# PROPOSED REMEDIAL ACTION PLAN
# NM Rome – Kingsley Avenue – Rome MGP
# Former Manufactured Gas Plant Site
# Operable Unit No. 2

**Rome (C), Oneida County, New York**
**Site No. 633043**

February 2009

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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### SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for former manufactured gas plant (MGP) Operable Unit 2 (OU2) of the Niagara Mohawk – Kingsley Avenue – Rome MGP Site. OU2 consists of a limited area of the shore of the Mohawk River, an off site area extending beneath the Mohawk River and the western bank of the Mohawk River to East Whitesboro Street. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, operation of the former manufactured gas plant has resulted in the disposal of hazardous wastes including: polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and dense nonaqueous phase liquid (DNAPL). These wastes have contaminated the groundwater and soil at the site, and have resulted in:

- a significant environmental threat associated with the impacts of contaminants to the groundwater of the State of New York.

To eliminate or mitigate these threats, the Department proposes DNAPL recovery with off-site disposal and a groundwater monitoring program that will be used to monitor the decline of dissolved MGP contamination. The proposed 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.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the "October 2000, Off-Site Remedial Investigation

Report", the "February 2008, Feasibility Study for the Rome (Kingsley Avenue) Site, Operable Unit No. 2" (FS), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Jervis Public Library
613 North Washington
Rome, NY 13440
(315)336-4570
Mon – Th 9:30 – 8:30
Fri - 9:30 – 5:30
Sat - 9:30 – 5:00

New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233
(800) 520-2334
By Appointment Mon through Fri 8:30 – 4:00
Contact: Charles Post, Project Manager

The Department seeks input from the community on all PRAPs. A public comment period has been set from February 27, 2009 to March 29, 2009 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 16, 2009 at the Rome City Hall – Common Council Room beginning at 7:00 PM.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Post at the above address through March 29, 2009.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

## SECTION 2: SITE LOCATION AND DESCRIPTION

The Niagara Mohawk Kingsley Avenue Site is located in the City of Rome, Oneida County, New York. The site is located south of East Dominick Street, bordering a commercial and residential district, about 2,000 feet north of the confluence of the Mohawk River with the New York State Barge Canal. It is bounded by the Genesee and Mohawk Valley Railroad to the north and the Mohawk River to the west. East Whitesboro Street terminates near the southern boundary of the site. The City of Rome Department of Public Works facility is located to the east. Residential properties are present near the site entrance on Kingsley Avenue. A site location map depicting the site boundaries is provided as Figure 1.

Manufactured gas plant operations formerly covered the northern half of the site. National Grid currently operates a natural gas regulator station on the northern parcel. The southern portion of the site is the location of two National Grid electric substations and a service building.

Operable Unit (OU) No. 2, which is the subject of this document, consists of an approximately 2-acre area between the National Grid property and the eastern shore of the Mohawk River. Additionally, OU2 includes the area beneath the Mohawk River and property west of the Mohawk to East Whitesboro Street. OU2 encompasses approximately 20 acres of land.

An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. The other operable unit of the site is OU1, which was the subject of a Record of Decision (ROD) was signed on March 27, 2002. OU1 includes the lands owned by National Grid, which is the former MGP site and a small contiguous area of undeveloped NYS owned land along the Mohawk River including sediment in a backwater area west of the site. The OU1 remedial design was approved in August 2006 and construction began in August 2007. These remedial activities are being performed under a three-year phased construction schedule. Phase 1 included the relocation of utilities, excavation of three small area of contamination, and the construction of access roads for future work. Phase 2 included the excavation of the major source areas. Construction of Phases 1 and 2 are now complete. Phase 3 construction will include the installation of the sheet-pile containment wall and is scheduled to begin 2009.

The primary surface water feature in the area is the Mohawk River, which discharges into the Barge Canal approximately 0.3 miles downstream (toward the south). The groundwater flow direction in both the watertable (near surface) and deep (within the overburden above the clay) is toward the south-southwest. Therefore, the groundwater flows from OU1 beyond the Mohawk River toward East Whitesboro Street.

## SECTION 3: SITE HISTORY

### 3.1: Operational/Disposal History

A manufactured gas plant (MGP) was a facility where gas for lighting and heating homes and businesses was produced. Gas production at the Kinglsey Avenue MGP began in 1917 and peaked in 1927. By 1930 production of gas at the Kingsley Avenue site was limited to emergency capacity, as the supply of gas for the City of Rome came from other MGPs. Between 1938 and 1941 the retort house and relief holder were decommissioned, and by 1949 gas manufacturing equipment had been removed from the central building. In 1959 the main gas holder was dismantled. The central building was demolished in 1994 as part of the concentrator house IRM.

Manufactured gas was produced at the site using the coal carbonization and water gas processes. Coal carbonization produced coal gas by heating coal in retorts or beehive ovens. The water gas process involved the passage of steam through burning coal. This formed a gaseous mixture that was passed through a superheater into which an oil feed stock was sprayed. In each process, the gas produced was condensed and purified prior to distribution.

The production of manufactured gas created many by-products, some of which remain on site. A dense, oily liquid known as MGP tar would condense out of the gas at various stages during its production, purification and distribution. Although much of the tar produced was reused, recovery of the tar waste was incomplete. Substantial amounts of tar leaked from storage and processing facilities, contaminating surface and subsurface soils as well as groundwater. Another by-product, purifier waste, was the discarded lime and/or wood chips treated with iron oxides to remove cyanide and sulfur from the gas. Purifier waste was often discarded on the site of a gas plant or used as a fill material.

### 3.2: Remedial History

In 1997, the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. 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.

The following is a chronology of the remedial history of the site and includes information for both OU1 and OU2:
1987 USEPA Preliminary Assessment
1992 Preliminary Site Assessment/ Interim Remedial Measures Work Plan (PSA/IRM)
May 1994 Concentrator House IRM
July 1994 Start of Remedial Investigation
Jan. 1995 Purifier Disposal Area IRM
July 1998 LNAPL Removal IRM initiated
Mar. 1999 Remedial Investigation Report
Dec. 2001 Off-site Remedial Investigation Report complete
Jan. 2002 Operable Unit 1 Feasibility Study complete
Mar. 2002 Record of Decision for OU1
Mar. 2006 Remedial Design for OU1 was completed
Aug 2006 Remedial Design for OU1 was approved
Feb. 2006 Feasibility Study for OU2 submitted

## 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.

The PRP for the site, documented to date, include National Grid, a successor company to Niagara Mohawk Power Corporation (NMPC). NMPC entered into a multi-site agreement with the Department on December 7, 1992 where NMPC agreed to remediate several sites including the Kingley Avenue site. The Department and the NMPC entered into a Consent Order on November 7, 2003. The Order obligates the responsible party to implement a full remedial program.

## SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and/or the environment.

### 5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between July 1994 and August 2008 by environmental consultants retained by NMPC and National Grid. The objective of the remedial investigation was to generate sufficient data to delineate the horizontal and vertical limits of the hazardous substances at the site and determine the potential public health and environmental impacts as a consequence of those substances.

To determine the extent of contamination, the remedial investigation utilized knowledge of the gas manufacturing process and historic plans to target probable areas of the site where MGP wastes could have been generated, disposed, or released. Additionally, the findings of the OU1 remedial investigation were used to determine likely migration routes of contamination through all media. From those plans and findings, areas east and west of the Mohawk River were tested for the presence of MGP wastes.

