Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

NYSEG Oneonta MGP Site
City of Oneonta, Otsego County, New York
Site Number 4-39-001

March 2005

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor*　　DENISE M. SHEEHAN, *Acting Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

NYSEG Oneonta MGP Inactive Hazardous Waste Disposal Site
City of Oneonta, Otsego County, New York
Site No. 4-39-001

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the NYSEG Oneonta MGP site, a Class 2 inactive hazardous waste disposal site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the NYSEG Oneonta MGP inactive hazardous waste disposal site, and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened releases of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and/or the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) for the NYSEG Oneonta MGP site and the criteria identified for evaluation of alternatives, the NYSDEC has selected a combination of excavation and in-situ treatment. The components of the remedy are as follows:

- On-site soils containing tar or elevated concentrations of PAHs will be excavated and removed from the targeted areas and properly disposed off-site.

- Tar-contaminated sediments in Mill Race Creek will be removed and properly disposed off-site, along with sediments with lower levels of PAH contamination attributable to the MGP.

- A biosparge system will be constructed outside the limits of the MGP site excavation to accelerate the degradation of MGP-related contaminants in groundwater.

- All vegetated areas will be covered with a two-foot layer of clean soil and all non-vegetated areas will be covered with either concrete or a paving system. A geotextile fabric will be placed over any site soils which are returned to the excavation as backfill, to serve as a demarcation layer.

- A series of tar collection wells will be drilled in the areas where tar is still present in the subsurface outside the MGP excavation.

- A site management plan (SMP) will be developed and implemented, which will include the institutional controls and engineering controls to: (a) address any residually contaminated soils that may be excavated from the site during future redevelopment; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) provide for the operation and maintenance of the components of the remedy; (d) an assessment of post-removal groundwater quality will be conducted to determine the need for continued monitoring; and (e) identify any use restrictions on site development or groundwater use.

- Imposition of an institutional control in form of an environmental easement

- The SMP will require the property owner to provide an IC/EC certification

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy selected for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

________________________	________________________
Date	Dale A. Desnoyers, Director Division of Environmental Remediation

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RECORD OF DECISION

NYSEG Oneonta MGP Site
Oneonta, Otsego County, New York
Site No. 4-39-001
March, 2005

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the New York State Electric and Gas Corporation's (NYSEG's) former Oneonta Manufactured Gas Plant (MGP). The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this remedy. As more fully described in Sections 3 and 5 of this document, the past use of coal and oil to manufacture gas has resulted in the disposal of hazardous wastes, including tar and other non-aqueous phase liquids (NAPL), inorganic compounds (e.g. cyanide), polycyclic aromatic hydrocarbons (PAHs), and a group of volatile organic compounds, benzene, toluene, ethylbenzene, and xylenes (BTEX). These wastes have contaminated the subsurface soils, groundwater and Mill Race Creek sediments at the site, and have resulted in:

- a significant threat to human health associated with current and/or potential exposure to contaminated subsurface soils, groundwater, and creek sediments.
- a significant environmental threat associated with the impacts of contaminants to creek sediments and groundwater.

To eliminate or mitigate these threats, the NYSDEC has selected the following remedy:

- A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.
- On-site soils containing tar or elevated concentrations of PAHs will be excavated and removed from the targeted areas and properly disposed off-site.
- Tar-contaminated sediments in Mill Race Creek will be removed and properly disposed off-site, along with sediments with lower levels of PAH contamination attributable to the MGP.
- A biosparge system will be constructed outside the limits of the MGP site excavation to accelerate the degradation of MGP-related contaminants in groundwater.
- Most of the on-site buildings will be demolished and all recyclable and reusable materials will be salvaged. The rest of the demolition debris will be disposed at a permitted landfill.

- All vegetated areas will be covered with a two-foot layer of clean soil and all non-vegetated areas will be covered with either concrete or a paving system. A geotextile fabric will be placed over any site soils which are returned to the excavation as backfill, to serve as a demarcation layer.

- A series of tar collection wells will be drilled in the areas where tar is still present in the subsurface outside the MGP excavation.

- Since the remedy will result in contamination above unrestricted levels remaining at the site, a site management plan (SMP) will be developed and implemented. The SMP will include the institutional controls and engineering controls to: (a) address any residually contaminated soils that may be excavated from the site during future redevelopment. The plan will require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) provide for the operation and maintenance of the components of the remedy; (d) an assessment of post-removal groundwater quality will be conducted to determine the need for continued monitoring; and (e) identify any use restrictions on site development or groundwater use.

- Imposition of an institutional control in form of an environmental easement

- The SMP will require the property owner to provide an IC/EC certification

The selected remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Oneonta Manufactured Gas Plant (MGP) Site is located in the eastern portion of the City of Oneonta, Otsego County. The site location, as shown on Figure 1, lies within the Susquehanna River flood plain on an island bordered by the Susquehanna River to the south and Mill Race Creek to the north, east, and west. Mill Race Creek is an artificial water body, created by a partial diversion of the Susquehanna River during the 1800s.

The 2-acre site is divided by James Georgeson Avenue (formerly known as Gas Avenue). The side west of James Georgeson Avenue, referred to as the "western plant area", contained the majority of the MGP buildings and operations, and consequently contains most of the resulting contamination. Currently, the City of Oneonta uses the former western plant area as storage for park maintenance equipment and supplies. It borders on Damaschke Field, a minor league baseball stadium.

The portion of the site east of James Georgeson Avenue, referred to as the "eastern plant area", was used primarily for storage tanks during the later years of MGP operation. It is currently used as part of the parking lot for Damaschke Field.

Bordering the site and Damaschke Field on the south, east, and west is a large city-owned recreational facility, Neawha Park. Land use to the north, beyond Mill Race Creek is both commercial and residential. Canadian Pacific railroad tracks are located along the northern bank of the creek. Beyond the railroad, a petroleum storage facility operated by Mirabito Oil is located to the northeast, and an apartment building is located to the north.

The City of Oneonta operates two public water supply wells in Catella Park, roughly 2000 feet east-northeast of the MGP site. Protection of these wells from contaminated groundwater has been a high priority throughout the investigation of the MGP site. As detailed in Section 5, there appears to be little chance that contaminants from the MGP site will reach these wells, either under current conditions or under future conditions.

SECTION 3: <u>SITE HISTORY</u>

3.1: <u>Operational/Disposal History</u>

The Oneonta MGP was constructed by Oneonta Gas Light Company in 1881 and operated through the early 1950s. The layout of the facility during operations is shown on Figure 2. The plant used the Lowe carburetted water gas process to produce gas for lighting, cooking, and heating purposes. The carburetted water gas process involved the passage of steam through hot coal or coke. This formed a gaseous mixture (water gas or blue gas) which was then passed through a super heater. Oil sprayed into the super heater generated additional gas, enhancing the heating and lighting capacity of the overall gas mixture.

The gas was cooled and purified prior to distribution. During the cooling process, an oily liquid commonly referred to as "coal tar" would condense in the pipes and tanks used to store and transport the gas. During the early years of plant operation, reports filed with the New York State Public Service Commission indicate that this tar was not recovered for sale. Most of it appears to have settled in the deep foundations of two large structures known as gas holders. From there, it escaped into the surrounding soils.

Tar separators were eventually installed on the western plant area and tar storage tanks were constructed on the eastern plant area. The tar separators were concrete-lined subsurface structures measuring roughly 30 by 30 by 15 feet, where the tar/water mixture from the gas-making process was held and allowed to settle. Some tar apparently leaked from these structures as well.

A light water and tar mixture would also accumulate in the gas mains throughout the city, and required periodic removal. This material, known as "drip," was gathered into barrels, transported back to the site, and disposed of on the ground.

Through a series of consolidations and mergers, the Oneonta MGP came to be controlled by the New York State Electric and Gas Company (NYSEG). In 1887, this company merged with the Oneonta Electric Power and Light Company. In 1918, the Oneonta Electric Power and Light Company became part of the Ithaca Gas and Electric Company, which eventually became part of NYSEG.

Gas production continued at the site until the early 1950's. The gas holders and many of the gas plant structures were demolished by 1956. Tar which had accumulated in and beneath the holder foundations was left in place. The property was transferred to the City of Oneonta. The last remaining structure of the MGP, the former gas house, was retained and used as a storage building by the city until it was demolished and covered with clean fill in 2001.

3.2: <u>Remedial History</u>

In 1986, the NYSDEC first listed the site as a Class 2a site in the Registry of Inactive Hazardous Waste Disposal Sites in New York (the Registry). Class 2a is a temporary classification assigned to a site that has inadequate and/or insufficient data for inclusion in any of the other classifications. As additional information became available, the NYSDEC listed the site as a Class 2 site in the Registry in 1992. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

Several rounds of investigations have been completed at the site and in the surrounding areas in the years prior to the most recent Supplemental Remedial Investigation (SRI). In general, each successive investigation built on the results of the previous one, as the contamination at the site was discovered to be more widespread and more significant than anticipated.

A four-phase environmental investigation of the site was implemented between April 1986 and February 1990. Phase I was completed in September 1986. This phase included historical research, geological mapping, excavation of four test pits, and collection of three soil samples for analysis. The Phase II investigation, completed in 1988, included 20 test pits, eight soil borings, eight monitoring wells, and five surface-soil samples. Soil gas, electromagnetic conductivity, and electrical resistivity surveys were also conducted, and air quality was monitored in the vicinity of the site.

The Phase III Investigation, completed in 1989, included nine additional soil borings and five monitoring wells. The scope of investigation was expanded to include five piezometers to investigate detailed groundwater flow in and around Mill Race Creek and Neahwa Pond.
Chemical analyses were performed on five surface-soil samples, 16 subsurface-soil samples, seven sediment samples, six indoor-air-quality samples, and two complete rounds of groundwater samples.

In 1994, NYSEG constructed an air sparge/soil vapor extraction (SVE) system as an interim remedial measure. The intent was to help reduce the amount of groundwater contamination leaving the site by introducing air into the subsurface. Air was pumped into the subsurface through a series of sparge wells. At the same time, air was withdrawn from the subsurface through a horizontal well. This air was collected for treatment prior to discharge to the atmosphere.

The SVE system operated for four years, from 1997 to 2001. Samples collected from the air recovered by the horizontal well prior to treatment showed very low levels of volatile contaminants. It appeared that little contamination was being removed. Consequently, NYSEG proposed closing down operation of the SVE system, and it was abandoned in July 2001.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers. NYSEG is the only PRP identified for this site.

The NYSDEC and NYSEG entered into a Consent Order on March 30, 1994. The Order obligates NYSEG to investigate and, if necessary, remediate 33 former MGP sites in their service area. The Oneonta MGP site is one of the sites included in the multi-site order.

SECTION 5: SITE CONTAMINATION

A multi-phase remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment. For the sake of clarity, discussion will center on the most recent phase of the RI investigation: the "Supplemental RI" completed between November 2002 and May 2003. The Supplemental Remedial Investigation Report, dated May, 2004, includes all of the previous reports as appendices.

5.1: Summary of the Remedial Investigation

The purpose of the SRI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the SRI Report, which also summarizes the results from previous phases of the investigation.

The following activities were conducted during the SRI, adding to the existing data from previous investigations:

- Research of historical information;
- Excavation of three test pits to locate a former stream channel;
- Installation of 45 soil borings and 14 new monitoring wells/piezometers for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of all new and existing monitoring wells;
- A survey of public and private water supply wells in the area around the site;
- Collection of twenty-seven (27) surface water samples; and,

- Collection of 59 aquatic sediment samples and manual probing of the stream bottom along 37 transects.

To determine whether the soil, groundwater, and Mill Race Creek sediments contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels". Since the principal components of coal tar at MGP sites are BTEX, which are VOCs, and PAHs, which are SVOCs, the following site-specific cleanup objectives have been selected: 10 ppm for total BTEX; 500 ppm for total PAHs.

- Sediment SCGs are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments." Background sediment samples were collected from 15 locations. These locations were upstream of the site, and were unaffected by historic or current site operations. The samples were analyzed for BTEX and PAHs. The results of the analysis were compared to data from the RI (Table 1) to determine appropriate site remediation goals.

- Background soil samples were taken from two locations. These locations were upgradient of the site, and were unaffected by historic or current site operations. The samples were analyzed for BTEX and PAHs. The results of the analysis were compared to data from the RI (Table 1) to determine appropriate site remediation goals.

Based on the SRI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: <u>Site Geology and Hydrogeology</u>

The site is situated in the Susquehanna River Valley in the Appalachian Plateau physiographic province, which includes most of central and western New York State. The bedrock below the site is sedimentary, consisting of interbedded shales, siltstone, and sandstone. However, bedrock is of little importance at the site, because it is buried under thick deposits of more recent, unconsolidated sediments. Site contaminants do not appear to have reached bedrock. The deepest exploratory borings at the site reach 91 feet below the ground surface and have never reached the bedrock.

The unconsolidated material above the bedrock is made up of three significant hydrostratigraphic units. Hydrostratigraphic units are geologic units of similar hydrogeologic properties (e.g., hydraulic conductivity) that may be grouped together to aid interpretation and simplify the discussion of groundwater flow.

The uppermost unit is mostly man-made fill material, ranging from 2 to 11 feet thick. Fill material includes cinders, glass, coal fragments, and wood within a matrix of silt, sand, and gravel. It also includes demolition debris, foundation remnants, and buried utilities**.**

The next hydrostratigraphic unit beneath the fill is referred to as the "sand-and-gravel unit", and extends from near the ground surface to depths of 4 to 18 feet. The sand-and-gravel is the most significant unit at the site. Most of the liquid wastes released from the MGP site reside in this unit and migrate laterally through it. Most of the groundwater which has been contaminated by those wastes moves through this unit. The City of Oneonta's two municipal water wells draw their water from this unit, but have not been impacted at this time.

Beneath the sand and gravel unit lies a "silt-and-fine sand unit" which is far less permeable. It is at least 65 feet thick as observed in the deepest site borings. This unit appears to form a "floor", preventing downward migration of liquid wastes and groundwater. Site contaminants do not appear to have penetrated more than a few feet into this unit.

By far the majority of the groundwater flow and contaminant transport takes place in the sand and gravel unit. Within this unit, however, the groundwater flow pattern is complicated by the presence of man-made surface water bodies.

In general, groundwater flows to the south-southwest, moving down-valley toward the Susquehanna River. However, the presence of Neawha Pond complicates this general pattern somewhat. The water level in Neawha Pond is maintained at an artificially high level, using water collected from Mill Race Creek, upstream from the MGP site. Some of this water leaks from the bottom of the pond into the subsurface. In doing so, it elevates the water table, creating a "groundwater mound" in the surrounding area. Groundwater from the MGP site, including dissolved contaminants originating at the site, flows around this high spot as it moves generally southwestward.

The City of Oneonta's primary water sources are the Wilber and Lower Reservoirs. However, during drought periods, the City uses the Catella Park Wells, located roughly 2,000 feet east of the site.

5.1.2: <u>Nature of Contamination</u>

As described in the RI report, many soil, groundwater and sediment samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and inorganics (metals).

The principal contaminant released from the MGP is tar, a dark-colored, oily liquid which is slightly more dense than water. Tar and other contaminants which share these physical characteristics are commonly referred to as "dense, non-aqueous phase liquids," often referred to by the abbreviation DNAPL. Tens of thousands of gallons of tar were generated at the MGP annually, and it is evident that some of it escaped into the subsurface.

It is important to note that this material does not have the sticky, viscous consistency that most people commonly associate with the word “tar”. Instead, the tar at this site has roughly the consistency of lubricating oil. The combination of low viscosity and a density close to that of water make the liquid tar mobile in the subsurface. Throughout New York State, NYSDEC investigations have found numerous MGP sites where tar has moved laterally several hundred feet from the locations where it was released. Similar migration has taken place at this site.

