BY: KAM
DES BY: KAM
CHK BY: CHF
APP BY: SAU
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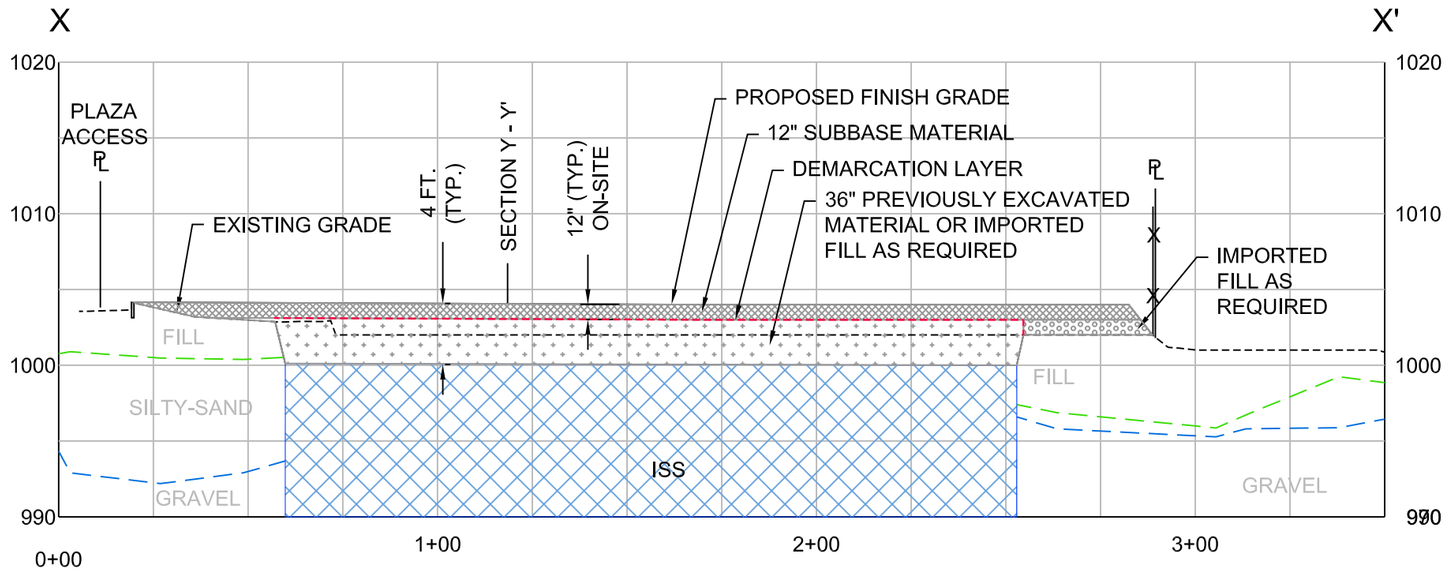
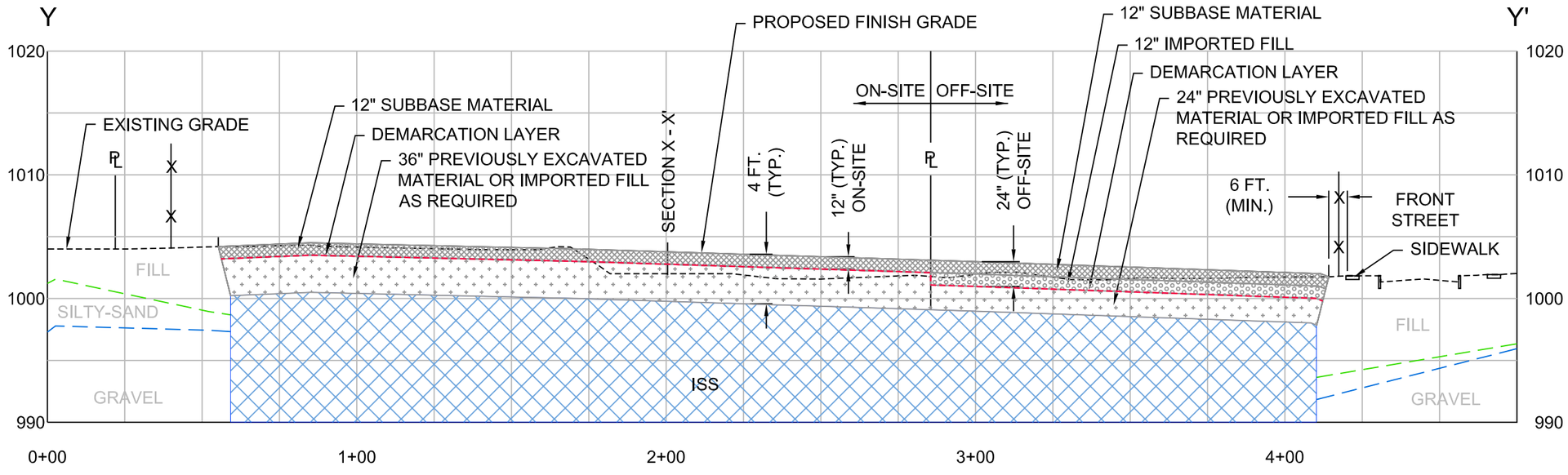
SITE RESTORATION PLAN
PROJECT START DATE (M / Y) MAY 2010
PROJECT NO. 106404
FILENAME Norwich-Base.dwg
SHEET NO. 11
DRAWING NO. 11
Plotted By: Meisterk
Plot File Date Created: May/05/2010 3:24 PM
Layout-Sheet Name: RESTORE
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG



SECTION X - X'

BACKFILL MATERIALS:

PREVIOUSLY EXCAVATED MATERIAL:	SOILS PREVIOUSLY EXCAVATED FROM THIS SITE, STORED AT THE SERVICE CENTER, TESTED AND APPROVED FOR BACKFILL.
IMPORTED FILL:	SOIL MEETING REQUIREMENT OF NYS STANDARD SPECIFICATION 203.06 - SELECT FILL.
SUBBASE MATERIAL:	SOIL MEETING REQUIREMENT OF NYS STANDARD SPECIFICATION 304.11 - SUBBASE COURSE, TYPE 1.
DEMARCATION LAYER:	POLYETHELENE / PLASTIC CONSTRUCTION FENCING, ORANGE IN COLOR, PLACED ON GRADE WITH NO GAPS.



SECTION Y - Y'

HORIZ. 0' 20' 40' 80'

VERT. 0' 10' 20'

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

1-INCH — VERIFY SCALE IF PLAN SHEET IS REDUCED

DRN BY: KAM
DES BY: KAM
CHK BY: CHF
APP BY: SAU

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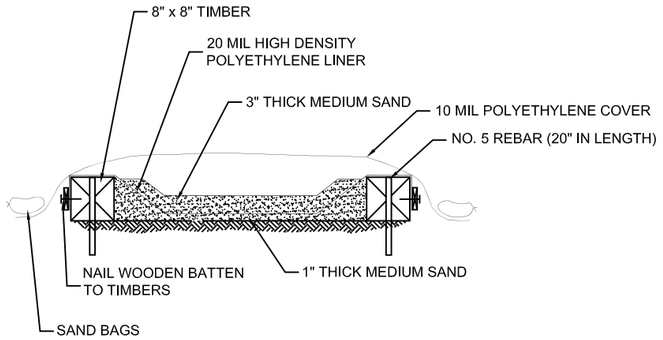
RESTORATION CROSS SECTIONS

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	12
DRAWING NO.	12

Plotted By: MeisterK
Plot File Date Created: May/05/2010 3:28 PM
Layout-Sheet Name: RESTORE-SEC
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG



STOCKPILE MANAGEMENT AREA DETAIL

NTS

ACTIVE AGRICULTURE (CORN FIELD)

APPROX. NYSEG PROPERTY LINE

SEASONALLY WET AREA

TOP OF BANK

GRAVEL/DIRT

AREA TO BE USED FOR STOCKPILED MATERIAL (SOIL) TO BE TESTED FOR REUSE.

DOG HOUSE

"TRUCKS ENTERING" SIGN

SEASONALLY WET AREA

PRACTICE POLE TO BE REMOVED BY NYSEG

MANUAL FENCE GATE TO BE CLOSED AND LOCKED EACH DAY

SPORADIC VEGETATION

PLASTIC PIPE RACK

FENCE GATE

LAWN

GRAVEL/DIRT

HAUL ROUTE

GRAVEL YARD

DECK

EAST NORWICH SUBSTATION

APPROX. NYSEG PROPERTY LINE

PAVED PARKING

FENCE GATE

HALE STREET

STOCKYARD

MANUAL FENCE GATE TO BE CLOSED AND LOCKED EACH LOAD

FENCE GATE

GRAVEL/CRUSHED STONE

FENCE GATE

PAVED AREA

SERVICE CENTER

GARAGE

FLOOR DRAINS

PAVED AREA

CONTRACTOR TO SUPPLY, INSTALL, AND REMOVE SIGNAGE FOR TRUCKS ENTERING THE COUNTY HIGHWAY IN EACH DIRECTION. LOCATION TO BE DETERMINED BY THE ENGINEER

LOADING DOCK

FENCE GATE

PAVED PARKING

COUNTY ROAD 32

RESIDENCE

PATIO

0' 40' 80' 160'

Map Reference:
Base mapping provided by NYSEG

DRN BY:	DES BY:	CHK BY:	APP BY:	REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)
KAM	KAM	CHF	SAU					

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET IS NOT FULL SIZE. VERIFY SCALE IF PLAN SHEET IS REDUCED

1 INCH

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SOIL STORAGE FACILITY (SERVICE CENTER)

PROJECT START DATE (M / Y)	MAY 2010
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	14
DRAWING NO.	14

Plotted By: MeisterK
Plot File Date Created: May/05/2010 3:37 PM
Layout-Sheet Name: SERVICE
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG

Attachment 2

Specifications

IN SITU SOLIDIFICATION – AUGER MIXED

PART 1 – GENERAL

1.01 INCLUDED IN THIS SECTION

- **A.** Summary
- **B.** References
- **C.** Definitions
- **D.** Qualifications
- **E.** Submittals
- **F.** Mix Design
- **G.** Performance Standards
- **H.** ISS Equipment
- **I.** Grout Reagents
- **J.** Grout Preparation
- **K.** Coordination of Work
- **L.** Solidification
- **M.** Spoil Management
- **N.** Quality Control
- **O.** Reprocessing

1.02 SUMMARY:

A. The Contractor shall provide all designs, submittals, equipment, materials, and manpower to complete the In Situ Solidification (ISS) of impacted soil as specified in this section and as shown on the Drawings.

B. An auger system specifically designed for environmental remediation shall be used.

C. ISS treatment shall extend a minimum of 2 feet vertically into the clay barrier layer, except along the perimeter of the ISS monolith, where ISS treatment shall extend at least 4 feet vertically into the clay barrier layer.

1.03 REFERENCES:

A. The most recent version of the following publications are incorporated in this specification:

1. ASTM C150 Standard Specification for Portland Cement.

2. American Petroleum Institute (API) 13-A Specification for Bentonite.

3. API RP 13-B-1 for Viscosity and Density.

4. ASTM D 5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

5. ASTM D 2166 Standard Test Method for Unconfined Compressive Strength of Cohesive Soil.

1.04 DEFINITIONS:

A. The following definitions are used in this section:

1. **Grout Reagent –**Type I Portland Cement, bentonite, Cement Kiln Dust or other material approved by the Engineer for solidifying impacted soils.

2. **Homogeneous Mixture** – A uniform, unvarying, and consistent blend of impacted soil, grout, and liquids, free from NAPL blebs and free from pockets of unmixed materials and free liquids.

3. **ISS Design Elevations:**

a. **Top Elevation for ISS Treatment** – the elevation of the top of ISS treatment as shown on the Drawings. Top Elevation for ISS Treatment corresponds with Pre-Cut elevations indicated on the Drawings.

b. **Bottom Elevation for ISS Treatment** – the elevation(s) of the bottom of ISS treatment as shown on the Drawings.

4. **ISS Working Platform** – the leveled surface of stable soil on which the ISS mixing equipment shall operate.

5. **Mixing Pass** – operation of the mixing equipment from the top elevation for ISS treatment to the bottom elevation for ISS treatment and back to the top.

6. **Obstruction –** subsurface manmade or natural object that impedes auger advancement.

7. **Overlap Ratio** – the ratio between the overlap distance between adjacent ISS columns and the width of the ISS column.

8. **Penetration Rate –** The rate, in feet per minute, at which the mixing auger is advanced into the ISS column.

9. **Extraction Rate** – The rate, in feet per minute, at which the mixing auger is retracted from the ISS column.

10. **Pre-Cut Excavation** – the removal of soil from the Working Platform elevation to the top of ISS elevation as shown in the Drawings.

11. **Refusal** – a condition that occurs during mixing when the auger can no longer be advanced either due to obstruction or soil geotechnical properties, defined as less than 6 inches of penetration over a 10-minute period. Contractor shall communicate Refusal conditions.

12. **Spoil** – the excess material resulting from addition of reagent to the *in situ* soils, typically a mixture of soil and reagent that “returns” to the top of the column**.**

13. **Mixing Energy** – A measure of the mixing effort for each grout column expressed as the number of mixing cycles (i.e., rotations) per unit length of ISS column.

1.05 QUALIFICATIONS:

A. The Contractor or ISS Subcontractor shall have completed at least 3 ISS remediation projects of similar size and scope.

B. The Contractor's or ISS Subcontractor's Project Manager/Superintendent shall have a minimum of 5 years of experience with ISS projects of similar scope, with a minimum of 2 of those years in the role of project Manager/Superintendent.

C. The Contractor's other Key Personnel shall have a minimum of 2 years of experience with ISS projects of similar scope. Key Personnel include equipment operators, batch plant operator, ISS rig operator, supervisory engineering staff, and technical staff involved with the ISS system operation and QA/QC sampling.

1.06 SUBMITTALS:

A. The Contractor shall submit a Work Plan (Technical Execution Plan) with their bid. At a minimum, the Work Plan shall include:

1. Description and specifications of ISS system, equipment, and processes, including available torque.

2. Proposed auger size(s) and configuration.

3. Proposed ISS reagents and design mix proportions.

4. Site map showing the proposed ISS sequencing, layout, and pattern, including overlap ratio between adjacent ISS columns.

5. Methods for determining and verifying the coordinates, elevations, and depths of the ISS columns.

6. Sample calculation for theoretical ISS column indicating required grout quantities.

7. Methods of controlling and mitigating exhaust, dust, and odor emissions and noise levels generated from the ISS equipment.

8. Methods for transporting, storing, protecting, and handling reagents, including controls and mitigation for dust and noise.

9. Detailed description and procedures for preparing reagent batch mixes, including methods to prepare and measure reagents to verify proper reagent mix proportions.

10. Detailed descriptions and procedures for controlling, measuring, and monitoring the injection of ISS reagents into the ground during each mixing pass.

11. Detailed descriptions and procedures for monitoring mixing energy, including auger rotation speed, penetration rate, and extraction rate during each mixing pass to verify that proper mixing energy is provided along the full length of the ISS column and that the resulting ISS column will be homogeneous.

12. Total estimated quantity of water and solidification reagents required for the Work.

13. Detailed solidification procedures and sequencing.

14. Equipment and methods for breaking existing ISS mass into sizes practical for in-situ re-solidification with vertical auger rig.

15. Associated dewatering procedures.

16. Contact water management, treatment and disposal procedures.

17. Stormwater run-on controls, management and discharge procedures.

18. Estimated production rate for solidification for ISS columns.

19. Methods for handling generated spoil, and estimated quantity of spoils.

20. Estimated schedule for completion of the Work.

21. Any proposed deviations from the Specifications and Drawings.

22. Spill control measures.

23. Erosion control measures.

24. Quality Control sampling methods, standard operating procedures, personnel, and equipment.

25. Equipment washout and grout waste management practices.

26. Resumes for key personnel assigned to conduct the Work, including Project Superintendent; ISS rig operator, other equipment operators, reagent plant operators, supervisory engineering staff, and other technical staff.

27. Equipment manufacturer's specifications and description.

28. Method to manage/remove subsurface obstructions encountered during the ISS process.

B. Contractor shall describe in the Work Plan how sufficient redundant or backup equipment will be provided and maintained so as to minimize delays attributable to equipment failures. The Contractor shall include a failure modes and effects analysis and determine systems or components that are likely to fail or require routine maintenance in the course of normal operation for this project. This analysis should determine credible failure modes or maintenance activities, which, if occurred, would result in the inability to

measure parameters critical to the performance of the work, or result in significant delays in the work.

C. Contractor shall provide (electronically, on a form acceptable to Engineer) a daily ISS report summarizing daily ISS activities including daily totals and running totals for volume of soil mixed and reagents used. Contractor shall attach daily grout mixing forms. ISS daily reports shall be submitted daily no later than 10:00 am the following day and shall include at a minimum the following information:

1. Date and Project Identification.

2. ISS equipment used; auger size(s)

3. Equipment problems/failures/maintenance that affected ISS efforts

4. List of columns solidified. Running total of number of columns solidified.

5. Volume of soil solidified that day and as a running total.

6. ISS Column Log for each column solidified. Logs shall include:

a. Column Identification.

b. Date that work was performed

c. Design and actual top elevation of ISS column.

d. Design and actual bottom elevation of ISS column.

e. Estimated depth of toe-in penetration into clay barrier layer

f. Column (neat) volume (cy).

g. Volume of grout injected into the column (gallons)

h. Calculation of grout reagents used, including solids (lbs) and water (gallons).

i. Start and finish time.

j. Number of mixing passes.

k. Auger rotation speed during penetration and extraction.

l. Rate of (vertical) auger penetration and extraction.

m. Mixing energy, expressed as the number of mixing cycles (i.e., rotations) per unit length of ISS column.

n. Overlap ratio and configuration.

o. Auger diameter. Number of mixing blades.

p. Any unforeseen Site conditions or equipment problems that affected solidification efforts.

q. Any modifications or deviations from the Specifications and Drawings or the Work Plan.

r. Obstructions encountered.

s. Notes on the appearance of the mixed material.

t. Depth, location, type, and number of quality assurance/quality control (QA/QC) samples collected.

7. Quantities of grout reagents received and offloaded including total weight received versus stored.

8. A survey data summary including Northing(s), Easting(s) and as-built top and bottom elevations provided for each column completed.

9. Any modifications to project schedule.

10. Spoils handling/management and quantities disposed offsite.

11. Any unforeseen project or site conditions that affected solidification efforts.

12. Any modifications or deviations from the Contract Documents or the Work Plan.

D. Contractor shall provide a Final ISS Job Summary containing, at a minimum, the following information:

1. Quantities of grout reagents delivered to the site and used during the project with backup in the form of certified weigh receipts, bills of lading, flow meter records, or equivalent.

2. Any modifications or deviations from the approved Work Plan.

3. Spoil disposal/handling methods and quantities managed and disposed offsite.

4. Any unforeseen Site conditions or equipment problems that affected solidification efforts.

5. Any modifications or deviations from the Contract Documents.

6. As-built survey drawings of the lateral extent and top and bottom elevations of the ISS columns and all QA/QC sampling locations. Identify any columns re-solidified during construction. Show locations and identification of all ISS columns on a plan.

7. Results of all QA/QC test data.

E. Contractor shall submit a Mix Design in accordance with the requirements of this specification.

1.07 MIX DESIGN:

A. The Contractor shall provide a mix design that specifies the proportions and quantities of reagents and water.

1. The Engineer has conducted a treatability study with impacted site soils using varying percentages of Type I Portland Cement, Cement Kiln Dust, and Bentonite as reagents. The results of the treatability study are attached (Kemron, November 2009). The treatability study results are provided for information purposes only.

2. The Treatability Study indicates that the soils at this site can be successfully solidified to meet specified performance criteria using the following mix designs:

Reagents Added to Soils	Portland Cement (percentage by weight)	CKD (percentage by weight)	Bentonite (percentage by weight)
Design A	8%	0%	1%
Design B	7.5%	5%	1%

3. The Contractor shall determine the appropriate mix design using the available Treatability Study data as a guide. Based on the data summarized in the above table, the proposed mix design shall include, at a minimum, 7.5 to 8.0 percent by weight Portland cement and 1.0 percent bentonite.

4. The Contractor may, at their option and own expense, perform additional bench studies to establish the design mix. The Contractor may also propose alternative solidification reagents not considered in the Engineer's Treatability Study, subject to approval by NYSEG.

5. The Contractor shall bear all costs associated with changes in the mix design and/or construction means and methods needed to achieve the performance criteria, including, but not limited to, sample collection and bench testing.

D. The water to dry reagent ratio shall be 1:1 by weight. Higher water to solids ratios may be considered by the Engineer upon request from the Contractor, but in no case shall exceed 2:1.

E. Based on the results of performance testing of the solidified soil, the Contractor may elect to modify the solidification mixture proportions, with the approval of the Engineer. Contractor shall not modify the reagent mix proportions without prior written approval from the Engineer.

F. Contractor shall calculate (on a form acceptable to the Engineer) the minimum reagent proportions as follows:

1. Calculate the volume of soil being treated based on the total depth of the impacted soil.

2. Calculate the weight of soil being treated based on the previously calculated volume, using an appropriate unit weight for the soil being solidified.

3. Water and reagent addition shall be in accordance with the mix design.

1.08 PERFORMANCE CRITERIA:

A. The solidified soil shall have permeability less than or equal to $1x10^{-6}$ cm/s as determined by ASTM D 5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter, latest edition. The $1x10^{-6}$ cm/s criterion represents an upper bound value, and all performance test results shall be less than or equal to this criterion without exception.

B. The solidified soil shall have an Unconfined Compressive Strength (UCS) greater than 50 psi but less than 500 psi after 28 days as determined by ASTM D 2166 Standard Test Method for Unconfined Compressive Strength of Cohesive Soil, latest edition. The 50 psi criterion represents a lower bound value, and all performance test UCS strength results shall meet or exceed 50 psi without exception.

C. The solidified soil shall have no free liquid present, as observed along the break surface of the USC test specimens.

D. The Contractor shall, under the Engineer's direction, retrieve QA samples of mixed soil and produce test specimens within one hour of mixing. The Engineer will test Quality Assurance (QA) test specimens to confirm that the performance criteria are met.

E. Passes or columns shall be laid out in a manner to solidify the entire area and provide an overlap between adjacent columns so that no soil within the specified horizontal and vertical limits of solidification is left untreated.

F. The pre-excavation elevations (corresponding to the top elevation for ISS treatment) and bottom elevation for ISS treatment are shown on the Drawings. Contractor shall not deviate from the elevations shown by greater than 0.5 feet without written authorization by the Engineer.

G. Contractor shall ensure that the reagents are injected and mixed uniformly throughout the pass or column and that adequate and consistent mixing energy is applied to result in a uniform and homogeneous mixture, meeting the performance requirements listed in this section.

H. Samples will be visually inspected by the Engineer to verify that a homogeneous mixture has been created, based on the following criteria:

1. No visible non-aqueous phase liquids (NAPL) or sheen.

2. Reagent and soil are thoroughly intermixed in the column, with uniform and consistent color, soil gradation, moisture content, and consistency.

3. There are no unmixed soil clumps greater than 2 inches in maximum dimension.

4. Columns that do not meet these criteria will be immediately remixed by the Contractor.

I. Contractor shall minimize the amount of spoils generated by the ISS processes, while still meeting the performance standard.

1.09 ISS EQUIPMENT:

A. The ISS equipment shall be of sufficient size and capacity to solidify the soil to the depths indicated on the Drawings within the proposed ISS schedule and meeting the requirements of this specification. The Contractor shall provide an excavator capable of reaching to the total depth of solidification for obstruction removal during ISS activities. The excavator shall be available at all times during the ISS process. The equipment used shall be specified in the Work Plan and approved by the Engineer.

B. The grout mixing system shall be capable of precisely proportioning the mix reagents and thoroughly blending and mixing them into a homogeneous grout of uniform consistency. It shall be capable of continuously batching and mixing the grout in sufficient quantity without interruption due to inadequate batching, mechanical limitations, or volume limitations. Where used, automatic metering systems shall be calibrated in the presence of the Engineer prior to the beginning of grout injection and any additional times required by the Engineer. All automatic metering systems shall also have a manual backup method for verifying quantities. Properly calibrated volumetric containers and scales necessary for proper calibration of the mixing equipment shall be provided by the Contractor. Batch type mixers may be used, subject to provisions of an accurate means of proportioning the individual grout constituents, and shall be able to allow for uninterrupted injection. Batch plants which require slowing or stopping of the injection procedure while mixing additional batches are not acceptable.

C. The ISS contractor shall be prepared to mobilize alternative/additional ISS equipment, if necessary, to complete the ISS work as indicated and specified at no additional cost to NYSEG.

PART 2 – MATERIALS

2.01 GROUT REAGENTS:

A. The Contractor shall provide Type I Portland Cement, bentonite, CKD, or other solidifying reagent approved by the Engineer for the solidification work.

B. The Contractor shall control all dust during offloading, storage, transportation, mixing, and use of reagents.

C. Reagents:

1. Portland Cement – Type I Portland Cement Meeting the requirements of ASTM C150.

2. Bentonite – Powdered bentonite meeting the requirements of API 13-A, Section 4 with a density of 90 barrels per ton.

3. Cement Kiln Dust (CKD) – Lafarge North America, Ravena Plant, Ravena, New York.

D. Contractor shall coordinate the delivery of all reagents to the site.

E. Contractor shall provide an off-site source of water. Use of the fire hydrants for supply of water WILL NOT be allowed.

F. Contractor shall maintain strict dust control when offloading and handling dry bulk materials and shall meet all particulate control limitations set forth in the perimeter air monitoring plan.

G. Contractor shall, at all times, maintain an adequate quantity of solidification grout materials so that the work is completed without delay. Any delays or costs associated with inadequate supply of grout materials at the Site shall be the responsibility of the Contractor.

H. Containers and locations for materials storage shall be protected from precipitation, moisture, and other potential deleterious events.

I. Containers for reagent storage shall be properly labeled per the supplier's requirements and Contractor shall maintain material safety data sheets for the reagents onsite at all times.

J. The Contractor shall provide measuring equipment that is capable of measuring reagent quantities within a tolerance of +/- 2% by weight.

K. Grout additives such as thinners, retarders, accelerators, etc. shall not be used without prior written approval from the Engineer.

PART 3 – EXECUTION

3.01 GROUT PREPARATION:

A. Contractor shall provide all equipment, materials, and personnel needed to properly prepare the grout in accordance with these specifications.

B. Contractor shall complete a form to calculate the needed quantities of grout and grout reagents for each column. Calculated and actual quantities shall be provided including:

1. Column Identification

2. Grout Unit Weight (lbs/cubic foot)(mud balance)

3. Volume and weight of water added (Gal.)(lbs)

4. Weight of Grout reagents (lbs)

C. Contractor shall add the calculated quantities of reagent, as determined by the mix design.

D. Contractor shall thoroughly mix the water and reagents until consistent and homogenous grout mixture free from lumps forms.

E. Contractor shall pump or deliver the reagent mixture from the mixing plant to the ISS equipment at an adequate pressure and flow rate for the solidification process.

F. Contractor shall verify that the grout volume and density meets the Performance Standards in this Specification. Grout shall be metered with a calibrated turbine flow meter properly sized for surrounding piping, or equivalent, modified for grout flow, that has the ability to display or record rate (gpm) and total (gal) injected into each column.

G. Processed grout that reaches a temperature of more than 80°F or is held for greater than 1 hour prior to use shall be discarded at the Contractor's expense.

H. The Engineer will periodically visually inspect each batch of mixed grout to ensure that the grout has been sufficiently mixed. Contractor shall continue to mix the grout until thoroughly mixed to the satisfaction of the Engineer.

3.02 COORDINATION OF WORK:

A. Contractor shall coordinate ISS activities with excavation, dewatering, sampling, backfilling, and other Work as necessary.

B. Contractor shall not backfill or cover any Work areas without prior approval from the Engineer.

3.03 SOLIDIFICATION:

A. Contractor shall provide all personnel, equipment, and materials required to conduct the Work identified on the drawings and in these specifications.

B. Solidification shall be conducted to the vertical and horizontal extents shown in the drawings.

C. Prior to beginning solidification in a given area, Contractor shall excavate that area to the Pre-Cut elevations shown in the Drawings. The indicated Pre-Cut elevations shall be considered equal to the proposed Top Elevation for ISS Treatment.

D. In the event ground water is encountered during Pre-ISS excavation, the Engineer may direct the Contractor to modify the Pre-Cut and Top Elevation of ISS Treatment. Contractor shall adjust grout mix requirements accordingly based on the actual Top Elevation of ISS Treatment.

E. The Contractor shall perform surveying to document and confirm the Top Elevation for ISS Treatment. Contractor is responsible for maintaining the Top Elevation for ISS Treatment as shown on the Drawings unless otherwise directed by the Engineer.

F. The Contractor shall note any variance for Top Elevation for ISS Treatment and adjust grout mix accordingly.

G. In the event that the auger tool meets an obstruction, the Contractor shall notify the Engineer who will evaluate the following potential actions to be taken, as approved by NYSDEC:

1. Engineer may direct Contractor to excavate in an attempt to remove the Obstruction.

2. The Obstruction is deemed unmovable (refusal), then NYSEG will coordinate with NYSDEC to ensure that no compromise in the approved remedy exists.

H. All ISS columns shall extend through the granular overburden and toe (penetrate) into the underlying clay barrier layer. The top of the clay barrier layer is defined in the drawings and is based on available subsurface exploration specifically performed for this purpose. Columns shall be keyed approximately 4 feet into the clay barrier layer at the perimeter of the ISS monolith and approximately 2 feet into the clay barrier layer in interior portions of the monolith as indicated on the Drawings. The continuous perimeter key shall be installed at a minimum width of 10 feet as shown on the Drawings.

I. ISS columns in the interior of the ISS treatment area shall extend to the Bottom of ISS elevations indicated on the drawings. The indicated Bottom of ISS elevations are intended to provide the necessary 2-ft minimum toe (penetration) into the clay barrier layer. ISS columns along the perimeter of the treatment area shall extend to elevations corresponding to 2 feet deeper than the Bottom of ISS elevations indicated to achieve the required 4-ft toe penetration.

J. The entire perimeter of the ISS Work Area shall be treated first, prior to solidifying the soil in the interior portion of the ISS Work Area.

K. Remnant foundations and other subsurface obstructions should be anticipated at this site. All obstructions shall be removed by the Contractor as necessary to facilitate ISS operations.

L. The Engineer shall be notified immediately if an obstruction is encountered.

M. Dewatering shall be conducted only to the extent necessary to complete the Work.

N. Grout addition shall be at the prescribed proportions of the mix design in accordance with the Contractor's Work Plan and as calculated on the Contractor's forms.

O. Contractor shall mix grout with impacted soil until it is a homogeneous mixture of soil and grout from the Top Elevation for ISS Treatment to the Bottom Elevation for ISS Treatment shown on the Drawings.

P. Auger shall be surfaced periodically to remove soil clods from the top of the auger for reprocessing within the column to ensure a homogenous mixture is achieved.

Q. Contractor shall complete a minimum of three mixing passes of the entire column once bottom elevation of ISS treatment is reached for each column.

3.04 SPOIL MANAGEMENT:

A. The Contractor shall remove spoil as necessary to avoid exceedance of the design Top Elevation for ISS Treatment.

1. The Contractor shall manage spoils so that they do not accumulate in the working area and above columns yet to be mixed. The Contractor shall prevent spoil from previously mixed columns from being incorporated into subsequently mixed columns.

2. The Contractor shall place spoils in a temporary stockpile for removal and disposal.

3.05 QUALITY ASSURANCE AND QUALITY CONTROL:

A. The Contractor shall collect a sample of the mixed grout for density verification testing according to API Method RP 13-B1 at a frequency of every third batch mixed or at the direction of the Engineer.

ISS Column sampling:

1. Sampling Timing. Sampling of the treated soil will occur within 45 minutes of mixing while mixture is still wet and pliable.

2. Sampling Tool. Contractor shall collect samples as directed by the Engineer using a sampling tool capable of taking discrete samples from mixed material. Sampler shall be a hydraulically or similarly powered sampler capable of being fully opened and closed from the ground level. Sampler must be capable of retrieving a discrete sample from the Bottom of ISS elevations as shown on the Drawings.

3. The Engineer may instruct the Contractor to collect samples using the on-site excavator periodically in lieu of using the Sampling Tool. The collection method will be at the sole discretion of the Engineer.

4. Quality Control Testing: The Engineer will test QA samples at their discretion. Samples will be analyzed for UCS, hydraulic conductivity (K), and presence of free liquids. Samples will also be visually inspected for homogeneity.

a. At a minimum, one bulk sample of newly solidified soil shall be tested for every 250 cubic yards of ISS for the first 1,000 cubic yards of treated soil and one sample per every 500 cubic yards of ISS or once per day thereafter, whichever is greater.

B. Contractor's sampling equipment must be maintained in close proximity to the area being actively solidified. Sampling equipment must be kept in good repair and Contractor shall maintain backup or redundant sampler and power supply on site for the duration of the project. Contractor shall be able to initiate sampling activities within 20 minutes of request by the Engineer.

C. The Engineer will determine whether the Contractor's ISS operations meet specified Performance Standards.

D. The center point of each column shall be located by the Contractor using survey equipment approved by the Engineer. Utilization of measuring tapes, cables, or triangulation for location of column center points will not be acceptable. The tolerance shall be plus or minus 3 inches.

E. Vertical depth of each column shall be recorded by comparing auger depth with a fixed reference elevation that shall not be changed throughout the project without prior approval of the Engineer. Monitoring and data collection systems such as Gamperl & Hatlapa® GmbH or equivalent are also acceptable where calibrated for specific rig and kelly bar assembly.

F. ISS columns shall be keyed into the clay layer to the depths shown on the Drawings. The top of clay elevations indicated on the Drawings are based on the available information.

G. The Engineer may require additional sampling based on the QC and QA test results.

3.06 REPROCESSING:

A. The Contractor shall reprocess the column(s) at the direction of the Engineer if the QC or QA samples do not meet the requirements of the performance standards.

B. If the sample fails the visual inspection by the Engineer's representative due to insufficient mixing, the Contractor shall reprocess the column from which such sample was collected. Reprocessing shall be completed within one working day of the rejected sample at the Contractor's expense.

END OF SECTION

ENVIRONMENTAL SERVICES

1359-A Ellsworth Industrial Blvd • Atlanta, GA 30318 • TEL 404-636-0928 • FAX 404-636-7162

October 28, 2009

Carsten Floess Senior Geotechnical Engineer
AECOM
40 British American Blvd.
Latham, NY 12110

Re: In Situ Soil Stabilization/Solidification Treatability Study
Norwich, NY MGP Site
KEMRON Project # SE-0301

Dear Mr. Floess

KEMRON Environmental Services is pleased to provide this final report for the above reference site. The treatability study was conducted based on the Treatability Study Work Plan provided to KEMRON and dated February 2009. The study included untreated material physical properties characterization, mixture evaluations, and treated material physical properties testing.

On April 6, 2009, KEMRON received 18 samples identified as: Sand/Silt Unit Core, Gravel Unit Core, and Fill Unit Core, Fill Composite, Gravel Composite, Sand/Silt Composite, ISS 2 Sand(4-5) ISS 2 Gravel Top(5-6), ISS 2 Gravel Bottom(8-10), ISS 1 Sand(6-7), ISS 1 Gravel Top(7-8), ISS 1 Gravel Bottom(19-20), ISS 4 Sand(3-5), ISS 4 Gravel Top(5-7), ISS 4 Gravel Bottom(16-18), ISS 3 Sand(2-4), ISS 3 Gravel Top(4-6), and ISS 3 Gravel Bottom(10-12). The characterization included selected testing for: Particle Size Analysis (ASTM D422), Atterberg Limits (ASTM D4318), Moisture Content (ASTM D2216), pH (EPA Method 9045), Permeability (ASTM D5084 or D2434), and Bulk Density (ASTM D2937). Initial characterization results of the untreated material physical properties testing are summarized in **Table 1.** The initial characterization physical property data reports are provided in **Appendix A**

KEMRON understands that site activities consist of in-situ remediation. As such, additives were incorporated into the untreated materials as a pumpable slurry to facilitate in-situ auger mixing. Mixture development was performed by introducing the reagent slurry into the site sediments while mixing using a standard bench-top mixer. All reagents and water were added on a by-weight basis. For example, with a mixture containing a 10% addition of reagent and 8% water addition, 10 grams of reagent will be slurried with 8 grams of water and then blended with 100 grams of the site sediment. The mixture designs were developed by AECOM.

Mixtures on three materials (Fill Composite, Gravel Composite, and Sand/Silt Composite) were prepared. The mixtures were allowed to cure for 28 days at room temperature in preformed cylindrical molds enclosed in sealed plastic bags to prevent moisture loss. KEMRON conducted Moisture Content (ASTM D2216) and pH (EPA Method 9045) immediately following mixing. During the curing period, KEMRON measured pocket penetrometer at 3,5, and 7 days of curing. After 7, 14, and 28 days of curing, KEMRON conducted Unconfined Compressive Strength

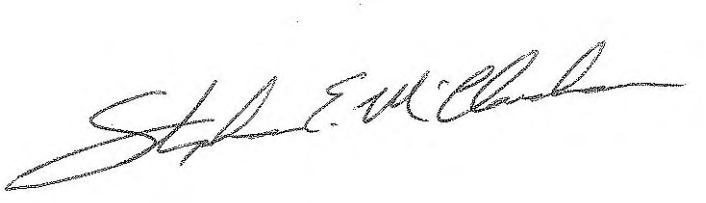
testing (ASTM D2166) respectively. After 28 days of curing, KEMRON conducted Permeability testing (ASTM D5084).

The pocket penetrometer testing results are summarized in **Table 2**. Mixture development sheets are provided in **Appendix B**. Treated Soil Moisture Content and pH testing results are summarized in **Table 3** and the data reports are provided in **Appendix C.** Treated Soil Permeability testing results are summarized in **Table 4** and the data reports are provided in **Appendix D.** Treated Soil Unconfined Compressive Strength testing results are summarized in **Table 5** and the data reports are provided in **Appendix E.** The Chain of Custodies received on April 6, 2009 are provided in **Appendix F.**

If you have any questions concerning the data provided in this report, please do not hesitate to call at 404-601-6927.

Sincerely,

KEMRON Environmental Services, Inc.



Erik McClanahan
Project Manager

Tommy A. Jordan,
P.G.Program Manager

Attachments

DATA TABLES

NORWICH MGP SITE
AECOM
TABLE 1
INITIAL CHARACTERIZATION RESULTS

TESTING PARAMETERS	TEST METHOD	UNIT	RESULTS																
			Sand Silt Unit (1-3.5) Core	Gravel Unit (15-17.5) Core	Fill Unit (4-6') Core	Fill Composite	Gravel Composite	Sand / Silt Composite	ISS 2 Sand (4-5)	ISS 2 Gravel Top (5-6)	ISS 2 Gravel Bottom (8-10)	ISS 1 Sand (6-7)	ISS 1 Gravel Top (7-8)	ISS 1 Gravel Bottom (19-20)	ISS 4 Sand (3-5)	ISS 4 Gravel Top (5-7)	ISS 4 Gravel Bottom (16-18)	ISS 3 Sand (2-4)	ISS 3 Gravel Top (4-6)	ISS 3 Gravel Bottom (10-12)
PHYSICAL PROPERTIES																			
Particle Size Analysis	ASTM D422																		
- Gravel		%	3.5	0	37.3	18.5	33.2	3.5	2.6	42.3	50.0	10.1	22.4	21.2	5.7	46.7	57.1	0.0	59.2	38.6
- Sand		%	8.3	74.1	38.5	49.3	48.6	30.6	21.2	44.9	30.4	59.4	53.7	68.8	24.8	36.6	36.7	10.7	32.8	46.5
- Silt		%	66.5	21.6	15.8	20.5	12.2	43.8	59.4	3.6	13.5	17.7	15.4	7.0	43.1	10.3	2.9	74.4	3.6	10.6
- Clay		%	21.7	4.3	8.4	11.7	6.0	22.1	16.8	9.2	6.1	12.8	8.5	3.0	26.4	6.4	3.3	14.9	4.4	4.3
Atterberg Limits	ASTM D4318																		
- Liquid Limit		-	28	NL	22	31	22	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- Plastic Limit		-	23	NP	16	22	19	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
- Plasticity Index		-	5	NPI	6	9	3	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	ASTM D2216	%	28.09	24.14	6.02	12.39	13.81	23.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	EPA 9045	S.U.	6.73	7.02	7.97	7.86	8.18	7.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Permeability	ASTM D5084	cm/sec	1.0 E-04	8.14 E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Permeability	ASTM D2434	cm/sec	NA	NA	9.79 E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bulk Density	ASTM D2937	pcf	114.5	115.8	116.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
NL = No Liquid Limit
NP = No Plastic Limit
NPI = No Plasticity Index
NA = Not Applicable

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NORWICH MGP SITE

TABLE 2

STABILIZATION EVALUATIONS - POCKET PENETROMETER RESULTS

KEMRON SAMPLE No.	UNTREATED MATERIAL	REAGENT TYPE	Reagent ID			Reagent Addition (%)	Water Addition (%)	Penetrometer Testing (tons/ft^2)		
								3 Day	5 Day	7 Day
0301-001	Sand / Silt	PC	818			5	2.18	> 4.5	> 4.5	> 4.5
0301-002	Sand / Silt	PC	818			10	4.23	> 4.5	> 4.5	> 4.5
0301-003	Sand / Silt	PC	818			15	6.79	> 4.5	> 4.5	> 4.5
0301-004	Sand / Silt	PC / Bent	818	718		10.0 / 1.0	6.85	> 4.5	> 4.5	> 4.5
0301-005	Sand / Silt	PC / Bent	818	718		10.0 / 2.0	9.18	> 4.5	> 4.5	> 4.5
0301-006	Sand / Silt	PC / CKD	818	841		5.0 /10.0	9.30	3.0	4.0	> 4.5
0301-007	Sand / Silt	PC / CKD	818	841		5.0 / 15.0	18.92	3.0	4.25	> 4.5
0301-008	Sand / Silt	PC / CKD	818	841		5.0 / 25.0	26.71	3.5	4.25	> 4.5
0301-009	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 1.0	19.73	4.0	4.25	> 4.5
0301-010	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 2.0	21.14	3.5	4.25	> 4.5
0301-011	Sand / Gravel	PC	818			5	2.04	> 4.5	> 4.5	> 4.5
0301-012	Sand / Gravel	PC	818			10	4.12	> 4.5	> 4.5	> 4.5
0301-013	Sand / Gravel	PC	818			15	6.39	> 4.5	> 4.5	> 4.5
0301-014	Sand / Gravel	PC / Bent	818	718		10.0 / 1.0	7.31	4.0	> 4.5	> 4.5
0301-015	Sand / Gravel	PC / Bent	818	718		10.0 / 2.0	9.05	4.3	> 4.5	> 4.5
0301-016	Sand / Gravel	PC / CKD	818	841		5.0 /10.0	12.11	3.75	4.25	> 4.5
0301-017	Sand / Gravel	PC / CKD	842	841		5.0 / 15.0	18.95	3.75	4.25	> 4.5
0301-018	Sand / Gravel	PC / CKD	842	841		5.0 / 25.0	23.93	3.5	4.25	> 4.5
0301-019	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 1.0	18.76	4.0	4.5	> 4.5
0301-020	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 2.0	21.35	4.25	> 4.5	> 4.5

> 4.5 EXCEEDS POCKET PENETROMETER
PC = Portland Cement
Bent = Bentonite
CKD = Cement Kiln Dust

KEMRON ENVIRONMENTAL SERVICES

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NORWICH MGP SITE

TABLE 3

STABILIZATION EVALUATIONS - MOISTURE CONTENT - ASTM D2216

STABILIZATION EVALUATIONS - pH - EPA METHOD 9045

KEMRON SAMPLE No.	UNTREATED MATERIAL	REAGENT TYPE	Reagent ID			Reagent Addition (%)	Water Addition (%)	Ph (S.U.)	Moisture Content (%)
0301-001	Sand / Silt	PC	818			5	2.18	11.26	22.96
0301-002	Sand / Silt	PC	818			10	4.23	11.43	22.74
0301-003	Sand / Silt	PC	818			15	6.79	11.44	25.72
0301-004	Sand / Silt	PC / Bent	818	718		10.0 / 1.0	6.85	11.46	26.24
0301-005	Sand / Silt	PC / Bent	818	718		10.0 / 2.0	9.18	11.53	29.10
0301-006	Sand / Silt	PC / CKD	818	841		5.0 /10.0	9.30	11.66	27.35
0301-007	Sand / Silt	PC / CKD	818	841		5.0 / 15.0	18.92	12.19	35.25
0301-008	Sand / Silt	PC / CKD	818	841		5.0 / 25.0	26.71	12.29	38.42
0301-009	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 1.0	19.73	12.27	33.95
0301-010	Sand / Silt	PC / CKD / Bent	818	841	718	5.0 / 15.0 / 2.0	21.14	12.08	37.51
0301-011	Sand / Gravel	PC	818			5	2.04	11.32	12.19
0301-012	Sand / Gravel	PC	818			10	4.12	11.54	13.99
0301-013	Sand / Gravel	PC	818			15	6.39	11.62	20.93
0301-014	Sand / Gravel	PC / Bent	818	718		10.0 / 1.0	7.31	11.46	20.92
0301-015	Sand / Gravel	PC / Bent	818	718		10.0 / 2.0	9.05	11.51	21.96
0301-016	Sand / Gravel	PC / CKD	818	841		5.0 /10.0	12.11	11.82	27.86
0301-017	Sand / Gravel	PC / CKD	842	841		5.0 / 15.0	18.95	12.40	24.01
0301-018	Sand / Gravel	PC / CKD	842	841		5.0 / 25.0	23.93	12.56	30.24
0301-019	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 1.0	18.76	12.38	24.91
0301-020	Sand / Gravel	PC / CKD / Bent	842	841	718	5.0 / 15.0 / 2.0	21.35	12.35	31.40

