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Remedial Design Work Plan

Goshen Former Manufactured Gas Plant Site
West Main Street, Goshen New York
Site No. 3-36-046

August 2013

Remedial Design Work Plan

Goshen Former Manufactured Gas Plant Site

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Date:
August 2013

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1. Introduction

This *Remedial Design Work Plan* (RDWP) has been prepared by ARCADIS on behalf of NYSEG to present the proposed activities associated with the preparation of the remedial design for the New York State Department of Environmental Conservation-(NYSDEC-) selected remedy for the Goshen Former Manufactured Gas Plant (MGP) Site (the site) located on West Main Street in Goshen, New York. The selected remedy to address environmental impacts identified at the site is presented in the March 2011 Record of Decision (ROD) (NYSDEC, 2011).

NYSEG entered into an Order on Consent with the NYSDEC in March 1994 to investigate and, where necessary, remediate 33 former MGP sites in New York State. The Goshen Former MGP Site (Site No. 3-36-046) is included on this list of 33 sites. Section VI of the Order on Consent indicates that NYSEG shall submit to the NYSDEC a remedial design to facilitate implementation of the selected remedial alternative for the site. This RDWP has been prepared in accordance with the NYSDEC's *Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC, 2010b) describes the pre-design investigation (PDI) activities required to support the remedial design, as well as the anticipated components of the remedial design.

1.1 RDWP Organization

This RDWP has been organized into sections as described in the following table.

Table 1.1 RDWP Organization

Section	Description
Section 1 – Introduction	Presents site background information, a summary of the remedial investigation, potentially applicable SCGs, remedial goals identified for the site, and a summary of the NYSDEC-selected remedy.
Section 2 – Pre-Design Investigation	Presents the scope and rationale for the PDI activities to be completed in support of the remedial design.
Section 3 – Remedial Design	Presents a description of the remedial design activities to be completed in support of implementing the remedial construction activities.

Section	Description
Section 4 – Permits and Approvals	Identifies the permits and approvals necessary to implement the remedial action.
Section 5 – Remedial Design Documents	Identifies the remedial design documents to be prepared in support of the remedial action.
Section 6 – Remedial Design Schedule	Presents the anticipated project schedule for implementing the pre-design investigation and preparing the remedial design.
Section 7 – References	Presents a list of documents used to support the preparation of this RDWP.

1.2 Site Background

This section presents a summary of site background information, including a description of the site location and physical setting, as well as a brief site history.

1.2.1 Site Location and Physical Setting

The approximately ¾-acre site is located on West Main Street in the Village of Goshen, in Orange County, New York (see Figure 1). The site is owned by NYSEG and presently serves as a natural gas service center. A gas regulator is located on northern portion of the site and another gas regulator is located within the eastern portion of the service center building. The site is bounded by Rio Grande Creek at the northwest corner, Village of Goshen property to the north and northeast, private commercial properties to the east and west, and West Main Street to the south. Based on conversations with the Village of Goshen and according to the Village of Goshen Zoning Map (last updated August 2003), the site is zoned as commercial shopping (i.e., commercial). Areas immediately west of the site are zoned as industrial. Other areas in the immediate vicinity of the site are zoned as central shopping and one and two family residential. The site is also located within the Village of Goshen Architectural Design District. Properties and buildings located within this district are subject to regulations/restrictions regarding historical areas.

Site topography slopes gently downward to the north across most of the site, from West Main Street to the more steeply sloping south bank of Rio Grande Creek. The elevation of the site ranges between 430 and 437 feet above mean sea level (amsl).

The eastern site boundary is bordered by a concrete wall that is approximately three feet high in the southeast corner and approximately 10 feet high in the northeast corner. The eastern half of the site contains the service center building (which was formerly the gas house associated with the MGP) and equipment lay-down/storage areas and is surrounded by a chain-link fence with double-swing gates located on the western and southeastern sides of the fenced area. The site contains no distinctive surface water runoff pathways, such as drainage ditches or storm drains. The paved areas, consisting of the driveway and the parking area in the eastern half of the property, allow for surface water runoff to Rio Grande Creek. Rio Grande Creek flows from the northeast to the southwest.

1.2.2 Site History

MGP operations began at the site between 1885 and 1889 as a carbureted water gas plant. The plant was apparently converted to a coal gas plant in 1923 and continued to operate as a coal gas plant until sometime between 1945 and 1947, when the facility was converted to a natural gas operations center (Engineering-Science [ES], 1991). During this time, the site was owned by the A. VanDerwerken Water Gas Works (circa 1889 to circa 1905), Goshen Gas Light Company Water Gas Works (circa 1905 to circa 1923), Goshen Illuminating Company Coal Gas Plant (circa 1923 to 1945), Associated Gas & Electric Company (1945 to 1947) and NYSEG (1947 to present). While operational, the MGP consisted of a gas house (composed of a meter house, purifying/purifier houses, oil tanks, a boiler, a generator, a washer, and a superheater), three gas holders, a shed, furnace area, coal storage area, retorts, and a lime kiln.

1.3 Standards, Criteria, and Guidelines

Chemical-, action-, and location-specific SCGs that are potentially applicable to the design and implementation of the NYSDEC-selected remedy are presented in Tables 1, 2, and 3, respectively. Primary SCGs that were considered during the development of this RDWP include the following:

- NYSDEC's DER-10 *Technical Guidance for Site Investigation and Remediation*
- Soil cleanup objectives (SCOs) based on Title 6 of the New York Code of Rules and Regulations (NYCRR) Part 375-6 (6 NYCRR Part 375-6).

- Groundwater, drinking water, and surface water SCGs based on NYSDEC's *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (TOGS 1.1.1) and Part 5 of the New York State Sanitary Code.

- Sediment SCGs based on the NYSDEC document titled *Technical Guidance for Screening Contaminated Sediments.*

- Resource Conservation and Recovery Act (RCRA) and New York State regulations regarding the identification and listing of hazardous wastes outlined in 40 CFR 261 and 6 NYCRR Part 371, respectively.

- NYSDEC's *Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants* (DER-4) (NYSDEC, 2002).

1.4 Site Characterization Summary

This section presents an overall site characterization and a summary of the nature and extent of impacted media at the site based on the results obtained for the site investigation activities and remedial measures completed to date, which include the following:

- 1990 – Site Prioritization Investigation – In October and November 1990, ES conducted a Site Prioritization Investigation (SPI) on behalf of NYSEG. The SPI was a preliminary site evaluation designed to assess whether the site posed an imminent threat to human health and/or the environment and to establish a rank for the site relative to NYSEG's other MGP sites.

- 1992 – Task II Remedial Investigation – Following completion of the SPI, NYSEG initiated the Task II Remedial Investigation (RI). In 1992, Blasland, Bouck & Lee, Inc. (BBL; now known as ARCADIS) developed a conceptual model for the site that noted data gaps to be addressed by the Task II RI. These gaps included the nature of potential source areas and the extent of MGP impacts on environmental media, particularly subsurface soil and groundwater and numerous field activities were conducted to address these data gaps.

- 2007 – Tar Drip Remedial Measure – NYSEG completed a remedial measure in May 2007 to remove tarry material in the apparent former tar drip (i.e., sump-like) structure located in the storage area of the former gas house (current service center building).

- 2008 – Soil Vapor Intrusion Evaluation – ARCADIS conducted a soil vapor intrusion (SVI) evaluation at the site on March 14 and 15, 2008. Investigation activities included the collection and analysis of sub-slab, indoor air, and ambient air samples.

- 2008 – Remedial Investigation – ARCADIS conducted RI activities from October 2008 to October 2009 to characterize the site by establishing the nature and extent of MGP-related impacts and provide the information needed to prepare a Feasibility Study (FS) for evaluating remedial actions to address MGP-related impacts.

The site characterization consists of a summary of site geology and hydrogeology and the nature and extent of impacts. A detailed site characterization is presented in the July 2010 *Remedial Investigation Report* (RI Report) (ARCADIS, 2010).

1.4.1 Geology

Site investigations identified three relevant unconsolidated geologic units beneath the site: fill, alluvium, and till.

- Fill – The fill unit is generally 10 to 12 feet thick and consists of reworked alluvial deposits (sands, gravels, silts) and anthropogenic materials (e.g., slag, coal, wood, metal, ash, concrete, brick and foundations from former MGP structures). The saturated thickness of the fill on site is generally 2 to 10 feet, and is thinnest along southern edge of the site and near Rio Grande Creek. The saturated thickness of the unit is greatest in the areas of former Gas Holders #1 and #2 (approximately 10 feet).

- Alluvium – An alluvial sand and silt unit is located directly beneath the fill unit and consists of deposits of fine sands, silts, and varying amounts of clay and gravel. In general, this sand and silt unit is less permeable than the overlying fill unit. The alluvial unit is found throughout the site with a relatively uniform thickness between approximately 15 to 19 feet. The alluvial unit is thickest in the area just to the north of the service center building where two depressions are present in the surface of the underlying till. The upper several feet of the sand and silt unit were likely reworked as the site was developed. This unit is fully saturated across the site.

- Till – The till unit is located directly beneath the alluvial unit and consists of dense matrix of sand, silt, and varied amounts of gravel and clay. The dense nature of the

till suggests that it is a lodgment till. Lodgment till is deposited by ice at the base of the glacier, and is typically very compact due to the immense weight of the overlying glacier that deposited the material. In general, the till unit appears to be slightly less permeable than the overlying sand and silt unit. The bottom of the till unit was not encountered during investigation activities but is estimated to have a thickness greater than 15 feet.

1.4.2 Hydrogeology

Groundwater flow beneath the site is primarily within the three above-mentioned geologic units. The water table lies within the fill unit at approximately 3 to 10 feet below grade. Shallow groundwater flow trends northwest, towards Rio Grande Creek at a fairly steep gradient of 0.09 ft/ft. Groundwater contours indicate irregular flow within the area of former Gas Holders #1 and #2, which suggests that the foundations for these holders may influence shallow groundwater flow.

The general groundwater flow trend in the deeper alluvium and till units is westward, parallel to the creek. Water-level data suggests a downward hydraulic gradient across most of the site. However, upward gradients appear to exist at well clusters located near Rio Grande Creek. Even though downward and upward gradients exist at the site, the preferred groundwater flow direction is horizontal.

1.4.3 Nature and Extent of Impacts

Surface soil, subsurface soil, groundwater, surface water, sediment, and soil vapor were evaluated during investigation activities. Site data indicated that soil, groundwater, and/or sediment contain elevated levels of benzene, toluene, ethylbenzene and xylenes (BTEX), a subset of volatile organic compounds (VOCs); a more general class of organic compounds called polycyclic aromatic hydrocarbons (PAHs); and several inorganic compounds. PAHs are a subgroup of semi-volatile organic compounds (SVOCs) that consists of approximately 17 commonly recognized multi-ringed, aromatic compounds. These compounds, because of their physical and chemical characteristics, are commonly targeted as identifiers for discussion.

The primary MGP-related byproduct responsible for most of the impacts at the site is coal tar, which is a dense non-aqueous phase liquid (DNAPL). DNAPLs are heavier than water and tend to sink below the water table if released in sufficient quantities. Coal tar contains many organic compounds, a number of which have toxic properties and are regulated by the NYSDEC. Chief among these compounds are BTEX and

PAHs. These two groups of compounds, including non-aqueous phase liquids (NAPLs), are used to characterize the nature and extent of site-related impacts.

As indicated in the RI Report, purifier waste was not observed in any subsurface investigation work and only low levels of cyanide were detected in site soil and groundwater. Therefore, cyanide is not considered a constituent of concern (COC) at this site.

A summary of environmental impacts, by media type, is presented below. A detailed account of the environmental site impacts, including analytical summary tables, is presented in the RI Report.

1.4.3.1 Surface Soil Quality

Surface soil samples were collected from both on-site and off-site locations. Analytical results for the surface soil samples were compared to the NYSDEC 6 NYCRR Part 375-6 soil cleanup objectives for the protection of human health based commercial future use (commercial SCOs) and protection of ecological resources (ecological SCOs). Surface soil samples SB08-21 and SB08-22, collected inside the service center building footprint (i.e., beneath the concrete building floor) contained the greatest total PAHs concentrations: 1,100 and 300 milligrams per kilogram (mg/kg), respectively. In general, other surface soil samples only contained PAHs at concentrations that slightly exceeded the commercial and ecological SCOs. Remaining surface soil samples collected within the service center property boundary contained total PAHs at concentrations up to 100 mg/kg. However, surface soil samples collected from off-site locations (i.e., north of Rio Grande Creek and more than 300 feet west of the site) also contained total PAHs at concentrations up to 100 mg/kg.

1.4.3.2 NAPL Distribution and Characterization

Coal tar DNAPL in subsurface soil is responsible for the majority of environmental impacts on site. NAPL-containing soil was observed at 13 of the 88 subsurface investigation locations completed during the various site investigations. The distribution of DNAPL observed at the site (as shown on Figure 2) is likely due a combination of the predominant northwesterly hydraulic gradient, gravitational forces, and heterogeneity of the overburden materials. DNAPL has been observed generally within the boundary of the eastern half of the site within the alluvial unit in the vicinity of former MGP structures (tar drip, former Gas Holders #1 and #2). The vast majority of the NAPL was encountered in relatively thin, sporadic seams at depths below the water

table generally between 12 to 25 feet below grade. NAPL appears to have migrated only a short distance from the assumed NAPL sources (i.e., holders, tar drip). The deepest interval where NAPL (blebs only) was observed was approximately 33.5 feet below grade, where blebs of what was visually characterized as oil-like material (OLM) appears to have penetrated less than one foot into the till unit at soil boring SB08-30, located west of former Gas Holders #1 and #2. Recoverable amounts of NAPL have historically accumulated in NAPL monitoring well NMW08-02. Approximately one foot of NAPL was measured in the well during two NAPL monitoring events conducted in December 2008 and March 2009. NAPL was recovered to the extent practicable during both monitoring events using a peristaltic pump. All DNAPL encountered during site investigations has been observed within the fenced portion (eastern half) of the site.