The physical and chemical makeup of the MGP tar provides two distinct means by which contaminants can move from the MGP site to off-site areas. First, the tar itself can migrate. When released into the subsurface, the tar tends to move downward until it reaches an impermeable barrier, at which point it is likely to spread laterally. At this site, the first low-permeability unit encountered in the subsurface was in most cases the top of the silt and fine sand unit at a depth of 15-20 feet below ground surface.

The second means of contaminant migration is through migration of contaminated groundwater. Some of the chemical compounds contained in the tar can dissolve in groundwater and, once dissolved, move through the subsurface along with ordinary groundwater flow.

MGP tar contains two principal classes of chemical constituents which pose risks to human health and the environment: PAHs and BTEX compounds.

PAH is an abbreviation for “polycyclic aromatic hydrocarbons”, a class of chemical contaminants which are commonly found in petroleum products, coal, and in residues from incomplete combustion of organic materials, such as soot. Dozens of different PAH compounds have been identified in tar; however, for the sake of simplicity, the NYSDEC focuses its attention on 16 PAH compounds which are believed to present the greatest risk to human health and the environment. Most PAH compounds do not readily dissolve in water; consequently, PAH compounds do not ordinarily move far from the tar from which they originate.

BTEX is also an abbreviation, in this case for a group of four compounds: benzene, toluene, ethylbenzene and xylene. All four compounds are volatile, and are far more soluble in water than the PAH compounds. This higher solubility makes the BTEX compounds more mobile than the PAH compounds, since dissolved BTEX compounds can be carried away from the source areas by moving groundwater. However, it should also be noted that ordinary soil bacteria are capable of using the dissolved BTEX compounds as food. This bacterial digestion process is the chief limiting factor in controlling how far a plume of dissolved BTEX contamination can spread.

It is important to note that the two migration processes noted above can transport site contaminants in different directions. Undissolved tar sinks downward, then moves along the base of the sand and gravel unit, following low spots in the surface of the underlying silt and fine sand. This migration is in many cases independent of the direction of groundwater flow. MGP contaminants which are dissolved in groundwater (primarily BTEX compounds) will move along with the flow of groundwater.

Smaller amounts of more conventional petroleum contamination have been found in the eastern plant area, where tanks containing MGP feedstock oil products were located. Unlike the tar, these materials are less dense than water and thus tend to float on the water table. Consequently, the petroleum contamination in this area has not sunk as deeply into the ground as the tar has.

One common form of MGP waste has not been encountered at the Oneonta site. Purification of the manufactured gas was performed at all MGPs; the waste material from this process was typically a mixture of wood chips, iron filings, and solidified tar. Purifier waste is often found to be contaminated with complexed cyanide compounds. No such waste has been encountered at this site.

5.1.3: <u>Extent of Contamination</u>

This section describes the findings of the investigation for all environmental media that were investigated. Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for waste, soil, and sediment. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in soil, groundwater, and Mill Race Creek sediments, and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste Materials

Large quantities of liquid MGP tar were released at this site, principally from the gas holders and other structures in the western plant area. Some leakage also took place from the tanks in the eastern plant area. In general, the liquid tar sank downward into the ground until it reached the top of the silt and clay unit at a depth of roughly 18-20 feet. At this point, unable to move further downward into the clay, the tar began to flow laterally through the bottom 1-2 feet of the sand and gravel unit, just above the top of the silt and clay. There also appears to have been some spillage of ordinary petroleum products from the eastern plant area. Some of the liquids spilled are less dense than water, and consequently tend to float on the water table at a depth of 5-10 feet below ground surface.

The tar spread over a broad area on top of the silt and clay unit, eventually reaching roughly 300 feet east, 450 feet south, and 450 feet west from the center of the MGP site. The extent of tar spreading is shown on Figure 3. On a broad scale, it appears that the tar plume has reached stability-- the tar has come to rest in the lower 1-2 feet of the sand and gravel unit, and is not currently moving into uncontaminated areas. However, at some locations within the tar plume, the liquid tar remains mobile and retains the ability to flow into wells, excavations, and nearby sections of Mill Race Creek. Although tar has only accumulated in two wells (NMW-0201 and MW-8602S) so far, it is likely that other areas of mobile tar still exist within the overall tar plume.

Surface Soil

Due to the nature of the contaminants, the way in which they were released, and the recent use of the site, there is relatively little surface soil contamination present.

Most of the release of tar from the MGP took place from subsurface structures such as tar separators and gas holder foundations. Much of this leakage took place 10-20 feet below the ground surface and so did not impact surface soils. What contamination there was on the surface has largely been covered by subsequent activities at the site.

The MGP has been out of operation for nearly 50 years, and extensive regrading of the site has taken place in the intervening time. Most of the MGP site has been covered with gravel to facilitate its use as a logistical support area for the City's Department of Public Works. Nonetheless, some areas of exposed soil remain at the MGP site, and the surrounding areas of Neawha Park and Damaschke Field are largely grass covered. The MGP site is fenced; however, the adjacent area consists of publicly-accessible park land.

Two samples (0-6 inches depth) were collected from the soccer and baseball field (Damaschke Field) adjacent to the site in November 2002. The two surface soils samples were analyzed for PAHs and BTEX compounds. No BTEX compounds were detected in either sample. The maximum total PAH concentration was 2 ppm.

Subsurface Soil

Most of the remaining contamination at the Oneonta MGP site is held in subsurface soils. Subsurface soils have been contaminated by the passage and continuing presence of MGP tar throughout the broad tar plume area discussed in the previous section.

Due to the high concentrations of PAH and BTEX compounds in the tar, contaminated subsurface soils contain high levels of these compounds. Concentrations of PAHs range from non-detect to 14,063 ppm. Concentrations of BTEX compounds range from non-detect to 1,935 ppm. In both cases, the highest contaminant levels are found in grossly contaminated soils with visible liquid tar contamination.

It should be noted that, outside the boundaries of the MGP site itself, the contaminated soils are found at considerable depths below the ground surface. This minimizes the chances of human or ecological exposures to the contamination. The principal reason for concern with contaminated subsurface soils is their potential to release tar into surrounding areas and to contaminate groundwater which comes into contact with them.

Groundwater

Because of the potential for the MGP site to impact water quality at the City's municipal wells in Catella Park, an ongoing program of groundwater monitoring has been in place since 1986. Over 20 rounds of samples have been collected and analyzed over this time period. No site-related contaminants have been detected near the municipal wells. As discussed below and shown on Figure 3, contaminated groundwater which leaves the MGP site travels away from the Catella Park wells. However, it is important to note that groundwater beneath Catella Park remains an important natural resource which could be tapped in the future. Thus, although this contaminated groundwater will not reach the Catella Park wells, particular attention to groundwater contamination issues is warranted.

Groundwater which comes into contact with MGP tar, or with heavily tar-contaminated soils, becomes contaminated with dissolved BTEX compounds. The MGP tar has spread significantly in the subsurface, and the entire area where tar is currently located must be considered as the "source area" for this contamination. As shown on Figure 3, this source area is considerably larger than the structures from which the tar originally escaped. Groundwater flowing through this source area becomes contaminated and moves generally to the south and southwest. A total area of over 4.5 acres, all of it within the limits of Neawha Park, is contaminated with BTEX compounds at levels which exceed TAGM levels.

During the most recent sampling conducted in May 2003, thirteen (13) of the twenty-eight (28) shallow groundwater sampling locations exceeded SCGs for one or more BTEX compounds. The highest BTEX concentrations were detected in samples collected in well MW-0201 (3600 ppb). Benzene, the most important BTEX compound, was frequently above its standard of 1 ppb. Concentrations of benzene ranged from 2.4 ppb to 2,500 ppb.

Seven of the twenty-eight shallow groundwater samples had one or more PAH compounds above their respective guidance values. Guidance values were exceeded for naphthalene, acenaphthene, flourene, and phenanthrene. The highest total PAH concentrations (greater than 1000 ppb) were found in samples collected at shallow monitoring wells PM-5 (6,800 ppb) and PM-7 (3,000 ppb). Of the four PAH compounds, naphthalene was most-frequently exceeding its SCG of 10 ppb. Naphthalene concentrations were highest at shallow monitoring wells PM-5 (6100 ppb) and PM-7 (2300 ppb). No PAHs were detected above SCGs in groundwater samples collected at monitoring wells MW-0301, MW-8808S, MW-0203, MW-9111S, and MW-9112S.

Cyanide was detected only at monitoring well PM-7(2000 ppb) above its SCG of 200 ppb. Cyanide concentrations did not approach the guidance value for any of the other 27 samples analyzed. It should be noted that well PM-7 is located within the boundaries of the MGP site, and that the selected remedy will deal with this area directly through excavation.

The only metals exceeding their SCGs are iron and manganese. These metals are not considered to be associated with MGP operations and most likely represent natural background concentrations. High levels of iron and manganese are common in naturally occurring groundwater.

Groundwater samples were collected from three deep groundwater monitoring wells (screened at 60-80 feet below ground surface) within the boundaries of the MGP site. These wells did not have any detectable concentrations of BTEX, PAHs, or cyanide. Only iron and manganese exceeded their SCGs.

In summary, the site has contaminated groundwater with BTEX compounds, PAH compounds, and (in one isolated case) cyanide. Of these, only the BTEX compounds appear to be significant in terms of potential off-site impact. Groundwater flow is moving the dissolved contaminants to the south and southwest, and is not transporting them toward the standby municipal supply wells in Catella Park. Although the contamination of shallow groundwater is widespread, this contamination does not appear to have reached to great depths beneath the site.

Surface Water

Three surface water samples were collected from Mill Race Creek and one from the Neawha Pond during the RI. No MGP-related chemical contamination was found.

Sediments

A small area of tar-impacted sediments has been identified in Mill Race Creek, immediately adjacent to the center of the MGP site. This is the area where the tar source areas (in particular, one of the relief gas holders) were closest to the creek. The most grossly contaminated sediments are readily identifiable, with visible drops of tar in some cases. When disturbed, they create a sheen on the water surface. Surface sheens of this type constitute a violation of New York State Ambient Surface Water Standards (6NYCRR Part 703.2).

Tar-impacted sediments can be found at shallow depths here, within a foot of the creek bottom. It appears that tar is still migrating slowly into the sediments on the creek bottom. This migration creates a potential exposure for wildlife living in the stream bed. The RI included borings on the north side of Mill Race Creek to determine the extent of tar contamination in this direction. This investigation determined that tar has not migrated beyond Mill Race Creek.

Obvious MGP-related sediment contamination was found in an area measuring roughly 20 by 40 feet, starting at depths of roughly a foot below the bottom of the stream bed. Smaller areas of sheen-producing sediments with characteristic MGP odors were found a few hundred feet downstream. It appeared that the downstream contamination contained small amounts of sediment which had been transported by the stream and then redeposited. It should be noted that this transported material was not noted during subsequent visits, having apparently been removed by subsequent erosion.

The precise distribution of tar contamination in the stream bed has varied somewhat from one investigation to the next. It appears that this is due to the dynamic nature of the stream bed: sediments are constantly moving along with the stream flow, so contamination noted on one site visit may have been moved, buried, or dispersed by the time of the next visit. Despite this variability, some conclusions can be drawn from observations of the stream. Tar appears to be slowly leaking from the MGP site into the stream bed. Depending on flow conditions in the stream, the tar-contaminated sediments may be eroded and either be dispersed, moved downstream, or temporarily buried by relatively uncontaminated sediments from upstream sources.

MGP tar can contribute to contamination of sediments even when visible tar is not present. PAH compounds derived from the tar can remain sorbed onto the surfaces of sediment particles, and then be transported with the sediment. Such PAH contamination can be toxic to benthic organisms which live in the stream bed. However, it should be noted that many other sources of PAH contamination also exist in the area of the MGP site, including highway runoff, oil and petroleum spills, and atmospheric deposition of particulates from smoke. In sediments which contain PAH contamination but lack the characteristic MGP odors or visible drops of tar, it can be quite difficult to determine the source of the contamination.

In the case of Mill Race Creek, significant levels of PAH sediment contamination have been found upstream from the MGP site. This contamination obviously is not derived from the MGP, and appears to be related to street runoff from the City of Oneonta. A survey of discharges to Mill Race Creek was conducted during the RI; a total of nine storm sewer discharge pipes were noted in the reach between the Route 28 overpass and the downstream confluence with the Susquehanna River. Four of these discharges were located upstream of the MGP site. Several of the pipes were noted to be occasionally discharging water with surface sheens into Mill Race Creek. Each of these storm sewer outfalls is considered as a potential source of PAH contamination to the sediments of Mill Race Creek.

The RI included an investigation to determine the relative contributions of the MGP and other sources of PAH contamination in sediments. Total PAH concentrations in the immediate vicinity of the site reached as high as 124 ppm. However, levels as high as 79 ppm were found upstream, outside the influence of the MGP site. Downstream, PAH levels decline rapidly to levels similar to those found at upstream locations. Some of the downstream sediment samples contained elevated PAH levels which appeared to be MGP-related. However, these samples were located near other, comparably contaminated, sediments which were not MGP related. The investigation concluded that the MGP was a significant contributor of PAH to the sediments in Mill Race Creek, but that it was not the only source, and that its identifiable effects were limited to a relatively small area near the MGP itself.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

One IRM was performed during the early phases of site investigation. As discussed in Section 3.2, an air sparge/soil vapor extraction system operated at the site from 1997 to 2001. This system was constructed in the main source area on the western plant site. This area was very heavily contaminated, and the system proved ineffective against the high concentrations of contaminants. It should be noted, however, that sparging technology may still be effective against lower-level contamination found around the fringes of the contaminated area.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in the RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Potential exposure pathways at the site are:

- dermal contact with contaminated sediments and coal tar;
- dermal contact with contaminated subsurface soil;
- ingestion of contaminated groundwater; and
- inhalation of vapors from contaminated soil gas/vapor intrusion.

If people were to wade in Mill Race Creek there is a potential for exposure to MGP-related contamination and coal tar in the creek sediments. However, this appears to be an unlikely scenario as Mill Race Creek is not used for recreational purposes. Dermal contact with residual contaminated subsurface soil is possible in the event of future ground intrusive construction activities. It is expected that the site management plan will greatly reduce the potential for this exposure. Because the area surrounding the park is serviced by municipal water, site groundwater is not currently used for drinking. The selected remedy places a restriction on site groundwater as a future drinking water source. No site-related contamination has been detected in the nearby City water supply wells. Monitoring of the public water supply will continue to ensure this remains the case. Soil vapor intrusion is a potential concern should buildings be constructed on the site in the future. An evaluation of this potential exposure pathway will occur prior to any future building construction, including provision for mitigation of any identified impacts.

5.4: <u>Summary of Environmental Impacts</u>

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways and ecological risks have been identified:

- MGP tar has migrated into sediments at the bottom of Mill Race Creek, and it appears that this tar movement is still taking place today. Sediments which have been contaminated by tar will generate a sheen on the water surface when disturbed, which is a violation of New York State Ambient Water Quality Standards (6NYCRR Part 703.2). These sediments, and others containing MGP contaminants at somewhat lower levels, are toxic to benthic (bottom dwelling) organisms in the creek.