PC = Portland Cement
Bent = Bentonite
CKD = Cement Kiln Dust

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NORWICH MGP SITE
TABLE 4

TREATED MATERIAL TESTING
Summary of Permeability Testing - ASTM D5084

KEMRON SAMPLE No.	SAMPLE MIX DATE	UNTREATED MATERIAL TYPE	REAGENT TYPE	REAGENT ADDITION (%)	PERMEABILITY				
					Moisture Content (%)	Bulk Density (lbs/ft^3)	Dry Density (lbs/ft^3)	Permeability (cm/sec)	
0301-001	5/1/2009	Sand / Silt	PC	5	22.5	121.5	99.2	7.2 E-07	
0301-002	5/1/2009	Sand / Silt	PC	10	21.6	123.2	101.3	1.7 E-08	
0301-003	5/4/2009	Sand / Silt	PC	15	21.2	122.8	101.4	3.1 E-09	
0301-004	5/5/2009	Sand / Silt	PC / BENT	10.0 / 1.0	24.5	120.0	96.4	1.8 E-08	
0301-005	5/5/2009	Sand / Silt	PC / BENT	10.0 / 2.0	26.9	118.6	93.4	2.2 E-08	
0301-006	5/5/2009	Sand / Silt	PC / CKD	5.0 / 10.0	25.8	119.3	94.8	2.9 E-08	
0301-007	5/6/2009	Sand / Silt	PC / CKD	5.0 / 15.0	33.3	117.1	87.9	5.8 E-08	
0301-008	5/6/2009	Sand / Silt	PC /CKD	5.0 / 25.0	37.3	113.5	82.7	9.4 E-08	
0301-009	5/6/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 1.0	29.6	113.3	87.40	7.5 E-08	
0301-010	5/7/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 2.0	33.6	113.1	84.70	8.7 E-08	
0301-011	5/1/2009	Sand / Gravel	PC	5	10.8	134.7	121.6	1.7 E-07 *	* Sample full of rocks
0301-011(Re-test)	5/1/2009	Sand / Gravel	PC	5	9.70	134.8	122.9	5.8 E-07	Sample re-tested
0301-012	5/1/2009	Sand / Gravel	PC	10	12.3	128.5	114.4	1.2 E-06	
0301-013	5/4/2009	Sand / Gravel	PC	15	15.6	126.6	109.4	2.9 E-08	
0301-014	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 1.0	19.2	130.7	109.7	5.7 E-08	
0301-015	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 2.0	17.1	129.2	110.3	4.3 E-08	
0301-016	5/5/2009	Sand / Gravel	PC / CKD	5.0 / 10.0	19.5	123.2	103.0	3.3 E-07	
0301-017	5/7/2009	Sand / Gravel	PC / CKD	5.0 / 15.0	23.8	115.8	93.6	3.2 E-07	
0301-018	5/6/2009	Sand / Gravel	PC /CKD	5.0 / 25.0	27.8	115.2	90.10	2.2 E-07	
0301-019	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 1.0	24.0	115.2	92.90	2.1 E-07	
0301-020	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 2.0	24.3	116.5	93.70	1.4 E-07	
New Mixes									
0301-021	7/28/2009	Sand/Silt	PC	7.5	19.5	117.3	98.2	2.6 E-07	
0301-022	7/29/2009	Sand/Silt	PC/CKD	7.5 / 10	26.1	115.0	91.2	2.5 E-08	
0301-023	7/29/2009	Sand/Silt	PC/CKD	10.0 / 10.0	21.6	116.2	95.6	5.4 E-09	
0301-024	7/29/2009	Sand/Silt	PC/CKD	10.0 / 15.0	20.6	116.4	96.5	6.7 E-09	
0301-025	7/29/2009	Sand/Silt	PC/CKD/BENT	7.5 / 15 / 1.0	23.7	115.0	93.0	1.1 E-08	
0301-026	7/29/2009	Sand/Silt	PC/CKD/BENT	10.0 / 15.0 / 1.0	25.8	112.3	89.3	1.3 E-08	
0301-027	7/29/2009	Sand/Gravel	PC	5.0	22.3	118.8	97.2	5.1 E-06	
0301-028	7/29/2009	Sand/Gravel	PC/BENT	7.5 / 1.0	23.6	125.7	101.7	5.4 E-07	
0301-029	7/29/2009	Sand/Gravel	PC/CKD	7.5 / 10.0	28.0	118.8	92.8	1.5 E-06	
0301-030	7/29/2009	Sand/Gravel	PC/ CKD	10.0 / 10.0	27.5	119.4	93.7	5.8 E-07	
0301-031	7/29/2009	Sand/Gravel	PC/ CKD / BENT	7.50 / 10.0 / 1.0	25.6	122.8	97.8	3.7 E-07	
0301-032	7/29/2009	Sand/Gravel	PC/ CKD / BENT	10.0 / 15.0 / 1.0	26.6	121.5	96.0	8.3 E-07	

PC - PORTLAND CEMENT
CKD - CEMENT KILN DUST
BENT- BENTONITE

AECOM
NORWICH MGP SITE
TABLE 5

TREATED MATERIAL TESTING
Summary of Unconfined Compressive Strength Testing - ASTM D2166

KEMRON SAMPLE No.	SAMPLE MIX DATE	UNTREATED MATERIAL TYPE	REAGENT TYPE	REAGENT ADDITION (%)	Cure Time (days)	UNCONFINED COMPRESSIVE STRENGTH			
						Moisture Content (%)	Bulk Density (lbs/ft^3)	Dry Density (lbs/ft^3)	UCS (lbs/in^2)
0301-001	5/1/2009	Sand / Silt	PC	5	7	22.23	122.9	100.5	45.0
					14	22.18	122.3	100.1	50.7
					28	22.14	119.5	97.8	37.5
0301-002	5/1/2009	Sand / Silt	PC	10	7	22.71	124.0	101.0	203.9
					14	21.52	123.8	101.9	231.2
					28	21.14	120.3	99.3	212.3
0301-003	5/4/2009	Sand / Silt	PC	15	7	22.48	126.4	103.2	443.8
					14	16.53	126.1	108.2	628.7
					28	21.57	123.9	101.9	704.9
0301-004	5/5/2009	Sand / Silt	PC / BENT	10.0 / 1.0	7	24.47	121.9	97.9	158.9
					14	23.58	120.5	97.5	161.8
					28	22.97	121.8	99.1	325.9
0301-005	5/5/2009	Sand / Silt	PC / BENT	10.0 / 2.0	7	27.63	120.3	94.2	202.2
					14	27.19	119.7	94.1	238.0
					28	27.29	119.7	94.0	261.3
0301-006	5/5/2009	Sand / Silt	PC / CKD	5.0 / 10.0	7	26.47	120.6	95.3	238.0
					14	25.20	120.6	96.3	336.0
					28	25.42	121.7	97.0	400.0
0301-007	5/6/2009	Sand / Silt	PC / CKD	5.0 / 15.0	7	33.86	117.0	87.4	52.2
					14	33.46	115.9	86.8	98.2
					28	33.26	117.2	88.0	129.0
0301-008	5/6/2009	Sand / Silt	PC /CKD	5.0 / 25.0	7	36.53	115.4	84.6	43.5
					14	37.95	112.2	81.3	68.5
					28	36.63	113.9	83.4	87.7
0301-009	5/6/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 1.0	7	34.22	114.8	85.6	47.6
					14	35.61	113.7	83.9	68.1
					28	33.48	114.6	85.9	107.6
0301-010	5/7/2009	Sand / Silt	PC / CKD / BENT	5.0 / 15.0 / 2.0	7	36.29	115.5	84.7	40.8
					14	35.81	115.8	85.3	62.6
					28	35.48	115.0	84.9	92.3
0301-011	5/1/2009	Sand / Gravel	PC	5	7	10.74	142.5	128.7	228.7
					14	11.49	142.7	128.0	230.3
					28	10.30	143.6	130.2	379.4
0301-012	5/1/2009	Sand / Gravel	PC	10	7	14.00	132.3	116.1	312.9
					14	13.29	134.9	119.1	320.6
					28	11.70	131.7	117.9	412.8
0301-013	5/4/2009	Sand / Gravel	PC	15	7	17.12	127.0	108.4	516.0
					14	22.86	122.4	99.6	480.0
					28	15.49	128.0	110.8	899.9
0301-014	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 1.0	7	18.43	126.8	107.1	135.5
					14	17.49	127.4	108.4	262.7
					28	18.40	123.0	103.8	239.7
0301-015	5/5/2009	Sand / Gravel	PC / BENT	10.0 / 2.0	7	20.26	119.8	99.6	137.4
					14	19.67	122.1	102.0	176.9
					28	19.50	115.7	96.8	201.1
0301-016	5/5/2009	Sand / Gravel	PC / CKD	5.0 / 10.0	7	22.28	123.9	101.3	45.1
					14	19.20	126.0	105.7	58.9
					28	22.30	124.9	102.1	70.6
0301-017	5/7/2009	Sand / Gravel	PC / CKD	5.0 / 15.0	7	25.24	121.0	96.6	53.6
					14	24.50	122.5	98.4	65.0
					28	21.01	123.2	101.8	81.9
0301-018	5/6/2009	Sand / Gravel	PC /CKD	5.0 / 25.0	7	27.91	121.9	95.3	30.4
					14	25.12	118.5	94.7	51.9
					28	32.08	116.0	87.8	67.6
0301-019	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 1.0	7	24.70	122.1	97.9	48.1
					14	26.81	120.7	95.2	58.8
					28	23.44	120.0	97.2	69.7
0301-020	5/6/2009	Sand / Gravel	PC / CKD / BENT	5.0 / 15.0 / 2.0	7	28.31	118.1	92.1	41.9
					14	23.88	121.1	97.8	34.6
					28	24.29	117.7	94.7	62.8
0301-021	7/28/2009	Sand/Silt	PC	7.5	28	19.70	124.9	104.3	177.3
0301-022	7/29/2009	Sand/Silt	PC/CKD	7.5 / 10	28	29.92	115.0	88.5	334.3
0301-023	7/29/2009	Sand/Silt	PC/CKD	10.0 / 10.0	28	25.38	118.3	94.3	474.1
0301-024	7/29/2009	Sand/Silt	PC/CKD	10.0 / 15.0	28	27.20	116.4	91.5	473.7
0301-025	7/29/2009	Sand/Silt	PC/CKD/BENT	7.5 / 15 / 1.0	28	28.75	114.8	89.1	241.5
0301-026	7/29/2009	Sand/Silt	PC/CKD/BENT	10.0 / 15.0 / 1.0	28	38.74	115.0	82.9	136.8
0301-027	7/29/2009	Sand/Gravel	PC	5.0	28	23.20	124.0	100.7	42.3
0301-028	7/29/2009	Sand/Gravel	PC/BENT	7.5 / 1.0	28	24.75	123.7	99.1	90.2
0301-029	7/29/2009	Sand/Gravel	PC/CKD	7.5 / 10.0	28	26.79	121.1	95.5	85.6
0301-030	7/29/2009	Sand/Gravel	PC/ CKD	10.0 / 10.0	28	27.02	90.1	71.0	166.8
0301-031	7/29/2009	Sand/Gravel	PC/ CKD / BENT	7.5.0 / 10.0 / 1.0	NT	NT	NT	NT	NT
0301-032	7/29/2009	Sand/Gravel	PC/ CKD / BENT	10.0 / 15.0 / 1.0	NT	NT	NT	NT	NT

NT - NOT TESTED
PC - PORTLAND CEMENT
CKD - CEMENT KILN DUST
BENT- BENTONITE

Appendices

Appendix A

New York State Department of Environmental Conservation Order on Consent

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

In the Matter of the Development and Implementation of a Former Manufactured Gas Plant (MGP) Sites Investigation and Remediation Program by New York State Electric & Gas Corporation

ORDER ON CONSENT
Index #D0-0002-9309

WHEREAS:

1. The New York State Department of Environmental Conservation (the "Department") is responsible for enforcement of the Environmental Conservation Law, which, inter alia, requires the Department to carry out the environmental policy of the State set forth of the ECL 1-0101. ECL 3-0301.1.

2. The New York State Electric & Gas Corporation ("Respondent") is a business corporation organized under the laws of the State of New York.

3. Respondent is aware of former manufactured gas plant ("MGP") sites at the locations listed in Table "A" of Paragraph I of this Order at which coal tar and associated hazardous substances ("MGP wastes") were, or which may have been, disposed at various times in the past by Respondent or its predecessors or affiliates (individually, "the Site;" collectively, "the Sites"). Respondent also is the owner of other former MGP sites.

4. The Department asserts that its authority to require abatement and remediation of releases of, inter alia, hazardous substances as that term is defined in 42 U.S.C. 9601(14), including MGP wastes, that are in violation of law or that exceed State environmental quality standards (as those set forth in 6 NYCRR Part 703) ("hazardous substances"), is varied, including, but not limited to, ECL 1-0101, 3-0301, 71-1929, 71-2703, and 71-2705. In addition, the Department asserts that it has the power, inter alia, to provide for the prevention and abatement of all water, land, and air pollution caused by, inter alia, the release of hazardous substances into the environment. ECL 3-0301.1.i. Furthermore, the Department asserts that it has authority to require abatement and remediation of significant threats to the public health or the environment caused by threatened releases of hazardous substances that are hazardous wastes as that term is defined in ECL 27-1301.

5. The Department and Respondent agree that the goals of this Order are for Respondent to (i) gather and provide data pertaining to each of the Sites (other than Mechanicville [Central Avenue] and Owego) sufficient to constitute a Preliminary Site Assessment ("PSA") that will enable the Department to characterize hazardous

substances, as that term is defined in 42 USC 9601(14) (including MGP wastes) which are or may be present at the Site and to enable the Department to determine whether such hazardous substances constitute a significant threat to public health or the environment necessitating remediation; (ii) develop and implement a Remedial Investigation ("RI") and prepare a Feasibility Study ("FS") for any Site the Department determines, based upon the results of the PSA, to require the more comprehensive evaluations and assessments that would be provided through the Remedial Investigation/Feasibility Study ("RI/FS") process; (iii) remediate each Site that the Department determines is in need of remediation on a schedule and to an extent acceptable to the Department, including authorizing Respondent to develop and implement Interim Remedial Measures ("IRMs") that the Department determines to be appropriate; (iv) develop and implement acceptable methods of treating and disposing of nonhazardous coal tar soils ("CTS") that minimize any future impacts on public health and the environment and minimize cost, including, as appropriate, the burning of CTS in Respondent's existing utility steam generating facilities including but not limited to Respondent's Hickling and Jennison Stations; and (v) pay for the State's reasonable administrative and oversight costs associated with implementation of this Order.

6. Respondent, without admitting or denying the Department's authority to require investigation and remediation of hazardous substances at the sites listed in Table "A" of Paragraph I of this Order and having waived its right to a hearing herein as provided by law, and having consented to the issuance and entry of this Order, agrees to be bound by its terms. Respondent consents to and agrees not to contest the authority or jurisdiction of the Department to issue or enforce this Order; and agrees not to contest the validity of this Order or its terms. However, should the Department request that this Order be revised, Respondent reserves all of its rights provided by law and the New York Environmental Conservation Law.

7. Respondent and the Department agree that Respondent shall not be responsible under this Order to investigate, gather data concerning, or remediate those hazardous substances that may exist at or originate from any Site listed in Table "A" of Paragraph I of this Order if, respecting that Site, all the following criteria are met:

a. Respondent no longer owns or controls the Site where the hazardous substances are found;

b. the original disposal and release of the hazardous substances occurred after Respondent or its predecessors or affiliates sold or returned control of the Site to its owner;

c. the hazardous substances were not generated, stored, treated, or disposed at the Site while Respondent or its predecessors or affiliates owned or controlled the Site; and

d. investigation and remediation of the hazardous substances would require Respondent to perform activities and incur costs not necessary to study, characterize, and remediate hazardous substances at the Site that were generated, treated, stored, or disposed at the Site during the ownership or control of Respondent or any of its predecessors or affiliates.

NOW, having considered this matter and being duly advised, IT IS ORDERED THAT:

I. Initial Submittals

Unless otherwise agreed with respect to specific Sites, no later than 45 days after the effective date of this Order, Respondent shall submit to the Department all data and information it has respecting each Site listed in Table "A" of this Paragraph. The data and other information shall include, at a minimum:

A. A brief history and description of the Site, including the types, quantities, physical state, location, and, if applicable, dates of disposal of MGP wastes, including methods of disposal and spillage of such wastes;

B. A comprehensive list and copies of all existing relevant reports with titles, authors, and subject matter, as well as a description of the results of all previous investigations of each Site and areas in the vicinity of each Site, including copies of all available topographic and property surveys, engineering studies and aerial photographs; and

C. An 8.5 inch by 11 inch portion of a United States Geological Survey topographic map of the Site which contains the name of the quadrangle and an arrow indicating the orientation of a northern compass point.

TABLE "A"

1. Auburn (Clark Street)
2. Auburn (Green Street)
3. Auburn (McMaster Street)
4. Clyde
5. Cortland/Homer
6. Dansville
7. Elmira (Madison Avenue)
8. Elmira (Water Street)
9. Geneva (Border City)
10. Geneva (Wadsworth Street)
11. Goshen
12. Granville
13. Ithaca (Cayuga Inlet)

14. Ithaca (Court Street)
15. Ithaca First Street)
16. Lockport (State Road)
17. Lockport (Transit Road)
18. Lyons
19. Mechanicville (Central Avenue)
20. Mechanicville (Coon's Crossing)
21. Newark
22. Norwich
23. Oneonta
24. Owego
25. Palmyra
26. Penn Yan (Jackson Street)
27. Penn Yan (Water Street)
28. Plattsburgh (Bridge Street)
29. Plattsburgh (Saranac Street)
30. Seneca Falls
31. Warsaw
32. Waterloo
33. Waterville

II. Preliminary Site Assessment

A. The Department shall review the data and information Respondent shall submit under Paragraph I of this Order for the purpose of determining whether additional data need to be obtained to enable it to characterize the nature and extent of distribution of any hazardous substances at the Site and to determine whether such substances constitute a significant threat to public health or the environment necessitating remediation. For those Sites pertaining to which the Department determines that there exist sufficient data to enable it to make such characterization and determination, the Department shall inform Respondent of its determination, and if the Department determines that the hazardous substances found at the Site constitute a significant threat to the environment, Respondent shall undertake an RI/FS for such Site as described in this Order. For those Sites pertaining to which the Department determines that more data must be acquired to enable it to make such characterization and determination, the Department shall inform Respondent in writing of its determination and identify the information which must be obtained, and Respondent shall undertake such additional investigation (referred to below as a "Preliminary Site Assessment," or "PSA") as the Department shall require in accordance with a schedule the Department shall determine in consultation with Respondent. Such schedule shall include the date by which Respondent shall submit to the Department a work plan to acquire the information the Department shall require and a date by which field work necessary to develop such information shall commence ("PSA Work Plan").

B. The Department may revise the PSA Work Plan submittal date and the field work start date, or either of them, for any Site identified in Table "A" of Paragraph I if information is developed, or otherwise becomes available, indicating the existence of a condition or circumstance justifying immediate or near-term evaluation or response at that Site which otherwise would not be addressed until a later time.

C. Each Site's PSA Work Plan shall describe the methods and procedures to be implemented in undertaking a study at the Site to which it pertains that will cause the generation of information sufficient to enable the Department to characterize the nature and extent of distribution of any hazardous substances at the Site and to determine whether such substances constitute a significant threat to public health or the environment necessitating remediation. Hence, each Site's PSA Work Plan shall include, but not be limited to, the following:

(1) A chronological description of the anticipated investigative activities together with a schedule for the performance of these activities. Such schedule shall take into account, at a minimum, the submission of draft documents, Department review of such documents, and submission of final approvable documents;

(2) A Sampling and Analysis Plan that shall include:

(a) A quality assurance project plan that describes the quality assurance and quality control protocols necessary to achieve the initial data quality objectives. This plan shall designate a data validation expert and must describe such individual's qualifications and experience, and

(b) A field sampling plan that defines sampling and data gathering methods in a manner consistent with appropriate provisions of the "Compendium of Superfund Field Operations Method" (EPA/540/P-87/001, OSWER Directive 9355.0-14, December 1987) as supplemented by the Department; and

(3) A health and safety plan to protect persons at and in the vicinity of the Site during the performance of the investigation, which shall be prepared in accordance with 29 CFR 1910 and all other applicable standards by a certified health and safety professional. Respondent shall add supplemental items to this plan if necessary to ensure the health and safety of all persons at or in the vicinity of the Site during the performance of any work pursuant to this Order.

D. If after review of the data generated during and after implementation of the Department-approved PSA Work Plan for a particular Site the Department determines that the hazardous substances found at the Site constitute a significant threat to the environment and that response actions are needed in addition to any IRMs the Department may approve or may have approved for the Site under Paragraph III of this Order to address adverse environmental conditions at the Site, the Department shall

notify Respondent of that determination and within 90 days after receipt of that notification, Respondent shall submit to the Department a work plan for that Site that shall incorporate all appropriate elements of an RI/FS as set forth in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA") [42 USC 9601 et seq.], as amended; the National Contingency Plan ("NCP") of March 8, 1990 [40 CFR Part 300]; the USEPA guidance document entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA," dated October 1988 and any subsequent revisions to that guidance document in effect at the time the RI/FS Work Plan is submitted; and appropriate USEPA and Department technical and administrative guidance documents (the "RI/FS Work Plan" for that particular Site). (However, Respondent shall undertake RI/FSs for Mechanicville [Central Avenue] [546033] and Owego [754008] under the terms of, respectively, Department Orders on Consent A5-0276-91-10 dated 23 February 1993 and A7-0150-88-09 dated 2 January 1991.)

III. IRMs

A. (1) Respondent may propose one or more IRMs for any Site. Respondent may propose a treatability study as an IRM.

(2) In proposing each IRM, Respondent shall submit to the Department a work plan that includes a chronological description of the anticipated IRM activities together with a schedule for performance of those activities (an "IRM Work Plan" for that Site).

(3) Upon the Department's determination that the proposal is an appropriate IRM and upon the Department's approval of such work plan, the IRM Work Plan shall be incorporated into and become an enforceable part of this Order; and Respondent shall submit to the Department for its review and (as appropriate) approval, in accordance with the schedule contained in the Department-approved IRM Work Plan, detailed documents and specifications prepared, signed, and sealed by a professional engineer to implement the Department-approved IRM. Such documents shall include a health and safety plan, contingency plan, and (if the Department requires such) a citizen participation plan that incorporates appropriate activities outlined in the Department's publication, "New York State Inactive Hazardous Waste Citizen Participation Plan," dated August 30, 1988, and any subsequent revisions thereto. Respondent shall then carry out such IRM in accordance with the requirements of the approved IRM Work Plan, detailed documents and specifications, and this Order. Respondent shall notify the Department of any significant difficulties that may be encountered in implementing the Department-approved work plan, detailed documents, or specifications and shall not modify any obligation unless first approved by the Department.

(4) During implementation of all construction activities identified in the Department-approved IRM Work Plan, Respondent shall have on-Site a full-time

representative who is qualified to supervise the work done.

(5) Within the schedule contained in the Department-approved IRM Work Plan, Respondent shall submit to the Department a final engineering report prepared by a professional engineer that includes a certification by that individual that all activities that comprised the IRM were performed in full accordance with the Department-approved IRM Work Plan, detailed documents and specifications, and this Order.

(i) If the performance of the Department-approved IRM encompassed construction activities, the final engineering report shall include a detailed post-remedial operation and maintenance plan ("O & M Plan"); "as-built" drawings and a final engineering report (each including all changes made to the Remedial Design during construction); and a certification by a professional engineer that the IRM was implemented and all construction activities were completed in accordance with the Department-approved detailed documents and specifications for the IRM. The O & M Plan, "as built" drawings, final engineering report, and certification must be prepared, signed, and sealed by a professional engineer.

(ii) Upon the Department's approval of the O & M Plan, Respondent shall implement the O & M Plan in accordance with the requirements of the Department-approved O & M Plan.

(6) After receipt of the final engineering report and certification, the Department shall notify Respondent in writing whether the Department is satisfied that the IRM was completed in compliance with the Department-approved IRM Work Plan and design.

B. (1) In implementing any IRM approved by the Department under this Order, Respondent shall be exempt from the requirement to obtain any permit issuable by the Department for an activity satisfying the criteria set out in Subparagraph III.B(2) of this Order.

(2) The following criteria must be met:

(i) The activity is conducted on the Site. For purposes of this Order, an activity is on the Site:

(a) if it is conducted on the same premises as the Site, or

(b) if it is conducted on different premises that are under common control or are contiguous to or physically connected with the Site and the activity manages exclusively hazardous substances for which Respondent is liable (except

in situations where the PSA discloses the existence of off-Site hazardous substance deposits derived from, or otherwise related to materials deposited on-Site, in which case such deposits shall be deemed "on-Site" and subject to this Order to the extent Respondent is able to obtain access for purposes of investigation and/or removal); and

(c) the activity is conducted in a manner which satisfies all substantive technical requirements applicable if the activity were conducted pursuant to a permit issued by the Department.

IV. Performance and Reporting of PSA and of Remedial Investigation

A. (1) In accordance with the schedule contained in a Site's Department-approved PSA Work Plan, Respondent shall commence that Site's PSA.

(2) Respondent shall perform the PSA in accordance with that Site's Department-approved PSA Work Plan.

(3) During the performance of that Site's Department-approved PSA, Respondent shall have at such Site a full-time representative who is qualified to supervise the work done. Respondent's designated representative may be a qualified employee of a consultant or contractor.

(4) In accordance with the schedule contained in a particular Site's Department-approved PSA Work Plan, Respondent shall prepare a PSA Report pertaining to that Site that shall:

(i) include all data generated and all other information obtained during the investigation of that Site;

(ii) provide all appropriate assessments and evaluations set forth in CERCLA, the NCP, and the guidance documents identified in Subparagraph II.D of this Order; and

(iii) include a certification by the individual or firm with primary responsibility for the day to day performance of the PSA for that Site that all activities that comprised the Investigation were performed in full accordance with the Department-approved PSA Work Plan for that Site.

B. This Subparagraph applies only to those Sites identified in Table "A" of Paragraph I of this Order concerning which the Department determines under this Order that an RI/FS must be prepared. (Respondent shall undertake RI/FSs for Mechanicville [Central Avenue] [546033] and Owego [754008] under the terms of, respectively, Department Orders on Consent A5-0276-91-10 dated 23 February 1993 and A7-0150-88-09 dated 2 January 1991.)

(1) In accordance with the schedule contained in a particular Site's Department-approved RI/FS Work Plan, Respondent shall commence that Site's Remedial Investigation.

(2) Respondent shall perform the Remedial Investigation in accordance with that Site's Department-approved RI/FS Work Plan.

(3) During the performance of that Site's Remedial Investigation, Respondent shall have at such Site a full-time representative who is qualified to supervise the work done. Respondent's designated representative may be a qualified employee of a consultant or contractor.

(4) In accordance with the schedule contained in a particular Site's Department-approved RI/FS Work Plan, Respondent shall prepare a Remedial Investigation Report pertaining to that Site that shall:

(i) include all data generated and all other information obtained during the remedial investigation of that Site;

(ii) identify any additional data that must be collected; and

(iii) provide all appropriate assessments and evaluations set forth in CERCLA, the NCP, and the guidance documents identified in Subparagraph II.D of this Order; and

(iv) include a certification by the individual or firm with primary responsibility for the day to day performance of the Remedial Investigation at that Site that all activities that comprised the Remedial Investigation were performed in full accordance with the Department-approved RI/FS Work Plan for that Site.

C. As an element of the Feasibility Study pertaining to a Site, Respondent may undertake a treatability study of remedial alternatives for potential use at such Site, including two EPRI-sponsored demonstration projects, one involving a clean soil process and another involving a contaminated groundwater biotreatment demonstration project (the "study"). The Department agrees with Respondent that the data generated during the course of the study will be beneficial to both Respondent and the Department. In implementing the study, Respondent shall be exempt from the requirement to obtain any permit issuable by the Department for an activity that is conducted on the Site. For purposes of this Order, an activity is on the Site:

1. if it is conducted on the same premises as the Site, or

2. if it is conducted on different premises that are under common control or are contiguous to or physically connected with the Site and the activity

manages exclusively hazardous substance for which Respondent is liable (except in situations where the PSA discloses the existence of off-Site hazardous substance deposits derived from, or otherwise related to materials deposited on-Site, in which case such deposits shall be deemed "on-Site" and subject to this Order and this Subparagraph to the extent Respondent is able to obtain access for purposes of investigation and/or removal); and

3. the activity satisfies all substantive technical requirements applicable to like activity conducted pursuant to a permit as determined by the Department.

Respondent, under the provisions of the Freedom of Information Law, may request that the Department treat as confidential any technology descriptions and data submitted to the Department as part of the study; and the Department, under the provisions of the Freedom of Information Law, shall maintain as confidential any of those descriptions or data that the Department determines is confidential.

V. Feasibility Study

This Paragraph applies only to those Sites identified in Table "A" of Paragraph I of this Order concerning which the Department determines under this Order that an RI/FS must be prepared. (Respondent shall undertake RI/FSs for Mechanicville [Central Avenue] [546033] and Owego [754008] under the terms of, respectively, Department Orders on Consent A5-0276-91-10 dated 23 February 1993 and A7-0150-88-09 dated 2 January 1991.)

A. Within 150 days after receipt of the Department's approval of the Remedial Investigation Report pertaining to a particular Site, Respondent shall submit a Feasibility Study evaluating on-Site and off-Site remedial actions to eliminate, to the maximum extent practicable, all health and environmental hazards and potential hazards attributable to hazardous substance disposal at that Site. Such evaluation may include remediation cleanup levels based upon a Site-specific risk assessment that shall consider a range of exposure scenarios and assumptions that take into account the form, nature, biodegradation, fate, and transport of the contaminant present, and available toxicological data that are based upon generally accepted and peer-reviewed scientific evidence or methodologies. Such Site-specific risk assessment shall be consistent with guidance and regulations for exposure assessment developed by the United States Environmental Protection Agency pursuant to CERCLA and other statutory authorities as applicable; and any proposed remediation cleanup level based upon a Site-specific risk assessment shall be protective of the public health and safety and of the environment. In the event that Respondent intends to undertake such evaluation using a Site-specific risk assessment, Respondent shall submit such risk assessment to the Department for its review no later than 90 days before Respondent shall be required to submit the Feasibility Study for the Site. Unless the Department determines that such risk

assessment is not consistent with peer-reviewed scientific evidence or methodologies, or appropriate guidance and regulations--in which case, the Department shall provide Respondent with a written explanation of the basis for such a determination--the Site-specific risk-based remediation cleanup level determined by application of the risk assessment shall be approved by the Department and shall be used for purposes of selecting the remedial alternative for the Site. Such evaluation also shall take into account any and all Department-approved IRMs that were implemented at the Site. The Feasibility Study shall be prepared by and have the signature and seal of an individual licensed and registered to practice professional engineering in the State of New York who shall certify that the Feasibility Study was prepared in accordance with this Order.

B. Unless the Department otherwise specifies for a particular Site, Respondent shall perform and prepare the Feasibility Study in accordance with the Department-approved RI/FS Work Plan in a manner consistent with appropriate sections of CERCLA, the NCP, and the guidance documents identified in Subparagraph II.D of this Order. If the Department specifies otherwise for a particular Site, Respondent shall perform and prepare the Feasibility Study in accordance with the Department's specifications.

C. (1) Within 30 days after the Department's approval of the Feasibility Study, Respondent shall cooperate and assist the Department in soliciting public comment on the RI/FS and the proposed remedial action plan identified therein, in accordance with appropriate provisions of CERCLA, the NCP, the guidance documents identified in Subparagraph II.D of this Order, and with any Department policy and guidance documents in effect at the time the public comment period is initiated.

(2) The Department shall afford Respondent an opportunity to review and comment upon the proposed remedial action plan for a Site before its release to the public using the following procedure: the Department shall prepare a proposed remedial action plan and shall mail a copy of same to Respondent at least fifteen business days before the scheduled date of the publication of the notice of availability of the document. Respondent shall have ten business days to meet with the Department to discuss it. In the event that Respondent disputes the proposed remedial action plan, within that ten day period, it may request in writing a resolution of its dispute using the procedures contained in Subparagraph XVII.A of this Order. Any resolution of the dispute through the use of those procedures shall concern only the contents of the proposed remedial action plan to be released to the public and shall not preclude the Department from selecting a final remedial alternative for the Site that may be inconsistent with the contents of the proposed remedial action plan that shall have been released to the public.

(3) After the close of the public comment period, the Department shall select a final remedial alternative for the Site in a Record of Decision ("ROD").

The ROD shall be incorporated into and become an enforceable part of this Order.

VI. Remedial Design

This Paragraph applies only to those Sites concerning which the Department determines under this Order that an RI/FS must be prepared, and to Mechanicville (Central Avenue) (546033) and Owego (754008).

A. Unless the ROD selects the "no action" alternative, within 180 days after the ROD is signed, or as otherwise specified in the ROD, Respondent shall submit to the Department a remedial design to implement the remedial alternative for the Site selected by the Department in the ROD (the "Remedial Design"). The Remedial Design shall be prepared by and have the signature and seal of a professional engineer who shall certify that the Remedial Design was prepared in accordance with this Order.

B. The Remedial Design shall include the following:

(1) A detailed description of the remedial objectives and the means by which each essential element of the selected remedial alternative will be implemented to achieve those objectives, including, but not limited to:

(i) the construction and operation of any structures;

(ii) the collection, destruction, treatment, and/or disposal of hazardous substances and their constituents and degradation products, and of any soil or other materials contaminated thereby;

(iii) the collection, destruction, treatment, and/or disposal of contaminated groundwater, leachate, and air;

(iv) physical security and posting of the Site;

(v) health and safety of persons living and/or working at or in the vicinity of the Site;

(vi) quality control and quality assurance procedures and protocols to be applied during implementation of the Remedial Design; and

(vii) monitoring which integrates needs which are present on-Site and off-Site during implementation of the Department-selected remedial alternative.

(2) "Biddable quality" documents for the Remedial Design including, but not limited to, documents and specifications prepared, signed, and sealed

by a professional engineer. These plans shall satisfy all applicable local, state and federal laws, rules and regulations;

(3) A time schedule to implement the Remedial Design;

(4) The parameters, conditions, procedures, and protocols to determine the effectiveness of the Remedial Design, including, if the Remedial Design encompasses groundwater monitoring, a schedule for periodic sampling of groundwater monitoring wells on-Site and off-Site;

(5) A description of operation, maintenance, and monitoring activities to be undertaken after the Department has approved construction of the Remedial Design, including the number of years during which such activities will be performed;

(6) A contingency plan to be implemented if any element of the Remedial Design fails to achieve any of its objectives or otherwise fails to protect human health or the environment;

(7) A health and safety plan for the protection of persons at and in the vicinity of the Site during construction and after completion of construction. This plan shall be prepared in accordance with 29 CFR 1910 by a certified health and safety professional; and

(8) A citizen participation plan which incorporates appropriate activities outlined in the Department's publication, "New York State Inactive Hazardous Waste Citizen Participation Plan," dated August 30, 1988, and any subsequent revisions thereto.

VII. Remedial Construction

This Paragraph applies only to those Sites concerning which the Department determines under this Order that an RI/FS must be prepared, and to Mechanicville (Central Avenue) (546033) and Owego (754008).

A. Within such time as identified in the Department's approval of the Remedial Design (such time being determined in consultation with Respondent), Respondent shall commence construction of the Remedial Design. The Department will extend this period if reasonably necessary to accommodate weather-related limitations or other restrictions upon the construction season.

B. Respondent shall implement the Remedial Design in accordance with the Department-approved Remedial Design.

C. During implementation of all construction activities identified in the Remedial Design, Respondent shall have on-Site a full-time representative who is qualified to supervise the work done.

D. Within 90 days after completion of the construction activities identified in the Remedial Design, Respondent shall submit to the Department a detailed post-remedial operation and maintenance plan ("O & M Plan"); "as-built" drawings and a final engineering report (each including all changes made to the Remedial Design during construction); and a certification by a professional engineer that the Remedial Design was implemented and all construction activities were completed in accordance with the Department-approved Remedial Design. The O & M Plan, "as built" drawings, final engineering report, and certification must be prepared, signed, and sealed by a professional engineer.

E. Upon the Department's approval of the O & M Plan, Respondent shall implement the O & M Plan in accordance with the requirements of the Department-approved O & M Plan.

F. After receipt of the "as-built" drawings, final engineering report, and certification, the Department shall notify Respondent in writing whether the Department is satisfied that all construction activities have been completed in compliance with the approved Remedial Design.

G. If the Department concludes that any element of the Remedial Program fails to achieve its objectives or otherwise fails to protect human health or the environment, Respondent shall take whatever action the Department determines necessary to achieve those objectives or to ensure that the Remedial Program otherwise protects human health and the environment.

VIII. Progress Reports and Meetings

A. Respondent shall submit to each of the parties set forth in Paragraph XVI of this Order two copies of written monthly progress reports that:

1. describe the actions which have been taken toward achieving compliance with this Order during the previous month;

2. identify all work plans, reports, and other deliverables required by this Order that were completed and submitted during the previous month;

3. describe all actions, including, but not limited to, data collection and implementation of work plans, that are scheduled for the next month and provide other information relating to the progress at each Site;

4. include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Respondent's obligations under the Order, and efforts made to mitigate those delays or anticipated delays; and

5. include any modifications to any work plans that Respondent has proposed to the Department or that the Department has approved. Respondent shall submit these progress reports to the Department with respect to each Site by the 10th day after the end of the month to which the report pertains.

B. Respondent shall allow the Department to attend, and shall provide the Department at least seven days advance notice of the occurrence of, any of the following: prebid meetings, job progress meetings, substantial completion meeting and inspection, and final inspection and meeting; provided, however, that if circumstances are such as to prevent Respondent from providing the Department with such seven day notice period, Respondent shall provide as much advance notice as possible, under the circumstances.

IX. Review of Submittals

A. (1) The Department shall review each of the submittals Respondent is required to make pursuant to this Order to determine whether it was prepared, and whether the work done to generate the data and other information in the submittal was done, in accordance with this Order and generally accepted technical and scientific principles. Respondent shall include all results of sampling and tests and all other data received or generated by Respondent or Respondent's contractors or agents, including quality assurance/quality control information, whether conducted pursuant to this Order or conducted independently by Respondent, in the submittal to which such sampling, tests, and other data pertain. The Department shall notify Respondent in writing of its approval or disapproval of the submittal, except for the health and safety plans identified in Paragraph III and in Subparagraphs II.C(3) and VI.B(7) of this Order. All Department-approved submittals shall be incorporated into and become an enforceable part of this Order.

(2) (i) If the Department disapproves a submittal, it shall so notify Respondent in writing and shall specify the reasons for its disapproval. Within 30 days after receiving written notice that Respondent's submittal has been disapproved, Respondent shall make a revised submittal to the Department that addresses and resolves all of the Department's stated reasons for disapproving the first submittal.

(ii) Within a reasonable time after receipt of the revised submittal so as to not cause Respondent to be unable to comply with subsequent obligations and schedule deadlines as presented in Department-approved work plans, the Department shall notify Respondent in writing of its approval or disapproval. If the Department disapproves the revised submittal, Respondent shall be in violation of this

Order and the Department may take any action or pursue whatever rights it has pursuant to any provision of statutory or common law, unless Respondent exercises the dispute resolution procedure described in Subparagraph XVII.A of this Order. If the Department approves the revised submittal, it shall be incorporated into and become an enforceable part of this Order.

B. The Department may require Respondent to modify and/or amplify and expand a submittal if the Department determines, as a result of reviewing data generated by an activity required under this Order or as a result of reviewing any other data or facts, that further work is necessary.

X. Penalties

A. Respondent's failure to comply with any term of this Order constitutes a violation of this Order and the ECL.

B. Respondent shall not suffer any penalty under this Order or be subject to any proceeding or action for enforcement of this Order if it cannot comply with any requirement hereof because of war, riot, or an unforeseeable disaster which the exercise of ordinary human prudence could not have prevented. Respondent shall, within five days of when it obtains knowledge of any such condition, notify the Department in writing. Respondent shall include in such notice the measures taken and to be taken by Respondent to prevent or minimize any delays and shall request an appropriate extension or modification of this Order. Failure to give such notice within such five-day period constitutes a waiver of any claim that a delay is not subject to penalties. Respondent shall have the burden of proving that an event is a defense to compliance with this Order.

XI. Entry upon Site

Subject to conditions that may be described in a particular Site's health and safety plan, Respondent hereby consents to the entry upon the Site or areas in the vicinity of the Site which may be under the control of Respondent by any duly designated employee, consultant, contractor, or agent of the Department or any State agency for purposes of inspection, sampling, and testing and to ensure Respondent's compliance with this Order.

XII. Payment of State Costs

The Department shall establish an interest-bearing account into which the Department shall place all monies received from Respondent under the provisions of this Paragraph in order to pay for the State's expenses (including, but not limited to, direct labor and fringe benefits, overhead, travel, analytical costs, and contractor costs) incurred by the State of New York to fund environmental monitors for work associated with

reviewing and revising submittals made pursuant to this Order, overseeing activities conducted pursuant to this Order, collecting and analyzing samples, and administrative costs associated with administering the requirements of this Order. Respondent shall make payments to the Department as follows:

A. Respondent shall submit to the Department the sum of $310,000, which shall represent the State's estimate of the first year expenses (including, but not limited to, direct labor and fringe benefits, overhead, travel, analytical costs, and contractor costs) incurred by the State of New York to fund environmental monitors for work associated with reviewing and revising submittals made pursuant to this Order to date, overseeing activities conducted pursuant to this Order, collecting and analyzing samples, and administrative costs associated with administering the requirements of this Order. The $310,000 shall be submitted as follows: $110,000 on or before the effective date of this Order; $100,000 on or before the 60th day after the effective date of this Order; and $100,000 on or before the 120th day after the effective date of this Order. Respondent shall make subsequent quarterly payments to the Department for the duration of this Order in order to maintain an account balance sufficient to meet the next nine months' anticipated above-described State costs, however, not exceeding on an annual basis $310,000 (which amount may be increased on an annual basis based upon increases in the Consumer Price Index). Each quarterly billing will be based on expenditures incurred to date. The quarterly billing will take into account matters such as inflation, salary increases, accrued interest to be applied to the balance, changes in operating hours and procedures and the need for additional personnel and supervision of such personnel by full-time supervisors. Costs and expenses to be covered by this account include:

(1) Direct personal service costs and fringe benefits of the State's staff assigned to work associated with reviewing and revising submittals made pursuant to this Order, overseeing activities conducted pursuant to this Order, collecting and analyzing samples, and administrative costs associated with administering the requirements of this Order, including their supervisors and including the costs of replacement personnel for the persons regularly assigned to these duties;

(2) Direct non-personal service costs, including but not limited to purchase of a vehicle if necessary and its full operating costs, any appropriate chemical sampling and analysis, travel, supplies, and contractual costs;

(3) Indirect support or overhead costs at the annually approved indirect support cost rate; and

(4) Consultant services.

B. The Department shall notify Respondent in writing when a quarterly payment is due by submitting a quarterly billing. Respondent shall make such payment

in the form of a check payable to the order of the New York State Department of Environmental Conservation and shall submit such payment to the Department at the following address no later than 30 days from receipt of such billing:

New York State Department of Environmental Conservation
50 Wolf Road, Room 608
Albany, NY 12233-1510
ATTENTION: Director of Environmental Monitors

Payments are to be in advance of the period in which they will be expended. Respondent may dispute a quarterly billing by informing the Department in writing within 30 days of receipt of such billing that the amount of such billing is unreasonable. For purposes of this Order, the sole grounds for determining that a billing is unreasonable are that it contains clerical errors; and that all or a portion of a billing cannot be substantiated by the documentation identified in Subparagraph XII.D or XII.E, as appropriate, of this Order. The procedures contained in Subparagraph XVII.A of this Order shall be used to resolve such dispute, and Respondent shall pay the amount as those procedures shall determine Respondent shall pay, within the time period they shall require.

C. Upon the later termination of this Order and upon payment of any outstanding costs and expenses, the Department shall return the unexpended balance, including interest, to Respondent.

D. Actual personal service costs will be based on Site-specific time and activity ("T&A") costs. Non-personal service costs will be prorated based on the type of cost incurred: general costs (such as, supplies and equipment) will be prorated evenly among the Sites subject to this Order; while other project-related costs will be prorated based on the percentage of T&A incurred for each Site subject to this Order for that time period.

E. Actual costs incurred will be documented by quarterly T&A reports for personal service costs. Copies of actual invoices will not be provided but shall be made available for auditing purposes.

XIII. Department Reservation of Rights

A. Nothing contained in this Order shall be construed as barring, diminishing, adjudicating, or in any way affecting any of the Department's rights.

B. Nothing contained in this Order shall be construed to prohibit the Commissioner or his duly authorized representative from exercising any summary abatement powers.

XIV. Indemnification

Respondent shall indemnify and hold the Department, the State of New York, and their representatives and employees harmless for all claims, suits, actions, damages, and costs of every name and description arising out of or resulting from the fulfillment or attempted fulfillment of this Order by Respondent, and/or Respondent's directors, officers, employees, servants, agents, successors, and assigns; provided, however, that Respondent shall not indemnify the Department, the State of New York, and their representatives and employees in the event that such claim, suit, action, damages, or cost relate to or arise from any unlawful, willful, grossly negligent, or malicious acts or omissions on the part of the Department, the State of New York, or their representatives and employees.

XV. Public Notice

A. Within 30 days after the effective date of this Order with respect to each Site Respondent owns as of the effective date of this Order, or within 30 days after Respondent acquires ownership in any Site, Respondent shall file, with respect to each Site, a Declaration of Covenants and Restrictions with the Clerk of the County within which each such Site is located to give all parties who may acquire any interest in such Site notice of this Order.

B. If Respondent proposes to convey the whole or any part of Respondent's ownership interest in any Site, Respondent shall, not fewer than 60 days before the date of conveyance, notify the Department in writing of the identity of the transferee and of the nature and proposed date of the conveyance of the Site in question and shall notify the transferee in writing, with a copy to the Department, of the applicability of this Order and shall accompany such notification with a copy of this Order.

XVI. Communications

A. All written communications required by this Order shall be transmitted by United States Postal Service, by private courier service, or hand delivered as follows:

Communication from Respondent shall be sent to:

(1) Charles N. Goddard, P.E.
Assistant Director
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

(2) Director, Bureau of Environmental
Exposure Investigation
New York State Department of Health
2 University Place
Albany, New York 12203

(3) Department Regional Director in whose
Region the Site in question is located

(4) Charles E. Sullivan, Jr.
Division of Environmental Enforcement
New York State Department of
Environmental Conservation
50 Wolf Road, Room 609
Albany, New York 12233-5500

B. Copies of work plans and reports shall be submitted as follows:

(1) Six copies (one unbound) to Mr. Goddard

(2) Two copies to the Director, Bureau of
Environmental Exposure Investigation

(3) One copy to Mr. Sullivan

C. Within 30 days of the Department's approval of any report submitted pursuant to this Order, Respondent shall submit to Mr. Goddard a computer readable magnetic media copy of the approved report in American Standard Code for Information Interchange (ASCII) format. This requirement shall not apply to past reports that will be submitted to the Department but have already been completed by Respondent.

D. Communication to be made from the Department to Respondent shall be sent to:

Phillip M. Murphy, Manager--Alternative Methods
Environment & Research Department
New York State Electric & Gas Corporation
Corporate Drive, Kirkwood Industrial Park
P.O. Box 5227
Binghamton, New York 13902-5227

E. The Department and Respondent reserve the right to designate additional or different addressees for communication or written notice to the other.

XVII. Miscellaneous

A. (1) This Subparagraph applies only to those Sites identified in Table "A" of Paragraph I of this Order concerning which the Department determines under this Order that an RI/FS must be prepared.

(2) If after conferring in good faith, there remains a dispute between Respondent and the Department concerning a provision of this Order identified as subject to this Subparagraph's procedures, within the time period provided in that provision Respondent serve on the Department a request for an appointment of an Administrative Law Judge ("ALJ"), and a written statement of the issues in dispute, the relevant facts upon which the dispute is based, and factual data, analysis, or opinion supporting its position, and all supporting documentation on which Respondent relies (hereinafter called the "Statement of Position"). The Department shall serve upon Respondent its Statement of Position, including supporting documentation no later than ten (10) business days after receipt of Respondent's Statement of Position. Respondent shall have five (5) business days after receipt of the Department's Statement of Position within which to serve upon the Department a reply to the Department's Statement of Position, and in the event Respondent serves such a reply, the Department shall have five (5) business days after receipt of Respondent's reply to the Department's Statement of Position within which to serve upon Respondent the Department's reply to Respondent's reply to the Department's Statement of Position. In the event that the periods for exchange of Statements of Position and replies may cause a delay in the work being performed under this Order, the time periods may be shortened upon and in accordance with notice by the Department as agreed to by Respondent.

(3) The Department shall maintain an administrative record of any dispute being addressed under this Subparagraph. The record shall include the Statement of Position of each party served pursuant to Subparagraph XVII.A(2) and any relevant information. The record shall be available for review of all parties and the public.

(4) Upon review of the administrative record as developed pursuant to this Subparagraph, the ALJ shall issue a final decision and order resolving the dispute. If the matter in dispute concerns a submittal,

(i) Respondent shall revise the submittal in accordance with the Department's specific comments, as may be modified by the ALJ and except for those which have been withdrawn by the ALJ, and shall submit a revised submittal. The period of time within which the submittal must be revised as specified by the Department in its notice of disapproval shall control unless the ALJ revises the time frame in the ALJ's final decision and order resolving the dispute.

(ii) After receipt of the revised submittal, the Department

shall notify Respondent in writing of its approval or disapproval of the revised submittal.