1.4.3.3 Subsurface Soil Quality

Subsurface soil sampling locations where elevated concentrations of MGP-related COCs were detected generally coincide with locations where DNAPL was observed; specifically north of the former tar drip and in the vicinity of former Gas Holders #1 and #2. At least one subsurface soil sample collected from nine soil borings (57 total soil borings completed at the site) contained concentrations of BTEX and PAHs greater than 10 and 500 mg/kg, respectively. The greatest concentrations of MGP-related COCs were detected in subsurface soil samples collected from soil borings SB08-2(22.5'-23'), SB08-18(19'-19.5'), SB08-29(18.5'-19'), and piezometer PZ08-2(11'-11.5'). Visual observations of OLM were noted at each of these sampling locations/intervals where elevated concentrations of BTEX and PAHs were detected.

A total of 13 subsurface soil samples collected from soil borings, test borings, and test pits contained individual BTEX compounds and PAHs at concentrations greater than commercial SCOs. Additionally, 24 subsurface soil samples contained individual BTEX compounds and PAHs at concentrations greater than 6 NYCRR Part 375-6 unrestricted use SCOs.

1.4.3.4 Groundwater Quality

Dissolved phase BTEX and PAHs were detected at concentrations greater than NYSDEC Class GA Standards or Guidance Values in groundwater samples collected from several shallow monitoring wells (screened within the fill and alluvial units). Elevated concentrations were generally detected on the northern half of the site, downgradient from areas where DNAPL was observed. Groundwater samples collected from monitoring well MW-08-05S contained the greatest concentrations of

BTEX and PAHs. Monitoring wells MW-08-05D and MW-08-07D were the only deep monitoring wells to contain BTEX compounds and/or PAHs at concentrations greater than NYSDEC Class GA Standards and Guidance Values.

1.4.3.5 Sediment Quality

During sediment investigations, numerous outfalls were observed upstream, adjacent to, and downstream from the site. Additionally, abundant anthropogenic materials (e.g., general refuse, construction waste, asphalt, paint buckets, and oil cans) were observed within the creek and on the creek banks. Although sheens were observed during the sediment investigations, the sheens were determined to not be related to the MGP.

During the sediment investigations, 67 sediment samples were collected from areas upstream, adjacent to, and downstream from the site. The sample results revealed the following:

- BTEX was detected in only six of the 67 sediment samples. Total detected BTEX concentrations ranged from 0.0019 to 0.48 mg/kg. One sample was collected upstream from the site and the remaining samples were collected adjacent to or downstream from the site.

- PAHs were detected in every sediment sample. Total PAH concentrations ranged from 1.10 to 1,700 mg/kg, with a geometric mean of 99 mg/kg. A surface sediment sample (0 to 0.5 foot depth) collected near the mouth of a 24-inch storm sewer outfall contained total PAHs at a concentration of 1,700 mg/kg.

Although several sediment samples appeared to have a PAH signature consistent with coal carbonization tar, the signature can also be attributable to creosote and particles/flakes of coal-tar-based sealcoat contributed by the numerous sewer outfalls and run-off from parking lots along the creek. Given this information and the lack of visually MGP-impacted sediments in the creek, PAHs detected in sediment samples were not conclusively attributed to the former MGP.

1.4.3.6 Surface Water Quality

Surface water samples were collected from two upstream, two adjacent, and two downstream locations. Samples were analyzed for VOCs, SVOCs and total cyanide. BTEX compounds were not detected in any surface-water sample. Several PAHs were detected in four of the six samples. Benzo(a)anthracene was the only PAH that

exceeded its associated Guidance Value; these exceedances were observed in two samples collected adjacent to the site and one sample upstream from the site. The highest concentration was detected in a sample collected upstream from the site. As such, it is reasonable to assume that the benzo(a)anthracene detections are associated with a source(s) upgradient from the site.

1.4.3.7 Soil Vapor Quality

The *SVI Evaluation Report* (ARCADIS, 2008) concluded that additional soil vapor investigations were not warranted because the service center building is mainly used to store materials and supplies used by NYSEG gasfitters and only lows level of VOCs were detected in soil vapor and indoor air. As of the date of this RDWP, the NYSDEC and/or NYSDOH have not commented on the *SVI Evaluation Report*.

1.5 Remediation Objectives

As presented in the NYSDEC ROD (NYSDEC, 2011), the selected remedy must eliminate or mitigate all significant threats to public health and/or the environment. To achieve this goal, the following remediation objectives have been established for the site.

Soil

- Prevent ingestion/direct contact with contaminated soil
- Prevent inhalation of contaminants volatilizing from contamination in soil
- Prevent migration of contaminants that would result in groundwater or surface water contamination

Groundwater

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater
- Restore the groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable
- Prevent discharge of contaminants to surface water

Soil Vapor

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into future buildings at the site

Sediment

- Prevent direct contact with contaminated sediment
- Prevent surface water contamination which may result in fish advisories
- Restore sediment to pre-release/background conditions, to the extent feasible

1.6 Description of Selected Remedy

Major remedial components are shown on Figure 2. The NYSDEC-selected remedy for the site consists of the following:

- A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

- Excavation and off-site disposal of surface and subsurface soil, including former MGP structures and foundations. Piping associated with these structures will be removed to the extent practical when determined to contain MGP-related by-products.

- Conducting in-situ soil solidification (ISS) at the area impacted by MGP contamination, including source material outside the footprint of the existing structures, will be addressed to the top of the till layer located at approximately 28 feet below grade.

- Sediment in the Rio Grande Creek near the mouth of the 24-inch outfall pipe where elevated levels of PAHs are present will be removed to a depth up to 2 feet. Clean material suitable for benthic habitat will be imported from off-site location to replace the impacted sediment removed from the creek.

- NAPL recovery wells will be installed in the area between the existing service center building and the ISS area.

- A site cover will be required to allow for commercial use of the site. The cover will consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

- Imposition of an institutional control in the form of an environmental easement for the controlled property that:

  a) requires the remedial party or site owner to complete and submit to the NYSDEC, a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3)

  b) limits the use and development of the controlled property for commercial and industrial use, recognizing that land use is subject to local zoning laws

  c) restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDEC, New York State Department of Health (NYSDOH) or County DOH

  d) prohibits agriculture or vegetable gardens on the controlled property

  e) requires compliance with the NYSDEC approved Site Management Plan (SMP)

- A Site Management Plan is required, which includes the following:

  a) An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to assure the following institutional and/or engineering controls remain in place and effective:

     - Institutional Controls (as described above)
     - Engineering Controls (the recovery wells and site cover described above)

This plan includes, but may not be limited to:

i. An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination (under and next to the service center building)
ii. Descriptions of the provisions of the environmental easement including any land use or groundwater restrictions
iii. Provisions for the management and inspection of the identified engineering controls

b) A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan will include, but is not limited to:

i. Monitoring of soil cover and groundwater to assess the performance of the remedy
ii. A schedule of monitoring and frequency of submittals to NYSDEC
iii. Provision to evaluate the potential for vapor intrusion for any buildings developed on the site, implementing actions recommended to address exposure related to soil vapor intrusion

2. Pre-Design Investigation Activities

This section describes the PDI activities to be conducted at the site to address additional data needs necessary to support the remedial design activities described in Section 3.

Health and safety protocols to be followed by field personnel during investigation activities are presented in the *Health and Safety Plan* (HASP) included as Appendix A. The air monitoring activities to be conducted during the PDI are presented in the *Community Air Monitoring Plan* (CAMP) included as Appendix B.

2.1 PDI Task 1 – Utility Coordination

PDI Task 1 consists of coordinating with NYSEG and other parties (as appropriate) to determine the presence and location of utilities that may impact the construction of the selected remedy.

Current known utilities at the site include overhead electrical transmission lines, gas regulators, and subsurface natural gas distribution lines. As shown on Figure 2, several natural gas distribution lines transect the ISS treatment area. NYSEG anticipates that these lines will be relocated (i.e., outside the ISS limits) in late Summer 2014. Following the completion of gas line relocation activities, the ARCADIS will coordinate with NYSEG to document the location of new and existing subsurface utilities at the site.

2.2 PDI Task 2 – Exploratory Subsurface Investigation

PDI Task 2 consists of conducting exploratory test pits in support of developing the ISS treatment plan for the site. Test pits will be completed to confirm the presence of gas holder foundations and identify any additional shallow foundations and obstructions (including materials of construction, thickness, depth, etc.) that may potentially impact implementation of the remedy (i.e., ISS treatment). Additionally, test pitting in the eastern portion of the site will be used to assess the construction/conditions of the retaining wall in this area.

Based on the presence of the subsurface gas distribution lines, test pitting activities will comply with all NYSEG requirements for conducting work in close proximity to subsurface utilities. Prior to excavating the test pits, ARCADIS' subcontractor will air knife soil to depth of 5 feet below ground surface (bgs) at the proposed test pit

locations to confirm the absence of the subsurface gas lines at the test pit locations. Additionally, a representative from NYSEG's gas department will be on-site to observe the test pitting activities.

Test pits will be completed at the general locations shown on Figure 3 using a rubber-tired backhoe or small excavator. Excavated material will be staged on polyethylene sheeting adjacent to the test pits. The location and elevation of subsurface foundations and obstructions will be surveyed. Each test pit will be backfilled by replacing the excavated material in the reverse order that it was removed.

2.3 PDI Documentation

The results from the PDI will be documented in a PDI Summary Report letter. Those results, along with existing site information, will support the basis for the remedial design. The PDI Summary Report letter will include the following:

- A summary of the PDI activities including health and safety monitoring, field observations, problems encountered, and other pertinent information necessary to document that the site activities were performed pursuant to this RDWP.
- Test pit logs.
- An updated site plan showing the investigation locations and the locations of the identified above- and below-ground utilities.
- An updated schedule for completing the remedial design.

3. Remedial Design Activities

This section presents a description of the remedial design activities to be completed in support of the design of the selected site remedy. Work activities associated with preparing the remedial design will be conducted under the following tasks:

- RD Task 1 – UST Removal
- RD Task 2 – In-Situ Solidification
- RD Task 3 – Sediment Removal
- RD Task 4 – NAPL Collection Well Installation
- RD Task 5 – Backfill and Site Restoration

A description of each task associated with the preparation of the remedial design is presented below.

3.1 RD Task 1 – UST Removal

Excavation will be conducted to remove the underground storage tank (UST) located in the eastern portion of the site. As reported in the February 2001 *Site Characterization Summary and Data Transmittal for the Goshen Site* (BBL, 2001), the tank is approximately 5 feet in diameter, 12 feet long, and the bottom of the tank is located at approximately 6 feet below grade.

Given the proximity of the UST to the retaining wall and the service center building, as part of the remedial design, ARCADIS will evaluate the need for potential excavation support systems (e.g., engineered slopes, slide rails, etc.) during the UST removal activities.

3.2 RD Task 2 – In-Situ Solidification

ISS treatment will be conducted to address accessible MGP source material, which includes soil containing visual MGP-related impacts in quantities greater than slight/trace sheens, staining, or isolated blebs. Additionally, accessible MGP source material is defined as:

- source material located above the till unit

- source material that can be removed/treated without demolishing or compromising the structural integrity of the service center building

The ISS process will solidify site media (i.e., soil and groundwater) containing MGP-related impacts into a solid mass (micro-encapsulation), as well as soil surrounding MGP-related materials (macro-encapsulation), thereby preventing migration of COCs and NAPL beyond the solidified mass. ISS will be performed by mixing binding reagents (e.g., a fluid grout containing a combination of water, Portland cement, bentonite, fly ash, and/or blast furnace slag, etc.) into the existing soil column.

The anticipated horizontal and vertical limits of ISS, as presented in the ROD, are shown on Figure 3. ISS is anticipated to be accomplished by bucket mixing, which involves using the bucket on an excavator to mix the fluid grout into the soil until homogenized. An appropriately sized excavator (e.g., long-stick) would be used to achieve the anticipated mixing depths of up to 28 feet below grade. Mixing will be performed by mechanically turning the soil with the excavator bucket until the grout is evenly distributed throughout the soil (i.e., the mixture is homogenized). ISS treatment methods will be further assessed as part of the remedial design.

The remedial design will be prepared such that ISS performance will be based on the following criteria:

- *Hydraulic Conductivity* – Reduction in the hydraulic conductivity of the soil matrix resulting from solidification. The target hydraulic conductivity for the treated soil matrix following addition of mixing reagents will be approximately 10^{-6} centimeters per second (cm/sec) or less.

- *Strength* – The treated soil matrix will need to have suitable physical properties to withstand anticipated earth, excavation/mixing hydrostatic, and surcharge loading without settling or deterioration. The targeted 28-day unconfined compressive strength of the treated soil matrix is a minimum of 50 pounds per square-inch (psi).

As part of the pre-mobilization activities, the remediation contractor (to be selected) may elect to perform a bench-scale treatability study to evaluate the optimum mix design to best meet the ISS performance criteria (described above), as well as evaluate other design and installation criteria (i.e., bulk density, grain size distribution, moisture content, hydraulic conductivity, and unconfined compressive strength) necessary for full-scale ISS treatment. The remedial design will include remediation contractor requirements for quality assurance/ quality control (QA/QC) sampling and analysis (to be performed during ISS treatment) to verify that performance criteria are

met. If performance criteria are not achieved in certain locations, the soil in these locations may require re-mixing (and the ISS mix design may be altered).

