RECORD OF DECISION

K - Patchogue MGP
Patchogue, Suffolk County
Site No. 152182
March 2011

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

DECLARATION STATEMENT - RECORD OF DECISION

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Statement of Purpose and Basis

This document presents the remedy for the K - Patchogue MGP site. The remedial program was chosen in accordance with 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, 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 (the Department) for the K - Patchogue MGP site and the public's input to the proposed remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principals and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term
- Reducing direct and indirect greenhouse gas and other emissions
- Increasing energy efficiency and minimizing use of non-renewable energy
- Conserving and efficiently managing resources and materials
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste
- Maximizing habitat value and creating habitat when possible
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development

2. On-site excavation of the following:

- any existing former MGP structures, debris, and major obstructions, including highly impacted soils in the immediate vicinity of these structures, to allow for excavation and/or treatment of underlying soils and installation of a soil cover; and

- on-site fill materials to a depth of at least two feet below ground surface (bgs) over the entire Central/Core Area (beyond the limits of the ISS area) to allow for installation of a two-foot thick soil cover. The on-site excavations will be backfilled with stockpiled soils and/or imported soil, the top two-feet of which will meet the 6NYCRR 375-6.7(d) restricted- residential criteria for backfill.

3. Off-site excavation (immediately to the east of the main MGP site), to a depth of approximately 9 feet below ground surface (bgs) to remove visual MGP-related source material and petroleum impacted soils. A demarcation layer will be placed at the bottom of the off-site excavation and the area will be backfilled entirely with material that meets 6NYCRR 375-6.7(d) residential criteria for backfill.

4. In-situ solidification (ISS) of impacted soil. The ISS will include all areas of MGP-related source material and associated soil, with the deepest targeted treatment depth being 23 feet below grade (bgs.) The soil will be mixed in place with cement and/or other hardening materials to form an impermeable, solid mass to prevent migration of MGP-related contaminants. The area to be solidified will extended laterally beyond the limits of contamination to insure that all impacts are encapsulated. The method of ISS will be determined during the remedial design. Solidified soils will be covered by a sufficient layer of soil to protect them from freeze-thaw cycles. The top two feet of this cover will be soil that meets the restricted-residential requirements for cover material set forth in 6 NYCRR Part 375-6.7(d), which will be placed over a demarcation layer. The ISS treatment process increases the volume of the soil, so an additional volume of material sufficient to account for this expansion will be required to be excavated and removed. The materials to be excavated to account for the frost protection layer and volume expansion will target source areas that are accessible and not otherwise excavated. Impacted soil and any excess stabilized soil will be transported to an approved off-site disposal facility. Excavated materials that are not considered source material (e.g. visual MGP tar-impacts) may be stockpiled and evaluated for reuse as backfill on-site. All off-site excavated soils and those on-site excavated soils which are not suitable for reuse, will be transported and disposed off-site at an approved landfill or treatment facility.

5. Material handling on-site (dewatering and/or blending operations) will be performed under a temporary fabric structure, as necessary, to control vapor, odor and dust emissions. Odor suppression materials such as foam will be available on site at all times. Excavated soils will either be directly loaded into transport trucks, if waste characterization has been performed, or staged on-site for waste characterization. A Community Air Monitoring Plan (CAMP) will be implemented which will include real-time monitoring for volatile organic compounds and particulates (i.e., dust) at the downwind perimeter of each designated work area during all ground-intrusive activities at the site.

6. Installation of a site cover to allow for restricted-residential use of the site. The site will be restored to its existing grade. The cover will consist either of structures, such as buildings, pavement, and sidewalks comprising the site development, or a soil cover in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). The soil cover will consist of a minimum of two feet of soil meeting the requirements for cover material set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to support vegetation.

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

(a) requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
(b) allows the use and development of the controlled property for restricted residential, commercial and industrial uses or as defined by Part 375-1.8(g), though land use is subject to local zoning laws;
(c) restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or Suffolk County DHS;
(d) prohibits agriculture or vegetable gardens on the controlled property; and
(e) requires compliance with the Department approved Site Management Plan.

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

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

Institutional Controls: The Environmental Easement discussed in Paragraph 7 above.

Engineering Controls: The ISS area discussed in Paragraph 4 and the site cover discussed in Paragraph 6 above.

A copy of the Site Management Plan will be provided to the appropriate property owners. This plan will include, but may not be limited to:

(i) an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
(ii) descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
(iii) a provision to evaluate the potential for soil vapor intrusion should the on-site building become occupied or should any buildings be developed on the site and to implement actions (e.g., mitigation or monitoring) recommended to address exposures related to soil vapor intrusion;

(iv) provisions for the management and inspection of the identified engineering controls;

(v) maintaining site access controls and Department notification;

(vi) the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

(b) A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

(i) monitoring of groundwater to assess the performance and effectiveness of the remedy; and

(ii) a schedule of monitoring and frequency of submittals to the Department.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy 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.

MAR 31 2011

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

RECORD OF DECISION

K - Patchogue MGP
Patchogue, Suffolk County
Site No. 152182
March 2011

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. The remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This Record of Decision (ROD) identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for selecting the remedy.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: SITE DESCRIPTION AND HISTORY

Location: The Patchogue Former Manufactured Gas Plant (MGP) site is a 3.6 acre parcel of land located at 234 West Main Street in the Village of Patchogue, Town of Brookhaven, Suffolk County, New York.

Site Features: The site is informally divided into three areas; the Northern Area, the Central/Core Area, and the Southern Area. The site is enclosed by a lockable chain-link fence. The site is essentially flat with elevations less than 10 feet above mean sea level (msl).

The Northern Area is bordered by West Main Street to the north, an access drive to an adjacent commercial property to the east and, the Central/Core Area to the south. The Northern Area is overlain by two concrete slabs.

The Central/Core Area is bordered to the north by the Northern Area, to the east by a commercial property, to the south by the Southern Area and to the west by a steep slope separating the site from the adjacent commercial and residential properties as well as a municipal storage yard. The majority of the former gas manufacturing operations took place on the Central/Core Area. This area is rectangular in shape and is vegetated. A steep slope runs along the western boundary of the site, beyond which is a residential area and municipal storage yard.

The Southern Area is bounded to the north by the Central/Core Area and to the east and south by the Patchogue River. The Southern Area comprises the tapered end of the property. This area of the site is vegetated.

Current Zoning/Uses: The site is zoned for industrial use. It is located in a mixed commercial and residential area, and is currently undeveloped and vacant.

Historical Uses: The site was operated as a manufactured gas plant (MGP) from 1904 to 1926. MGPs such as this converted coal and/or petroleum products to a flammable gas which was used in the surrounding community in much the same way that natural gas is used today.

Compared with other MGP sites, gas manufacturing operations at the Patchogue site were conducted on a small scale and for a short period of time. The Patchogue Gas Company was originally an independent company, but was subsequently sold to the Long Island Lighting Company (LILCO). Within a few years of the LILCO acquisition, the site was converted to store and distribute gas manufactured at other MGPs. Gas was purchased from the Suffolk County Gas and Electric plant in Bay Shore and was distributed from the Patchogue Plant from 1914 through 1918. Gas production facilities remained at Patchogue for several years, but appear to have been used only on a standby basis.

From 1918 through 1970's the facility served as an emergency gas storage facility. During this period a 60,000 cubic foot gas holder and seven horizontal above ground storage tanks were used for gas storage. The gas storage and distribution facility remained until the 1970s when LILCO sold the property to a third party.

From the mid-1970s through early 2005, the site was used as a refrigerator equipment and scrap storage yard. In 1999, LILCO and Brooklyn Union Gas merged to form KeySpan. KeySpan re-acquired the site in 2005 for the purposes of remediation. National Grid acquired KeySpan in 2008 and currently maintains ownership of the site.

Site Geology and Hydrogeology: Beneath the site, the water table is normally found within a few feet of the ground surface. Observed groundwater levels from 2008 to 2010 ranged from -2.93 to 5.33 feet msl. The lowest groundwater measurements were found during March 2010 and were likely due to dewatering occurring at a construction site located on the southeast side of the Patchogue River. Groundwater flows in a south-southeast direction toward the Patchogue River. On-site groundwater is not utilized as a drinking water source.

A two to five foot fill layer consisting of sand, silt, gravel and debris covers the Central/Core area of the site. Soils beneath the fill layer are predominantly sand, part of Pleistocene Age glacial outwash deposits. However, a thin layer of peat was observed in the top two feet of the western portion of the Central/Core area. The peat is likely part of recent floodplain deposits associated with the Patchogue River.

A site location map is attached as Figure 1.

SECTION 3: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to restricted-residential use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) is/are being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

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 PRPs for the site, documented to date, include:

National Grid

The Department and Keyspan (a predecessor to National Grid) entered into an Order on Consent A2-0552-0606 in February, 2007. The Order obligates the responsible parties to implement a full remedial program. As a successor to KeySpan, National Grid remains bound by the terms of this consent order.

SECTION 5: SITE CONTAMINATION

5.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI 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 RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,

- Ecological and Human Health Exposure Assessments.

5.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to 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.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

5.1.2: RI Information

The analytical data collected on this site includes data for:

- groundwater
- surface water
- soil
- sediment
- soil vapor
- indoor air

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

coal tar
benzene
toluene
ethylbenzene
xylene (mixed)
polycyclic aromatic hydrocarbons (PAHs), total

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

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 issuance of the Record of Decision.

There were no IRMs performed at this site during the RI.

5.3: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

People are not drinking contaminated groundwater because the area is served by a public water supply that gets water from a different source; also, no private wells have been identified in the area. Although total polyaromatic hydrocarbons were found in water and sediments from the Patchogue Creek, they were found upgradient and downgradient from the site and consequently are not site-related contaminants. Therefore, people are not expected to contact MGP-related wastes in the Patchogue Creek. The site is surrounded with a fence to limit access; however, persons who enter the site may come into contact with contaminants in the soil by walking on the dirt, digging on or below the ground surface, and otherwise disturbing the soil. Volatile organic compounds in the soil or groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Because there is no on-site building, inhalation of site contaminants in indoor air due to soil vapor intrusion does not represent a concern for the site in its current condition. However, the potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future on-site development. Sampling indicates soil vapor intrusion is not a concern for off-site buildings.

5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

The Fish and Wildlife Resources Impact Analysis (FWRIA) for OU 01, 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 primary contaminant of concern for the site is coal tar. Materials such as coal tar are commonly referred to as Non-Aqueous Phase Liquids (NAPL). Coal tar contains both volatile and semi-volatile organic compounds. Specific volatile organic compounds (VOCs) of concern are benzene, toluene, ethylbenzene and xylenes (BTEX). Specific semi-volatile organic compounds of concern are the polycyclic aromatic hydrocarbons (PAHs).

The majority of the volume of coal tar at the site is within the top 10 to 12 feet of overburden material in the vicinity of the former MGP structures in the Central/Core Area. This area of MGP tar-impacted source material is referred to as the source area. The degree of coal tar impact (MGP tar-impacted source material) decreases with depth, but thin lenses or layers that are saturated and/or partially saturated with coal tar, or where the coal tar is present as blebs, were found as deep as 22.4 feet below ground surface (bgs) in localized areas.

The chemical constituents of the tar are found in soils near the locations where the tar is found. Consequently, subsurface soil is impacted with BTEX compounds and PAHs in concentrations greater than the soil cleanup objective concentrations (SCOs) for unrestricted use. Benzene, a VOC with an unrestricted SCO of 0.06 ppm, was detected at concentrations ranging from 0.001 ppm to 6.3 ppm. Benzo(a)pyrene, a PAH with an unrestricted SCO of 1 ppm, was detected at concentrations ranging from 0.042 ppm to 500 ppm. Subsurface soil with elevated concentrations of both BTEX and PAHs extend a short distance off-site, primarily where coal tar is present to the east of the site. Concentrations of BTEX and PAH compounds in soil samples from intervals where no coal tar is present are typically below unrestricted use SCOs or were not detected.

Coal tar contamination at the site has caused an impact to the groundwater resource. Concentrations of BTEX and PAHs exceed groundwater standards on-site. Benzene, with a groundwater standard of 1 ppb, was detected at two of the 14 site monitoring wells at concentrations between 0.8 ppb and 46 ppb. Naphthalene, a PAH with a groundwater guidance value of 10 ppb, was detected at 5 of the 14 site monitoring wells at concentrations ranging from 0.6 ppb and 2,600 ppb. Groundwater contamination extends off-site, primarily where coal tar is present to the east of the Central/Core area. The concentration of BTEX and PAHs tend to decrease with depth and with lateral distance from the source area. Groundwater in the vicinity of the Patchogue River contains far lower levels of site-related contamination, but still exceeds New York State Ambient Groundwater Standards.

Elevated Total PAH (TPAH) concentrations have been identified in Patchogue River sediments. However, the elevated concentrations are found both upstream and downstream of the site, and do not appear to be related to the site. Other sources, such as highway runoff and discharges from the adjacent wastewater treatment plant, appear to be contributing to the elevated TPAH levels.

The Fish and Wildlife Resource Impact Analysis concluded that there is not a significant risk associated with the MGP-related contamination, to the fish and wildlife resources present.

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected the 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. The remedy must also attain the remedial action objectives identified for the site, which are presented in Exhibit B. Potential remedial alternatives for the Site were identified, screened and evaluated in the feasibility study (FS) report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit C. Cost information is presented in the form of present worth, which 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. A summary of the Remedial Alternatives Costs is included as Exhibit D.

6.1: Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. 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 six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. 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.