(iii) If the revised submittal fails to address the Department's specific comments, as may be modified by the ALJ, and the Department disapproves the revised submittal for this reason, Respondent shall be in violation of this Order and the ECL.

(5) In review by the ALJ of any dispute pursued under this Subparagraph, Respondent shall have the burden of proving by a preponderance of the evidence that the Department's position should not prevail.

(6) a deadline involving any matter that is the subject of the dispute resolution process described in this Subparagraph shall be held in abeyance while it is the subject of the dispute resolution process unless the Department and Respondent otherwise agree in writing. The invocation of the procedures stated in this Subparagraph shall constitute an election of administrative remedies by Respondent, and such election of this remedy shall constitute a waiver of any and all other administrative remedies which may otherwise be available to Respondent regarding the issue in dispute.

B. All activities and submittals required by this Order shall address both on-Site and off-Site contamination resulting from the disposal of hazardous substances at each Site.

C. Respondent shall retain professional consultants, contractors, laboratories, quality assurance/quality control personnel, and data validators acceptable to the Department to perform the technical, engineering, and analytical obligations required by this Order. Within 30 days after completion of Respondent's retainer process resulting in the selection of a particular firm or individual to perform any of such obligations, Respondent shall submit to the Department a summary of the experience, capabilities, and qualifications of the firm or individual retained. Respondent must obtain the Department's approval of these firms or individuals before the initiation of any activities for which Respondent and such firms or individuals will be responsible.

D. The Department shall have the right to obtain split samples, duplicate samples, or both, of all substances and materials sampled by Respondent, and the Department also shall have the right to take its own samples. Respondent shall have the right to obtain split samples, duplicate samples, or both, of all substances and materials sampled by the Department, and Respondent also shall have the right to take its own samples. Respondent shall make available to the Department the results of all sampling and/or tests or other data generated by Respondent with respect to implementation of this Order, including a tabular summary of any such results in any report submitted pursuant to this Order requiring such results.

E. Respondent shall notify the Department at least 10 working days in

advance of any field activities to be conducted pursuant to this Order. The Department's project manager is hereby authorized to approve any modification to an activity to be conducted under a Department-approved work plan in order to adapt the activities to be undertaken under such work plan to the conditions actually encountered in the field.

F. Respondent shall use reasonable efforts to obtain whatever permits, easements, rights-of-way, rights-of-entry, approvals, or authorizations are necessary to perform Respondent's obligations under this Order. If Respondent is unable, after exhaustion of such reasonable efforts, to obtain any such permissions, the Department will exercise whatever authority is available to it, in its discretion, to obtain same. In no event will Respondent be determined to be in violation of this Order if it fails to obtain any such permissions after exhausting reasonable efforts to obtain same. This is in recognition of the fact that, with respect to certain Sites, the New York State Electric and Gas Corporation is the current owner of only part of the potential area of disposal of MGP wastes, and may in fact, as to certain Sites, not be the owner of any portion of the Site. Significant impediments may, therefore, be encountered as to Respondent's ability to obtain access for purposes of carrying out the requirements of this Order.

G. If Respondent determines, in connection with any given Site, that a valid claim exists in favor of Respondent as against any other potentially responsible party, for contribution toward response costs deemed necessary by the Department in connection with such Site (or for recovery of an appropriate portion of such costs previously incurred by Respondent), the Department shall provide, in a timely manner, information responsive to any reasonable request (otherwise in conformity with Freedom of Information Law requirements) by such party related to conditions at the Site and any other relevant information that may be helpful in substantiating Respondent's claim. Similarly, if Respondent requests access to non-privileged and otherwise disclosable information in the Department's possession and relevant to the potential liability of any person or entity who may be subject to such claim by Respondent for contribution or cost recovery, the Department will take reasonable steps to expedite Respondent's access to such information.

H. Respondent and its successors and assigns shall be bound by this Order. Any change in ownership or corporate status of Respondent including, but not limited to, any transfer of assets or real or personal property shall in no way alter Respondent's responsibilities under this Order. Respondent's officers, directors, employees, servants, and agents shall be obliged to comply with the relevant provisions of this Order in the performance of their designated duties on behalf of Respondent.

I. Respondent shall provide a copy of this Order to each contractor hired to perform work required by this Order and to each person representing Respondent with respect to the Site and shall condition all contracts entered into hereunder upon performance in conformity with the terms of this Order. Respondent or Respondent's contractors shall provide written notice of this Order to all subcontractors hired to

perform any portion of the work required by this Order. Respondent shall nonetheless be responsible for ensuring that Respondent's contractors and subcontractors perform the work to be done under this Order in accordance with this Order.

J . All references to "professional engineer" in this Order are to an individual licensed and registered to practice professional engineering in accordance with Article 145 of the New York State Education Law.

K. All references to "days" in this Order are to calendar days unless otherwise specified.

L. The section headings set forth in this Order are included for convenience of reference only and shall be disregarded in the construction and interpretation of any of the provisions of this Order.

M. (1) The terms of this Order shall constitute the complete and entire Order between Respondent and the Department concerning the Site. No term, condition, understanding, or agreement purporting to modify or vary any term of this Order shall be binding unless made in writing and subscribed by the party to be bound. No informal advice, guidance, suggestion, or comment by the Department regarding any report, proposal, plan, specification, schedule, or any other submittal shall be construed as relieving Respondent of Respondent's obligation to obtain such formal approvals as may be required by this Order. However, in the event that Respondent determines that it cannot continue burning CTS at either its Jennison Station or Hickling Station, then Respondent may request that the Department modify its obligations regarding the Sites listed in Table "A" of Paragraph I of this Order. The Department's decision on whether to grant Respondent's request shall not be unreasonably denied and shall consider, but not be limited to, Respondent's costs of proceeding with its obligations under this Order.

(2) If Respondent desires that any provision of this Order be changed, Respondent shall make timely written application, signed by the Respondent, to the Commissioner setting forth reasonable grounds for the relief sought. Copies of such written application shall be delivered or mailed to Messrs. Goddard and Sullivan.

N. The effective date of this Order shall be the date it is signed by the Commissioner or his designee.

DATED: Albany, New York
March 30, 1994

J. LANGDON MARSH
Acting Commissioner
New York State Department
of Environmental Conservation

CONSENT BY RESPONDENT

Respondent hereby waives its right to a hearing herein as provided by law; consents to the issuance and entry of this Order; and agrees to be bound by its terms, not to contest the authority or jurisdiction of the Department to issue or enforce this Order, and not to contest the validity of this Order or its terms.

NEW YORK STATE ELECTRIC & GAS CORPORATION

by: Vincent W Rider

Typed name of signer: Vincent W. Rider

Title of signer: Vice President - Electric Generation

Date signed: March 25, 1994

STATE OF NEW YORK)
) ss:
COUNTY OF Broome)

On this 25th day of March, 1994, before me personally appeared Vincent W. Rider, to me known, who, being duly sworn, did depose and say that he resides in Endicott, New York; that he is Vice President - Electric Generation of the New York State Electric & Gas Corporation; that he executed the foregoing instrument on behalf of the New York State Electric & Gas Corporation; that he knew the seal of said corporation; that the seal affixed to said instrument was such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; and that he signed his name thereto by like order.

Gail A. Marion
Notary Public State of New York
Registration number: 5003473
My commission expires: 10/26/94

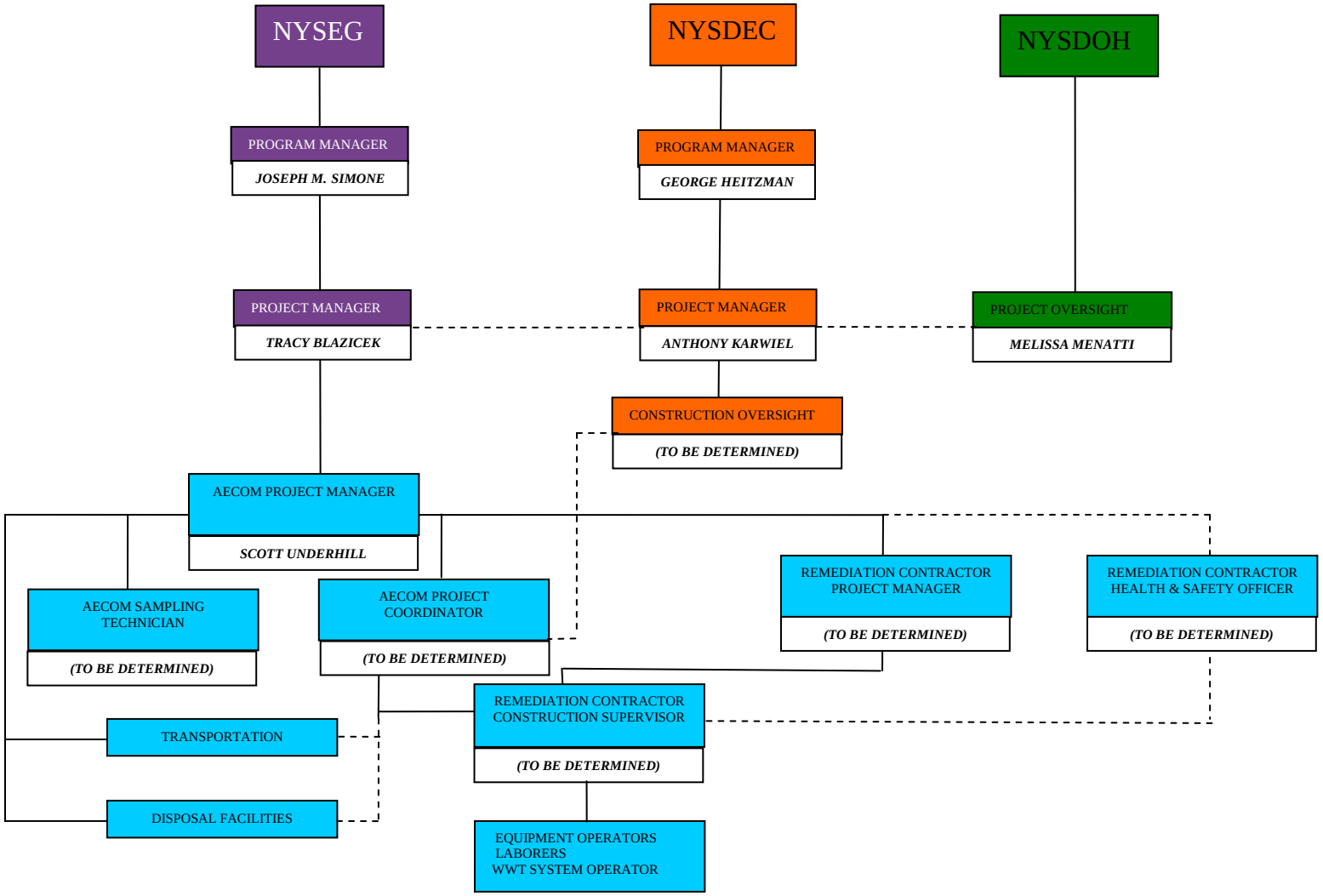
GAIL A. MARION
Notary Public, State of New York
No. 5003473
Residing in Broome County
My commission expires Oct 26 19 94

(oNYSEG2.cst)

Appendix B

Organization Structure

ORGANIZATIONAL STRUCTURE FOR REMEDIATION ACTIVITIES AT NORWICH FORMER MANUFACTURED GAS PLANT SITE



Appendix C

Citizen Participation Plan

Final Phase 1
Remedial Design Report
Citizen Participation Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
New York State Department of Environmental Conservation
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Final Phase 1
Remedial Design Report
Citizen Participation Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
NYSDEC
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
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James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Author: Scott T. McDonough

Title: Environmental Engineer

Date: May 6, 2010

Reviewer: Scott Underhill, P.E.

Title: Project Manager

Date: May 6, 2010

Table of Contents

1.0 INTRODUCTION

New York State Electric & Gas Corporation (NYSEG) is preparing to implement a Remedial Action Design involving the excavation and In-Situ Solidification (ISS) of coal tar impacted soil associated with the Norwich former manufactured gas plant (MGP) site located in Norwich, Chenango County, New York. This *Citizen Participation Plan (CPP)* will detail citizen participation activities that will be implemented for this remediation project.

The proposed *Remedial Action Design* will involve excavation and ISS of coal tar impacted soil and debris. 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). 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).

2.0 REMEDIAL ACTION OBJECTIVES

The primary objectives of the remedial action, as required by the Record of Decision (ROD) issued March 2008, include:

- Remediate, to the extent practicable, areas containing source material;
- Eliminate potential exposure to source material;
- Control future migration of source material from on-site to off-site areas;
- Eliminate potential human exposure to subsurface soil containing MGP-related contamination; and
- Eliminate potential human exposure to groundwater containing MGP-related contamination.

Further, the remediation goals for the site include attaining to the extent practicable:

- Ambient groundwater quality standards.

3.0 INTERESTED/AFFECTED PUBLIC

A mailing list has been developed that includes adjacent property owners and businesses, local and state elected officials, local media, and other identified interested parties. Names can be added to the mailing list by contacting any of the individuals listed below in Section 5.0 (Additional Information), or by completing an "interested party mailer" that is included with all NYSEG mailings for this site.

4.0 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 the NYSDEC and the NYSDOH, will inform the public and local officials of planned remedial activities. Public participation will include at least the following:

- Distribution to those identified in Section 3.0 of this document of a fact sheet prepared by either the NYSDEC or NYSEG describing the planned remedial activities.
- The *Remedial Action Design* will be available for public review a minimum of 30 days prior to the public availability session.
- A public availability session will be held by the NYSDEC, in conjunction with the NYSDOH and NYSEG, prior to *Remedial Action Design* finalization, to describe the planned activities at the site.
- Posting a phone number for public to call with any questions or concerns that may arise during the project.

Notice of public availability session will be provided by either the NYSDEC or NYSEG via mailing list and notices through the local media.

5.0 ADDITIONAL INFORMATION

For additional information about this project you may contact any of the following individuals:

NYSEG:

Mr. Joseph M. Simone, P.E. Manager - Compliance
NYSEG
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224
Binghamton, New York 13902
Phone: (607) 762-7498
Cellular Phone: (607) 427-7498
E-mail: jmsimone@nyseg.com

Mr. Tracy Blazicek, CHMM: Remediation Project Manager
James A. Carrigg Center, 18 Link Drive, P.O. Box 5224
Binghamton, New York 13902
Phone: (607) 762-8839
Cellular Phone: (607) 237-5325
E-mail: tlblazicek@nyseg.com

NYSDEC:

Mr. Anthony Karwiel: Site Project Manager
NYSDEC
625 Broadway
Albany, New York 12233-7014
Phone: (518) 402-9662
E-mail: alkarwie@gw.dec.state.ny.us

NYSDOH:

Melissa Menetti: Public Health Specialist
NYSDOH
547 River Street
Troy, New York 12180-2216
Phone: (518) 402-7860
E-mail: mxm29@health.state.ny.us

Appendix D

Transportation of Solid and/or Liquid Material

Final Phase 1
Remedial Design Report
Transportation Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
New York State Department of Environmental Conservation
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Final Phase 1
Remedial Design Report
Transportation Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
NYSDEC
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Author: Scott T. McDonough

Title: Environmental Engineer

Date: May 6, 2010

Reviewer: Scott Underhill, P.E.

Title: Project Manager

Date: May 6, 2010

Table of Contents

1.0 SCOPE OF WORK

This Specification is for the transportation of solid or liquid non-hazardous and hazardous waste associated with the Norwich former manufactured gas plant (MGP) site in the City of Norwich, Chenango, 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 (NYSDEC) Regulations, and any other applicable Federal, State, and Local Laws.

2.0 WORK BY TRANSPORTATION CONTRACTOR

The transportation 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 the 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 the 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 MGP site residuals.

3.6 The transporter shall adhere to the following rules while working on a MGP site project and waste disposal facility:

3.6.1 Any truck found unacceptable by the NYSEG project coordinator or the contractor health & safety officer will be rejected. Any cost for rejected trucks shall be born by the transporter. If the NYSDEC project oversight finds any truck unacceptable, they should bring it to the attention of the NYSEG project coordinator.

3.6.2 The truck drivers will report their arrival to the 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 MGP site project without express permission from the NYSEG project coordinator.

3.6.4 Truck drivers will don **HARD HATS, SAFETY GLASSES, and STEEL TOE BOOTS,** as a minimum for personal protection.

3.6.5 The drivers of all trucks and roll off containers transporting hazardous solid waste or conditionally exempt MGP 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 the tailgate.

3.6.6 All trucks require working audible and visual backup signals.

3.6.7 When loading or when directed by the NYSEG project coordinator, the truck engine should be shut off. Trucks 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) of waste.

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 MGP site projects.

3.6.16 No passengers are allowed 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 Eating, and/or drinking is not permitted. Eating, and/or drinking are permitted in designate areas of the Support Zone.

3.6.20 Smoking is not allowed on NYSEG Properties.

3.6.21 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

The truck route for arrival and departure at the Norwich former MGP site will be as follows:

- **Arrival:** From US Route 12 (south); turn left (east) on East Main Street; turn right (south) onto Birdsall Street; enter site from Truck Gate on Birdsall Street.

- **Departure from Site:** Exit the site by the Truck Gate; turn left (north) onto Birdsall Street; proceed north to intersection with East Main Street; turn left (west) onto East Main Street; proceed to US Route 12.

- **Arrival to Site from Service Center:** Exit the service center by the Truck Gate; turn right (south) onto County Route 32; proceed south on Country Route 32 to intersection with County Route 32A; turn right (west) onto County Route 32A; turn right (north) onto Birdsall Street; enter site from Truck Gate on Birdsall Street.

- **Departure from Site to Service Center:** Exit the site by the Truck Gate; turn right (south) onto Birdsall Street; proceed south to intersection with County Route 32A; turn left (east) onto County Route 32A; turn left (north) onto County Route 32; enter service center from Truck Gate on County Route 32.

Appendix E

Pre-Design Investigation Soil Sampling & Analysis

AECOM
40 British American Blvd, Latham, New York 12110
T 518.951.2200 F 518.951.2300 www.aecom.com

Mr. Tracy Blazicek
Project Manager
NYSEG Corporation
18 Link Drive, PO Box 5224
Binghamton, New York 13902

May 28, 2009

Subject: Pre-Design Investigation Soil Sampling & Analysis and In-Situ Solidification Treatability Study
Former Norwich MGP Site (Birdsall Road)
Norwich, New York (ET #106404.0002)

Sent via Email

Dear Mr. Blazicek:

AECOM, Inc. (AECOM) is pleased to submit this letter summarizing the pre-design investigation that occurred at the former Norwich manufactured gas plant (MGP) site in the spring of 2009. The work was conducted in general accordance with the approved "Remedial Design Work Plan" prepared by AECOM for NYSEG Environmental Compliance and dated February 2009. As indicated in the work plan, the objective of the sampling event was to characterize coal tar-impacted soil at the subject site, located at 24 Birdsall Road in Norwich, New York and selected off-site soils, located along Front Street.

Field Sampling Summary

AECOM and its contractor, Paragon Environmental Construction, Inc. (PEC), mobilized to the site and installed a total of 33 soil borings between March 30th and April 3rd, 2009 using a track-mounted Geoprobe® and Hollow Stem Augers (HSA). Soil boring locations are depicted on Figure 1. All 33 samples were collected using a 2-inch diameter Macro-Core® sampler with 4-foot long disposable acetate liners. As designed in the "Remedial Design Work Plan", the site was separated into two distinct sections: the on site and the off site in-situ solidified areas. 26 soil samples were collected from the on site in-situ solidified area and 7 soil samples were collected from the off site in-situ solidified area. All 33 soil borings were completed to 6-feet below ground surface (bgs) with four borings advanced to 24 feet for the In-Situ Solidification (ISS) Treatability Study utilizing HSA and 3-inch split-spoons samplers. Soil characteristics like odor, highest photo ionization detector (PID) reading, staining were noted on field documentation by an AECOM geologist. Boring logs were completed and have been provided in Attachment A.

Description of soil and screening for the presence of volatile organic compounds (VOCs) was completed by cutting open the acetate liners containing the soils, placing the inlet of the PID near the soil and collecting readings at intervals of approximately 6 inches across the entire length of the sample, allowing for readings to stabilize at each interval while completing the soil description. For each soil boring, soils were collected from 2 foot intervals from 0 to 6 feet bgs and placed in 1 quart plastic bag for headspace screening. Soil from the 2 foot interval with the highest PID reading was collected for analysis of VOCs. The soil collected in the three 1 quart plastic bags were then combined into one 2.5 gallon plastic bag and mixed together by hand until thoroughly

homogenized. This homogenized soil was then used to collect a composite sample of soils from 0 to 6 feet bgs for waste characterization.

In conjunction with collecting soil samples for the waste characterization, soils were also collected from the four borings advanced to 24 feet for the ISS Treatability Study. From these four borings, a series of samples were collected to test the soil for in-situ solidification of the on site and off site areas. Two Shelby tubes and one 4 foot Macro-Core® were used to collect undisturbed soil samples from the two prominent soil types (i.e., alluvial and glacial lacustrine) and the upper most fill layer. Samples of finer (the upper section) and coarser (the lower section) glacial lacustrine deposits and the middle of the alluvium deposits were collected for grain size analysis. These samples were collected utilizing HSA methodology and 3 inch split spoons, so blow counts were documented for every 6 inches of the ISS borings. While advancing the augers and the split spoons to the necessary depth for collecting the Shelby tubes and the grain size analysis samples, soil from each of the three soil types was collected and composited into two 5 gallon buckets for each of the three soil types. Bucket tops were places on top of the 5 gallon buckets to minimize any loss through volatilization while completing the borings. Upon collecting enough soil to fill the two 5 gallon buckets, composite samples from each of the three soil types were collected to analyze for VOCs USEPA 8260B, semi-volatile organic compounds (SVOCs) USEPA 8270C, and total Cyanide USEPA 9012A.

All samples collected for analysis of VOCs, SVOCs, total Cyanide and waster characterization were labeled, packed in coolers with ice, and shipped via FedEx to Test America in Amherst, NY the day the samples were collected. Samples were shipped under standard chain-of-custody procedures and submitted for standard turnaround on the analyses. All other ISS samples (i.e., grain size analysis, Shelby tubes, Macro-Core® and the 5 gallon buckets) were shipped to Kemron Environmental Services in Atlanta, Georgia. .

Analytical Results

The analytical results are used to designate how the excavated sections of soil will be handled and to demonstrate the ability of the ISS 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** – Non-hazardous soil without visible evidence of staining and has been sampled *ex situ* and determined to have total polycyclic aromatic hydrocarbons (PAHs) concentrations below 500 ppm (Table 2 shows the list of individual PAHs included in the total).
- **Non-hazardous Waste** – Coal tar soil found not to exceed the toxicity characteristic leaching procedure (TCLP) limits or reactivity limits (Table 3 shows the limits) but have total PAHs concentrations exceeding 500 ppm.
- **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.

All 33 samples were submitted for a complete suite of waste characterization analyses, as indicated in the Work Plan, which included the following:

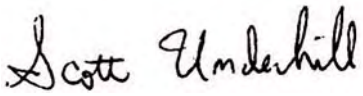
- VOC TCL US EPA Method 8260B
- SVOC TCL US EPA Method 8270C
- Metals (8 RCRA) US EPA Method 6010B/7471A
- Total Cyanide US EPA Method 9010
- TPH 8100 or 8015DRO
- Total PCBs US EPA Method 8082
- % Sulfur ASTM D129-64
- BTU Content ASTM D240-87 (<100 BTU/pound det. limits)
- TCLP VOCs US EPA Method 1311/8260B
- TCLP SVOCs US EPA Method 1311/8270C
- TCLP Metals US EPA Method 1311/6010B/7470A
- TCLP Pest/Herb US EPA Method 1311/8151A/8081A

- Flashpoint (ignitability) US EPA Method 1010
- Percent solids
- pH US EPA Method 9045C
- Paint Filter
- Reactivity

As stated in the Work Plan, no Quality Assurance/Quality Control samples were collected during the waste characterization sampling. Analytical Results, summarized in Table 4, indicate that soil from all 33 sample locations can be classified as **Subsurface Fill** and can be reused on site except for from four sample locations. Soil from sample locations PDI-4, PDI-15, PDI-16, and PDI-25 can not be reused on site and have to be removed from the site because NAPL was visually identified in the soil samples collected from these locations.

Should you have any questions, please contact me at (518) 951-2200.

Yours sincerely,



Scott Underhill
Project Manager
scott.underhill@aecom.com

L:\work\106404\DOCS\Waste Characterization Transmittal letter

Tables

Table 1
Pre-Remediation Investigation
Former Norwich MGP Site
Norwich, New York

Soil Classification: Reuse on site or Remove from site

Sample Location	Total BTEX (ppm)	Total PAHs (ppm)	Visual NAPL	Soil to be reused on-site(1)
PDI-1	0.0012	33.84	No	Yes
PDI-2	0	7.98	No	Yes
PDI-3	0	10.19	No	Yes
PDI-4	1.852	53.68	Yes	No
PDI-5	0	48.12	No	Yes
PDI-6	0.004	1.95	No	Yes
PDI-7	0.074	16.18	No	Yes
PDI-8	0	1.36	No	Yes
PDI-9	0	1.77	No	Yes
PDI-10	0	1.05	No	Yes
PDI-11	0	7.77	No	Yes
PDI-12	0	42.13	No	Yes
PDI-13	0	14.45	No	Yes
PDI-14	0	0.57	No	Yes
PDI-15	0	13.42	Yes	No
PDI-16	0	2.83	Yes	No
PDI-17	0	6.65	No	Yes
PDI-18	0	4.51	No	Yes
PDI-19	0	0.30	No	Yes
PDI-20	0	0.87	No	Yes
PDI-21	0	3.14	No	Yes
PDI-22	0	4.78	No	Yes
PDI-23	0	1.90	No	Yes
PDI-24	0	2.55	No	Yes
PDI-25	0	1.15	Yes	No
PDI-26	0	2.71	No	Yes
PDI-27	0	0.63	No	Yes
PDI-28	0	1.13	No	Yes
PDI-29	0	0.65	No	Yes
PDI-30	0	0.17	No	Yes
PDI-31	0	0.22	No	Yes
PDI-32	0	0.71	No	Yes
PDI-33	0	2.31	No	Yes

Notes:
(1) Soil can be reused on-site if Total BTEX < 10 (ppm) or Total PAHs < 500 (ppm) or no Visual NAPL.
PDI - Pre-Design Investigation
BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes
PAHs - Polycyclic Aromatic Hydrocarbons
PPM - Parts Per Million
NAPL - Non Aqueous Phase Liquid

Table 2
Listing of Polycyclic Aromatic Hydrocarbons
Included in Total PAH Summation

Naphthalene
2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Dibenzofuran
Pyrene
Benzo (A) Anthracene
Chrysene
Benzo (B) Fluoranthene
Benzo (K) Fluoranthene
Benzo (A) Pyrene
Indeno (1,2,3 CD) Pyrene
Dibenzo (A, H) Anthracene
Benzo (G, H, I) Perylene

Table 3
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
2,4,6-Trichlorophenol	2.0
Vinyl chloride	0.2
Other Analytes	**Regulatory Limits (units noted)**
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 4
Pre-Remediation Investigation
Former Norwich MGP Site
Norwich, New York

Analytical Results

Sample ID			PDI-1		PDI-2		PDI-3		PDI-4		PDI-5		PDI-6		PDI-7		PDI-8		PDI-9		PDI-10		PDI-11		PDI-12		PDI-13		PDI-14		PDI-15		PDI-16		PDI-17
Sample Composite Interval (feet)	Disposal		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'
Date Collected:	Criteria	Units	03/31/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		03/30/2009		03/30/2009		03/30/2009		03/30/2009		03/30/2009		03/30/2009		03/30/2009		03/31/2009		03/30/2009		03/30/2009		03/30/20
Volatile Organic Compounds (VOCs)																																		
1,1,1-Trichloroethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
1,1,2,2-Tetrachloroethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
1,1,2-Trichloroethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
1,1-Dichloroethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
1,1-Dichloroethene	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
1,2-Dichloroethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
1,2-Dichloroethene, Total	NA	µg/kg	10	U	10	U	17	U	10	U	10	U	12	U	12	U	10	U	11	U	10	U	11	U	12	U	11	U	12	U	12	U	12	U	11
1,2-Dichloropropane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
2-Butanone	NA	µg/kg	26	U	26	U	42	U	25	U	26	U	31	U	30	U	25	U	26	U	25	U	27	U	30	U	27	U	29	U	31	U	29	U	28
2-Hexanone	NA	µg/kg	26	U	26	U	42	U	25	U	26	U	31	U	30	U	25	U	26	U	25	U	27	U	30	U	27	U	29	U	31	U	29	U	28
4-Methyl-2-pentanone	NA	µg/kg	26	U	26	U	42	U	25	U	26	U	31	U	30	U	25	U	26	U	25	U	27	U	30	U	27	U	29	U	31	U	29	U	28
Acetone	NA	µg/kg	**6.3**	**J**	**6.4**	**J**	**16**	**J**	**20**	**J**	26	U	**13**	**J**	**29**	**J,B**	**6.8**	**J,B**	26	U	**7.2**	**J,B**	**7.9**	**J,B**	**8.0**	**J,B**	**6.4**	**J,B**	29	U	**15**	**J,B**	**44**	**B**	**19**
Benzene	NA	µg/kg	**1.2**	**J**	5.2	U	8.5	U	**10**		5.1	U	**3.1**	**J**	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Bromodichloromethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Bromoform	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Bromomethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Carbon disulfide	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Carbon Tetrachloride	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Chlorobenzene	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Chloroethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Chloroform	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Chloromethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
cis-1,3-Dichloropropene	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Dibromochloromethane	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Ethylbenzene	NA	µg/kg	5.2	U	5.2	U	8.5	U	**800**		5.1	U	6.1	U	9.9		5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Methylene Chloride	NA	µg/kg	**3.8**	**J**	**6.8**	**B**	**19**		**15**		**6.5**		6.1	U	**10**		**10**		**10**		**14**		**14**		**20**		**16**		**4.6**	**J**	**5.2**	**J**	**8.9**		**11**
Methyl-t-Butyl Ether (MTBE)	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Styrene	NA	µg/kg	5.2	U	5.2	U	8.5	U	**73**		5.1	U	6.1	U	**13**		5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Tetrachloroethene	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Toluene	NA	µg/kg	5.2	U	5.2	U	8.5	U	**42**		5.1	U	**1.2**	**J**	**2.1**	**J**	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
trans-1,3-Dichloropropene	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Trichloroethene	NA	µg/kg	5.2	U	5.2	U	8.5	U	5.0	U	5.1	U	6.1	U	5.9	U	5.0	U	5.3	U	5.1	U	5.3	U	6.0	U	5.4	U	5.9	U	6.1	U	5.8	U	5.5
Vinyl acetate	NA	µg/kg	26	U	26	U	42	U	25	U	26	U	31	U	30	U	25	U	26	U	25	U	27	U	30	U	27	U	29	U	31	U	29	U	28
Vinyl chloride	NA	µg/kg	10	U	10	U	17	U	10	U	10	U	12	U	12	U	10	U	11	U	10	U	11	U	12	U	11	U	12	U	12	U	12	U	11
Xylenes, total	NA	µg/kg	10	U	10	U	17	U	**1000**		10	U	12	U	**72**		10	U	11	U	10	U	11	U	12	U	11	U	12	U	12	U	12	U	11
Total BTEX	10,000	µg/kg	1.2		0		0		**1,852**		0		**4**		**74**		0		0		0		0		0		0		0		0		0		0
Semivolatile Organics (SVOCs)																																		
1,2,4-Trichlorobenzene	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
1,2-Dichlorobenzene	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
1,3-Dichlorobenzene	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
1,4-Dichlorobenzene	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
2,2'-Oxybis(1-Chloropropane)	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2,4,5-Trichlorophenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2,4,6-Trichlorophenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2,4-Dichlorophenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2,4-Dimethylphenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2,4-Dinitrophenol	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
2,4-Dinitrotoluene	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2,6-Dinitrotoluene	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2-Chloronaphthalene	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2-Chlorophenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2-Methylnaphthalene	NA	µg/kg	**580**	**J**	2000	U	**86**	**J**	**6200**		**4700**		8900	U	**3300**		**16**	**J**	**50**	**J**	**17**	**J**	**40**	**J**	10000	U	3700	U	210	U	2000	U	200	U	1100
2-Methylphenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
2-Nitroaniline	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U,L	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
2-Nitrophenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
3 & 4 Methylphenol	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
3,3'-Dichlorobenzidine	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
3-Nitroaniline	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
4,6-Dinitro-2-methylphenol	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
4-Bromophenyl phenyl ether	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
4-Chloro-3-methylphenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
4-Chloroaniline	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100

Table 4
Pre-Remediation Investigation
Former Norwich MGP Site
Norwich, New York

Analytical Results

Sample ID Sample Composite Interval (feet) Date Collected:	Disposal Criteria	Units	PDI-1 0-6' 03/31/2009		PDI-2 0-6' 03/31/2009		PDI-3 0-6' 03/31/2009		PDI-4 0-6' 03/31/2009		PDI-5 0-6' 03/31/2009		PDI-6 0-6' 03/31/2009		PDI-7 0-6' 03/30/2009		PDI-8 0-6' 03/30/2009		PDI-9 0-6' 03/30/2009		PDI-10 0-6' 03/30/2009		PDI-11 0-6' 03/30/2009		PDI-12 0-6' 03/30/2009		PDI-13 0-6' 03/30/2009		PDI-14 0-6' 03/31/2009		PDI-15 0-6' 03/30/2009		PDI-16 0-6' 03/30/2009		PDI-17 0-6' 03/30/20
4-Chlorophenyl phenyl ether	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
4-Nitroaniline	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
4-Nitrophenol	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
Acenaphthene	NA	µg/kg	3800	U	2000	U	1900	U	**1300**	**J**	**710**	**J**	8900	U	**280**	**J**	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	110
Acenaphthylene	NA	µg/kg	**2200**	**J**	**540**	**J**	**530**	**J**	**3600**	**J**	**3900**		8900	U	**910**		**56**	**J**	**68**	**J**	**41**	**J**	**470**		**1400**	**J**	**770**	**J**	210	U	**240**	**J**	**270**		**330**
Anthracene	NA	µg/kg	**720**	**J**	**200**	**J**	**300**	**J**	**2600**	**J**	**2800**		8900	U	**710**	**J**	**30**	**J**	**36**	**J**	**29**	**J**	**140**	**J**	**630**	**J**	**230**	**J**	210	U	**200**	**J**	**44**	**J**	**180**
Benzo(a)anthracene	NA	µg/kg	**2800**	**J,B**	**840**	**J,B**	**980**	**J,B**	**2500**	**J**	**3200**	**B**	**680**	**J,B**	**1100**		**93**	**J**	**150**	**J**	**78**	**J**	**500**		**2600**	**J**	**1200**	**J**	**20**	**J**	**1500**	**J**	**160**	**J**	**400**
Benzo(a)pyrene	NA	µg/kg	**5400**		**1100**	**J**	**1400**	**J**	**2700**	**J**	**3700**		**660**	**J**	**1100**		**200**		**240**		**130**	**J**	**920**		**5400**	**J**	**2300**	**J**	**26**	**J**	**1700**	**J**	**410**		**560**
Benzo(b)fluoranthene	NA	µg/kg	**4000**	**B**	**930**	**J,B**	**1100**	**J,B**	**2900**	**J**	**3000**	**B**	**610**	**J,B**	**940**		**180**	**J**	**310**		**160**	**J**	**1100**		**5700**	**J**	**1900**	**J**	**35**	**J**	**1700**	**J**	**260**		**400**
Benzo(ghi)perylene	NA	µg/kg	**3900**		**940**	**J**	**1100**	**J**	**1100**	**J**	**2900**		8900	U	**530**	**J**	**140**	**J**	**220**		**130**	**J**	**1100**		**5100**	**J**	**2100**	**J**	**18**	**J**	**1000**	**J**	**540**		**530**
Benzo(k)fluoranthene	NA	µg/kg	**1800**	**J,B**	**390**	**J,B**	**520**	**J,B**	3700	U	**1300**	**J,B**	8900	U	**420**	**J**	**63**	**J**	200	U	190	U	250	U	10000	U	**840**	**J**	210	U	**680**	**J**	**86**	**J**	**170**
Benzoic acid	NA	µg/kg	110000	U	56000	U	54000	U	100000	U	50000	U	250000	U	25000	U	5000	U	5800	U	5300	U	6900	U	290000	U	110000	U	6000	U	57000	U	5700	U	30000
Benzyl alcohol	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
Bis(2-chloroethoxy)methane	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Bis(2-chloroethyl)ether	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Bis(2-ethylhexyl) phthalate	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	**140**	**J**	10000	U	3700	U	210	U	2000	U	200	U	1100
Butyl benzyl phthalate	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Chrysene	NA	µg/kg	**2400**	**J,B**	**620**	**J,B**	**820**	**J,B**	**1900**	**J**	**2700**	**B**	8900	U	**780**	**J**	**92**	**J**	**150**	**J**	**78**	**J**	**500**		**2400**	**J**	**1200**	**J**	**15**	**J**	**1100**	**J**	**180**	**J**	**400**
Dibenzo(a,h)anthracene	NA	µg/kg	**780**	**J**	**93**	**J**	**260**	**J**	3700	U	**620**	**J**	8900	U	**150**	**J**	180	U	**67**	**J**	**29**	**J**	**260**		**1200**	**J**	**520**	**J**	210	U	**330**	**J**	**110**	**J**	1100
Dibenzofuran	NA	µg/kg	3800	U	2000	U	1900	U	**520**	**J**	**590**	**J**	8900	U	**330**	**J**	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Diethyl phthalate	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Dimethyl phthalate	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Di-n-butyl phthalate	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Di-n-octyl phthalate	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Fluoranthene	NA	µg/kg	**2800**	**J**	**930**	**J**	**1200**	**J**	**4300**		**5400**		8900	U	**2000**		**140**	**J**	**190**	**J**	**100**	**J**	**560**		**2300**	**J**	**1100**	**J**	210	U	**1900**	**J**	**150**	**J**	**580**
Fluorene	NA	µg/kg	**380**	**J**	**77**	**J**	**140**	**J**	**2800**	**J**	**2200**		8900	U	**830**	**J**	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	**18**	**J**	1100
Hexachlorobenzene	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Hexachlorobutadiene	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Hexachlorocyclopentadiene	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Hexachloroethane	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Indeno(1,2,3-cd)pyrene	NA	µg/kg	**2700**	**J**	**740**	**J**	**910**	**J**	**960**	**J**	**2200**		8900	U	**500**	**J**	**120**	**J**	**180**	**J**	**99**	**J**	**830**		**3800**	**J**	**1600**	**J**	**20**	**J**	**970**	**J**	**470**		**400**
Isophorone	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Naphthalene	NA	µg/kg	**480**	**J**	**110**	**J**	**240**	**J**	**15000**		**6400**		8900	U	**1500**		180	U	**47**	**J**	**99**	**J**	**62**	**J**	10000	U	3700	U	210	U	2000	U	200	U	1100
Nitrobenzene	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
N-Nitrosodi-n-propylamine	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
N-Nitrosodiphenylamine	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Pentachlorophenol	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
Phenanthrene	NA	µg/kg	**1100**	**J**	**340**	**J**	**900**	**J**	**9300**		**8700**		8900	U	**2200**		**87**	**J**	**92**	**J**	**59**	**J**	**200**	**J**	**1500**	**J**	**420**	**J**	**15**	**J**	**490**	**J**	**21**	**J**	**170**
Phenol	NA	µg/kg	3800	U	2000	U	1900	U	3700	U	1800	U	8900	U	880	U	180	U	200	U	190	U	250	U	10000	U	3700	U	210	U	2000	U	200	U	1100
Pyrene	NA	µg/kg	**5700**		**1400**	**J**	**1800**	**J**	**5900**		**7200**		8900	U	**2800**		**190**		**250**		**160**	**J**	**850**		**3900**	**J**	**1800**	**J**	**15**	**J**	**2000**	**J**	**280**		**970**
Pyridine	NA	µg/kg	7400	U	3800	U	3700	U	7100	U	3500	U	17000	U	1700	U	350	U	400	U	370	U	480	U	20000	U	7200	U	410	U	3900	U	390	U	2100
Total PAHs	500,000	µg/kg	**33,840**		**7,980**		**10,186**		**53,680**		**48,120**		**1,950**		**16,180**		**1,360**		**1,768**		**1,050**		**7,772**		**42,130**		**14,460**		**569**		**13,420**		**2,828**		**6,650**
Diesel Range Organics (DRO)																																					
Diesel range organics		mg/kg	**190**	**B**	**83**	**J,B**	**85**	**J,B**	**220**	**B**	**190**	**B**	**93**	**B**	**330**	**B**	**76**	**J,B**	91	U	84	U	**120**	**B**	**240**	**B**	**100**	**B**	**88**	**J,B**	**230**	**B**	**150**	**B**	**100**
Polychlorinated Biphenyls (PCBs)																																					
Total Polychlorinated Biphenyls		µg/kg	16	U	14	U	14	U	14	U	14	U	15	U	15	U	12	U	14	U	17	U	21	U	19	U	14	U	19	U	16	U	15	U	**140**
Total Metals																																					
Arsenic	NA	mg/kg	**11.2**		**12.7**		**9.8**		**9.5**		**9.3**		**7.6**		**5.7**		**9.8**		**10.2**		**10.4**		**11.4**		**8.3**		**9.5**		**7.8**		**6.2**		**10.6**		**8.0**
Barium	NA	mg/kg	**51.1**		**55.9**		**49.0**		**44.4**		**55.6**		**40.2**		**40.6**		**60.8**		**50.3**		**48.6**		**76.2**		**43.2**		**50.2**		**51.9**		**45.0**		**49.4**		**51.0**
Cadmium	NA	mg/kg	**0.196**	**J**	**0.205**	**J**	**0.177**	**J**	0.234	U	**0.171**	**J**	**0.174**	**J**	0.213	U	0.217	U	0.228	U	0.238	U	0.274	U	0.257	U	0.224	U	0.245	U	0.265	U	1.22	J,D0	0.268
Chromium	NA	mg/kg	**16.5**		**17.5**		**17.3**		**16.8**		**14.9**		**16.3**		**14.8**		**17.0**		**19.8**		**18.6**		**21.5**		**14.4**		**14.7**		**18.8**		**12.9**		**17.1**		**16.7**
Lead	NA	mg/kg	**20.6**		**17.8**		**17.1**		**16.1**		**33.2**		**14.6**		**13.9**		**18.1**		**21.5**		**16.1**		**28.9**		**32.1**		**32.8**		**20.2**		**27.3**		**11.7**		**13.6**
Mercury	NA	mg/kg	**0.0429**		**0.0379**		**0.0333**		**0.0437**		**0.0912**		**0.0263**		**0.0326**		**0.0331**		**0.0331**		**0.0236**		**0.0544**		**0.0626**		**0.0573**		**0.0292**		**0.138**		**0.0317**		**0.0418**
Selenium	NA	mg/kg	4.6	U	4.3	U	4.3	U	4.7	U	4.1	U	4.2	U	4.3	U	4.3	U	**0.7**	**J**	4.8	U	5.5	U	5.1	U	4.5	U	4.9	U	5.3	U	4.9	U	5.4
Silver	NA	mg/kg	0.580	U	0.537	U	0.540	U	0.585	U	0.515	U	0.523	U	0.534	U	0.541	U	0.569	U	0.594	U	0.686	U	0.643	U	0.559	U	0.612	U	0.661	U	0.608	U	0.670
General Chemistry Parameters																																					
% Sulfate		%	0.0568	U	0.0581	U	0.0568	U	0.0549	U	0.0532	U	**0.417**		0.106	U	0.0892	U	0.122	U	0.112	U	0.145	U	0.122	U	0.111	U	0.127	U	0.122	U	0.122	U	0.128
% Sulfur		%	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	**0.129**		0.0333	U	0.0282	U	0.0333	U	0.0333	U	0.0333	U	0.0333	U	0.0333	U	0.0333	U	0.0333	U	0.0333	U	0.0333
BTU Content		BTU/lb	334		549		334		519		502		412		597		216		467		530		813		576		623		710		576		684		833
Ignitability (Flashpoint)	> 140	ºF	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176
Cyanide	NA	mg/kg	1.0	U	1.1	U	1.0	U	**1.7**		0.9	U	1.1	U	1.0	U	1.0	U	1.1	U	1.1	U	1.4	U	0.9	U	1.0	U	1.2	U	**2.9**		1.2	U	1.1
H2S Released From Waste	NA	mg/kg	10.0	J	20.0		20.0		10.0		70.2		10.0	U	10.0		50.1		10.0		10.0		10.0		10.0		10.0		10.0		20.0		10.0		20.0
HCN Released From Waste	NA	mg/kg	1.62	J	0.120	J	0.120	J	0.120	J	0.120	J	15.1		0.120	J	0.800	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120

Table 4
Pre-Remediation Investigation
Former Norwich MGP Site
Norwich, New York

Analytical Results

Sample ID Sample Composite Interval (feet) Date Collected:	Disposal Criteria	Units	PDI-1 0-6' 03/31/2009		PDI-2 0-6' 03/31/2009		PDI-3 0-6' 03/31/2009		PDI-4 0-6' 03/31/2009		PDI-5 0-6' 03/31/2009		PDI-6 0-6' 03/31/2009		PDI-7 0-6' 03/30/2009		PDI-8 0-6' 03/30/2009		PDI-9 0-6' 03/30/2009		PDI-10 0-6' 03/30/2009		PDI-11 0-6' 03/30/2009		PDI-12 0-6' 03/30/2009		PDI-13 0-6' 03/30/2009		PDI-14 0-6' 03/31/2009		PDI-15 0-6' 03/30/2009		PDI-16 0-6' 03/30/2009		PDI-17 0-6' 03/30/20
Paint Filter Test	Pass		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed
Percent Solids	> 20	%	88		86		88		91		94		93		94		95		82		89		69		82		90		79		82		82		78
Corrosivity (pH)	> 2 or < 12.5		7.92		8.26		7.87		8.69		7.79		8.20		6.47		7.70		8.01		8.12		8.25		7.60		7.93		8.02		7.52		8.60		8.13
TCLP Volatile Organic Compounds (VOCs)																																						
1,1-Dichloroethene	700	µg/kg	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
1,2-Dichloroethane	500	µg/kg	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
2-Butanone (MEK)	NA	µg/kg	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50
Benzene	500	µg/kg	10	U	10	U	10	U	10	U	**2.1**	**J**	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Carbon Tetrachloride	500	µg/kg	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Chlorobenzene	100000	µg/kg	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Chloroform	6000	µg/kg	**20**	**B**	**20**	**B**	**22**	**B**	**26**	**B**	**21**	**B**	**24**	**B**	**19**	**B**	**17**	**B**	**17**	**B**	**17**	**B**	**17**	**B**	**17**	**B**	**18**	**B**	**23**	**B**	**17**	**B**	**15**	**B**	**19**
Tetrachloroethene	700	µg/kg	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Trichloroethene	500	µg/kg	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
Vinyl chloride	200	µg/kg	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10
TCLP Semivolatile Compounds (SVOCs)																																						
1,4-Dichlorobenzene	NA	µg/kg	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	**2.6**	**J**	40	U	40	U	40	U	40
2,4,5-Trichlorophenol	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
2,4,6-Trichlorophenol	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
2,4-Dinitrotoluene	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
2-Methylphenol	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
3 & 4 Methylphenol	NA	µg/kg	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40
Hexachlorobenzene	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
Hexachlorobutadiene	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
Hexachloroethane	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
Nitrobenzene	NA	µg/kg	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20
Pentachlorophenol	NA	µg/kg	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40
Pyridine	NA	µg/kg	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100
TCLP Metals																																						
Arsenic	5	mg/L	0.0100	U	**0.0053**	**J,B**	**0.0052**	**J,B**	**0.0100**	**U**	**0.0051**	**J,B**	**0.0052**	**J,B**	**0.0047**	**J**	0.0100	U	**0.0088**	**J**	**0.0055**	**J**	0.0100	U	**0.0085**	**J**	**0.0066**	**J**	0.0100	U	**0.0126**		**0.0126**		**0.0094**	
Barium	100	mg/L	**0.434**	**B**	**0.335**	**B**	**0.455**	**B**	**0.355**	**B**	**0.416**	**B**	**0.352**	**B**	**0.372**	**B**	**0.330**	**B**	**0.373**	**B**	**0.390**	**B**	**0.355**	**B**	**0.382**	**B**	**0.404**	**B**	**0.401**	**B**	**0.513**	**B**	**0.419**	**B**	**0.469**	
Cadmium	1	mg/L	**0.0010**	**J**	**0.0006**	**J**	**0.0006**	**J**	**0.0005**	**J**	**0.0006**	**J**	**0.0006**	**J**	**0.0005**	**J**	**0.0009**	**J**	0.0010	U	0.0010	U	0.0010	U	**0.0004**	**J**	**0.0006**	**J**	**0.0007**	**J**	**0.0005**	**J**	0.0010	U	0.0010	U
Chromium	5	mg/L	**0.0016**	**J**	**0.0032**	**J**	**0.0056**		**0.0012**	**J**	**0.0024**	**J**	**0.0047**		**0.0049**		**0.0040**	**J**	**0.0126**		**0.0074**		**0.0036**	**J**	**0.0133**		**0.0082**		**0.0046**		**0.0172**		**0.0199**		**0.0192**	
Lead	5	mg/L	**0.0041**	**J**	**0.0037**	**J**	**0.0056**	**J**	**0.0060**	U	**0.0173**		**0.0052**	**J**	**0.0061**		0.0060	U	**0.0104**		**0.0052**	**J**	0.0060	U	**0.0256**		**0.0101**		**0.0072**		**0.0579**		**0.0141**		**0.0160**	
Mercury	0.2	mg/L	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002
Selenium	1	mg/L	0.0150	U	0.0150	U	0.0150	U	0.0150	U	**0.0068**	**J**	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150
Silver	5	mg/L	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030
TCLP Herbicides																																						
2,4-D		µg/kg	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50
Silvex [2,4,5-TP]		µg/kg	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50
TCLP Pesticides																																						
Chlordane	30	µg/kg	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0
Endrin	20	µg/kg	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
gamma-BHC (Lindane)		µg/kg	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Heptachlor	8	µg/kg	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	**0.064**	**J**	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Heptachlor epoxide	400	µg/kg	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Methoxychlor	10000	µg/kg	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20
Toxaphene	500	µg/kg	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0