The remedial investigation consisted of several tasks to investigate the soil, groundwater, and soil vapors. The soil sampling involved advancing soil borings and collecting soil samples. Groundwater monitoring wells were installed in the completed soil borings. Groundwater samples were collected from these wells and analyzed for contaminants of concern. Additionally, soil vapor sampling points were driven into the ground and soil gas samples were collected for analysis. All of the collected samples were analyzed by a certified laboratory. The results of these field investigations were evaluated and compiled into reports.

During the review of the February 2006 Feasibility Study, the Department directed National Grid to perform additional soil vapor and groundwater sampling to confirm the subsurface conditions. Soil vapor and groundwater sampling analytical results collected in August and December 2007 confirmed the subsurface conditions. The remedial investigation of Operable Unit 2 was completed in August 2008.

The field activities and findings of the investigation are described in the RI report.

### 5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil vapor, soil, and/or groundwater 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 the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the Department's Cleanup Objectives ("Technical and Administrative Guidance Memorandum [TAGM] 4046) and 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives.

- Concentrations of VOCs in air were evaluated using the air guidelines provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006.

Based on the RI 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 in Section 5.1.2. More complete information can be found in the RI report.

### 5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI report, many soil, groundwater, and soil vapor samples were collected to characterize the nature and extent of contamination. As seen in Figures 3, 4 and 5, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). The VOCs of concern are benzene, toluene, ethylbenzene and xylene. These compounds are referred to as BTEX in this document, and are common components of MGP tar. Of these compounds, benzene, which is a known human carcinogen, is the most significant. SVOCs of concern are primarily a group of chemicals commonly referred to as polycyclic aromatic hydrocarbons (PAHs). Total PAH (TPAHs) concentrations referred to in this plan are the sum of the individual PAHs.

For comparison purposes, where applicable, SCGs are noted on the figures for each medium. Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for waste, soil, soil, and sediment. Air samples are reported in micrograms per cubic meter ($\mu g/m^3$).

Figures 3, 4, and 5 summarize the degree of contamination for the contaminants of concern in soil, groundwater, and soil vapor 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 Material

Waste material in the form of MGP tar (DNAPL) was identified east of the river at three locations within OU2. Each occurrence of tar was observed at depth below the water table (as deep as 38 feet below the ground surface (bgs)). As shown on Figure 3, MGP tar was observed in groundwater monitoring wells and at a soil boring location The tar was found more than 16-feet bgs. A trace amount of DNAPL accumulated in the monitoring well sump at GP-34. DNAPL was observed in monitoring wells from 2000 to 2004 at thickness ranging from a trace to 0.48 feet.

Waste identified during the RI/FS will be addressed in the remedy selection process.

### Surface Soil

No site-related surface soil contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface soil.

### Subsurface Soil

Subsurface soil samples were collected at locations east and west of the Mohawk River during drilling activities. MGP tar was visually observed in the samples and were considered to be contaminated without further analysis. Laboratory samples were also evaluated for benzene, toluene, ethybenzene, and xylenes (collectively referred to as BTEX) and PAHs. Sample results indicated soil BTEX concentrations ranging from 0.02 to 6.16 ppm. Sample results indicated PAH concentrations ranging from below detection limits to 6.1 ppm. Figure 3 depicts the location and concentrations of the soil sample results.

Subsurface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

### Groundwater

Several groundwater sampling events were performed, in which groundwater samples were collected from wells installed in the overburden soil. Groundwater is shallow on the east side of the river (less than three feet below the surface) and deeper on the west side of the river. The analytical results indicated for the most recent round of samples are shown on Figure 4. Since 1997 the benzene concentration reported in monitoring well MW-25 has declined from 2,500 ppb to 93 ppb. Similarly, the benzene concentration reported in MW-26 has generally declined (from 10,000 ppb in 1997 to <2.0 ppb in 2008). In general, the sample results indicate that the contaminant concentrations are diminishing with time and with distance from OU1.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

**Surface Water**

No site-related surface water contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface water.

**Sediments**

No site-related sediment contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for sediment.

**Soil Vapor/Sub-Slab Vapor/Air**

A soil vapor study was conducted on the west side of the river adjacent to three residences. The soil vapor sampling point locations are depicted on Figure 5. The analytical results indicted that relatively low-level VOC concentrations were detected including the gasoline additive methyl tertiary butyl ether (MTBE). The presence of MTBE indicates that a portion of the contamination is related to gasoline. Based on the analytical data, MGP-related contaminants are not expected to impact indoor air quality at the nearby residences. These laboratory analytical results indicate that the concentrations were not occurring at levels requiring further action.

No site-related soil vapor contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for this medium.

## 5.2: <u>Interim Remedial Measures</u>

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.

There were no IRMs performed on OU2 of this site during the RI/FS.

## 5.3: <u>Summary of Human Exposure Pathways</u>:

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 Section 4.0 of the "Offsite Remedial Investigation Report" (October 2000). This report can be found in the document repository. 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.

Public drinking water is supplied to the area so exposures via drinking water are not expected. No accessible soil contamination was detected off-site; therefore exposures related to soil are unlikely. An evaluation of the vapor intrusion pathway on the site perimeter indicates that soil vapor contamination is also not an exposure issue.

### 5.4: Summary of Environmental Assessment

This section summarizes the assessment of 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 following environmental exposure pathways and ecological risks have been identified:

Samples from the Mohawk River were collected as part of the OU1 RI. The laboratory results did not indicate any impacts from the site. Therefore a viable exposure pathway to fish and wildlife receptors is not present. These findings were addressed by the ROD for OU1.

Site contamination has impacted the groundwater resource in the overburden soils. This groundwater is not a source of drinking water and current data supports that these levels are declining.

## 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. 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 operable unit are to eliminate or reduce to the extent practicable:

- MGP contaminants in the soil and groundwater around the site (OU2);
- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and
- the release of contaminants from soils and groundwater into the Mohawk River through DNAPL flow and groundwater movement.

- the release of contaminants from subsurface soil and groundwater into the environment.

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

- ambient groundwater quality standards

## 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 NM – Kingsley Avenue – Rome MGP Site (Operable Unit 2) were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would 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 would 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 soils and groundwater at the site.

**Alternative 1: No Action**

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.

**Alternative 2: DNAPL Collection and Offsite Disposal with Groundwater Monitoring**

Present Worth: ....................................................................$1,713,000
Capital Cost: ....................................................................$373,000
Annual Costs:
(Years 1-30): ....................................................................$108,000

Alternative 2 would involve establishing a network of new NAPL recovery wells to facilitate DNAPL collection. An estimated eight, 4-inch diameter recovery wells would be installed along the eastern shore of the Mohawk River. Each well would be constructed so that the well screen would be within the zone where

DNAPL is expected. DNAPL observed in the wells would be removed by manual bailing, with a peristaltic pump, or some similar extraction method. Any DNAPL that would be recovered would be collected and transported off-site to a permitted facility for disposal, treatment or reuse.

Wells where no DNAPL was observed would be included in the groundwater monitoring program. The work plan would include a groundwater sampling program for the first year that is sufficient to establish baseline conditions. The findings of the baseline sampling events would be used to develop a long-term monitoring plan. The groundwater sampling events would be designed to confirm whether subsurface conditions favor the natural aerobic degradation of contamination, thereby reducing the contaminant mass load. During each sampling event each well would also be inspected for the presence of DNAPL.