4. 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.

5. Short-term Impacts and 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.

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-Effectiveness. 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.

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

The final criterion, Community Acceptance, 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.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, 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.

6.2: Elements of the Remedy

The basis for the Department's remedy is set forth at Exhibit E.

The estimated present worth cost to implement the remedy is $5,930,000. The cost to construct the remedy is estimated to be $5,150,000 and the estimated average annual cost is $91,000.

The elements of the selected remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principals and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term
- Reducing direct and indirect greenhouse gas and other emissions
- Increasing energy efficiency and minimizing use of non-renewable energy
- Conserving and efficiently managing resources and materials
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste

- Maximizing habitat value and creating habitat when possible
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development

2. On-site excavation of the following:

- any existing former MGP structures, debris, and major obstructions, including highly impacted soils in the immediate vicinity of these structures, to allow for excavation and/or treatment of underlying soils and installation of a soil cover; and

- on-site fill materials to a depth of at least two feet below ground surface (bgs) over the entire Central/Core Area (beyond the limits of the ISS area) to allow for installation of a two-foot thick soil cover. The on-site excavations will be backfilled with stockpiled soils and/or imported soil, the top two-feet of which will meet the 6NYCRR 375-6.7(d) restricted- residential criteria for backfill.

3. Off-site excavation (immediately to the east of the main MGP site), to a depth of approximately 9 feet below ground surface (bgs) to remove visual MGP-related source material and petroleum impacted soils. A demarcation layer will be placed at the bottom of the off-site excavation and the area will be backfilled entirely with material that meets 6NYCRR 375-6.7(d) residential criteria for backfill.

4. In-situ solidification (ISS) of impacted soil. The ISS will include all areas of MGP-related source material and associated soil, with the deepest targeted treatment depth being 23 feet below grade (bgs.) The soil will be mixed in place with cement and/or other hardening materials to form an impermeable, solid mass to prevent migration of MGP-related contaminants. The area to be solidified will extended laterally beyond the limits of contamination to insure that all impacts are encapsulated. The method of ISS will be determined during the remedial design. Solidified soils will be covered by a sufficient layer of soil to protect them from freeze-thaw cycles. The top two feet of this cover will be soil that meets the restricted-residential requirements for cover material set forth in 6 NYCRR Part 375-6.7(d), which will be placed over a demarcation layer. The ISS treatment process increases the volume of the soil, so an additional volume of material sufficient to account for this expansion will be required to be excavated and removed. The materials to be excavated to account for the frost protection layer and volume expansion will target source areas that are accessible and not otherwise excavated. Impacted soil and any excess stabilized soil will be transported to an approved off-site disposal facility. Excavated materials that are not considered source material (e.g. visual MGP tar-impacts) may be stockpiled and evaluated for reuse as backfill on-site. All off-site excavated soils and those on-site excavated soils which are not suitable for reuse, will be transported and disposed off-site at an approved landfill or treatment facility.

5. Material handling on-site (dewatering and/or blending operations) will be performed under a temporary fabric structure, as necessary, to control vapor, odor and dust emissions. Odor suppression materials such as foam will be available on site at all times. Excavated soils will

either be directly loaded into transport trucks, if waste characterization has been performed, or staged on-site for waste characterization. A Community Air Monitoring Plan (CAMP) will be implemented which will include real-time monitoring for volatile organic compounds and particulates (i.e., dust) at the downwind perimeter of each designated work area during all ground-intrusive activities at the site.

6. Installation of a site cover to allow for restricted-residential use of the site. The site will be restored to its existing grade. The cover will consist either of structures, such as buildings, pavement, and sidewalks comprising the site development, or a soil cover in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). The soil cover will consist of a minimum of two feet of soil meeting the requirements for cover material set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to support vegetation.

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

(a) requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
(b) allows the use and development of the controlled property for restricted residential, commercial and industrial uses or as defined by Part 375-1.8(g), though land use is subject to local zoning laws;
(c) restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or Suffolk County DHS;
(d) prohibits agriculture or vegetable gardens on the controlled property; and
(e) requires compliance with the Department approved Site Management Plan.

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

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

Institutional Controls: The Environmental Easement discussed in Paragraph 7 above.

Engineering Controls: The ISS area discussed in Paragraph 4 and the site cover discussed in Paragraph 6 above.

A copy of the Site Management Plan will be provided to the appropriate property owners. This plan will include, but may not be limited to:

(i) an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

(ii) descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;

(iii) a provision to evaluate the potential for soil vapor intrusion should the on-site building become occupied or should any buildings be developed on the site and to implement actions (e.g., mitigation or monitoring) recommended to address exposures related to soil vapor intrusion;

(iv) provisions for the management and inspection of the identified engineering controls;

(v) maintaining site access controls and Department notification;

(vi) the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

(b) A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

(i) monitoring of groundwater to assess the performance and effectiveness of the remedy; and

(ii) a schedule of monitoring and frequency of submittals to the Department.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation and Feasibility Study (RI/FS). As described in the RI/FS, waste/source materials were identified at the site and are impacting groundwater and soil.

Waste/Source Areas

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium.

Wastes and source areas, in the form of coal tar and coal tar-impacted soils, were identified primarily in the vicinity of the former MGP-related structures. These areas are noted on Figure 2. There has been some limited migration of MGP –related source materials from the site to the adjacent property.

Coal tar is a reddish brown to black oily liquid which formed as a condensate as the freshly-made gas cooled. Materials such as coal tar which do not readily dissolve in water are commonly referred to as "non-aqueous phase liquids" or NAPLs. The terms NAPL and coal tar are used interchangeably in this document. Although most coal tars are slightly denser than water, the difference in density is minimal. Consequently, this tar can either float or sink when in contact with water.

In this setting, the phrase "source material" is used to describe soils and debris which contain significant quantities of visible coal tar. The majority of the visible coal tar is found within the top 10 to 12 feet of soils beneath the site. However, lenses of coal tar- saturated soils and thin seams of tar stained soils were found as deep as 22 feet below ground surface (bgs) in localized areas. Soils exhibiting lesser degrees of contamination such as odors, staining, and/or sheens are not necessarily included in the definition of source materials.

The coal tar contains a wide variety of chemical constituents. Specific volatile organic compounds (VOCs) of concern are benzene, toluene, ethylbenzene and xylenes. These are referred to collectively as BTEX in this document. Specific semivolatile organic compounds (SVOCs) of concern are the following polycyclic aromatic hydrocarbons (PAHs):

acenaphthene
acenaphthylene
anthracene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(g,h,i)perylene
benzo(k)fluoranthene
pyrene
chrysene
fluoranthene
fluorene
indeno(1,2,3-cd)pyrene
2-methylnaphthalene
naphthalene
phenanthrene
dibenzo(a,h)anthracene

Total PAH (TPAH) concentrations as referred to in this plan, are the sum of the individual PAHs listed above. The italicized PAHs are probable human carcinogens. Coal tar contains high levels of PAH compounds, often greater than 100,000 parts per million. Tars also exceed SCGs for BTEX compounds by several orders of magnitude.

The waste/source areas identified will be addressed in the remedy selection process.

This section describes the findings for all environmental media that were evaluated. As described in Section 5.1.2, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each environmental medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in each of the media and compare the data with the applicable SCGs for the site. The contaminants are arranged into two categories; VOCs and SVOCs. For comparison purposes the SCGs that allow for unrestricted use are provided for each medium. For soil, if applicable, the Restricted Use SCGs identified in Section 5.1.1 are also presented.

Groundwater

Fourteen (14) groundwater monitoring wells were installed during the RI/FS and during previous investigations. Wells were installed at locations upgradient, cross-gradient and downgradient from various former MGP features, to allow collection of groundwater samples throughout the site and the surrounding area. Additionally, a single set of three discrete depth groundwater samples were collected in September 2010 from temporary wells, located immediately downgradient of the source areas.

Concentrations of BTEX and some PAH compounds were detected at levels above the New York State Ambient Water Quality Standards (AWQS) and Guidance Values for Class GA Groundwater (Class GA criteria) at two on-site wells (MW-5 and MW-6), located near the center of the former MGP. Both of these wells are located in close proximity to soils with visible coal tar contamination. Evidence of dense NAPL (DNAPL) has been observed in both of these wells during separate monitoring events. Phenol concentrations in an on-site well were also detected above the Class GA criteria during one sampling event.

The concentrations of some PAH compounds were also elevated during one or more monitoring rounds at three off-site wells (MW-9S, MW-3, and MW-4D) located adjacent to the Patchogue River. BTEX was elevated in MW-9S during September 2010 but had not been detected in previous monitoring rounds and was not detected subsequently.

Trichloroethene (TCE) was detected in samples obtained from MW-3 which is adjacent to the Patchogue River. TCE was detected at 7.4 J ug/L in March 2008 and 5.1 ug/L is July 2008, both slightly above the standard of 5 ug/L. TCE is not a MGP related constituent, and is not the result of operations of the former MGP. These slight exceedances are not considered significant and therefore were not investigated further.

Groundwater sampling results for two separate sampling events (September 2010 and January 2011) are presented on Figures 4a - 4d. Groundwater contamination was more widespread during the

September 2010 sampling event, which took place while a large scale dewatering project was taking place at the waste water treatment plant on the opposite side of the Patchogue River. Large scale groundwater withdrawals such as this can temporarily redirect groundwater flow and affect the distribution of contamination. In general, as seen in Figures 4c and 4d, groundwater contamination which originates at the site does not travel far from the source areas.

The primary groundwater contamination appears to be associated with the former storage tanks located on the eastern side of the site. Contaminant concentrations drop sharply with distance, as the groundwater approaches the bank of the Patchogue River. This reduction in concentrations is due to biological degradation of the contaminants by naturally occurring soil bacteria as the groundwater moves away from the source of contamination. The groundwater discharges into the Patchogue River through the sandy materials at the bottom of the river bed.

Table 1 – Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG[c]
Volatile Organic Compounds (VOCs)			
Benzene	ND - 46	1	8/90
Ethylbenzene	ND - 500	5	7/90
Toluene	ND - 140	5	9/90
Xylenes	ND - 590	5	9/90
Trichloroethene (TCE)	ND - 7.4	5	2/28
Semi-volatile Organic Compounds (SVOCs)			
Polycyclic Aromatic Hydrocarbons (PAHs)			
Total Carcinogenic PAHs (CPAH)	ND - 128	NA	12/90[d]
Total PAHs (TPAH)	ND - 2,390	NA	18/90[d]

ND - Not Detected
a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).
c- Fraction is representative of the number of times a constituent concentration is above SCG over the number of times constituent was analyzed for. Includes samples from permanent monitoring wells as well as samples collected for screening purposes (i.e., groundwater grab samples).
d- SCGs have been established for various constituents within group of analytes. Frequency exceeding SCG number is equal to the number of times an individual constituent concentration within group is above its corresponding SCG over the number of times the group of constituents were analyzed for.

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are BTEX and PAHs.

Soil

Two sets of surface soil samples were collected at the site during the RI/FS. Surface soil samples were collected from a depth of 0-2 inches to assess the potential for direct human exposure. A second set of surface soil samples were collected from 0-6 inches for development of the Fish and Wildlife Resources Impact Analysis. Samples were analyzed for VOCs and SVOCs.

The results, which are presented in Table 2a and 2b, indicate that surface soils in the Central/Core Area of the site exceed the unrestricted SCGs for some carcinogenic PAHs.

Table 2a - Surface Soil (0-2'')

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Residential SCG[c] (ppm)	Frequency Exceeding Restricted Residential SCG
Semi-volatile Organic Compounds (SVOCs)					
Benzo(a)anthracene	ND-16	1	3/30	1	3/30
Benzo(a)pyrene	ND-26	1	5/30	1	5/30
Benzo(b)fluoranthene	ND-17	1	4/30	1	4/30
Benzo(K)Fluoranthene	ND-13	0.8	4/30	3.9	3/30
Chrysene	ND-18	1	5/30	3.9	3/30
Indeno(1,2,3-Cd)Pyrene	ND-43	0.5	4/30	0.5	4/30
Dibenzo(a,h)Anthracene	ND-1.3	0.33	2/30	0.33	2/30
Total Carcinogenic PAHs	ND-88	NA	5/30 [d]	NA	5/30 [d]
Total PAHs	ND-250	NA	5/30 [d]	NA	5/30 [d]

Table 2b - Surface Soil (0-6'')

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Residential SCG[c] (ppm)	Frequency Exceeding Restricted Residential SCG
Semi-volatile Organic Compounds (SVOCs)					
Benzo(a)anthracene	ND-7.4	1	4/17	1	4/17
Benzo(a)pyrene	ND-7.9	1	4/17	1	4/17
Benzo(b)fluoranthene	ND-8.4	1	6/17	1	6/17
Benzo(K)Fluoranthene	ND-1.8	1.7	1/17	3.9	0/17
Chrysene	0.11-8.4	1	5/17	3.9	2/17
Indeno(1,2,3-Cd)Pyrene	ND-5.1	0.5	5/17	0.5	5/17

Dibenzo(a,h)Anthracene	ND-0.61	0.33	2/17	0.33	2/17
Total Carcinogenic PAHs	ND-37.2	NA	6/17[d]	NA	6/17[d]
Total PAHs	ND-68.6	NA	6/17[d]	NA	6/17[d]

ND - Not Detected
a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil.
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted-Residential Soil Cleanup Objectives.
d- SCGs have been established for various constituents within group of analytes. Frequency exceeding SCG number is equal to the number of times an individual constituent concentration within group is above its corresponding SCG over the number of times the group of constituents were analyzed for.