Site contamination has also impacted the groundwater resource in the sand and gravel aquifer. This aquifer supplies a portion of the City of Oneonta's drinking water supply. However, the municipal wells which produce water from this aquifer are located over 2000 feet away from the site. Site contaminants have not reached these wells and it is considered unlikely that they will do so in the future. Nonetheless, a large area of the aquifer in and adjacent to the site has been contaminated by wastes at the site.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to site related VOCs, specifically BTEX, and PAHS in subsurface soils, groundwater, and sediments;
- environmental exposures of flora or fauna to MGP tar and tar-derived contaminants in sediments beneath Mill Race Creek;
- the release of contaminants from MGP tar and tar-contaminated soil into groundwater that may create exceedances of groundwater quality standards; and
- the release of contaminants from tar-contaminated sediments into the water column of Mill Race Creek, which creates sheens on the water surface.

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

- ambient groundwater quality standards in the sand and gravel aquifer.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the former Oneonta MGP Site were identified, screened and evaluated in the FS report which is available at the document repositories identified in Section 1.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that will be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring will cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated subsurface source materials, groundwater, and Mill Race Creek sediments at the site. The nature of the contamination problem is different in each of these three media; consequently, they are discussed separately.

Source Area Alternatives

Alternative SM1: No Action

Present Worth: *$96,000*
Capital Cost: *$65,000*
Annual OM&M: *$2,500*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative will leave the site in its present condition and would not provide any additional protection to human health or the environment.

Under this alternative, groundwater impacted by MGP-related constituents would not be addressed with remedial activities. The current site conditions would remain unchanged. Institutional controls and the lack of remedial activities would minimize the potential for human exposure, but would not minimize the potential environmental exposures from the impacted media. Institutional controls would be in place to restrict groundwater use and/or groundwater extraction. Also, annual monitoring of some sentinel wells associated with the protection of the Catella Park Wells would continue. For costs estimation purposes, a 30 year monitoring program has been assumed.

Alternative SM2: Source Material Removal & Asphalt Cover

Present Worth: *$3,357,000*
Capital Cost: *$3,202,000*
Annual OM&M . . . (years 1-5). . . . . *.$18,500*
. . . (years 6-30). . . . . *.$9,500*

This alternative would involve the excavation and off-site disposal of the underground structures/vessels as well as excavation and off-site disposal of soils that represent the most likely sources of mobile tar at the site. These soils are located adjacent to and beneath the subsurface MGP structures/vessels. The remainder of the site would be capped.

The proposed extent of this alternative is shown on Figure 4. In general, the remedy would involve driving steel sheet piling to encircle the two easternmost gas holders and a nearby area which contained tar separators and associated piping. Within the limits of the sheet pile enclosure, these structures and surrounding source materials would be excavated down to the confining layer, roughly 20 feet below ground surface. An estimated 6100 cubic yards of soil would be removed. Soils would be dewatered on site, and (if necessary) prepared for off-site shipment and treatment by blending with less contaminated soils or other blending materials. Large debris such as concrete fragments, bricks, etc. would be decontaminated on site and could then be sent for disposal at a permitted landfill.

Because three of the outbuildings associated with baseball operations at Damaschke Field (the souvenir booth, restroom building, and concession stand) sit directly on top of the most grossly contaminated soils and structures, these buildings would need to be removed prior to the commencement of work. It is anticipated that these buildings would be demolished and replaced after clean up is complete; however, if it proves more economical, they could be moved temporarily and returned to the site.

Following excavation, the sheeted area would be backfilled with select fill material to within 18 inches of the original ground surface. Construction of an asphalt cover (over the entire site) would then proceed as described below.

Beyond the limits of the sheet piled excavation, no soil removal would be performed. Following excavation and backfill of the sheeted area, the western plant area and the entire eastern plant area would be covered with low-permeability asphalt to limit the amount of rainwater which could infiltrate through the remaining contaminated soils and thus limit the generation of contaminated groundwater. A tar recovery well system would be installed to remove recoverable tar in these areas, if present.

In addition, institutional controls in the form of an environmental easement would be placed on the site to limit disturbance of the cap, limit use of the site to recreational use, prohibit excavation of subsurface materials below the cover, and limit the extraction and use of groundwater. A site management plan would be prepared to detail the above and would include a certification of the continued effectiveness of the institutional and engineering controls associated with the remedy.

Alternative SM3: Removal to Total PAH TAGM Levels

Present Worth: *$8,036,000*
Capital Cost: *$7,955,000*
Annual OM&M: *$6,500*

This alternative would offer a higher level of protection by removing more contaminated soil from a larger portion of the site. Whereas Alternative SM2 would call for removal of soils in or adjacent to the gas holder foundations, SM3 would expand the excavation to include most of the eastern and western plant areas. In addition, Alternative SM2 would call for removal of only those soils which contain visible tar. Under alternative SM3, soils which contain no tar, but which do contain 500 ppm or more total PAHs would also be removed.

The approximate layout of this alternative is shown on Figure 5. It should be noted that not all of the soil within the excavation limits would necessarily be removed. Soils which contain neither visible tar nor total PAHs over 500 ppm, could be either left in place or returned to the excavation (assuming that such soils might be removed in order to gain access to contamination at greater depths). Any such soil returned to the excavation would be covered with a geotextile fabric, and then covered with clean fill materials from off site sources. The purpose of the geotextile would be to serve as a demarcation and warning layer in the event of future excavation.

The post-excavation cover and ongoing tar recovery efforts included in Alternative SM2 would not be necessary. Following backfill of the excavated area, the finished ground surface would be restored using crushed stone, asphalt, or other surface materials. The finished surface would be specified in consultation with the City of Oneonta to allow their continued use of the site. If landscaped soil cover is desired for some areas of the site, these areas would require a layer of clean topsoil two feet in thickness.

The actual depth of excavation would be determined based upon the removal goals of this alternative. Based on the subsurface investigation data from the RI, the site has been subdivided into sections, some of which would require deeper excavation than others. Temporary steel sheet piling would be required surrounding the western plant area to stabilize the walls of the excavation. The eastern plant excavation is expected to be shallower, so no sheeting is required.

A pre-design investigation would be conducted to refine the limits of the overall excavation area, and to more precisely define the depths to which each subarea must be excavated. Particular attention would be devoted to defining the northern site boundary along Mill Race Creek. Although the sediment contamination in the creek appears to be shallow (0-8 feet below the stream bed) based on currently available data, further work may show contamination extending to greater depths. If this proves true, it may be more economical to extend the temporary sheet pile wall into the stream bed to facilitate excavation of the contaminated sediments and underlying contaminated soils. In addition, a cast-iron pipe which was found in the stream bed would be further evaluated and prepared for removal if necessary. Further discussion of this issue can be found under the "Sediments" heading later in this document.

Alternative SM3 would require imposition of institutional controls and a site management plan similar to alternative SM2.

Alternative SM4: In-situ Chemical Oxidation

Present Worth: *$15,522,000*
Capital Cost: *$15,441,000*
Annual OM&M: *$6,500*

Alternative SM4 would provide for a thorough site cleanup while minimizing the need for extensive excavation and off-site treatment of contaminated soils. This would be achieved through the introduction of chemical oxidizing compounds into the subsurface, which react with and destroy the MGP tar contaminants. The most common classes of oxidant chemicals are persulfates and peroxides, which would require verification testing for this particular site.

The presence of subsurface structures (holder foundations, tar separators, etc.) would limit the introduction and dispersal of the oxidant through the subsurface. Thus, these structures and their contents would be removed by conventional excavation methods prior to the introduction of oxidant. Soils and debris generated during this excavation would be handled and disposed in the same way as described under alternatives SM2 and SM3.

During full-scale implementation, a network of injection wells would be installed within or above the subsurface source material with greater than 500 ppm total PAHs. The oxidizing agent would need to be delivered in a manner that optimizes contact with chemical constituents for the technology to be effective. As such, injection points would be spaced based on each individual injection well's anticipated area of influence. The area of influence surrounding an individual injection location is uncertain and is affected by site-specific conditions, including subsurface stratigraphy, oxidant concentration, injection pressure, etc. Information collected during the pilot-scale study would be evaluated to properly design the oxidant delivery parameters (e.g., oxidant concentration, injection pressure) and guide the spacing of oxidant injection points.

The proposed layout of the oxidant injection system is shown on Figure 6. This plan would be subject to revision based on the results of a pre-design investigation. The pre-design investigation would also include bench scale and field scale testing of the oxidation system to verify its effectiveness.

A post-injection monitoring program would be implemented to document the effectiveness of the remedial technology during full-scale implementation. The monitoring program would consist of the periodic collection and analysis of subsurface soil samples to determine if the treatment efforts are reducing the MGP impacts. In addition, monitoring for oxidant distribution would also be conducted. For the purposes of this Feasibility Study Report, based on the oxidant demands for sodium persulfate and potassium permanganate and the volume/mass of subsurface source materials requiring treatment, it is estimated that up to five applications of oxidant would be required.

Institutional controls would be the same as described under Alternative 2.

Alternative SM5: In Situ Solidification/stabilization

Present Worth: *$7,530,000*
Capital Cost: *$7,233,000*
Annual OM&M: *$6,500*

Alternative SM5 would remove subsurface material with total PAHs greater than 500 ppm in the unsaturated zone and stabilize soils greater than 500 ppm total PAHs in the saturated zone. The physical extent of this Alternative is shown on Figure 7.

This stabilization would accomplished by mixing the contaminated soil with cement and other materials such as clay or fly ash. Although the stabilization process would not actually destroy the site contaminants, it would significantly reduce the mobility of those contaminants (either mobile tar or contaminated groundwater) by blocking pore spaces in the soil and reducing permeability.

Stabilization can be achieved in-situ using large-diameter augering machines. This technique has not been employed in New York State but has been used successfully elsewhere. The augers, typically 5-15 feet in diameter, are lowered into the ground as they are rotated. The augers are hollow at the center, allowing a mix of cement or other binding agent to be injected and mixed with the soil as the augers turn. The result is a vertical, cylindrical column of solidified soil. Adjacent auger holes can be overlapped with one another to create a continuous "monolith", or mass of stabilized, solidified material.

The augering machinery cannot penetrate concrete structures in the subsurface, nor can it adequately deal with pieces of rock or debris more than roughly a foot in diameter. Consequently, the gas holder foundations, their contents, and their associated subsurface structures would need to be removed prior to the commencement of stabilization. Elsewhere, all unsaturated soils (those above the water table) containing more than 500 ppm total PAH would be removed for off-site treatment and disposal, prior to the commencement of stabilization.

A pre-design investigation would be required to determine the optimal amount of cement, low-permeability clay, and/or other binding agents necessary to achieve stabilization. Due to the addition of these agents, the soil is expected to grow somewhat in volume, resulting in a slight increase in ground surface elevation. Due to the prior excavation of unsaturated soils, this increase in volume of the stabilized soil would not be noticeable when finished.

Following solidification, the monolith would be covered with select backfill materials and with any uncontaminated soils segregated during the prior excavation work. Based on the results of the pre-design investigation, it may be necessary to cover the stabilized soil monolith with an impermeable geomembrane barrier to further limit contact with groundwater. As with Alternative SM3, the finished ground surface could be a covering of crushed stone, asphalt, or other material suitable for continued use of the property by the City of Oneonta.

Institutional controls would be the same as described under Alternative 2.

Creek Sediment Alternatives

The presence of grossly contaminated sediments in the bed of Mill Race Creek adjacent to the site presents the greatest exposure for both human and wildlife receptors. Elsewhere on the site, MGP tar is found at significant depths below the ground surface, where ordinary daily activities will not result in contact, either to humans or to wildlife receptors. In the stream, however, benthic organisms are exposed to MGP tar and contaminated sediments on a daily basis, and humans could be exposed while wading in the stream.

It should be noted that, due to the difficult drilling conditions in the stream, only shallow borings have been attempted here so far. Contamination has been found as deep as 8.5 feet below the stream bed. However, it is not known how far below this level the contamination extends--tar contamination is found several feet deeper than this beneath adjacent portions of the MGP site, and there is some reason to expect that at least some MGP tar is present at these depths beneath the stream.

Alternative CK1: No Action

Present Worth: *$70,000*
Capital Cost: *$39,000*
Annual OM&M: *$2,500*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Under this alternative, the contaminated stream sediments currently located at the bottom of Mill Race Creek would be left in place. Over time, some portion of this material would be expected to be removed by erosion and transported downstream. This process is taking place currently, as described previously.

Depending on what alternative is chosen for the source areas (see alternatives SM1 through SM5, above) the site would either continue to feed tar into the stream, or this discharge could be cut off by treatment or removal of the source. If no action were chosen for both the source areas and the stream, then current site conditions would remain unchanged indefinitely.

Some form of institutional controls could be attempted to reduce the chances for human contact with contaminated sediments. These controls would reduce the potential for human exposure somewhat, but would not minimize the potential environmental exposures from the impacted media.

Alternative CK2: Monitored Natural Attenuation

Present Worth: *$308,000*
Capital Cost: *$91,000*
Annual OM&M: *$17,500*

This alternative would build somewhat on the no action alternative by monitoring sediment contamination conditions over time. However, no active remediation would be attempted.

If combined with source removal or treatment as discussed in Alternatives SM1 through SM5, there is a chance that contaminant levels in the sediments would decline as time passes. Under current conditions, tar is entering the streambed slowly but continuously, and is being removed episodically during flood events. Presumably, if tar input from the source areas was cut off, this episodic erosion process would remove some or all of the contaminated sediment. Other physical, biological, and chemical degradation processes could help lower contaminant concentrations as well.

Alternative CK3: Sediment and Soil Removal, Engineered Backfill, Upland and Creek Tar Recovery

Present Worth: *$894,000*
Capital Cost: *$776,000*
Annual OM&M: . . . (years 1-5) *$13,500*
. . . (years 6-30). *$7,500*

Alternative CK3 would involve the removal of sheen-producing sediments, sediments containing MGP-related PAHs at concentrations above background levels, and tar-containing sediments and subsurface soils beneath the creek; removal of soils along the south bank of the creek; placement of engineered backfill; installation of a passive tar collection system; implementation of institutional controls; and performance of long-term monitoring and maintenance.

Sediments and the underlying unconsolidated soils in the area between transects T-13 and T-14B would be removed to a depth of approximately 2.5 feet. Removal would extend to a depth of approximately 4 feet in areas beneath the creek where tar is present at greater depths, but would not extend to the full 8.5 foot depth, so some contamination would be left behind. Soils along the south bank immediately adjacent to the creek would be excavated to 4 feet between transects T-13 to T-14B. Sediment/subsurface material/bank soil removal limits associated with this alternative are shown on Figure 8. It should be noted that the removal limits shown on Figure 8 are based on existing data and would be subject to modification/refinement based on data collected as part of a pre-design investigation. Materials would be removed using standard earth-moving equipment (e.g., excavators, loaders, etc.), then handled, transported, and disposed off site similar to the soils excavated under Alternatives A3 through A5.

In the 2.5-foot deep sediment removal areas (i.e., in areas where tar is not present at depth of greater than 4 feet below the sediment surface), engineered backfill would be placed following sediment removal. For the purposes of this Feasibility Study Report, it is assumed that the engineered backfill would consist of 24 inches of sand, 6 inches of armor stone, and a layer of fine-grained material. Armor stone sizing would be determined by the analysis of area-specific erosional forces exerted on the backfill materials. The layer of fine-grained material would fill in spaces within and cover the stone armoring to create a benthic habitat type similar to current conditions. Over time, natural depositional processes would also support the re-establishment of benthic habitat. The actual backfill materials and thicknesses to be used would be determined during the remedial design.