Prior to ISS treatment activities, the remediation contractor will be required to conduct pre-ISS excavation activities to allow for the expansion of materials being treated and maintain the top of the ISS mass at depths greater than 36 to 48 inches below grade (to protect the stabilized monolith from freeze/thaw cycle). Excess materials (i.e., spoils) will be generated during ISS treatment as a result of volume expansion (bulking) of soil when solidified. The excess materials will consist of a mixture of soil, groundwater, and grout and the volume of excess material is estimated to be 15 to 25% of the soil volume treated. The excess materials generated by ISS will generally be managed within the limits of the pre-ISS excavation. However, based on the actual volume expansion, some of the excess materials may need to be transported for offsite disposal. Additionally, if gas holder foundations are found to be present (during completion of PDI Task 2), holder foundations will be removed as part of the pre-ISS excavation. The remedial design will include pre-ISS excavation requirements, including excavation support requirements (e.g., sloping, slide rail, etc.), as necessary.

Additionally, the remedial design will include an ISS sequencing plan. Based on the proximity of the retaining wall and service center building (to the east and south of the ISS area, respectively), ISS activities are anticipated to be conducted in smaller “cells” to minimize the potential for damage to nearby structures due to soil movement/settling.

3.3 RD Task 3 – Sediment Removal

As indicated in the ROD, based on the analytical results for sediment sample SEDGRAB 09-03, sediment will be removed in the vicinity of the mouth of the 24-inch outfall that discharges to the Rio Grande Creek near the site. As part of the remedial design, appropriate methods and means to conduct sediment removal within the creek will be determined. Additional sediment removal design components could include management of surface water in the vicinity of the removal area, sediment erosion control measures, and restoration measures.

3.4 RD Task 4 – NAPL Collection Well Installation

The site remedy includes the installation of NAPL collection points to facilitate the recovery of potentially mobile NAPL (i.e., inaccessible NAPL that may be present beneath the service center building). The remedial design will include construction

details of NAPL collection wells to be installed following the completion of ISS treatment activities. NAPL collection wells are anticipated to be installed near existing NAPL monitoring well NMW08-02 (i.e., where NAPL has historically accumulated).

3.5 RD Task 5 – Backfill and Site Restoration

As indicated above, the remedial contractor will be required to manage ISS spoils such that stabilized material is located a minimum of 36 inches below grade. The UST excavation area, as well as the ISS treatment area will be backfilled with material that meets 6 NYCRR Part 375 commercial use SCOs. The final surface cover for the site will be selected and specified (i.e., type and gradation) as part of the remedial design. Final surface covers are anticipated to consist of either asphalt pavement or gravel to provide access and allow site use as an active service center following the completion of remedial construction activities.

4. Permits and Approvals

The remedial design will be developed to meet applicable SCGs, permits, and approvals. In addition to NYSDEC approval of the remedial design, permits and approvals will be necessary to implement the NYSDEC-selected remedy (permits are not anticipated to be required to implement the PDI activities).

Remedial activities will be conducted in accordance with Village and Town of Goshen building/construction codes and ordinances. Although the site is located with the Village of Goshen Architectural Design District, implementation of the remedial construction activities would not impact the potential historical significance of the service center building or the property (i.e., because the service center building will not be removed).

Removal of sediment from the Rio Grande Creek will likely be conducted in accordance with United Stated Army Corp of Engineers (USACE) approval and oversight and a Joint Permit for Protection of Waters from the NYSDEC and the USACE will be required to complete any remedial activities within the creek.

A final list of permits necessary to implement the remedy will be identified in the remedial design.

5. Remedial Design Documents and Project Schedule

Consistent with the requirements set forth in DER-10 (NYSDEC, 2010b), the following remedial design submittals will be prepared:

- *Preliminary (50%) Remedial Design Report*
- *Final (100%) Remedial Design Report*

The contents of each remedial design document are presented below.

5.1 Preliminary (50%) Remedial Design Report

The *Preliminary (50%) Remedial Design Report* will generally include the following information:

- An introductory section that will provide a brief overview of the remedial design, site background information, design report objectives and report organization.
- A summary of the PDI activities, including the results obtained for the PDI activities.
- A summary of the remedy with a basis of design that describes the proposed remedial design and presents information used to develop the design and construction components of the project.
- A description of site controls for protecting the public health, safety, welfare and environment and to maintain the effectiveness of the remedial action.
- The regulatory and permitting requirements associated with implementing the remedial construction activities.
- A general description of the various components associated with completing the remedial construction activities.
- A set of engineering design drawings that represent an accurate identification of existing site conditions and an illustration of the work proposed. Each engineering design drawing will include a north arrow (where applicable), scale, legend,

definitions of all symbols and abbreviations and sheet number. The engineering design drawings are anticipated to include, at a minimum, the following:

- Title Sheet – to include at least the title of the project, key map, date prepared, sheet index and NYSDEC project identification.

- Existing Site Plan – to include pertinent property data including owners of record for all properties adjacent to the site (as necessary); site survey including the distance and bearing of all property lines that identify and define the project site; all easements, right-of-ways and reservations (as necessary); existing buildings and structures, wells, facilities and equipment; a topographic survey of existing contours and spot elevations within the project limits of disturbance, based on United States Geological Survey datum; all known existing underground and aboveground utilities; and location and identification of significant natural features, including, among other things, wooded areas, water courses, wetlands and flood hazard areas.

- Site Remediation Plan – to include limits of soil excavation, ISS treatment, and sediment removal; and relocation of utilities (if any).

- Restoration Plan – to include limits of the final surface cover, location of new structures and/or wells, and other final restoration features.

- Technical specifications (table of contents only).

5.2 Final (100%) Remedial Design Report

In addition to the items identified for the *Preliminary (50%) Remedial Design Report*, the *Final (100%) Remedial Design Report* will include the following information:

- Revisions to the *Preliminary (50%) Remedial Design Report* based on NYSDEC comments, as appropriate.

- Remedial Action Schedule (preliminary), which presents the preliminary anticipated schedule for implementation of the remedial activities.

- Final Engineering Design Drawings, including but not limited to the following, in addition to the design drawings prepared for the *Preliminary (50%) Remedial Design Report*:

- Site Preparation Plan – to include minimum requirements for temporary erosion and sedimentation controls; identification of other site features to be protected during remedial construction activities; and site facilities (parking areas, decontamination area, equipment/material lay down areas.

- Excavation Support Profile and Details (if necessary) – to include a profile of excavation support system, structural details related to the type of support to be used, and other miscellaneous details related to the excavation support system.

- NAPL Collection Well Installation Plan and details – to include the proposed location and number of NAPL collection wells and provide NAPL collection well construction details.

- Miscellaneous Details – to include details related to the surface cover profiles, temporary erosion and sedimentation controls, and decontamination area.

- Technical Specifications.

- A description of operation, maintenance, and monitoring activities to be undertaken after the NYSDEC has approved construction of the remedial design, including the number of years during which such activities will be performed.

- A waste management plan (WMP) that describes the characterization, handling, treatment, and disposal requirements for various waste materials to be generated as a result of the remedial activities.

- A community air monitoring plan (CAMP) that describes the monitoring activities that will be conducted to detect potential airborne releases of constituents of concern during the implementation of remedial activities.

- A construction quality assurance plan (CQAP) that describes the materials, procedures, and testing necessary for proper construction, evaluation, and documentation during remedial activities.

- A community environmental response plan (CERP) that presents a summary of the site monitoring and work practices that will be completed to address potential short-term impacts to the surrounding community and/or environmental resources.

- A contingency plan that provides responses to potential emergencies that may arise as a result of the remediation activities that will be completed at the site.

- A Citizen Participation Plan which incorporates appropriate activities outlined in the NYSDEC's *Draft Citizen Participation Handbook for Remedial Programs* (DER-23) (NYSDEC, 2010a).

5.3 Remedial Design Schedule

The anticipated schedule for completing the PDI activities identified in this RDWP and a preliminary schedule for completion of the remedial design and construction of the selected remedy for the site is presented below.

Table 5.1 Preliminary Project Schedule

Schedule Component	Date
NYSDEC approval of this RDWP	October 2013
Conduct PDI activities	November 2013
Submit PDI Summary Letter Report	December 2013
Submit Preliminary (50%) Remedial Design Report to NYSDEC	December 24, 2014
Receive NYSDEC comments	February 25, 2014
Submit Draft Final (95%) Remedial Design Report to NYSDEC	May 22, 2014
Receive NYSDEC comments	August 14, 2014
Submit Final (100%) Remedial Design Report to NYSDEC	September 1, 2014
Bid Document Preparation and Remedial Contractor Procurement	September 2014 – May 2015
Remedial Construction	Fall 2015

This schedule for conducting PDI activities and preparing remedial design documents is dependent on receipt of NYSDEC comments on project submittals.

6. Post-Construction Activities

Following remedial construction activities, future site activities will be conducted in accordance with a *Site Management Plan* and institutional controls to be established for the site. The anticipated components of the SMP and institutional controls are presented below.

6.1 Site Management Plan

As indicated in the ROD (NYSDEC, 2011), the primary components of the SMP will consist of an *Institutional and Engineering Control Plan* and *Monitoring Plan*. These plans will consist of the following:

- *Institutional and Engineering Control Plan* – describes the use restrictions and engineering controls that have been established at the site.

- *Monitoring Plan* – used to assess the performance and effectiveness of the remedial activities.

The SMP will include requirements for post-remedial action groundwater and NAPL monitoring, as well as site inspection schedules, and NYSDEC submittal requirements. The SMP will also include soil vapor intrusion monitoring requirements for any new buildings constructed at the site.

6.2 Institutional Controls

As indicated in the ROD (NYSDEC, 2011), institutional controls in the form of an environmental easement will be established for the site to:

- Require NYSEG to provide a periodic certification of institutional and engineering controls to the NYSDEC in accordance with 6NYCRR Part 375-1.8(h)(3)

- Limit the land use and development of the site to commercial use

- Restrict the use of site groundwater for potable purposes or as process water, unless proper water quality treatment is conducted, as determined by NYSDOH

- Prohibit agriculture or vegetable gardens at the site

- Require compliance with an NYSDEC-approved SMP

Institutional controls will be established by NYSEG following the completion of the remedial construction activities.

7. References

ARCADIS, 2008. Letter report to NYSDEC regarding soil vapor intrusion evaluation results. Submitted on May 20, 2008 on behalf of NYSEG.

ARCADIS, 2010. *Remedial Investigation Report*. Goshen Former MGP Site, Goshen, New, York. Prepared on behalf of NYSEG. July 2010.

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Blasland, Bouck & Lee, Inc., 2001. Site *Characterization Summary and Data Transmittal for the Goshen Site*, Goshen Former MGP Site, prepared on behalf of New York State Electric and Gas Corporation, February 2001.

Engineering-Science, 1991. Prioritization of Former Manufactured Gas Plant Site, Goshen Site (NYSEG Code CGGS), prepared for New York State Electric and Gas. September 1991.

NYSDEC, 2002. *Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants* (DER-4), January 11, 2002.

NYSDEC, 2004. *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (TOGS 1.1.1), Reissued June 1998 and addended April 2000 and June 2004.

NYSDEC. 2010a. *DER-23*, *Citizen Participation Handbook for Remedial Programs.* January, 2010.

NYSDEC, 2010b. DER-10 *Technical Guidance for Site Investigation and Remediation*, May 2010.

NYSDEC, 2011. *Record of Decision, NYSEG Goshen MGP.* Site Number 3-36-046. March 2011.

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Tables

Table 1
Summary of Chemical-Specific SCGs

Remedial Design Work Plan
NYSEG - Goshen Former Manufactured Gas Plant Site - Goshen, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal				
National Primary Drinking Water Standards	40 CFR Part 141	S	Establishes maximum contaminant levels (MCLs) which are health-based standards for public water supply systems.	These standards are potentially applicable if an action involves future use of ground water as a public supply source.
RCRA-Regulated Levels for Toxic Characteristics Leaching Procedure (TCLP) Constituents	40 CFR Part 261	S	These regulations specify the TCLP constituent levels for identification of hazardous wastes that exhibit the characteristic of toxicity.	Excavated materials may be sampled and analyzed for TCLP constituents prior to disposal to determine if the materials are hazardous based on the characteristic of toxicity.
Universal Treatment Standards/Land Disposal Restrictions (UTS/LDRs)	40 CFR Part 268	S	Identifies hazardous wastes for which land disposal is restricted and provides a set of numerical constituent concentration criteria at which hazardous waste is restricted from land disposal (without treatment).	Applicable if waste is determined to be hazardous and for remedial alternatives involving off-site land disposal.
New York State				
NYSDEC Guidance on Remedial Program Soil Cleanup Objectives	6 NYCRR Part 375	G	Provides an outline for the development and execution of the soil remedial programs. Includes soil cleanup objective tables.	These guidance values are to be considered, as appropriate, in evaluating soil quality.
NYSDEC Ambient Water Quality Standards and Guidance Values	Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 (6/98)	G	Provides a compilation of ambient water quality standards and guidance values for toxic and non-conventional pollutants for use in the NYSDEC programs.	These standards are to be considered in evaluating groundwater and surface water quality.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	S	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.	Applicable for determining if materials generated during implementation of remedial activities are hazardous wastes. These regulations do not set cleanup standards, but are considered when developing remedial alternatives.
New York State Surface Water and Groundwater Quality Standards	6 NYCRR Part 703	S	Establishes quality standards for surface water and groundwater.	Potentially applicable for assessing water quality at the site during remedial activities.