Notes:
U = Not detected above method of detection
B = Compound detected in laboratory method blank
J = Estimated concentration
D = Concentration determined by dilution
NA = Not Applicable

Table 4
Pre-Remediation Investigation
Former Norwich MGP Site
Norwich, New York

Analytical Results

Sample ID				PDI-18		PDI-19		PDI-20		PDI-21		PDI-22		PDI-23		PDI-24		PDI-25		PDI-26		PDI-27		PDI-28		PDI-29		PDI-30		PDI-31		PDI-32		PDI-33	
Sample Composite Interval (feet)	Disposal			0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'	
Date Collected:	Criteria	Units	09	03/30/2009		03/30/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		04/01/2009		03/31/2009		03/31/2009		03/31/2009		04/03/2009		03/31/2009		04/01/2009		04/01/2009		04/03/2009	
Volatile Organic Compounds (VOCs)																																	
1,1,1-Trichloroethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
1,1,2,2-Tetrachloroethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
1,1,2-Trichloroethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
1,1-Dichloroethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
1,1-Dichloroethene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
1,2-Dichloroethene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
1,2-Dichloroethene, Total	NA	µg/kg	U	11	U	12	U	13	U	12	U	12	U	11	U	10	U	12	U	11	U	12	U	12	U	14	U	11	U	12	U	11	U	11	U
1,2-Dichloropropane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
2-Butanone	NA	µg/kg	U	27	U	30	U	32	U	30	U	29	U	27	U	25	U	29	U	27	U	30	U	29	U	35	U	28	U	30	U	27	U	29	U
2-Hexanone	NA	µg/kg	U	27	U	30	U	32	U	30	U	29	U	27	U	25	U	29	U	27	U	30	U	29	U	35	U	28	U	30	U	27	U	29	U
4-Methyl-2-pentanone	NA	µg/kg	U	27	U	30	U	32	U	30	U	29	U	27	U	25	U	29	U	27	U	30	U	29	U	35	U	28	U	30	U	27	U	29	U
Acetone	NA	µg/kg	**J,B**	**6.4**	**J,B**	30	U	32	U	**9.4**	**J**	**13**	**J**	27	U	**6.6**	**J**	29	U	27	U	**9.6**	**J**	29	U	35	U	28	U	30	U	27	U	29	U
Benzene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Bromodichloromethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Bromoform	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Bromomethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Carbon disulfide	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Carbon Tetrachloride	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Chlorobenzene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Chloroethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Chloroform	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Chloromethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
cis-1,3-Dichloropropene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Dibromochloromethane	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Ethylbenzene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Methylene Chloride	NA	µg/kg		**12**		**14**		**11**		**12**		**11**		**8.6**		**8.1**		**16**		**13**		**6.3**	**B**	**2.6**	**J**	**5.5**	**J**	**1.9**	**J,B**	**8.3**	**B**	**8.2**	**B**	**17**	
Methyl-t-Butyl Ether (MTBE)	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Styrene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Tetrachloroethene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Toluene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
trans-1,3-Dichloropropene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Trichloroethene	NA	µg/kg	U	5.4	U	6.0	U	6.4	U	6.1	U	5.9	U	5.3	U	5.0	U	5.9	U	5.3	U	6.0	U	5.8	U	7.0	U	5.6	U	5.9	U	5.4	U	5.7	U
Vinyl acetate	NA	µg/kg	U	27	U	30	U	32	U	30	U	29	U	27	U	25	U	29	U	27	U	30	U	29	U	35	U	28	U	30	U	27	U	29	U
Vinyl chloride	NA	µg/kg	U	11	U	12	U	13	U	12	U	12	U	11	U	10	U	12	U	11	U	12	U	12	U	14	U	11	U	12	U	11	U	11	U
Xylenes, total	NA	µg/kg	U	11	U	12	U	13	U	12	U	12	U	11	U	10	U	12	U	11	U	12	U	12	U	14	U	11	U	12	U	11	U	11	U
Total BTEX	10,000	µg/kg		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
Semivolatile Organics (SVOCs)																																	
1,2,4-Trichlorobenzene	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
1,2-Dichlorobenzene	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
1,3-Dichlorobenzene	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
1,4-Dichlorobenzene	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
2,2'-Oxybis(1-Chloropropane)	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2,4,5-Trichlorophenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2,4,6-Trichlorophenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2,4-Dichlorophenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2,4-Dimethylphenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2,4-Dinitrophenol	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
2,4-Dinitrotoluene	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2,6-Dinitrotoluene	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2-Chloronaphthalene	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2-Chlorophenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2-Methylnaphthalene	NA	µg/kg	U	990	U	200	U	200	U	210	U	20	J	180	U	3800	U	4100	U	180	U	210	U	**23**	**J**	210	U	190	U	200	U	210	U	2000	U
2-Methylphenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
2-Nitroaniline	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
2-Nitrophenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
3 & 4 Methylphenol	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
3,3'-Dichlorobenzidine	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
3-Nitroaniline	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
4,6-Dinitro-2-methylphenol	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
4-Bromophenyl phenyl ether	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
4-Chloro-3-methylphenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
4-Chloroaniline	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U

Table 4
Pre-Remediation Investigation
Former Norwich MGP Site
Norwich, New York

Analytical Results

Sample ID				PDI-18		PDI-19		PDI-20		PDI-21		PDI-22		PDI-23		PDI-24		PDI-25		PDI-26		PDI-27		PDI-28		PDI-29		PDI-30		PDI-31		PDI-32		PDI-33	
Sample Composite Interval (feet)				0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'	
Date Collected:	Disposal Criteria	Units	09	03/30/2009		03/30/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		04/01/2009		03/31/2009		03/31/2009		03/31/2009		04/03/2009		03/31/2009		04/01/2009		04/01/2009		04/03/2009	
4-Chlorophenyl phenyl ether	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
4-Nitroaniline	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
4-Nitrophenol	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
Acenaphthene	NA	µg/kg	J	990	U	200	U	200	U	210	U	16	J	180	U	3800	U	4100	U	180	U	210	U	**45**	**J**	210	U	190	U	200	U	210	U	2000	U
Acenaphthylene	NA	µg/kg	**J**	**460**	**J**	**55**	**J**	**41**	**J**	**70**	**J**	**290**		**100**	**J**	3800	U	4100	U	180	U	140	J	210	U	**16**	**J**	**20**	**J**	200	U	210	U	2000	U
Anthracene	NA	µg/kg	**J**	**100**	**J**	**12**	**J**	**27**	**J**	**52**	**J**	**130**	**J**	**52**	**J**	3800	U	4100	U	180	U	**48**	**J**	**83**	**J**	**22**	**J**	190	U	200	U	**20**	**J**	**100**	**J**
Benzo(a)anthracene	NA	µg/kg	**J**	990	U	200	U	**130**	**J**	**350**		**460**		**230**		400	J	**280**	**J,B**	**7.1**	**J**	**23**	**J,B**	**98**	**J,B**	**82**	**J**	**18**	**J,B**	**32**	**J,B**	**88**	**J,B**	**380**	**J**
Benzo(a)pyrene	NA	µg/kg	**J**	**460**	**J**	**29**	**J**	**110**	**J**	**470**		**590**		**240**		460	J	**220**	**J**	180	U	**25**	**J**	**77**	**J**	**85**	**J**	**16**	**J**	**30**	**J**	**91**	**J**	**250**	**J**
Benzo(b)fluoranthene	NA	µg/kg	**J**	**290**	**J**	**26**	**J**	**170**	**J**	**490**		**870**		**300**		280	J	**260**	**J,B**	180	U	**23**	**J,B**	**77**	**J,B**	**79**	**J**	**20**	**J,B**	**45**	**J,B**	**90**	**J,B**	**270**	**J**
Benzo(ghi)perylene	NA	µg/kg	**J**	**550**	**J**	**88**	**J**	**57**	**J**	**300**		**390**		**130**	**J**	**200**	**J**	**160**	**J**	180	U	**270**		**37**	**J**	**43**	**J**	**36**	**J**	**22**	**J**	**56**	**J**	**140**	**J**
Benzo(k)fluoranthene	NA	µg/kg	**J**	**140**	**J**	**200**	**U**	200	U	**210**	**J**	200	U	180	U	**280**	**J**	4100	U	180	U	**210**	**U**	**36**	**J,B**	**49**	**J**	**190**	**U**	**11**	**J,B**	**40**	**J,B**	**180**	**J**
Benzoic acid	NA	µg/kg	U	28000	U	5800	U	5600	U	6000	U	5600	U	5000	U	110000	U	120000	U	5100	U	5900	U	5800	U	5900	U	5400	U	5700	U	6000	U	57000	U
Benzyl alcohol	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
Bis(2-chloroethoxy)methane	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Bis(2-chloroethyl)ether	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Bis(2-ethylhexyl) phthalate	NA	µg/kg	U	990	U	200	U	200	U	95	J	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Butyl benzyl phthalate	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Chrysene	NA	µg/kg	**J**	**320**	**J**	200	U	**110**	**J**	**340**		**550**		**250**		**320**	**J**	4100	U	180	U	**16**	**J,B**	**87**	**J,B**	**86**	**J**	**14**	**J,B**	**28**	**J,B**	**94**	**J,B**	**310**	**J**
Dibenzo(a,h)anthracene	NA	µg/kg	U	**130**	**J**	**22**	**J**	200	U	**120**	**J**	**110**	**J**	**37**	**J**	3800	U	4100	U	180	U	210	U	15	J	210	U	190	U	200	U	20	J	2000	U
Dibenzofuran	NA	µg/kg	U	56	J	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	29	J	210	U	190	U	200	U	210	U	2000	U
Diethyl phthalate	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Dimethyl phthalate	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Di-n-butyl phthalate	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Di-n-octyl phthalate	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Fluoranthene	NA	µg/kg	**J**	**460**	**J**	200	U	**150**	**J**	**420**		**760**		**320**		**370**	**J**	4100	U	180	U	**25**	**J**	**230**		**160**	**J**	**23**	**J**	**42**	**J**	**160**	**J**	**550**	**J**
Fluorene	NA	µg/kg	U	990	U	200	U	200	U	210	U	**47**	**J**	**15**	**J**	3800	U	4100	U	180	U	210	U	44	J	210	U	190	U	200	U	210	U	2000	U
Hexachlorobenzene	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Hexachlorobutadiene	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Hexachlorocyclopentadiene	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Hexachloroethane	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Indeno(1,2,3-cd)pyrene	NA	µg/kg	**J**	**450**	**J**	**69**	**J**	**58**	**J**	**270**		**330**		**100**	**J**	**160**	**J**	4100	U	180	U	**62**	**J**	**34**	**J**	**41**	**J**	**16**	**J**	**15**	**J**	**52**	**J**	**130**	**J**
Isophorone	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Naphthalene	NA	µg/kg	U	990	U	200	U	200	U	210	U	**28**	**J**	180	U	3800	U	4100	U	180	U	210	U	**33**	**J**	210	U	190	U	200	U	210	U	2000	U
Nitrobenzene	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
N-Nitrosodi-n-propylamine	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
N-Nitrosodiphenylamine	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Pentachlorophenol	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
Phenanthrene	NA	µg/kg	**J**	**450**	**J**	200	U	**67**	**J**	**160**	**J**	**500**		**190**		**240**	**J**	4100	U	180	U	**16**	**J**	**300**		**110**	**J**	**18**	**J**	**18**	**J**	**87**	**J**	**520**	**J**
Phenol	NA	µg/kg	U	990	U	200	U	200	U	210	U	200	U	180	U	3800	U	4100	U	180	U	210	U	210	U	210	U	190	U	200	U	210	U	2000	U
Pyrene	NA	µg/kg	**J**	**560**	**J**	200	U	**170**	**J**	**470**		**950**		**450**		**450**	**J**	**230**	**J**	180	U	**25**	**J**	**200**	**J**	**150**	**J**	**27**	**J**	**40**	**J**	**160**	**J**	**550**	**J**
Pyridine	NA	µg/kg	U	1900	U	400	U	390	U	410	U	390	U	340	U	7400	U	7900	U	350	U	410	U	400	U	410	U	370	U	390	U	410	U	3900	U
Total PAHs	500,000	µg/kg		**4,506**		**301**		**873**		**3,142**		**4,781**		**1,904**		**2,550**		**1,150**		**2,707**		**632**		**1,128**		**653**		**167**		**223**		**711**		**2,310**	
Diesel Range Organics (DRO)																																	
Diesel range organics		mg/kg	**J,B**	**110**	**B**	**110**	**B**	**93**	**J,B**	**130**	**B**	**110**	**B**	**72**	**J,B**	**120**	**B**	99	U	**73**	**J,B**	**100**	**J,B**	**91**	**J,B**	**120**	**B**	87	U	**87**	**J,B**	**96**	**J,B**	**93**	**B**
Polychlorinated Biphenyls (PCBs)																																	
Total Polychlorinated Biphenyls		µg/kg		**1000**		19	U	15	U	21	U	14	U	14	U	17	U	20	U	16	U	15	U	19	U	14	U	17	U	16	U	19	U	14	U
Total Metals																																	
Arsenic	NA	mg/kg		**5.5**		**7.0**		**5.3**		**6.2**		**7.2**		**7.2**		**6.8**		**6.3**		**4.6**		**7.8**		**4.3**		**12.8**		**6.6**		**6.8**		**6.2**		**8.8**	
Barium	NA	mg/kg		**44.0**		**38.6**		**49.1**		**46.0**		**118**		**49.4**		**92.2**		**42.7**		**50.1**		**97.0**		**135**		**124**		**101**		**79.7**		**71.6**		**86.2**	
Cadmium	NA	mg/kg	U	0.240	U	0.242	U	0.247	U	0.241	U	**0.352**		0.225	U	**0.203**	**J**	**0.188**	**J**	0.199	U	**0.252**		**0.146**	**J**	**0.323**		**0.214**	**J**	**0.181**	**J**	**0.205**	**J**	**0.213**	**J**
Chromium	NA	mg/kg		**14.8**		**16.2**		**14.8**		**16.4**		**16.6**		**14.5**		**12.4**		**12.1**		**12.2**		**15.0**		**18.6**		**19.5**	**B**	**14.7**		**17.7**		**16.0**		**18.1**	**B**
Lead	NA	mg/kg		**31.0**		**10.7**		**52.5**		**53.4**		**223**		**48.8**		**147**		**33.9**		**10.2**		**102**		**10.3**		**141**		**82.3**		**33.2**		**54.8**		**83.8**	
Mercury	NA	mg/kg		**0.0405**		**0.0401**		**0.120**		**0.111**		**0.342**		**0.151**		**0.0945**		**0.0811**		**0.0313**		**0.145**		**0.0610**		**0.417**		**0.0902**		**0.0500**		**0.0761**		**0.211**	
Selenium	NA	mg/kg	U	4.8	U	4.8	U	4.9	U	4.8	U	**0.7**	**J**	4.5	U	4.8	U	**0.8**	**J**	4.0	U	5.0	U	4.5	U	5.0	U	**1.3**	**J**	**1.0**	**J**	5.0	U	**1.0**	**J**
Silver	NA	mg/kg	U	0.599	U	0.604	U	0.618	U	0.602	U	**0.103**	**J**	0.563	U	**0.106**	**J**	0.584	U	0.498	U	0.621	U	0.559	U	0.623	U	0.579	U	0.570	U	0.621	U	0.603	U
General Chemistry Parameters																																	
% Sulfate		%	U	0.116	U	0.123	U	0.118	U	0.125	U	0.118	U	0.0532	U	0.0562	U	0.0610	U	0.0538	U	0.0633	U	0.0610	U	0.0574	U	0.0568	U	0.0602	U	0.0641	U	0.0567	U
% Sulfur		%	U	0.0333	U	0.0333	U	0.0333	U	0.0333	U	0.0333	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U	0.0166	U
BTU Content		BTU/lb		342		583		241		590		765		407		330		467		603		710		467		379		536		569		377		2750	
Ignitability (Flashpoint)	> 140	ºF	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>	176	>
Cyanide	NA	mg/kg	U	1.0	U	1.2	U	1.0	U	1.1	U	1.1	U	1.0	U	1.0	U	1.1	U	1.0	U	1.1	U	1.1	U	1.1	U	1.1	U	1.0	U	0.9	U	1.1	U
H2S Released From Waste	NA	mg/kg		10.0		0.2	U	10.0		30.1		10.0		20.0		10.0		20.0		20.0		20.0		20.0		10.0	J	10.0	J	20.0		20.0		20.0	
HCN Released From Waste	NA	mg/kg	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J	0.120	J

Table 4
Pre-Remediation Investigation
Former Norwich MGP Site
Norwich, New York

Analytical Results

Sample ID				PDI-18		PDI-19		PDI-20		PDI-21		PDI-22		PDI-23		PDI-24		PDI-25		PDI-26		PDI-27		PDI-28		PDI-29		PDI-30		PDI-31		PDI-32		PDI-33	
Sample Composite Interval (feet)	Disposal			0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'		0-6'	
Date Collected:	Criteria	Units	09	03/30/2009		03/30/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		03/31/2009		04/01/2009		03/31/2009		03/31/2009		03/31/2009		04/03/2009		03/31/2009		04/01/2009		04/01/2009		04/03/2009	
Paint Filter Test	Pass			Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed		Passed	
Percent Solids	> 20	%		86		81		85		80		85		94		89		82		93		79		82		80		88		83		78		83	
Corrosivity (pH)	> 2 or < 12.5			7.81		7.30		8.01		7.78		7.66		7.79		6.90		7.38		5.24		7.35		7.61		7.44		7.27		7.50		7.29		7.15	
TCLP Volatile Organic Compounds (VOCs)																																			
1,1-Dichloroethene	700	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
1,2-Dichloroethane	500	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
2-Butanone (MEK)	NA	µg/kg	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Benzene	500	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Carbon Tetrachloride	500	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chlorobenzene	100000	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Chloroform	6000	µg/kg	**B**	**18**	**B**	**18**	**B**	**22**	**B**	**24**	**B**	**23**	**B**	**24**	**B**	**25**	**B**	**11**	**B**	**23**	**B**	**21**	**B**	**22**	**B**	**11**	**B**	**13**	**B**	**14**	**B**	**12**	**B**	**22**	**B**
Tetrachloroethene	700	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Trichloroethene	500	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Vinyl chloride	200	µg/kg	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
TCLP Semivolatile Compounds (SVOCs)																																			
1,4-Dichlorobenzene	NA	µg/kg	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U
2,4,5-Trichlorophenol	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4,6-Trichlorophenol	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2,4-Dinitrotoluene	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
2-Methylphenol	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
3 & 4 Methylphenol	NA	µg/kg	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U
Hexachlorobenzene	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachlorobutadiene	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Hexachloroethane	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Nitrobenzene	NA	µg/kg	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Pentachlorophenol	NA	µg/kg	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U	40	U
Pyridine	NA	µg/kg	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U	100	U
TCLP Metals																																			
Arsenic	5	mg/L	**J**	**0.0054**	**J**	**0.0094**	**J**	0.0100	U	**0.0074**	**J,B**	**0.0122**	**B**	**0.0049**	**J,B**	0.0100	U	**0.0042**	**J**	0.0100	U	**0.0065**	**J,B**	**0.0046**	**J,B**	**0.0082**	**J**	0.0100	U	0.0100	U	0.0100	U	0.0100	U
Barium	100	mg/L	**B**	**0.265**	**B**	**0.242**	**B**	**0.634**	**B**	**0.266**	**B**	**0.771**	**B**	**0.456**	**B**	**0.502**	**B**	**0.481**	**B**	**0.321**	**B**	**0.529**	**B**	**0.588**	**B**	**0.627**	**B**	**0.501**	**B**	**0.333**	**B**	**0.349**	**B**	**0.518**	**B**
Cadmium	1	mg/L	U	0.0010	U	0.0010	U	**0.0026**		**0.0005**	**J**	**0.0033**		**0.0015**		**0.0024**		**0.0012**		**0.0004**	**J**	**0.0008**	**J**	0.0010	U	**0.0011**		**0.0010**	**J**	0.0010	U	**0.0005**	**J**	**0.0010**	**J**
Chromium	5	mg/L		**0.0105**		**0.0171**		**0.0034**	**J**	**0.0100**		**0.0094**		**0.0023**	**J**	**0.0022**	**J**	**0.0082**	**B**	**0.0027**	**J**	**0.0049**		**0.0176**		**0.0025**	**J,B**	**0.0033**	**J,B**	**0.0019**	**J,B**	**0.0010**	**J,B**	**0.0010**	**J,B**
Lead	5	mg/L		**0.0116**		**0.0111**		**0.152**		**0.0421**		**0.299**		**0.0304**		**0.0610**		**0.0550**		0.0060	U	**0.124**		**0.0073**		**0.128**		**0.0383**		**0.0044**	**J**	**0.0301**		**0.0222**	
Mercury	0.2	mg/L	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	J	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U
Selenium	1	mg/L	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0078	J	0.0150	U	0.0150	U	0.0150	U	**0.0068**	**J**	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U	0.0150	U
Silver	5	mg/L	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U	0.0030	U
TCLP Herbicides																																			
2,4-D		µg/kg	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
Silvex [2,4,5-TP]		µg/kg	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
TCLP Pesticides																																			
Chlordane	30	µg/kg	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Endrin	20	µg/kg	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
gamma-BHC (Lindane)		µg/kg	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Heptachlor	8	µg/kg	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Heptachlor epoxide	400	µg/kg	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Methoxychlor	10000	µg/kg	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
Toxaphene	500	µg/kg	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U

Notes:
U = Not detected above method of detection
B = Compound detected in laboratory method blank
J = Estimated concentration
D = Concentration determined by dilution
NA = Not Applicable

Figure

ASPHALT

NYSEG SUBSTATION

SHOPPING PLAZA

FORMER ABOVE GROUND DISTRIBUTION HOLDER

FORMER AST (OIL)

GAS REG. BLDG.

FORMER RELIEF HOLDER

OIL TANK

FORMER PURIFIER HOUSE

CONCRETE SLAB

FORMER ELECTRIC PLANT

FORMER GAS PLANT

FORMER TAR WELLS

FORMER AST'S (OIL)

COAL SHED

COAL SHED

PARKING

PARKING

WOOD FENCE

PDI-1 PDI-2 PDI-3 PDI-4 PDI-5 PDI-6 PDI-7 PDI-8 PDI-9 PDI-10 PDI-11 PDI-12 PDI-13 PDI-14 PDI-15 PDI-16 PDI-17 PDI-18 PDI-19 PDI-20 PDI-21 PDI-22 PDI-23 PDI-24 PDI-25 PDI-26 PDI-27 PDI-28 PDI-29 PDI-30 PDI-31 PDI-32 PDI-33

BM-1 BM-1 BM-2

CTL-1 (PK) CTL-2 CTL-3

GARAGE

ASPHALT ASPHALT ASPHALT ASPHALT ASPHALT

49 47 45 43 41 37

FRONT STREET

52 50 48 46

COLUMBIA STREET

DECK 42 40

LACKAWANNA RAILROAD

LEGEND

- CONTROL POINT
- BENCHMARK
- UTILITY POLE W/GUY
- POWER POLE
- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- -FORMER STRUCTURE LOCATION (APPROX.)
- CONTOUR (1 FT. INTERVAL)
- PROPOSED ON SITE IN-SITU SOLIDIFIED AREA
- PROPOSED OFF SITE IN-SITU SOLIDIFIED AREA
- -SOIL PRE-CHARITERIZATION SAMPLE LOCATION

0' 25' 50' 100'

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
40 British American Blvd.
Latham, New York 12110
T 518.951.2200 F 518.951.2300
WWW.AECOM.COM

NYSEG
FORMER NORWICH MGP SITE
NORWICH, NEW YORK

EXISTING CONDITIONS

PROJECT START DATE (M / Y)	APRIL 2009
PROJECT NO.	106404
FILENAME	Norwich-Base.dwg
SHEET NO.	XX-Y-Z
DRAWING NO.	000

Plotted By: keith.meister
Plot File Date Created: Apr/03/2009 11:26 AM
Layout-Sheet Name: LAYOUT1
Filename: L:\WORK\106404\CADD\REF\NORWICH-BASE.DWG

Attachment A

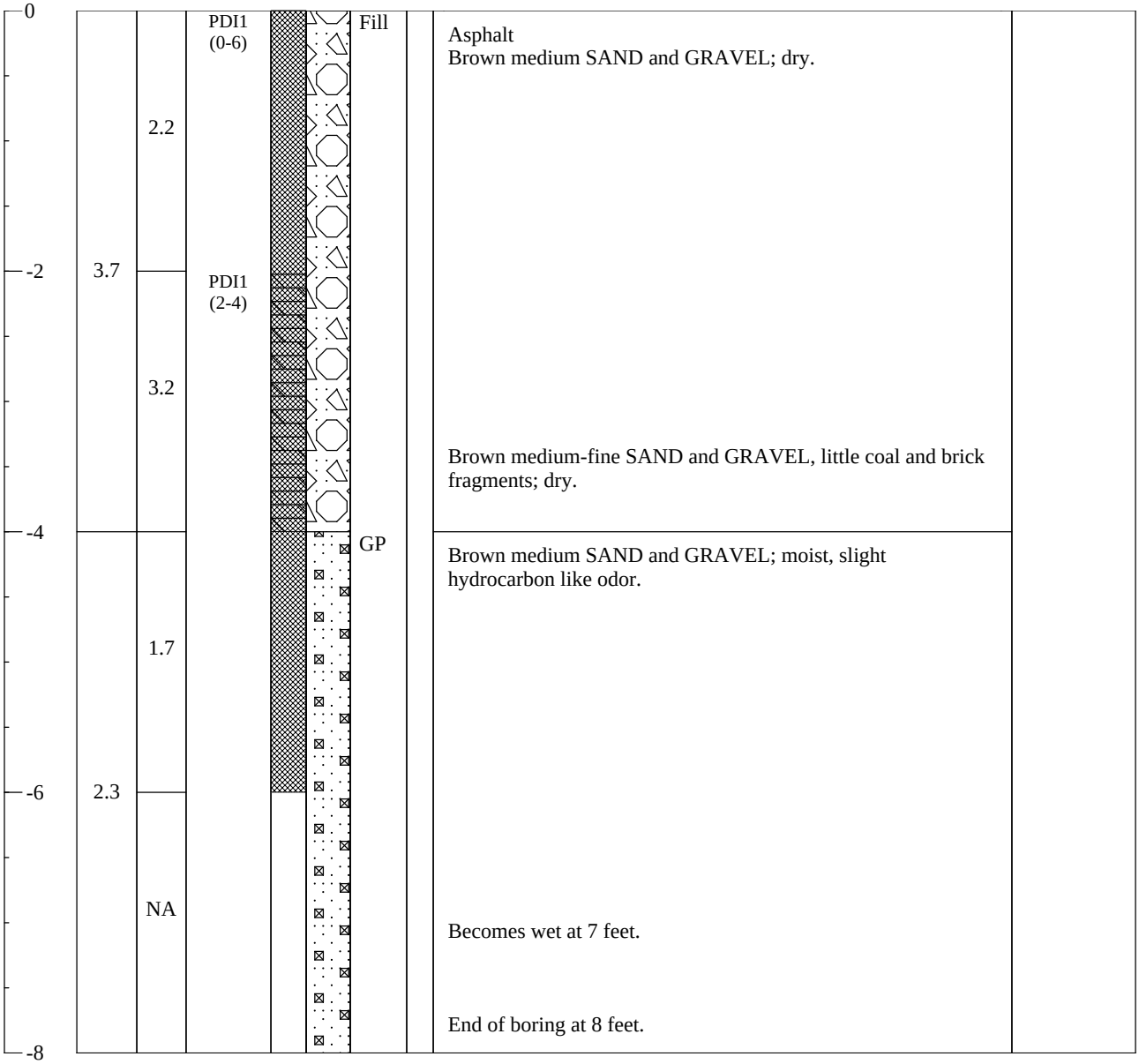
Boring Logs

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI1

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: West end of plaza parking lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

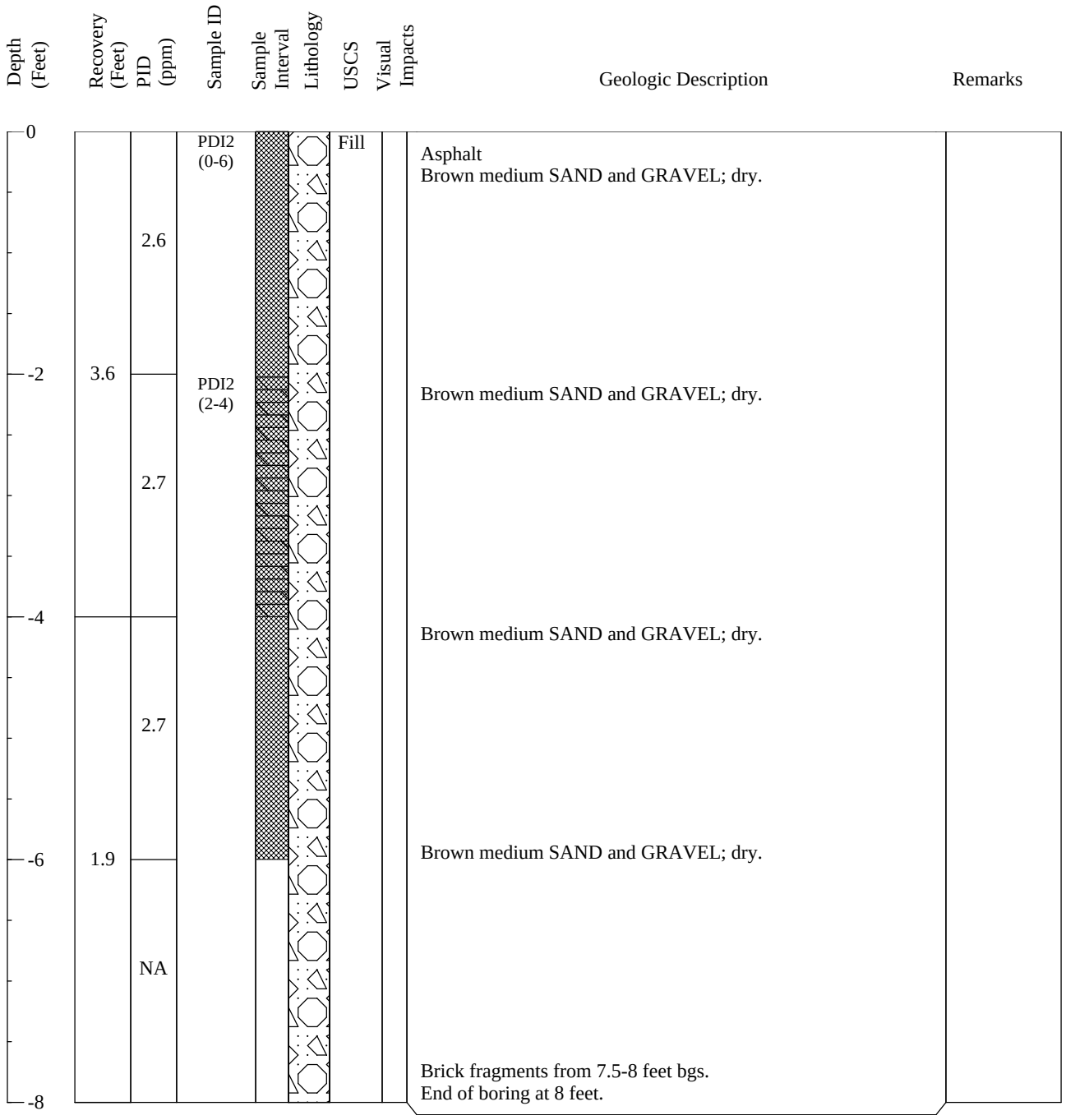
Comments: Sample PDI1(0-6) was analyzed for waste characterization suite.
Sample PDI1(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI2

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: West end of plaza parking lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

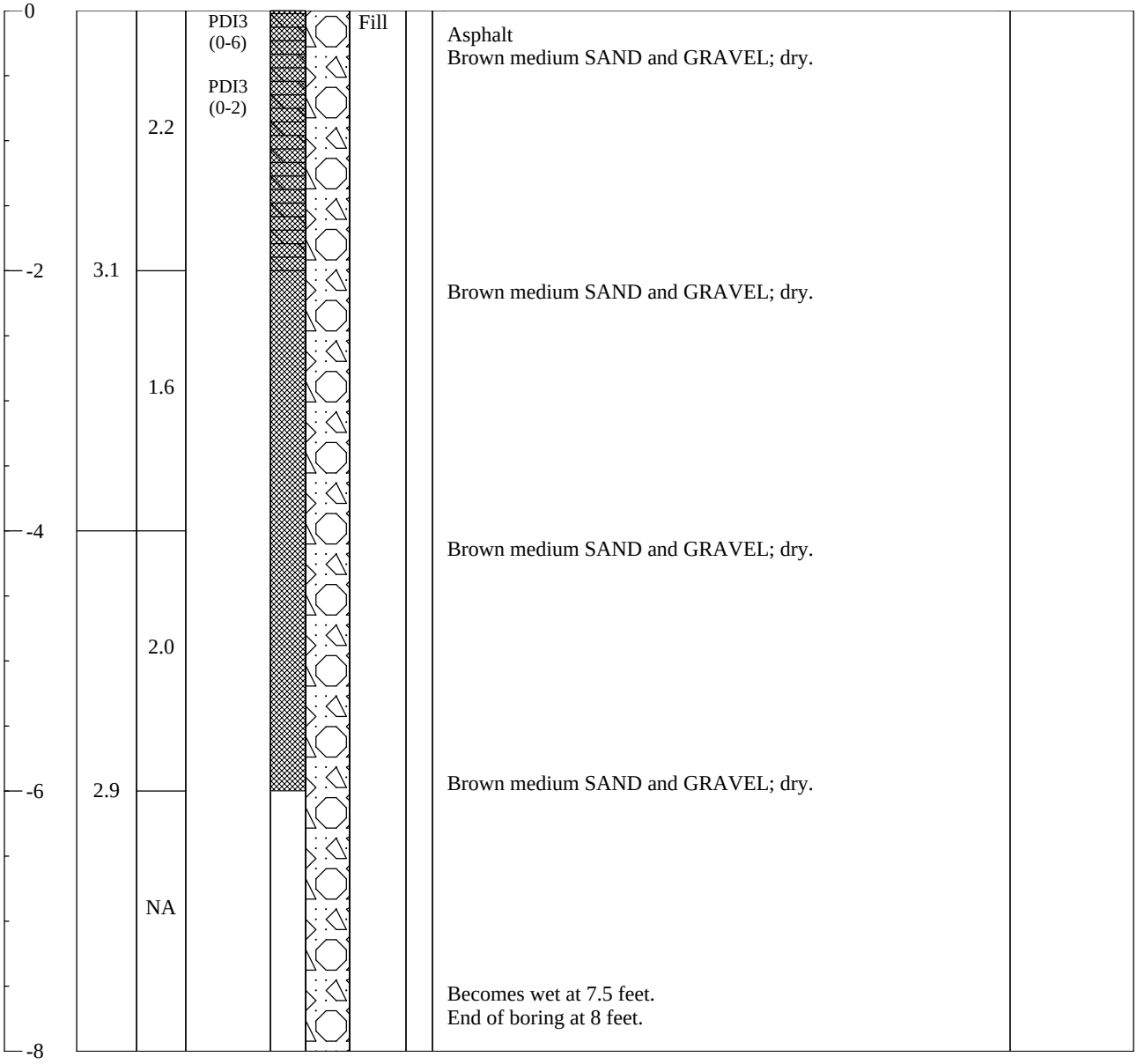
Comments: Sample PDI2(0-6) was analyzed for waste characterization suite.
Sample PDI2(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI3

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: West end of plaza parking lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

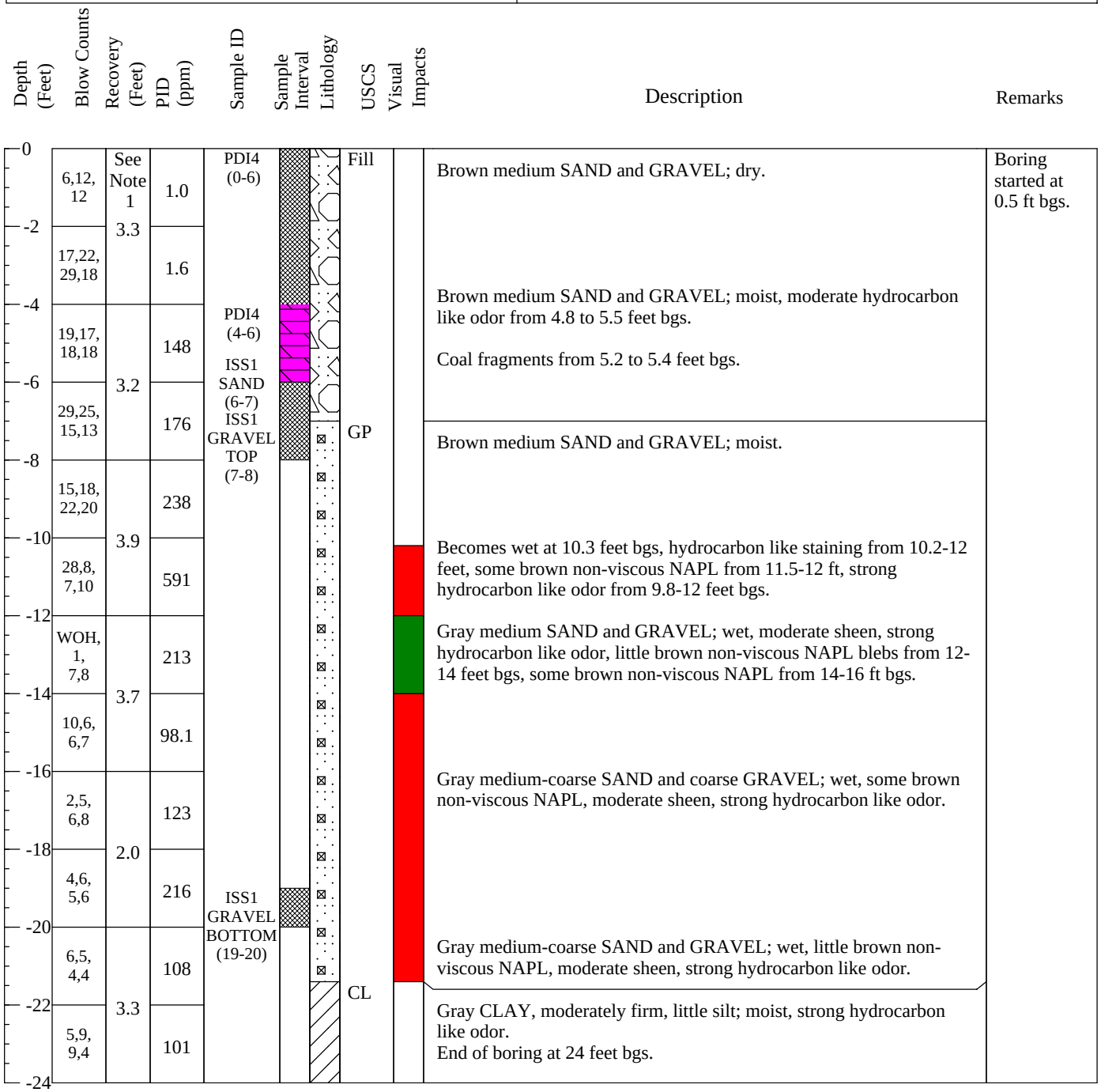
Comments: Sample PDI3(0-6) was analyzed for waste characterization suite.
Sample PDI3(0-2) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI4/ISS1

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-030-0002
Date Started/Completed: 4/2/09
Boring Location: Plaza parking lot
Drilling Company: Paragon

Drilling Method: Hollow stem auger
Sampling Method: Macro-core, 3-inch split spoon
Total Depth: 24 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

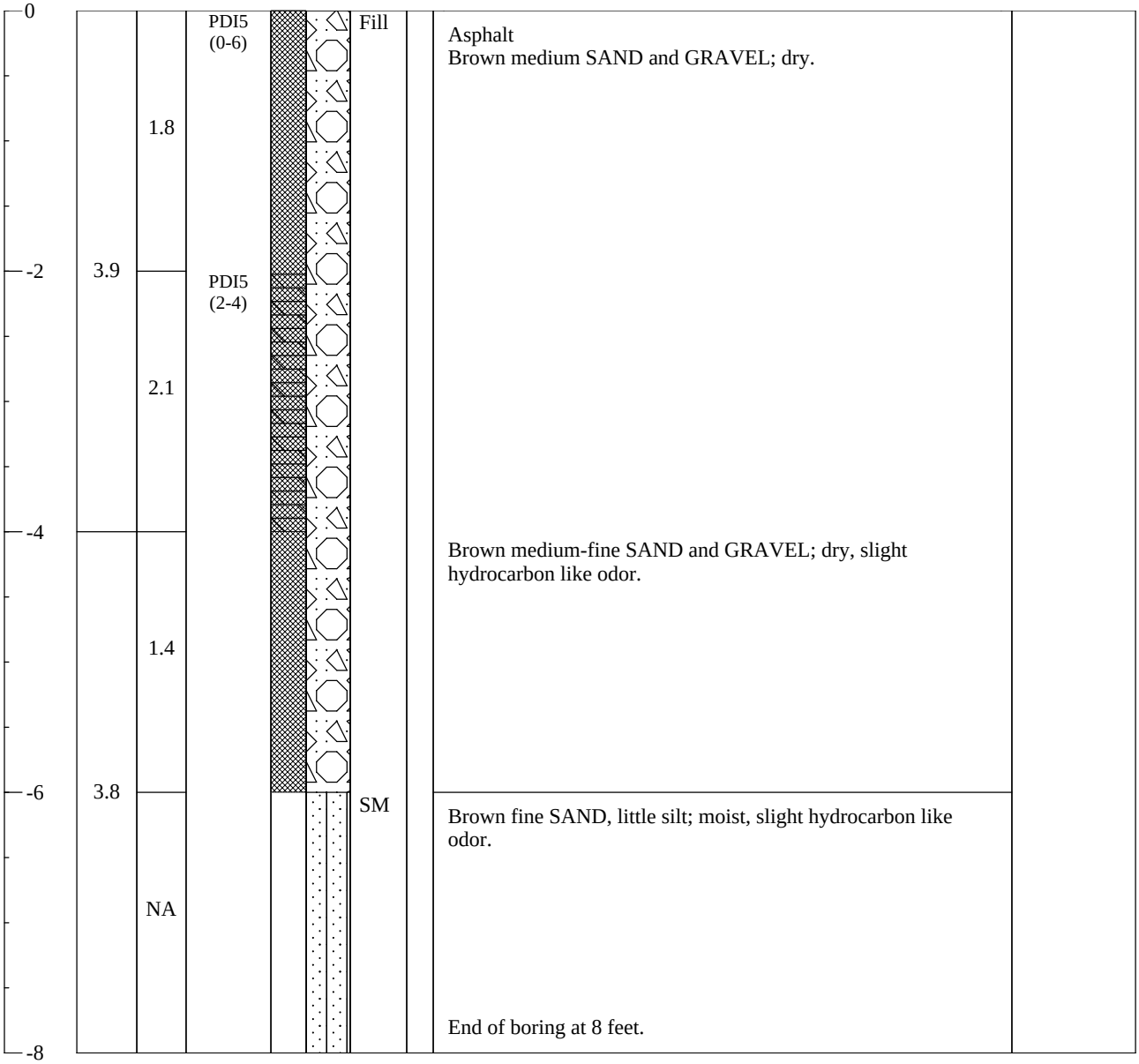
Comments: Note 1 - Boring was first sampled with a 4 ft macro-core, then with a 2 ft split spoon to obtain blow counts. Sample PDI4(0-6) was analyzed for waste characterization suite. Sample PDI4(4-6) was analyzed for VOCs. ISS1SAND(6-7), ISS1GRAVELTOP(7-8), ISS1GRAVELBOTTOM(19-20) were sampled for grain size. Shelby tube collected in fill unit from 4-6 ft bgs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI5

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: East end of plaza parking lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