In the 4-foot sediment/subsurface material removal area of the creek (where tar would remain at depths greater than 4 feet below the sediment surface) the engineered backfill would include a passive tar collection system and a layer of highly sorptive material to mitigate, to the extent practicable, the potential for tar present below 4 feet to migrate into the overlying engineered backfill materials, discharge to the creek, and generate sheens in the creek. It should be noted that the pre-design investigation may determine that a tar collection system is unnecessary, and the potential for upward movement of tar to the creek bed may adequately be addressed with an appropriately designed sorptive barrier. Testing of the site tar indicates its density to be slightly greater than that of water, and based on information provided in the SRI Report (BBL, 2004), there is little upward hydraulic head in the Mill Race Creek. However, for the purposes of this document, it is assumed that the passive tar collection system would consist of a 1.5- to 2.5-foot layer of high permeability material (e.g., locally available gravel) with perforated piping that gravity drains to sumps where tar accumulations could be monitored and removed. The actual tar collection system components would be determined during the remedial design.

It should also be noted that excavation of the contaminated sediments may prove easier to achieve by simply extending excavation activities from the adjacent MGP site into the stream. For example, under Alternatives SM3 and SM5, the temporary sheet pile wall along the stream bank could be extended outward into the stream, with the stream temporarily diverted around the work area. Once enclosed by the sheet pile wall, the stream bed area could be excavated along with the on-site contaminated soils. Under these conditions, with the tar source area removed, the tar collection system would no longer be necessary, and would be deleted.

Alternative CK4: Sediment and Subsurface Soil Removal and Upland Tar Recovery
Present Worth: *$2,006,000*
Capital Cost: *$1,888,000*
Annual OM&M: . . . (years 1-5) *$13,500*
. . . (years 6-30). $7,500

This alternative would provide a higher level of certainty and protection by removing contaminated sediments and soils beneath Mill Race Creek to a greater depth than Alternative CK3.

Rather than stopping excavation at 4 feet below the creek bed, excavation would proceed to the full 8.5 foot depth of contamination, as defined by the currently available data. Excavation would proceed beyond this depth if necessary.

The proposed physical boundaries of this alternative are shown on Figure 9. These boundaries would be subject to modification based on further sampling during the Remedial Design.

As with Alternative CK3, it may be easier to perform the sediment removal by extending the excavation activities from the MGP site into the stream. The area to be excavated under Alternative CK4 could be included inside the sheet pile wall (with Mill Race Creek temporarily diverted around the area) and the contaminated sediments could then be excavated and handled along with contaminated soils from the main excavation. Under these conditions, with the tar source area removed, the tar collection system would no longer be necessary, and would be deleted

Groundwater Alternatives

Grouped together under this heading are alternatives for remediation of the thin layer of tar which has migrated away from the MGP site beneath Damaschke Field and the surrounding city park lands. In general, this contamination takes the form of a thin, pancake-shaped mass, roughly 2 acres in area and roughly a foot thick. This contamination is found in the range of 15-20 feet below ground surface. Direct contact with this contamination is unlikely, but it does play a role in the contamination of groundwater in the area.

Alternative GW1: No Action

Present Worth: *$96,000*
Capital Cost: *$65,000*
Annual OM&M: *$2,500*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Under this alternative, the contaminated soils beyond the limits of the MGP site itself would be left in place. Groundwater which comes into contact with the tar and tar-contaminated soils would continue to become contaminated. The dissolved groundwater contamination would continue to move through the subsurface until native soil bacteria completely digest the contaminants.

Although this microbial digestion process is taking place currently, the volume of contaminants contained in the tar is large enough that the contamination would probably persist indefinitely into the future.

Alternative GW2: Passive Tar Removal and Monitored Natural Attenuation

Present Worth: *$805,000*
Capital Cost: *$130,000*
Annual OM&M: . . . (years 1-5) *$68,500*
. . . (years 6-30). *$47,500*

This alternative would provide for the passive removal of mobile tar from a series of tar collection wells in the area outside the MGP boundaries. The objective would be to remove the tar which is most likely to move through the subsurface, either under current conditions or under reasonably foreseeable future conditions such as drought or increased use of the aquifer for municipal water supply.

A series of tar collection wells would be installed in the tar-impacted areas surrounding the MGP on the east and south. Tar which spontaneously enters these wells would be captured in the wells and removed manually on a periodic basis. No pumping of groundwater would be planned for these wells; however, some wells could be pumped at very low flow rates if they consistently produced tar at a rate too high for manual collection, or if it appears that tar production could be increased by pumping tar.

Special well designs could be required in some areas, due to the presence of the baseball stadium and surrounding park lands. In most locations, the wells would need to be terminated below ground level, with the well head surrounded by a small concrete or metal structure flush with the ground surface.

For planning purposes, it has been assumed that a total of ten collection wells would be installed; however, this number could be increased based on the results of the Remedial Design Investigation.

Alternative GW3: In-situ Treatment

Present Worth: *$1,744,000*
Capital Cost: *$448,500*
Annual OM&M: . . . (years 1-5) *$118,500*
. . . (years 6-30). *$97,500*

This alternative would build on Alternative GW2 by adding a biosparging system south of the western plant area. This system would introduce oxygen into the groundwater by injecting air below the water table through a series of wells. The objective would be to encourage the growth of native bacteria which break down MGP contaminants.

Sparging has been shown to be effective at removing dissolved groundwater contaminants, and is widely employed as a remediation technology for volatile contaminants such as gasoline. However, its effectiveness against concentrated, semivolatile contamination (such as the undissolved MGP tar) has not been clearly demonstrated. Consequently, sparging should be viewed as a "polishing" technology, which would be expected to be effective in treating the dissolved BTEX plume and potentially reducing the mobility of the tar, but which could prove only marginally effective at remediating tar.

As with Alternative GW2, the exact number, location, and construction details of the tar collection wells would be established during the Remedial Design. Figure 10 shows the proposed arrangement of sparging wells. As with the tar collection wells, the exact location and number could be adjusted during the Remedial Design.

For the purposes of cost estimation, it is assumed that the sparging system would require 10 to 12 injection wells, and that the system would operate for 30 years. The effectiveness of the system would be reviewed after 5 years of operation. Groundwater monitoring would continue throughout the period of operation, both to help evaluate the system's effectiveness and to guard against the possibility that contaminants are moving toward the Catella Park water supply wells. If the system were to prove ineffective at reducing dissolved-phase BTEX contamination or NAPL mobility around the perimeter of the impacted area, it could be modified to improve effectiveness or shut down.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility, or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP have been evaluated. The Responsiveness Summary (Appendix A) presents public comments received and the manner in which the NYSDEC addressed the concerns raised.

In general, the public comments received were supportive of the selected remedy.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the Administrative Record (Appendix B) and the discussion presented below, the NYSDEC has selected a combination of alternatives as the remedy for this site. The elements of this remedy are described at the end of this section.

For source areas on the MGP site itself, the NYSDEC has selected **Alternative SM3: Removal to Total PAH TAGM Levels**.

For the adjacent portion of Mill Race Creek, the NYSDEC has selected **Alternative CK4: Sediment and Subsurface Soil Removal and Upland Tar Recovery.**

For the groundwater contamination beyond the limits of the MGP site, the NYSDEC has selected **Alternative GW3: In-situ Treatment**.

The selected remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

This combination of alternatives is being selected because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It will achieve the remediation goals for the site by removing as much of the source material as practicable, removing the area where contaminants cause the greatest risk of exposure, and reducing the mobility of the remaining tar that is being left behind.

Source Area Remedy

On the MGP site itself, large and concentrated sources of MGP tar have been identified near the two easternmost gas holders. Substantial amounts of heavily contaminated soils have been identified elsewhere on the site. Off-site migration of this material is the primary concern. Alternative SM3 will provide the most effective means for addressing this contamination.

Alternative SM1 (No Action) was rejected because it would not meet the threshold criterion of protecting human health and the environment. Without a substantial change in site conditions, tar will continue to migrate off site into Mill Race Creek and will continue to contaminate groundwater.

All of the other alternatives were judged to meet threshold criteria. All would employ available technologies, for which equipment and trained personnel are available, and thus were judged roughly equal in implementability. The remaining alternatives differ primarily in the degree to which they permanently reduce mobility, toxicity, and volume and assure long-term effectiveness.

Alternative SM2 would be somewhat effective in reducing mobility, toxicity, and volume, in that the gross contamination near the gasholders would be removed. However, the overall long-term effectiveness of this alternative at preventing off-site tar migration would be limited. Some areas of mobile tar would likely be left behind elsewhere on the MGP site, outside the excavation limits. Although some efforts would be made to remove this tar through passive collection wells, some areas of mobile tar would probably escape detection and capture. This tar would still be in close proximity to Mill Race Creek, and could drawn into the creek by changes in future land use, construction, or other activities.

Alternative SM4 (In-situ chemical oxidation) was rejected due to concerns with short-term effectiveness. Although this technology has proven effective on dissolved-phase groundwater plumes elsewhere, its effectiveness against pools of liquid tar has not been demonstrated. The oxidant would only function when it can be brought into direct contact with the target contaminants. Water-based solutions (such as the oxidants proposed for use here) often can not penetrate pools or drops of non-aqueous liquids. Within the limits of the MGP site, there are numerous areas where direct contact between the aqueous oxidant solution and the non-aqueous tar would be difficult or impossible to establish.

Alternative SM5 (In-situ stabilization and solidification) was not selected due to concerns with long-term permanence. In order for this alternative to be effective, existing drops and pools of liquid tar would need to be very thoroughly mixed into the stabilized soil mass, and the permeability of the mass would need to be greatly reduced. These changes would need to be permanent, in order to prevent the liquid tar from moving through the mass, reaccumulating, and potentially moving off site. There is very little data available on the long-term stability of stabilized soils which contain liquid tar.

Alternative SM3 provides for the greatest reduction in mobility, toxicity, and volume by removing and permanently destroying the greatest amount of tar-contaminated soil. This alternative also provides the highest degree of short -term and long-term effectiveness. In the short term, by opening up a large portion of the site to excavation and physical inspection, it provides the highest degree of certainty that the mobile tar that is close to the stream will be successfully found and removed. In the long term, the permanence of moving the contamination off site for treatment is unsurpassed.

Creek Sediment Remedy

The contaminated creek sediments represent the greatest exposure risk for both humans and wildlife. Any remedy applied in this area needs to offer a high degree of certainty that it will remove the threat of these exposures recurring in the future.

Alternative CK1 (No Action) would not meet either of the threshold criteria and was thus rejected.

Alternative CK2 (Monitored Natural Attenuation) was also rejected, since it too would not meet the threshold criteria. There is little evidence that natural processes would substantially degrade the tar. At other MGP sites in New York State, tar deposits in stream beds have persisted for decades with little evidence of degradation.

Alternative CK3 would meet the threshold criteria; however, there are concerns with its implementability and long-term effectiveness given the dynamic nature of this stream. Tar is known to exist in soils deeper than the proposed four foot excavation depth. This alternative would propose to deal with this by constructing a tar-capture system beneath the active stream bed. This has not been attempted elsewhere in New York State. The detailed mechanisms that control the flow of tar are not well established, which would make design of the capture system difficult. There would also be concerns with possible downward stream erosion into the capture system, and biological fouling of this system.

By removing all of the tar-impacted soils and sediments beneath the stream, Alternative CK4 will provide the highest degree of long-term effectiveness and the highest reduction in toxicity, mobility, and volume. The MGP contaminants removed from the stream bed will be permanently destroyed. Alternative CK4 uses standard construction machinery such as backhoes, bulldozers, and dump trucks, and is considered readily implementable. Implementability may be further increased by combining (if possible) the excavation of the contaminated stream bed with the source area excavation under Alternative SM3.

Groundwater Remedy

With the presence of two municipal supply wells roughly 2000 feet away, groundwater contamination has received very careful consideration throughout the history of the investigation of this site. Fortunately, site contaminants have not reached the municipal wells, and NYSDEC has not identified any likely conditions under which contaminants will reach them.

The source removal called for in the selected Alternative SM3 will reduce, but will not eliminate, the generation of contaminated groundwater. Significant amounts of tar exist beyond the limits of the selected remedy for the MGP site itself. The physical distribution of this tar–in a thin, flat layer nearly two acres in size and roughly 20 feet below an existing baseball stadium–greatly limits the available options for dealing with it. Excavation would require demolition of the stadium. In-situ remedies (such as in-situ oxidation, similar to source area Alternative SM4) would face the same limitations that apply in the source area.

Given these constraints and the lack of human or ecological exposure, the NYSDEC has identified limiting the mobility of this tar and lessening its impact on the groundwater resource as the most important objectives.

Alternative GW1 (No Action) was rejected because it would fail to meet the threshold criterion of protectiveness. Tar in the areas surrounding the MGP site could be remobilized if current land use changes, migrating further into currently uncontaminated areas. Groundwater contamination resulting from contact with the tar would continue indefinitely.

Alternative GW2 would provide a higher level of protection by seeking to collect as much of the mobile tar as can be identified from the ground surface. However, the residual tar left in the formation after the mobile tar has been drained away would continue to contaminate groundwater as it passes through the site. Thus, GW2 would reduce the mobility and volume of the remaining waste somewhat, and would offer higher long-term effectiveness.

It is important to note the limited level of effectiveness offered by Alternative GW2. Although the wells can be effective in removing tar in the immediate vicinity where they are installed, each well would be expected to capture tar over a relatively small area. It is likely that some pockets of mobile tar would escape detection, and thus would remain in the ground. In addition, it should be expected that substantial amounts of tar contamination would remain trapped in soil pore spaces.

Alternative GW3 builds on GW2 to provide a higher level of protection by removing more dissolved-phase groundwater contamination. Alternative GW3 is the preferred alternative because it provides for delineation and removal of as much of the mobile off-site tar as practicable, and provides for treatment of contamination that will remain. The remaining residual tar contamination will be more accessible to soil bacteria once the mobile tar has been drained away; the biosparging system will make oxygen available to those bacteria to help digest as much of the contamination as possible. The result should be a smaller dissolved groundwater plume. Alternative GW3 thus provides a greater reduction in mobility, toxicity, and volume, and a higher degree of long-term effectiveness as well. Alternative GW3 involves the long term operation of a biosparge system. The operation and maintenance (O&M) costs of this system account for most of the difference of $939,000 between GW3 and GW2. A monitoring program will be instituted to document the extent to which natural attenuation is reducing groundwater contamination levels. It should be noted, however, that the attenuation of the remaining tar contamination is likely to be a slow process, even with the addition of the biosparging component.

The estimated present worth cost to implement the three components of the remedy (Alternatives SM3, CK4, and GW3) is $11,786,000. The cost to construct the remedy is estimated to be $10,291,500 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is $138,500.

The elements of the selected remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. This will include verification of whether contaminated stream sediments can be removed in conjunction with the main soil excavation, the limits of sediment removal, precise placement of the temporary sheet pile wall, a biosparge pilot study, and the location and number of sparging wells.

2. The existing outbuildings associated with the baseball stadium (rest rooms, concession stand, and locker rooms) will be either moved or demolished.

3. Approximately 26,000 cubic yards of contaminated soil will be removed from the east and west plant areas and shipped off site for treatment and disposal. Soils will be excavated using conventional equipment (backhoes, dump trucks, etc.) and staged on site for evaluation. Any soils which contain visible tar or sheens will be sent off site to a permitted facility for thermal treatment and disposal. In addition, soils which do not contain tar will be tested to determine their PAH content. Soils which contain 500 ppm or more total PAHs will be sent off site for thermal treatment. Soils containing less than 500 ppm total PAHs will be staged and reused as backfill at the bottom of the excavation. Any debris and piping encountered during the excavation will be decontaminated and sent to a permitted solid waste landfill or construction and demolition (C&D) landfill. Liquid tar which is encountered during excavation or removed from wells during dewatering will be segregated from the soils to the extent practicable and transferred to USDOT-approved drums for off-site treatment and disposal.

   The western plant area will be totally surrounded by a temporary steel sheet pile wall, to provide groundwater control and support for the walls of the excavation. Excavation will proceed to the full depth of tar contamination, in most cases to the top of the silt and clay unit at a depth of roughly 20 feet below ground surface.

