RECORD OF DECISION

OR - Nyack MGP
Operable Unit Number: 02
Nyack, Rockland County
Site No. 344046
March 2011

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

DECLARATION STATEMENT - RECORD OF DECISION

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Operable Unit Number: 02
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Statement of Purpose and Basis

This document presents the remedy for Operable Unit Number: 02 of the OR - Nyack MGP site, a Class 2 inactive hazardous waste disposal 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 Operable Unit Number: 02 of the OR - Nyack 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. A pre-design investigation will be necessary to confirm sediment conditions north of the boat club dock and in the immediate vicinity of off-shore mooring structures (a.k.a. the "dolphins") and to confirm conditions in the on-shore and intertidal areas. 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:
a. Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
b. Reducing direct and indirect greenhouse gas and other emissions;
c. Increasing energy efficiency and minimizing use of non-renewable energy;
d. Conserving and efficiently managing resources and materials;
e. Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste. To support these objectives, the Department would consider incorporating excess stabilized soil into the existing, OU1 monolith;
f. Maximizing habitat value and creating habitat when possible. This could include reusing oversized stone from the current rip-rap shoreline for restoration of the original shoreline and

intertidal zone in the vicinity of the jetty;
g. Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
h. Integrating the remedy with the end use where possible and encouraging green and sustainable re-development

2. On-shore areas (above the mean high water mark and below the existing ISS monolith which extends to the 100 year flood line) where MGP tar is present in the soil at less than 7 feet below ground surface (bgs) will be excavated and transported to a permitted, off-site treatment/disposal facility. The excavation will occur in a manner which controls emissions of odors, dust, and VOCs. Following excavation, slopes would be restored using existing soil/sediment/rip-rap meeting the cleanup criteria and vegetation.

3. On-shore areas where significant quantities of MGP tar are present at greater than 7 feet bgs will be treated using in-situ solidification (ISS). The ISS will create a low permeability cement monolith which will effectively isolate the MGP contamination from human contact and the environment, eliminating potential exposure pathways. Implementing ISS at this site will require conducting a treatability study to verify that the design standards (permeability less than 10-6 cm/sec and unconfined compressive strength between 50 and 500 psi) can be achieved by the ISS method being employed. Following solidification, post-mix sampling will be conducted to verify effectiveness. Appropriate steps will also be taken to protect the solidified soil from frost damage and wave erosion, and to isolate it from the environment.

4. Sediment (below the mean high water mark) which contains visible MGP tar or which, through multiple lines of evidence has been shown to contain MGP-related contamination resulting in an impact to the environment, will be removed by dredging and transported to a permitted, off-site treatment and disposal facility. The approximate extent of this removal is shown on Figure 6. Following completion of the remedial action, the steam bed and banks will be restored with a minimum 2 foot thick clean substrate layer. The design will include a restoration plan for areas disturbed by the remedy and will be consistent with the requirements of 6 NYCRR Part 608.

5. The remedy will result in some on-shore soil and solidified material remaining at the site which contains site contaminants at levels above restricted residential soil cleanup objectives (SCOs). These materials will be isolated from the public by a minimum of 2 feet of soil meeting restricted residential SCOs, or another barrier acceptable to the NYSDEC and NYSDOH (e.g., asphalt). For the areas where underlying soil does not meet SCOs, a demarcation layer will be provided. For areas where solidified material underlies the cover, the material itself will serve as the demarcation layer due to the nature of the material. The two feet of clean soil cover currently in place in OU1 will also be restored as necessary following OU2 remedial activities. This restoration will ensure that the remedy for OU1 will not be negatively impacted by the work proposed for OU2.