A set of subsurface soil samples were collected at depths ranging from 1-26 feet to assess the potential for soil contamination to contaminate groundwater. Samples were analyzed for VOCs and SVOCs.

Coal tar-impacted subsurface soil or fill is present in the Central/Core Area, in and around the former MGP structures, to depths as great as 23 feet. Some of the soils contain enough coal tar contamination to meet the definition of "source material" as discussed above. Soil is impacted with coal tar and contaminants of concern (COC) in concentrations greater than soil cleanup objective concentrations (SCOs) in the Central Core area of the site as well as off-site to the east.

No coal tar-impacted subsurface soils were found in the Northern or Southern Areas of the site. Soils in the Northern and Southern Area of the site did not exceed SCOs for BTEX or PAHs.

Table 3 - Subsurface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Residential SCG[cd] (ppm) / Protection of Groundwater SCG (ppm)	Frequency Exceeding Restricted Residential SCG[cd] (ppm) / Protection of Groundwater SCG (ppm)
Volatile Organic Compounds (VOCs)					
Benzene	ND-6.3	0.06	7 / 115	0.06	7/115
Ethylbenzene	ND-140	1	12 / 115	0.7	9/115
Toluene	ND-23	0.7	9 / 115	1	12/115
Xylenes	ND-170	0.26	15 / 115	1.6	11/115
Semi-volatile Organic Compounds (SVOCs)					
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenapthene	ND-630	20	12 / 115	98	8/115
Acenaphthylene	ND-340	100	2 / 115	100	2/115
Anthracene	ND-1,800	100	16 / 115	100	16/115
Benzo(a)anthracene	ND-660	1	39 / 115	1	39/115
Benzo(a)pyrene	ND--500	1	43 / 115	1	43/115
Benzo(b)fluoranthene	ND--470	1	42 / 115	1	42/115
Benzo(g,h,i)perylene	ND--270	100	1 / 115	100	1/115

Benzo(k)Fluoranthene	ND-160	0.8	37 / 115	1.7	31/115
Chrysene	ND-660	1	41 / 115	1	41 / 115
Dibenzo(a,h)Anthracene	ND-60	0.33	41 / 115	0.33	37/115
Fluoranthene	ND-1,700	100	18 / 115	100	18/115
Fluorene	ND-890	30	19 / 115	100	9/115
Indeno(1,2,3-Cd)Pyrene	ND-160	0.5	43 / 115	0.5	43/115
Naphthalene	ND-1,700	12	16 / 115	12	16/115
Phenanthrene	ND-4,400	100	22 / 115	100	22/115
Pyrene	ND-2,100	100	20 / 115	100	20/115
Total Carcinogenic PAHs	ND-2,670	NA	45/115[d]	NA	44/115 [d]
Total PAHs	ND-16,410	500[e]	24/115	NA	44/115 [d]

ND - Not Detected
a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Soil Cleanup Objectives / Protection of Groundwater – lowest concentration is used for the primary contaminants of concern (BTEX and PAHs)
d - SCGs have been established for various constituents within group of analytes. Frequency exceeding SCG number is equal to the number of times an individual constituent concentration within group is above its corresponding SCG over the number of times the group of constituents were analyzed for.
e - SCG: CP-51 Commissioner Policy on Soil Cleanup Guidance

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil on-site and off-site. The contaminated soil is causing a contravention of groundwater standards both in the central area on-site and for a short distance eastward off-site. The applicable restricted use SCG for this site is restricted residential as long as the chosen remedy includes controls to address the on-site impacts and off-site migration of contamination, as well as places groundwater use restrictions on the site. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are coal tar, BTEX and TPAH.

Surface Water

Five surface water samples (plus one duplicate) were collected during the RI and analyzed for BTEX, and PAHs. None of the samples were found to contain any constituents above NYSDEC Ambient Water Quality Standards and Guidance Values for Class C Surface Water.

As noted above, groundwater which has been contaminated by passing through contaminated soils at the site eventually discharges to the Patchogue River. However, the concentrations of contaminants decrease rapidly as the groundwater moves toward the river, and no site-related surface water contamination was identified in the river itself during the RI. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

Sediment samples were collected from the Patchogue River during the RI and PSA activities. Four samples were collected upstream of the site to evaluate the potential influence of other contaminant sources unrelated to the MGP. Six samples were collected adjacent to the site or downstream of the site.

Prior to collection of sediment samples, numerous locations were probed with metal rods and other tools to determine if any areas of coal tar discharge were present and to identify potential sampling locations. Sediments which contain coal tar will generate an obvious sheen on the water surface when they are disturbed. Sheens can also result from natural processes or other contaminants, but sheens related to coal tar contamination also produce a distinctive odor.

Although some minor sheens were detected in limited areas, these were not considered to be MGP related. Had any MGP-related sheens been found, sediment sampling would have targeted the sheen bearing areas, to evaluate worst case conditions of sediment contamination. However, since no such sheens were detected, the sediment samples were collected in an approximately even distribution upstream of the site, adjacent to the site, and downstream from the site.

All sediment samples were analyzed for BTEX and PAHs. The concentration levels of the PAH compounds, and the distribution of these concentrations and the observed sheens, are indicative of sediments impacted by urban runoff. They are not indicative of a localized MGP source such as the site.

No BTEX compounds were detected in the sediment samples adjacent to the site or in the upstream background samples.

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

Soil Vapor Intrusion

The evaluation of the potential for soil vapor intrusion resulting from the presence of site-related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site, no buildings are present in impacted area, so only soil vapor was evaluated. Off-site, however, due to the presence of a building, a full suite of samples were collected to evaluate whether actions are needed to address exposure related to soil vapor intrusion.

Three soil gas samples were collected during the 2009 RI. Based on the constituents detected and their concentrations, an additional sub-slab sample, indoor air sample, and ambient air sample were collected during the heating season in November 2009 from the building adjacent to the site. Based on the data collected no actions are needed to address exposure related to soil vapor intrusion in off-site buildings. No site-related soil vapor contamination of concern was identified during the RI. However, the remedy will address any future site development and the potential for on-site soil vapor intrusion.

Exhibit B

SUMMARY OF THE REMEDIATION OBJECTIVES

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial objectives for this site are:

Public Health Protection

Groundwater

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
- Prevent contact with contaminated groundwater.

Soil

- Prevent ingestion/direct contact with contaminated soil.

Soil Vapor

- Address exposures to the public related to soil vapor intrusion into buildings.

Environmental Protection

Groundwater

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

Soil

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

NAPL

- Remove free product/NAPL identified at the site to the extent technically practicable.
- Eliminate through removal, treatment and/or containment the free product/NAPL as source of contamination to other environmental media.

Soil Vapor

- Eliminate, to the extent practicable, the impact of contaminants in soil or groundwater to soil vapor.

Exhibit C

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Exhibit B) to address the contaminated media identified at the site as describe in Exhibit A:

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment. There are no costs associated with this alternative.

Alternative 2: Institutional and Engineering Controls, On-Site Cover, and Excavation of Off-Site MGP Tar and Petroleum-Impacted Source Materials

This alternative includes a site-wide cover which meets the restricted-residential requirements as set forth in 6 NYCRR Part 375-6.7(d). To protect public health and the environment from any contamination identified at the site, this alternative requires that an institutional control, in the form of an environmental easement be placed on the property to limit the site to restricted-residential use. The easement would also require compliance with a Site Management Plan (SMP) and would restrict the use of groundwater. A groundwater monitoring program would be required to determine the degree of contaminant reduction associated with the source removal and natural attenuation processes.

This alternative also includes an off-site excavation (immediately to the east of the main MGP site), to a depth of approximately 9 feet below ground surface (bgs) to remove MGP-related source material and petroleum impacted soils. The off-site area would be backfilled to existing elevations with material which meets the 6NYCRR 375-6.7(d) residential criteria.

Present Worth:..... *$2,050,000*
Capital Cost:..... *$1,270,000*
Annual Costs:..... *$91,000*

Alternative 3: Excavation of All MGP Impacted Soils (Restoration of Site to Pre-Release Conditions)

This alternative is meant to achieve all of the SCGs discussed in Section 5.1.1 and Exhibit A and meet the unrestricted soil clean objectives listed in Part 375-6.8 (a). This alternative would require excavation and off-site disposal of all waste and soil which is contaminated above the unrestricted soil cleanup objectives and all soil which is visually impacted (stains, tars and sheens). The depth of excavation would range from 2 feet bgs to at least 23 feet bgs. This alternative also includes an off-site

excavation (immediately to the east of the main MGP site), to a depth of approximately 9 feet bgs to remove MGP-related source material and petroleum impacted soils.

Excavation deeper than approximately five feet bgs would encounter the groundwater table. To maintain a dry excavation would require the extraction and treatment of very large volumes of groundwater. Excavated soils would be transported and disposed off-site at an approved landfill or treatment facility. Soils excavated under wet conditions would need to be dewatered prior to transport. In some cases, the soil could need to be blended with additives such as cement kiln dust or fly ash to adequately dry out the soil for shipment. Dewatering and/or blending operations would be performed under a temporary fabric structure to control vapor, odor and dust emissions.

The on-site and off-site excavation areas would be backfilled to existing elevations with imported clean fill materials or excavated materials which meet the criteria for backfill set forth at 6 NYCRR 375-6.7(d) for unrestricted use.

This remedy would include a groundwater use restriction and a one year (quarterly) of post-remedial groundwater monitoring program to verify the completeness of the removal and to verify the Department's expectation that contaminant levels in groundwater would achieve SCGs quickly following removal.

Present Worth:..... *$11,720,000*
Capital Cost:..... *$11,660,000*
Annual Costs:..... *$60,000*

Alternative 4: Excavation of MGP Tar Impacted Source Materials

This alternative includes excavation and off-site disposal of all source material. The principal difference with Alternative 3 is that only source materials would be removed. In this alternative, lower levels of contamination, including soils displaying odors, sheens, or staining, or soils which slightly exceed SCGs, would in some cases be left in place.

The depths of the on-site excavation target the deepest MGP tar-impacts, which range from 9 feet bgs to 23 feet bgs. Excavation deeper than approximately five feet bgs would encounter the groundwater table. To maintain a dry excavation would require the extraction and treatment of very large volumes of groundwater. Excavated soils would be transported and disposed off-site at an approved landfill or treatment facility. Soils excavated under wet conditions would need to be dewatered prior to transport. In some cases, the soil could need to be blended with additives such as cement kiln dust or fly ash to adequately dry out the soil for shipment. Dewatering and/or blending operations would be performed under a temporary fabric structure to control vapor, odor and dust emissions.

This alternative includes a site-wide cover to meet restricted-residential requirements set forth in 6 NYCRR Part 375-6.7(d). In the Central/Core Area (beyond the limits of the deep excavation) this will require excavation and off-site disposal of on-site fill materials to allow for installation of a two-foot thick soil cover.

This alternative includes all the remedial elements in Alternative 2, which include institutional and engineering controls, on-site cover, and off-site excavation. As in Alternative 2, the off-site area would be backfilled to existing elevations with material which meets the 6NYCRR 375-6.7(d) restricted-residential criteria.

Present Worth:..... *$5,170,000*
Capital Cost:..... *$4,390,000*
Annual Costs:..... *$91,000*

Alternative 5: In-Situ Solidification of MGP Tar-Impacted Source Materials

This alternative calls for excavation of any remaining subsurface MGP structures followed by in-situ solidification (ISS) of MGP tar-impacted soil. ISS is a well-developed technology which has been applied at MGP sites in New York State and elsewhere. The soil would be mixed in place with cement and/or other hardening materials to form an impermeable, solid mass which would prevent migration of MGP related contaminants. The method of ISS mixing would be determined during the remedial design. Solidified soils will be covered by a sufficient layer of soil to protect them from freeze-thaw cycles. The top two feet of this cover will be soil that meets the restricted-residential requirements for cover material set forth in 6 NYCRR Part 375-6.7(d), which will be placed over a demarcation layer.

The targeted treatment area for this alternative would be similar to Alternative 4. The targeted treatment depth would be approximately 23 feet below grade. The area to be solidified would extend laterally beyond the limits of contamination to insure that all impacts are encapsulated. Prior to solidification, subsurface obstructions such as piping, building foundations and large pieces of debris in the fill layer would have to be removed to avoid interfering with the solidification process. Excavated materials which are not MGP impacted (such as concrete) may be stockpiled, crushed, and evaluated for re-use on-site. The ISS treatment process increases the volume of the treated soils, so a volume of treated soil sufficient to account for this expansion would also be removed and trucked off site for proper disposal.

Dewatering and/or blending operations would be performed under a temporary fabric structure as necessary, to control vapor, odor and dust emissions. Excavated materials that are not considered source material (visual MGP tar-impacts) may be stockpiled and evaluated for reuse as backfill. The on-site excavations will be backfilled with stockpiled soils and/or imported soil, the top two-feet of which will meet the 6NYCRR 375-6.7(d) criteria for backfill.

This alternative includes all the remedial elements in Alternative 2, which include institutional and engineering controls, on-site cover, and off-site excavation. As in Alternative 2, the off-site area would be backfilled to existing elevations with material which meets the 6NYCRR 375-6.7(d) residential criteria.

This alternative includes a site-wide cover to meet restricted-residential requirements set forth in 6 NYCRR Part 375-6.7(d). In the Central/Core Area (beyond the limits of the deep excavation) this will require excavation and off-site disposal of on-site fill materials to allow for installation of a two-foot thick soil cover.