**Alternative 3: Enhanced Aerobic Biodegradation, DNAPL Collection and Offsite Disposal and Groundwater Monitoring**

Present Worth: ....................................................................................................................$2,500,000
Capital Cost: ......................................................................................................................$1,084,000
Annual Costs:
(Years 1-30): .........................................................................................................................$114,000

Alternative 3 would involve enhancing the natural aerobic degradation of contaminants by introducing chemicals into the groundwater, monitoring the degradation of contaminants, DNAPL collection from recovery wells, and the offsite treatment and disposal of the recovered DNAPL.

This alternative would be similar to Alternative 2 with the addition the enhanced aerobic biodegradation. In-situ aerobic biodegradation would be enhanced using chemical additives such as slow-release oxygen compounds and/or nutrients to stimulate natural microbial activity. The additives would be introduced into the subsurface to increase oxygen levels in the groundwater, thereby optimizing the conditions for microbial growth. This increased microbial growth would accelerate the degradation of the contaminants. The oxygen releasing chemicals would be injected into the subsurface through wells or trenches.

DNAPL observed in the wells would be removed by manual bailing, with a peristaltic pump, or some similar extraction method. Any NAPL that would be recovered would be collected and transported off-site to a permitted facility for disposal, treatment or reuse.

Wells where no DNAPL was observed would be included in the groundwater monitoring program. The work plan would include a groundwater sampling program for the first year that is sufficient to establish baseline conditions. The findings of the baseline sampling events would be used to develop a long-term monitoring plan. The groundwater sampling events would be designed to confirm whether subsurface conditions favor the natural aerobic degradation of contamination, thereby reducing the contaminant mass load. During each sampling event each well would also be inspected for the presence of DNAPL.

**Alternative 4: In-Situ Chemical Oxidation, DNAPL Collection and Offsite Disposal and Groundwater Monitoring**

Present Worth: ....................................................................................................................$4,090,000
Capital Cost: ......................................................................................................................$1,782,000

Annual Costs:
(Years 1-3): ....................................................................................................$466,000
(Years 4-30): ..................................................................................................$114,000

In this alternative, oxidizing chemicals would be injected into the ground to break down contamination. This degradation would be achieved using chemical agents such as hydrogen peroxide or permanganate to reduce the contaminants to non-toxic byproducts. The additives would be injected by the use of wells to bring the oxidizer into contact with contaminants resulting in a chemical reaction. The majority of VOCs and SVOCs would be destroyed through chemical oxidation, and residual contaminant concentrations outside the treatment zone would be reduced by natural aerobic degradation. Pilot testing would be necessary to determine the proper dose and frequency of chemical injections.

DNAPL observed in the wells would be removed using manual bailing, a peristaltic pump, or some similar extraction method. Any DNAPL that would be recovered would be collected and transported off-site to a permitted facility.

Wells where no DNAPL was observed would be included in the groundwater monitoring program. The work plan would include a groundwater sampling program for the first year that is sufficient to establish baseline conditions. The findings of the baseline sampling events would be used to develop a long-term monitoring plan. During the groundwater sampling events the wells would be sampled to confirm that the chemical oxidation is effective, and that subsurface conditions favor the natural aerobic degradation of contamination, thereby reducing the contaminant mass load. During each sampling event wells would also be inspected for the presence of DNAPL.

## 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. 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 Department 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 annual 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 1.

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 are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

## SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 2, DNAPL Collection and Offsite Disposal with Groundwater Monitoring as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. Alternative 2 is proposed since, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing the DNAPL in the subsurface that creates the most significant threat to the environment. The proposed remedy would further reduce the limited amount of DNAPL that is the source of MGP contamination to groundwater, and would create the conditions needed to restore groundwater quality to the extent practicable. Alternative 2 would involve monitoring the groundwater to confirm that contamination would be further reduced over time.

This proposed remedy takes into account the ongoing remediation of OU1, which had been the primary source of contamination to the off-site area. The March 2002 Record of Decision for OU1is currently being implemented, and is expected to be completed in 2009, which will eliminate further migration of contaminants from the source area to the off-site area.

Groundwater monitoring would be performed in conjunction with the monitoring program for OU1. If the results of the monitoring program indicate that the groundwater contaminant concentrations in the off-site area are not being reduced, and/or MGP-related contaminants in the groundwater are further migrating, then National Grid would be required to evaluate additional remedial measures subject to Department approval. The site management plan, institutional controls, and engineering controls to be developed for OU2 will be incorporated into the site management plan for OU1.

Alternative 1 (No Further Action) would not produce results that are physically different from the current conditions and would not address the DNAPL that has been identified in the soil on the eastern bank of the Mohawk River. The presence of uncontrolled DNAPL would continue uncontrolled into the future. Therefore, Alternative 1 is rejected as a potential remedy for OU2 because it would not meet the threshold criteria of protecting of human health and the environment and would not achieve SCGs for groundwater.

Because Alternatives 2, 3, and 4 would satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternative 2 (DNAPL recovery and groundwater monitoring), Alternative 3 (DNAPL recovery and enhanced bioremediation), and Alternative 4 (DNAPL recovery and chemical oxidation) would all have short-term impacts which would require control. The time needed to achieve the remediation goals would be longest for Alternative 2 with similar time frames for Alternatives 3 and 4. Alternative 2 would have the fewest short-term impacts, which would be associated with monitoring and recovery well installations. Alternatives 3 and 4 would involve additional drilling and handling of chemicals, which would result in a longer period of on-site activity and any associated short term impacts. Alternative 4 could temporarily increase the mobility of contaminants as the result of oxidant coming in contact with DNAPL and mobilizing it, which has occurred at other sites. This would necessitate additional measures to control DNAPL that would be limited by the presence of the river.

The Department expects that Alternative 2 would effectively reduce the level of contaminants in groundwater in the long term by removing DNAPL from the subsurface and allowing natural processes to further degrade contaminants. Alternatives 3 and 4 would provide a somewhat higher level of long-term effectiveness by introducing chemicals into the subsurface to accelerate the degradation processes.

Each of the three alternatives would be implementable using standard construction methods. DNAPL recovery and monitoring (Alternative 2) would be the most readily implementable. Alternatives 3 and 4 would have site-related engineering limitations that could affect their implementability. The presence of the river next to the area where chemicals would be applied would create difficulties in designing and monitoring the chemical injections. Chemical reactions within the subsurface must be monitored downgradient within close proximity to the application area. Since the application area would be immediately adjacent to the river, the nearest monitoring point would be to the west of the river. The effect of the river itself on groundwater flow would also complicate the chemical injection design.

Alternatives 2, 3 and 4 would permanently reduce the volume and mobility of contamination. Each of these alternatives would remove mobile DNAPL from the site for treatment and disposal offsite. Alternative 2 would rely on natural processes to further degrade contaminants, while alternatives 3 and 4 would reduce the volume of contaminants by chemical treatment or biological enhancement.

The cost of the alternatives would vary significantly. DNAPL collection and monitoring (Alternative 2) would be less expensive than chemical additives (Alternatives 3 and 4). Alternative 2 would be favorable because it is a permanent remedy that would eliminate most of a continuing source of groundwater contamination at the site in a cost-effective approach. The cost estimates for Alternatives 3 and 4 would be somewhat uncertain because multiple applications of chemical additives may be required to achieve the remedial goals.

The estimated present worth cost to implement the remedy is $ 1,713,000. The cost to construct the remedy is estimated to be $373,000 and the estimated average annual costs for 30 years is $108,000.