Table 2
Summary of Action-Specific SCGs

Remedial Design Work Plan
NYSEG - Goshen Former Manufactured Gas Plant Site - Goshen, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal				
Occupational Safety and Health Act (OSHA) - General Industry Standards	29 CFR Part 1910	S	These regulations specify the 8-hour time-weighted average concentration for worker exposure to various compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below required concentrations. Appropriate training requirements will be met for remedial workers.
OSHA - Safety and Health Standards	29 CFR Part 1926	S	These regulations specify the type of safety equipment and procedures to be followed during site remediation.	Appropriate safety equipment will be on-site and appropriate procedures will be followed during remedial activities.
OSHA - Record-keeping, Reporting and Related Regulations	29 CFR Part 1904	S	These regulations outline record-keeping and reporting requirements for an employer under OSHA.	These regulations apply to the company(s) contracted to install, operate and maintain remedial actions at hazardous waste sites.
RCRA - Preparedness and Prevention	40 CFR Part 264.30 - 264.31	S	These regulations outline requirements for safety equipment and spill control when treating, handling and/or storing hazardous wastes.	Safety and communication equipment will be installed at the site as necessary. Local authorities will be familiarized with the site.
RCRA - Contingency Plan and Emergency Procedures	40 CFR Part 264.50 - 264.56	S	Provides requirements for outlining emergency procedures to be used following explosions, fires, etc. when storing hazardous wastes.	Emergency and contingency plans will be developed and implemented during remedial design. Copies of the plan will be kept on-site.
90 Day Accumulation Rule for Hazardous Waste	40 CFR Part 262.34	S	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers and containment buildings without having to obtain a RCRA hazardous waste permit.	Potentially applicable to remedial alternatives that involve the storing or treating of hazardous materials on-site.
Land Disposal Facility Notice in Deed	40 CFR Parts 264 and 265 Sections 116-119(b)(1)	S	Establishes provisions for a deed notation for closed hazardous waste disposal units, to prevent land disturbance by future owners.	The regulations are potentially applicable because closed areas may be similar to closed RCRA units.
Federal Power Act of 1920	16 USC 79la et.seq. 18 CFR 1-149	S	Authorizes the Federal Energy Regulatory Agency (FERC) to issue licenses for hydropower dams.	Remedial alternatives involving alteration of dam operations would require consideration of existing permits.
RCRA - General Standards	40 CFR Part 264.111	S	General performance standards requiring minimization of need for further maintenance and control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products. Also requires decontamination or disposal of contaminated equipment, structures and soils.	Decontamination actions and facilities will be constructed for remedial activities and disassembled after completion.
Standards Applicable to Transporters of Applicable Hazardous Waste - RCRA Section 3003	40 CFR Parts 170-179, 262, and 263	S	Establishes the responsibility of off-site transporters of hazardous waste in the handling, transportation and management of the waste. Requires manifesting, recordkeeping and immediate action in the event of a discharge.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
United States Department of Transportation (USDOT) Rules for Transportation of Hazardous Materials	49 CFR Parts 107 and 171.1 - 172.558	S	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous materials.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
Clean Air Act-National Ambient Air Quality Standards	40 CFR Part 60	S	Establishes ambient air quality standards for protection of public health.	Remedial operations will be performed in a manner that minimizes the production of benzene and particulate matter.
USEPA-Administered Permit Program: The Hazardous Waste Permit Program	RCRA Section 3005; 40 CFR Part 270.124	S	Covers the basic permitting, application, monitoring and reporting requirements for off-site hazardous waste management facilities.	Any off-site facility accepting hazardous waste from the site must be properly permitted. Implementation of the site remedy will include consideration of these requirements.

Table 2
Summary of Action-Specific SCGs

Remedial Design Work Plan
NYSEG - Goshen Former Manufactured Gas Plant Site - Goshen, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal (Cont.)				
Land Disposal Restrictions	40 CFR Part 368	S	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes Universal Treatment Standards (UTSs) to which hazardous waste must be treated prior to land disposal.	Excavated materials that display the characteristic of hazardous waste or that are decharacterized after generation must be treated to 90% constituent concentration reduction capped at 10 times the UTS.
RCRA Subtitle C	40 U.S.C. Section 6901 et seq.; 40 CFR Part 268	S	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes UTSs to which hazardous wastes must be treated prior to land disposal.	Potentially applicable to remedial activities that include the dredging and disposal waste material from the site.
New York State				
NYSDEC's Monitoring Well Decommissioning Guidelines	CP-43	G	This guidance presents procedure for abandonment of monitoring wells at remediation sites.	This guidance is applicable for soil or groundwater alternatives that require the decommissioning of monitoring wells onsite.
Guidelines for the Control of Toxic Ambient Air Contaminants	DAR-1 (Air Guide 1)	G	Provides guidance for the control of toxic ambient air contaminants in New York State and outlines the procedures for evaluating sources of air pollution.	This guidance may be applicable for soil or groundwater alternatives that results in certain air emissions.
New York State Air Quality Classification System	6 NYCRR Part 256	G	Outlines the air quality classifications for different land uses and population densities.	Air quality classification system will be referenced during the treatment process design.
New York Air Quality Standards	6 NYCRR Part 257	G	Provides air quality standards for different chemicals (including those found at the site), particles, and processes.	Emissions from the treatment process will meet the air quality standards.
Discharges to Public Waters	New York State Environmental Conservation Law, Section 71-3503	S	Provides that a person who deposits gas tar, or the refuse of a gas house or gas factory, or offal, refuse, or any other noxious, offensive, or poisonous substances into any public waters, or into any sewer or stream running or entering into such public waters, is guilty of a misdemeanor.	During the remedial activities, MGP-impacted materials will not be deposited into public waters or sewers.
New York Hazardous Waste Management System - General	6 NYCRR Part 370	S	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management.	Hazardous waste is to be managed according to this regulation.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	S	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.	Applicable for determining if solid waste generated during implementation of remedial activities are hazardous wastes. These regulations do not set cleanup standards, but are considered when developing remedial alternatives.
Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities	6 NYCRR Part 372	S	Provides guidelines relating to the use of the manifest system and its recordkeeping requirements. It applies to generators, transporters and facilities in New York State.	This regulation will be applicable to any company(s) contracted to do treatment work at the site or to transport or manage hazardous material generated at the site.
New York Regulations for Transportation of Hazardous Waste	6 NYCRR Part 372.3 a-d	S	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous waste.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
Waste Transporter Permits	6 NYCRR Part 364	S	Governs the collection, transport and delivery of regulated waste within New York State.	Properly permitted haulers will be used if any waste materials are transported off-site.
NYSDEC Technical and Administrative Guidance Memorandums (TAGMs)	NYSDEC TAGMs	G	TAGMs are NYSDEC guidance that are to be considered during the remedial process.	Appropriate TAGMs will be considered during the remedial process.
NYSDEC Technical Guidance for Site Investigation and Remediation	DER-10	G	Outlines the minimum technical activities DEC accepts for remedial projects administered under DER.	This guidance is applicable for the remedy selection process and remedial design process.
New York Regulations for Hazardous Waste Management Facilities	6 NYCRR Part 373.1.1 - 373.1.8	S	Provides requirements and procedures for obtaining a permit to operate a hazardous waste treatment, storage and disposal facility. Also lists contents and conditions of permits.	Any off-site facility accepting waste from the site must be properly permitted.

Table 2
Summary of Action-Specific SCGs

Remedial Design Work Plan
NYSEG - Goshen Former Manufactured Gas Plant Site - Goshen, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
New York State (Cont.)				
Management of Soil and Sediment Contaminated With Coal Tar From Former Manufactured Gas Plants	NYSDEC Program Policy	G	Purpose of the guidance is to facilitate the permanent treatment of soil contaminated with coal tar from the sites of former MGPs.	Policy will be considered for D018 hazardous and non-hazardous material removed during removal activities.
Land Disposal of a Hazardous Waste	6 NYCRR Part 376	S	Restricts land disposal of hazardous wastes that exceed specific criteria.	New York defers to USEPA for UTS/LDR regulations.
NYSDEC Guidance on the Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants	DER-4	G	Outlines the criteria for conditionally excluding coal tar waste and impacted soils from former MGPs which exhibit the hazardous characteristic of toxicity for benzene (D018) from the hazardous waste requirements of 6 NYCRR Parts 370 - 374 and 376 when destined for thermal treatment.	This guidance will be used as appropriate in the management of MGP-impacted soil and coal tar waste generated during the remedial activities.
National Pollutant Discharge Elimination System (NPDES) Program Requirements, Administered Under New York State Pollution Discharge Elimination System (SPDES)	40 CFR Parts 122 Subpart B, 125, 301, 303, and 307 (Administered under 6 NYCRR 750-758)	S	Establishes permitting requirements for point source discharges; regulates discharge of water into navigable waters including the quantity and quality of discharge.	Removal activities may involve treatment/disposal of water. If so, water generated at the site will be managed in accordance with NYSDEC SPDES permit requirements.

Table 3
Summary of Location-Specific SCGs

Remedial Design Work Plan
NYSEG - Goshen Former Manufactured Gas Plant Site - Goshen, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal				
National Environmental Policy Act Executive Orders 11988 and 11990	40 CFR 6.302; 40 CFR Part 6, Appendix A	S	Requires federal agencies, where possible, to avoid or minimize adverse impact of federal actions upon wetlands/floodplains and enhance natural values of such. Establishes the "no-net-loss" of waters/wetland area and/or function policy.	To be considered if remedial activities are conducted within the floodplain or wetlands.
Fish and Wildlife Coordination Act	16 USC 661; 40 CFR 6.302	S	Actions must be taken to protect fish or wildlife when diverting, channeling or otherwise modifying a stream or river.	Potentially applicable to remedial activities within and/or adjacent to the Hudson River.
Historical and Archaeological Data Preservation Act	16 USC 469a-1	S	Provides for the preservation of historical and archaeological data that might otherwise be lost as the result of alteration of the terrain.	The National Register of Historic Places website indicated no records present for historical sites in the immediate vicinity of the MGP site.
National Historic and Historical Preservation Act	16 USC 470; 36 CFR Part 65; 36 CFR Part 800	S	Requirements for the preservation of historic properties.	The National Register of Historic Places website indicated several historic sites are present within 0.4 miles of the MGP site.
Hazardous Waste Facility Located on a Floodplain	40 CFR Part 264.18(b)	S	Requirements for a treatment, storage and disposal (TSD) facility built within a 100-year floodplain.	Hazardous waste TSD activities (if any) will be designed to comply with applicable requirements cited in this regulation.
Endangered Species Act	16 USC 1531 et seq.; 50 CFR Part 200; 50 CFR Part 402	S	Requires federal agencies to confirm that the continued existence of any endangered or threatened species and their habitat will not be jeopardized by a site action.	During the Fish and Wildlife evaluation, one candidate (Atlantic sturgeon) and one endangered species (short-nose sturgeon) were identified on the USFWS list of Threatened, Endangered, Sensitive Species for Rockland County.
Floodplains Management and Wetlands Protection	40 CFR 6 Appendix A	S	Activities taking place within floodplains and/or wetlands must be conducted to avoid adverse impacts and preserve beneficial value. Procedures for floodplain management and wetlands protection provided.	To be considered if remedial activities are conducted within the floodplain or wetlands.
New York State				
New York State Floodplain Management Development Permits	6 NYCRR Part 500	S	Provides conditions necessitating NYSDEC permits and provides definitions and procedures for activities conducted within floodplains.	Potentially applicable to remedial activities within and/or adjacent to the Monhagen Brook 100-year flood plain.
New York State Freshwater Wetlands Act	ECL Article 24 and 71; 6 NYCRR Parts 662-665	S	Activities in wetlands areas must be conducted to preserve and protect wetlands.	Does not appear to be applicable as the site is not located in a wetlands area.
New York State Parks, Recreation, and Historic Preservation Law	New York Executive Law Article 14	S	Requirements for the preservation of historic properties.	The National Register of Historic Places website indicated no records present for historical sites in the immediate vicinity of the MGP site.
Endangered & Threatened Species of Fish and Wildlife	6 NYCRR Part 182	S	Identifies endangered and threatened species of fish and wildlife in New York.	The shortnosed sturgeon is a candidate on the List of Endangered, Threatened and Special Concern Fish & Wildlife Species of New York State.
Floodplain Management Criteria for State Projects	6 NYCRR Part 502	S	Establishes floodplain management practices for projects involving state-owned and state-financed facilities.	Portions of the area to be remediated are located within the floodplain. Activities located in these areas would be performed in accordance with this regulation.

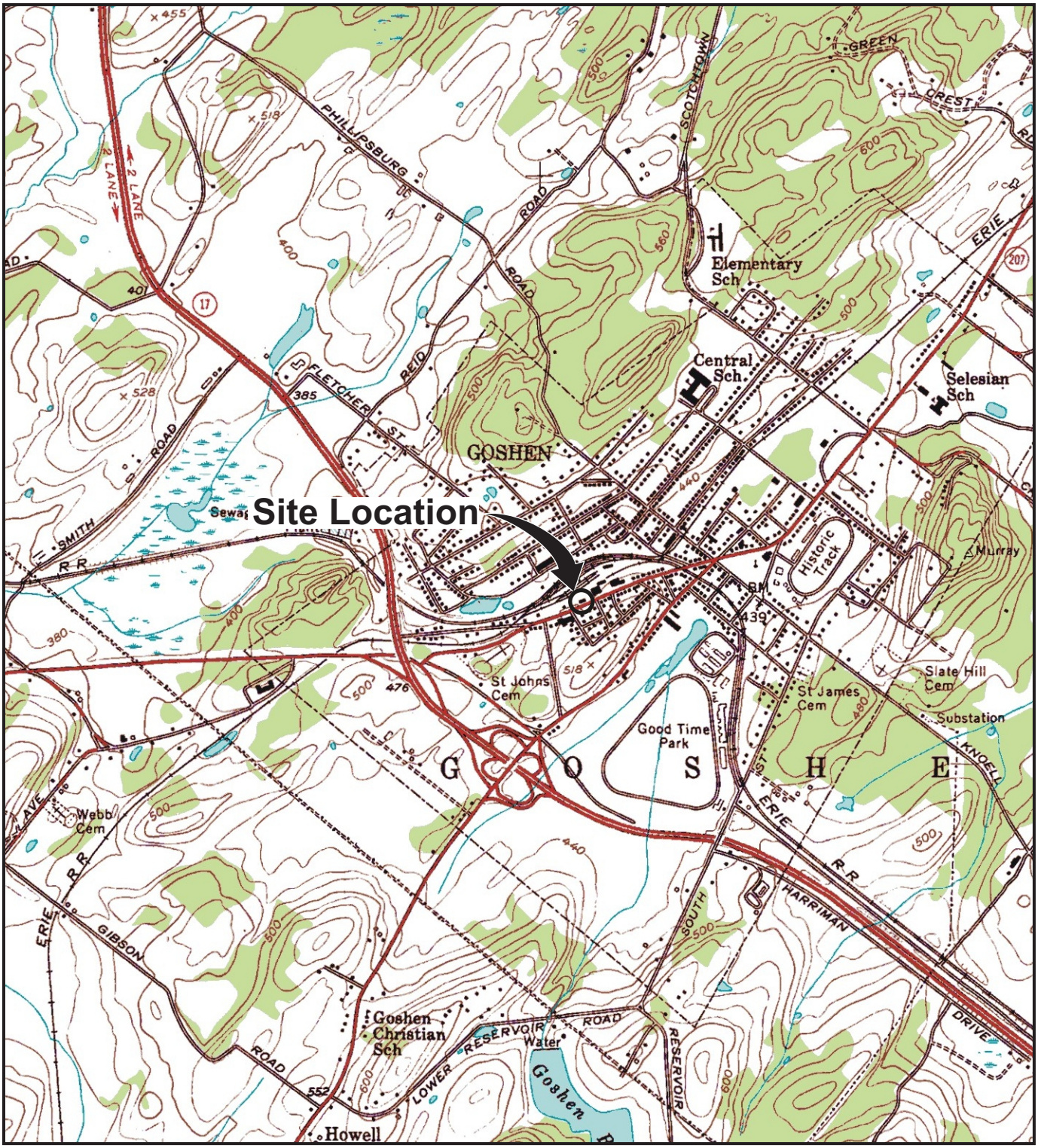
Table 3
Summary of Location-Specific SCGs