A conceptual plan of Alternative 5 is depicted on Figure 7.

Present Worth:..... *$5,930,000*
Capital Cost:..... *$5,150,000*
Annual Costs:..... *$91,000*

Exhibit D

Table 3
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Average Annual Cost ($)	Total Present Worth ($)
Remedial Alternatives			
Alternative 1: No Action	$ 0	$ 0	$ 0
Alternative 2: IC/EC	$1,270,000	$91,000	$2,050,000
Alternative 3: Excavation to Pre-Release	$11,660,000	$60,000	$11,720,000
Alternative 4: Excavation of MGP source material	$4,390,000	$91,000	$5,170,000
Alternative 5: ISS *	$5,150,000	$91,000	$5,930,000

* Proposed Remedy

Exhibit E

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 5: In-Situ Solidification of MGP Tar-Impacted Source Materials, as the remedy for this site. The elements of this remedy are described in Section 6.2. The proposed remedy is depicted in Figure 7.

Basis for Selection

The proposed remedy is based on the results of the RI/FS and the evaluation of alternatives.

Alternative 5 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the balancing criteria described in Exhibit C. The remedy includes in-situ solidification (ISS) of the MGP tar-impacted source material and a soil cover. Thus, the first few feet of the accessible contaminants will be replaced by the soil cover, and remaining contamination will be at depth, in a stabilized form which does not pose a direct contact risk and does not generate groundwater contamination. Combined, these components of the remedy remove the potential for direct human exposure and eliminate or greatly diminish the site related contamination of the groundwater resource in the vicinity of the site.

Engineering controls consist of the establishment of a site cover over the site. Institutional controls consist of the establishment of an environmental easement to limit future use of the site and the development of a Site Management Plan (SMP) to govern future soil disturbing activity.

Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternatives 2 through 5 all provide protection of public health and protection of the groundwater resource by removing or isolating the source of the contamination. All of these alternatives are likely to be highly effective. Fortunately, the contaminated groundwater does not travel far from the contaminant source, even under current conditions. Consequently, once remediation is complete and the source area stops contributing contaminants into the groundwater, contaminant levels are expected to fall rapidly.

Alternative 2 meets the threshold criteria by providing a soil cover and institutional controls to prevent public exposure. Alternative 3, by removing all soil contaminated above the “Unrestricted” soil cleanup objective, meets the threshold criteria. Alternatives 4 and 5 meet the threshold criteria by providing a soil cover and institutional controls to prevent public exposure, and by removing or solidifying all source material that may contaminate other media, particularly groundwater. Because Alternatives 2, 3, 4, and 5 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

Long-term effectiveness and permanence is greatest for those alternatives which employ excavation and permanent destruction of contaminants by off-site treatment of contaminated soils. Alternative 3 thus provides the highest degree of long-term effectiveness because it results in removal of almost all of the chemical contamination at the site and removes the need for property use restrictions and long-term monitoring. Long-term effectiveness of Alternative 2 is notably lower than the other

Alternatives, since it leaves the majority of the site contamination in place, where monitoring would be required indefinitely. Alternative 4 would result in the removal of the majority of the contaminated soil at the site and all of the MGP tar impacted source material, but would still leave significant amounts of contamination in the subsurface and would still require a permanent long term monitoring program. Alternative 5 also requires long term monitoring, but the contamination left behind will be confined in a cement/soil matrix. This treatment has proven a stable, long term isolation technique at other sites and is expected to be highly effective at this site as well. Although the alternatives which include greater excavation (Alternatives 3, 4) provide a somewhat higher level of long term effectiveness and permanence, the short term impacts and uncertain implementability are not justified, when compared to the relatively small additional amount of contamination that would be removed.

All alternatives being considered include the excavation and replacement of surficial soils (top 2 feet of overburden) as well as off-site impacts, which will greatly reduce the toxicity, mobility or volume of contaminants in the surface soils. However, the alternatives differ in how they deal with the mobility, toxicity, and volume of contaminants in subsurface soils. Alternative 3 (excavation and off-site disposal to pre-release conditions) provides the maximum degree of reduction by removing nearly all of the site contamination and by transferring approximately 16,200 tons of material to an approved off-site location for treatment and disposal. Alternative 4 provides a lower degree of reduction, since it leaves more contamination in place at depth. Alternative 5 greatly reduces the mobility and toxicity of site contaminants by immobilizing them in a cement/soil matrix; however, the volume will actually increase somewhat due to the swelling of the soils during ISS treatment. This volume increase will be of little consequence, however, since any excess material generated by the swelling will be removed from the site in order to restore the site to its existing elevation.

Alternatives 2 through 5 all have short-term impacts that vary with the amount of associated ISS and/or excavation. Excavation and off-site transport activities will generate noise associated with construction machinery, and truck traffic through the surrounding community as contaminated soils are trucked out and backfill materials are trucked in. Solidification work generates truck traffic to a lesser extent, involving mostly the delivery of cement or other materials to solidify the soils. Most of these short-term impacts can be controlled or mitigated, but significant differences in short term impacts between the different alternatives remain. In particular, the alternatives which call for large scale excavations, deep below the water table, require extensive steel sheeting support to prevent collapse of the excavation. Driving this sheeting and removing it creates significant noise impacts which are difficult to control adequately. Alternative 2 would have the smallest impact because it involves only minimal excavation and filling. Only surface soils would be excavated on-site and a small excavation would occur off-site. Alternative 5 can probably be implemented without the need for driven sheet piling, removing that source of noise in the surrounding community.

The time needed to complete remedial construction of Alternative 2 (2 months), is the shortest of the alternatives considered. Alternative 3 would create the greatest short term impact, since it involves the largest volume of soil removal and the largest volume of backfill material as well. Alternatives 4 and 5 involve less truck traffic than Alternative 3, but more than Alternative 2. Alternative 5 will have less of a short term impact than Alternatives 3 and 4 because the removal volumes are less and the time taken to complete the remedial construction is somewhat shorter (approximately 4 months vs. 6 months).

Alternatives 2-5 all involve the use of standard construction materials and machinery, and thus at first glance appear to be technically and administratively feasible. However, the highly permeable soils and shallow water table make the excavation alternatives (Alternatives 3 and 4) extremely challenging. Alternative 3 requires a large excavation which would require dewatering. Dewatering a 23 feet-deep excavation in these conditions is a serious undertaking which requires nearly constant pumping of huge amounts of water. The water from the excavation would be treated on-site and then discharged to the Patchogue River. An adequately sized, on-site water treatment facility would require significant space in addition to adequate odor control measures. The awkward physical layout and small size of the site would not easily accommodate these facilities. Although it is possible to remove much of the contaminated soil without dewatering the excavation, reaching the remedial action objectives would remobilization of liquid tar along the bottom of the excavation could not be entirely prevented and verification sampling would prove difficult, if not impossible, since the bottom of the excavation could not be observed directly. Combined, these factors make the achievement and documentation of pre-release conditions through excavation (Alternative 3) unlikely. The same limitations apply to Alternative 4, but to a lesser degree. Alternative 5 does not require direct observation of the conditions at the bottom of an excavation, since the solidification can simply be extended further into the ground to address any uncertainties.

Alternative 2 has the lowest cost, but would leave the majority of contaminated soil and source material behind. With its large volume of soil handling and large scale dewatering effort, Alternative 3 at a present worth cost of $11,720,000 is by far the most expensive. Alternative 4 requires a smaller excavation which could be performed without extensive dewatering, and thus incurs a much lower costs. Alternative 5 is much less expensive than Alternative 3, but provides essentially the same level of overall protectiveness, with fewer impacts to the surrounding community.

The anticipated use of the site is commercial. Alternative 5 will achieve the conditions necessary to allow development of the property for restricted-residential, commercial and industrial uses. Also, the remaining contamination associated with Alternative 5 will be controllable with implementation of institutional controls and a site management plan.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

K - Patchogue MGP
Patchogue, Suffolk County, New York
Site No. 152182

The Proposed Remedial Action Plan (PRAP) for the Patchogue MGP site was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 23, 2011. The PRAP outlined the remedial measure proposed for the contaminated soil and groundwater at the Patchogue 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, 2011, which included a presentation of the remedial investigation and feasibility study (RI/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 25, 2011.

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

The following comments were received during the March 10, 2011 public meeting:

Comment 1: When was In Situ Solidification (ISS) technology first utilized to remediate MGP sites?

Response 1: Solidification is an established technology that has been used for over 20 years to treat a variety of residual wastes at industrial sites. ISS was implemented in 2001 at a former MGP site in Macon, Georgia for the treatment of coal tar residues in the saturated zone soil. The first use of ISS at a MGP site in New York was in 2007 at the Nyack Former MGP. ISS has been employed at 7 MGP sites across the state and is proposed and/or currently in design at 8 others.

Comment 2: Will local residents be notified before construction starts?

Response 2: Yes, fact sheets and public notices to announce the start of construction will be distributed in advance. The public is encouraged to sign up for the Department’s listserv for Suffolk County in order to receive fact sheets and notices on this and other remedial sites in the county (see http://lists.dec.state.ny.us/mailman/listinfo/suffolkcountycleanupnews).

Comment 3: If the soil in the area is so porous and sandy, how is it that NAPL only sank down 10-12 feet bgs? How do stringers (very thin seams of NAPL) form?

Response 3: The Patchogue MGP produced gas for a relatively short time period and consequently only a relatively small amount of MGP tar made its way into the subsurface. The tar found on MGP

sites, such as this site, is a dense non-aqueous phase liquid (DNAPL). DNAPLs are slightly heavier than water and are only slightly soluble in water. DNAPLs tend to sink vertically through porous, permeable soils. Although the sandy soils at this site appear to be generally homogenous, there are often subtle differences in layering that can cause the NAPL to run laterally and drop many times, creating a complex stair-step pattern of thin horizontal and vertical seams.

It appears the majority of the NAPL in the subsurface is within the first 10-12 feet below ground surface (bgs), but some NAPL has migrated in thin seams as deep as 22 feet bgs. This is not an uncommon migration scenario for NAPL at MGP sites.

Comment 4: Does the remedy include both excavation and in-situ solidification?

Response 4: Yes, both excavation and in-situ solidification are called for.

In the off-site area, to the east of the site, the contamination will be removed by excavation, and the excavation will be backfilled to the original grade with clean soil from off-site sources.

In the on-site area, a combination of solidification and excavation will be employed. The most contaminated material in the center of the site will be solidified to a depth of 23 feet. Outside this area, the top two feet of existing soil will be replaced with clean soil from off-site sources.

Three factors will determine how this work is performed. First, the solidified soil needs to be insulated from freeze-thaw cycling, so the intent is have sufficient soil cover over it when the job is finished to protect it from freezing. Second, the solidification process expands the volume of the soil. Third, we need to make room for the two foot layer of clean soil by removing the top two feet of existing soil. Combined, these factors will require that some soil will be removed for off-site disposal.

The exact sequence of activities in the on-site area will be determined in consultation with the contractor, but due to the high water table we anticipate that the solidification will be performed first. Following this, excess solidified soil will be removed and disposed off site, so that the top of the solidified mass lies far enough below the ground surface. Outside the solidified area, two feet of existing soils will be removed so that they can be replaced with clean soil from off-site sources.

Comment 5: You found that the greatest depth which contamination was found was at 22.4 feet. Why would you use solidification if you did not find contamination below 22.4 feet? By using this technology, aren't you solidifying material farther down than the contamination actually exists?

Response 5: Solidifying the impacted area to 23 feet bgs ensures that the contaminated soils are solidified. Additionally, the area to be solidified will extended laterally beyond the limits of contamination to assure that all impacted soils are solidified.

Comment 6: What's the intended use of the site?

Response 6: National Grid owns the property. It will control what is done with the property in the future. The ROD restrictions on the future use of the plant site property have been minimized to the

extent practicable allowing for the restricted residential use of the site, which allows for development consistent with surrounding properties and with local zoning regulations.

Comment 7: If you decide to develop this site and need to excavate, wouldn't this remedy defeat the purpose?

Response 7: No, the solidified material is soft enough to excavate with conventional equipment, but its overall bearing strength is increased during the solidification process. The site will be left with approximately 4-5 feet of clean material over the solidified area and a two foot cover system over the rest of the site. ISS mixing techniques can be adjusted to produce a range of soil strength; typically, this is in the range of 50-500 psi unconfined compressive strength, which is an improvement over the loose, sandy soils currently present at the site. Limitations are typically in place to ensure adequate strength, but also to prevent making the solidified mass too strong, to avoid creating a material that is difficult to excavate with conventional equipment during subsequent redevelopment. Please note that although the material is not as strong as commercial concrete, it is not "less stable." The long term stability of this material, particularly when isolated from freeze-thaw cycling is high.

The Former MGP in Kendall Square, Cambridge, Massachusetts has had several high rise buildings installed on ISS mass that was constructed from the surface to about 25 feet. This ISS was implemented in 2000 with additional parcels completed later.

Comment 8: If the site was to be developed, could you put a cellar there?

Response 8: The very high water table in this area largely precludes constructing a building with a basement.

Comment 9: Assuming the remedy is carried out as presented, would the site be suitable for any type of development, including residential?

Response 9: The remedy will restrict the use of the site to restricted-residential use. Restricted-residential use includes multi-family developments such as apartments or condominiums, but not single-family housing. It also allows for passive recreational uses, which are public uses with a reasonable potential for soil contact (i.e., parks, walking trails,) as well as commercial use and industrial use, based on local zoning considerations.

Comment 10: Will tests be conducted on the ISS mixtures first?