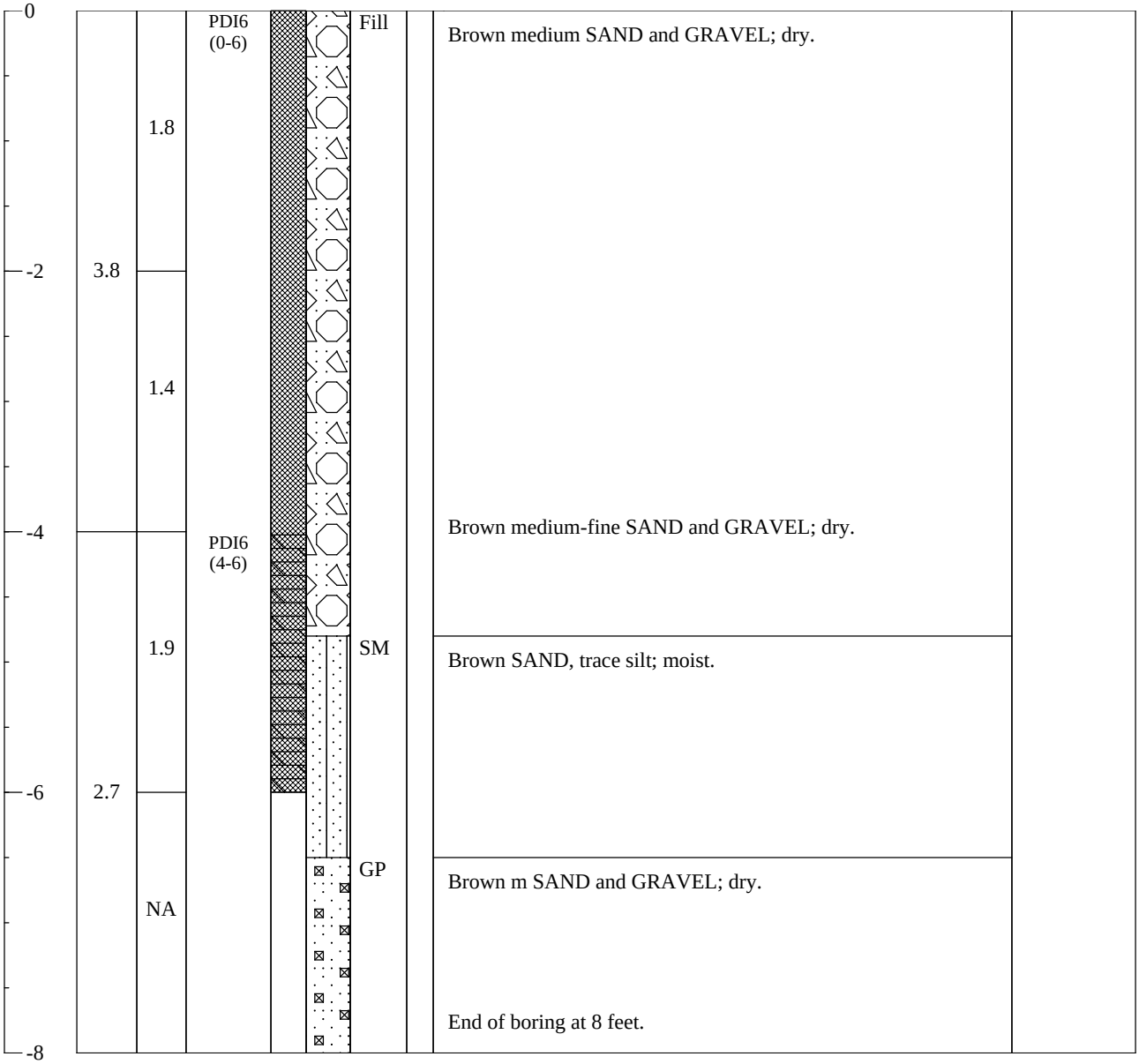
Comments: Sample PDI5(0-6) was analyzed for waste characterization suite.
Sample PDI5(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI6

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: East end of plaza parking lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

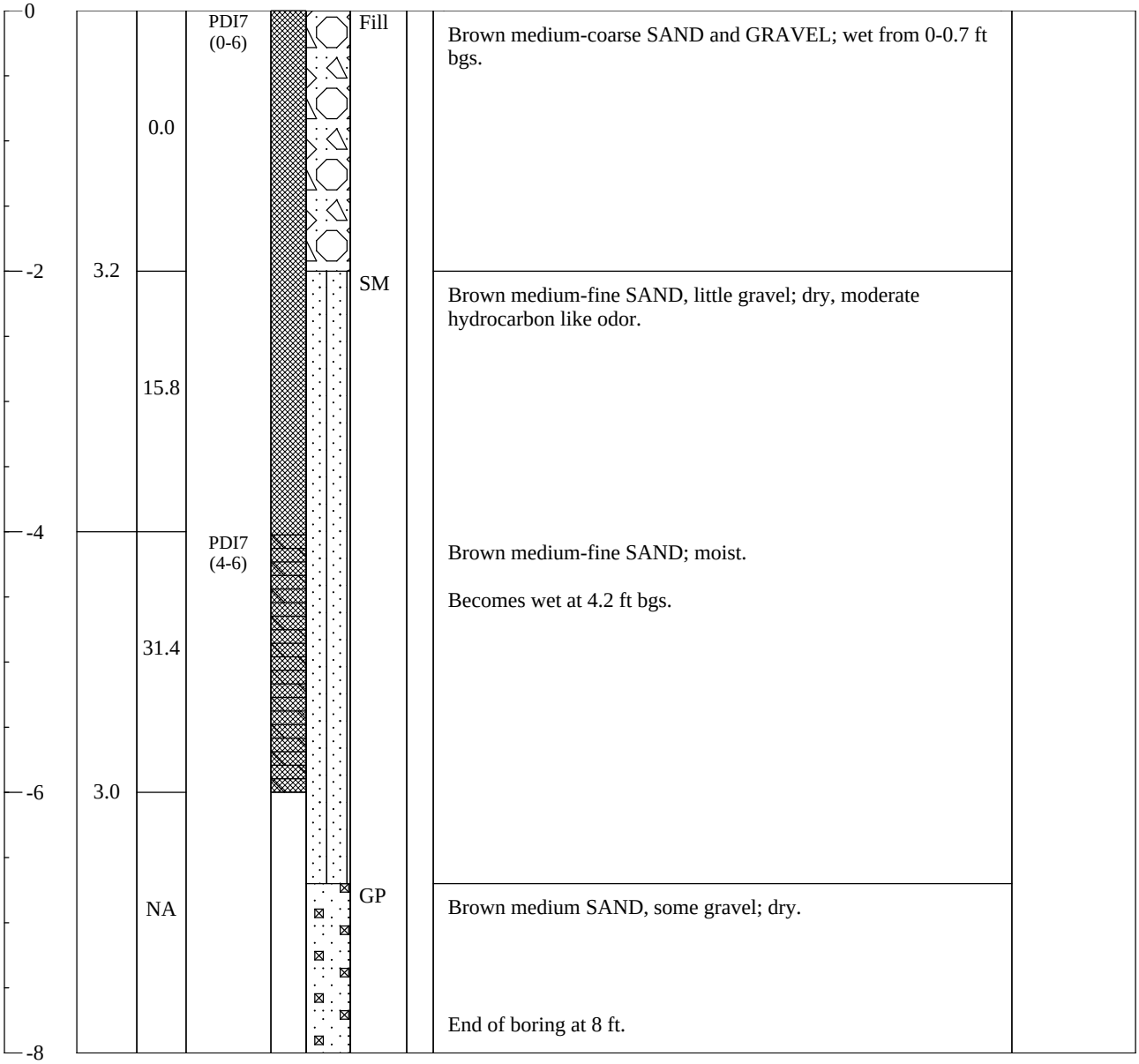
Comments: Sample PDI6(0-6) was analyzed for waste characterization suite.
Sample PDI6(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI7

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: Northwest corner of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

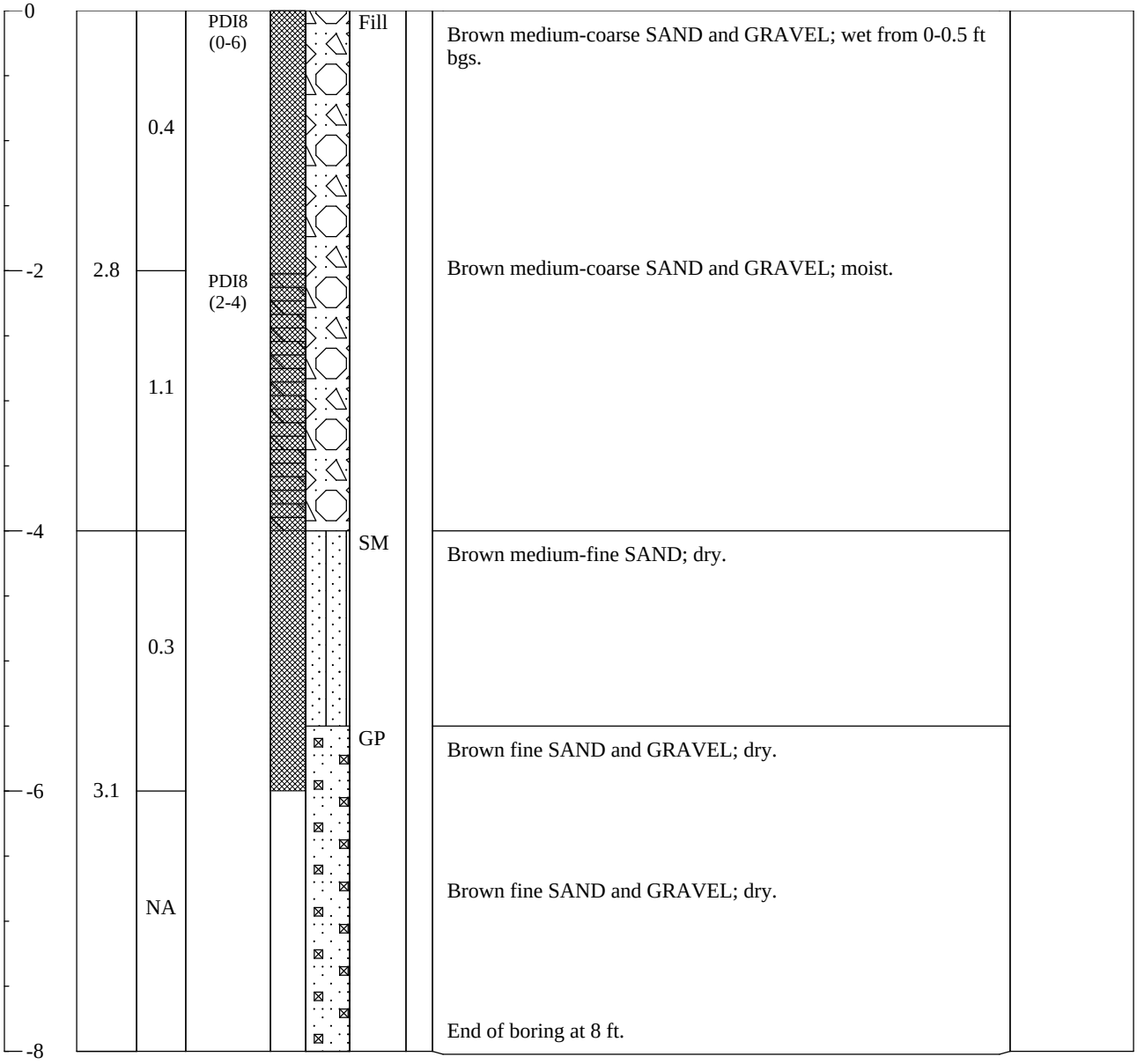
Comments: Sample PDI7(0-6) was analyzed for waste characterization suite.
Sample PDI7(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI8

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North side of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

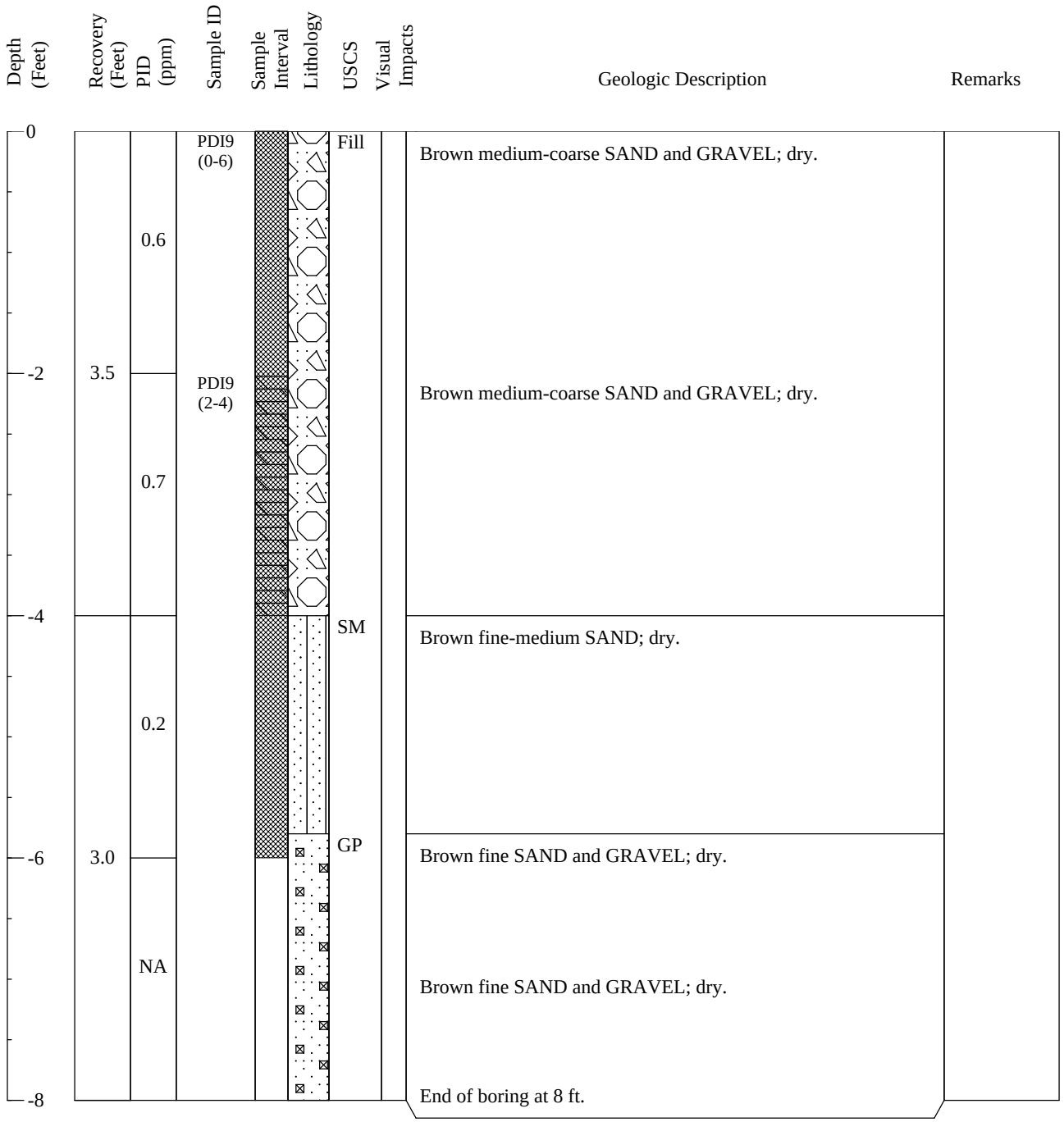
Comments: Sample PDI8(0-6) was analyzed for waste characterization suite.
Sample PDI8(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI9

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North side of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

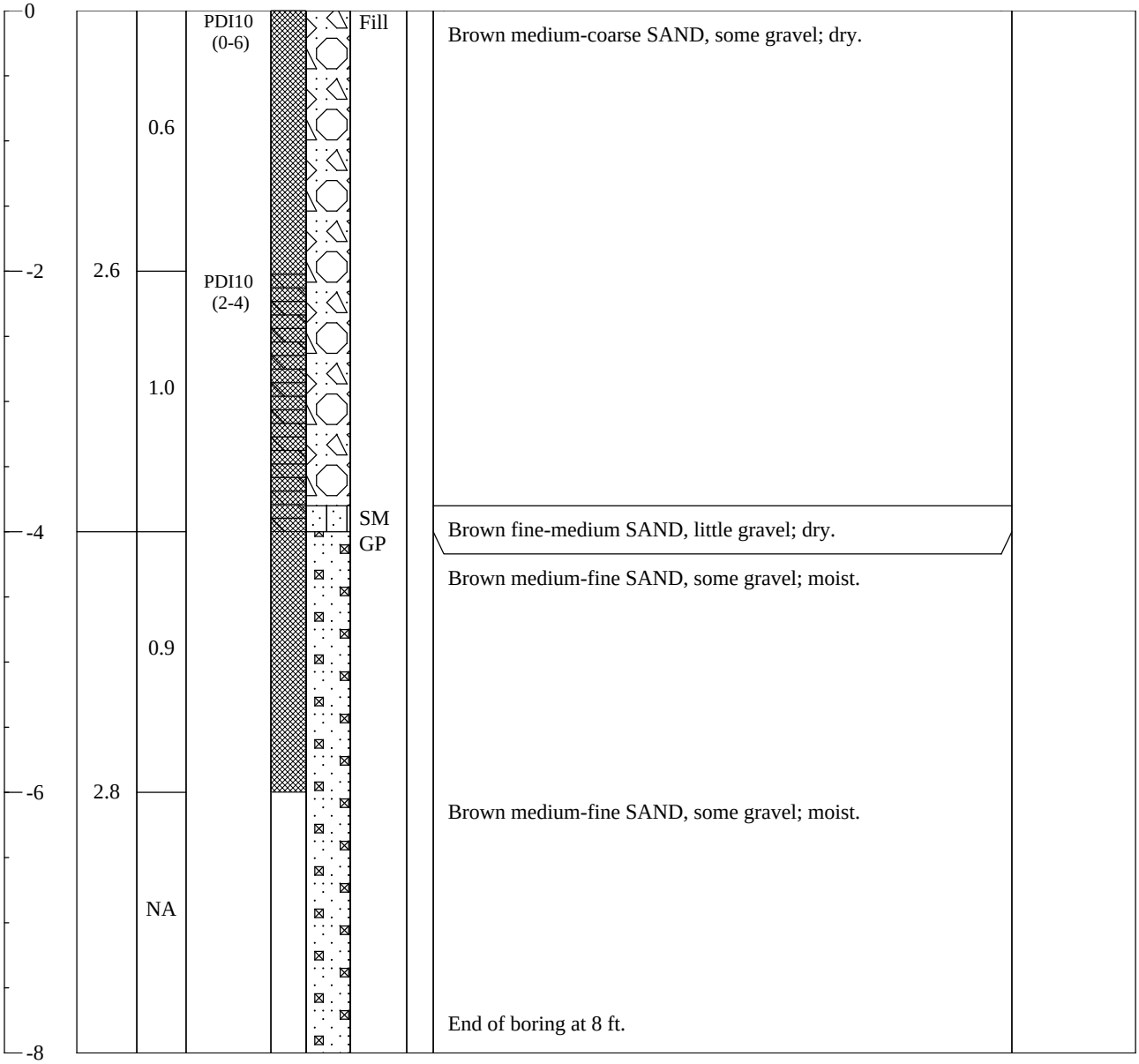
Comments: Sample PDI9(0-6) was analyzed for waste characterization suite.
Sample PDI9(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI10

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North side of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Sample PDI10(0-6) was analyzed for waste characterization suite.
Sample PDI10(2-4) was analyzed for VOCs.

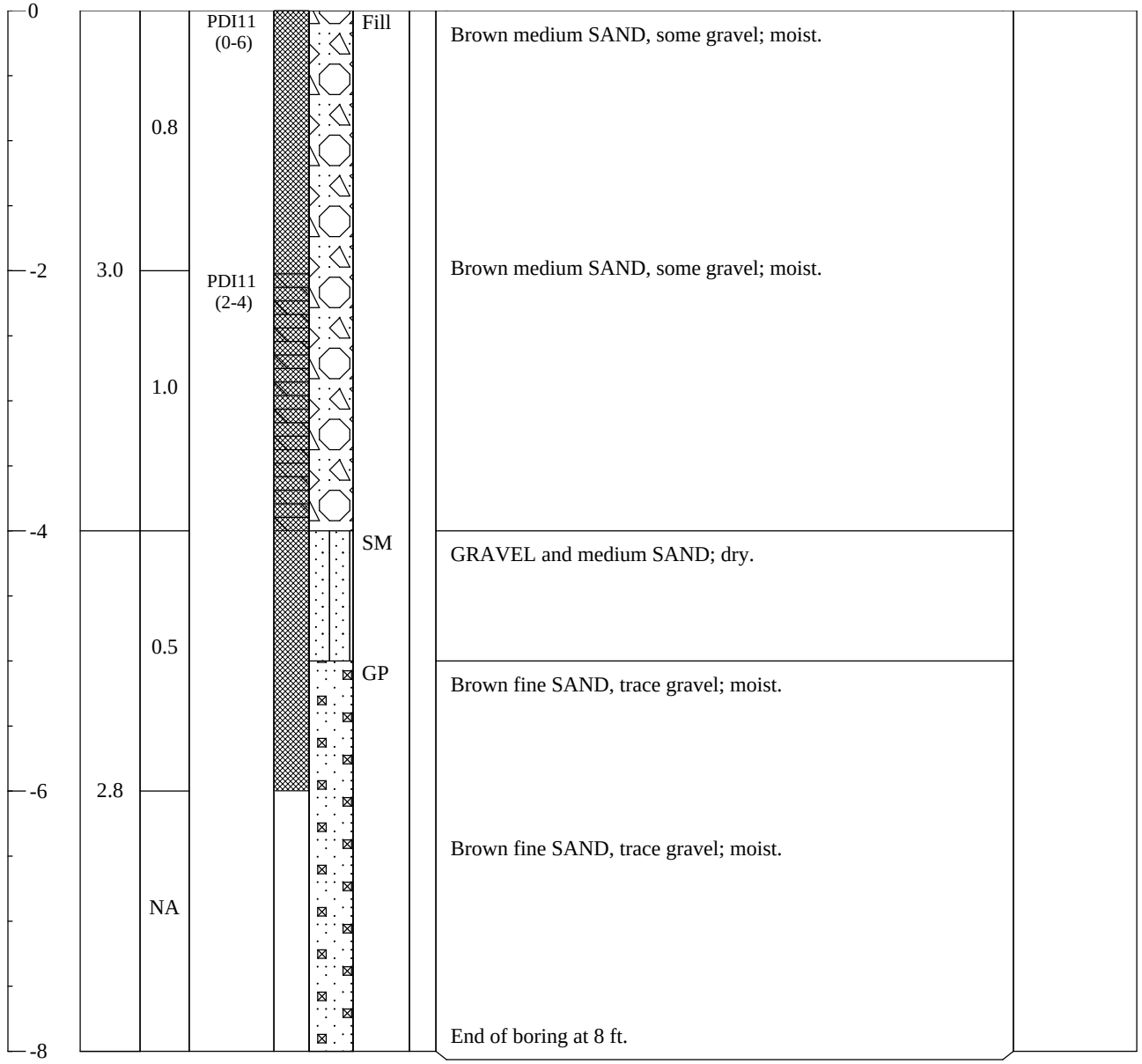
AECOM

1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI11

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North side of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

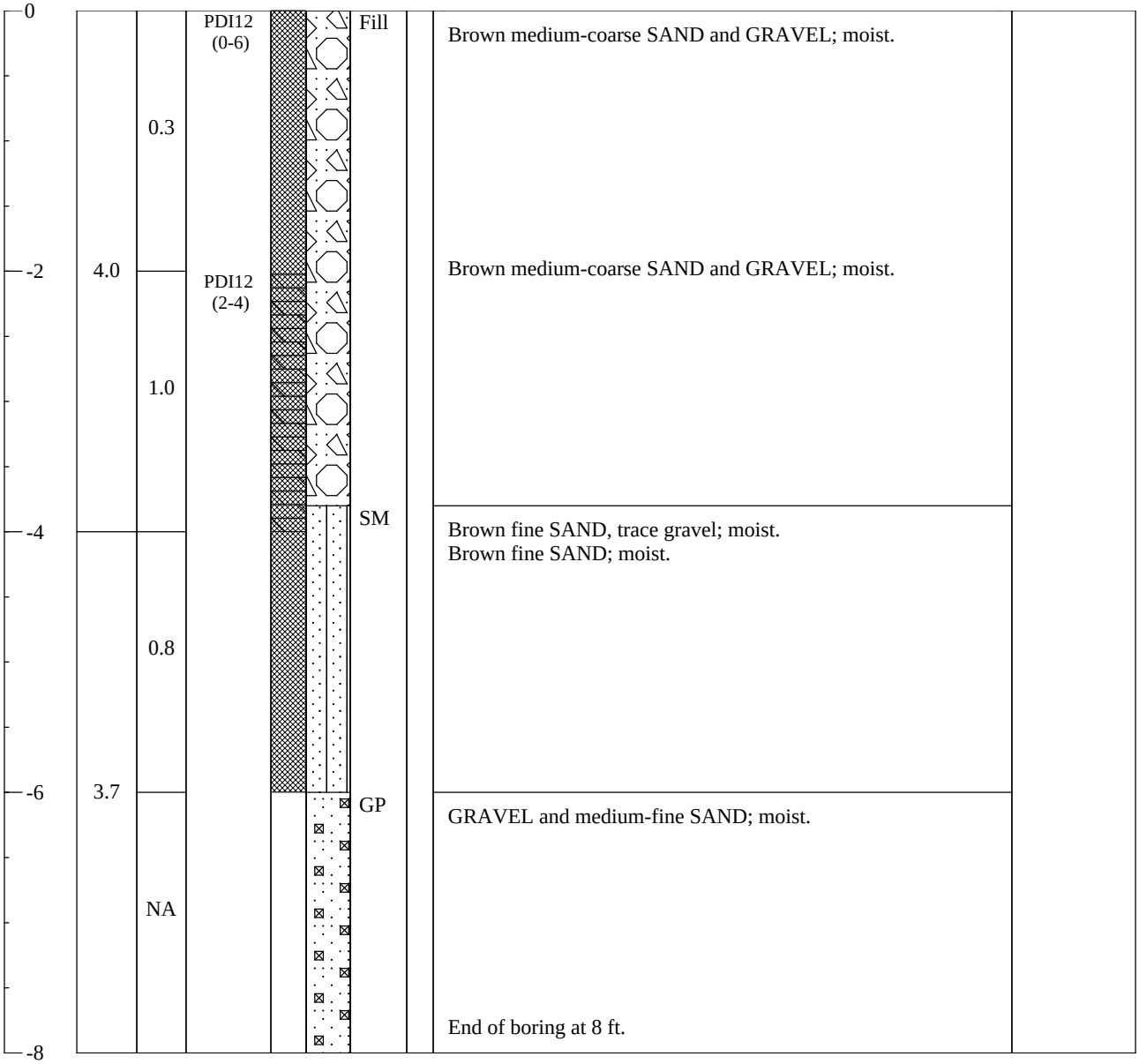
Comments: Sample PDI11(0-6) was analyzed for waste characterization suite.
Sample PDI11(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI12

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North side of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

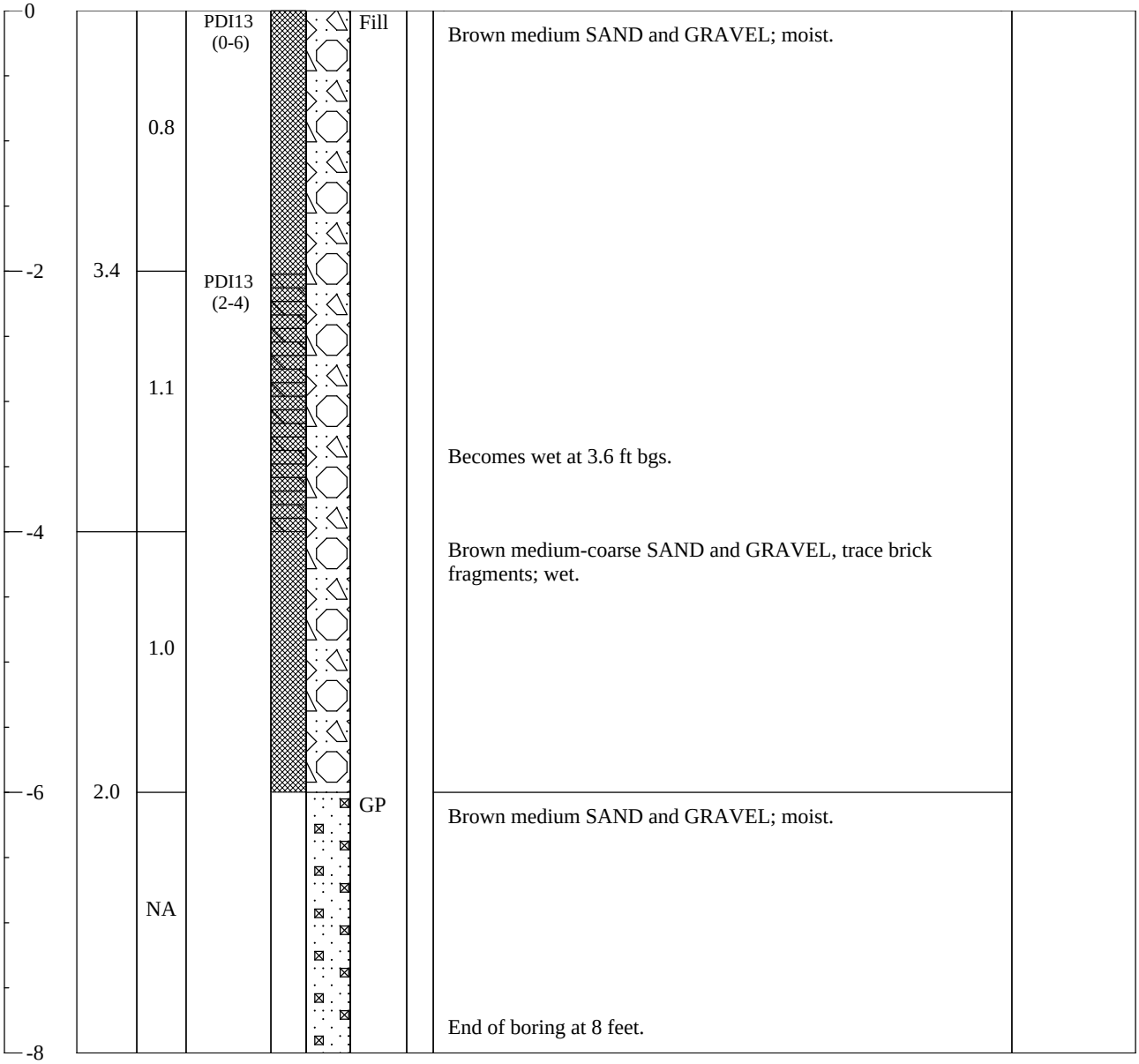
Comments: Sample PDI12(0-6) was analyzed for waste characterization suite.
Sample PDI12(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI13

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North side of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

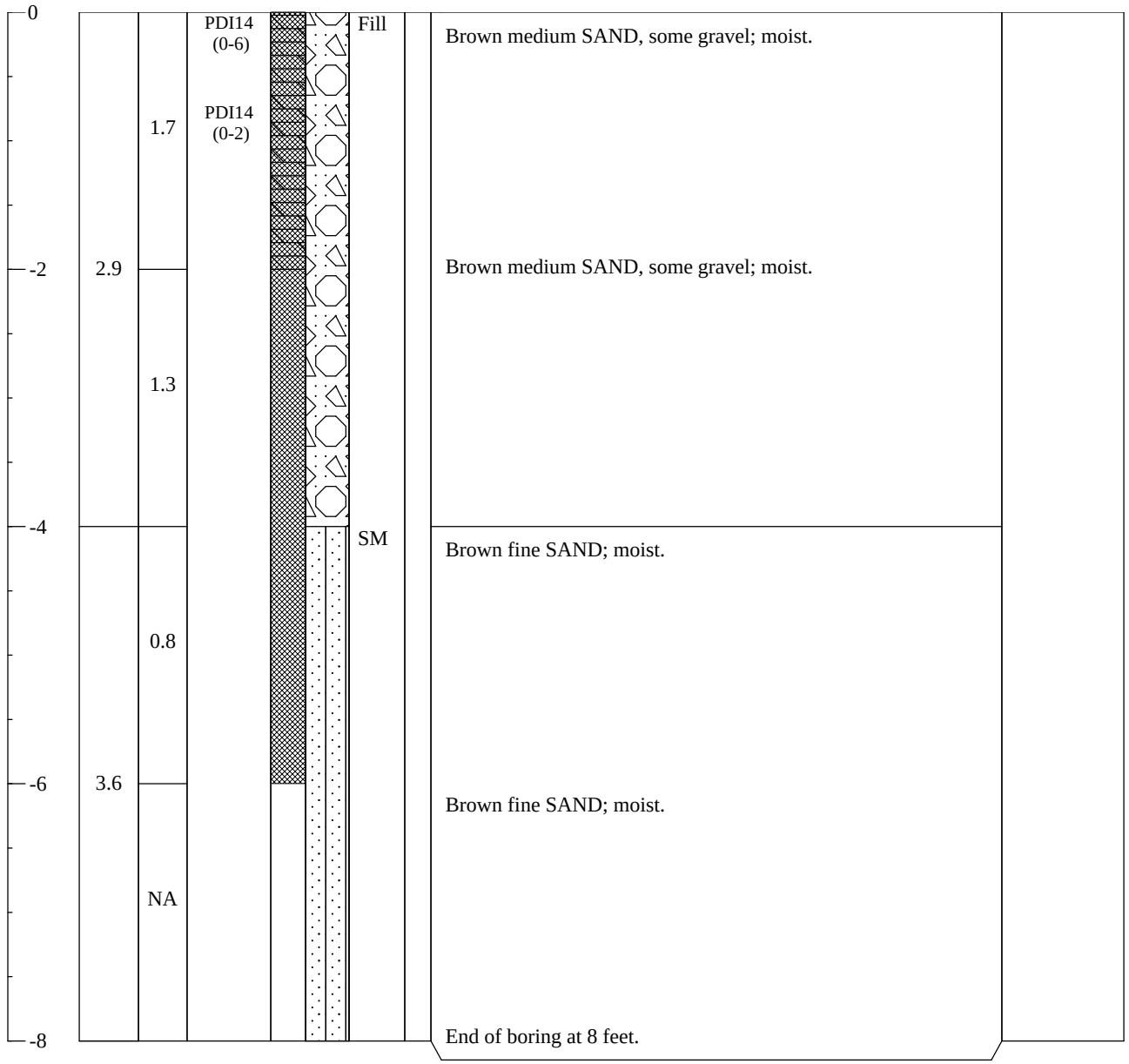
Comments: Sample PDI13(0-6) was analyzed for waste characterization suite.
Sample PDI13(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI14

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: West of former Aero Products building
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

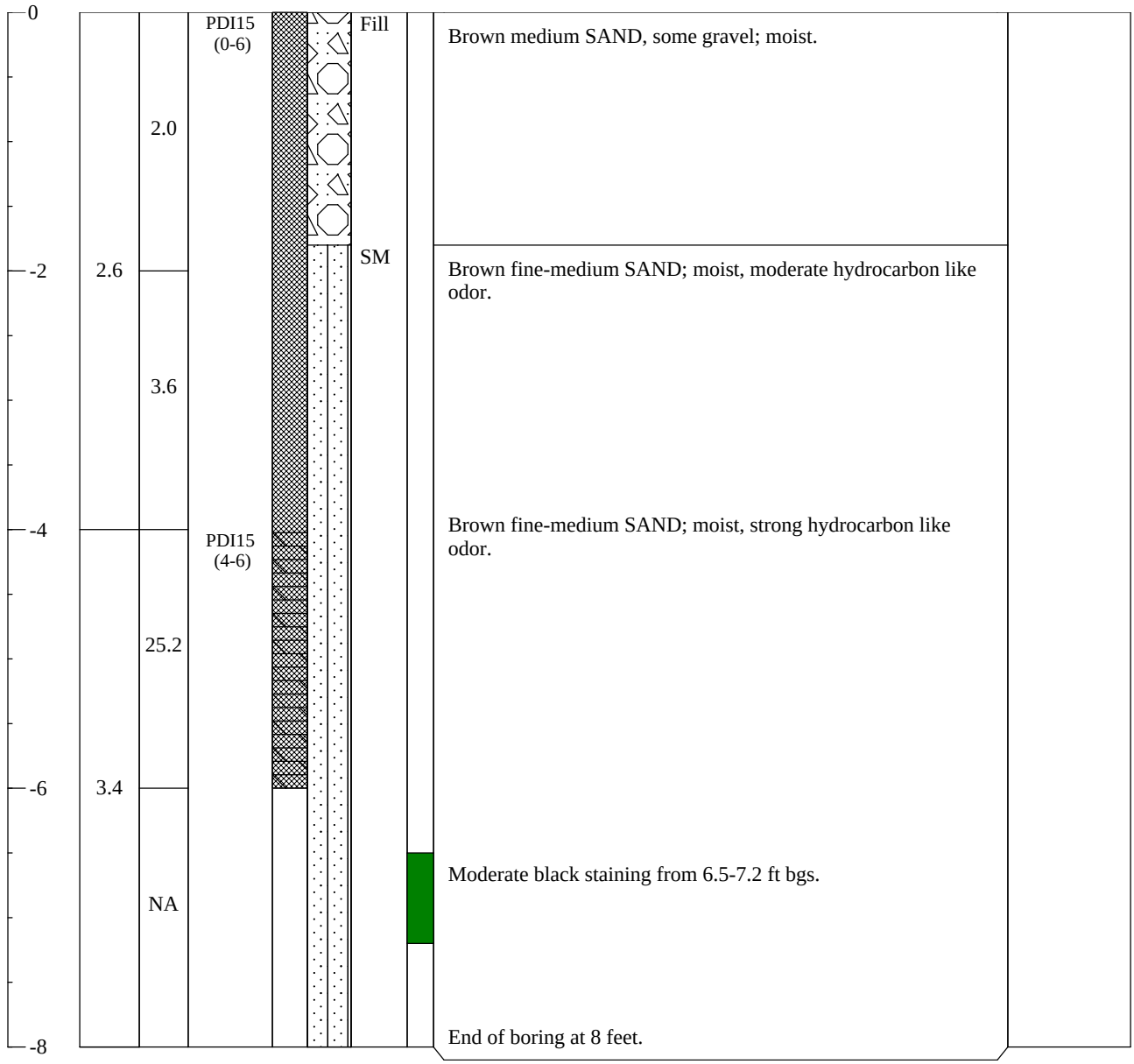
Comments: Sample PDI14(0-6) was analyzed for waste characterization suite.
Sample PDI14(0-2) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI15

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North of former Aero Products building
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Sample PDI15(0-6) was analyzed for waste characterization suite.
Sample PDI15(4-6) was analyzed for VOCs.

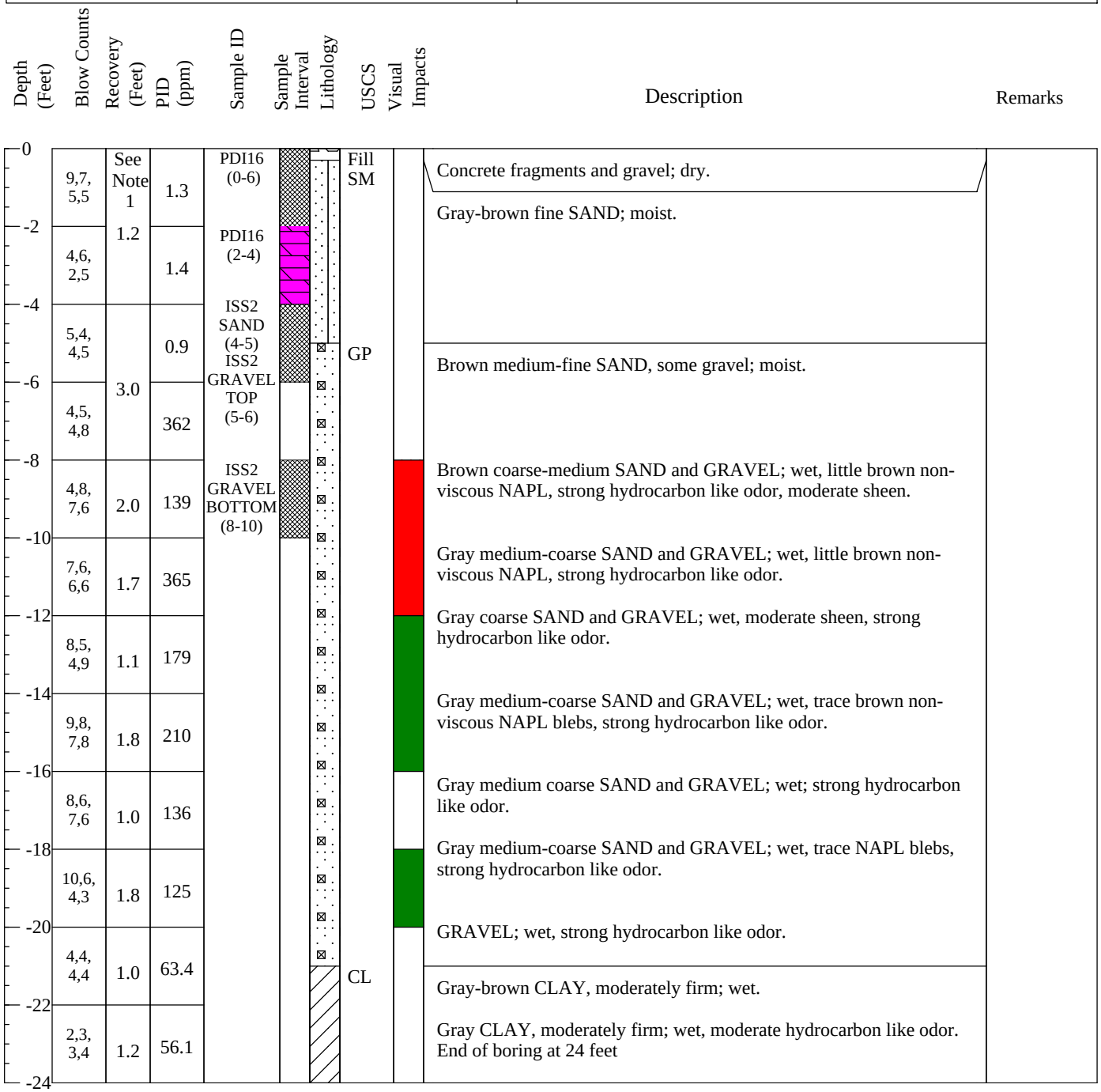
AECOM

1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI16/ISS2

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-030-0002
Date Started/Completed: 4/2/09
Boring Location: 37 Front Street
Drilling Company: Paragon

Drilling Method: Hollow stem auger
Sampling Method: Macro-core, 3-inch split spoon
Total Depth: 24 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

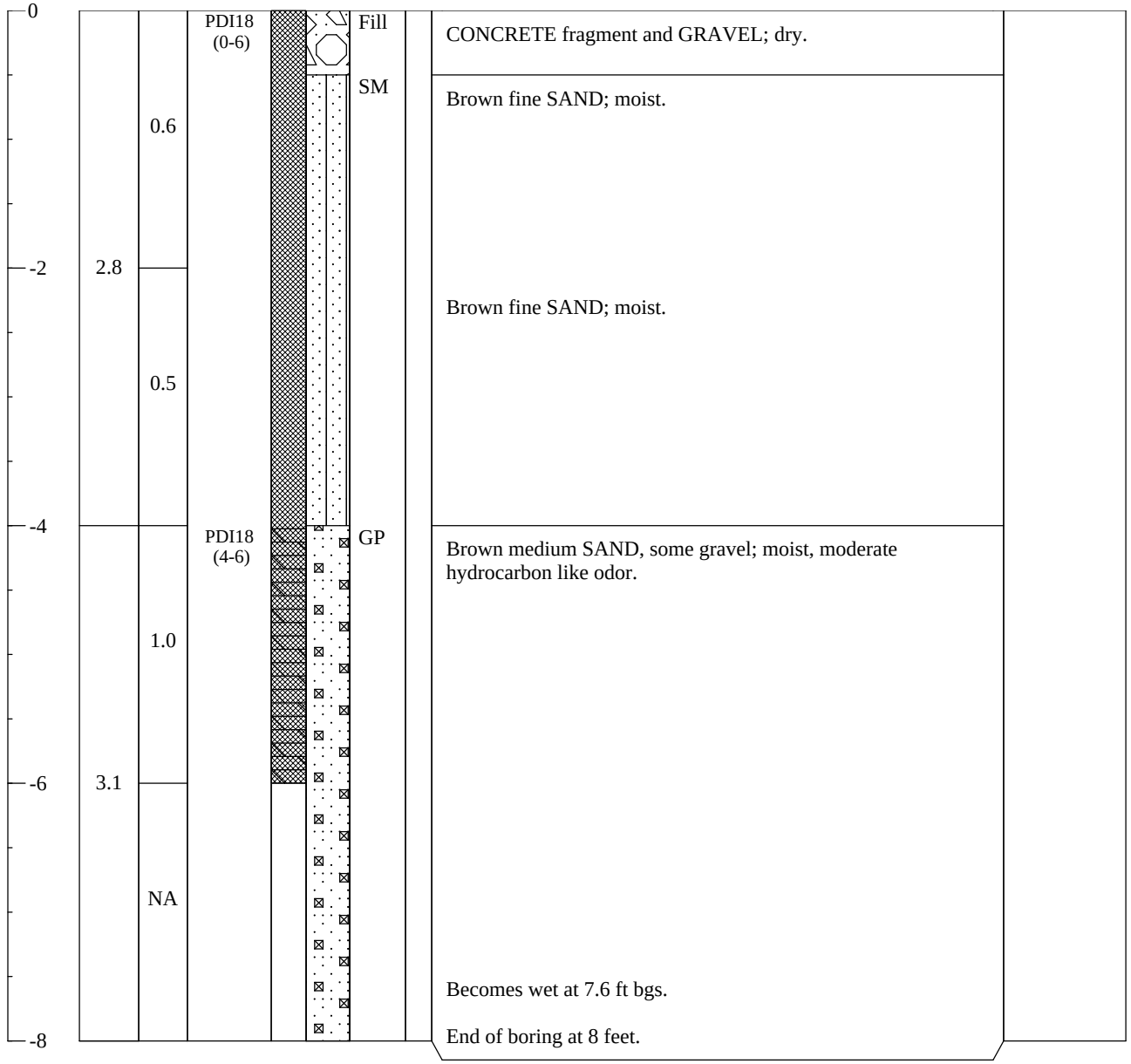
Comments: Note 1 - Boring was sampled from 0-8 ft with a 4 ft macro-core, then with a 2 ft split spoon to obtain blow counts. Sample PDI16(0-6) was analyzed for waste characterization suite. Sample PDI16(2-4) was analyzed for VOCs. ISS2SAND(4-5), ISS2GRAVELTOP(5-6), ISS2GRAVELBOTTOM(8-10) were sampled for grain size.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI18

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: North of former Aero Products building
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

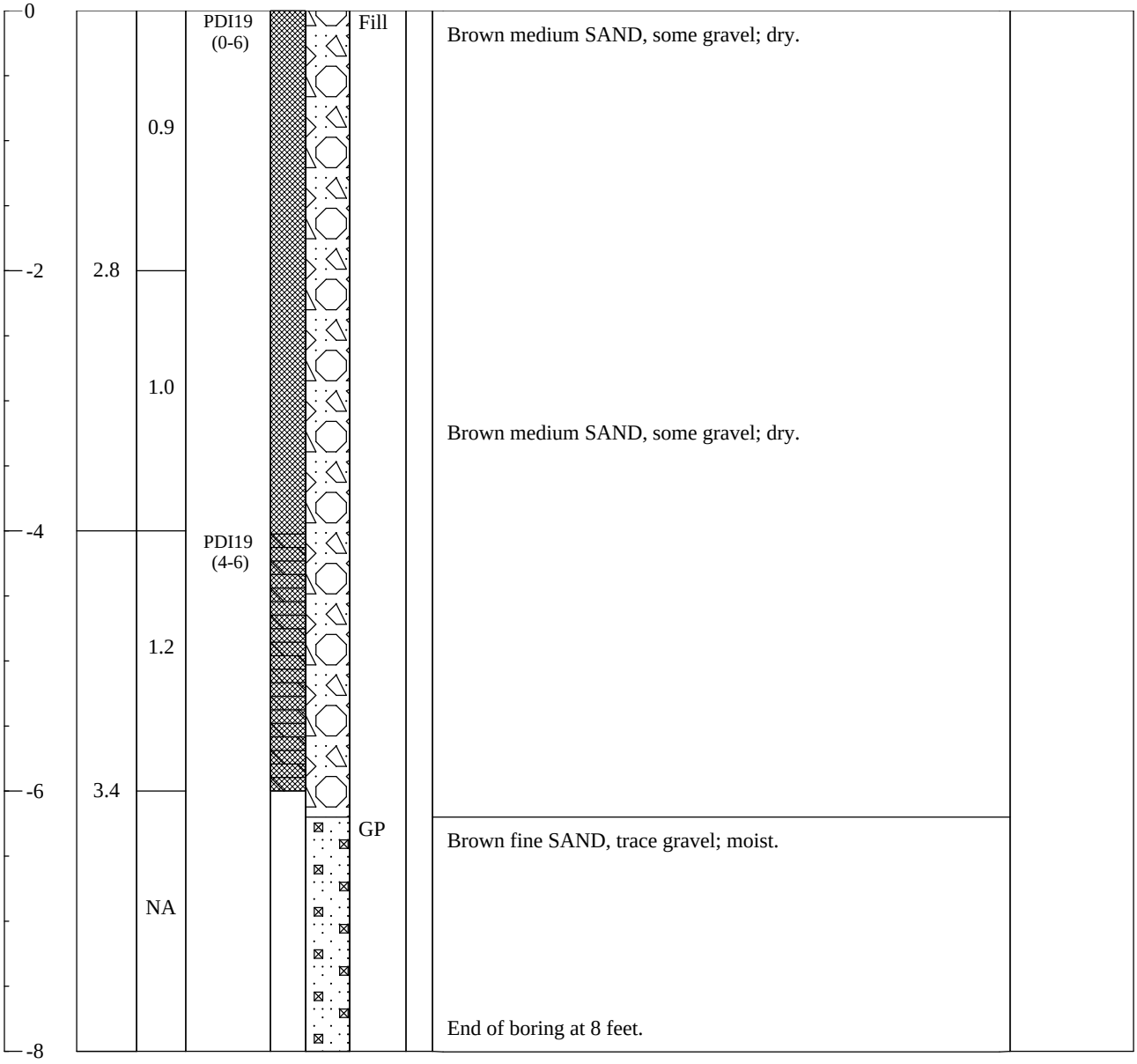
Comments: Sample PDI18(0-6) was analyzed for waste characterization suite.
Sample PDI18(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI19

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/30/09
Boring Location: NE corner of former Aero Products building
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

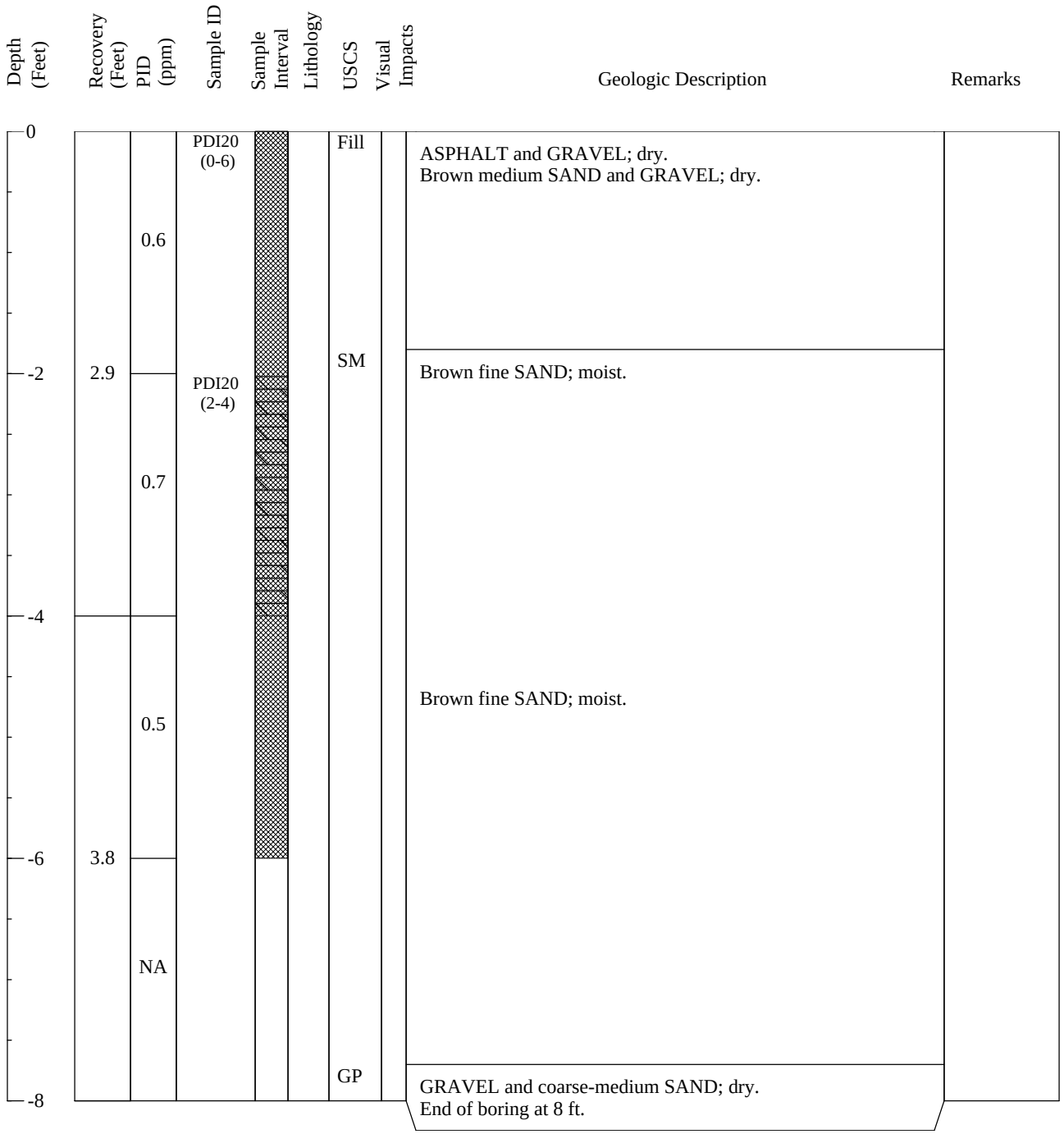
Comments: Sample PDI19(0-6) was analyzed for waste characterization suite.
Sample PDI19(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI20

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: North side of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Sample PDI20(0-6) was analyzed for waste characterization suite.
Sample PDI20(2-4) was analyzed for VOCs.