The elements of the proposed remedy are as follows:

A. Remedial Actions

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

2. The installation of approximately eight 4-inch recovery wells between the eastern edge of the Mohawk River and OU1. Periodic DNAPL recovery would be performed by manual bailing, peristaltic pump, or similar method from each well observed to have a recoverable quantity of DNAPL.

B. Institutional Controls

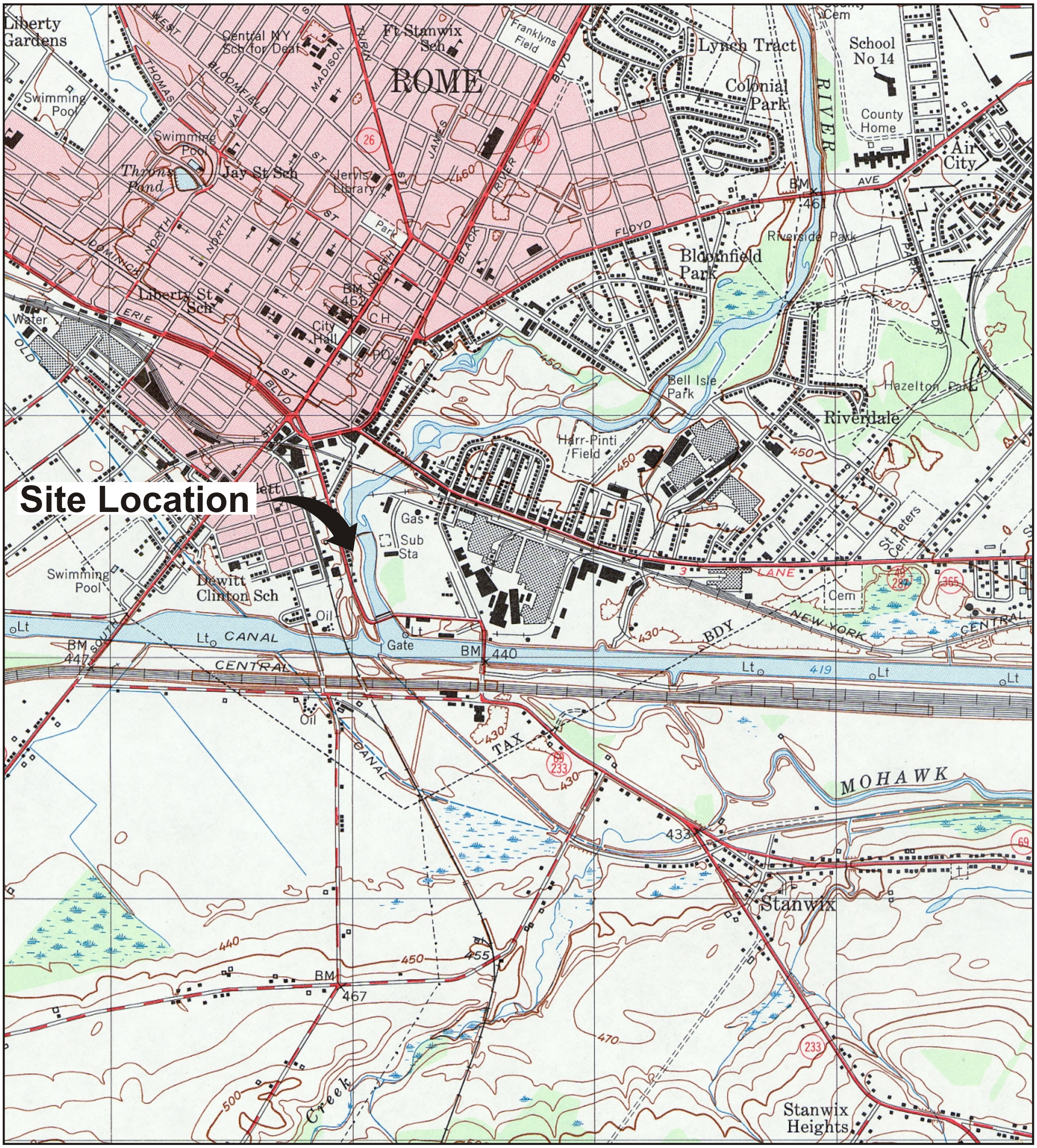
1. Development of a site management plan which would include the following institutional and engineering controls: (a) monitoring of groundwater; (b) restrictions on future soil excavations on the eastern shore of the Mohawk River; (c) extraction of DNAPL; and (d) provisions for the continued proper operation and maintenance of the components of the remedy.

2. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

3. The site management plan, institutional controls, and engineering controls (IC/EC) would be coordinated with the controls for OU1.

## Table 1
## Remedial Alternative Costs

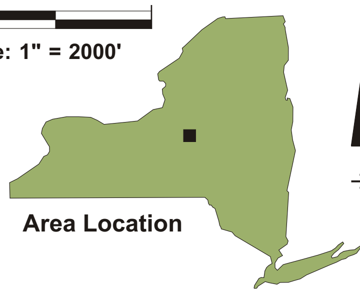
| Remedial Alternative | Capital Cost ($) | Annual Costs ($) | Total Present Worth ($) |
|---|---|---|---|
| Alternative 1<br>No Action | $0 | $0 | $0 |
| Alternative 2<br>Monitored Natural Attenuation with Passive DNAPL Collection and Offsite Treatment and Disposal | $373,000 | $108,000 | $1,713,000 |
| Alternative 3<br>In-Situ Enhance Aerobic Biodegradation (Chemical Additives), Monitored Natural Attenuation, Passive DNAPL Collection with Offsite DNAPL Treatment and Disposal | $1,084,000 | $114,000 | $2,500,000 |
| Alternative 4<br>In-Situ Chemical Oxidation, Monitored Natural Attenuation, Passive DNAPL Collection with Offsite DNAPL Treatment and Disposal | $1,782,000 | Year 1-3<br>$466,000<br>Years 4-30<br>$114,000 | $4,090,000 |




**REFERENCE:** Base Map Source: USGS 7.5 Min. Topo. Quad., Rome, NY.

2000' 0 2000'