Remedial Design Work Plan
NYSEG - Goshen Former Manufactured Gas Plant Site - Goshen, New York

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Local				
Local Building Permits	N/A	S	Local authorities may require a building permit for any permanent or semi-permanent structure, such as an on-site water treatment system building or a retaining wall.	Substantive provisions are potentially applicable to remedial activities that require construction of permanent or semi-permanent structures.
Local Street Work Permits	N/A	S	Local authorities will require a permits for conducting work within and closing local roadways.	Street work permits will be required to conduct remedial activities within public roadways.
Discharge of Water to Local Sewers	N/A	S	Village of Goshen has indicated that discharge of treated or untreated water from the site to local sanitary sewers would not be permitted.	Water generated remedial construction activities would have to stored (and potentially treated) on-site and transported off-site for final treatment/disposal.
Architectural Design District Zoning	N/A	G	The site is located with the Village of Goshen Architectural Design District. Properties and buildings located within this area are subject to regulations/restrictions regarding historical areas.	The Village of Goshen may not permit the demolition and removal of the service center building as part of site remedy.

ARCADIS

Figures



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., GOSHEN, NY, 1957.

2000' 0 2000'

Approximate Scale: 1" = 2000'

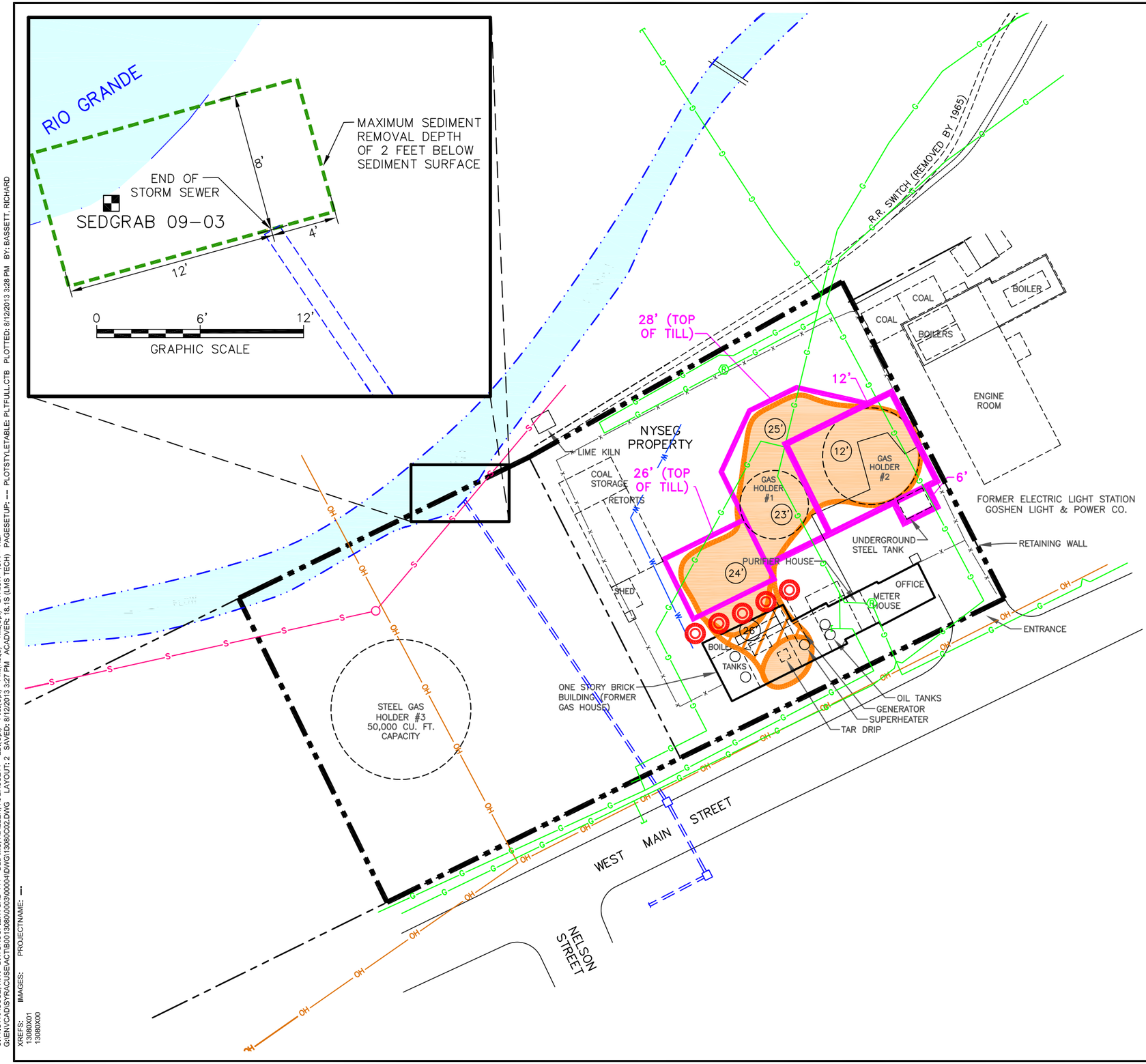
NYSEG
GOSHEN FORMER MGP SITE
GOSHEN, NEW YORK
REMEDIAL DESIGN WORK PLAN

SITE LOCATION MAP

ARCADIS

FIGURE
1

08/07/2013 SYRACUSE, NY-ENV/CAD-DJHOWES
B0013080/0003/00004/CDR/13080N01.CDR



LEGEND:

- FORMER STRUCTURE (1889–1945)
- NYSEG PROPERTY LINE (SITE)
- GAS LINE
- WATER LINE
- SEWER LINE
- OVERHEAD ELECTRIC LINE
- STORM LINE
- PROPERTY LINE
- FENCE LINE
- APPROXIMATE EXTENT OF SOIL CONTAINING MGP–RELATED SOURCE MATERIAL (HATCHED WHERE INFERRED)
- (12') APPROXIMATE MAXIMUM DEPTH TO SOURCE MATERIAL
- APPROXIMATE EXTENT OF ISS TREATMENT
- 12' APPROXIMATE DEPTH OF ISS TREATMENT
- PROPOSED NAPL COLLECTION WELL

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. LOCATIONS OF FORMER STRUCTURES ARE BASED ON SANBORN FIRE INSURANCE MAPS FROM 1889 THROUGH 1939.

0 40' 80'

GRAPHIC SCALE

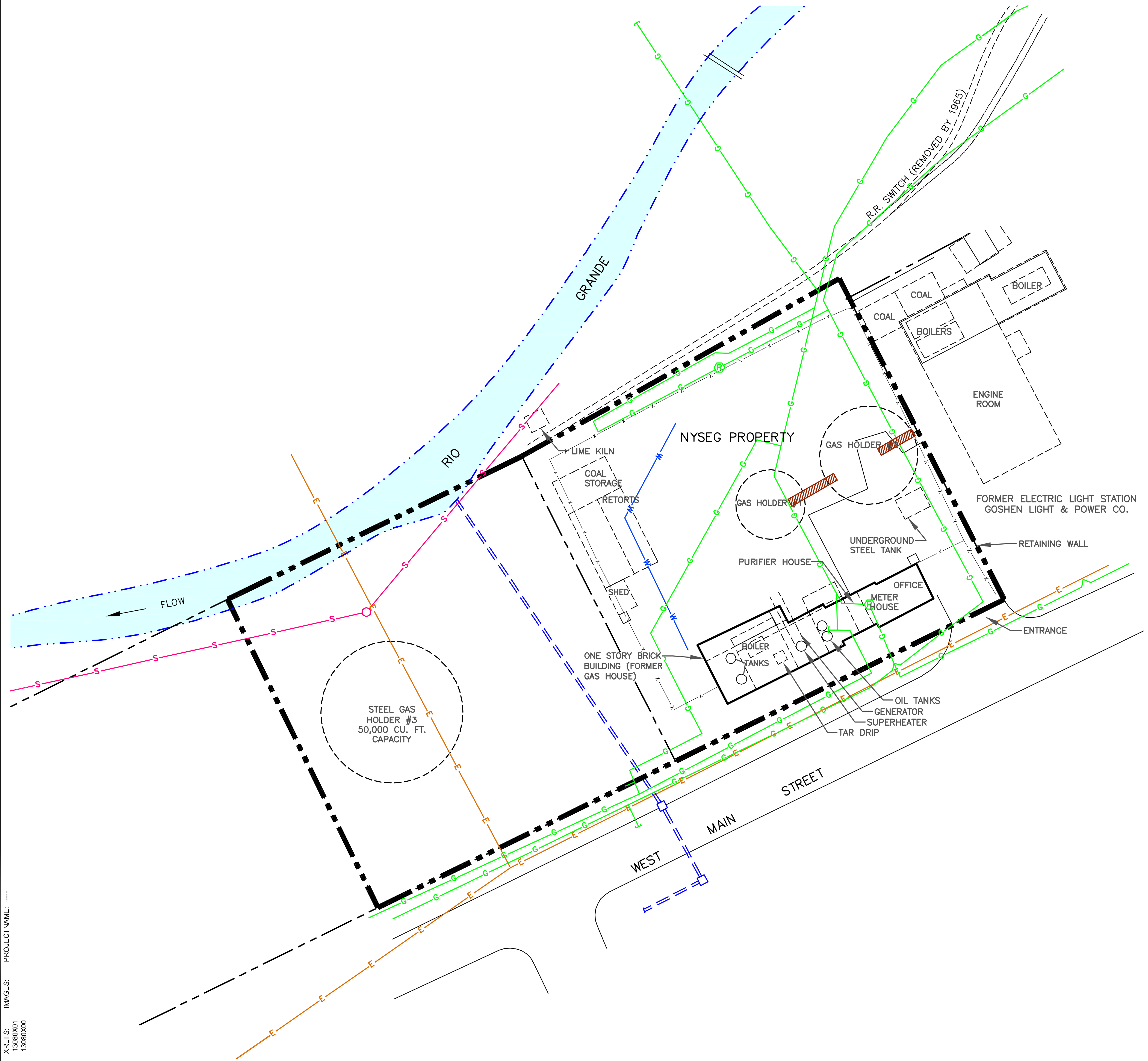
NYSEG
GOSHEN FORMER MGP SITE
GOSHEN, NEW YORK
REMEDIAL DESIGN WORK PLAN

SELECTED REMEDY

ARCADIS

FIGURE
2

CITY:SYRACUSE, N.Y. DIV/GROUP:ENVCAD-141 DB:AMS, R.ALLEN, R.BASSETT LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013080\0003\300004\DWG\130800C02.DWG LAYOUT: 2 SAVED: 8/12/2013 3:27 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 8/12/2013 3:28 PM BY: BASSETT, RICHARD
XREFS: IMAGES: PROJECTNAME: ---
13080X01
13080X00



LEGEND:

- FORMER STRUCTURE (1889–1945)
- NYSEG PROPERTY LINE (SITE)
- GAS LINE
- WATER LINE
- SEWER LINE
- ELECTRIC LINE
- STORM LINE
- PROPERTY LINE
- FENCE LINE
- TEST PIT

NOTES:

1. TEST PIT LOCATIONS ARE APPROXIMATE AND MAY BE REINED IN THE FIELD BASED ON SUBSURFACE CONDITIONS ENCOUNTERED.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LOCATIONS OF FORMER STRUCTURES ARE BASED ON SANBORN FIRE INSURANCE MAPS FROM 1889 THROUGH 1939.

0 40' 80'

GRAPHIC SCALE

NYSEG
GOSHEN FORMER MGP SITE
GOSHEN, NEW YORK
REMEDIAL DESIGN WORK PLAN

TEST PIT LOCATIONS

ARCADIS

FIGURE
3

Appendix A

Health and Safety Plan

Site Specific Health and Safety Plan

Revision 11 9/20/2012

Project Name: Goshen Former MGP Site
West Main Street, Goshen, New York
Site No. 3-36-046

Project Number: B0013080
Client Name: NYSEG
Date: August 2013
Revision: 0

Approvals:

HASP Developer: Jason Golubki, P.E.

HASP Reviewer: Bob Gang

Project Manager: Jason Brien, P.E.