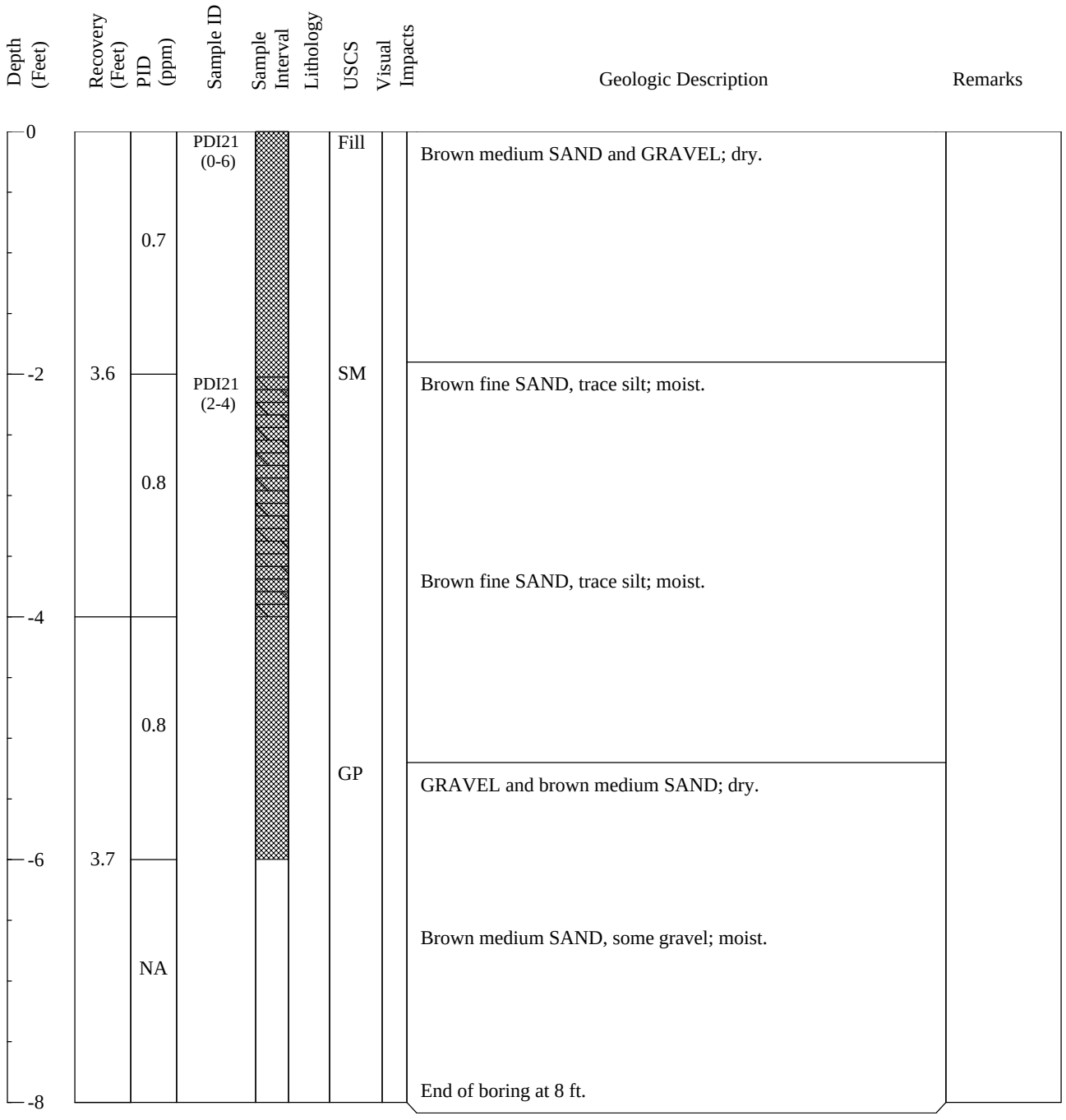
AECOM

1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI21

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: Center of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

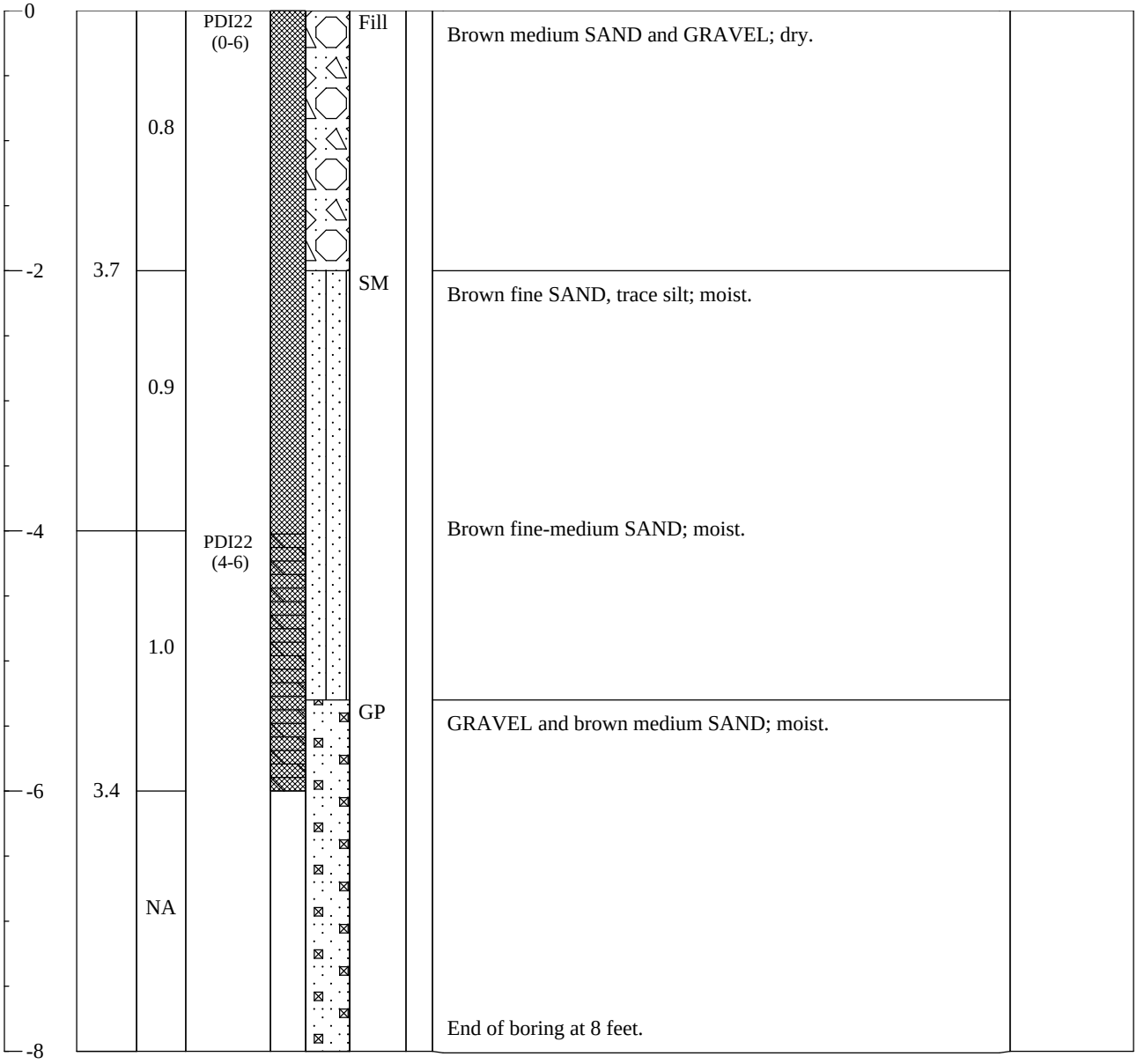
Comments: Sample PDI21(0-6) was analyzed for waste characterization suite.
Sample PDI21(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI22

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: Center of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

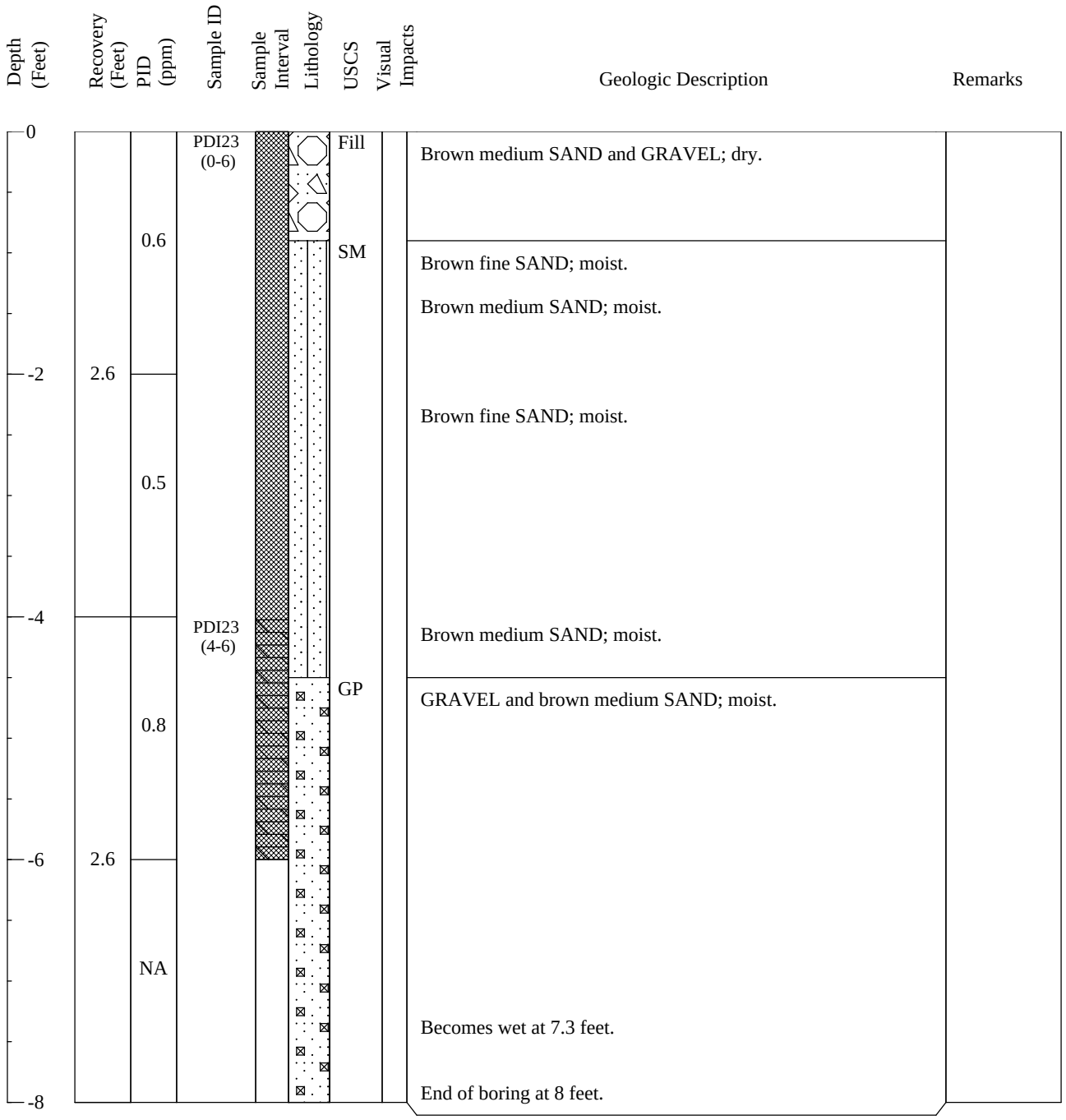
Comments: Sample PDI22(0-6) was analyzed for waste characterization suite.
Sample PDI21(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI23

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: Center of lot
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Sample PDI23(0-6) was analyzed for waste characterization suite.
Sample PDI23(4-6) was analyzed for VOCs.

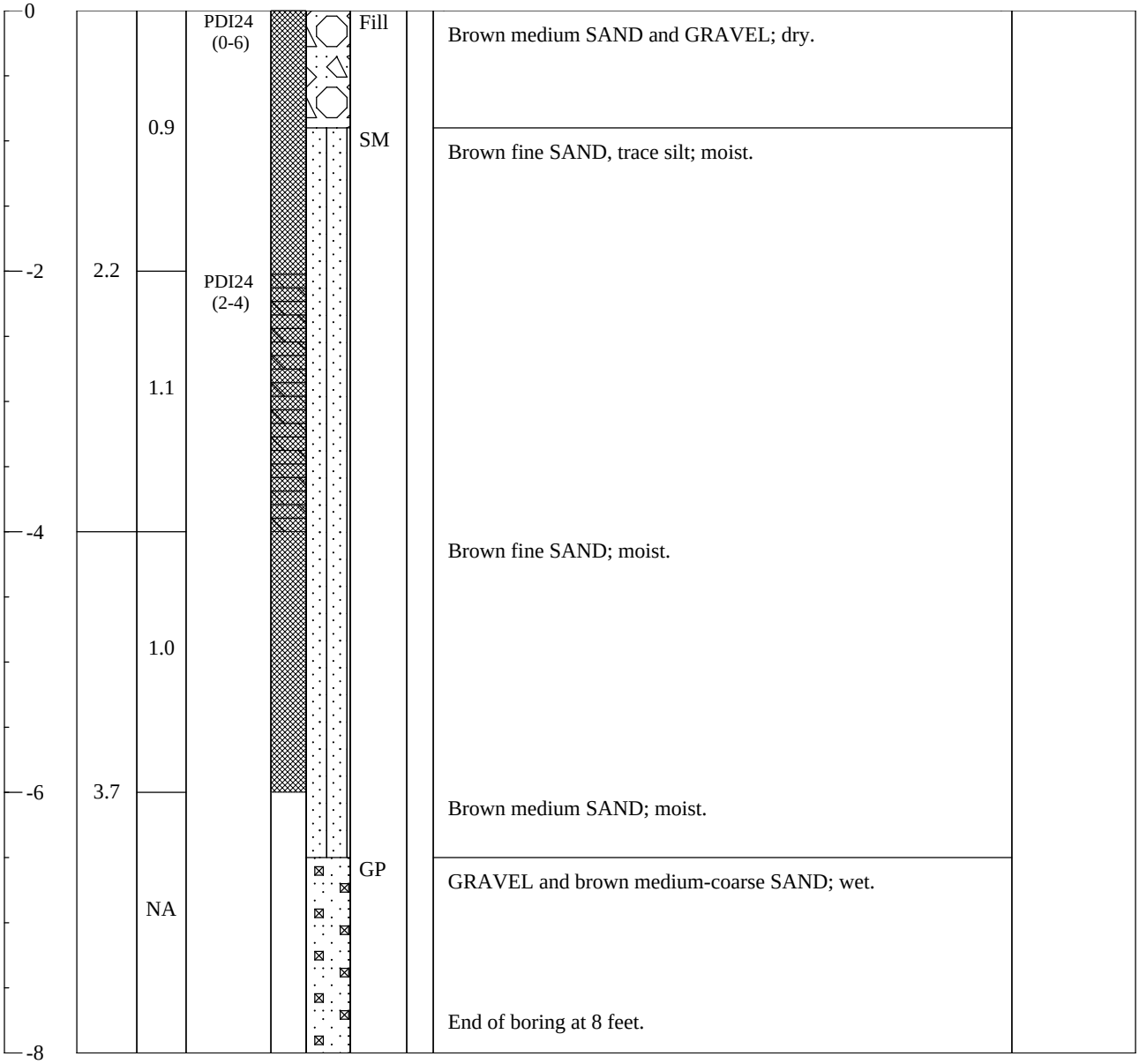
AECOM

1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI24

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: North of 37 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Sample PDI24(0-6) was analyzed for waste characterization suite.
Sample PDI24(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI25/ISS3

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-030-0002
Date Started/Completed: 4/2/09
Boring Location: North of 41 Front Street
Drilling Company: Paragon

Drilling Method: Hollow stem auger
Sampling Method: Macro-core, 3-inch split spoon
Total Depth: 22 feet
Logged By: Scott Harrigan

Depth (Feet)	Blow Counts	Recovery (Feet)	PID (ppm)	Sample ID	Sample Interval	Lithology	USCS	Visual Impacts	Description	Remarks
0	3,1, 1	See Note 1	0.9	PDI25 (0-6)			Fill		Asphalt and gravel; dry.	Boring was started at 0.5 ft bgs.
-2	4,10, 10,10	3.7	1.4	PDI25 (2-4) ISS3 SAND (2-4)			SM		Brown fine SAND; moist.	
-4	6,6, 5,5	2.0	1.1	ISS3 GRAVEL TOP (4-6)			GP		Brown medium SAND and GRAVEL; moist.	
-6	5,6, 7,6		8.9							
-8	3,4, 3,4	0.8	15.6						Brown GRAVEL and SAND; moist, little brown non-viscous NAPL, moderate staining, moderate hydrocarbon like odor.	
-10	4,6, 10,7	2.0	379	ISS4 GRAVEL BOTTOM (10-12)					Gray medium coarse SAND and GRAVEL; wet, moderate staining, strong hydrocarbon like odor.	
-12	5,6, 10,7	0.9	88						Gray coarse SAND and rounded GRAVEL; wet, strong hydrocarbon like odor.	
-14	7,4, 4,4	1.1	11.6						Gray coarse SAND and GRAVEL; wet, moderate hydrocarbon like odor.	
-16	4,5, 7,7	1.5	1.6						Gray coarse SAND and rounded GRAVEL; wet, slight hydrocarbon like odor.	
-18	3,2, 4,3	1.8	1.8				CL		Brown firm CLAY, little gravel; wet.	
-20	2,3, 4,5	1.7	2.0						Gray firm CLAY; wet.	
-22									End of boring at 22 ft bgs.	

Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

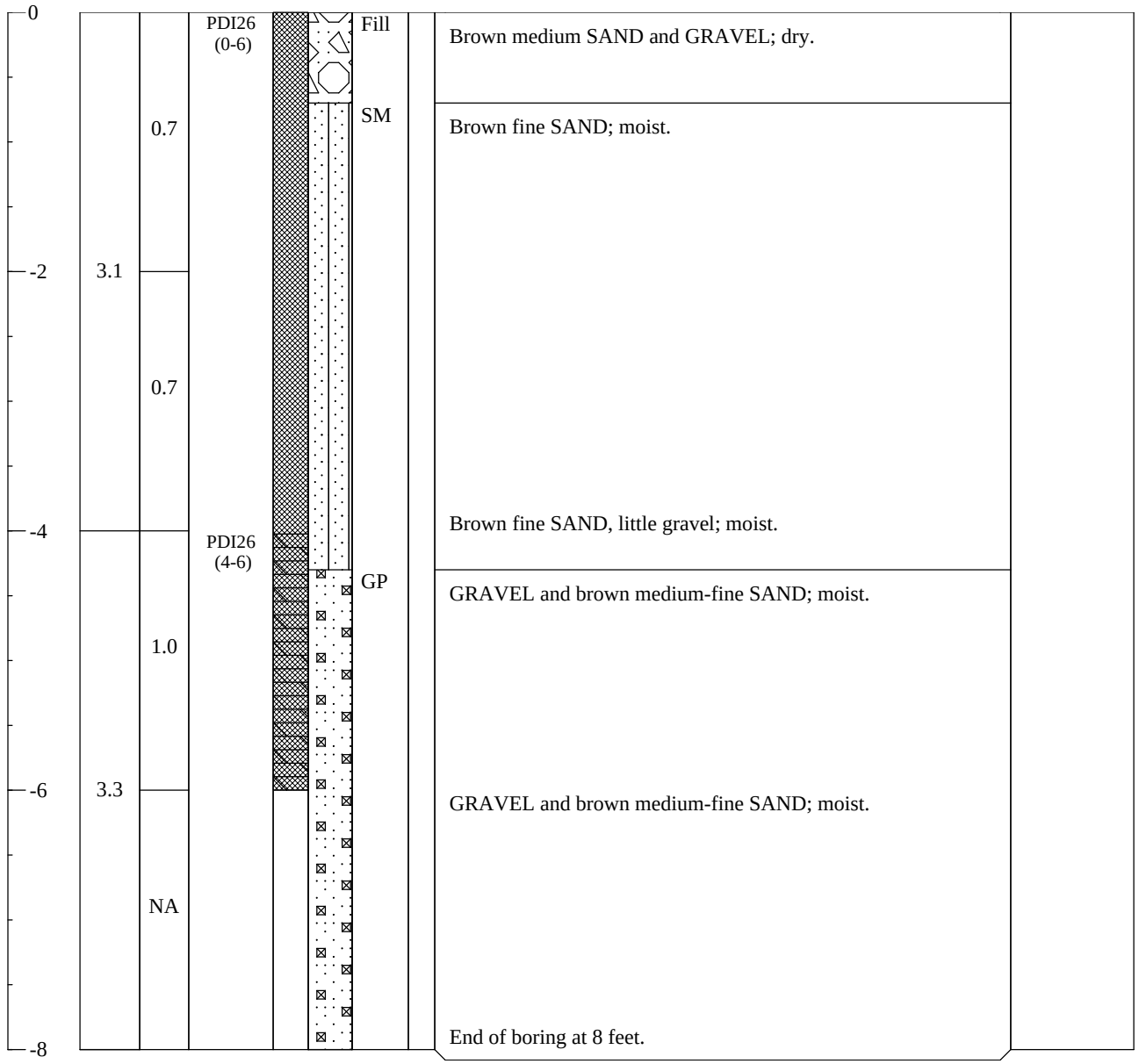
Comments: Note 1 - Boring was sample with a 4 ft macro-core from 0-8 ft bgs, then with a 2 ft split spoon to obtain blow counts. Sample PDI25(0-6) was analyzed for waste characterization suite. Sample PDI25(2-4) was analyzed for VOCs. ISS23SAND(2-4), ISS3GRAVELTOP(4-6), ISS4GRAVELBOTTOM(10-12) were sampled for grain size. Shelby tubes were collected from the sand unit (1-3.5 feet bgs) and the gravel unit (15-17.5 feet bgs).

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI26

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: North of 41 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

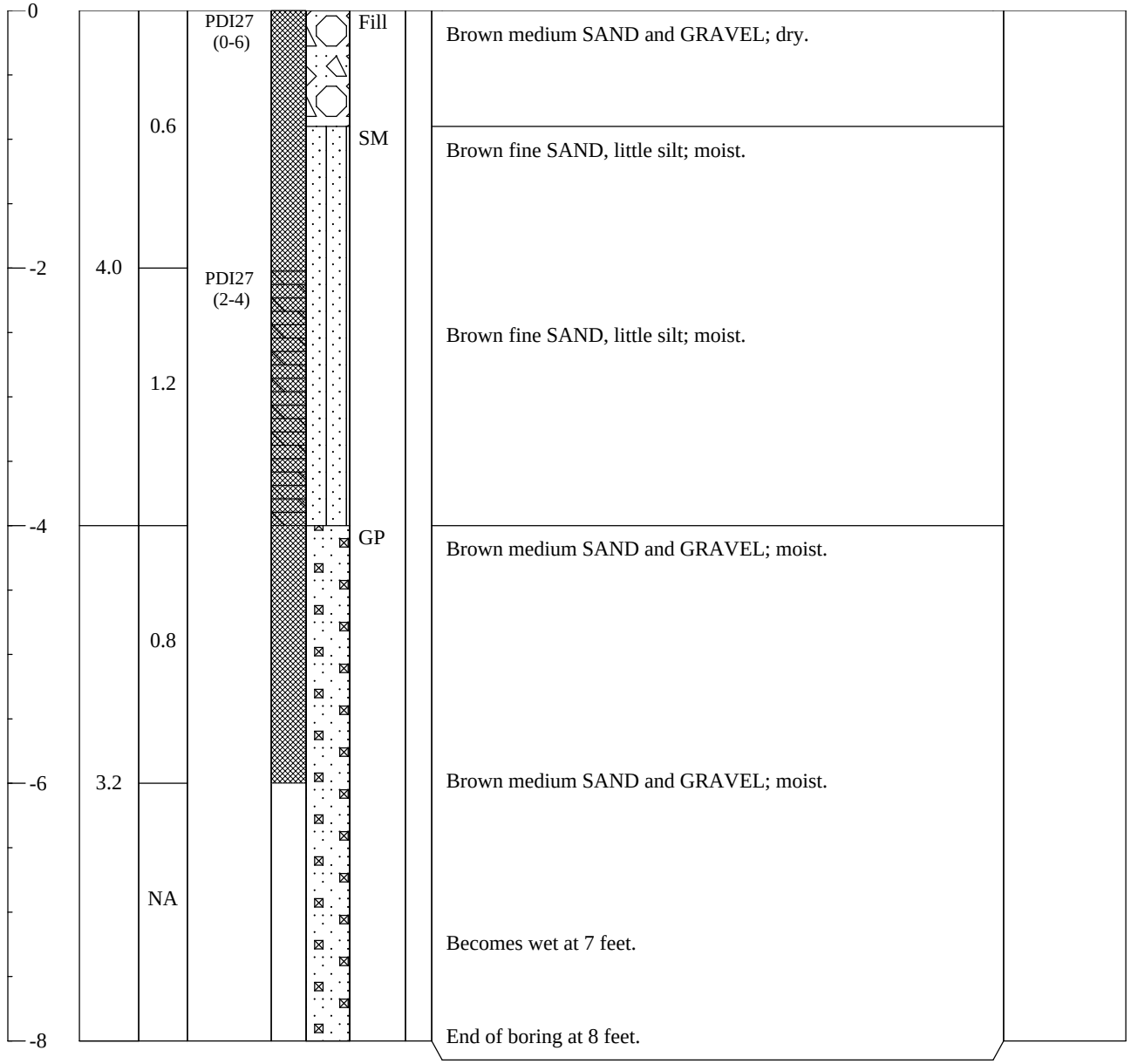
Comments: Sample PDI26(0-6) was analyzed for waste characterization suite.
Sample PDI26(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI27

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: Northwest of 41 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

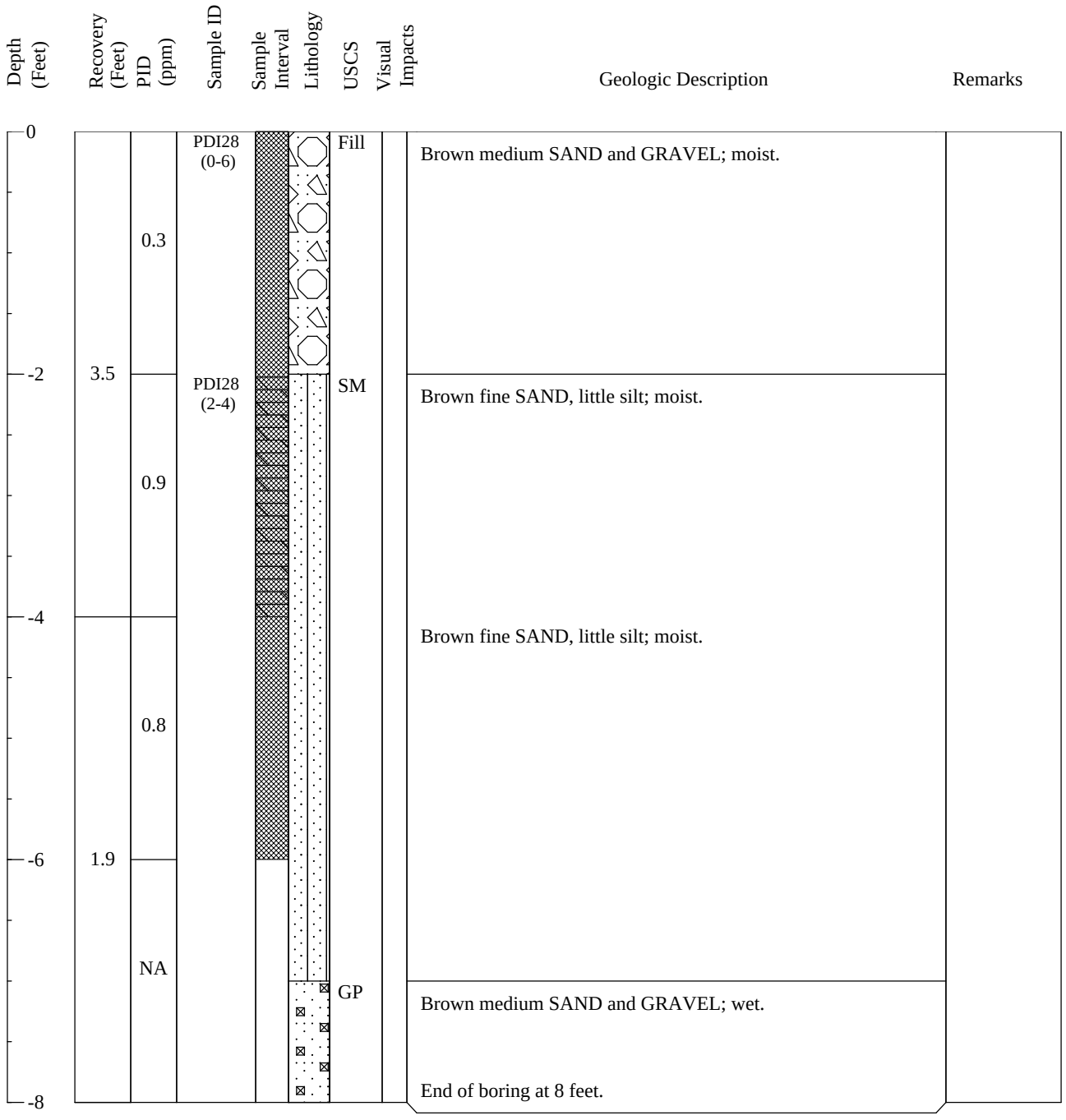
Comments: Sample PDI27(0-6) was analyzed for waste characterization suite.
Sample PDI27(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI28

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: North of 41 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Sample PDI28(0-6) was analyzed for waste characterization suite.
Sample PDI28(2-4) was analyzed for VOCs.

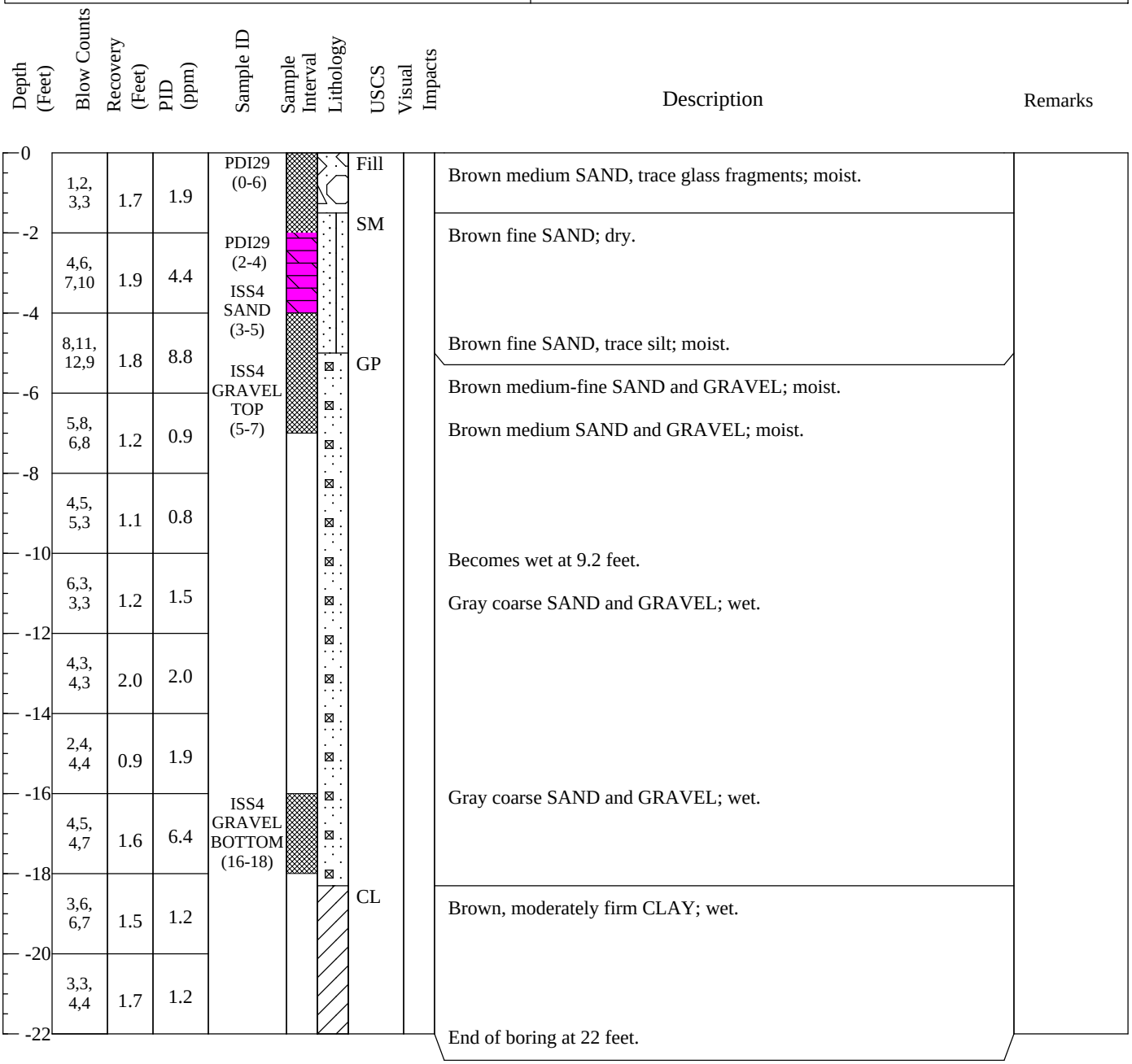
AECOM

1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI29/ISS4

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-030-0002
Date Started/Completed: 4/2/09
Boring Location: Plaza parking lot
Drilling Company: Paragon

Drilling Method: Hollow stem auger
Sampling Method: 3-inch split spoon
Total Depth: 22 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil

Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

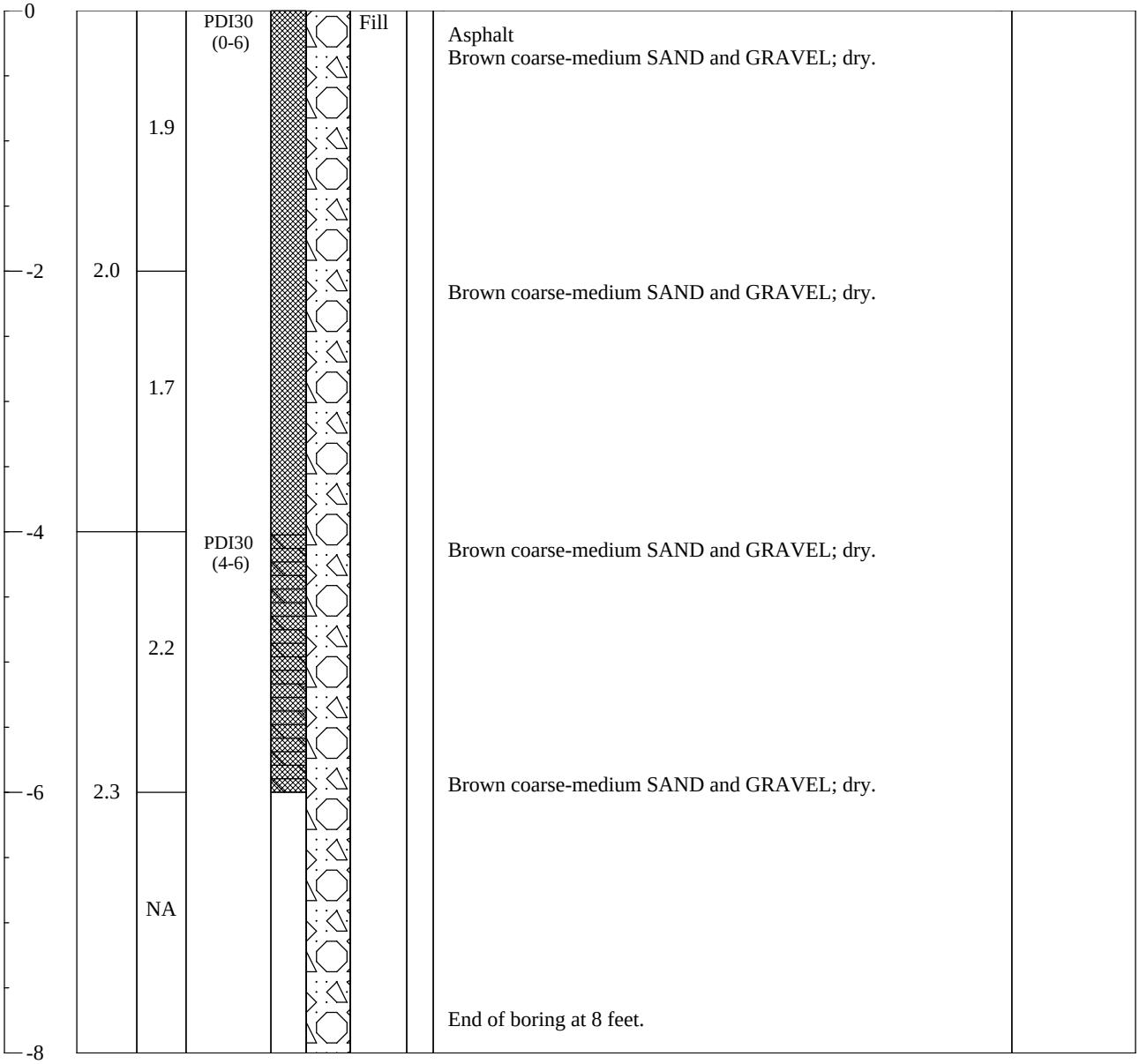
Comments: Sample PDI29(0-6) was analyzed for waste characterization suite. Sample PDI29(2-4) was analyzed for VOCs. ISS4SAND(3-5), ISS4GRAVELTOP(5-7), ISS4GRAVELBOTTOM(16-18) were sampled for grain size.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI30

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 3/31/09
Boring Location: North of 41 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

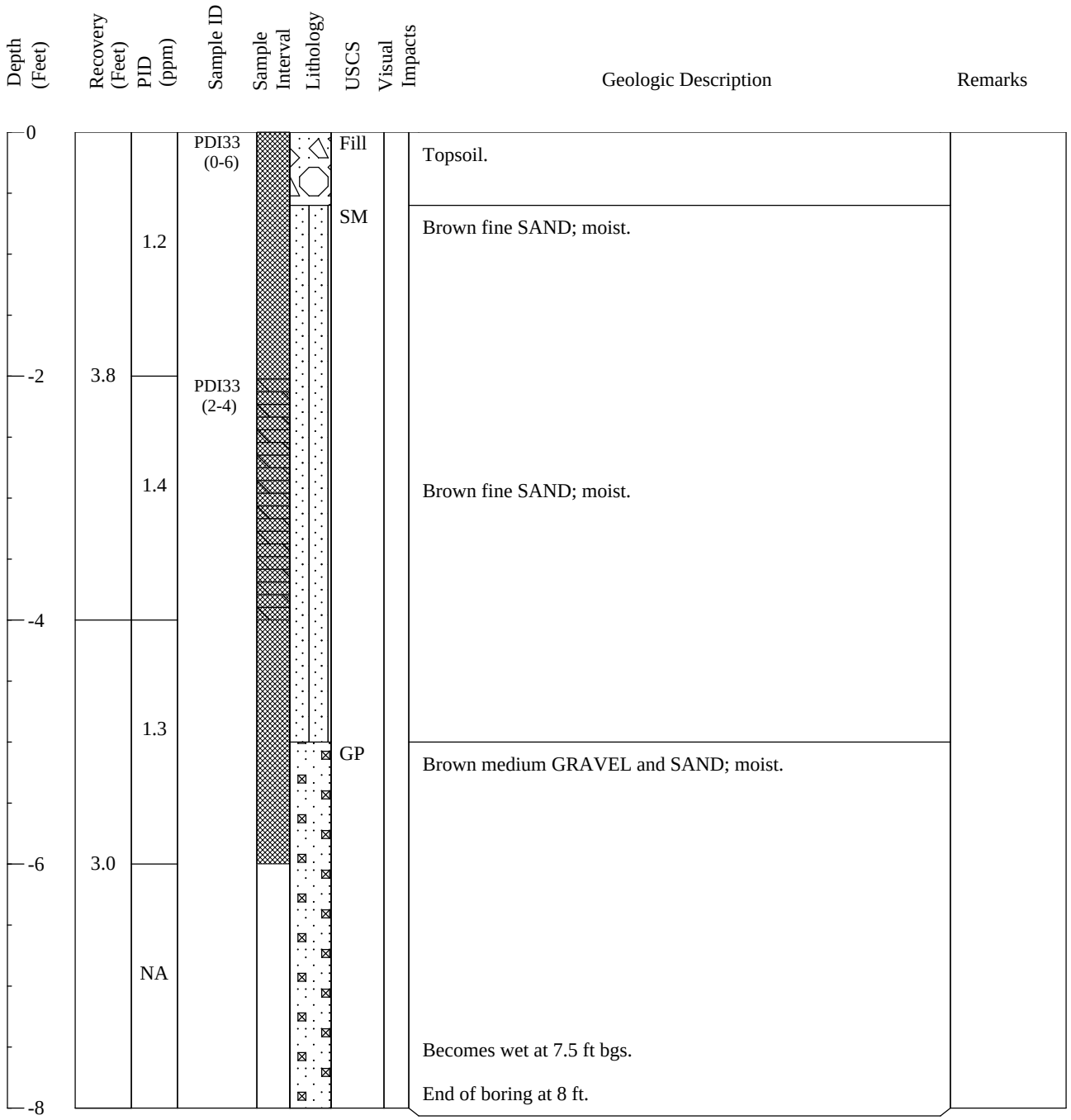
Comments: Sample PDI30(0-6) was analyzed for waste characterization suite.
Sample PDI30(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI31