Any water which accumulates in the excavation will be collected for offsite treatment and disposal, or treated on site prior to discharge to Mill Race Creek. Any such discharge will need to meet the substantive requirements of the State Pollution and Discharge Elimination (SPDES) regulations.

4. All vegetated areas excavated will be covered with a two-foot layer of clean soil and all non-vegetated areas with either concrete or a paving system. Prior to placement of these materials, a geotextile demarcation fabric will be placed to identify the bottom of the clean backfill layer.

5. Excavation of Mill Race Creek sediments will be accomplished "in the dry" by rerouting Mill Race Creek temporarily. Within a sheet pile enclosure, sediments or underlying soils which contain visible tar, produce a sheen when agitated in water, or which contain PAH compounds at levels above upstream background levels will be removed for off site treatment disposal. Contaminated materials will be removed to the full extent of identified contamination, which is currently estimated to be approximately 8.5 feet below the bottom of the stream channel. Excavation will also proceed into the stream bank until it reaches the limits of the MGP excavation.

   Following streambed excavation, the streambed will be restored to its current grade and physical habitat conditions. The bottom of the excavation can be backfilled with the same select fill materials used for backfill at the MGP site. The stream bed itself will be restored using a six inch layer of armoring stones, sized to match existing cobbles in the stream bed, and a layer of fine-grained material placed to fill in between the cobbles. All backfill materials will meet NYSDEC screening criteria for sediment quality.

6. A series of tar collection wells will be drilled in the zones where tar remains in the subsurface outside the MGP excavation. The number and location of these wells will be determined during the remedial design. Each well will be drilled into the top of the silt and clay unit, and equipped with a two-foot sump for passive collection of tar. Tar will be collected on a periodic schedule, which will be adjusted to ensure that the sumps do not overfill.

7. An air injection (biosparging) system will be installed in the area of subsurface tar outside the MGP excavation. Sparging wells will be drilled and connected to a manifold, which in turn will be connected to an air compressor and piping system to allow continuous injection of air below the water table. The effectiveness of this technology will be confirmed by pilot testing, as will the location and number of sparging wells. The operation of the components of the sparging system will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation will be technically impracticable or not feasible.

8. Since the remedy will result in contamination above unrestricted levels remaining at the site, a site management plan (SMP) will be developed and implemented. The SMP will include the institutional controls and engineering controls to: (a) address residual contaminated soils

that may be excavated from the site during future redevelopment. require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations; (b) evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) provide for the operation and maintenance of the components of the remedy; (d) monitor the groundwater, and (e) identify any use restrictions on site development or groundwater use.

9. Imposition of an institutional control in the form of an environmental easement that will: (a) require compliance with the approved site management plan, (b) limit the use and development of the property to recreational uses only; (c) restrict use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Otsego County Department of Health; and, (d) require the property owner to complete and submit to the NYSDEC an Institutional Control/Engineering Control (IC/EC) certification.

10. The SMP will require NYSEG to provide an IC/EC certification, prepared and submitted by a professional engineer or environmental professional acceptable to the NYSDEC annually or for a period to be approved by the NYSDEC, which will certify that the institutional controls and engineering controls put in place are unchanged from the previous certification and that nothing has occurred that will impair the ability of the controls to protect public health or the environment or constitute a violation or failure to comply with any operation an maintenance or soil management plan.

TABLE 1

Nature and Extent of Contamination
Data Collected During the SRI, 2001-2004

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	nd	0.06	none
	Toluene	nd	1.5	none
	Ethylbenzene	nd	5.5	none
	Xylene	nd	1.2	none
Semivolatile Organic Compounds (SVOCs)	total PAHs	2.01	10	none

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	nd-65	0.06	20 of 54
	Toluene	nd-270	1.5	7 of 54
	Ethylbenzene	nd-790	5.5	8 of 54
	Xylene	nd-810	1.2	19 of 54
Semivolatile Organic Compounds (SVOCs)	Total PAHs	nd-14063	500	8 of 54

SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ug/ g oc)[a]	SCG[b] (ug/ g oc)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	nd-880	0.6	2 of 32
Semivolatile Organic Compounds (SVOCs)	total PAH	.01-3782	4	42 of 58

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	nd-4100	0.7	76 of 110
	Toluene	nd-118	5	20 of 110
	Ethylbenzene	nd-2600	5	56 of 110
	Xylene	nd-1300	5	54 of 110
Semivolatile Organic Compounds (SVOCs)	Total PAH	nd-869,000	various	na

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter
ug/g oc= micrograms per gram of organic carbon

nd=none detected

[b] SCG = standards, criteria, and guidance values;

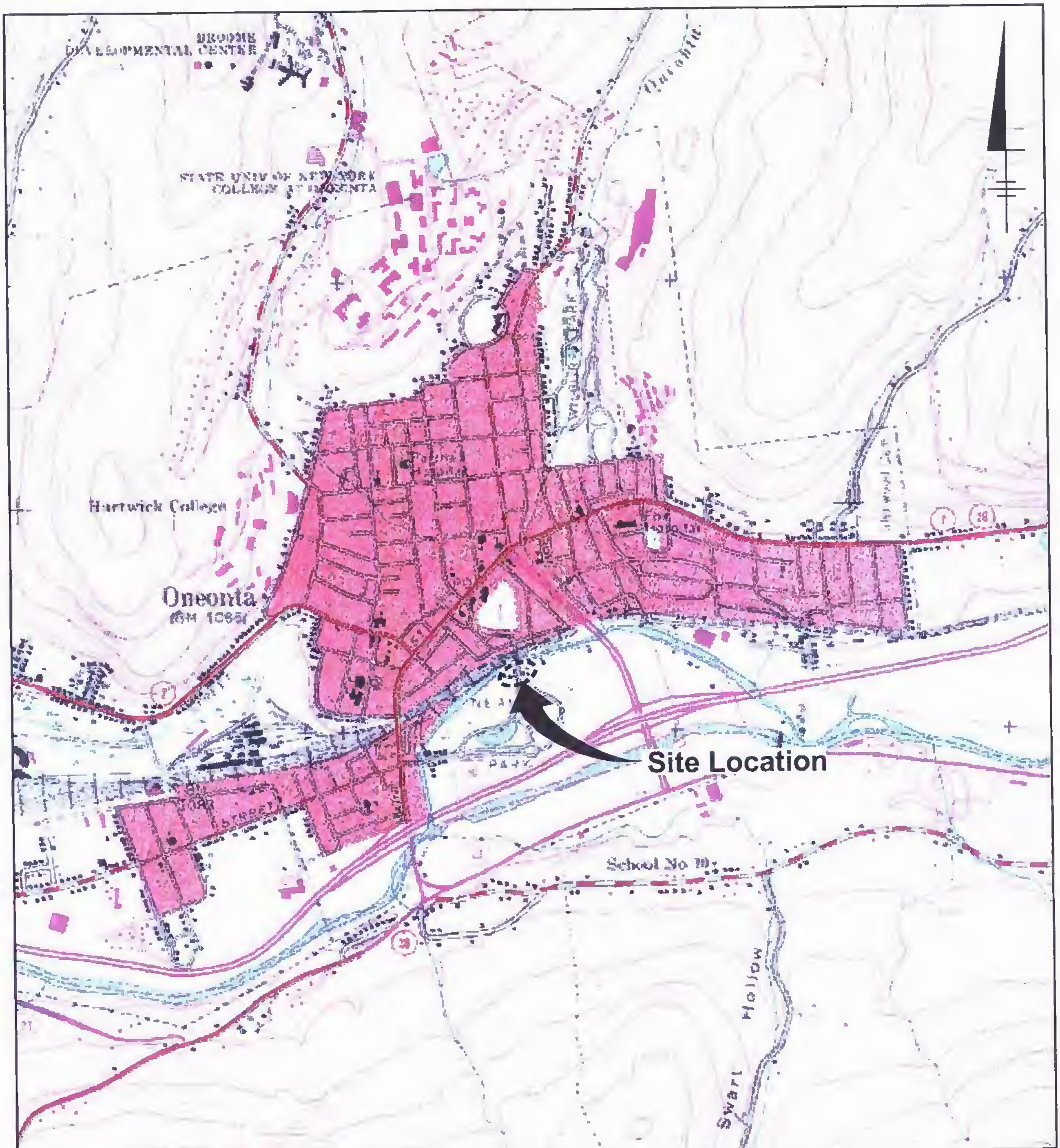
[c] LEL = Lowest Effects Level and SEL = Severe Effects Level. A sediment is considered to be contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the LEL is exceeded, the impact is considered to be moderate.

Table 2
Remedial Alternative Costs

Remedial Alternatives: Source Area	Capital Cost	Annual OM&M	Total Present Worth
SM1: No Action	$65,000	$2,500	$96,000
SM2: Source Material Removal and Asphalt Cover	$3,202,000	$18,500	$3,357,000
SM3: Removal to Total PAH TAGM Levels	$7,955,000	$6,500	$8,036,000
SM4: In-situ Chemical Oxidation	$15,441,000	$6,500	$15,522,000
SM5: In-situ Solidification/ Stabilization	$15,441,000	$6,500	$15,522,000

Remedial Alternatives: Creek Sediments	Capital Cost	Annual OM&M	Total Present Worth
CK1: No Action	$39,000	$2,500	$70,000
CK2: Monitored Natural Attenuation	$91,000	$17,500	$308,000
CK3: Sediment and Soil Removal, Engineered Backfill, Upland Tar Recovery	$776,000	$13,500	$894,000
CK4: Sediment and Subsurface Soil Removal, Upland NAPL Recovery	$1,888,000	$13,500	$2,006,000

Remedial Alternatives: Groundwater	Capital Cost	Annual OM&M	Total Present Worth
GW1: No Action	$65,000	$2,500	$96,000
GW2: Passive Tar Removal and Natural Attenuation	$130,000	$68,500	$805,000
GW3: In-situ Treatment	$448,500	$118,500	$1,744,000



REFERENCE: Base Map USGS 7.5 Min. Quad. Oneonta, New York, 1943, Photorevised in 1982.

2000' 0 2000'

Approximate Scale: 1" = 2000'

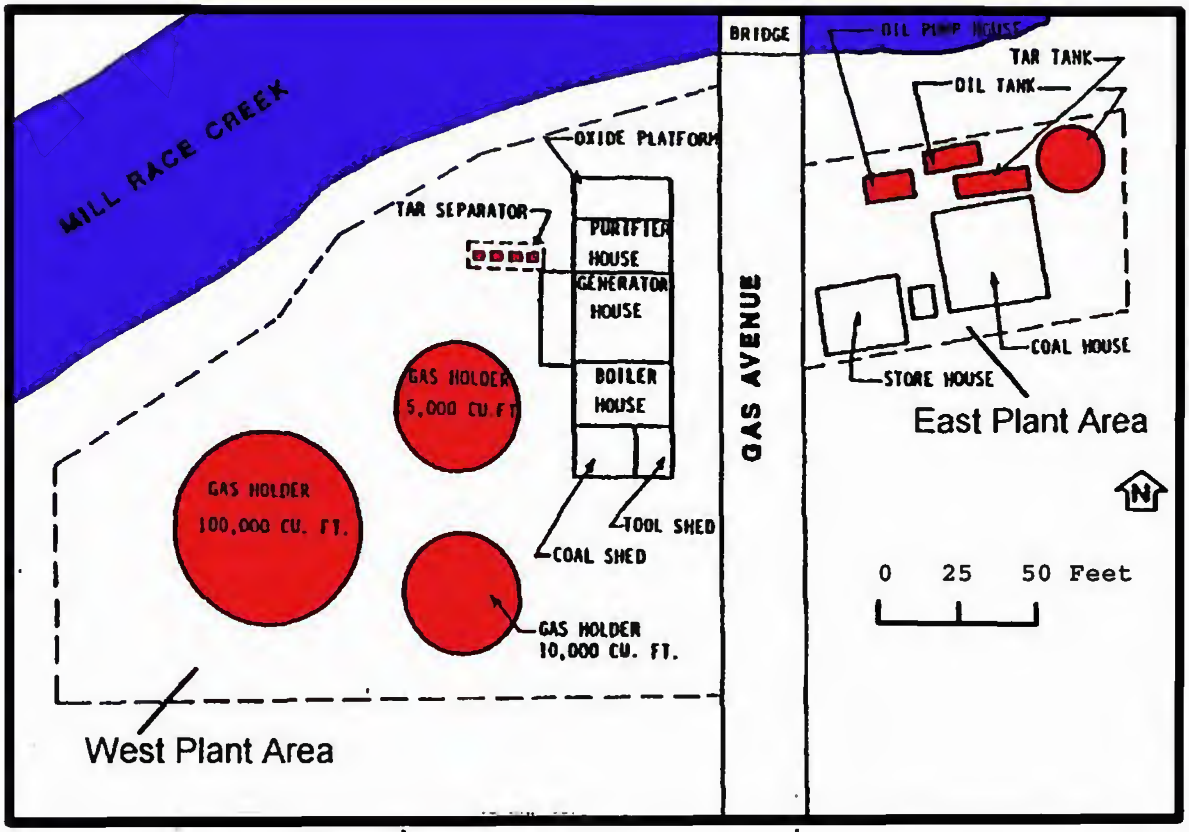
Area Location

NEW YORK STATE ELECTRIC & GAS
ONEONTA MGP SITE

SITE LOCATION MAP

Figure 1

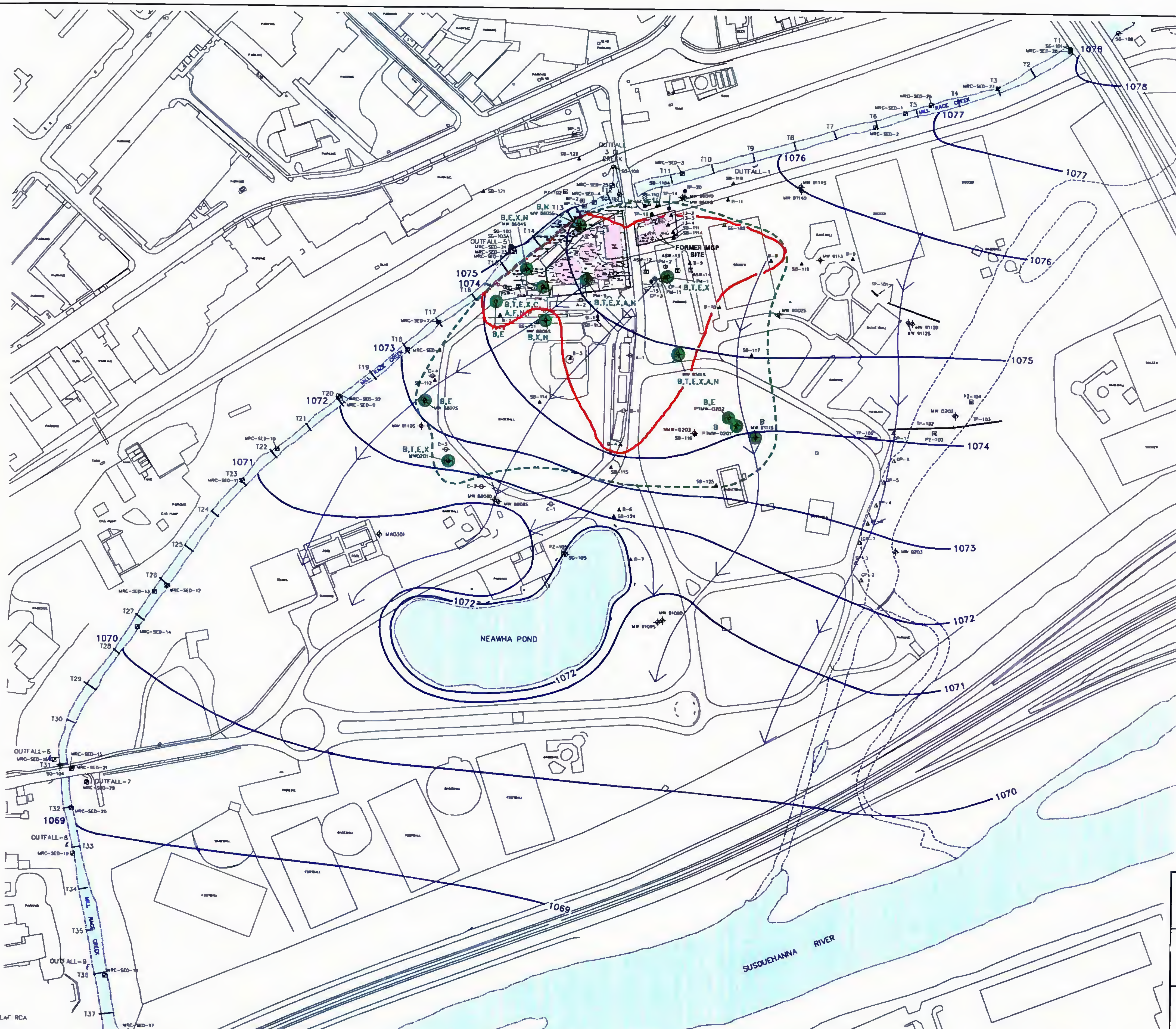
07/08/03 SYR-D85-LBR
13042204/13042n02.cdr