Response 10: Yes. Bench scale tests of the solidification mixture will performed to demonstrate that it will be successful in meeting the project's performance standards. Physical tests such as hydraulic conductivity and unconfined compressive strength (UCS) will be performed. Chemical tests such as leachability would be performed, as appropriate. The performance standards will be defined in the remedial design.

Comment 11: What are the grout mixtures composed of?

Response 11: The mixture will contain binding agents such as Portland cement, bentonite, fly ash, and/or cement kiln dust etc. The specific binding agents and their ratios will be dependent on the contractor and the results of the bench scale tests.

Comment 12: Are there any polymers that are mixed together with the grout?

Response 12: The Department would consider the use of polymers if they were proposed during the design, but they are not typically included in ISS formulations.

Comment 13: When I first read the PRAP, I thought you were going to excavate 10-12 feet of material. Why would you choose in-situ solidification instead of excavation? I thought DEC likes to dig these sites up and ship them out. What are the advantages of this over excavation? Is it cheaper?

Response 13: The Department has a preference for a permanent remedy; however site specific conditions can limit the feasibility of such a remedy. The high water table is the biggest limitation at this site. Any excavation to depth would require extensive dewatering of the excavation and/or the material removed from the excavation. This dewatering effort would not only be costly, but would involve on-site treatment and disposal of large amounts of treated water. Also the small size of the site and surrounding development provide little available space to support such excavation and groundwater treatment, while resulting in additional short term impacts on the surrounding community.

As for cost, the ISS remedy was not the least expensive alternative considered. ISS to the depths defined in the ROD will however be less expensive than the excavation remedy to pre-release conditions, while providing essentially the same level of overall protectiveness, with fewer impacts to the surrounding community. The ISS remedy was chosen because it was determined to be the best balance of the selection criteria. For a thorough discussion of the selection criteria, please see "Summary of the Proposed Remedy", in Exhibit E of the ROD.

Comment 14: Why wouldn't you excavate two feet before you do the in-situ solidification?

Response 14: See Response 4.

Comment 15: Since you overlap the columns as you drill, it seems the mixture will not be homogeneous after the process is completed. Is it possible you would miss any contamination?

Response 15: A sampling program will be performed during the solidification process; this program will ensure that all homogeneity performance standards are met.

Comment 16: How big is the area that will be treated with solidification?

Response 16: The volume of the solidified area is approximately 6,800 cubic yards.

Comment 17: Is there any potential to change the water flow of the Patchogue River due to disruption of the groundwater flow by the solidified soils?

Response 17: It is not expected that there will be a groundwater mounding problem given the very permeable soils. This will be verified before construction proceeds. A hydraulic analysis will be incorporated into the design to ensure that there are no unintended complications from the redirection of groundwater. If the models anticipate mounding, this can be mitigated to allow groundwater flow over the treated area.

Comment 18: Have any water quality tests been done of the Patchogue River?

Response 18: Yes. Surface water sampling in the Patchogue River shows no site-related contamination.

Comment 19: What type of monitoring will be done following the remedy? What will the frequency be and how long will it continue?

Response 19: Groundwater monitoring will be conducted to determine the degree of contaminant reduction associated with the source removal and natural attenuation processes. Initially groundwater monitoring will be conducted on at least an annual basis. The frequency and duration will be evaluated over time; however monitoring will continue until it has been shown that the remedy has successfully achieved its objectives.

Comment 20: In 2009, a letter was sent to National Grid from DEC concerned about sediments found in the river. Later samples alleviated these concerns. What happened? Why was DEC concerned and what were the results?

Response 20: The letter and subsequent additional investigation were in response to a request by the Suffolk County Department of Health. Subsequent sampling and probing of the river bottom confirmed that there were no site-related impacts.

Comment 21: When would you anticipate beginning the process?

Response 21: After the ROD is finalized, the detailed design of the remedy will begin. A fact sheet will announce the availability of the Remedial Design for public review. The Remedial Design will need to be approved by DEC.

Comment 22: When does the comment period end?

Response 22: The comment period ends March 25, 2011.

Comment 23: How long will the process take?

Response 23: Based on the schedule being discussed at this time, the design process should take 12 to 16 months. National Grid will need to have overhead electrical transmission lines relocated before any remedial construction can begin. The relocation of the transmission lines can only be done at certain times of year, when electricity usage is low. Construction could likely begin in the winter of 2012-2013.

National Grid submitted a letter dated March 23, 2011 which included the following comments:

Comment 24: National Grid would like to establish the rationale behind the decision made by the New York State Department of Environmental Conservation (NYSDEC) regarding the need to address the deeper materials considering the characteristics of the impacts at the Site.

At the beginning of the FFS process, a remedial alternative consisting of excavation to a depth of approximately 10 feet bgs was discussed and included in the Draft FFS dated June 2010. Based on comments generated during regulatory review of the June 2010 Draft FFS, National Grid was directed to develop remedial alternatives for the Site that would address the deeper impacts. National Grid would like to better understand the rationale behind the decision to address impacts deeper than ±10 feet bgs at the Site. Presently it is National Grid's opinion that the original remedy proposed in June 2010 would be effective in meeting the Remedial Action Objectives for the site and be protective of human health and the environment. As a result, National Grid requests that NYSDEC reconsider the originally proposed June 2010 remedy.

Response 24: The June 2010 FFS was not accepted by the Department, and it was determined that additional data was necessary to complete the selection of an appropriate remedy. Two phases of investigation were conducted subsequently, and the results were used to develop additional alternatives included in the 2011 Focused Feasibility Study.

The additional investigation clarified the nature and extent of deeper tar contamination. Although the majority of the NAPL in the subsurface appeared to be within the first 10-12 feet bgs, most of the soil borings sampled in the center of the site during this work encountered significant seams (thicknesses ranging from less than an inch to several feet) of NAPL below the 10-12 foot level. This material would not have been addressed by National Grid's original June 2010 proposal. Although challenging to reach with conventional excavation techniques, these contaminated materials can be readily addressed using in situ solidification (ISS).

DER-10 requires that a remedial party evaluate protection of public health and the environment, source contamination, and groundwater protection and control measures as baseline considerations when developing alternatives. Removal and/or treatment of the sources of contamination identified should be considered the preference in the hierarchy of response actions; and such contamination shall be removed or treated to the greatest extent feasible.

Suffolk County Department of Health Services submitted a letter (dated March 25, 2011) which included the following comments:

Comment 25: As per the Brown and Caldwell Feasibility Study of June 2010 Alternative 5 would immobilize the contaminants on site rather than remove them like Alternative 4. Brown and Caldwell also state, "Further costs associated with treatability studies, excavation and off-site treatment/disposal of soils due to swell and undefined costs associated with stabilization agents and mixing methods would result in Alternative 5 not being cost effective for this application."

Response 25: The June 2010 FS was not accepted by DEC. The FS upon which the PRAP was

based was revised in March 2011, to address contamination present at greater depth than evaluated by the June 2010 FS. This document is available in the repositories and on-line. Also see Response 24.

Comment 26: The process of in-situ solidification (ISS) would cause swelling and needs to be removed. To get below the frost line requires removal of approximately 4-5' of "homogenized" MGP tar impacted source material that must be disposed of as hazardous waste.

Response 26: Following solidification, the top 4 feet of material will be removed to eliminate the possibility of freeze-thaw cracking of the solidified mass. This material generally is not expected to require disposal as hazardous waste.

Comment 27: Removal of subsurface obstructions is necessary prior to the ISS process. Once removed, the MGP impacted soil becomes more accessible making Alternative 4 a viable alternative.

Response 27: The RI showed that there are very few subsurface obstructions in the area slated for soil stabilization. Subsurface obstructions were not a limiting factor during remedy selection.

Comment 28: Although compared to concrete, the actual solidification mixture is about 10% the strength of actual concrete. Average concrete has strength rating of at least 3000 psi (after 28 days). At the public meeting held on March 10, 2011 at the Patchogue Fire Department, Gardiner Cross stated that the hardened solidification mixture has a strength rating far less than concrete, about 300 psi or the consistency of a "stale cookie". The Suffolk County Department of Health Services (SCDHS) has concerns about the integrity of encapsulated MGP impacted mass in the water table. Will this mixture support the foundation of future structures?

Response 28: The soil stabilization technology called for is commonly used in the construction industry to permanently increase the strength of soils prior to the construction of large engineered structures such as buildings and bridges. As such, it has an established track record in upstate locations with more severe winters. Mechanical, freeze-thaw cracking of the solidified mass is a potential concern, but this has been addressed by the removal of material near the ground surface that would be subject to freeze-thaw cycling and placement of a clean soil cover. Below the water table, such temperature cycling does not occur. See also Response 7.

Comment 29: ISS requires mixing contaminated soil, Portland cement, bentonite and fly ash. The use of fly ash is questionable due to its toxic nature (metal content).

Response 29: Fly ash has been routinely used for years as an ingredient in a variety of concrete formulations, including highway pavement. Its potential use here does not present any additional risk. The Department notes that EPA approves the application of fly ash in concrete (see http://www.epa.gov/epawaste/conserve/rrr/imr/ccps/flyash.htm) See also Response 11.

Comment 30: The success of ISS is dependent on complete homogenization of the tar impacted soil.

Response 30: The success of ISS is indeed dependent on thorough mixing of impacted soils. However, experience at other sites has shown that this degree of mixing is readily achievable with

conventional excavation equipment such as backhoes, or with augers mounted on cranes or excavators. The relatively uniform, sandy soils at this site are particularly favorable for achieving complete mixing. A post-stabilization sampling program will be included in the Remedial Design to verify that this mixing has been achieved. See also Response 15.

Comment 31: There is no previous application in Suffolk County and this method is not consistent with other Suffolk County MGP clean up strategies.

Response 31: Remedial decisions are made based on site-specific characteristics and limitations; and consequently there are different remedies for different sites. The NYSDEC has implemented ISS remedies on MGP sites throughout the state, and yet other ISS remedies are being designed. Further, while ISS has not been applied at other *MGP* sites in Suffolk County, the technique has been applied here, e.g., the Dzus Fasteners Site (NYSDEC Site No. 152033) in West Islip used ISS successfully to solidify approximately 8,100 cubic yards of metals-contaminated soils in December 1996.

Comment 32: Due to the many uncertainties associated with the selected proposed remedy Alternative 5: In-Situ Solidification of MGP Tar Impacted Source Material, SCDHS recommends remedial Alternative 4: Excavation of MGP Tar Impacted Source Materials.

Response 32: See Responses 13, 24, and 31.

Adrienne Esposito, Executive Director, Citizens Campaign for the Environment submitted a letter (dated March 25, 2011) which included the following comments:

Comment 33: Comment 33: The Remedial Action Plan should be most protective of public health and the environment. The Plan needs to include removal of a minimum of the first ten feet of source material contamination on site. The Village is undergoing a positive transformation which includes the re-development of the waterfront area. The redevelopment of this area from industrial/commercial to residential is currently being considered. The redevelopment of adjacent properties is critical for the establishment of the much discussed and strongly supported River Walk in the village. This will result in greater public access to the river and increased community exposure to contamination if it is not effectively remediated. Increased homes, docking and public access to the waterway will inevitably increase public activity in this area including fishing, crabbing and wading in the river. Clean up methods need to be designed around increased public use and direct contact within the property and surrounding properties. To ensure a permanent remediation for the Patchogue community CCE is recommending that a minimum of ten feet be excavated and removed from the site.

Response 33: Anticipated restrictions on the future use of the plant site property have been minimized. The remedy will achieve the conditions necessary to allow development of the property for restricted-residential uses as described in Part 375-1.8(g). Also see Responses 6 and 9.

Comment 34: CCE does not believe the dewatering challenges are greater than exist at other MGP sites across Long Island. As you are well aware, Bay Shore remediation dug down 30 feet into the water table. Other sites where source material was removed include Sag Harbor and Halesite. The proposal to use solidification is NOT consistent with remedies conducted for other communities.

CCE is left wondering if the desire to leave the source material on site in Patchogue is driven less by technology constraints and more by money constraints. In fact, this preferred option has not been utilized on Long Island.

Response 34: None of the other sites mentioned presented comparable dewatering challenges, particularly the challenge of verifying the completeness of contaminant removal in a wet excavation,

At Halesite, the majority of the deep excavation took place on a dry, sandy hillside above the water table. At Bay Shore, soils were removed to a depth roughly 20 feet below the water table. However, this was only one component of a multi-tiered remedy. Contamination reached much further down (to approximately 70 feet) and the remedy was not intended to remove all of it. Consequently, the excavation was conducted in the wet, with an understanding that significant volumes of contaminated soil would remain, to be addressed by other components of the remedy. It was not intended to demonstrate a "clean bottom" of the excavation.

At Sag Harbor, soils were removed to approximately 10 feet below the water table in a setting superficially similar to Patchogue, but with an important difference. A peat layer was present at Sag Harbor, which significantly limited the amount of water which entered the excavation. This situation does not exist at Patchogue. Also significantly more space was available for staging and the large dewatering system necessary to achieve the excavation required. Also see Response 13.

The Patchogue site will have a complete remedy. ISS techniques can readily reach the full vertical and horizontal extent of the contaminated mass, allowing the site to be addressed in its entirety—an opportunity that was not present at the other three sites.

Comment 35: Solidification process seems to limit how the property may be used in the future. When we discussed the composition of the solidified material at the March 10th meeting, DEC stated that it would be the consistency of a "stale cookie", and "much less stable than concrete". It was compared to "soft, crumbly concrete." Not too many buildings can be built on stale cookies, or soft, crumbly concrete. However, perhaps I am wrong. If you have examples where buildings have been constructed on this mixture I would be happy to review them.