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 4/1/09
Boring Location: West of 41 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

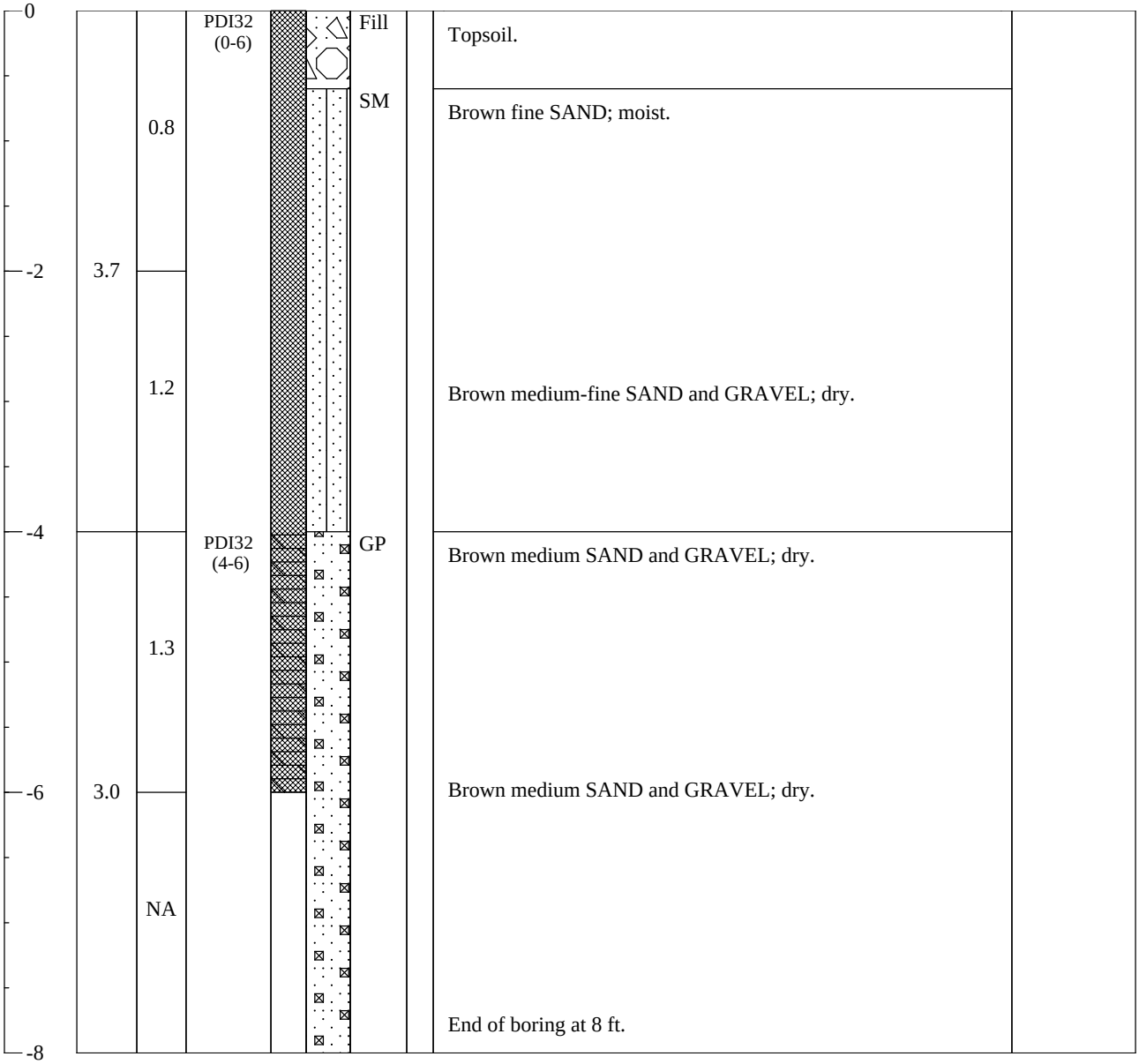
Comments: Sample PDI31(0-6) was analyzed for waste characterization suite.
Sample PDI31(2-4) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI32

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 4/1/09
Boring Location: South of 37 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

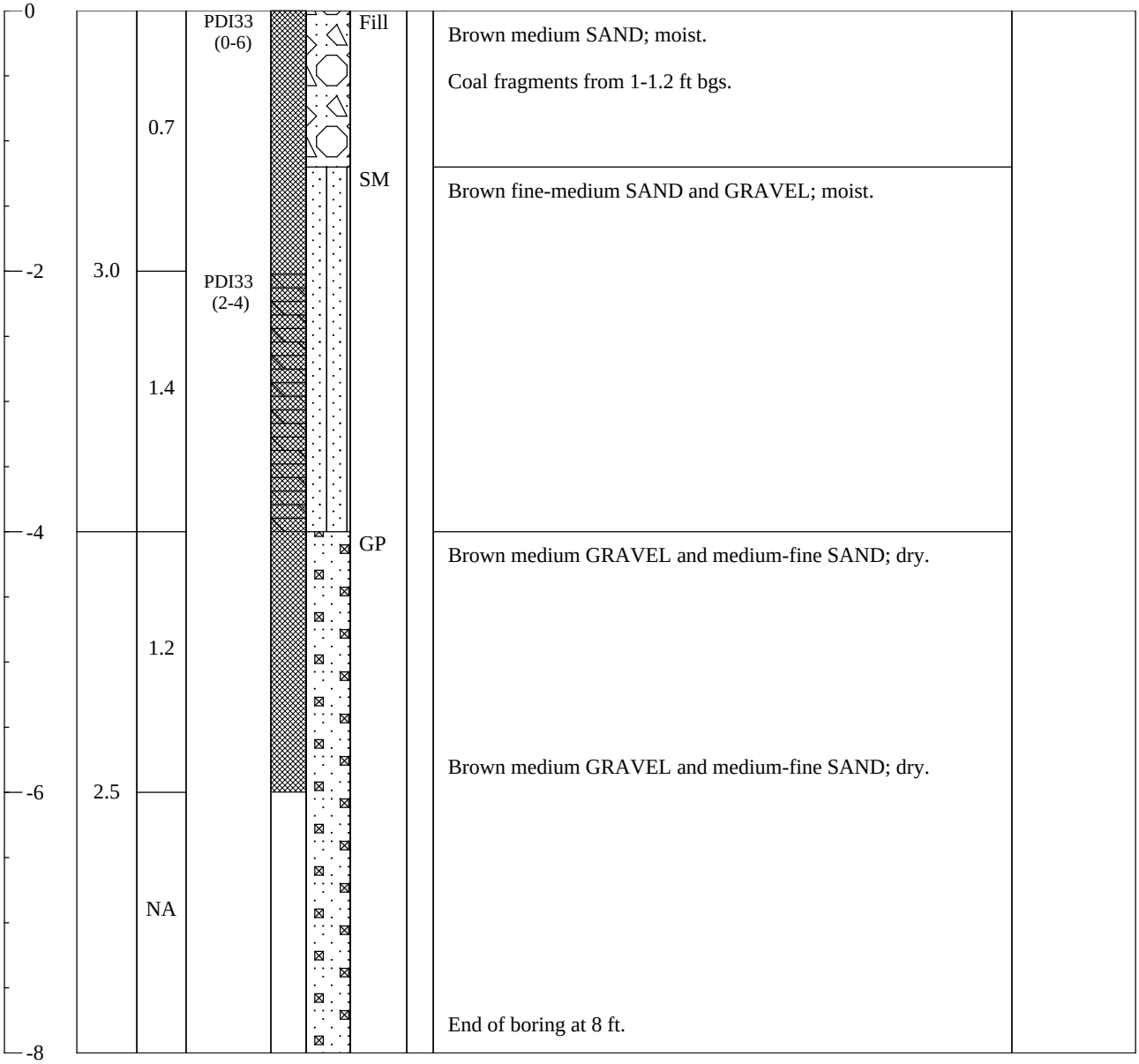
Comments: Sample PDI32(0-6) was analyzed for waste characterization suite.
Sample PDI32(4-6) was analyzed for VOCs.

AECOM
1001 West Seneca Street, Suite 204
Ithaca, New York, 14850

Boring ID: PDI33

Project Name: Norwich Pre-Design Investigation
Client/Project Number: NYSEG/04964-031-0002
Date Started: 4/3/09
Boring Location: North of 37 Front Street
Drilling Company: Paragon

Drilling Method: Direct Push
Sampling Method: 4 ft Macro-core
Ground Elevation (ft/msl, NAVD 88): NA
Total Depth: 8 feet
Logged By: Scott Harrigan



Coal Tar or Coal Tar NAPL Saturated Soil Hydrocarbon Staining, Hydrocarbon Sheen or NAPL Blebs

Comments: Samples PDI33(0-6) and PDI33(2-4) were analyzed for waste characterization suite.

Appendix F

Groundwater Modeling Memorandum

AECOM
40 British American Boulevard, Latham, New York 12110
T 518.951.2200 F 518.951.2300 www.aecom.com

Memorandum

Date: October 8, 2009

To: Scott Underhill, AECOM

From: Reeti Doshi, AECOM

Subject: Groundwater Modeling using Visual MODFLOW, Former Norwich MPG Site, Norwich, NY

Distribution: Dustin Winn File
Carsten Floess File

Introduction

This memo summarizes the method and assumptions used to prepare the groundwater flow model for the Norwich Former MGP Site (Site) located in Norwich, NY (Figure 1). The objective of the model was to evaluate the potential impact on the groundwater flow regime in response to in-situ solidification (ISS) of the contaminated areas on-site and off-site. The areas where the ISS is proposed are shown on the Figure 2. Visual MODFLOW version 2009.1 was used to create the groundwater model for the Site.

The model was created with two layers, each layer containing 289 rows and 190 columns spaced 5 ft apart from each other (Figure 3). The model area was selected to include all groundwater monitoring points at and around the Site. The Site boundary extends far enough in all directions to minimize the effects of the boundary conditions on the targeted model area (i.e., area immediately around the former MGP property). The two vertical layers for the Site included: Layer 1 the saturated sandy soils and Layer 2 the underlying confining clay layer. The Norwich groundwater model was set up in steady state.

Model Input and Calibration

The top of the Layer 1 was defined by importing the ground-surface elevations from the survey (Figure 4). The top of the Layer 2 was defined by importing the clay layer elevations (Figure 5), which was developed from the top of clay contour from the Final Supplemental Remedial Investigation (RI) Report (Ish Inc., October 2006). The groundwater elevations monitored on December 6, 2005 were imported into the model as the observation well heads. The groundwater elevations were taken from the RI Report.. The groundwater elevation contours based on the observed head values are depicted on Figure 6 and were used to calibrate the model.

Horizontal hydraulic conductivities for the Site soils ranged from 4.22 ft/day to 153 ft/day with the median conductivity of 30 ft/day, as determined during the RI (Ish Inc., October 2006). The hydraulic conductivity of the Layer 1 was assumed to be 30 ft/day (10^{-2} cm/s) and the conductivity of the Layer 2 (clay) was assumed to be an impermeable layer with a conductivity of 0.0288 ft/day (10^{-6} cm/s). Hydraulic conductivities were assumed to be constant for both layers.

The hydraulic conductivity of the ISS monolith will have a hydraulic conductivity of no greater than 10^{-6} cm/sec (0.0288 ft/day). For the purpose of this model, the model cells falling within the ISS monolith were assumed to be inactive (i.e., impermeable).

The general groundwater flow direction in the modeled area is towards the south. General boundary conditions were assigned to the northern boundary of the model area. The groundwater head elevation at 500 ft north of the boundary was assumed to be 995.63 ft. The conductance was calculated by the

default formula by the MODFLOW. A constant head boundary was assigned to the southern boundary of the model area based on the interpolation of the observed groundwater elevation contours. From west to east, constant head elevations ranged from 993.1 to 991.1 ft. No flow boundaries were assigned to the east and west boundaries of the model area.

The recharge and evapotranspiration was effective only in the first layer. The southern half of the model area and a small unpaved area (Figure 7) in the upper east portion of the Site were assumed to contribute to groundwater recharge (resulting from rainfall and melting snow). The rest of the Site was assumed to be completely paved and have minimal contribution to groundwater recharge. Evapotranspiration was assumed for the southern half of the model area and no evapotranspiration was assumed for the upper half of the model area.

The model was calibrated with varying the hydraulic conductivity and recharge/evapotranspiration rates in Layer 1. The parameters used for each calibration trial are listed in Table 1. The calibrated model that showed the best fit to between observed and calculated heads had a hydraulic conductivity of 50 ft/day, a recharge rate of 4 inches/year and an evaporation rate of 2 inches/year. The calibrated groundwater elevation contours are presented in Figure 8. The groundwater model calibration appears sufficient based on the following factors:

- A plot of observed versus calculated head values for most wells clusters around the 1:1 ration line, indication a good overall match within the model (Figure 9).

- The absolute residual mean for the model output is 0.227 ft. Using a standard United States Geological Survey (USGS) value of the range in the model head (highest groundwater elevation 995.65 ft – lowest groundwater elevation 991.22 ft = 4. 43 ft) multiplied by 5%, an error target of 0.222 ft is acceptable. Therefore, the overall model calibration meets USGS standards for groundwater models.

- The 1:1 ratio line was between the 95% confidence interval lines (Figure 9), indicating the model results are acceptable. The normalized root mean square for the model was 7.176%, the lowest of the nine calibration simulations performed.

In-Situ Solidification (ISS) Simulation Methodology

The footprint for ISS subsequently used to manipulate the model hydraulic conductivity (K) values taken from the AECOM 2009 Remedial Design Work Plan (RDWP) prepared in accordance with the Record of Decision (ROD). The model grid cells located within the ISS footprint were identified and the cells within this area were turned off (i.e., assigned a hydraulic conductivity of 0) to conservatively model groundwater impacts upgradient of the ISS monolith.

The calibrated model was then run with inactive cells within the ISS treatment area to evaluate groundwater response. The groundwater elevation contours generated by the calibrated MODFLOW are shown in Figure 10. The changes in head, groundwater velocity, and groundwater direction were evaluated within and around the treatment zone.

Model Simulation Results

Visual

Qualitatively, head contours did not vary significantly from the ISS simulation as compared to the initial model results. The water table rose by less than 0.1 ft behind the ISS monolith. In addition, groundwater head contours refract around the ISS location. Both of these results are expected in response to emplacing a low-K unit within a flow system (Winter, 1998; Schwartz and Zhang, 2003); therefore the model simulation response is commensurate with mathematical understanding of fluid flow through porous media.

Velocity Vectors

The velocity of groundwater increases in response to the ISS, which is around the ISS monolith. The velocity vectors are presented in the Figure 11. The directional component of the vectors in response to the ISS is shown in Figure 12, and when compared to the pre-ISS conditions (Figure 8), show only marginal influences at distances of 100 ft or greater from the ISS monolith.

Conclusions and Recommendations

The Norwich Groundwater Model determined that the effects of ISS on a local groundwater flow regime should be minimal. ISS does not appear to pose a serious risk of disrupting the groundwater flow and causing flooding of local basements. The calculated groundwater elevations increased by no more than 0.1 ft due to ISS. Hence, no significant effect on the groundwater elevation is anticipated in the model area due to the creation of the ISS monolith.

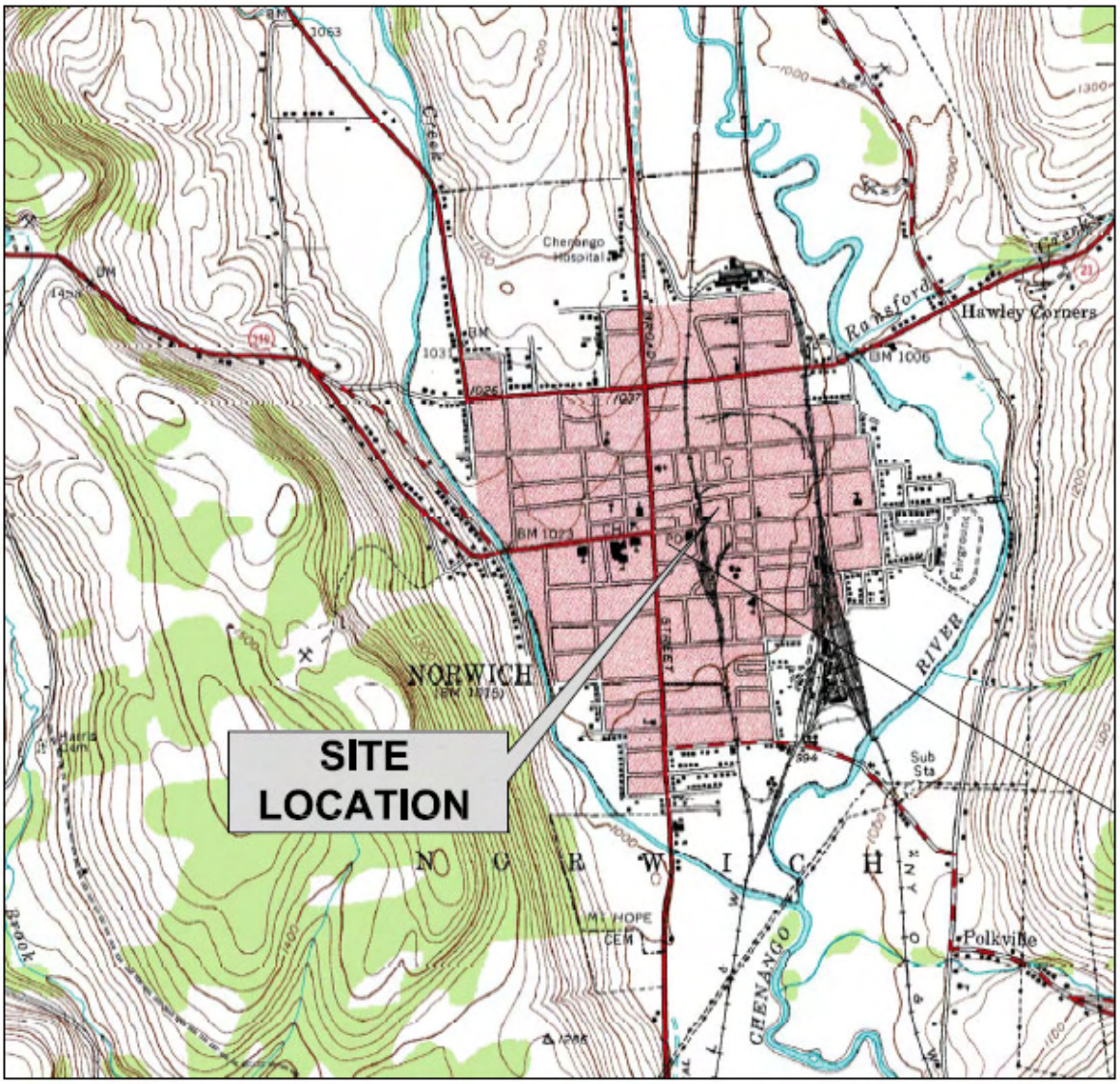
TABLES

AECOM

Table 1 - Summary of Calibration Trials
Former Norwich MPG Site
Norwich, NY

Trial	Layers	Conductivity (ft/day)	Boundary Condition	Other Changes/Notes	Visual Observation	Result (Normalized RMS)
1	Layer 1: From ground surface to top of clay, Layer 2: From clay layer down	30 ft/day for Layer 1 and 0.0288 ft/day for Layer 2	--	Observed GW elevations imported, and 5 ft by 5 ft grid was set up	The GW contours ranged from 991.4 to 992.9 instead of target 991 to 995.5 range	--
2	Same as Above	25 ft/day for Layer 1 and 0.0288 ft/day for Layer 2	North: General Head Boundary, at 500 ft distance GW elevation = 996 ft and conductivity = 25 ft/day South: Constant head Boundary, from west to east 992.75 ft, 992.25 ft, 991.75 ft, 991.25 ft	--	GW elevation was higher in the northern portion and lower in the southern portion compared to target contours	1:1 ratio line was not between 95% confidence interval, Normalized RMS = 11.99%
3	Same as Above	Same as Above	Same as Above	Assigned Recharge rate of 4 in/yr in southern half and 0 in/yr in the northern half. Assigned evapotranspiration rate of 2 in/yr to the southern half and 1 in/yr to the northern half of the site	GW elevations are higher than target elevations	1:1 ratio line was not between 95% confidence interval, Normalized RMS = 12.03%
4	Same as Above	50 ft/day for Layer 1 and 0.0288 ft/day for Layer 2	The GW elevation 500 ft from the northern boundary was changed to 995.5 ft from 996 ft for general head boundary conditions	Same as Above	GW elevations are lower in the middle of the Site and higher towards the southeastern portion	1:1 ratio line was not between 95% confidence interval, Normalized RMS = 9.53%
5	Same as Above	Same as Above	North: General Head Boundary, at 500 ft distance GW elevation = 995.75 ft and conductivity = 25 ft/day South: Constant head Boundary, from west to east 993 ft, 992.2 ft, 991.65 ft, 991.2 ft	Same as Above	GW elevations are higher in the northern portion, lower in the middle portion and a little higher in the southeastern portion	1:1 ratio line was between 95% confidence interval, Normalized RMS = 7.45%
6	Same as Above	Same as Above	North: General Head Boundary, at 500 ft distance GW elevation = 995.6 ft and conductivity = 25 ft/day South: Constant head Boundary, from west to east 992.9 ft, 992.2 ft, 991.5 ft, 991 ft	Same as Above	GW elevations were close to the target values in the northern portion of the Site, but were lower than target contours in the southern portion of the Site	1:1 ratio line was not between 95% confidence interval, Normalized RMS = 7.67%
7	Same as Above	Same as Above	North: General Head Boundary, at 500 ft distance GW elevation = 995.63 ft and conductivity = 25 ft/day South: Constant head Boundary, from west to east 993.1 ft, 992.2 ft, 991.55 ft, 991.1 ft	Removed GW 92-12 and GW 92-13	GW elevations in the northern portion of the site are close to the target values, in the middle portion they are lower than the target values and in the southern portion they are close to the target values	1:1 ratio line was between 95% confidence interval, Normalized RMS = 7.59%
8	Same as Above	Same as Above	Same as Above	GW 92-12 and GW 92-13 were again activated; Recharge rate of the northern half of the Site was changes to 4 in/yr from 0 in/yr	GW elevations in the northern and southern portions of the site were close to the target elevations but in the middle of the site they were lower than target values	1:1 ratio line was between 95% confidence interval, Normalized RMS = 7.20%
9	Same as Above	Same as Above	Same as Above	Recharge rate of 4 in/yr was assigned to a northeastern portion of the site	GW elevations in the northern and southern portions of the site were close to the target elevations but in the middle of the site they were lower than target values	1:1 ration line was almost in the middle of the 95% confidence interval; Normalized RMS = 7.17%

FIGURES



SOURCE: USGS NORWICH 7.5' QUADRANGLE
SCALE: 1" = 2000 FT.

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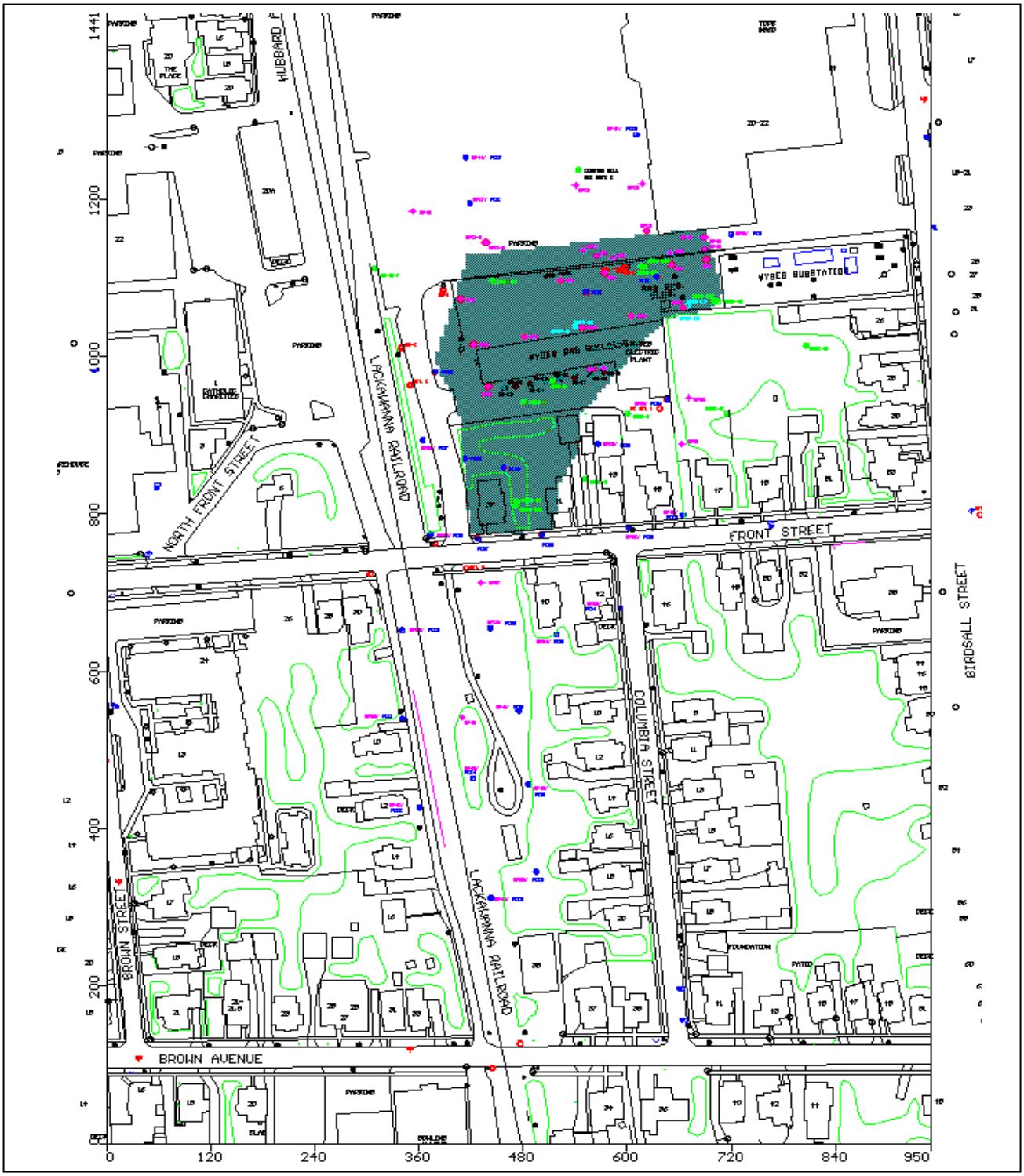
Figure 1: Site Location Map

AECOM

Date: 6/26/09

Project Number
106559



LEGEND

Shaded Area: ISS

Figure 2: ISS Location

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Date: 6/26/09

Project Number
106559

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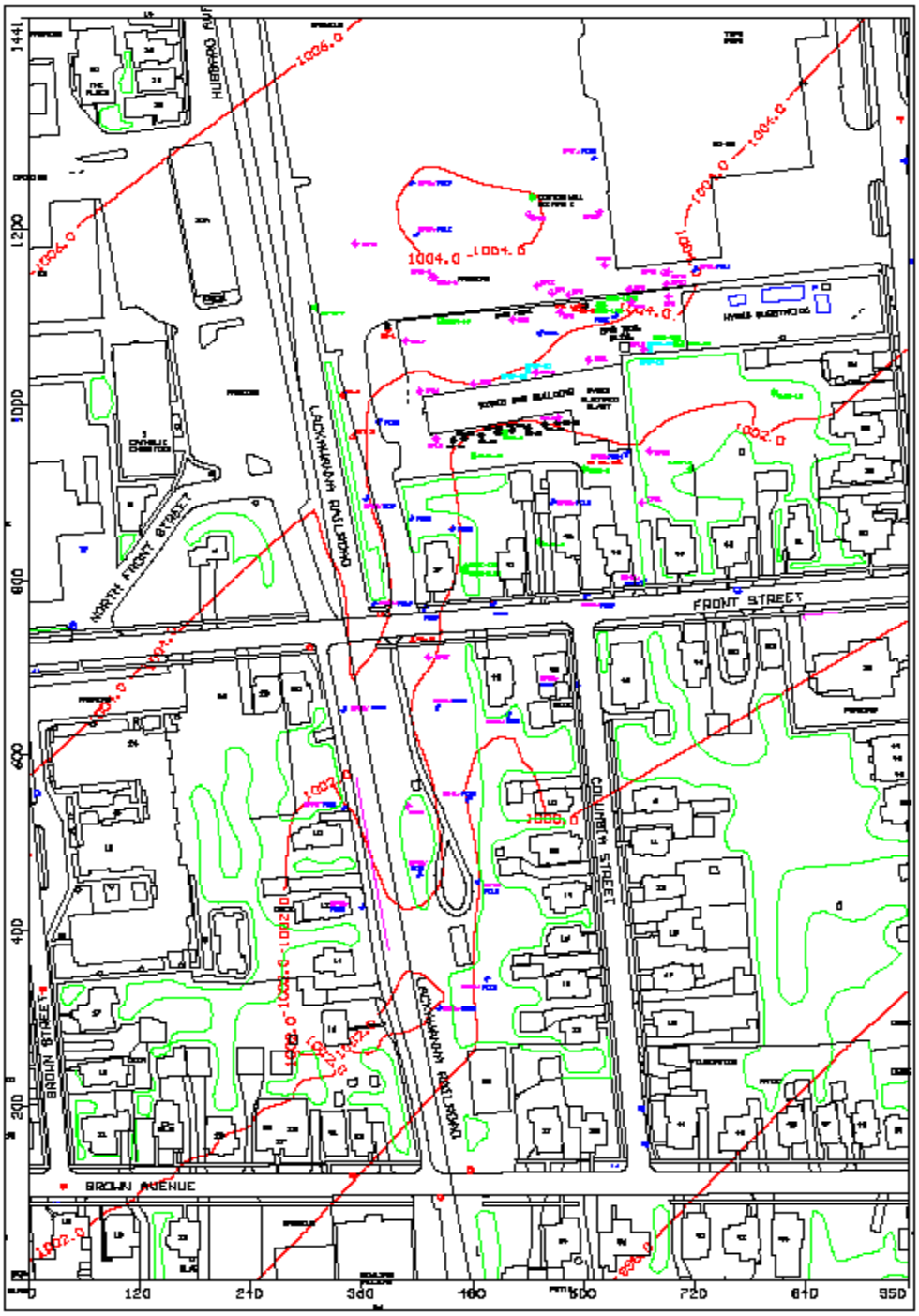
Figure 3: Model Area with Grids

AECOM

Date: 6/26/09

Project Number
106559



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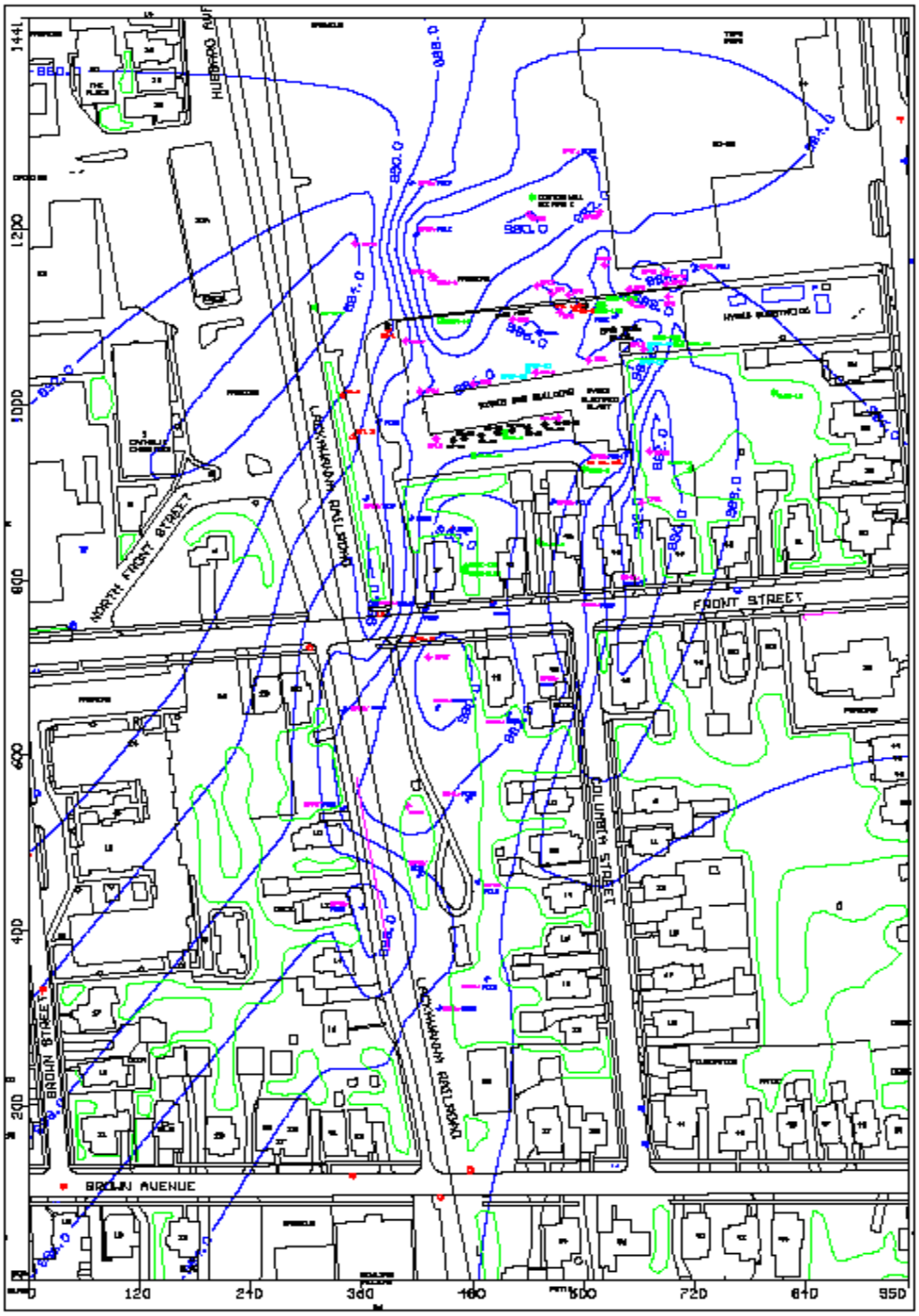
Contours: Ground Surface Elevation Contours

Figure 4: Ground Surface Elevation Contours

AECOM

Date: 6/26/09

Project Number 106559



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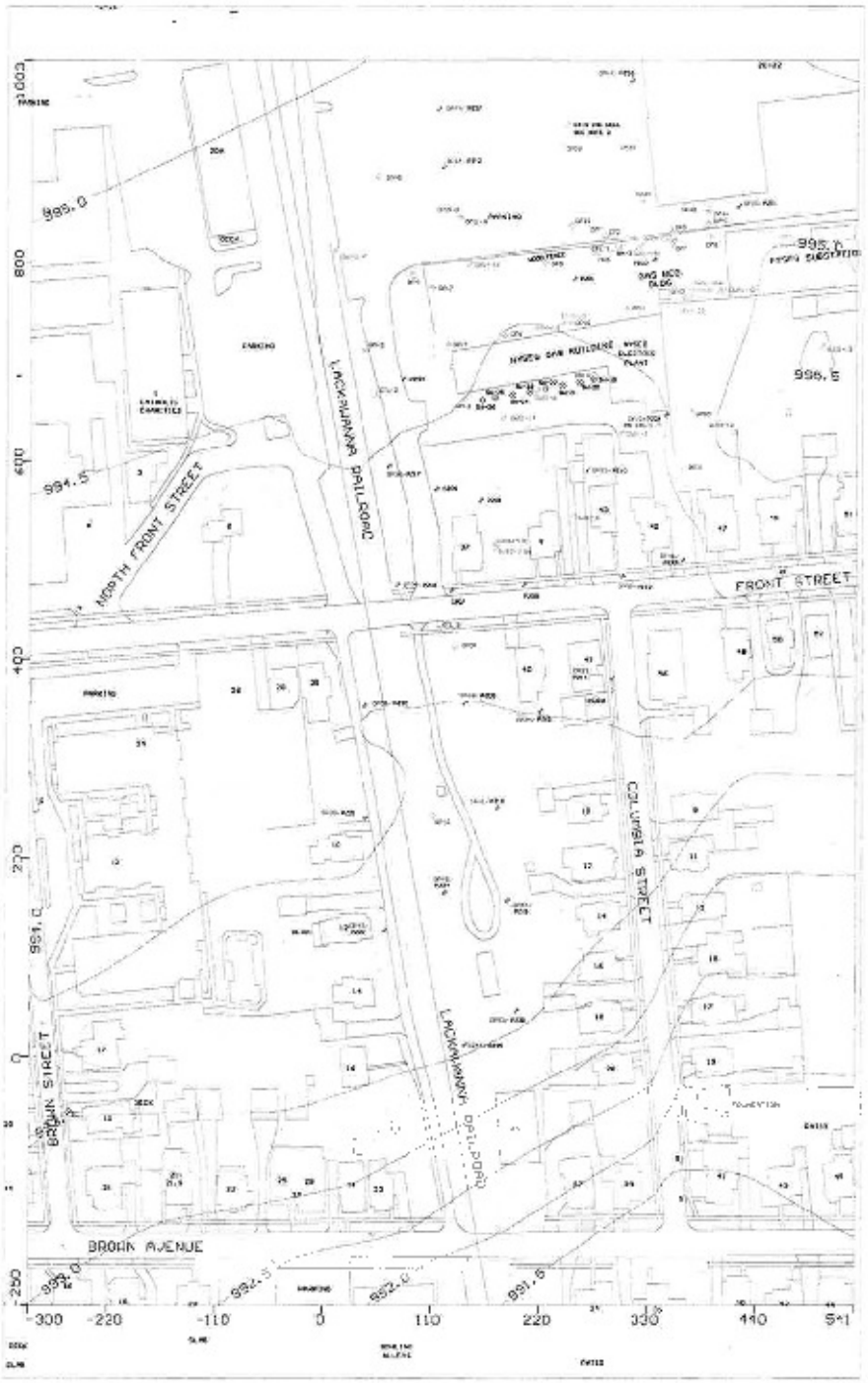
Contours: Clay Layer Elevation Contours

Figure 5: Clay Layer Elevation Contours

AECOM

Date: 6/26/09	Project Number 106559



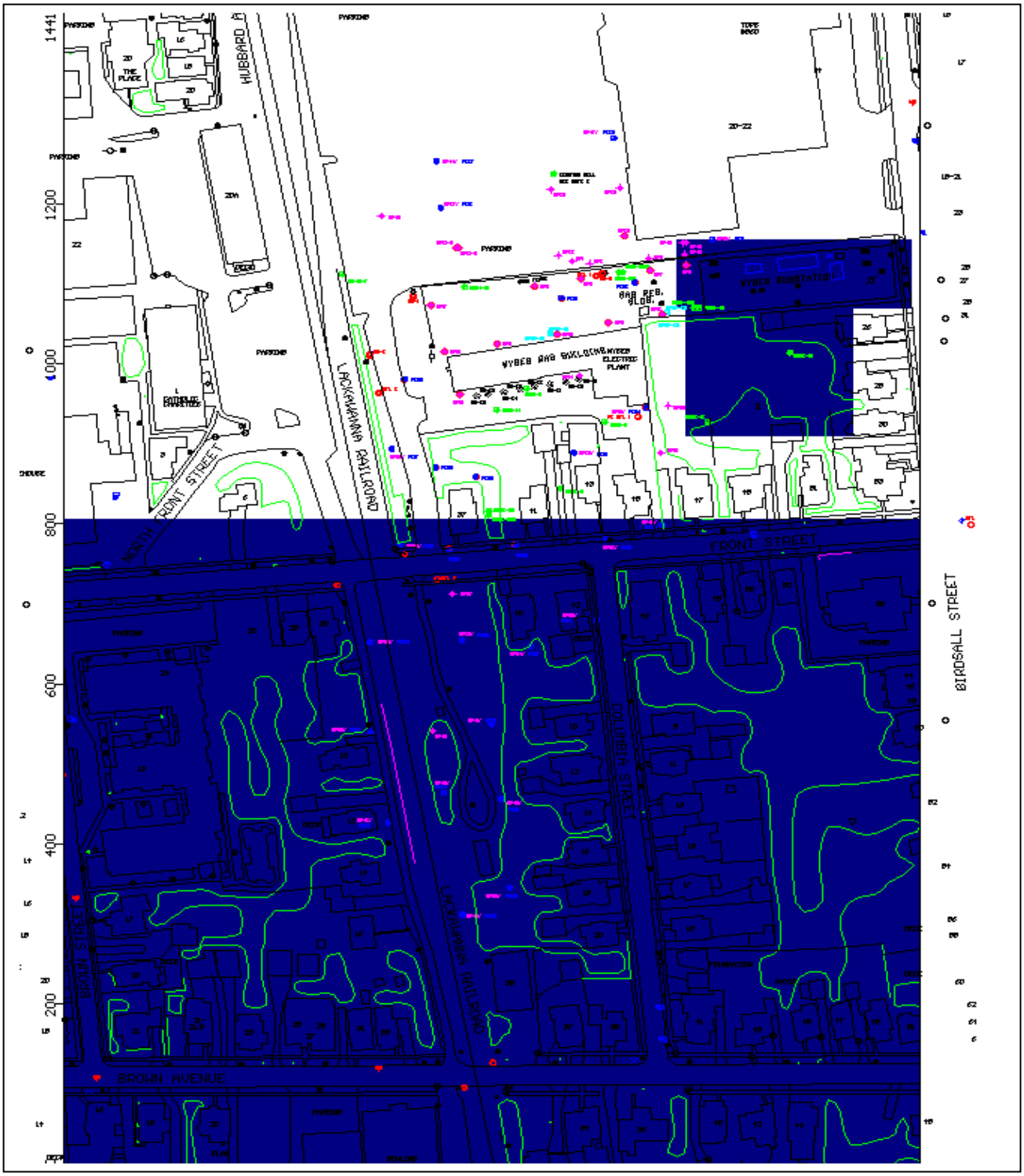
LEGEND

Figure 6: Groundwater Elevation Contours based on 12/6/05 Monitoring

AECOM

Date: 6/26/09

Project Number
106559



LEGEND

Blue Shaded Area: Area of Groundwater Recharge

Figure 7: Groundwater Recharge Area

AECOM

Date: 6/26/09

Project Number 106559

LEGEND

Contours: Elevation of Groundwater calculated by Modflow prior to ISS
Arrows: Direction of the Groundwater Flow

Figure 8: Groundwater Elevation Contours Calculated by Modflow

AECOM

Date: 6/26/09

Project Number
106559

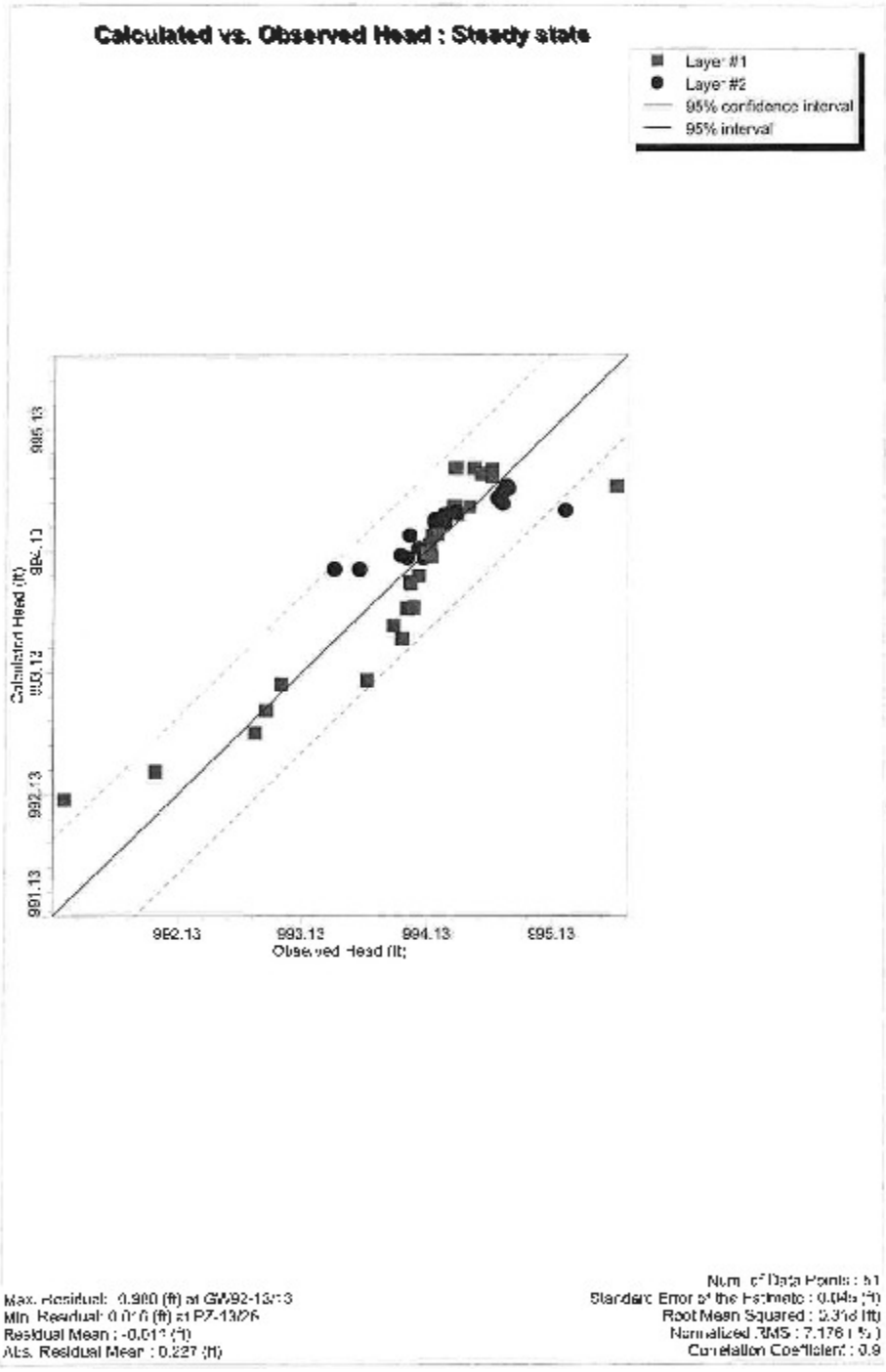


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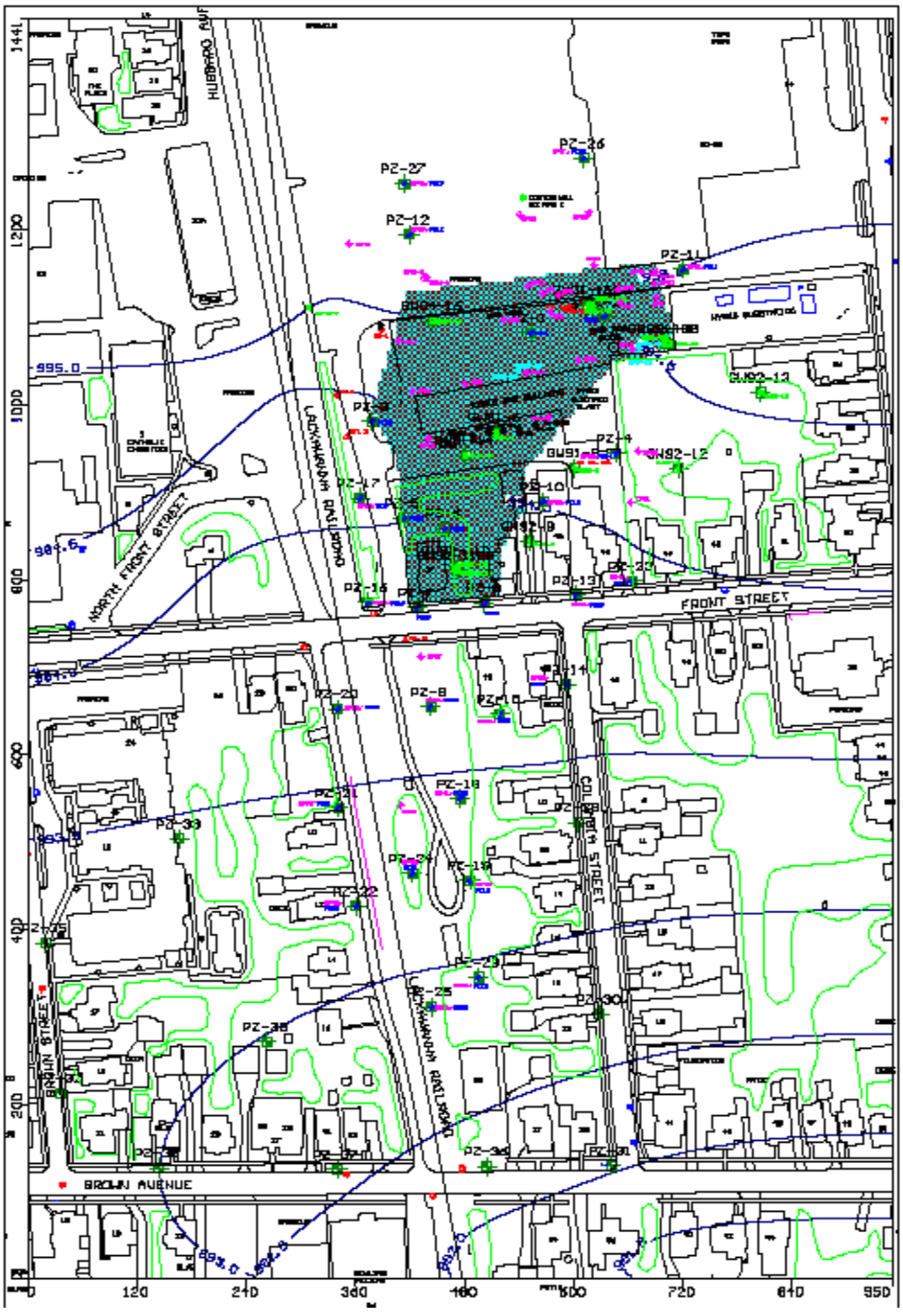
Figure 9: Observed Head Vs Calculated Head