Oneonta MGP Site Layout, Approximately 1920

Likely Tar Sources Shaded In Orange

Figure 2



LEGEND:

- MONITORING WELL
- PERFORMANCE MONITORING WELL
- PIEZOMETER
- SOIL BORING
- GEOPROBE BORING
- UTILITY POLE BORING
- SURFACE SOIL SAMPLE
- TEST PIT
- TEST PIT
- SEDIMENT SAMPLE
- LINE OF CREEK TRANSECT
- COMBINATION POINT
- VAPOR POINT
- AIR SPARGE WELL
- STAFF GAUGE
- FORMER MGP STRUCTURE
- 1073 INFERRED GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW PATHLINE
- B,T,E,X,C MAY 2003 GROUNDWATER SAMPLE CONTAINED ONE OR MORE CONSTITUENTS OF CONCERN (BTEX, PAHs, AND CYANIDE) AT A CONCENTRATION GREATER THAN THE NYSDEC CLASS GA GROUNDWATER STANDARD OR GUIDANCE VALUE (TOGS 1.1.1, JUNE 1998) THE LETTER GIVEN REPRESENTS THE COMPOUND(s) THAT EXCEED THEIR RESPECTIVE STANDARD, AS FOLLOWS:
  - N = NAPHTHALENE
  - A = ACENAPHTHENE
  - F = FLUORANTHEN
  - P = PHENANTHRENE
  - B = BENZENE
  - T = TOLUENE
  - E = ETHYLBENZENE
  - X = XYLENES
  - C = CYANIDE
- INFERRED EXTENT OF SHALLOW GROUNDWATER CONCENTRATIONS ABOVE NYSDEC CLASS GA GROUNDWATER STANDARDS AND GUIDANCE VALUES
- INFERRED EXTENT OF VISIBLE TAR IN SUBSURFACE SOILS

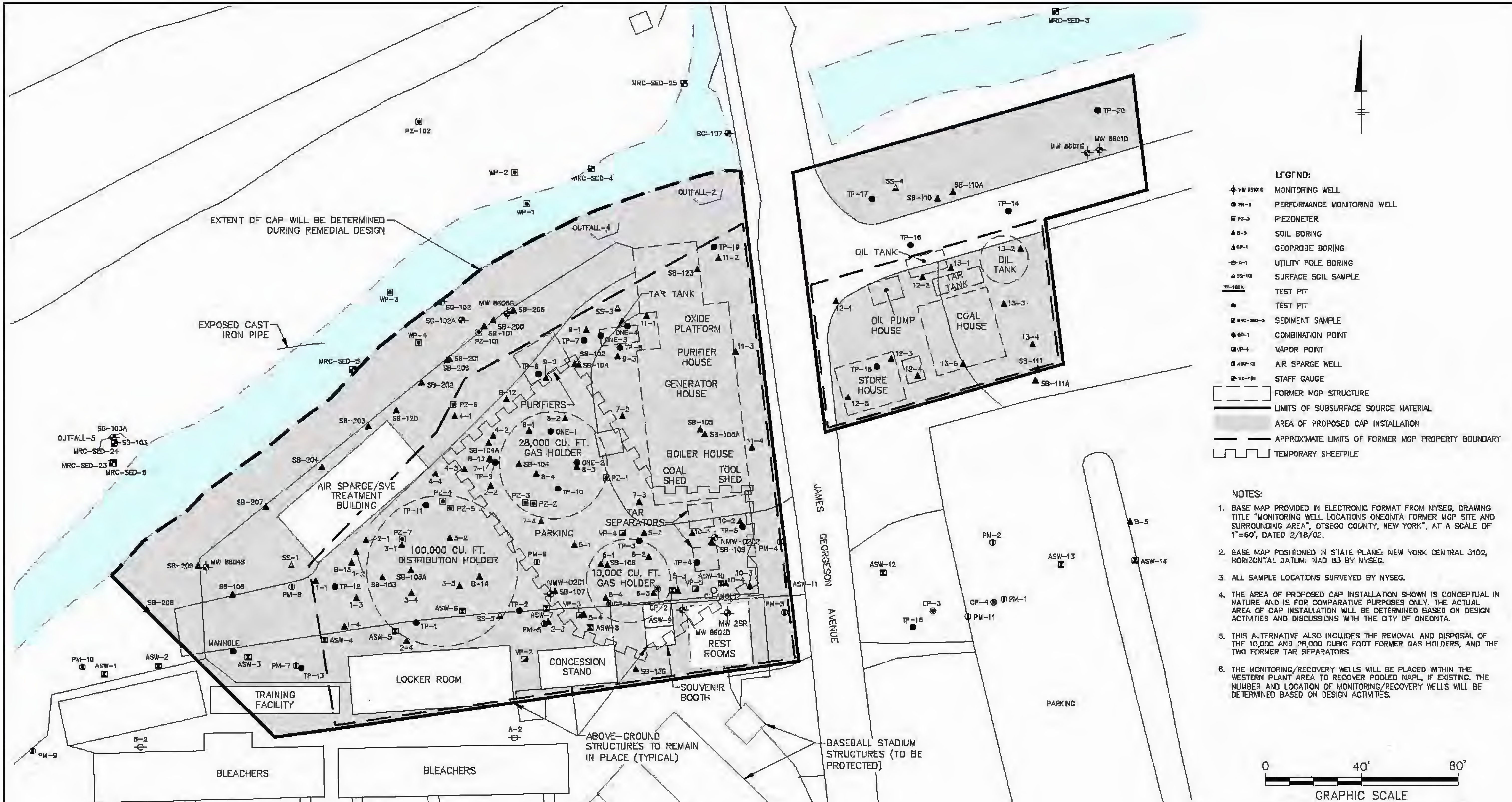
0 120' 240'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC & GAS
ONEONTA MGP SITE

EXTENT OF CONTAMINATION

FIGURE 3

X: 10342X02.DWG
L: ON=*, OFF=REF*
P: PAGESET/PLT-DL
8/21/03 SYR-DIV54-RCB LAF RCA
13042003/13042C03.DWG



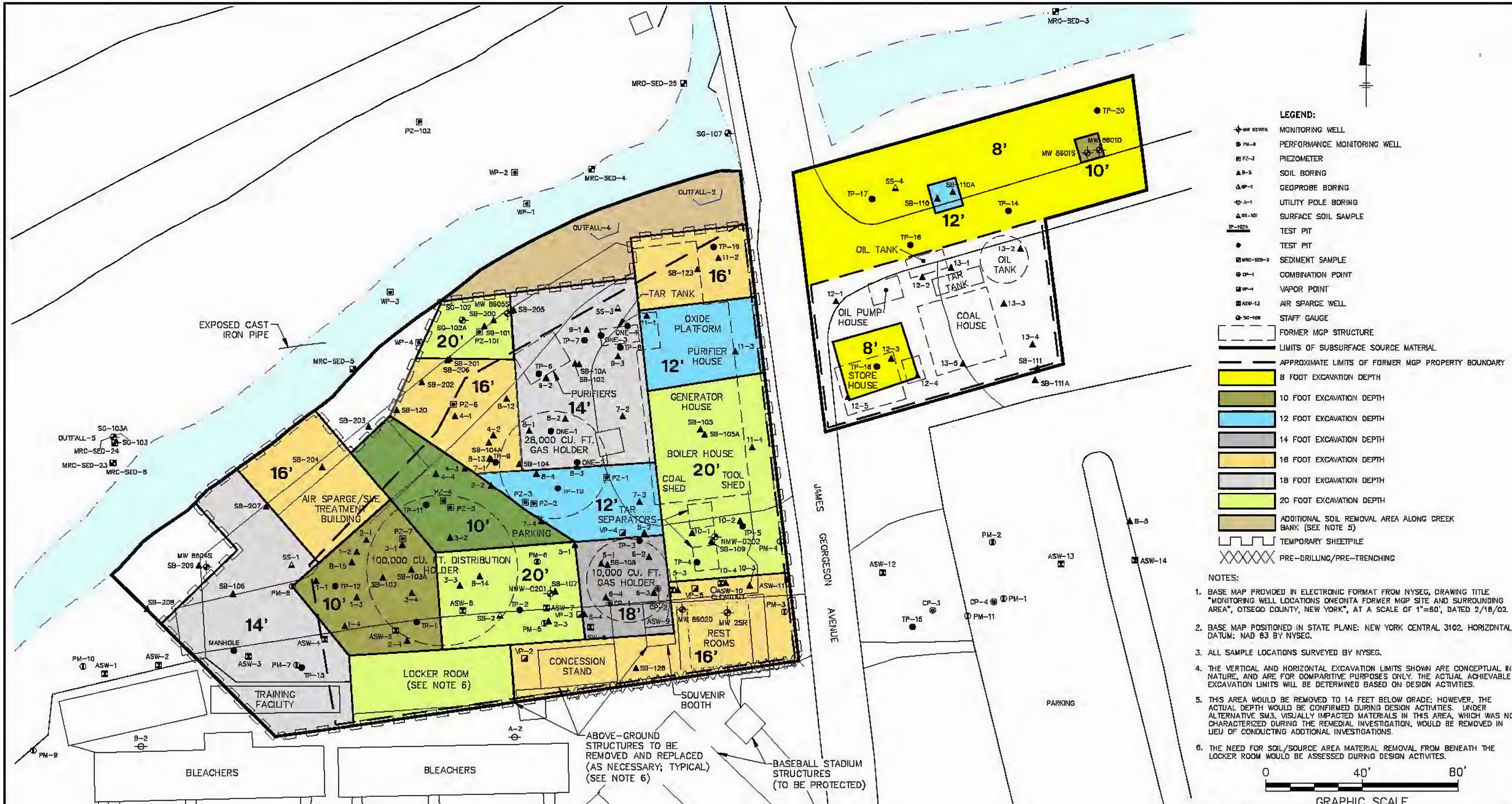
NOTES:

1. BASE MAP PROVIDED IN ELECTRONIC FORMAT FROM NYSEG, DRAWING TITLE "MONITORING WELL LOCATIONS ONEONTA FORMER MGP SITE AND SURROUNDING AREA", OTSEGO COUNTY, NEW YORK", AT A SCALE OF 1"=60', DATED 2/18/02.
2. BASE MAP POSITIONED IN STATE PLANE: NEW YORK CENTRAL 3102, HORIZONTAL DATUM: NAD 83 BY NYSEG.
3. ALL SAMPLE LOCATIONS SURVEYED BY NYSEG.
4. THE AREA OF PROPOSED CAP INSTALLATION SHOWN IS CONCEPTUAL IN NATURE AND IS FOR COMPARATIVE PURPOSES ONLY. THE ACTUAL AREA OF CAP INSTALLATION WILL BE DETERMINED BASED ON DESIGN ACTIVITIES AND DISCUSSIONS WITH THE CITY OF ONEONTA.
5. THIS ALTERNATIVE ALSO INCLUDES THE REMOVAL AND DISPOSAL OF THE 10,000 AND 28,000 CUBIC FOOT FORMER GAS HOLDERS, AND THE TWO FORMER TAR SEPARATORS.
6. THE MONITORING/RECOVERY WELLS WILL BE PLACED WITHIN THE WESTERN PLANT AREA TO RECOVER POOLED NAPL, IF EXISTING. THE NUMBER AND LOCATION OF MONITORING/RECOVERY WELLS WILL BE DETERMINED BASED ON DESIGN ACTIVITIES.

NYSEG
ONEONTA MGP SITE
ONEONTA, NEW YORK

ALTERNATIVE SM 2

FIGURE 4



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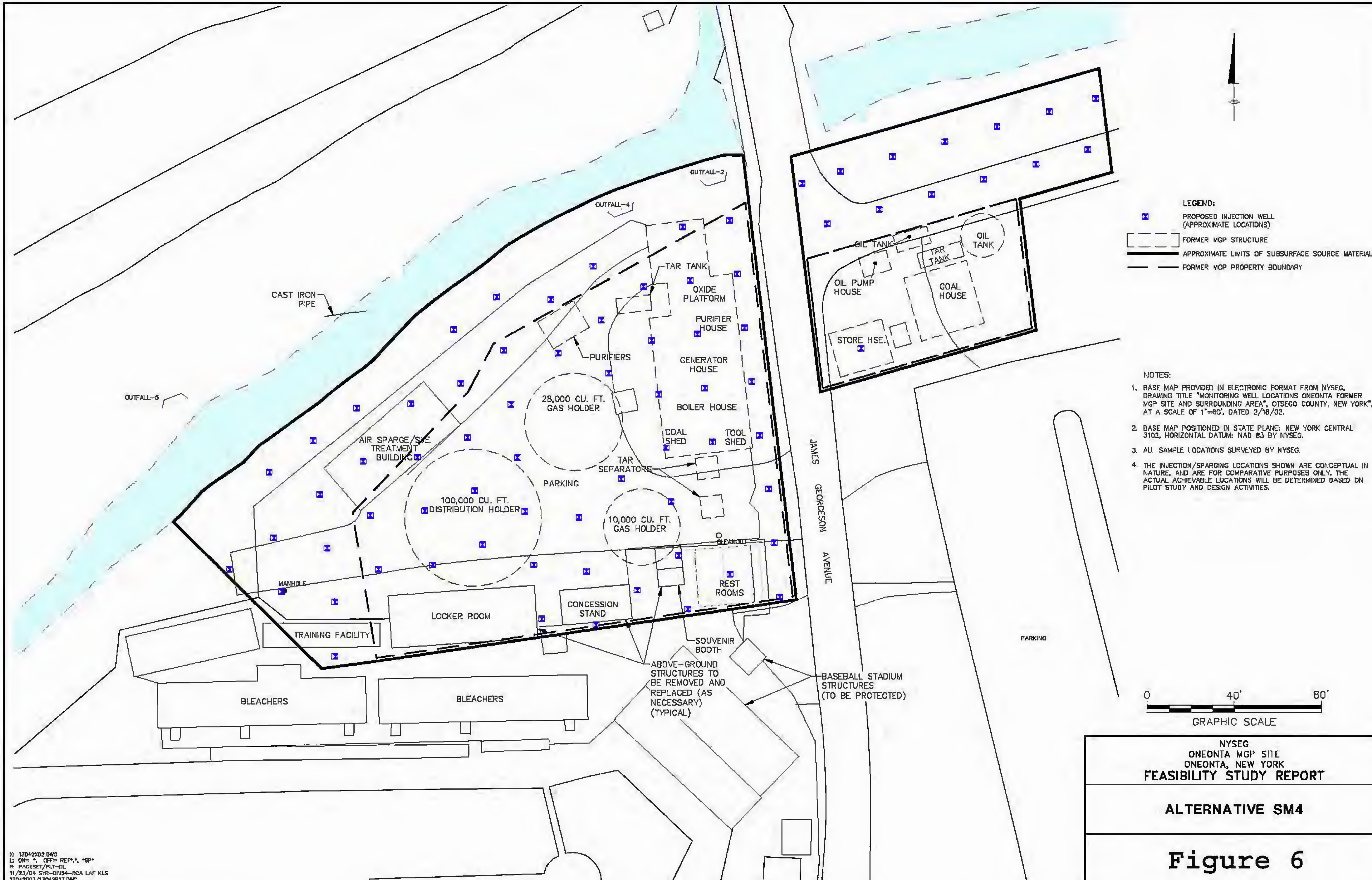
2. BASE MAP POSITIONED IN STATE PLANE: NEW YORK CENTRAL 3102, HORIZONTAL DATUM: NAD 83 BY NYSEG.
3. ALL SAMPLE LOCATIONS SURVEYED BY NYSEG.
4. THE VERTICAL AND HORIZONTAL EXCAVATION LIMITS SHOWN ARE CONCEPTUAL IN NATURE, AND ARE FOR COMPARITIVE PURPOSES ONLY. THE ACTUAL ACHIEVABLE EXCAVATION LIMITS WILL BE DETERMINED BASED ON DESIGN ACTIVITIES.
5. THIS AREA WOULD BE REMOVED TO 14 FEET BELOW GRADE; HOWEVER, THE ACTUAL DEPTH WOULD BE CONFIRMED DURING DESIGN ACTIVITIES. UNDER ALTERNATIVE SM3, VISUALLY IMPACTED MATERIALS IN THIS AREA, WHICH WAS NOT CHARACTERIZED DURING THE REMEDIAL INVESTIGATION, WOULD BE REMOVED IN LIEU OF CONDUCTING ADDITIONAL INVESTIGATIONS.
6. THE NEED FOR SOIL/SOURCE AREA MATERIAL REMOVAL FROM BENEATH THE LOCKER ROOM WOULD BE ASSESSED DURING DESIGN ACTIVITIES.