Emergency Information

Site Address: 250 W Main Street
Goshen, New York 10924

Emergency Phone Numbers:

Emergency (fire, police, ambulance)		911
Emergency (facility specific, if applicable):		
Emergency Other (specify)		
Client Contact	Tracy Blazicek	607.762.8839
WorkCare (non-lifethreatening injury/illness)		1-800-455-6155
Project H&S	Charles Webster	315.671.9657
Task Manager	Jason Golubski	315.671.9437
Project Manager	Jason Brien	315.671.9114
Corporate H&S Specialist		#N/A
Corporate H&S Director	Rebecca Lindeman	408-834-0368

Hospital Name and Address: Orange County Medical Center
707 East Main Street
Middletown, NY 10940

Hospital Phone Number: 845.333.1000

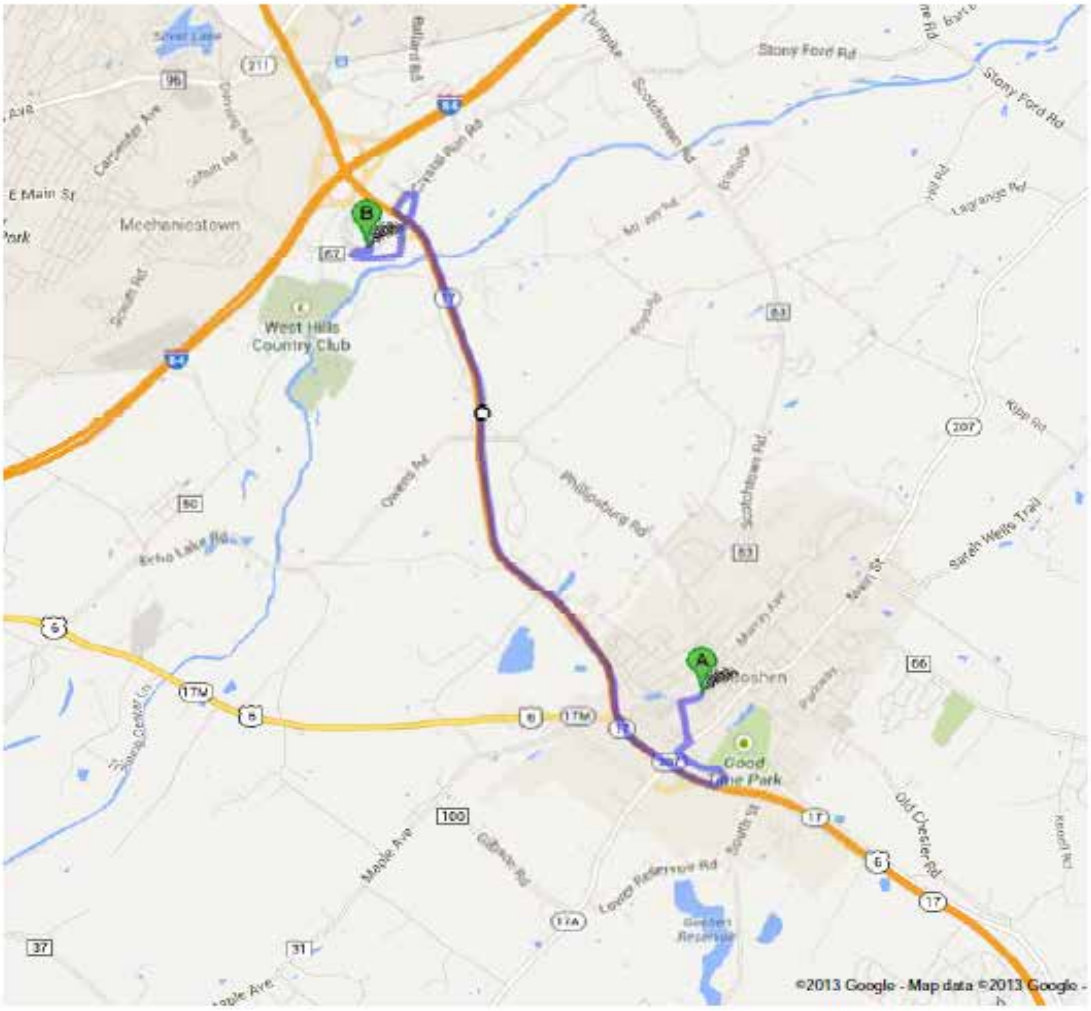
Incident Notification Process

1	Dial 911/Facility Emergency Number/WorkCare as applicable	
2	Contact PM/Supervisor	Jason Brien
3	Contact Corporate H&S	Rebecca Lindeman
4	Contact Client	Tracy Blazicek

Route to the Hospital

Google

Directions to 707 E Main St, Middletown, NY 10940
6.2 mi – about 11 mins



250 W Main St, Goshen, NY 10924

	1. Head **southwest** on **W Main St** toward **Nelson St**	go 0.1 mi total 0.1 mi
	2. Take the 2nd left onto **Clowes Ave** About 1 min	go 0.3 mi total 0.4 mi
	3. Take the 2nd right onto **Greenwich Ave**	go 492 ft total 0.5 mi
	4. Take the 1st left onto **N Connector Rd/Matthews St** Continue to follow N Connector Rd About 49 secs	go 0.2 mi total 0.7 mi
	5. Take the **U.S. 6 W/New York 17 W/New York 17M W** ramp	go 0.2 mi total 0.9 mi
	6. Merge onto **New York 17M W/US-6 W**	go 0.4 mi total 1.4 mi
	7. Continue onto **NY-17 W** About 3 mins	go 3.7 mi total 5.1 mi
	8. Take exit **122** for **Crystal Run Crossing**	go 0.2 mi total 5.3 mi
	9. Turn right onto **Crystal Run Crossing**	go 289 ft total 5.3 mi
	10. Turn right onto **Crystal Run Rd** About 58 secs	go 0.3 mi total 5.6 mi
	11. Continue onto **County Rd 67/E Main St**	go 0.3 mi total 6.0 mi
	12. Turn right	go 0.1 mi total 6.1 mi
	13. Turn left	go 157 ft total 6.1 mi
	14. Turn left	go 52 ft total 6.1 mi
	15. Turn left	go 62 ft total 6.2 mi
	16. Turn right Destination will be on the right	go 82 ft total 6.2 mi

707 E Main St, Middletown, NY 10940

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

General Information

Site Type (select all applicable where work will be conducted):

- [x] Active
- [ ] Bridge
- [ ] Buildings
- [x] Commercial
- [ ] Construction
- [ ] Government
- [ ] Inactive
- [ ] Industrial
- [ ] Landfill
- [ ] Marine
- [ ] Mining
- [x] Parking Lot/Private Roadway
- [ ] Railroad
- [ ] Remote Area
- [ ] Residential
- [ ] Retail
- [ ] Roadway (public, inlcuing right-of-way)
- [x] Secure
- [ ] Unknown
- [ ] Unsecured
- [x] Utility
- [ ] Other (specify): _____

Surrounding Area and Topography (select one):

- [x] Surrounding area and topography are presented in the project work plan
- [ ] Surrounding area and topography (*briefly describe*):

Site Background (select one):

- [x] Site background is presented in the project work plan
- [ ] Site background (*briefly describe)* :

Project Tasks

The following tasks are identified for this project:

Examples: "Drilling/soil sampling", "Surveying", "General Inspections", "Construction Management/Inspections"

1. Air knifing
2. Test pitting
3. Surveying
4.
5.

☐ Subcontractor H&S information is attached

☐ ARCADIS Standards apply to augment JSA

ARC HSFS Utility Clearance, ARC HSCS005 Excavation Trenching

☑ Utility clearance required.

☑ ARCADIS Field H&S Handbook sections apply *(list below)*

Comments:

II.H - Stop Work Authority; III.A - Daily Safety Meetings, III.L - Noise, III.R - Personal Protective Equipment; III.MM - Utility Location; IV.D - Excavation/Trenching

Roles and Responsibilities

	Name	*Role*	*Additional Responsibilities (Describe)*
1	Jason Brien	PM	Overall management of project
2	Jason Golubski	TM	Coordinate all field work
3	TBD	Field Lead	
4	TBD	SSO	
5			
6			

Training

All ARCADIS employees are required to have the following training:	*Selected ARCADIS employees are required to have the following additional training:*	Names or Numbers from above
☑ 40 hr HAZWOPER w current refresh.	☐ Not applicable	
☐ 24 hr HAZWOPER	☑ First aid/CPR/BBP	TBD - all on-site personnel
☐ 10 hr Construction	☐ 30 hr Construction	
☐ HazMat #1 (Ground/Air/MOT)	☐ 10 hr Construction	
☐ HazMat #4 (MOT)	☐ HazMat #1 (Gr./Air/MOT)	
☐ HazCom/Emergency Action Plan	☐ HazMat #4 (MOT)	
☑ H&S Orientation (classroom); or	☐ Confined space entrant	
☐ H&S Orientation (on-line)	☐ Confined space rescue	
☑ PPE	☐ Excavation CP	
☐ Respiratory protection	☐ Electrical (NFPA 70E)	
☐ MSHA	☐ Lockout/Tagout	
☑ Smith System (on-line)	☐ H&S Orientation (class)	
☐ OTS/eRailsafe	☐ OTS/eRailsafe	
☐ Client specific:	☐ Smith Sys. (hands on)	
	☐ Boating safety	
☐ Other:	☐ Other:	

Hazard Analysis

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Division
Environment

Business Unit
REM

Task 1: Air knifing

Hazardous Activity #1

Field-Ambient environment - exposure heat, cold, sun, weather, etc

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	L
Environmental	L	Gravity	H	Mechanical	-	Motion	L
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Medium if utilizing:
Primary Controls: TRACK PPE (see HASP "PPE" section) Field H&S Handbook

Secondary Controls: H&S Standards Engineering Controls Admin. Controls Specialized Equipment

Hazardous Activity #2

Field-Excavations - working adjacent to or within trenches and excavations

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	H	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: High Mitigated Risk: Medium. if utilizing:
Primary Controls: TRACK Competent Person Required (designated person) H&S Standards Excavation Awareness Training Engineering Controls

Secondary Controls: JSAs Job Briefing/Site Awareness Specialized Equipment Housekeeping Inspections

Hazardous Activity #3

Field-Utilities- pre-Clearing utilities with mechanical means (air knife, vacuum excavation, hydro knife, etc)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	L
Environmental	-	Gravity	M	Mechanical	M	Motion	M
Personal Safety	-	Pressure	M	Radiation	-	Sound	M

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:
Primary Controls: TRACK H&S Standards Job Briefing/Site Awareness PPE (see HASP "PPE" section) JSAs

Secondary Controls: Specialized Equipment Engineering Controls Admin. Controls

Hazardous Activity #4

Field-Traffic - parking lots

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	H
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:
Primary Controls: TRACK STAR Plan Engineering Controls

Secondary Controls: Job Briefing/Site Awareness

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Task 2: Test pitting

Hazardous Activity #1

Field-Ambient environment - exposure heat, cold, sun, weather, etc

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	L
Environmental	L	Gravity	H	Mechanical	-	Motion	L
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK PPE (see HASP "PPE" section) Field H&S Handbook

Secondary Controls: H&S Standards Engineering Controls Admin. Controls Specialized Equipment

Hazardous Activity #2

Field-Traffic - parking lots

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	H
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK STAR Plan Engineering Controls

Secondary Controls: Job Briefing/Site Awareness

Hazardous Activity #3

Field-Utilities - drilling, digging or excavating in the vicinity of subsurface utilities

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	H	Driving	-	Electrical	H
Environmental	-	Gravity	-	Mechanical	-	Motion	L
Personal Safety	-	Pressure	M	Radiation	-	Sound	-

Overall Unmitigated Risk: High Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK H&S Standards Engineering Controls Admin. Controls Inspections Specialized Equipment

Secondary Controls: JSAs Field H&S Handbook Job Briefing/Site Awareness Cont/Emerg. Planning Engineering Controls Admin. Controls

Hazardous Activity #4

Field-Excavation - soil removal, installation or removal piping, tanks or utilities, geologic investigations, etc

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	H	Mechanical	H	Motion	H
Personal Safety	-	Pressure	-	Radiation	-	Sound	M

Overall Unmitigated Risk: High Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK H&S Standards Excavation Awareness Training Excavation Competent Person Training (designated person) Engineering Controls

Secondary Controls: JSAs HASP Job Briefing/Site Awareness Client Training/Briefing Cont/Emerg. Planning PPE (see HASP "PPE" section) Specialized Equipment Housekeeping Inspections

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Task 3: Surveying

Hazardous Activity #1

Field-Ambient environment - exposure heat, cold, sun, weather, etc

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	L
Environmental	L	Gravity	H	Mechanical	-	Motion	L
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK PPE (see HASP "PPE" section) Field H&S Handbook

Secondary Controls: H&S Standards Engineering Controls Admin. Controls Specialized Equipment

Hazardous Activity #2

Field-Traffic - parking lots

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	H
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK STAR Plan Engineering Controls

Secondary Controls: Job Briefing/Site Awareness

Hazardous Activity #3

Field-Walking - uneven or slippery terrain

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	M	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Medium if utilizing:

Primary Controls: TRACK PPE (see HASP "PPE" section)

Secondary Controls: Housekeeping

Hazardous Activity #4

None

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological		Chemical		Driving		Electrical	
Environmental		Gravity		Mechanical		Motion	
Personal Safety		Pressure		Radiation		Sound	

Overall Unmitigated Risk: Not Ranked Mitigated Risk: Not Ranked if utilizing:

Primary Controls:

Secondary Controls:

Hazard Communication (HazCom)/Global Harmonization System (GHS)

☐ HAZCOM/GHS for this project is managed by the client or general contractor

*List the chemicals anticipated to be used by **ARCADIS** on this project per HazCom/GHS requirements.*
(Modify quantities as needed)