AECOM

Date: 6/26/09

Project Number
106559



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Contours: Groundwater Elevation Contours after ISS

Figure 10: Groundwater Elevation Contours after ISS

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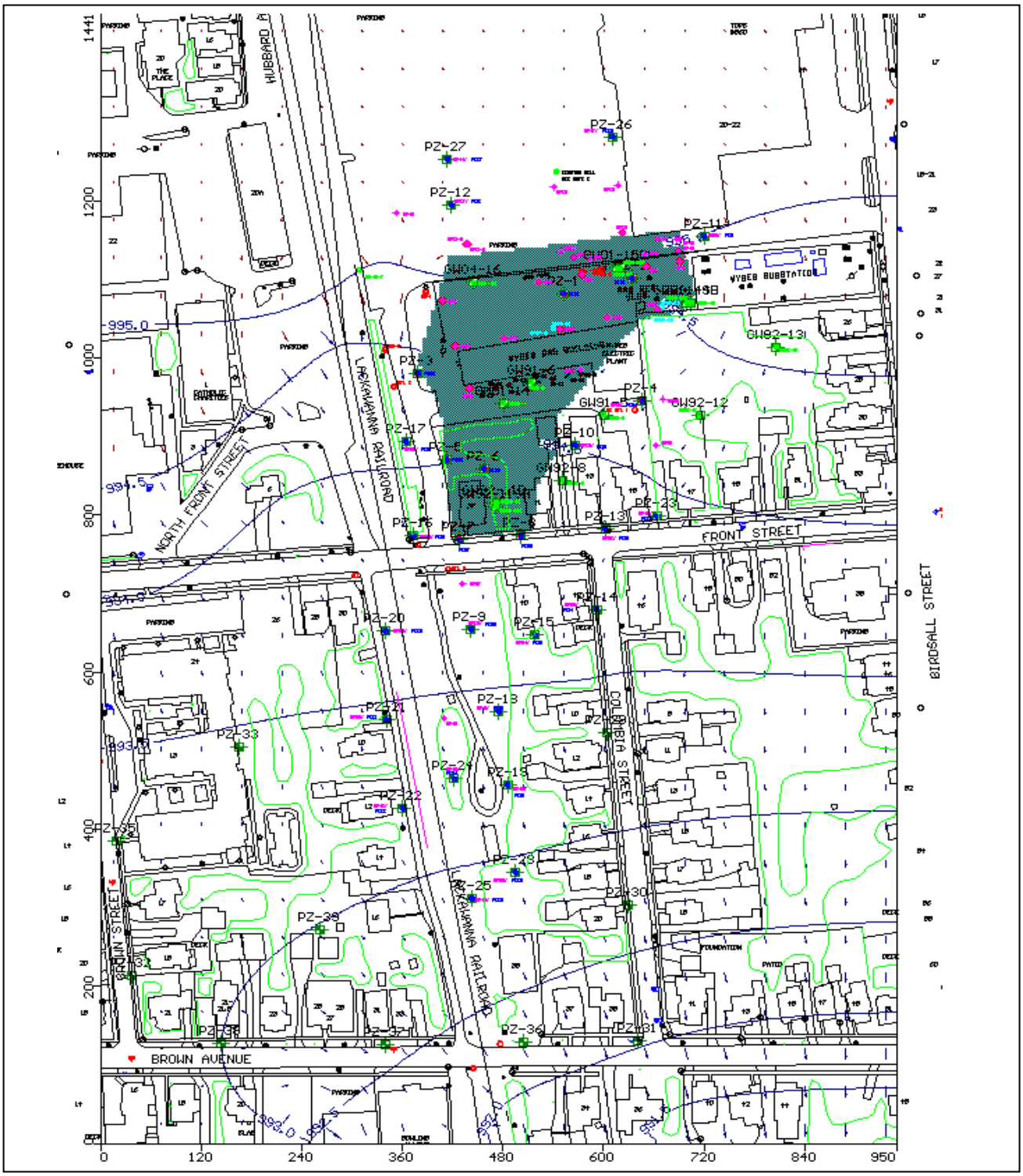
Date: 6/26/09

Project Number 106559



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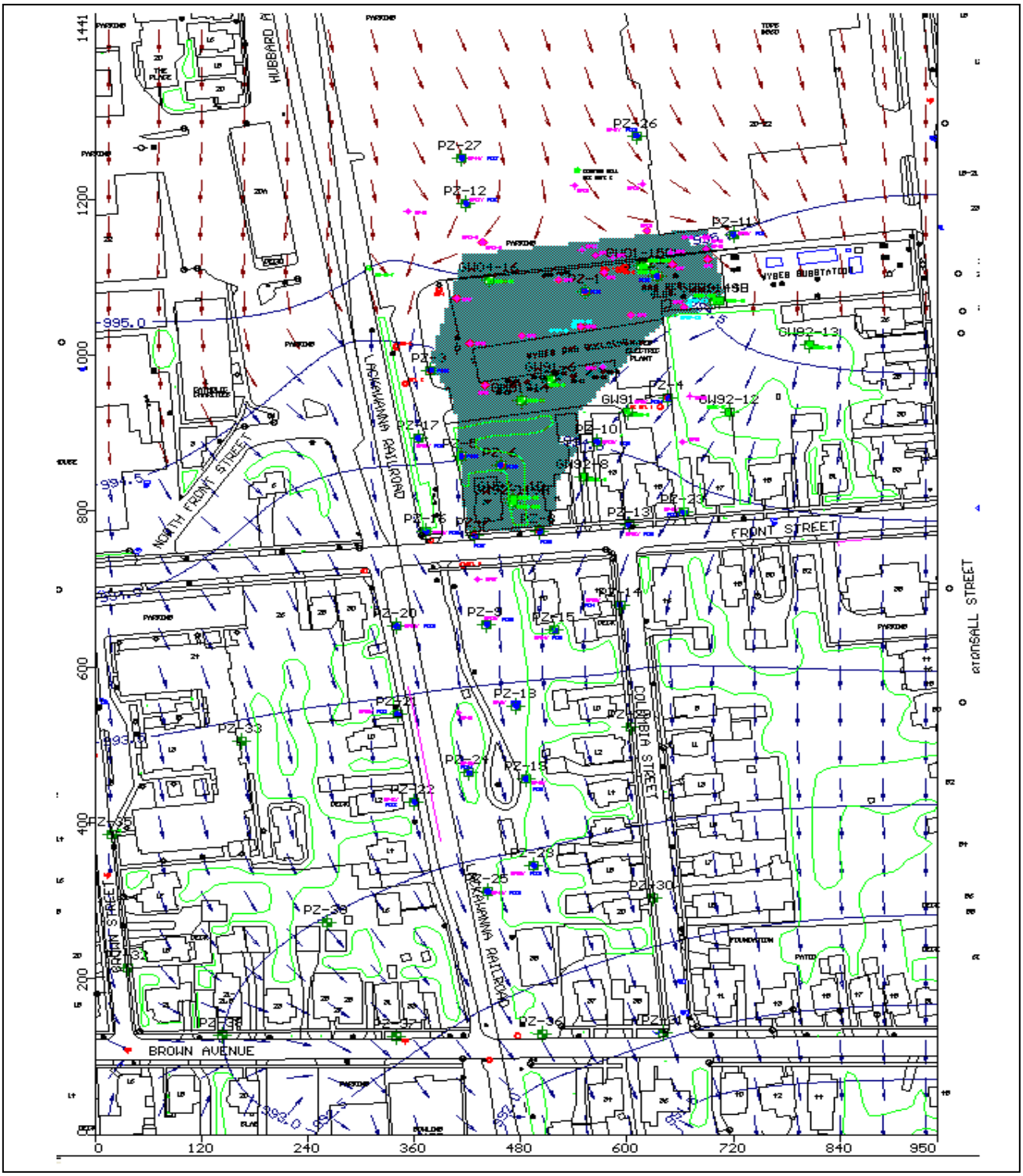
Shaded Area: ISS
Dashes: Groundwater Velocity Vector

Figure 11: Groundwater Velocity Vector after ISS

AECOM

Date: 6/26/09

Project Number 106559



LEGEND

Shaded Area: ISS
Arrows: Groundwater Flow Direction

Figure 12: Groundwater Flow Direction after ISS

AECOM

Date: 6/26/09

Project Number
106559

Appendix G

Community Air Monitoring Plan

Final Phase 1
Remedial Design Report
Community Air Monitoring Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
New York State Department of Environmental Conservation
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Final Phase 1
Remedial Design Report
Community Air Monitoring Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
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Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Author: Scott T. McDonough

Title: Environmental Engineer

Date: May 6, 2010

Reviewer: Scott Underhill, P.E.

Title: Project Manager

Date: May 6, 2010

Table of Contents

1.0 INTRODUCTION

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of the site when certain activities are in progress at contaminated sites. This CAMP was prepared for work associated with the Norwich Former Manufactured Gas Plant (MGP) site located in the Town of Norwich, Chenango County, New York and supplements the *Design Work Plan.*

2.0 PURPOSE

This CAMP is a companion document to the site-specific Health and Safety Plan (HASP). The HASP is directed primarily toward the protection of workers within the designated work zones. The CAMP is directed primarily toward the protection of the community downwind of site activities (i.e., off-site receptors including residences and businesses). This CAMP identifies action levels and subsequent responses to insure the safety of the downwind community. In addition, the CAMP aids in affirming that work activities do not spread constituents off site through the air.

3.0 AIR MONITORING

The constituents of concern at the Norwich former MGP site are volatile organic compounds (VOCs). VOCs will be monitored using a photo-ionization detector (PID) with a 10.2 eV lamp. Particulates will be monitored using a particulate air monitor equipped with a micro-processor to measure real-time measurements of airborne particulate concentrations in micrograms per cubic meter (ug/m^3).

Real-time air monitoring field logs will be maintained to allow for future interpretation of the logged data. Site conditions, weather conditions, work activities, implemented engineering controls, and periodic real-time VOC and total particulate readings will be recorded on field logs. Copies of all field logs will be available for review on a daily basis.

3.1 VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the upwind and downwind perimeter of the site on a continuous basis or as otherwise specified. Upwind concentrations will be measured to establish site specific background concentrations. In the event of minimal wind or frequent changes in wind direction, multiple locations will be monitored (i.e., three monitoring locations surrounding the work area).

Monitoring instrumentation will include a real-time PID monitor for VOCs equipped with a 10.2-eV lamp, which will be calibrated daily with a 100 parts per million (ppm) isobutylene air standard. Monitoring will be continuously logged by each of the air monitoring instruments during the course of daily operations and each instrument will have an visible light and telemetry/pager system to indicate when an action level has been exceeded. Each air monitoring instrument will be continuously downloaded and saved electronically to a dedicated computer located on-site. Each 15 minute average reading will be recorded during working hours along with the date, time, sampling location, wind direction, and weather conditions.

The *Vapor Emission Response Plan* describes the action levels for perimeter VOC air monitoring and the associated responses to each level.

3.2 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored at the upwind and downwind perimeter of the site on a continuous basis or as otherwise specified. Upwind concentrations will be measured to establish site-specific background concentrations. In the event of minimal wind or frequent changes in wind direction, multiple locations will be monitored (i.e., three monitoring locations surrounding the work area).

Particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. Each particulate monitor will be calibrated daily with a filtered air sample. Each air monitoring instrument will be continuously downloaded and saved electronically to a dedicated computer located on-site.
The table below describes the action levels for perimeter particulate air monitoring and the associated responses to each level.

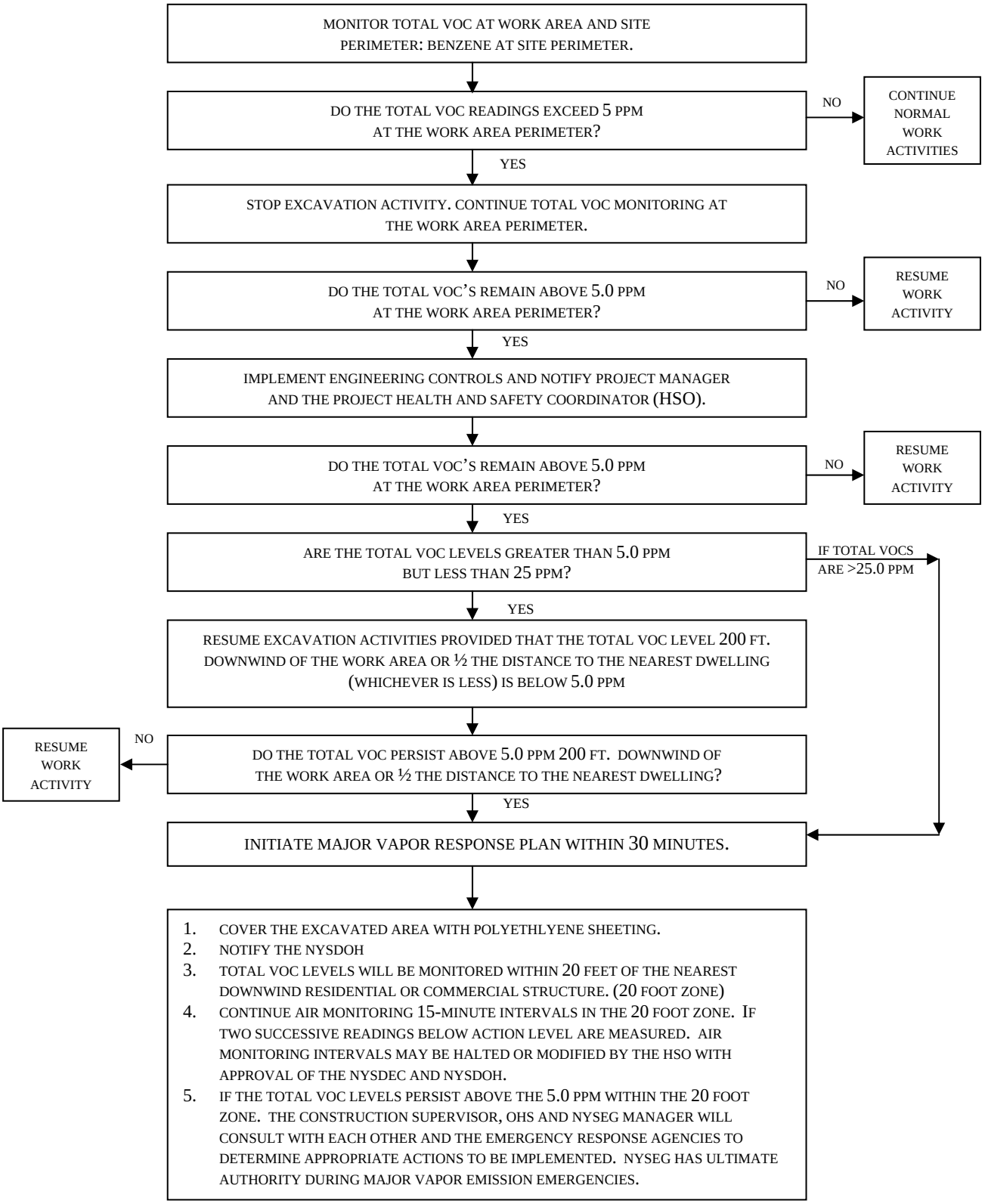
Action Level	Response
Downwind particulate concentrations 100 ug/m^3 greater than upwind particulate monitor sustained over 15 minute average	Dust suppression techniques are employed

Downwind particulate concentrations 150 ug/m^3 greater than upwind particulate monitor sustained over 15 minute average	Work halted and dust suppression techniques evaluated. Work continues once dust suppression techniques are proven successful

Appendix H

Vapor Emission Response Plan

NORWICH FORMER MGP REMEDIATION
VAPOR EMISSION RESPONSE PLAN



Appendix I

Contingency Plan

Final Phase 1 Remedial Design Report Contingency Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
New York State Department of Environmental Conservation
Department of Environmental Remediation
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May 2010

AECOM Project No. 106404.03

Final Phase 1 Remedial Design Report Contingency Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

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NYSDEC
Department of Environmental Remediation
625 Broadway
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Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
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40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Author: Scott T. McDonough

Title: Environmental Engineer

Date: May 6, 2010

Reviewer: Scott Underhill, P.E.

Title: Project Manager

Date: May 6, 2010

Table of Contents

1.0 INTRODUCTION

This construction contingency plan (CCP) has been developed for personnel to follow during the performance of the remediation project at the New York State Electric & Gas Corporation (NYSEG) Norwich Site, in the City of Norwich, Chenango County, New York. The focus of the work is to mitigate the impacts of manufactured gas plant (MGP) by-product associated with the site. The project will consist of mobilization, excavation of contaminated soils, in-situ stabilization (ISS), material handling, staging, loading, restoration, equipment decontamination, and demobilization. Soils contain contaminants that may be considered non-Resource Conservation and Recovery Act (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 has been prepared separately 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 and are anticipated to be encountered. These include volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) (polycyclic aromatic hydrocarbons [PAHs]).

3.0 PLANNED FIELD ACTIVITIES

The planned field activities include the following:

- Site preparation (installation of support facilities);
- Construction of decontamination pad;
- Construction of staging areas;
- Excavation of soils;
- Material Handling and dewatering activities;
- Water disposal;
- Loading of soils;
- ISS;
- Equipment Decontamination;
- NAPL Recovery; and
- 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. 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 through the fence gate and toward the parking 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 5 gallons 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 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 5 gallons 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. An absorbent pad, 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, the NYSDEC, and National Response Center shall be notified.

The local responders would be notified through 911. The Norwich Fire Department would be the first responders. The City of Norwich has a Hazardous Materials Team and has capabilities of performing Level A and Level B response actions. 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

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 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 the 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

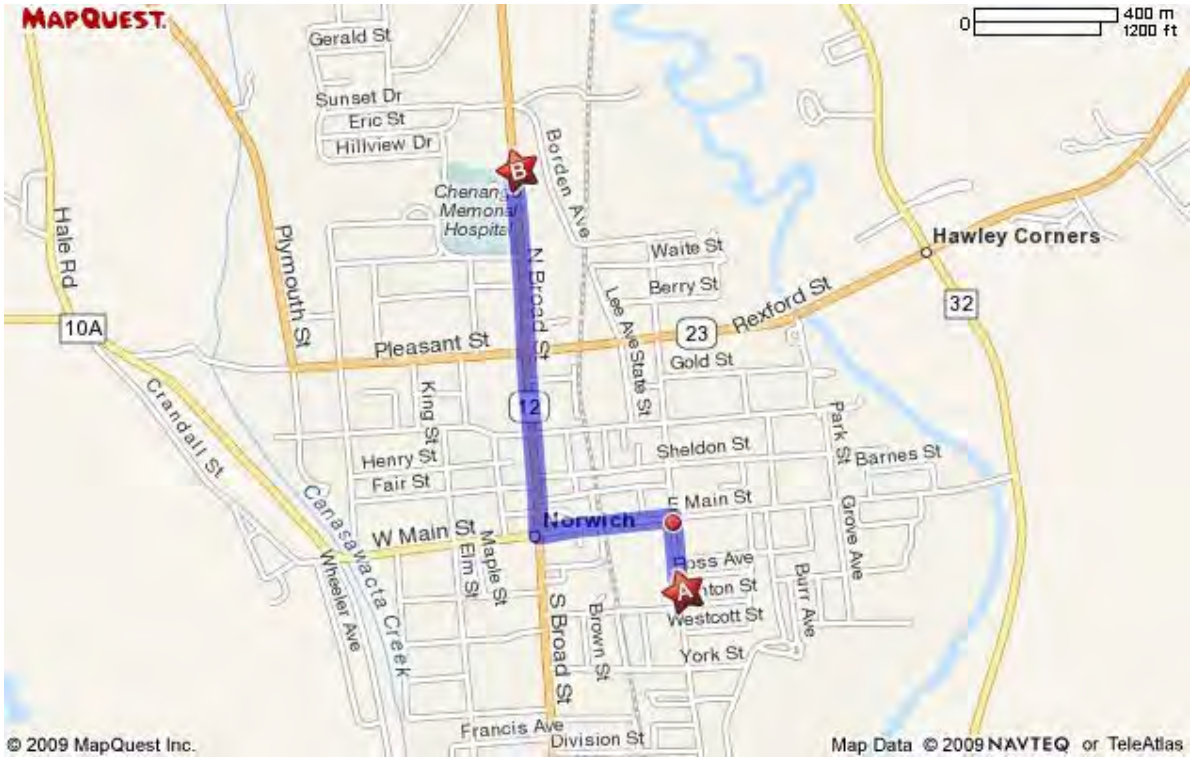
When a hurricane, flood, freeze-up or other severe weather-related threat is detected, all site personnel will immediately be notified. Each Severe Weather Alert will require last-minute preventative measures to minimize potential damage to facilities and equipment. For example, steps such as checking 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
Norwich Fire Department	911
Ambulance	911
Police Department	911
Chenango County Sheriff	911
Chenango Memorial Hospital	(607) 337-4157
Physicians under contract or agreement with AECOM Albany, New York	Occupational Medical Services 10 Madison Ave Ext. (518) 482-0666
National Response Center	(800) 424-8802
New York Department of Environmental Conservation	(800) 457-7362
Chemtrec (Emergency Technical Information)	(800) 424-9300

Direction to Chenango Memorial Hospital: Exit site from Truck Gate; turn left (north) on Birsdall Street; proceed along Birdsall Street to the intersection of East Main Street; turn left (west) on East Main Street; turn right (north) on US Route 12; turn left into Chenango Memorial Hospital (app. 1 mile from site)



Appendix J

Construction Quality Assurance Plan

Final Phase 1 Remedial Design Report Construction Quality Assurance Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
New York State Department of Environmental Conservation
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Final Phase 1 Remedial Design Report Construction Quality Assurance Plan

Site:
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40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Author: Scott T. McDonough

Title: Environmental Engineer

Date: May 6, 2010

Reviewer: Scott Underhill, P.E.

Title: Project Manager

Date: May 6, 2010

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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) Norwich Former Manufacturing Gas Plant (MGP) site, City of Norwich, Chenango County, New York. This CQAP supplements the Work Plan.

2.0 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; and 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., Work Plan, 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 Work Plan, local, state, and federal regulations.

4. Documentation and Reporting - Establish appropriate field documents (i.e. In-Situ Stabilization [ISS] mix reports, photographic log, sampling log, and variances to the Work Plan).

3.0 RESPONSIBILITY AND AUTHORITY

Responsibilities of each member of the construction project team are described below.

3.1 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.

3.2 Construction Quality Assurance Officer — **Tracy Blazicek, NYSEG Remediation Manager**

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.

3.3 Sampling Quality Assurance Officer — **Scott Underhill, P.E., AECOM Project Manager**

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.
- Providing the construction quality control officer with up to date sampling results.

3.4 Construction Quality Control Representative — TBD / AECOM Project Coordinator

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 this CQAP.
- Performing on-site inspection of the work in progress to assess compliance with the *Remedial Action Design.*
- 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 and modify materials and work to comply with *Remedial Action Design.* This includes:

    1. Providing reports on real time ISS mix, material shipments, and inspection results.
    2. Review and interpretation of all data sheets and reports.
    3. Identification of work that should be accepted, rejected, or uncovered for observation, or that may require special testing, inspection, or approval.

4. Rejection of defective work and verification that corrective measures are implemented
5. 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 tests 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.

3.5 Sampling Representative — TBD AECOM Sampling Technician

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), suspended particulate, and benzene 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 Work Plan. Submit real-time air quality data in an electronic format to Melissa Merriotti, NYSDOH at mxm29@health.state.ny.us, Mr. Anthony Karwiel, NYSDEC at alkarwie@gw.dec.state.ny.us and Mr. Tracy Blazicek, NYSEG project manager at tlblazicek@nyseg.com as required by the site *Community Air Monitoring Plan (CAMP)*.
- Daily calibration and operation of the portable gas chromatograph per guidelines specified in the *QAPP and Remedial Design.* Compiling calibration and results data onto spreadsheets. E-mailing compiled data to sampling quality assurance officer daily.
- Collection, packaging, and shipment of soil and water samples per guidelines specified in the *QAPP and Sampling Analysis Plan*. Maintaining a 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 construction of 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.

- Maintaining and organizing on-site field specialist equipment and supplies storage area.
- Performing the duties of assistant health & safety officer.

Appendix K

Quality Assurance Project Plan

Final Phase 1
Remedial Design Report
Quality Assurance Project Plan

Site:
Norwich Former Manufactured Gas Plant Site
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Submitted to:
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May 2010

AECOM Project No. 106404.03

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May 2010

AECOM Project No. 106404.03

Author: Scott T. McDonough

Title: Environmental Engineer

Date: May 6, 2010

Reviewer: Scott Underhill, P.E.

Title: Project Manager

Date: May 6, 2010

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Tables

Attachments

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 Norwich former manufactured gas plant (MGP) site located in the Norwich, Chenango 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 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.

3.0 SAMPLE COLLECTION

3.1 Soils

Soil samples will be collected as described in the appropriate sections of the *Remedial Design* or *Sampling Analysis Plan.* These sections describe the collection procedures, sampling equipment, locations, and frequencies for the soil samples. These schedules are based on the requirements for soil disposal or reuse on site.

All sampling equipment will be properly disposed or decontaminated before being reused (see Section 8.1.1). 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 (see Section 3.3). Samples will be stored at 4^{o} 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 Wastewater Sampling

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 being transported to a permitted facility for proper treatment and disposal.

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 (see Section 3.3). Samples will be stored at 4^{o} 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.

TABLE A SAMPLE CONTAINERS & PRESERVATIVES

Analysis	**Matrix**	**Container**	**Preservative**
TCLP Semivolatiles	Soil	500 ml glass*	4^{o} Celsius
TCLP Metals	Soil	500 ml glass*	4^{o} Celsius
TCPL Pesticides/Herbicides	Soil	500 ml glass*	4^{o} Celsius
Reactive Cyanide	Soil	500 ml glass*	4^{o} Celsius
Reactive Sulfide	Soil	500 ml glass*	4^{o} Celsius
TCLP Volatiles	Soil	20 ml glass	4^{o} Celsius
Total PAHs	Soil	250 ml glass	4^{o} Celsius
Total BTEX (benzene, toluene, ethylbenzene, xylenes)	Soil	125 ml glass	4^{o} Celsius
Total Metals	Soil	250 ml glass**	4^{o} Celsius
Percent Sulfur	Soil	250 ml glass**	4^{o} Celsius
PCBs	Soil	500 ml glass***	4^{o} Celsius
Ignitability	Soil	500 ml glass***	4^{o} Celsius
BTU/lb	Soil	500 ml glass***	4^{o} Celsius
Flashpoint	Soil	500 ml glass***	4^{o} Celsius
Percent Solids	Soil	500 ml glass***	4^{o} Celsius
pH	Soil	500 ml glass***	4^{o} Celsius
Reactivity	Soil/Water	500 ml glass***	4^{o} Celsius
Corrosivity	Soil/Water	500 ml glass***	4^{o} Celsius
Total Metals	Water	500 ml Plastic	HNO_3 to pH < 2
Semivolatiles	Water	1000 ml amber glass	4^{o} Celsius
Pesticides/Herbicides	Water	1000 ml amber glass	4^{o} Celsius
Volatiles	Water	40 ml glass	4^{o} Celsius or HCl to pH > 12
Paint Filter	Water	500 ml glass	4^{o} Celsius
Total Cyanide	Water	500 ml Plastic	4^{o} 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.

The following Tables identify samples by type and matrix and their related holding times.

TABLE B WASTE CHARACTERIZATION 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
PCBs	Soil	5 days (extraction) 40 days (after extraction)
Ignitability	Soil	NA
Reactivity	Soil	Cyanide 14 days Sulfide 7 days
Corrosivity	Soil	2 days
Percent solids	Soil	NA
* 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 WASTEWATER SAMPLES		
Sample Type	**Matrix**	**Holding Time***
Semivolatiles	Water	5 days to extraction 40 days after extraction
Metals	Water	180 days
Total Cyanide	Water	14 days
Paint Filter	Water	NA
Reactivity	Water	Cyanide 14 days Sulfide 7 days
Corrosivity	Water	Analyze immediately
Volatiles	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 & TRACKING

4.1 Holding Times and Sample Transport

Since the samples will be analyzed at 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 date and time collected, the number of containers collected, the 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 soil disposal or reuse 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 and speciated real-time air analyses will be calibrated daily, in accordance with manufacturer's recommendations. All equipment will be calibrated more frequently if conditions warrant. The total organic analyzer equipped with a photo ionization detector (PID) will be used to measure volatile organic vapors will be calibrated to benzene with a 100 ppm isobutylene air standard. The DataRam™ or a Thermo Andersen ADR-1200s used to measure particulates will be calibrated to zero with filtered air sample.

ANALYTICAL PROCEDURES
Laboratory Analyses

The following Table 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
TCLP Metals	SW 846 Method 6000/7000 Series
TCLP Pesticides/Herbicides	SW846 Method 8080/8151
Polycyclic Aromatic Hydrocarbons (Table F)	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*
Benzo (b) fluoranthene*
Benzo (k) fluoranthene*
Benzo (a) pyrene*
Indeno (1,2,3 cd) pyrene*
Dibenzo (a,h) anthracene*
***Carcinogenic PAHs (cPAHs)**

Laboratory Selection

The laboratory chosen for the project must be certified, and maintain certification, under the NYSDOH ELAP and the 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 has contracted with (To Be Determined) to perform laboratory services for this *Remedial Design.*

6.0 DATA REDUCTION VALIDATION AND REPORTING

6.1 Data Reduction

6.1.1 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.

6.1.1 Laboratory Data Collection

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.

6.2 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.

6.3 Full Data Validation

The full third party data validation process consists of a formal systematic review of analytical results and quality control documentation with regards to the parameters cited in Section 7.3. On the basis of this review, a third party 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 collected samples will be performed at NYSEG's discretion. Confirmatory sampling data will be archived as necessary to perform a full data validation at a future date.

6.4 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 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
- Field log sheets (if available)

7.0 QUALITY CONTROL CHECKS

7.1 Field Quality Control

7.1.1 Decontamination Procedures for Confirmation Sampling

The following decontamination procedure will be followed for all non-disposal 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.

7.2 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 the 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
- Duplicates
- Surrogate Spikes
- Internal Standards
- Laboratory Duplicates
- Calibration Check Standards
- Laboratory Control Samples

8.0 PREVENTATIVE MAINTENANCE

8.1 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 required 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.

8.2 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.

8.2.1 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.

8.2.2 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.

Attachments

Attachment A

Sample Chain of Custody Form

Attachment B

Sample Identification Naming Convention

SAMPLE IDENTIFICATION

NAMING CONVENTION FOR SOIL AND WATER SAMPLES

SYSTEM CODING

First & Second = Site	Norwich Birsdall Site	NB
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: Norwich Birsdall Site; Excavation; Sidewall; 2 ft below ground; and sample number

SAMPLE IDENTIFICATION: NBEXSW02005

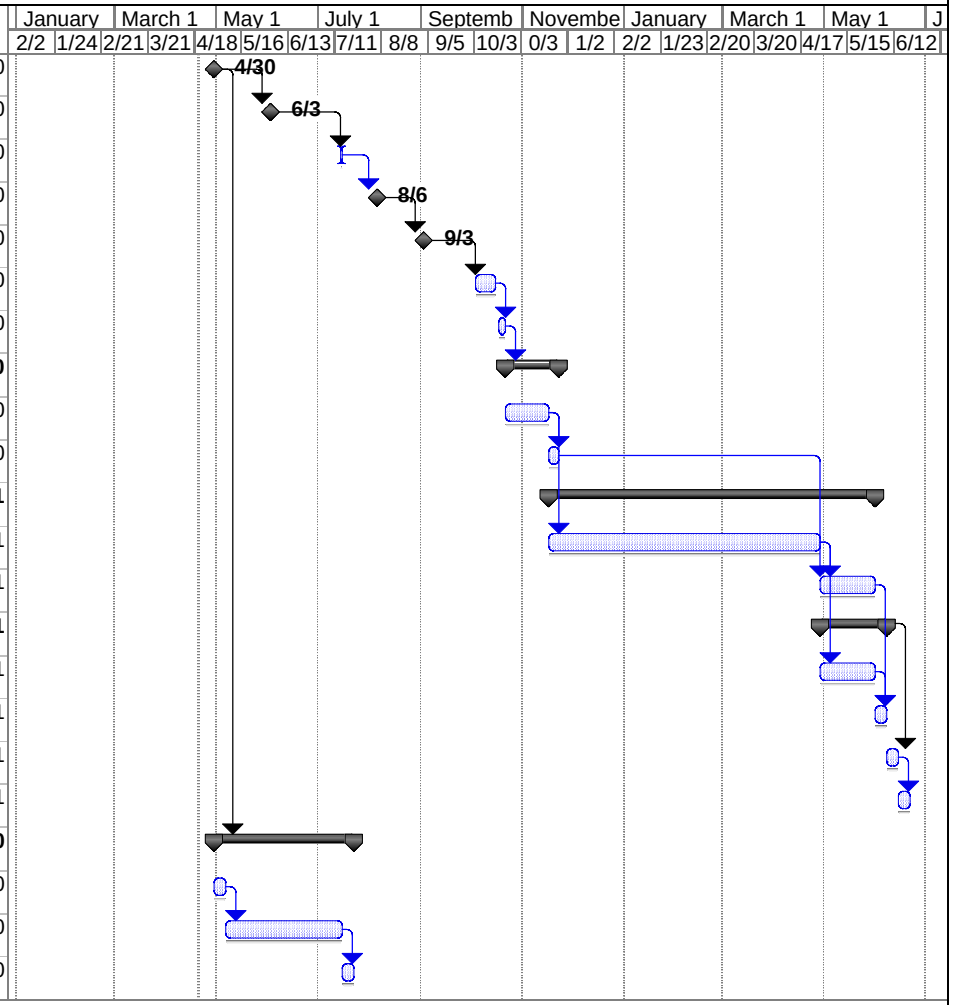
FORMER MANUFACTURED GAS PLANT SITE OR FORMER MANUFACTURED GAS PLANT SITE DISPOSAL AREA	
Site	Code
Albion Ingersoll Street	AI
Auburn Clark Street	AC
Auburn Green Street	AG
Auburn McMaster Street	AM
Binghamton Court Street	BC
Binghamton – Johnson City	BJ
Binghamton Washington Street	BW
Clyde Lock Street	CL
Corning Chestnut Street	CC
Cortland/Homer South Main Street	CH
Dansville Ossian Street	DO
Elmira Madison Avenue	EM
Elmira Water Street	EW
Geneva Border City	GB
Geneva Wadsworth Street	GW
Goshen West Main Street	GS
Granville North Street	GR
Ithaca Cayuga Inlet	II
Ithaca Court Street	IC
Ithaca First Street	IF
Lockport State Road	LS
Lockport Transit Street	LT
Lyons Water Street	LW
Mechanicville Central Avenue	MC
Mechanicville Coons Crossing	ME
Mechanicville Willow Glen MGP Disposal Site	MW
Newark Water Street	NW
Norwich Birdsall Street	**NB**
Oneonta James Georgeson Avenue (Gas Ave.)	OG
Owego East Main Street	OE
Palmyra Park Drive	PP
Penn Yan Jackson Street	PJ
Penn Yan Water Street	PW
Plattsburgh Bridge Street	PB
Plattsburgh Saranac Street	PS
Seneca Falls Fall Street	SF
Warsaw Court Street	WC
Waterloo East Main Street	WE
Waterloo Babbott Street	WB

Appendix L

Project Schedule

NYSEG - NORWICH MGP SITE
CONSTRUCTION SCHEDULE

ID	Task Name	Duration	Start	Finish
1	Final Remedial Design to NYSDEC	0 days	Fri 4/30/10	Fri 4/30/10
2	RFP Released	0 days	Thu 6/3/10	Thu 6/3/10
3	Site Walk	1 day	Thu 7/15/10	Thu 7/15/10
4	Bids Due	0 days	Fri 8/6/10	Fri 8/6/10
5	Contract Award	0 days	Fri 9/3/10	Fri 9/3/10
6	Mobilization	10 days	Mon 10/4/10	Fri 10/15/10
7	Soil Stockpile Pad Construction	4 days	Mon 10/18/10	Thu 10/21/10
8	**Excavation**	**22 days**	**Fri 10/22/10**	**Mon 11/22/10**
9	Onsite	18 days	Fri 10/22/10	Tue 11/16/10
10	Offsite	4 days	Wed 11/17/10	Mon 11/22/10
11	**ISS**	**137 days**	**Wed 11/17/10**	**Tue 5/31/11**
12	Onsite	114 days	Wed 11/17/10	Thu 4/28/11
13	Offsite	23 days	Fri 4/29/11	Tue 5/31/11
14	**Backfill**	**28 days**	**Fri 4/29/11**	**Tue 6/7/11**
15	Onsite	23 days	Fri 4/29/11	Tue 5/31/11
16	Offsite	5 days	Wed 6/1/11	Tue 6/7/11
17	Site Restoration	5 days	Wed 6/8/11	Tue 6/14/11
18	Demobilization	5 days	Wed 6/15/11	Tue 6/21/11
19	**NAPL Collection**	**60 days**	**Fri 4/30/10**	**Thu 7/22/10**
20	System Installation	5 days	Fri 4/30/10	Thu 5/6/10
21	System Operation	50 days	Fri 5/7/10	Thu 7/15/10
22	System Demobilization	5 days	Fri 7/16/10	Thu 7/22/10



Project: Schedule 1
Date: Tue 4/20/10

Task		Milestone		External Tasks	
Split		Summary		External MileTask	
Progress		Project Summary		Split	

Appendix M

BioSolve ® Product Information

MATERIAL SAFETY DATA SHEET

THE WESTFORD CHEMICAL CORPORATION®
P.O. Box 798
Westford, Massachusetts 01886 USA

Ref. No.: 2001
Date: 1/1/2008

Phone: (978) 392-0866/ (978) 392-0689
Alternate Phone: 1-866-838-3909
Emergency Phone-24 Hours: 1-800-225-3909
Fax: (978) 692-3487 / (978) 496-1108
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

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.

DOT Class: Not Regulated/Non Hazardous

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, provincial,
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 N

Erosion and Control Plan

Final Phase 1
Remedial Design Report
Erosion and Sediment Control Plan

Site:
Norwich Former Manufactured Gas Plant Site
Birdsall Street
Norwich, Chenango County, New York

Submitted to:
New York State Department of Environmental Conservation
Department of Environmental Remediation
625 Broadway
Albany, NY 12233-7012

Prepared for:
New York State Electric & Gas Company
James A. Carrigg Center, 18 Link Drive
P.O. Box 5224
Binghamton, New York 13902-5224

Prepared by:
AECOM
40 British American Blvd.
Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Final Phase 1
Remedial Design Report
Erosion and Sediment Control Plan

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Latham, New York 12110

May 2010

AECOM Project No. 106404.03

Author: Scott T. McDonough

Title: Environmental Engineer

Date: May 6, 2010

Reviewer: Scott Underhill, P.E.

Title: Project Manager

Date: May 6, 2010

Table of Contents

1.0 INTRODUCTION

New York State Electric & Gas Corporation (NYSEG) is preparing to implement a Remedial Action Design involving the excavation and In-Situ Solidification (ISS) of coal tar impacted soil associated with the Norwich former manufactured gas plant site located in Norwich, Chenango County, New York. This *Erosion and Sediment Control Plan* will detail planned erosion and sediment control activities and practices that will be implemented for this remediation project. This *Erosion and Sediment Control Plan* 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 *Erosion and Sediment Control Plan* and the *Remedial Design,* the *Remedial Design* shall control.

The proposed *Remedial Action Design* will involve excavation and ISS of coal tar impacted soil and debris. The *Remedial Action Design* will be conducted according to the requirements of an Order on Consent between NYSEG and the NYSDEC. 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 NYSEG Norwich Former MGP site (Site) is located at 24 Birdsall Street, in the City of Norwich, Chenango County, New York. The former facility is approximately one acre in area and is bounded to the north by a plaza with retail shops, to the east by a NYSEG substation and private residences, to the south by the former Aero Products property (now owned by NYSEG), and to the west by the Lackawanna railroad tracks. The former plant is located on Birdsall Street, in Chenango River valley, west of the Chenango River and Rt. 32, south of Rt. 23, and east of Rt. 12.

The Site previously occupied approximately one acre of land located at 24 Birdsall Street. In the years following cessation of gas production, former MGP structures were razed and subsequently NYSEG used the site for equipment storage. Presently, much of the property is paved with asphalt or covered with compacted gravel. A NYSEG electric substation exists on the eastern portion of the site.

The northern part of the Site has been developed as a shopping plaza with retail shops. NYSEG purchased the former Aero Products facility located to the south and used the building for storage for several years. During the summer of 2006, NYSEG demolished the former Aero Products building. The off-site area that extends to the south of the former Aero Products building is comprised of mostly residential housing. NYSEG has purchased property at 37 and 41 Front Street and razed the structures located on these properties to allow for the ISS of the underlying soils.

2.0 SITE PREPARATION

All erosion control measures shall be installed prior to clearing and grubbing of the site, prior to the first phase of construction. These measures shall consist of installing silt fence and hay bales. The silt fence and hay bales shall be installed around the entire project site. This system will reduce the velocity of runoff from the site.

All permanent on-site storm water management facilities (i.e. outfall pipes and the storm water inlets) shall be plugged and covered prior to the start of clearing operations to minimize the amount of sediment from impacting the waterway. All storm water inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.

3.0 REMEDIAL ACTIVITIES

The Contractor shall provide temporary drainage to relieve areas that may cause damage to the roadways, and erosion protection during construction. All erosion and sedimentation control devices shall be installed prior to any land disturbance activities.

3.1 Earth Moving Activities

All earth moving activities will incorporate best management practices to minimize accelerated erosion and sedimentation. Cut and fill slopes shall be designed and constructed in such a manner that erosion will be minimized. All earth moving activities will be conducted in such a manner as to minimize the extent and duration of disturbed land.

Where construction vehicles access routes intersect paved roads, provisions shall be made to minimize the transport of soils onto paved soils. Where soils are transported onto a public road surface, the road shall be cleaned thoroughly as soon as soil accumulations appear. If soil accumulates on a paved road in any significant amount then the accumulated soil shall be immediately removed by manual shoveling and transporting to an on-site material handling area. Street washing by street cleaning vehicles shall be allowed only after accumulated soils of significant thickness have been manually removed.

Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilization measures until the problem is corrected.

3.2 General Housekeeping

All heavy equipment shall be decontaminated in one of the on-site truck and equipment decontamination pads prior to going off site. These equipment pads shall be constructed such that any runoff or water draining out of the removed material shall be collected in the sump area.

Where construction vehicle access routes intersect paved public roads, provisions shall be made to minimize the transport of sediment onto the paved surface. Where sediment and excavated soils are transported onto a public road surface, the road shall be cleaned thoroughly as soon as soil accumulations appear. Sediment and soil residuals shall be removed from the road by shoveling or sweeping and transported to an on-site material handling area. Street washing shall be allowed only after sediment is removed in this manner.

Construction traffic shall be limited to access roads. All traffic is prohibited from crossing drainage swales unless where absolutely necessary.

3.3 Storm Water Management

As shown on the *Remedial Design* Design Drawings, hay bales and silt fence shall be placed around the entire site. The Contractor shall ensure storm water will not be permitted to flow onto or from the site.

3.4 Operations and Maintenance

Periodic inspections and required maintenance shall be conducted, especially after each significant storm event. The Subcontractor shall be responsible for the installation and maintenance of all erosion and sedimentation control practices.

In general, all erosion and sedimentation control measures shall be checked daily and after each rainfall, whichever is most frequent, and shall be cleaned and repaired according to the following schedule:

- The storm water inlets and outfall pipes will be checked regularly to ensure that they are still covered and sediment is not building up around the openings. If necessary, corrective action shall be taken immediately.

- The sump areas shall be cleaned out when the level of sediment buildup is half way up the riser pipe.

- Erosion and sediment control shall be checked regularly for undermining or deterioration and buildup or clogging with sediment. If necessary, corrective action shall be taken immediately.

All temporary erosion and sedimentation control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer necessary. Trapped sediment and the disturbed soil areas resulting from the deposition caused by the temporary control measures shall be permanently stabilized to prevent further erosion and sedimentation.

All erosion and sedimentation control measures shall be maintained until the permanent stabilization measures are completed

4.0 SITE RESTORATION

All disturbed areas will be stabilized as soon as possible after the final grade has been achieved for the project site. As shown on the *Remedial Design* Design Drawings, the site will be restored with a combination of vegetative cover and stone; those areas covered with vegetation will have a uniform coverage and density of at least 80% perennial vegetation.

The vegetative cover shall be a mixture of native grasses. A local landscape professional shall determine the type and quantity necessary to provide a permanently stabilized bank.

A silt fence shall be installed downgradient of all reseeded areas. The silt fence shall remain in place until healthy vegetation is established.

4.1 Operations and Maintenance

Periodic inspections and required maintenance shall be conducted, especially after each significant storm event. The Subcontractor shall be responsible for the installation and maintenance of all erosion and sedimentation control practices.

- All seeded areas shall be checked regularly to see that a good stand of grass is maintained. Areas should be fertilized and reseeded as necessary.

- All temporary erosion and sedimentation control measures shall be removed and disposed of within 30 days after the final site stabilization is achieved and vegetation is established.

- Trapped sediment and the disturbed soil areas resulting from the deposition caused by the temporary control measures shall be permanently stabilized to prevent further erosion and sedimentation.

5.0 REFERENCES

NYSDEC, 2005. New York state Standards and Specifications for Erosion and Sediment Control. Prepared by: NYS Soil and Water Conservation Committee for New York State Department of Environmental Conservation, August 2005.

Appendix O

NYSDEC Approval Letter