**Approximate Scale: 1" = 2000'**



**Area Location**

NATIONAL GRID
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ROME, NEW YORK
**OU-2 FEASIBILITY STUDY REPORT**

## SITE LOCATION MAP

ARCADIS

FIGURE
**1**

01/23/09 SYRACUSE, NY-ENV/CAD-DJH, KLS
B0036642/0000/00100/CDR/36642N01.CDR

01/23/09 SYRACUSE, NY-ENV/CAD-DJH, KLS
B0036642/0000/00100/CDR/36642G01.CDR


**REFERENCE:** Base Figure Source: Parsons Engineering Science, Inc., Figure 1.3 of Final RI Report, March 9, 1999.

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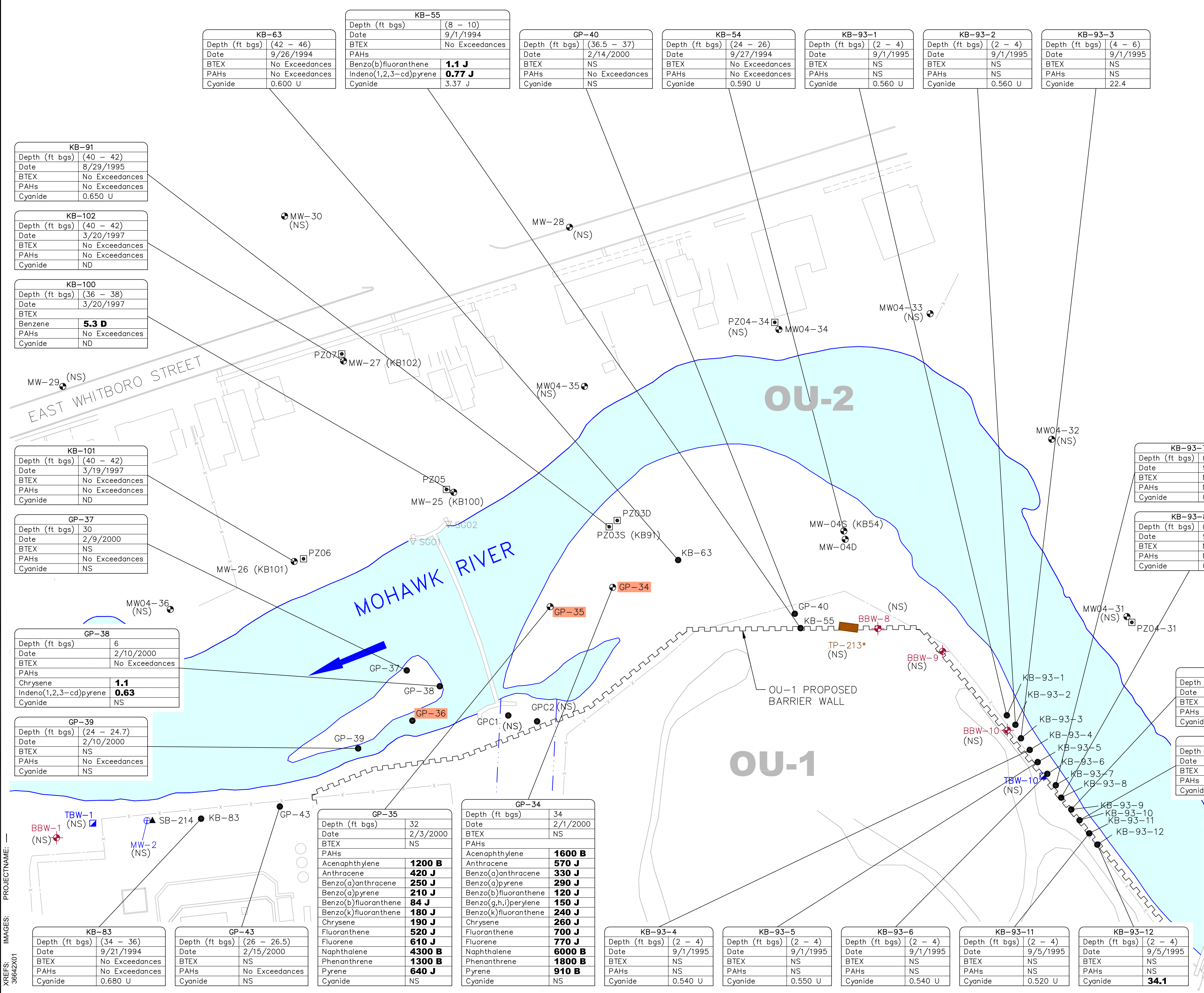
**AERIAL PHOTOGRAPH**

ARCADIS

FIGURE
**2**




| KB-63 | |
|---|---|
| Depth (ft bgs) | (42 – 46) |
| Date | 9/26/1994 |
| BTEX | No Exceedances |
| PAHs | No Exceedances |
| Cyanide | 0.600 U |

| KB-55 | |
|---|---|
| Depth (ft bgs) | (8 – 10) |
| Date | 9/1/1994 |
| BTEX | No Exceedances |
| PAHs | |
| Benzo(b)fluoranthene | **1.1 J** |
| Indeno(1,2,3-cd)pyrene | **0.77 J** |
| Cyanide | 3.37 J |

| GP-40 | |
|---|---|
| Depth (ft bgs) | (36.5 – 37) |
| Date | 2/14/2000 |
| BTEX | NS |
| PAHs | No Exceedances |
| Cyanide | NS |

| KB-54 | |
|---|---|
| Depth (ft bgs) | (24 – 26) |
| Date | 9/27/1994 |
| BTEX | No Exceedances |
| PAHs | No Exceedances |
| Cyanide | 0.590 U |

| KB-93-1 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/1/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.560 U |

| KB-93-2 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/1/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.560 U |

| KB-93-3 | |
|---|---|
| Depth (ft bgs) | (4 – 6) |
| Date | 9/1/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 22.4 |

| KB-91 | |
|---|---|
| Depth (ft bgs) | (40 – 42) |
| Date | 8/29/1995 |
| BTEX | No Exceedances |
| PAHs | No Exceedances |
| Cyanide | 0.650 U |

| KB-102 | |
|---|---|
| Depth (ft bgs) | (40 – 42) |
| Date | 3/20/1997 |
| BTEX | No Exceedances |
| PAHs | No Exceedances |
| Cyanide | ND |

| KB-100 | |
|---|---|
| Depth (ft bgs) | (36 – 38) |
| Date | 3/20/1997 |
| BTEX | |
| Benzene | **5.3 D** |
| PAHs | No Exceedances |
| Cyanide | ND |

| KB-101 | |
|---|---|
| Depth (ft bgs) | (40 – 42) |
| Date | 3/19/1997 |
| BTEX | No Exceedances |
| PAHs | No Exceedances |
| Cyanide | ND |

| GP-37 | |
|---|---|
| Depth (ft bgs) | 30 |
| Date | 2/9/2000 |
| BTEX | NS |
| PAHs | No Exceedances |
| Cyanide | NS |

| GP-38 | |
|---|---|
| Depth (ft bgs) | 6 |
| Date | 2/10/2000 |
| BTEX | No Exceedances |
| PAHs | |
| Chrysene | **1.1** |
| Indeno(1,2,3-cd)pyrene | **0.63** |
| Cyanide | NS |

| GP-39 | |
|---|---|
| Depth (ft bgs) | (24 – 24.7) |
| Date | 2/10/2000 |
| BTEX | NS |
| PAHs | No Exceedances |
| Cyanide | NS |

| KB-93-7 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/1/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.540 U |

| KB-93-8 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/5/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.520 U |

| KB-93-9 | |
|---|---|
| Depth (ft bgs) | 4 |
| Date | 9/5/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.97 |

| KB-93-10 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/5/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.530 U |

| KB-83 | |
|---|---|
| Depth (ft bgs) | (34 – 36) |
| Date | 9/21/1994 |
| BTEX | No Exceedances |
| PAHs | No Exceedances |
| Cyanide | 0.680 U |

| GP-43 | |
|---|---|
| Depth (ft bgs) | (26 – 26.5) |
| Date | 2/15/2000 |
| BTEX | NS |
| PAHs | No Exceedances |
| Cyanide | NS |

| GP-35 | |
|---|---|
| Depth (ft bgs) | 32 |
| Date | 2/3/2000 |
| BTEX | NS |
| PAHs | |
| Acenaphthylene | **1200 B** |
| Anthracene | **420 J** |
| Benzo(a)anthracene | **250 J** |
| Benzo(a)pyrene | **210 J** |
| Benzo(b)fluoranthene | **84 J** |
| Benzo(k)fluoranthene | **180 J** |
| Chrysene | **190 J** |
| Fluoranthene | **520 J** |
| Fluorene | **610 J** |
| Naphthalene | **4300 B** |
| Phenanthrene | **1300 B** |
| Pyrene | **640 J** |
| Cyanide | NS |

| GP-34 | |
|---|---|
| Depth (ft bgs) | 34 |
| Date | 2/1/2000 |
| BTEX | NS |
| PAHs | |
| Acenaphthylene | **1600 B** |
| Anthracene | **570 J** |
| Benzo(a)anthracene | **330 J** |
| Benzo(a)pyrene | **290 J** |
| Benzo(b)fluoranthene | **120 J** |
| Benzo(g,h,i)perylene | **150 J** |
| Benzo(k)fluoranthene | **240 J** |
| Chrysene | **260 J** |
| Fluoranthene | **700 J** |
| Fluorene | **770 J** |
| Naphthalene | **6000 B** |
| Phenanthrene | **1800 B** |
| Pyrene | **910 B** |
| Cyanide | NS |

| KB-93-4 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/1/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.540 U |

| KB-93-5 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/1/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.550 U |

| KB-93-6 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/1/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.540 U |

| KB-93-11 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/5/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | 0.520 U |

| KB-93-12 | |
|---|---|
| Depth (ft bgs) | (2 – 4) |
| Date | 9/5/1995 |
| BTEX | NS |
| PAHs | NS |
| Cyanide | **34.1** |