	Acids/Bases	Qty
☑	Not applicable	
☐	Hydrochloric acid	<500 ml
☐	Nitric acid	<500 ml
☐	Sulfuric acid	<500 ml
☐	Sodium hydroxide	<500 ml
☐	Zinc acetate	<500 ml
☐	Ascorbic acid	<500 ml
☐	Acetic acid	<500 ml
☐	Other:	
	_____	
	_____	
	_____	

	Decontamination	Qty
☐	Not applicable	
☑	Alconox	≤ 5 lbs
☐	Liquinox	≤ 1 gal
☐	Acetone	≤ 1 gal
☐	Methanol	≤ 1 gal
☐	Hexane	≤ 1 gal
☐	Isopropyl alcohol	≤ 4 gal
☐	Nitric acid	≤ 1 L
☐	Other:	
	_____	
	_____	
	_____	

	Calibration	Qty.
☐	Not applicable	
☐	Isobutylene/air	1 cyl
☐	Methane/air	1 cyl
☐	Pentane/air	1 cyl
☐	Hydrogen/air	1 cyl
☐	Propane/air	1 cyl
☐	Hydrogen sulfide/air	1 cyl
☐	Carbon monoxide/air	1 cyl
☐	pH standards (4,7,10)	≤ 1 gal
☐	Conductivity standards	≤ 1 gal
☐	Other:	
	_____	
	_____	
	_____	

	Fuels	Qty.
☑	Not applicable	
☐	Gasoline	≤ 5 gal
☐	Diesel	≤ 5 gal
☐	Kerosene	≤ 5 gal
☐	Propane	1 cyl
☐	Other:	
	_____	
	_____	

	Kits	Qty.
☑	Not applicable	
☐	Hach (specify):	_____ 1 kit
☐	DTECH (specify):	_____ 1 kit
☐	EPA 5035 Soil (specify kit):	_____ 1 kit
☐	Other:	
	_____	_____
	_____	_____

	Remediation	Qty.
☑	Not applicable	
☐	_____	
☐	_____	
☐	_____	
☐	_____	
☐	_____	

	Other:	Qty.
☐	Not applicable	
☑	Spray paint	≤ 6 cans
☐	WD-40	≤ 1 can
☐	Pipe cement	≤ 1 can
☐	Pipe primer	≤ 1 can
☐	Mineral spirits	≤ 1 gal

		Qty.
☐	_____	
☐	_____	
☐	_____	
☐	_____	
☐	_____	
☐	_____	

Material safety data sheets (MSDSs)/Safety Data Sheets (SDSs) must be available to field staff.
Indicate below how MSDS information will be provided:

☐ Not applicable
☑ Printed copy in company vehicle
☐ Printed copy in the project trailer/office
☐ Printed copy attached
☐ Electronic copy on field computer

☐ Contractor MSDSs/SDSs are not applicable
☐ Contractor MSDSs/SDSs are attached
☐ Contractor MSDSs/SDSs will be on site and located: _____

☐ Bulk quantities of the following materials will be stored: _____

Contact the project H&S contact for information in determining code and regulatory requirements associated with bulk storage of materials.

Monitoring

☐ Chemical air monitoring is not required for this project.

For projects requiring air monitoring, list the relevant constituents representing a hazard to site workers.

Constituent	Max. Conc.	Units	TWA	Units	STEL	Units	IDLH	Units	LEL/UEL (%)	VD Air=1	VP (mm Hg)	IP (eV)
Naphthalene	30	ppm	10	p,s	15	p,s	250	p,N	0.9/5.9	4.4	0.08	8.12
Benzene	10	ppm	0.5	p	2.5	p	500	p,N	1.2/7.8	2.8	75	9.24
Toluene			20	p	150	p,N	500	p,N	1.1/7.1	3.1	21	8.82
Ethylbenzene			20	p	125	p	800	p,N	0.8/6.7	3.7	874	8.86
Xylenes			100	p	150	p	900	p,N	1.1/7.0	3.7	9	8.44
Coal tar pitch volatiles	10	ppm	0.2	m	NA	-	80	m,N	NA/NA	NA	NA	NA

Notes: TWAs are ACGIH 8 hr-TLVs unless noted.
p-ppm m-mg/m3 c2- ceiling (2 hr) se-sensitizer "#N/A" -Constituent is not in database, manually enter information
s- skin c-ceiling "9999" - NA O-OSHA PEL
r- resipirable i-inhalable N-NIOSH 10 hr REL

Monitoring Equipment and General Protocols

Air monitoring is required for any task or activity where employees have potential exposure to vapors or particulates above the TWA. Action levels below are appropriate for most situations. Contact the project H&S contact for all stop work situations. Select monitoring frequency and instruments to be used.

Monitoring Frequency:	15 Minute intervals
Indicator Tube/Chip Frequency:	Indicator tube/chip monitoring not required

	Instrument	Action Levels			Actions
☑	Photoionization Detector		<	0.687	Continue work
		0.687	-	1.374	Sustained >5 min. continuous monitor, review eng. controls and PPE, proceed with caution
	Lamp (eV): 10.6		>	1.374	Sustained >5 min. stop work, contact SSO
☐	Flame Ionization Detector (FID)		<	0.0	Continue work
		0.0	-	0.0	Sustained >5 min. continuous monitor, review eng. controls and PPE, use caution
			>	0.0	Sustained >5 min. stop work, contact SSO
☐	LEL/O2 Meter	0-5% LEL			Continue work
		>5-10% LEL			Continuous monitor, review eng. controls, proceed with caution
		>10% LEL			Stop work, evacuate, contact SSO
		19.5%-23.5% O2			Normal, continue work
		<19.5% O2			O2 deficient, stop work, evacuate, cont. SSO
		>23.5% O2			O2 enriched, stop work, evacuate, contact SSO
☐	Indicator: ☐ tube ☐ chip	≤PEL/TLV			Continue work
		>PEL/TLV			Stop work, review eng. controls and PPE,
	Compound(s):				contact SSO
☑	Particulate Monitor		<	2.500	Continue work
	(mists, aerosols, dusts in	2.5	-	5.00	Use engineering controls, monitor continuously
	mg/m^3)		>	5.00	Stop work, review controls, contact SSO
☐	Other:	Specify:			Specify:

One or more consituents above is listed with a skin notation. Avoid conditions where dusts, mists, or aerosols are created. Avoid skin contact with impacted media. One or more constituents listed above is a particulate hazard. Use wetting as the primary control to eliminate dust hazards.

Personal Protective Equipment (PPE)

See JSA for the task being performed for PPE requirements. *If the work is not conducted under a JSA, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work not covered by a JSA on this project:*

Level D or Level D Modified:

☑	Hard hat	☐	Snake chaps/guards	☐	Coveralls:		Specify Type:
☑	Safety glasses	☐	Briar chaps	☐	Apron:		
☐	Safety goggles	☐	Chainsaw chaps	☐	Chem. resistant gloves:		
☑	Face shield	☐	Sturdy boot	☐	Gloves other:		
☑	Hearing protection	☑	Steel toe boot	☐	Chemical boot:		
☐	Rain suit	☐	Metatarsal boot	☐	Boot other:		
☐	Other:			☑	Traffic vest:		Class II or III
				☐	Life vest:		

Task specific PPE:

Comments:
Face shield should be using when conducting air knifing

Medical Surveillance (*check all that apply*)

- ☑ Medical Surveillance is not required for this project.
- ☐ HAZWOPER medical surveillance applies to all ARCADIS site workers on the project.
- ☐ HAZWOPER medical surveillance applies to all subcontractors on the project.
- ☐ HAZWOPER medical surveillance applies to all site workers on the project except:

- ☐ Other medical surveillance required (describe type and who is required to participate):

- ☐ Client drug and/or alcohol testing required.

Hazardous Materials Shipping and Transportation (*check all that apply*)

- ☑ Not applicable, no materials requiring a Shipping Determination will be transported or shipped
- ☐ A Shipping Determination has been reviewed and provided to field staff
- ☐ A Shipping Determination is attached
- ☐ All HazMat will be transported under Materials of Trade by ARCADIS
- ☐ Other (specify):

Roadway Work Zone Safety (*check all that apply*)

- ☑ Not applicable for this project
- ☐ All or portions of the work conducted under a TCP
- ☐ All or portions of the work conducted under a STAR Plan
- ☐ TCP or STAR Plan provided to field staff
- ☐ TCP or STAR Plan attached
- ☐ Other (specify):

WARNING - SELECTION CONFLICTS WITH YOUR HAZARD ANALYSIS CONTROL REQUIRING STAR PLAN!

ARCADIS Commercial Motor Vehicles (CMVs)

This section is applicable to ARCADIS operated vehicles only

- ☑ This project will **not** utilize CMV drivers
- ☐ This project will utilize CMV drivers

Site Control (*check all that apply*)

- ☑ Not applicable for this project.
- ☐ Site control protocols are addressed in JSA or other supporting document (attach)
- ☐ Maintain an exclusion zone of _____ ft. around the active work area
- ☐ Site control is integrated into the STAR Plan or TCP for the project
- ☐ Level C site control - refer to Level C Supplement attached
- ☐ Other (specify):

Decontamination (*check all that apply*)

- ☐ Not applicable for this project.
- ☑ Decontamination protocols are addressed in JSA or other governing document (attach)
- ☐ Level D work- wash hands and face prior to consuming food, drink or tobacco.
- ☐ Level D Modified work- remove coveralls and contain, wash hands and face prior to consuming food, drink or tobacco. Ensure footwear is clean of site contaminants
- ☐ Level C work - refer to the Level C supplement attached.
- ☐ Other (specify):

Sanitation *(check all that apply)*

- ☐ Mobile operation with access to off-site restrooms and potable water
- ☑ Restroom facilities on site provided by client or other contractor
- ☐ Project to provide portable toilets (1 per 20 workers)
- ☐ Potable water available on site
- ☐ Project to provide potable water (assume 1 gal./person/day)
- ☐ Project requires running water (hot and cold, or tepid) with soap and paper towels

Safety Briefings (*check all that apply*)

- ☑ Safety briefing required daily
- ☐ Safety briefing required twice a day
- ☐ Safety briefings required at the following frequency: _____
- ☐ Subcontractors to participate in ARCADIS safety briefings
- ☐ ARCADIS to participate in client/contractor safety briefings
- ☐ Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA for the task being performed. *If work is not performed under a JSA, the following safety equipment is required to be present on site in good condition (Check all that apply):*

- ☑ First aid kit
- ☐ Bloodborne pathogens kit
- ☑ Fire extinguisher
- ☐ Eyewash (ANSI compliant)
- ☑ Eyewash (bottle)
- ☑ Drinking water
- ☐ Other: _____

- ☐ Insect repellent
- ☑ Sunscreen
- ☐ Air horn
- ☑ Traffic cones
- ☐ 2-way radios
- ☐ Heat stress monitor

H&S Program (*check all that apply*)

- ☐ H&S metrics are provided on the account level, refer to account guidance
- ☑ TIP required at the following frequency on this project:
  Select One: _____ mhrs 1 time(s) _____ Define: _____
- ☐ H&S Field Assessment required at the following frequency on this project:
  Select One: _____ mhrs _____ time(s) _____ Define: _____
- ☐ Other (specify):

List tasks anticipated for TIP activity:

Test pit excavation

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date

Add additional sheets if necessary

- ☑ Subcontractor Acknowledgement Form attached

You have an absolute right to STOP WORK if unsafe conditions exist!

Attachments

ARCADIS

Document Control Number:TGM - _____

TGM + *project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year*

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____

2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/Trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss following questions (for some review previous day's post activities). **Check if yes :**

☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **A**ssess the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

X	**STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)				
	Elimination		Substitution		Isolation
	Engineering controls		Administrative controls		Monitoring
	General PPE Usage		Hearing Conservation		Respiratory Protection
	Personal Hygiene		Exposure Guidelines		Decon Procedures
	Emergency Action Plan (EAP)		Fall Protection		Work Zones/Site Control
	JLA to be developed/used ***(specify)***		LPO conducted ***(specify job/JLA)***		Traffic Control
					Other ***(specify)***

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the HASP

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at 1.720.344.3500

Visitor Name/Co - not involved in work

	In	Out
	In	Out
	In	Out
	In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB,** I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- ☐ Lessons learned and best practices learned today: _____
- ☐ Incidents that occurred today: _____
- ☐ Any Stop Work interventions today? _____
- ☐ Corrective/Preventive Actions needed for future work: _____
- ☐ Any other H&S issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155
Near Loss Hotline - 1.866.242.4304

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Subcontractor Acknowledgement: Receipt of HASP Signature Form

ARCADIS claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, ARCADIS does not guarantee the health and/or safety of any person entering this site. Strict adherence to the health and safety guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and ARCADIS and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

_____

_____

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

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Utilities and Structures Checklist

Project: _____
Project Number: _____
Date: _____
Work locations applicable to this clearance checklist:

Pre-Field Work

One Call or "811" notified 48-72 hours in advance of work? ☐ Yes ☐ No
Utility companies notified during the One Call process ☐ See attached ticket

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

List any other utilities requiring notification: ☐ None

_____ _____ _____ _____

Client provided utility maps or "as built" drawings showing utilities? ☐ Yes ☐ No

Field Work

Markings present: ☐ Paint ☐ Pin flags/stakes ☐ Other ☐ None

Subsurface Utility Lines of Evidence Used (3 Minimum):

☐ One Call/"811"
☐ Client Provided Maps/Drawings **OR** ☐ Maps/Drawings requested but not provided
☐ Client Clearance
☐ Interviews: Name(s)/Affiliation(s) _____
_____
_____

Did persons interviewed indicate depths of any utilities in the subsurface?
☐ Yes, depths provided:

☐ Did not know or refused to answer

Comments:

☐ Site Inspection
☐ GPR
☐ Air-Knife
☐ Hydro-Knife
☐ Public Records/Maps
☐ Radiofrequency
☐ Metal Detector
☐ Handauger
☐ Potholing
☐ Probing
☐ Private Locator: Name and Company: _____
☐ Marine Locator: Name and Company: _____
☐ Other:

_____
_____

Tips for Successful Utility Location:
1. No excessive turning or downward force of handaugers/shovels, etc.
2. No hammering- no pickaxes-no digging bars-no hurrying or shortcutting
3. Select alternate/backup locations for clearance
4. Utilities may run directly under asphalt/concrete or be > 5 ft depth
5. Be on site when utilizing private utility locators

TRACK

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Site Inspection

During inspections look for the following ("YES" requires follow up investigation):

		Utility color codes		
a)	Natural gas line present (evidence of a gas meter)?	Yellow	☐ Yes	☐ No
b)	Evidence of subsurface electric lines :	Red		
	i) Conduits to ground from electric meter?		☐ Yes	☐ No
	ii) Overhead electric lines absent		☐ Yes	☐ No
	iii) Light poles, electric devices with no overhead lines?		☐ Yes	☐ No
c)	Evidence of water lines:	Blue		
	i) Water meter on site?		☐ Yes	☐ No
	ii) Fire hydrants in vicinity of work?		☐ Yes	☐ No
	iii) Irrigation systems?		☐ Yes	☐ No
d)	Evidence of sewers or storm drains:	Green		
	i) Restrooms or kitchen on site?		☐ Yes	☐ No
	ii) Gutter down spouts going into ground		☐ Yes	☐ No
	iii) Grates in ground in work area		☐ Yes	☐ No
e)	Evidence of telecommunication lines:	Orange		
	i) Fiber optic warning signs in areas?		☐ Yes	☐ No
	ii) Lines from cable boxes running into ground?		☐ Yes	☐ No
	iii) Conduits from power poles running into ground?		☐ Yes	☐ No
	iv) Aboveground boxes or housings in work area?		☐ Yes	☐ No
f)	Underground storage tanks:			
	i) Tank pit present?		☐ Yes	☐ No
	ii) Product lines running to dispensers/buildings?		☐ Yes	☐ No
	iii) Vent present away from tank pit?		☐ Yes	☐ No
g)	Proposed excavation markings in work area?	White	☐ Yes	☐ No
h)	Other:			
	i) Evidence of linear asphalt or concrete repair		☐ Yes	☐ No
	ii) Evidence of linear ground subsidence or change in vegetation?		☐ Yes	☐ No
	iii) Manholes or valve covers in work area?		☐ Yes	☐ No
	iv) Warning signs ("Call Before you Dig", etc) on or adjacent to site?		☐ Yes	☐ No
	v) Utility color markings not illustrated in this checklist?		☐ Yes	☐ No
i)	Aboveground lines in or near the work area:			
	i) < 50 kV within 10 ft of work area?		☐ Yes	☐ No
	ii) >50 - 200 kV within 15 ft of work area?		☐ Yes	☐ No
	iii) >200-350 kV within 20 ft of work area?		☐ Yes	☐ No
	iv) >350-500 kV within 25 ft of work area?		☐ Yes	☐ No
	v) >500-750 kV within 35 ft or work area?		☐ Yes	☐ No
	vi) >750-1000 kV within 45 ft of work area?		☐ Yes	☐ No

Comments:

Do not initiate intrusive work if utilities are suspected to be present in area and are not located, markings are over 14 days old, or if clearance methods provide incomplete or conflicting information. Do not perform intrusive work within 30 inches of a utility marking without hand clearing.

Name and signature of person completing the checklist:

Name: _____

Signature: _____

Date: _____

Appendix B

Community Air Monitoring Plan

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Imagine the result

NYSEG

Community Air Monitoring Plan

Goshen Former Manufactured Gas Plant Site
West Main Street, Goshen New York
Site No. 3-36-046

August 2013

Community Air Monitoring Plan

Goshen Former Manufactured Gas Plant Site

Prepared for:
NYSEG

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017

Our Ref.:
B0013080

Date:
August 2013

ARCADIS

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Attachment

A NYSDOH G-CAMP

1. Introduction

This *Community Air Monitoring Plan* (CAMP) has been prepared by ARCADIS on behalf of NYSEG to support the performance of pre-design investigation (PDI) activities to be conducted at the Goshen Former Manufactured Gas Plant (MGP) Site located in Goshen, New York (Site No. 3-36-046). Details related to the proposed PDI activities are presented in the August 2013 *Remedial Design Work Plan* (RDWP) (ARCADIS, 2013).

This CAMP fulfills the general requirements set forth by the New York State Department of Health (NYSDOH) *Generic Community Air Monitoring Plan* (G-CAMP) (NYSDOH, 2002) (included as Attachment 1). The intent of this CAMP is to provide a measure of protection for downwind communities from potential airborne releases of constituents of concern during subsurface work activities at the site. As such, this CAMP identifies potential air emissions, and describes air monitoring procedures, monitoring schedule, data collection, and reporting requirements for the PDI activities.

1.1 Site Location and Description

The approximately ¾-acre site is located on West Main Street in the Village of Goshen, in Orange County, New York. The site is owned by NYSEG and presently serves as a natural gas service center. A gas regulator is located on northern portion of the site and another gas regulator is located within the eastern portion of the service center building. The site is bounded by the Rio Grande Creek at the northwest corner, Village of Goshen property to the north and northeast, private commercial properties to the east and west, and West Main Street to the south.

Based on conversations with the Village of Goshen and according to the Village of Goshen Zoning Map (last updated August 2003), the site is zoned as commercial shopping (i.e., commercial). Areas immediately west of the site are zoned as industrial. Other areas in the immediate vicinity of the site are zoned as central shopping and one and two family residential. The site is also located within the Village of Goshen Architectural Design District. Properties and buildings located within this district are subject to regulations/restrictions regarding historical areas.

1.2 Site History

MGP operations began at the site between 1885 and 1889 as a carbureted water gas plant. The plant was apparently converted to a coal gas plant in 1923 and continued to

operate as a coal gas plant until sometime between 1945 and 1947, when the facility was converted to a natural gas operations center (Engineering-Science [ES], 1991). During this time, the site was owned by the A. VanDerwerken Water Gas Works (circa 1889 to circa 1905), Goshen Gas Light Company Water Gas Works (circa 1905 to circa 1923), Goshen Illuminating Company Coal Gas Plant (circa 1923 to 1945), Associated Gas & Electric Company (1945 to 1947) and NYSEG (1947 to present). While operational, the MGP consisted of a gas house (composed of a meter house, purifying/purifier houses, oil tanks, a boiler, a generator, a washer, and a superheater), three gas holders, a shed, furnace area, coal storage area, retorts, and a lime kiln.

1.3 Summary of PDI Activities

The proposed PDI activities to be conducted at the site consist of excavating test pits to confirm the presence of gas holder foundations and identify any additional shallow foundations and obstructions (including materials of construction, thickness, depth, etc.) that may potentially impact implementation of the remedy (i.e., in-situ soil solidification [ISS] treatment). Additional details regarding the proposed PDI activities are provided in the RDWP.

1.4 Air/Odor Emissions and Control Measures

Air emissions control and fugitive dust suppression techniques will be used during the PDI activities, as necessary, to limit air/odor emissions. Air monitoring for the specific purpose of protecting the community from PDI activity impacts (and verification thereof) will take place during intrusive activities.

Odor and dust control measures will be available at the site during the investigation activities and will be used when necessary. Polyethylene sheeting used to control nuisance odors, dust, volatile organic compound (VOC) emissions, as needed. Odor and dust control measures will be implemented based on visual or olfactory observations, and the results of airborne particulate and VOC monitoring (described in Section 2). In event that airborne particulate and VOC monitoring indicates criteria exceedances, all staged and drummed materials will be covered with polyethylene sheeting and/or drum covers, as appropriate.

2. Air Monitoring Procedures

Real-time air monitoring will be implemented during PDI activities for VOCs, and particulate matter less than 10 microns in diameter (PM_{10}). However, particulate monitoring will not be performed during precipitation events. Upwind and downwind monitoring locations will be determined through visual observation (wind vane, windsock, or similar technique).

2.1 Monitoring Location Selection

VOC and PM_{10} monitoring locations will be determined based on visual observation of wind direction. A single upwind location will be selected daily where both VOC and PM_{10} will be recorded. This upwind location will be established at the start of the workday before PDI activities are initiated. Monitoring activities will continue in a downwind direction throughout the day. If wind direction shifts radically during the workday (i.e., greater than approximately +/- 60 degrees from original upwind direction), new upwind and downwind monitoring locations will be established. Any monitoring location changes will be documented in the field logbook.

2.2 VOC Monitoring

As required by the NYSDOH guidance for community air monitoring, VOCs will be monitored continuously during ground intrusive activities (e.g., test pit excavation) with instrumentation that is equipped with electronic data-logging capabilities. Because real-time monitors for polycyclic aromatic hydrocarbons (PAHs) are not available, the real-time VOC monitors will also serve as surrogate indicators for emissions (if any) of PAHs during the performance of PDI activities. A real-time VOC monitor equipped with either a photoionization detector (PID) or a flame ionization detector (FID) will be used to conduct the monitoring for VOCs. A MiniRAE 2000 (or equivalent) will be used to conduct the real-time VOC monitoring. All 15-minute readings shall be recorded via the data logging function of the monitoring equipment. All periodic, instantaneous readings, including readings taken to facilitate activity decisions, will be recorded in the field logbook.

2.3 PM_{10} Monitoring

As required by the NYSDOH guidance, real-time particulate matter will be monitored continuously during intrusive PDI activities using instrumentation equipped with electronic data-logging capabilities. A MIE DataRAM (or equivalent) will be used to

conduct the real-time PM_{10} monitoring. All 15-minute readings shall be recorded via the data logging function of the monitoring equipment. All periodic, instantaneous readings, including readings taken to facilitate activity decisions, will be recorded in the field logbook.

Fugitive dust migration will be visually assessed during all work activities, and reasonable dust suppression techniques will be used during any PDI activities that may generate fugitive dust (see Section 1.4).

2.4 Action Levels

The action levels provided below are to be used to initiate response actions, if necessary, based on real-time monitoring.

2.4.1 Action Levels for VOCs

As outlined in the NYSDOH G-CAMP, if the ambient air concentration for total VOCs exceeds 5 parts per million (ppm) above background (upwind location) for the 15-minute average, intrusive PDI activities will be temporarily halted while monitoring continues. If the total VOC concentration readily decreases (through observation of instantaneous readings) below 5 ppm above background, then intrusive PDI activities can resume with continuous monitoring.

If the ambient air concentrations for total VOCs persist at levels in excess of 5 ppm above background but less than 25 ppm above background, intrusive PDI activities will be halted, the source of the elevated VOC concentrations identified, corrective actions to reduce or abate the emissions undertaken, and air monitoring will be continued. Once these actions have been implemented, intrusive PDI activities can resume provided the following two conditions are met:

- The 15-minute average VOC concentrations remain below 5 ppm above background; and

- The VOC level 200 feet downwind of the monitoring location or half the distance to the nearest potential receptor or residential/commercial structure (whichever is less but in no case less than 20 feet) is below 5 ppm over background for the 15-minute average.

If the ambient air concentrations for total VOCs exceed 25 ppm above background, the intrusive PDI activities must cease, and emissions control measures must be implemented.

2.4.2 Action Levels for PM_{10}

As required by the NYSDOH guidance, if the ambient air concentration for PM_{10} at the monitoring downwind monitoring location is noted at levels in excess of 100 micrograms per cubic meter ($\mu g/m^3$) above the background (upwind location), or if airborne dust is observed leaving the work area, intrusive PDI activities will be temporarily halted. The source of the elevated PM_{10} concentration is to be identified, corrective actions to reduce or abate the emissions will be undertaken, and air monitoring will continue. Work may continue following the implementation of dust suppression techniques provided the PM_{10} levels do not exceed 150 $\mu g/m^3$ above background.

If, after implementation of dust suppression techniques, PM_{10} levels are greater than 150 $\mu g/m^3$ above background, work must be stopped and PDI activities must be re-evaluated. Work may only resume provided that the dust suppression measures and other controls are successful in reducing PM_{10} levels less than 150 $\mu g/m^3$ above background and in preventing visible dust from leaving the work area.

If the ambient air concentration of PM_{10} is 150 $\mu g/m^3$ above background, the intrusive PDI activities must cease and emission control measures must be implemented. The PM_{10} concentrations will be recorded in accordance with Section 2.3 above.

2.5 Meteorological Monitoring

Wind direction is the only meteorological information considered relevant for the PDI activities and CAMP. Meteorological monitoring will be conducted periodically at the site using a windsock, wind vane, or other appropriate equipment. Wind direction will be established at the start of each work day and may be re-established at any time during the work day if a significant shift in wind direction is noted. Wind direction will be recorded in the field activity logbook.

2.6 Instrument Calibration

Calibration of the VOC and PM_{10} instrumentation will occur in accordance with each of the equipment manufacturer's calibration and quality assurance (QA) requirements.

The VOC and PM_{10} monitors will be calibrated at least daily, and calibrations will be recorded in the field activity logbook.

3. Monitoring Schedule, Data Collection, and Reporting

The following identifies the monitoring schedule and data collection and reporting requirements.

3.1 Monitoring Schedule

Real-time VOC and PM_{10} monitoring will be performed continuously throughout the intrusive PDI activities. Wind direction will be determined at the start of each day and at any other appropriate time during PDI activities.

3.2 Data Collection and Reporting

Air monitoring data will be collected continuously from VOC and PM_{10} monitors during intrusive PDI activities by an electronic data-logging system. The data management software will be set up so that instantaneous observed readings would be recorded by the electronic data acquisition system and averaged over 15-minute time periods. In addition to the above, VOC readings will be collected periodically during non-intrusive PDI activities. All readings will be recorded and archived for review by NYSDOH and NYSDEC personnel, as necessary.

ARCADIS

Appendix A

NYSDOH G-CAMP

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

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

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

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Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.