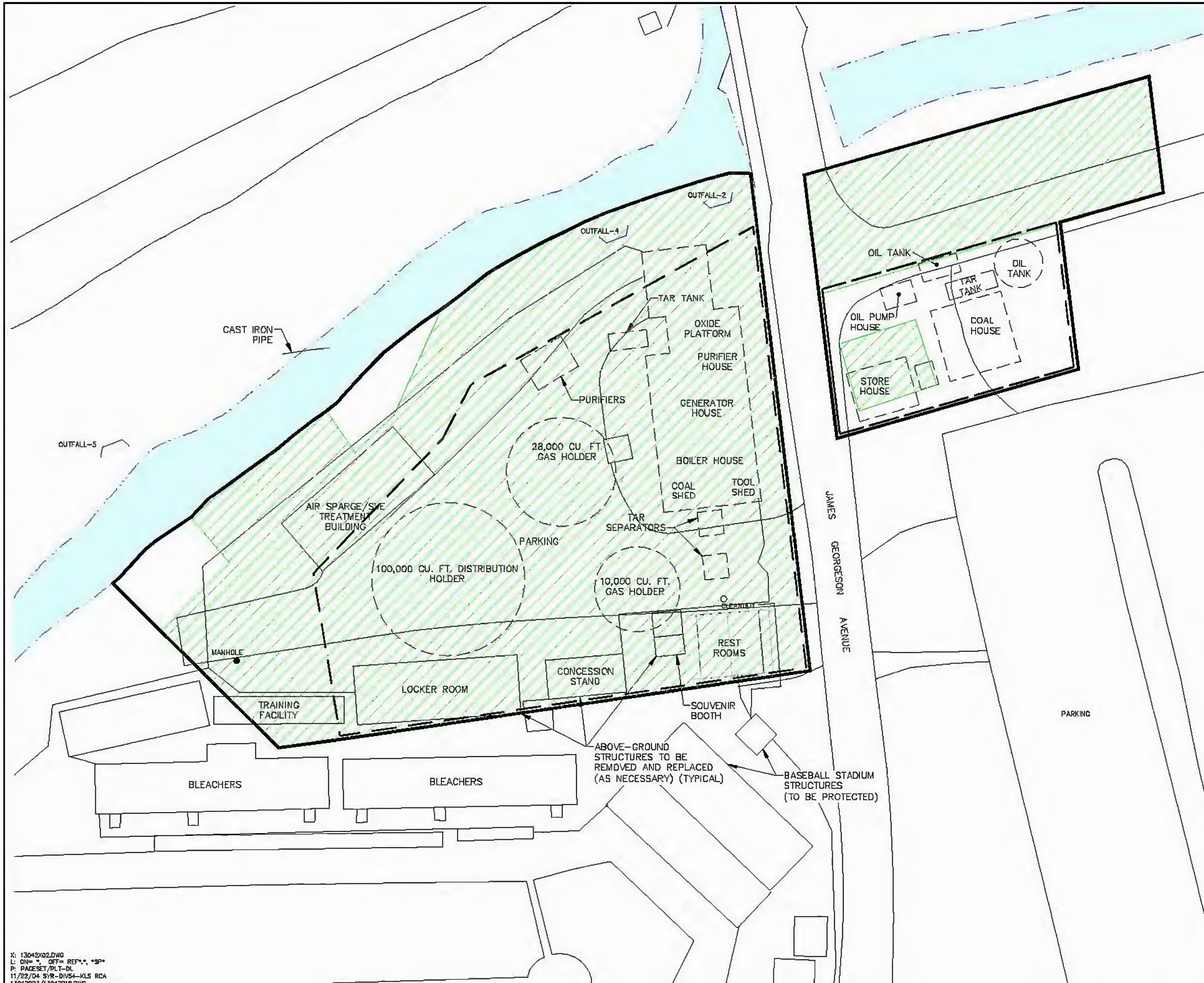
NYSEG
ONEONTA MGP SITE
ONEONTA, NEW YORK

ALTERNATIVE SM3

Figure 5



CAST IRON PIPE
OUTFALL-5
OUTFALL-4
OUTFALL-2
TAR TANK
OXIDE PLATFORM
PURIFIER HOUSE
PURIFIERS
GENERATOR HOUSE
BOILER HOUSE
COAL SHED
TOOL SHED
28,000 CU. FT. GAS HOLDER
AIR SPARGE/SVE TREATMENT BUILDING
100,000 CU. FT. DISTRIBUTION HOLDER
PARKING
TAR SEPARATORS
10,000 CU. FT. GAS HOLDER
CLEANOUT
MANHOLE
LOCKER ROOM
CONCESSION STAND
REST ROOMS
TRAINING FACILITY
SOUVENIR BOOTH
ABOVE-GROUND STRUCTURES TO BE REMOVED AND REPLACED (AS NECESSARY) (TYPICAL)
BASEBALL STADIUM STRUCTURES (TO BE PROTECTED)
BLEACHERS
BLEACHERS
JAMES GEORGESON AVENUE
OIL TANK
TAR TANK
OIL TANK
OIL PUMP HOUSE
COAL HOUSE
STORE HSE.
PARKING
LEGEND:
PROPOSED INJECTION WELL (APPROXIMATE LOCATIONS)
FORMER MGP STRUCTURE
APPROXIMATE LIMITS OF SUBSURFACE SOURCE MATERIAL
FORMER MGP PROPERTY BOUNDARY
NOTES:
1. BASE MAP PROVIDED IN ELECTRONIC FORMAT FROM NYSEG. DRAWING TITLE "MONITORING WELL LOCATIONS ONEONTA FORMER MGP SITE AND SURROUNDING AREA", OTSEGO COUNTY, NEW YORK", AT A SCALE OF 1"=60'. DATED 2/18/02.
2. BASE MAP POSITIONED IN STATE PLANE: NEW YORK CENTRAL 3102, HORIZONTAL DATUM: NAD 83 BY NYSEG.
3. ALL SAMPLE LOCATIONS SURVEYED BY NYSEG.
4. THE INJECTION/SPARGING LOCATIONS SHOWN ARE CONCEPTUAL IN NATURE, AND ARE FOR COMPARATIVE PURPOSES ONLY. THE ACTUAL ACHIEVABLE LOCATIONS WILL BE DETERMINED BASED ON PILOT STUDY AND DESIGN ACTIVITIES.
0
40'
80'
GRAPHIC SCALE
NYSEG
ONEONTA MGP SITE
ONEONTA, NEW YORK
FEASIBILITY STUDY REPORT
ALTERNATIVE SM4
Figure 6



LEGEND:

- FORMER MGP STRUCTURE
- LIMITS OF SUBSURFACE SOURCE MATERIAL
- APPROXIMATE LIMITS OF FORMER MGP PROPERTY BOUNDARY
- PROPOSED LOCATION OF SURFACE SOIL EXCAVATION AND SUBSURFACE SOIL IN-SITU SOLIDIFICATION/STABILIZATON

NOTES:

1. BASE MAP PROVIDED IN ELECTRONIC FORMAT FROM NYSEG, DRAWING TITLE "MONITORING WELL LOCATIONS ONEONTA FORMER MGP SITE AND SURROUNDING AREA", OTSEGO COUNTY, NEW YORK", AT A SCALE OF 1"=60', DATED 2/18/02.
2. BASE MAP POSITIONED IN STATE PLANE: NEW YORK CENTRAL 3102, HORIZONTAL DATUM: NAD 83 BY NYSEG.
3. ALL SAMPLE LOCATIONS SURVEYED BY NYSEG.
4. THE IN-SITU SOLIDIFICATION/STABILIZATION LIMITS SHOWN ARE CONCEPTUAL IN NATURE, AND ARE FOR COMPARTIVE PURPOSES ONLY. THE ACTUAL N-SITU STABILIZATION LIMITS WILL BE DETERMINED BASED ON DESIGN ACTIVITIES.

0 40' 80'

GRAPHIC SCALE

NYSEG
ONEONTA MGP SITE
ONEONTA, NEW YORK

ALTERNATIVE SM5

Figure 7

NYSEG
ONEONTA MGP SITE
ONEONTA, NEW YORK

ALTERNATIVE CK3

Figure 8

11/22/04 SYR-85 EAB
NYSEG 13042006
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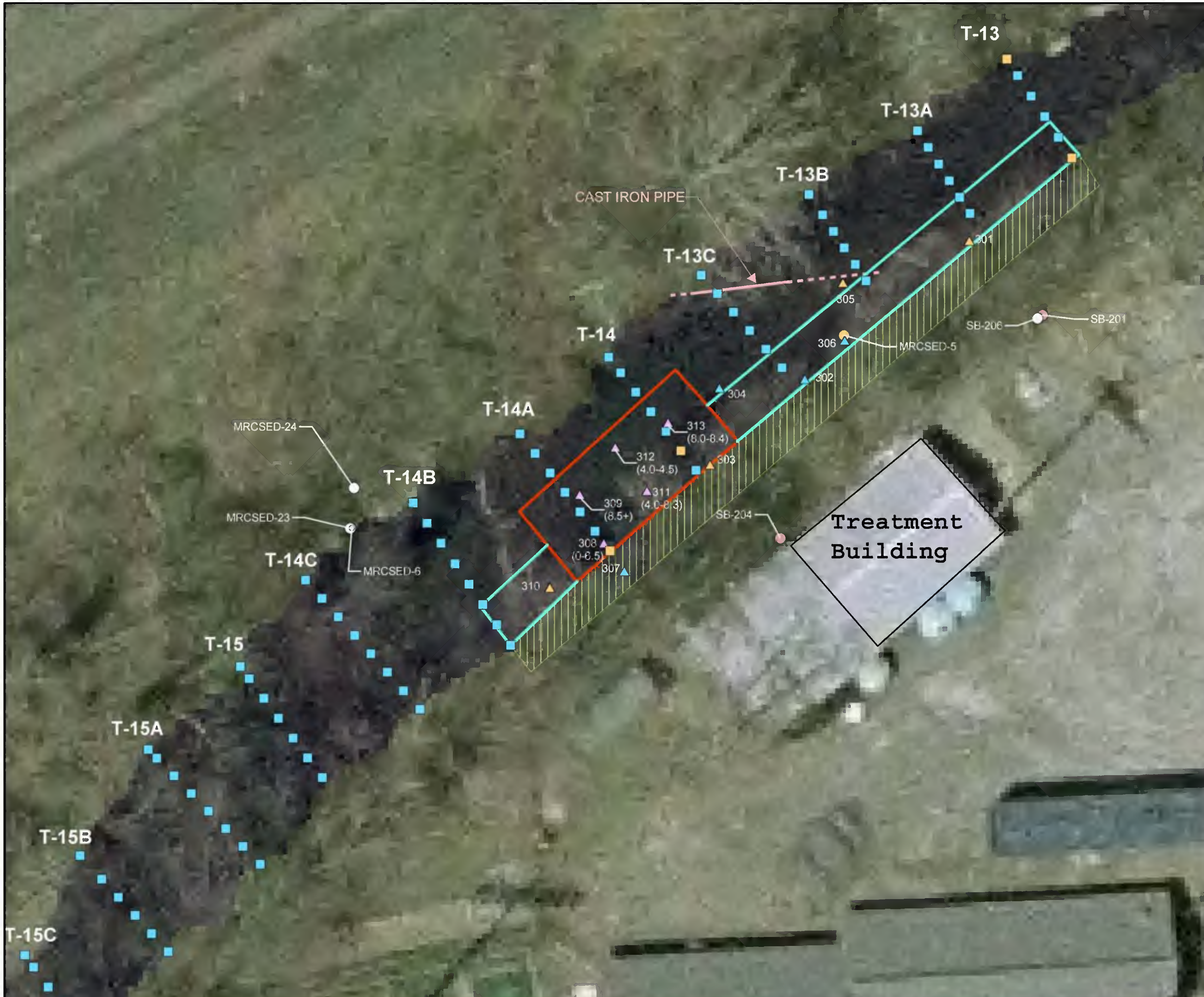


LEGEND:

SAMPLE LOCATIONS
- NONE
- NAPL
- ORGANIC ODOR
- PRODUCT ODOR
- SHEEN*

PROBE POINTS
- NO SHEEN
- SHEEN*

300 SERIES BORINGS
- 312 (4.0-4.5) BORING (NAPL, NO SHEEN) (NAPL DEPTH INTERVAL, IN FEET)
- 310 BORING (SHEEN*, NO NAPL)

- 2.5' REMOVAL/ENGINEERED BACKFILL AREA
- 8.5' REMOVAL/ENGINEERED BACKFILL AREA
- APPROXIMATE LOCATION OF VERTICAL ENGINEERED BARRIER/COLLECTION SYSTEM AREA

NOTE:

*SHEEN OBSERVED WITHIN 0-4FT DEPTH BELOW SEDIMENT BED.