## LEGEND:

- FORMER TAILRACE (APPROXIMATE)
- APPROXIMATE LOCATION OF PROPOSED BARRIER WALL
- MW04-34 — MONITORING WELL
- PZ02 — PIEZOMETER
- TP-204 — PRE-DESIGN TEST PIT (10/03)
- SB-201 — PRE-DESIGN SOIL BORING (10/03)
- MW-1 — PRE-DESIGN MONITORING WELL (10/03)
- SB-213 — GEOTECHNICAL SOIL BORING (10/03)
- BBW-10 — GEOTECHNICAL SOIL BORING (11/04)
- TBW-5 — GEOTECHNICAL TEST PIT (11/04)
- MW-28 — HISTORICAL MONITORING WELL
- PZ02 — HISTORICAL MONITORING WELL/PIEZOMETER
- KB-23 — HISTORICAL SOIL BORING/GEOPROBE LOCATION
- DNAPL (DENSE NON-AQUEOUS PHASE LIQUID) OBSERVED IN SOIL

## NOTES:

1. BASE MAP SUPPLIED BY ERDMAN ANTHONY, AT A SCALE OF 1" = 40' TITLED "KINGSLEY AVENUE", WAS CREATED BY PHOTOGRAMMETRIC METHODS FROM DATA COLLECTED ON NOVEMBER 10, 2003.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ONLY BTEX, PAHS, AND CYANIDE RESULTS ARE SHOWN. OTHER COMPOUNDS MAY HAVE BEEN DETECTED.
4. * TEST PIT TP-213 LOCATED BY FIELD MEASUREMENTS.
5. RESULTS IN BOLD EXCEED NYSDEC PART 375 RESTRICTED RESIDENTIAL USE CRITERIA.
6. ALL RESULTS ARE REPORTED IN MILLIGRAMS PER KILOGRAMS (mg/kg).
7. B: ESTIMATED VALUE BETWEEN THE INSTRUMENT DETECTION LIMIT AND THE REPORTING LIMIT.

   J: ESTIMATED VALUE.

   D: COMPOUND QUANTITATED USING A SECONDARY DILUTION.

   U: THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.

   ND: COMPOUND NOT DETECTED.

   NS: NO SOIL SAMPLE WAS COLLECTED AND SUBMITTED FOR ANALYSIS OF BTEX, PAHS OR CYANIDE.

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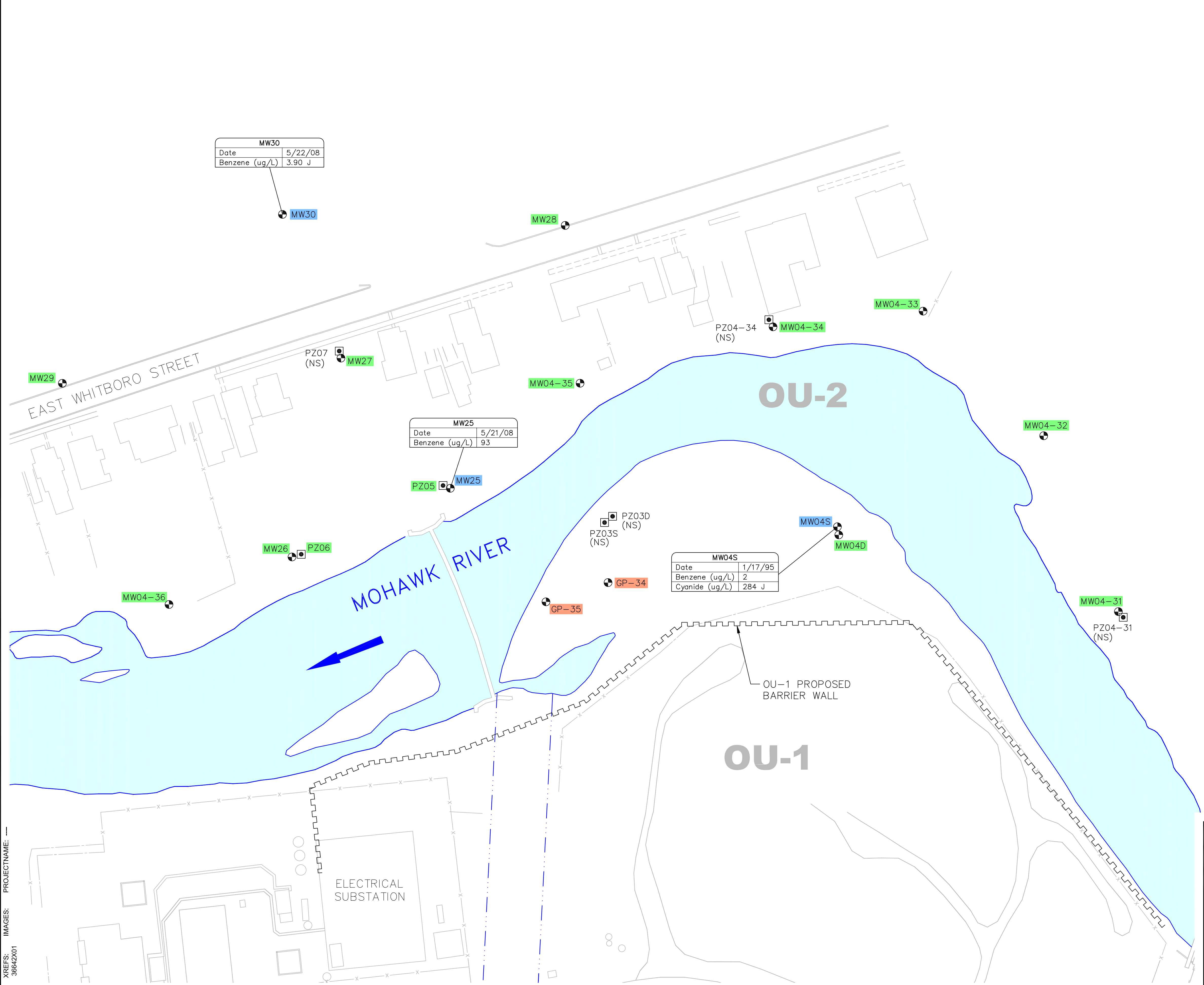
# BTEX, PAHs, AND TOTAL CYANIDE RESULTS IN SUBSURFACE SOIL