6. The remedy selected for Operable Unit 1 included the imposition of an institutional control. The following updates the requirements for that institutional control to be consistent with current regulations and guidance. The institutional control, in the form of an environmental

easement will:

a) require 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) allow the use and development of the controlled property for restricted residential, commercial and industrial uses as defined by Part 375-1.8(g), though land use is subject to local zoning laws;

c) restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;

d) prohibit agriculture or vegetable gardens on the controlled property;

e) require compliance with the Department approved Site Management Plan;

7. The remedy selected for Operable Unit 1 required a Site Management Plan. The following updates the requirements for that plan to be consistent with current regulations and guidance, including 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 ensure the following institutional and/or engineering controls remain in place and effective:

i) Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

ii) Engineering Controls: The soil cover discussed in Paragraph 5.

iii) This plan includes, but may not be limited to: (1) Soil Management Plan which details the provisions for management of future excavations in areas of remaining contamination; (2) descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions; (3) a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;(4)provisions for the management and inspection of the identified engineering controls;(5)maintaining site access controls and Department notification; and (6) the steps necessary for the periodic reviews and certification of the institutional and 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;

ii) Monitoring the steps taken to protect the solidified soil from frost damage and wave erosion, and to isolate it from the environment;

iii) monitoring the success of restoration;

iv) a schedule of monitoring and frequency of submittals to the Department;

v) monitoring for vapor intrusion for any buildings developed on the site, as may be required pursuant to item 7.a.iii above.

8. The property owner or remedial party will provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved

modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by 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

OR - Nyack MGP
Nyack, Rockland County
Site No. 344046
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 Nyack Manufactured Gas Plant (MGP) site a vacant property located on the west bank of the Hudson River in the downtown area of Nyack, Rockland County, NY.

Site Features: The site consists of an upper terrace at the elevation of Gedney Ave. and a lower terrace along the Hudson River. The entire site is currently landscaped to the rip/rap shoreline. The site is fenced to prevent trespassing.

Current Zoning/Use: Downtown Nyack has a blend of residential and commercial properties, including a marina immediately to the north and a multi-unit residential complex immediately to the south of the site. The site is zoned “waterfront,” which is intended to encourage uses along and near the Hudson River related to, and appropriate for, a waterfront area.

Historical Use: A manufactured gas plant (MGP) operated at this site from 1852 until 1965. Gas was made by heating coal and/or petroleum products in closed vessels. The gas was then cooled, purified, and distributed through a network of underground pipes in surrounding communities, where it was used in much the same way that natural gas is used today. Routine use of the plant was discontinued in 1938. From 1938 until 1965, the MGP was used only during times of peak demand, a practice known as “peak shaving.” The site-related contamination is coal tar, which

was a condensate from the gas manufacturing process. Tar would condense from the hot gas as it was being cooled and purified. Some of this tar escaped from pipes, storage vessels, and other subsurface structures into the surrounding soils. The locations of former MGP structures are shown on Figure 2.

Operable Units: The site has been divided into 2 operable units. An operable unit represents a portion of the site that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. This document pertains to Operable Unit 2.

Remediation of Operable Unit 1 (OU1), the portion of the site above the 100 year flood line, is complete. A large scale excavation was completed in the western portion of OU1 during 2006. Contaminated soils in two other areas to the south and east were treated with an in-situ solidification process in 2006 and 2007. The OU1 area was then covered with clean topsoil and restored to a park-like setting.

Operable Unit 2 (OU2), which is the subject of this document, consists of the remaining land (below the 100 year flood line and above the mean high water mark) and the Hudson River sediment which has been impacted by site-related contamination.

Site Geology and Hydrogeology: OU2 is covered with a varying thickness of fill. The jetty area which protrudes into the Hudson River has the thickest layer of fill (13 feet). A second significant area of fill is the slope between the upper and lower terraces, which was apparently placed after plant operations had ended. A layer of native silty sand generally underlies the fill material. A layer of glacial till was noted in one boring on the upper terrace. Underlying the silty sand is sandstone bedrock. The bedrock is a productive aquifer with the groundwater flowing upward through the bedrock. The overburden in the upper terrace is entirely above groundwater. In the lower terrace, groundwater is found in the overburden, and is seen to fluctuate with the tide, indicating some hydraulic communication between the river and the groundwater.

Operable Unit (OU) Number 02 is the subject of this document.

A Record of Decision was issued previously for OU 01.

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 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:

Orange and Rockland Utilities Inc.