Response 35: See Response 7.

Comment 36: Removal of the subsurface obstructions is necessary prior to the ISS process. Once removed, the MGP contaminate soil becomes more accessible, making the removal option of source MGP contamination a viable and sensible alternative.

Response 36: See Response 27.

APPENDIX B

Administrative Record

Administrative Record

K - Patchogue MGP
Patchogue, Suffolk County, New York
Site No. 152182

1. Proposed Remedial Action Plan for the Patchogue MGP site, dated March 2011, prepared by the Department.

2. Order on Consent, Index No. A2-0552-0606, between the Department and National Grid executed in February 2007.

3. "Preliminary Site Assessment Report Order on Consent D1-0001-99-05, NYSDEC Site No. 1-52-182 Former Patchogue MGP Site, Village of Patchogue, Suffolk County, New York," March 2002, prepared by Vanasse Hangen Brustlin, Inc.

4. "Final Remedial Investigation Report for the Patchogue Former MGP Site, Patchogue, Suffolk County, New York", December 2009, prepared by TetraTech EC.

5. "Letter Work Plan for Pre-Design Investigation Activities, Patchogue Former MGP Site", May 2010, prepared by Brown and Caldwell.

6. "Letter Supplemental Pre-Design Investigation, Patchogue Former MGP Site", September 2010, prepared by National Grid.

7. "Feasibility Study Patchogue Former MGP Site, NYSDEC Site No. 1-52-182, Village of Patchogue, Suffolk County, New York", March 2011, prepared by AECOM.

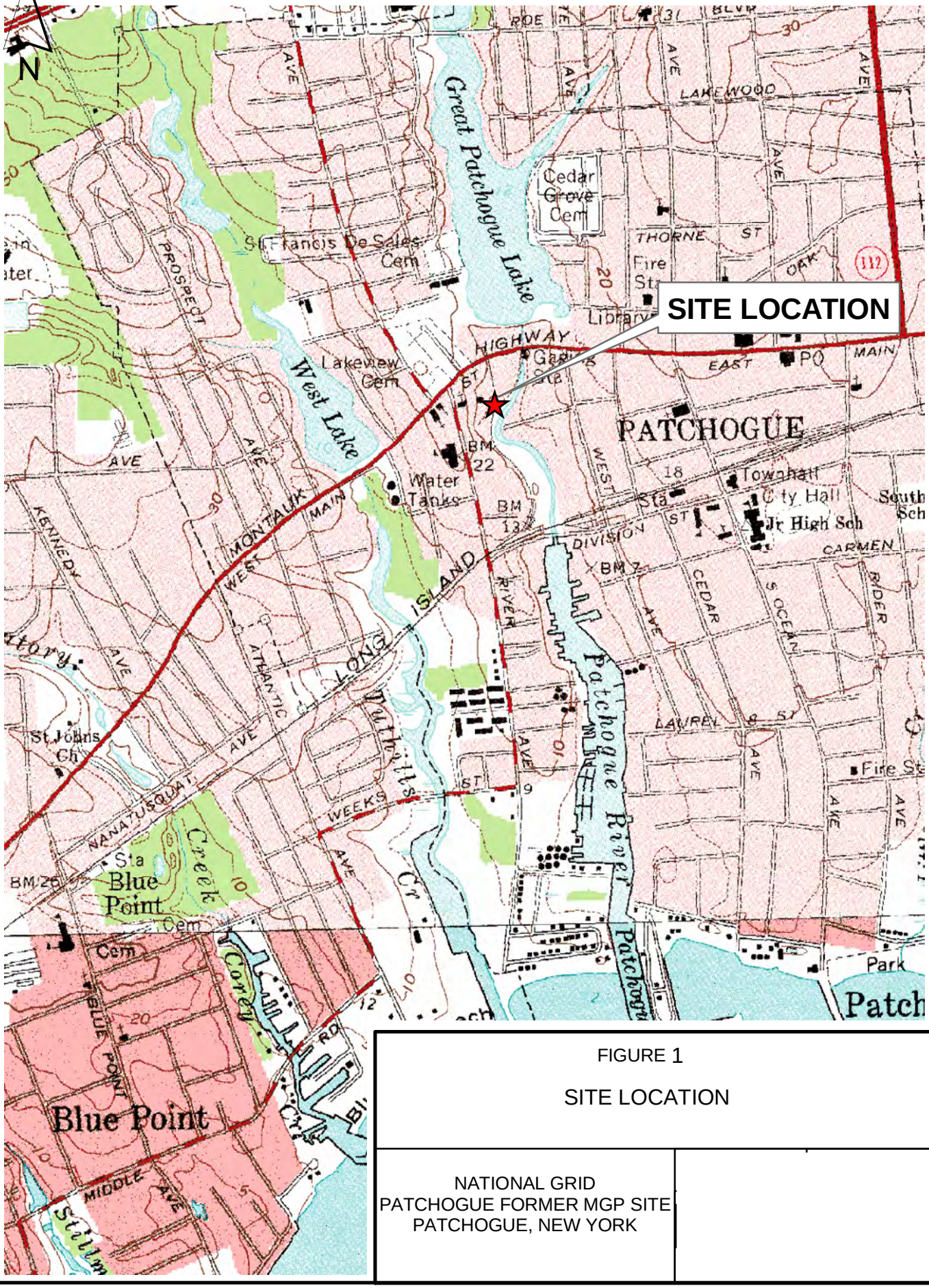


FIGURE 1

SITE LOCATION

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

P:\GIS\National_Grid\Patchogue\Patchogue_Site_Location.mxd

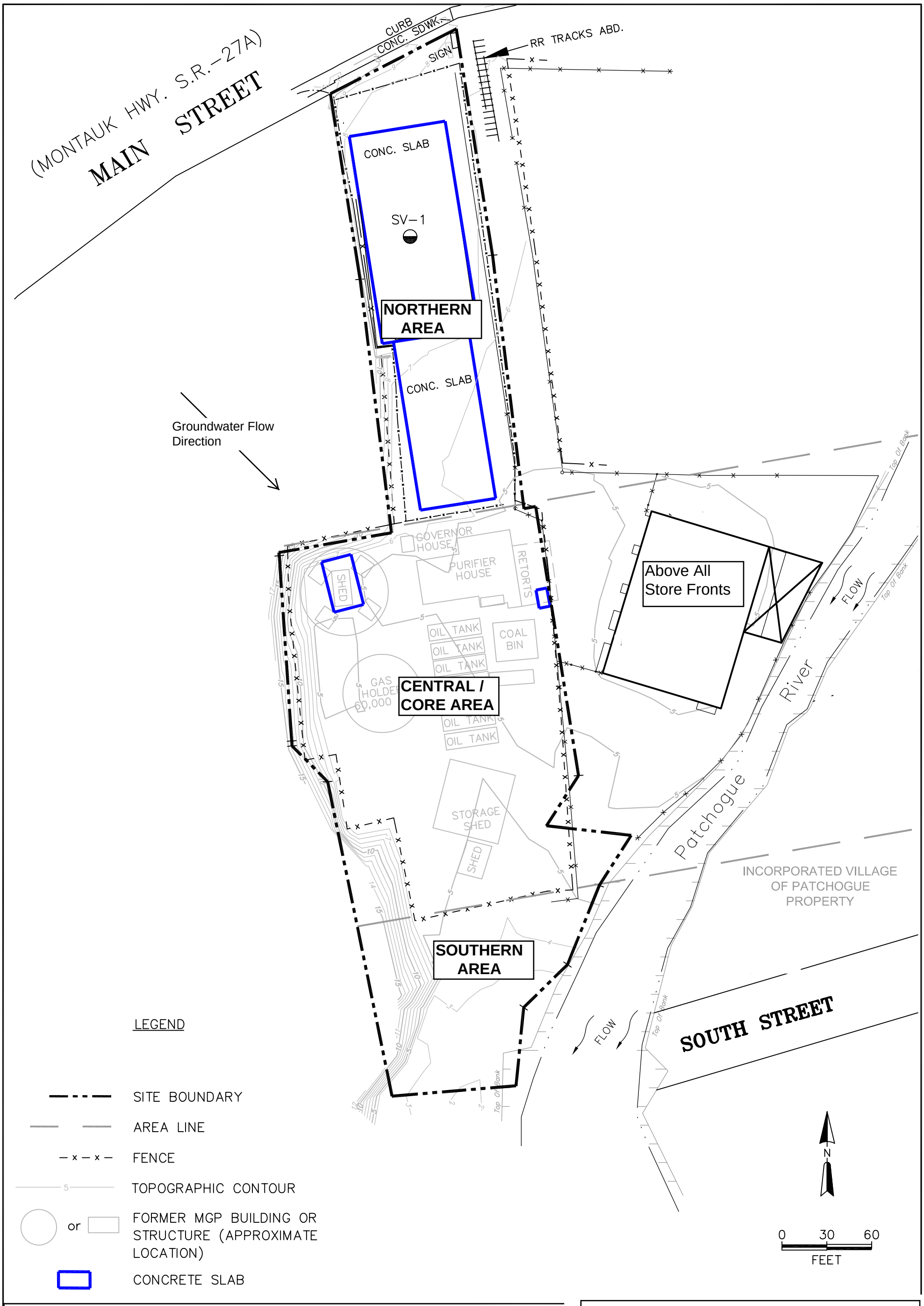


FIGURE 2:

SITE PLAN

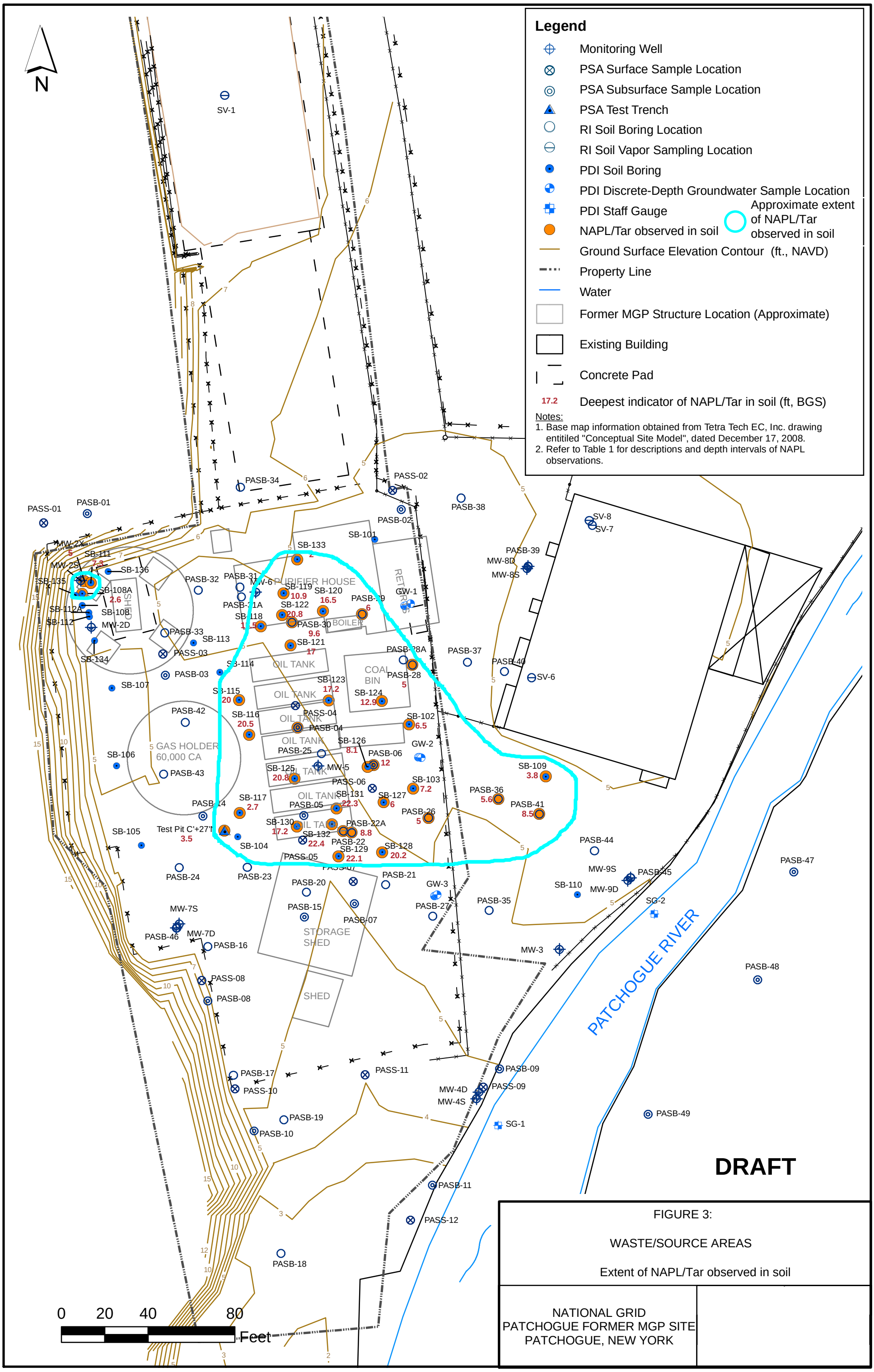
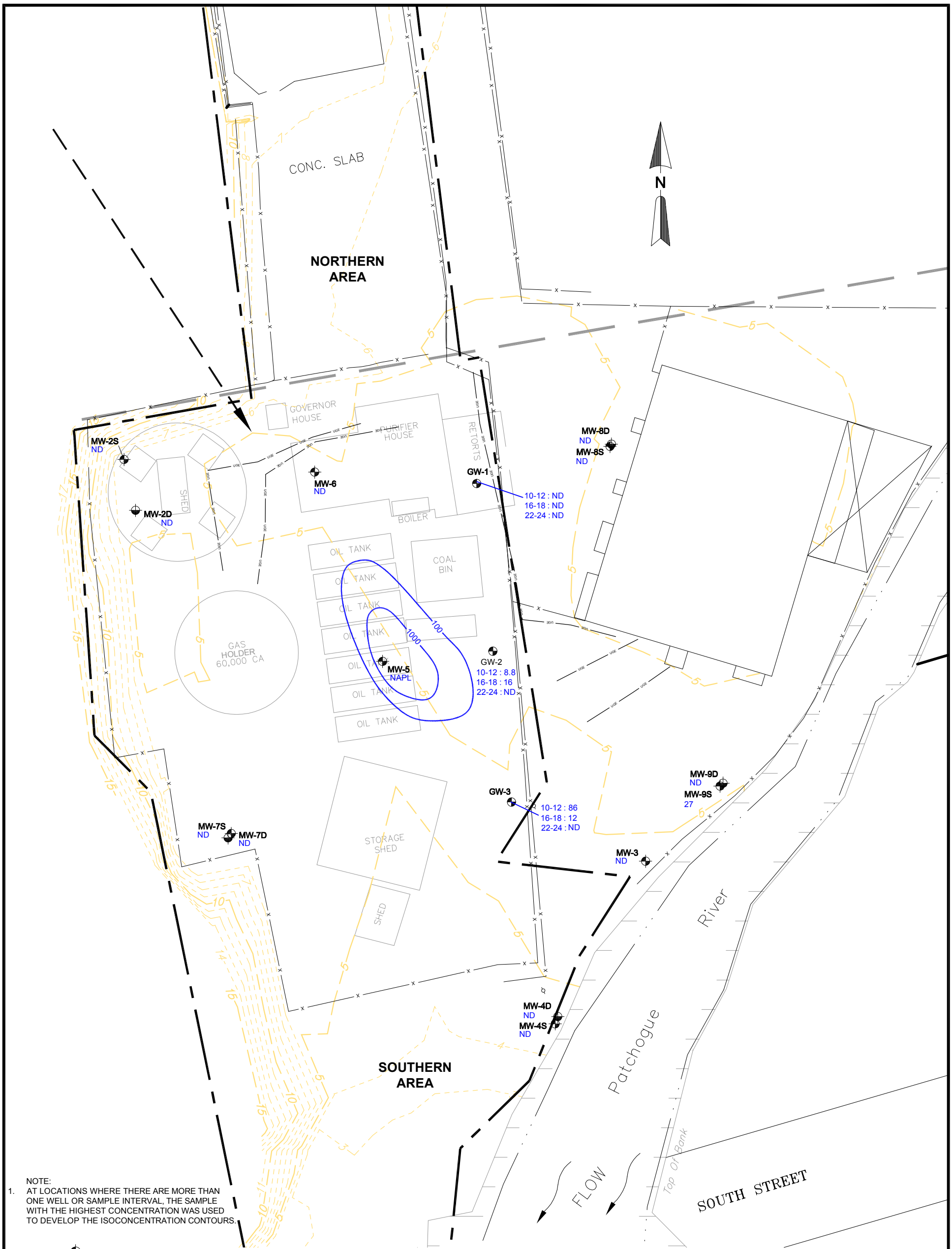