ARCADIS

FIGURE
3

CITY: SYRACUSE DIV/GROUP: 141 DB: RCA TJR GMS PM:(Reqd) LYR: ON=*;OFF=*REF
G:\ENVCAD\SYRACUSE\ACT\B0036642\0000\00100\DWG\36642C05.DWG LAYOUT: 3 SAVED: 1/29/2009 3:04 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: C-LD2B-PDF-TABLOID PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/29/2009 3:04 PM BY: STOWELL, GARY
XREFS: 36642X01 IMAGES: PROJECTNAME: ---




LEGEND:

- FORMER TAILRACE (APPROXIMATE)
- APPROXIMATE LOCATION OF PROPOSED BARRIER WALL
- MW04-34 MONITORING WELL
- PZ02 PIEZOMETER
- THE MOST RECENT GROUNDWATER SAMPLE EXCEEDS THE NYSDEC CLASS GA GROUNDWATER STANDARD FOR THE LISTED COMPOUND(S)
- THE MOST RECENT GROUNDWATER SAMPLE DOES NOT EXCEED THE NYSDEC CLASS GA GROUNDWATER STANDARD FOR ANY CONSTITUENTS
- DNAPL (DENSE NON-AQUEOUS PHASE LIQUID) MEASURED DURING MOST RECENT MONITORING EVENT

NOTES:

1. BASE MAP SUPPLIED BY ERDMAN ANTHONY, AT A SCALE OF 1" = 40' TITLED "KINGSLEY AVENUE", WAS CREATED BY PHOTOGRAMMETRIC METHODS FROM DATA COLLECTED ON NOVEMBER 10, 2003.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ONLY BTEX, PAH, AND CYANIDE RESULTS WERE EVALUATED FOR EXCEEDANCES OF CLASS GA STANDARDS AND GUIDANCE VALUES. OTHER COMPOUNDS MAY HAVE BEEN DETECTED. SEE ANALYTICAL TABLES FOR COMPLETE RESULTS.
4. NS: NOT SAMPLED
5. J: ESTIMATED VALUE
6. ug/L = MICROGRAMS PER LITER

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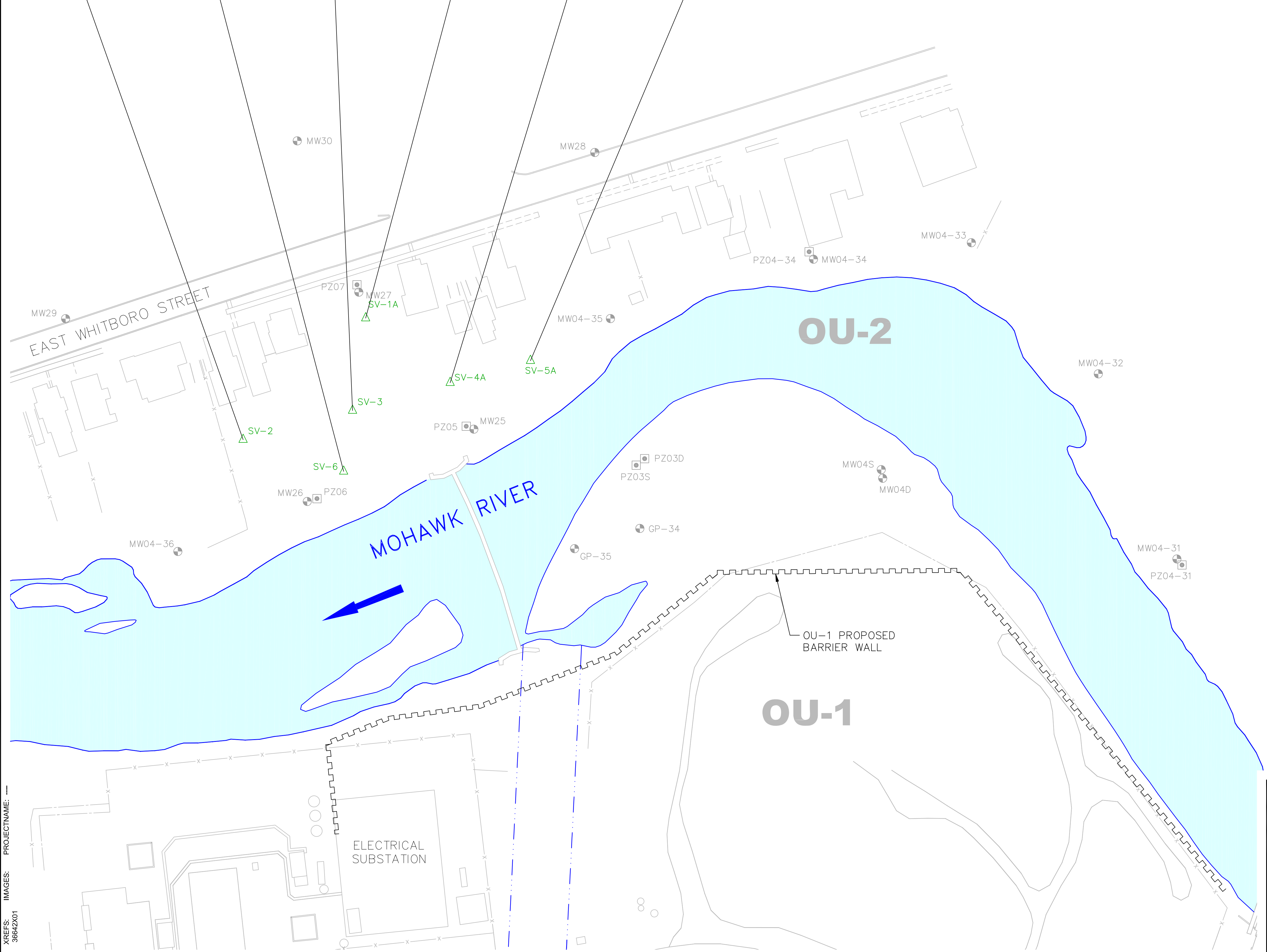
**EXCEEDANCES OF CLASS GA STANDARDS AND GUIDANCE VALUES**

ARCADIS

FIGURE 4

| | SV-2 | SV-6 | SV-3 | SV-1A | SV-4A | SV-5A | AMBIENT AIR | AMBIENT AIR |
|---|---|---|---|---|---|---|---|---|
| Date | 11/08/07 | 11/08/07 | 11/08/07 | 12/03/07 | 12/03/07 | 12/03/07 | 11/08/07 | 12/03/07 |
| Benzene | 5.2 [5.4] | 2.9 | 4.6 | 1.7 | 7 | 1.8 | 0.61 J | 0.74 |
| Ethylbenzene | 1.4 [1.8] | 0.82 J | 1 | 2.9 | 11 | 0.82 J | 0.152 | 0.26 J |
| Toluene | 13 [17] | 9.2 | 14 | 13 | 32 | 3.9 | 1.2 | 1.4 |
| Xylene | 5.8 [7.6] | 3.47 | 4.70 | 12.60 | 43.00 | 3.61 | 0.565 | 0.91 |
| Naphthalene | 0.314 B [0.225 B] | 0.157 B | 0.168 B | 0.613 | 0.48 J | 0.739 | 0.089 JB | 0.309 |




LEGEND:

- △ SOIL VAPOR SAMPLING POINT
- FORMER TAILRACE (APPROXIMATE)
- APPROXIMATE LOCATION OF PROPOSED BARRIER WALL
- MW04-34 MONITORING WELL
- PZ02 PIEZOMETER

NOTES:

1. BASE MAP SUPPLIED BY ERDMAN ANTHONY, AT A SCALE OF 1" = 40' TITLED "KINGSLEY AVENUE", WAS CREATED BY PHOTOGRAMMETRIC METHODS FROM DATA COLLECTED ON NOVEMBER 10, 2003.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ONLY BTEX AND NAPHALENE RESULTS SHOWN (IN MICROGRAMS PER CUBIC METER [ug/m3]). OTHER COMPOUNDS MAY HAVE BEEN DETECTED. SEE ANALYTICAL TABLES FOR COMPLETE RESULTS.
4. J: ESTIMATED VALUE.
   B: ANALYTE WAS ALSO DETECTED IN THE ASSOCIATED METHOD BLANK.
5. FIELD DUPLICATE RESULTS ARE SHOWN IN BRACKETS.