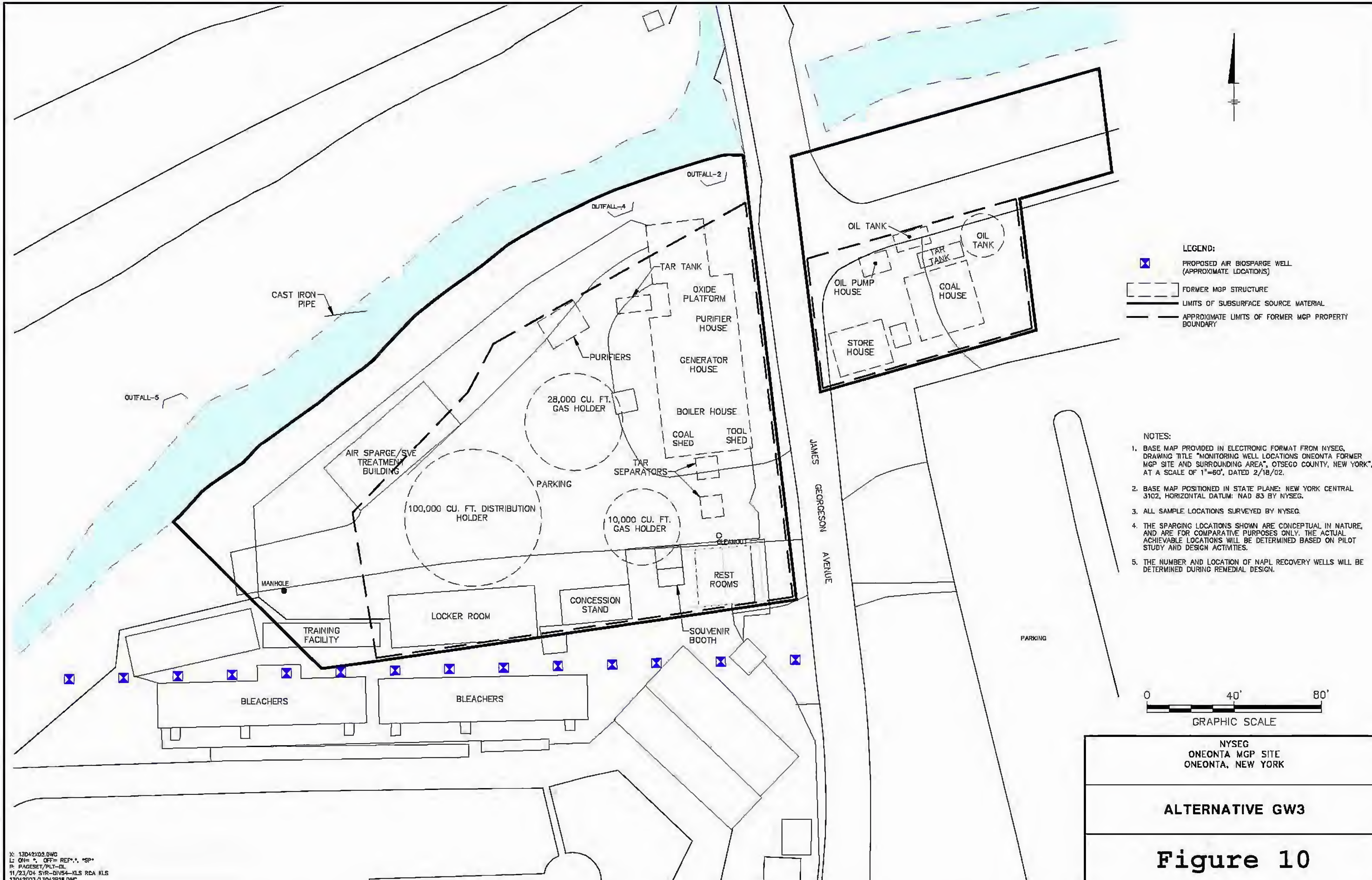
0 20 40 Feet

NYSEG
ONEONTA MGP SITE
ONEONTA, NEW YORK

ALTERNATIVE CK4

Figure 9

11/22/04 SYR-85 EAB
NYSEG 13042006
Q:\NYSEG_ONEONTA\mxd\Figure_Alt4.mxd



NYSEG
ONEONTA MGP SITE
ONEONTA, NEW YORK

ALTERNATIVE GW3

Figure 10


N
W
E
S
Legend
Sparge Points
Land Excavation Area
Deep Sediment Excavation(8.5')
Shallow Sediment Excavation(4')
NYSEG Oneonta MGP Site
Figure 11
Selected Remedy

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

NYSEG Oneonta MGP
City of Oneonta, Otsego County, New York
Site No. 4-39-001

The Proposed Remedial Action Plan (PRAP) for the NYSEG Oneonta MGP site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 27, 2005. The PRAP outlined the remedial measures proposed for the contaminated soils, sediments, and groundwater at the NYSEG Oneonta MGP site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on March 10, 2005, which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 30, 2005.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received at the public meeting, along with the NYSDEC's responses:

COMMENT 1: Will you have to dig under James Georgeson Avenue?

RESPONSE 1: We don't plan on that, because we don't think there's very much contamination there. That will be verified during the remedial design, when we determine the excavation limits in greater detail.

COMMENT 2: Is it correct that the proposed remediation is not expected to achieve the New York State groundwater quality standards?

RESPONSE 2: That is correct. A thin layer of MGP tar will be left in place at depth under Damaschke Field, and groundwater that comes into contact with that tar will continue to become contaminated. The proposed biosparging system will help minimize the impact of that contamination, but we do not expect it to be totally effective in destroying the tar that remains.

COMMENT 3: Do you have an alternative goal?

RESPONSE 3: We have not established an alternative goal for groundwater. Instead, the selected remedy is a combination of alternatives that includes removing as much contaminant source material (tar) as practicable, and taking measures to reduce the impact and limit human exposures to what remains.

COMMENT 4: Would this property be usable for residential purposes after remediation?

RESPONSE 4: This remediation is not proposed to reach a cleanup level that would be appropriate for unrestricted residential use.

COMMENT 5: Will there be an environmental easement for the park area?

RESPONSE 5: The ROD calls for an environmental easement for the MGP site itself, but does not call for one on off-site properties such as the surrounding city park land. There will be a site management plan, which will specify the steps necessary to excavate on the site and in surrounding areas, and what steps must be taken with contaminated soil which may be excavated. Further, the tar-impacted soil being left behind is generally 15-20 feet below ground surface. Therefore, it should not be encountered during routine excavation work.

COMMENT 6: Will the site be returned to the same state it is currently in?

RESPONSE 6: After the excavation is complete, the site will be restored to its current elevation. There will be a geotextile demarcation layer installed to mark the bottom of the clean backfill materials. The finished ground surface will be consistent with the City of Oneonta's current master plan for Damaschke Field, which shows this as a parking area for the field, which is an acceptable use. Areas that are to be covered with lawn or vegetation get a thicker cover of clean soil than paved areas. In vegetated areas, we require a minimum of two feet of clean soil instead of one, to provide for possible future tree planting and landscaping work.

COMMENT 7: Is there any plan to provide a more impervious surface, to prevent rainwater from infiltrating?

RESPONSE 7: The ROD does not call for an impermeable barrier, because site conditions are such that it would not provide any additional groundwater protection. The soil that is put back in the excavation will be in contact with groundwater no matter what is done at the surface. Even if rainwater infiltration were totally eliminated, groundwater would still come from Mill Race Creek and flow through the remaining contaminated soil.

COMMENT 8: How do you plan to avoid compromising the integrity of the grandstand? You're proposing to dig very close to there.

RESPONSE 8: The outbuildings along the right field line (concession stand, souvenir booth, and rest rooms) will probably have to be removed, since there is heavy contamination beneath them. The fate of the locker room, farther down the line, is still uncertain. It may be possible to keep that structure.

Preventing damage to the grandstand is an important consideration during the remedial design. There are a number of measures that can be taken to minimize possible damage during the driving of the sheet piling, including pre-trenching and the use of vibratory systems for advancing the sheeting instead of pounding it into the ground. It is anticipated that the excavation will stay about ten feet away from the grandstand.

COMMENT 9: What impact will this have on the baseball season?

RESPONSE 9: The remediation will be conducted so as to not disrupt the baseball season. The exact schedule is still somewhat uncertain, but NYSEG has proposed a schedule which would include conducting the excavation of the eastern plant area during the fall/winter of 2005-2006 while utility relocation and remedial design work continues on the western plant area. The western plant area excavation would be performed after the 2006 season.

COMMENT 10: My family and I have noticed distinct chemical odors near the children's playground. Are these related to the site?

RESPONSE 10: There is no waste exposed at the surface currently, so it is doubtful that any odors you noticed originated at the MGP site. We have drilled several borings and excavated some test trenches in that area, and have not observed any MGP related contamination.

Thomas Clough of the New York State Department of Transportation submitted a letter, dated March 9, 2005, which included the following comments:

COMMENT 11: I urge that the contaminated soil from the site should be shipped out by rail (in covered gondolas) instead of by truck. There is an appropriate loading site on River Street, close to the project area. This would allow the use of smaller trucks, keeping large tractor trailers out of the local traffic mix and reducing congestion.

RESPONSE 11: Rail transportation is sometimes used for soil removals, but a number of factors limit its applicability. First, the soil is to be sent for thermal treatment, at a permitted facility. There are only a limited number of such treatment facilities available, and relatively few of them have rail sidings. Guaranteeing a stable, dependable supply of cars is an ongoing problem in the rail industry. The delay occasioned by NYSEG waiting for cars to be provided for loading would be unacceptable.

New York State Electric and Gas Corporation (NYSEG) submitted a letter dated March 22, 2005 which included the following comments:

COMMENT 12: The actual location of the sheet piling on the western plant area, and therefore the limits of excavation, will be based on the pre-design investigation (PDI). Therefore, the actual limits of excavation may vary from those shown on Figure 5. There are two sanitary sewer trunk lines which pass through the western plant area and one will likely need to be re-routed prior to installation of the sheet piling and remedial excavation.

RESPONSE 12: NYSDEC accepts that the detailed location of the sheet piling will be determined during the PDI, and that this investigation may result in adjusting the wall's location. We are aware of the sanitary sewer lines; one will clearly need to be moved, and the need to move the other will be determined during the PDI as well.

COMMENT 13: The actual depths of excavation in each sub-area will be determined in the field during implementation of the remedial action based on visual and olfactory inspection of visible NAPL [tar] in the soils. The definition of visible NAPL must be more clearly defined so that lesser impacted soils (sheens, stains, etc.) will not be unnecessarily removed.

RESPONSE 13: Much of the determination of actual excavation depths will be made in the field. Once the excavation is open, a much clearer picture of the distribution of tar is possible. However, if the excavation bottom appears to be clean but deep borings indicate that additional tar is present at depth, then the excavation will proceed to sufficient depths to reach the known tar. The definition of visible tar is meant to include soils which contain visible droplets or stringers of tar. It is not meant to include soils which are only stained, or soils which have a sheen on the surface (unless further inspection indicates the sheen is being generated from visible tar.)

COMMENT 14: NYSEG contends that non-NAPL bearing soils below 8 feet should not necessarily be removed if the total PAH concentration is greater than 500 ppm since the site is not being cleaned up for unrestricted use.

RESPONSE 14: The selected remedy is intended to remove soils above 500 ppm PAH to the extent practicable. This takes into account the restricted future use. If the site were to be remediated for unrestricted use, the 500 ppm PAH criterion would be lowered.

COMMENT 15: When the creek remediation is combined with Alternative SM3 for the western plant area, the engineered barrier/tar collection system should not be required. The remedy for the plant area would remove tar-impacted soils from the site and thus eliminate the potential for tar migration into the creek.

RESPONSE 15: NYSDEC agrees with this conclusion. The source removal on the western plant area will remove the need for tar collection along the bank of the creek. The ROD has been revised to more clearly reflect this.

COMMENT 16: The description of the tar collection wells in the PRAP suggests that special well designs could be required if the wells were installed withing the baseball playing surface. It is not anticipated that the PDI activities will extend onto the baseball playing field, nor will recovery wells be installed within the playing surface.

RESPONSE 16: The ROD has been revised to remove reference to tar collection wells on the playing surface. This area represents the outer fringe of the tar plume. Given the logistical difficulties of siting wells here and the lower likelihood of successful tar collection, NYSDEC will not require wells to be installed in this area.

COMMENT 17: An air sparge system (AS/SVE) interim remedial measure was conducted at the site from 1997 through 2001. An evaluation of the groundwater monitoring data collected during that period indicated that dissolved BTEX was not noticeably affected at wells located at the perimeter of the dissolved plume. The AS/SVE system injected more oxygen than would be injected by the proposed low flow biosparge system, so the effectiveness of the proposed pilot-scale biosparge system on the dissolved BTEX plume is expected to be very limited.

RESPONSE 17: NYSDEC has reviewed the groundwater data from the period when the original SVE system was operational, and accepts that the effect of the system on the dissolved phase plume was marginal. However, there are some important differences between the original system and the one called for in the ROD. The original system was installed through the middle of the most grossly contaminated area, through material that will be removed by excavation. Thus, it is quite possible that the original system was simply overwhelmed by the sheer volume of contaminated material present. The system called for in the ROD will be installed outside the limits of the excavation, in an area where the amount of contamination should be considerably less. With much of the contaminant mass removed by excavation and the new sparging system concentrated on the fringe of the tar plume, the prospects for reducing the size of the BTEX groundwater plume are more encouraging.

COMMENT 18: The primary remedial objective for the biosparge system is unclear. Is it intended to limit tar mobility or to diminish the dissolved BTEX plume?

RESPONSE 18: The biosparge system is intended primarily as a “polishing step” to further reduce dissolved phase BTEX contamination following the excavation and removal of most of the contaminant mass. Although there is no evidence that the BTEX plume represents a threat to the existing Catella Park wells, the groundwater beneath the entire park represents a valuable natural resource that could be used for an expanded water supply in the future. By encouraging bacterial consumption of BTEX compounds, the system will help limit the area of BTEX contamination which limits the use of this resource.

The mobility of the remaining tar may also be reduced, since the lighter weight constituents of the tar are more likely to be digested by the bacteria first.

COMMENT 19: Assessing the mobility of tar is very difficult, and there are no well established methods to measure the reduction of tar mobility which could result from the operation of the biosparge system.

RESPONSE 19: Visual inspection of soil samples from the tar-impacted area will provide some qualitative evidence of effectiveness. However, since the reduction of tar mobility is a secondary consideration, no measures are being proposed to determine this reduction.

COMMENT 20: NYSEG suggests that the layout of the biosparge system, or even the technology for the groundwater remedy, may change during the remedial design, and the ROD should be written to allow for this flexibility.

RESPONSE 20: The layout of the biosparge system is already noted as being subject to change during remedial design. If NYSEG proposes a more effective technology for achieving these objectives, NYSDEC will consider it.

APPENDIX B

Administrative Record

Administrative Record

NYSEG Oneonta MGP
Site No. 4-39-001

1. Proposed Remedial Action Plan for the NYSEG Oneonta MGP site, dated February 2005, prepared by the NYSDEC.

2. Order on Consent, Index No. DO-002-9309, between NYSDEC and New York State Electric and Gas Co., executed in March, 1994.

3. "Supplemental Remedial Investigation Work Plan, Oneonta Former MGP Site", October, 2002 prepared by BBL.

4. "Supplemental Remedial Investigation Report, Oneonta Former MGP Site" May 2004, prepared by BBL

5. Several earlier reports are included in the Supplemental Remedial Investigation by reference, and can be found as attachments to the Supplemental Remedial Investigation Report.

6. "Feasibility Study Report, Oneonta Former MGP Site", November 2004, prepared by BBL

7. "As-Built Report For The Air Sparge/SVE Treatment System, New York State Electric and Gas Corporation Oneonta MGP Site, Oneonta, NY", December 4, 1996, prepared by GT Engineering

8. Fact Sheet announcing availability of the PRAP, February, 2005