FIGURE 3:

WASTE/SOURCE AREAS

Extent of NAPL/Tar observed in soil

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK



NOTE:
1. AT LOCATIONS WHERE THERE ARE MORE THAN ONE WELL OR SAMPLE INTERVAL, THE SAMPLE WITH THE HIGHEST CONCENTRATION WAS USED TO DEVELOP THE ISOCONCENTRATION CONTOURS.

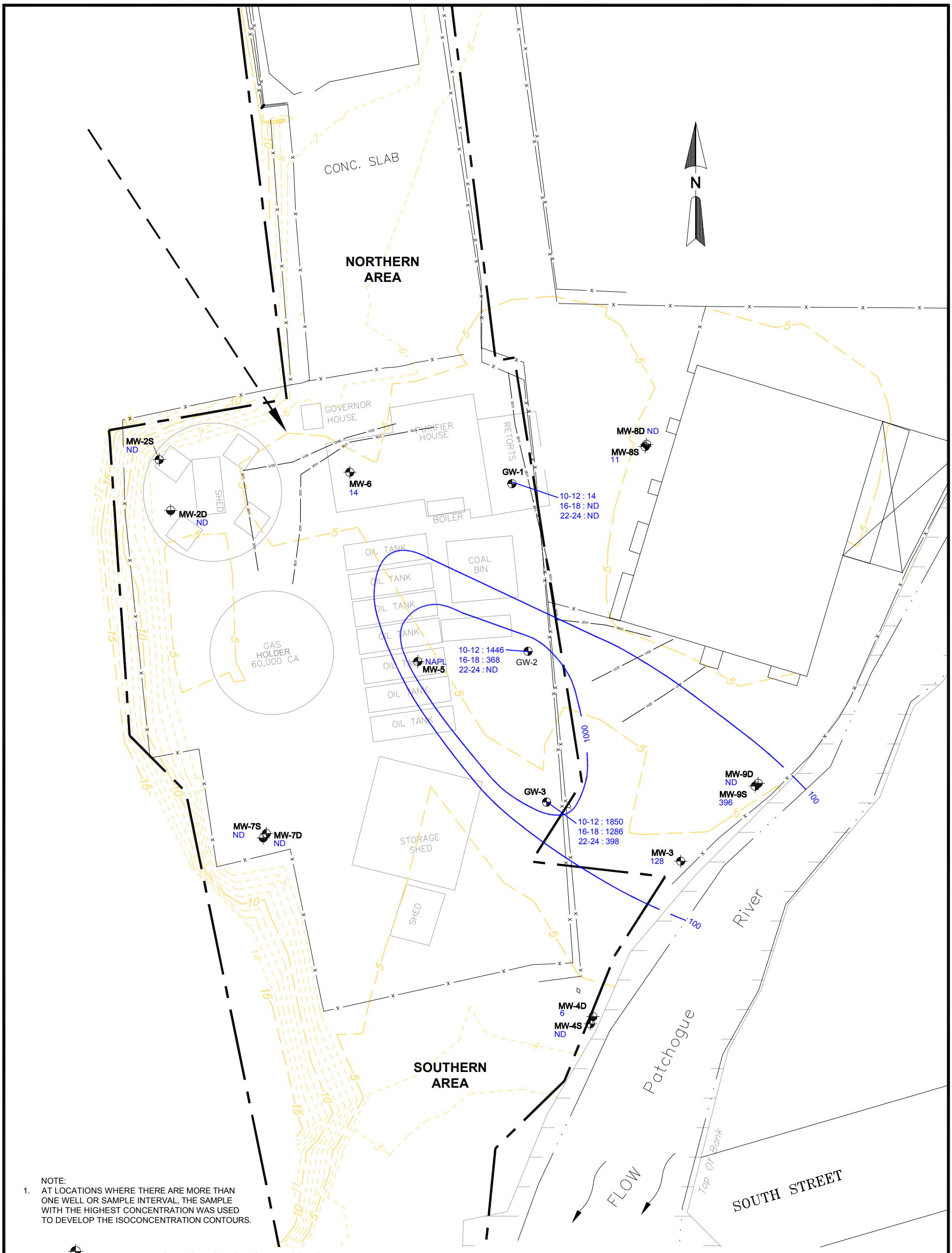
	RI SHALLOW MONITORING WELL LOCATION
	RI DEEP MONITORING WELL LOCATION
	PDI DISCRETE-DEPTH GROUNDWATER SAMPLE LOCATION
	PROPERTY LINE
x	FENCE
5	TOPOGRAPHIC CONTOUR
UGE	UNDERGROUND ELECTRIC
100	ISOCONCENTRATION CONTOUR (ug/L) (SEE NOTE 1)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
27	TOTAL PAH CONCENTRATION (ug/L) IN GROUNDWATER FROM MONITORING WELL SAMPLE
10-12 : 8.8	TOTAL BTEX CONCENTRATION (ug/L) IN GROUNDWATER FROM DISCRETE-DEPTH GROUNDWATER SAMPLES. DEPTH INTERVAL (FT. BELOW GRADE) TO LEFT OF CONCENTRATION.
BTEX	BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
NAPL	NON-AQUEOUS PHASE LIQUID DETECTED IN WELL, NO SAMPLE COLLECTED.
ND	NOT DETECTED

0 40 80
SCALE IN FEET

DRAFT

FIGURE 4a:
BTEX IN GROUNDWATER
SEPTEMBER/OCTOBER 2010

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK



NOTE:
1. AT LOCATIONS WHERE THERE ARE MORE THAN ONE WELL OR SAMPLE INTERVAL, THE SAMPLE WITH THE HIGHEST CONCENTRATION WAS USED TO DEVELOP THE ISOCONCENTRATION CONTOURS.

	RI SHALLOW MONITORING WELL LOCATION
	RI DEEP MONITORING WELL LOCATION
	PDI DISCRETE-DEPTH GROUNDWATER SAMPLE LOCATION
	PROPERTY LINE
x x	FENCE
5	TOPOGRAPHIC CONTOUR
UGE UGE UGE	UNDERGROUND ELECTRIC
100	ISOCONCENTRATION CONTOUR (ug/L) DASHED WHERE INFERRED (SEE NOTE 1)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
14	TOTAL PAH CONCENTRATION (ug/L) IN GROUNDWATER FROM MONITORING WELL SAMPLE
10-12 : 14	TOTAL PAH CONCENTRATION (ug/L) IN GROUNDWATER FROM DISCRETE-DEPTH GROUNDWATER SAMPLES. DEPTH INTERVAL (FT. BELOW GRADE) TO LEFT OF CONCENTRATION.
PAH	POLYCYCLIC AROMATIC HYROCARBONS
NAPL	NON-AQUEOUS PHASE LIQUID DETECTED IN WELL, NO SAMPLE COLLECTED.
ND	NOT DETECTED

0 40 80
SCALE IN FEET

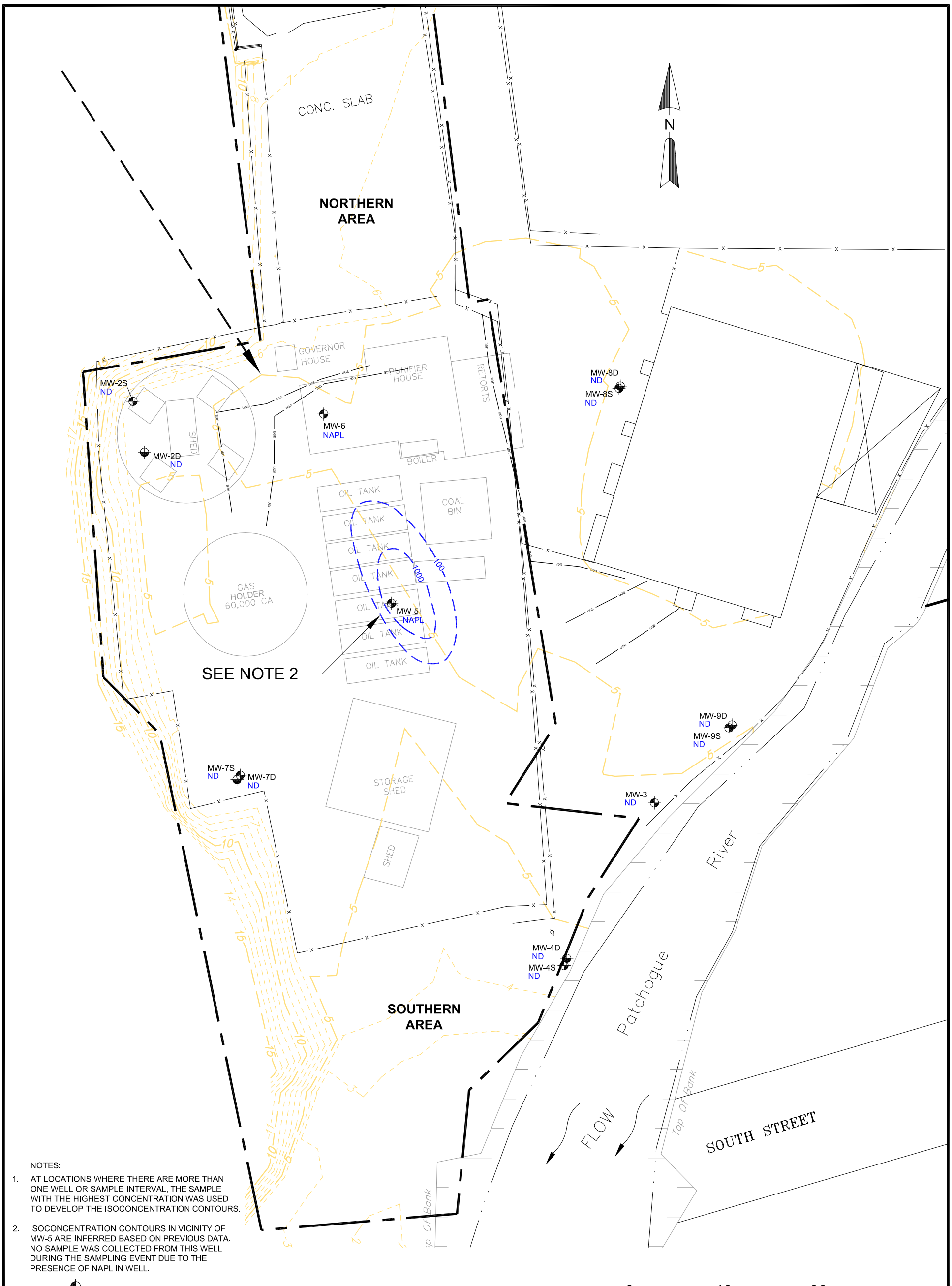
DRAFT

FIGURE 4b:
PAH IN GROUNDWATER
SEPTEMBER/OCTOBER 2010

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

DATE	PROJECT NUMBER
1/11	138893

Brown AND Caldwell
ASSOCIATES
ALLENDALE, NEW JERSEY



NOTES:

1. AT LOCATIONS WHERE THERE ARE MORE THAN ONE WELL OR SAMPLE INTERVAL, THE SAMPLE WITH THE HIGHEST CONCENTRATION WAS USED TO DEVELOP THE ISOCONCENTRATION CONTOURS.
2. ISOCONCENTRATION CONTOURS IN VICINITY OF MW-5 ARE INFERRED BASED ON PREVIOUS DATA. NO SAMPLE WAS COLLECTED FROM THIS WELL DURING THE SAMPLING EVENT DUE TO THE PRESENCE OF NAPL IN WELL.