0 50' 100'
GRAPHIC SCALE

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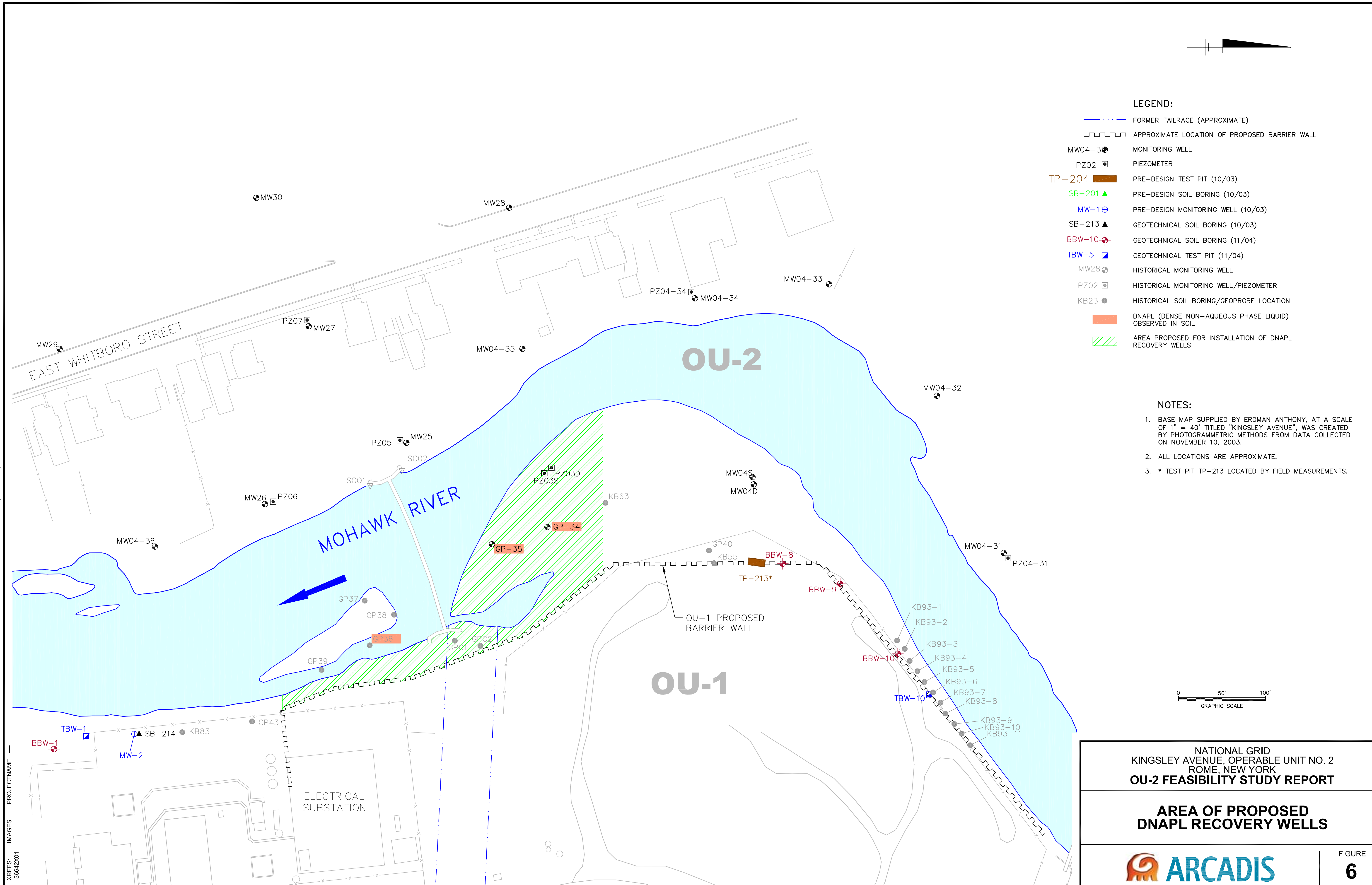
# BTEX AND NAPHTHALENE CONCENTRATIONS DETECTED IN SOIL VAPOR

ARCADIS

FIGURE
5


LEGEND:
FORMER TAILRACE (APPROXIMATE)
APPROXIMATE LOCATION OF PROPOSED BARRIER WALL
MW04-3 MONITORING WELL
PZ02 PIEZOMETER
TP-204 PRE-DESIGN TEST PIT (10/03)
SB-201 PRE-DESIGN SOIL BORING (10/03)
MW-1 PRE-DESIGN MONITORING WELL (10/03)
SB-213 GEOTECHNICAL SOIL BORING (10/03)
BBW-10 GEOTECHNICAL SOIL BORING (11/04)
TBW-5 GEOTECHNICAL TEST PIT (11/04)
MW28 HISTORICAL MONITORING WELL
PZ02 HISTORICAL MONITORING WELL/PIEZOMETER
KB23 HISTORICAL SOIL BORING/GEOPROBE LOCATION
DNAPL (DENSE NON-AQUEOUS PHASE LIQUID) OBSERVED IN SOIL
AREA PROPOSED FOR INSTALLATION OF DNAPL RECOVERY WELLS
NOTES:
1. BASE MAP SUPPLIED BY ERDMAN ANTHONY, AT A SCALE OF 1" = 40' TITLED "KINGSLEY AVENUE", WAS CREATED BY PHOTOGRAMMETRIC METHODS FROM DATA COLLECTED ON NOVEMBER 10, 2003.
2. ALL LOCATIONS ARE APPROXIMATE.
3. * TEST PIT TP-213 LOCATED BY FIELD MEASUREMENTS.
0 50' 100'
GRAPHIC SCALE
EAST WHITBORO STREET
MOHAWK RIVER
OU-2
OU-1
OU-1 PROPOSED BARRIER WALL
ELECTRICAL SUBSTATION
MW30
MW28
MW29
PZ07
MW27
MW04-35
PZ04-34
MW04-34
MW04-33
MW04-32
PZ05
MW25
SG02
SG01
MW26
PZ06
MW04-36
PZ03D
PZ03S
KB63
MW04S
MW04D
GP-34
GP-35
GP40
KB55
BBW-8
TP-213*
BBW-9
MW04-31
PZ04-31
GP37
GP38
GP36
GP39
GP01
GP02
KB93-1
KB93-2
KB93-3
KB93-4
KB93-5
KB93-6
KB93-7
KB93-8
KB93-9
KB93-10
KB93-11
BBW-10
TBW-10
TBW-1
BBW-1
SB-214
KB83
MW-2
GP43
NATIONAL GRID
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OU-2 FEASIBILITY STUDY REPORT
AREA OF PROPOSED DNAPL RECOVERY WELLS
ARCADIS
FIGURE
6