	RI SHALLOW MONITORING WELL LOCATION
	RI DEEP MONITORING WELL LOCATION
	PDI DISCRETE-DEPTH GROUNDWATER SAMPLE LOCATION
	PROPERTY LINE
x x	FENCE
5	TOPOGRAPHIC CONTOUR
UGE UGE UGE	UNDERGROUND ELECTRIC
100	ISOCONCENTRATION CONTOUR (ug/L) DASHED WHERE INFERRED (SEE NOTE 1)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
1257	TOTAL BTEX CONCENTRATION (ug/L) IN GROUNDWATER FROM MONITORING WELL SAMPLE
BTEXT	BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
NAPL	NON-AQUEOUS PHASE LIQUID DETECTED IN WELL, NO SAMPLE COLLECTED.
ND	NOT DETECTED

0 40 80
SCALE IN FEET

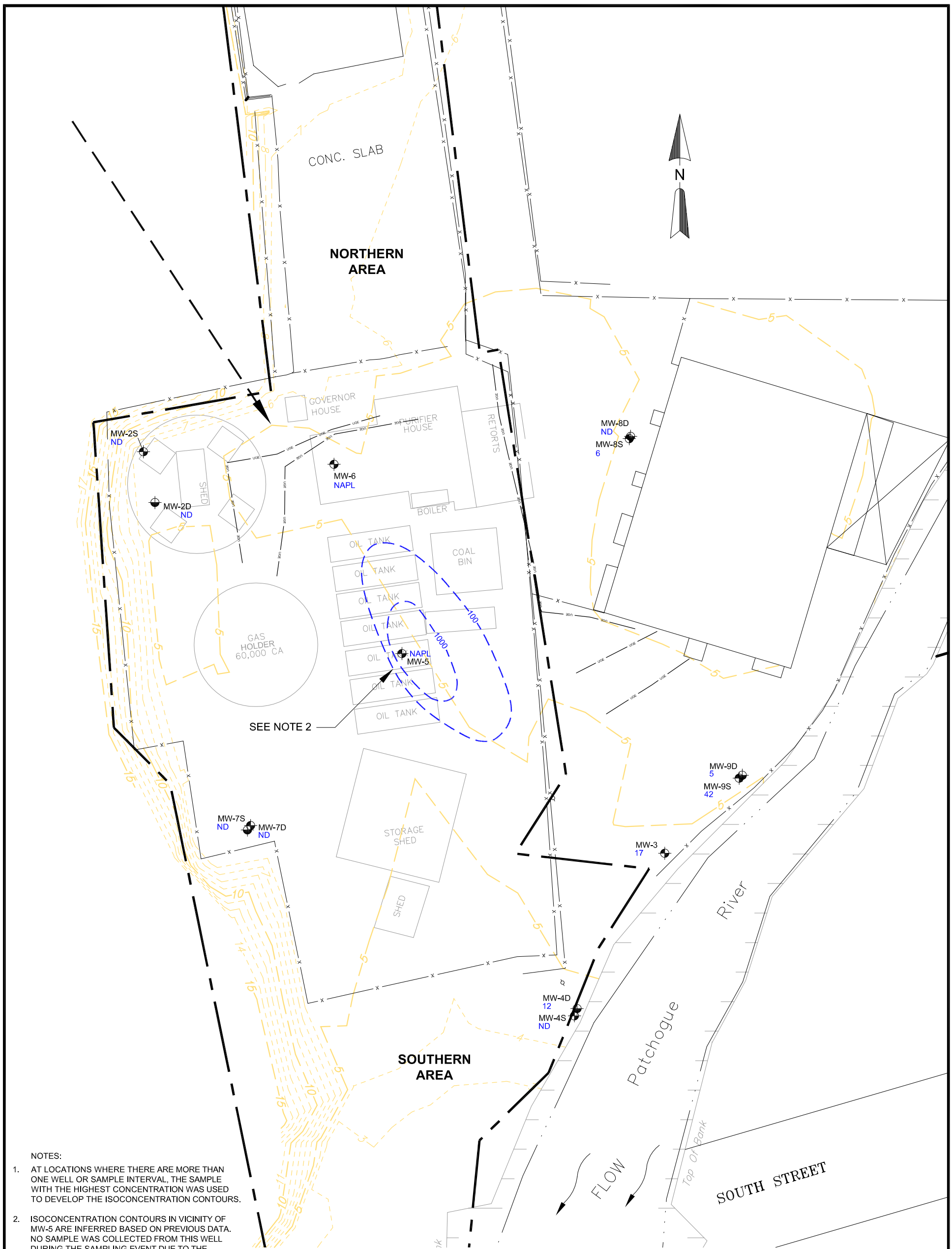
DRAFT

FIGURE 4c:
BTEX IN GROUNDWATER
JANUARY 2011

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

DATE	PROJECT NUMBER
1/11	138893

Brown AND Caldwell
ASSOCIATES
ALLENDALE, NEW JERSEY



NOTES:

1. AT LOCATIONS WHERE THERE ARE MORE THAN ONE WELL OR SAMPLE INTERVAL, THE SAMPLE WITH THE HIGHEST CONCENTRATION WAS USED TO DEVELOP THE ISOCONCENTRATION CONTOURS.
2. ISOCONCENTRATION CONTOURS IN VICINITY OF MW-5 ARE INFERRED BASED ON PREVIOUS DATA. NO SAMPLE WAS COLLECTED FROM THIS WELL DURING THE SAMPLING EVENT DUE TO THE PRESENCE OF NAPL IN WELL.

	RI SHALLOW MONITORING WELL LOCATION
	RI DEEP MONITORING WELL LOCATION
	PDI DISCRETE-DEPTH GROUNDWATER SAMPLE LOCATION
	PROPERTY LINE
	FENCE
5	TOPOGRAPHIC CONTOUR
	UNDERGROUND ELECTRIC
100	ISOCONCENTRATION CONTOUR (ug/L) DASHED WHERE INFERRED (SEE NOTE 1)
	APPROXIMATE GROUNDWATER FLOW DIRECTION
1257	TOTAL BTEX CONCENTRATION (ug/L) IN GROUNDWATER FROM MONITORING WELL SAMPLE
BTEXT	BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
NAPL	NON-AQUEOUS PHASE LIQUID DETECTED IN WELL, NO SAMPLE COLLECTED.
ND	NOT DETECTED

0 40 80
SCALE IN FEET

DRAFT

FIGURE 4d:
PAH IN GROUNDWATER
JANUARY 2011

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

DATE	PROJECT NUMBER
1/11	138893

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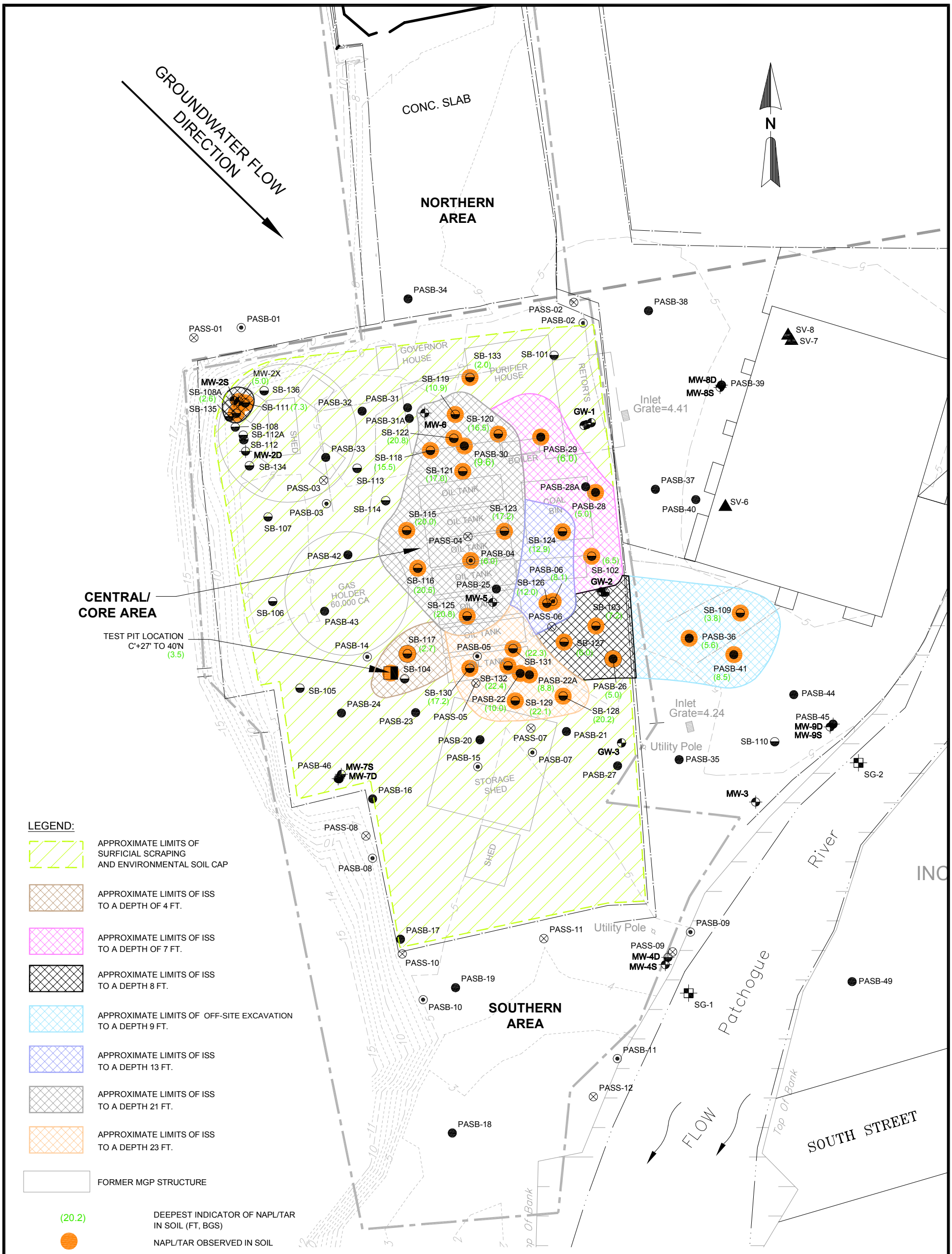

LEGEND:

- APPROXIMATE LIMITS OF SURFICIAL SCRAPING AND ENVIRONMENTAL SOIL CAP
- APPROXIMATE LIMITS OF ISS TO A DEPTH OF 4 FT.
- APPROXIMATE LIMITS OF ISS TO A DEPTH OF 7 FT.
- APPROXIMATE LIMITS OF ISS TO A DEPTH 8 FT.
- APPROXIMATE LIMITS OF OFF-SITE EXCAVATION TO A DEPTH 9 FT.
- APPROXIMATE LIMITS OF ISS TO A DEPTH 13 FT.
- APPROXIMATE LIMITS OF ISS TO A DEPTH 21 FT.
- APPROXIMATE LIMITS OF ISS TO A DEPTH 23 FT.
- FORMER MGP STRUCTURE
- (20.2) DEEPEST INDICATOR OF NAPL/TAR IN SOIL (FT, BGS)
- NAPL/TAR OBSERVED IN SOIL
- TEST TRENCH SAMPLE LOCATION
- PSA SURFACE SAMPLE LOCATION
- PSA SUBSURFACE SAMPLE LOCATION
- RI SOIL BORING LOCATION
- RI SOIL VAPOR SAMPLE LOCATION
- RI SHALLOW MONITORING WELL LOCATION
- RI DEEP MONITORING WELL LOCATION
- PDI DISCRETE-DEPTH GROUNDWATER SAMPLE LOCATION
- PDI STAFF GAUGE
- PDI SOIL BORING LOCATION
- PROPERTY LINE
- FENCE
- 5 TOPOGRAPHIC CONTOUR
- UNDERGROUND ELECTRIC

0 20 40
SCALE IN FEET

DRAFT

FIGURE 5

ALTERNATIVE 5
IN-SITU STABILIZATION (ISS) OF MGP TAR-IMPACTED SOURCE MATERIALS

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

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