The NYSDEC and Orange and Rockland Utilities, Inc. (O and R) entered into a Consent Order on January 2, 1996. This order was superseded by a second order dated March 5, 1999 (Index #D3-0001-98-08). These orders obligate O and R to investigate, and as necessary, remediate the Nyack Gas Plant Site.

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

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 for this Operable Unit at this site is/are:

coal tar	polycyclic aromatic hydrocarbons (PAHs), total

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

- groundwater
- soil
- sediment

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.*

Operable Unit 1:
Since the site is covered by a combination of asphalt and clean soil, people will not come in contact with subsurface contamination unless they dig below these cover materials. People are not drinking contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. They will not come into contact with contaminated groundwater unless they dig deeper than six feet below the ground surface.
Volatile organic compounds in the groundwater and/or soil may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect 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. Data indicate inhalation of site-related contaminants via soil vapor intrusion is not a concern off-site. The potential for soil vapor intrusion will be evaluated for any buildings developed on-site.

Operable Unit 2:
Persons who dig below the ground surface may come in contact with contaminants in subsurface soil. People may come in contact with contaminants present in shallow river sediments while entering or exiting the river.

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 02, 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 at this site is coal tar (a condensate from the gas manufacturing process). Coal tar contains BTEX compounds (benzene, toluene, ethylbenzene, and xylene) and PAHs (polycyclic aromatic hydrocarbons). Investigations have shown coal tar and contaminated groundwater to be present at the site. Site related contaminants have also been observed in the sediment in the Hudson River at levels above applicable sediment standards. No site related contamination has been observed in surface water at levels above applicable standards.

The site presents an environmental threat due to the ongoing presence of coal tar in the subsurface and releases of contamination from the coal tar into the groundwater and into the aquatic environment.

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 $14,300,000. The cost to construct the remedy is estimated to be $12,000,000 and the estimated average annual cost is $130,000.

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. A pre-design investigation will be necessary to confirm sediment conditions north of the boat club dock and in the immediate vicinity of off-shore mooring structures (a.k.a. the "dolphins") and to confirm conditions in the on-shore and intertidal areas. 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:
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b. Reducing direct and indirect greenhouse gas and other emissions;

c. Increasing energy efficiency and minimizing use of non-renewable energy;
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f. Maximizing habitat value and creating habitat when possible. This could include reusing oversized stone from the current rip-rap shoreline for restoration of the original shoreline and intertidal zone in the vicinity of the jetty;
g. Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
h. Integrating the remedy with the end use where possible and encouraging green and sustainable re-development

2. On-shore areas (above the mean high water mark and below the existing ISS monolith which extends to the 100 year flood line) where MGP tar is present in the soil at less than 7 feet below ground surface (bgs) will be excavated and transported to a permitted, off-site treatment/disposal facility. The excavation will occur in a manner which controls emissions of odors, dust, and VOCs. Following excavation, slopes would be restored using existing soil/sediment/rip-rap meeting the cleanup criteria and vegetation.

3. On-shore areas where significant quantities of MGP tar are present at greater than 7 feet bgs will be treated using in-situ solidification (ISS). The ISS will create a low permeability cement monolith which will effectively isolate the MGP contamination from human contact and the environment, eliminating potential exposure pathways. Implementing ISS at this site will require conducting a treatability study to verify that the design standards (permeability less than 10-6 cm/sec and unconfined compressive strength between 50 and 500 psi) can be achieved by the ISS method being employed. Following solidification, post-mix sampling will be conducted to verify effectiveness. Appropriate steps will also be taken to protect the solidified soil from frost damage and wave erosion, and to isolate it from the environment.

4. Sediment (below the mean high water mark) which contains visible MGP tar or which, through multiple lines of evidence has been shown to contain MGP-related contamination resulting in an impact to the environment, will be removed by dredging and transported to a permitted, off-site treatment and disposal facility. The approximate extent of this removal is shown on Figure 6. Following completion of the remedial action, the steam bed and banks will be restored with a minimum 2 foot thick clean substrate layer. The design will include a restoration plan for areas disturbed by the remedy and will be consistent with the requirements of 6 NYCRR Part 608.

5. The remedy will result in some on-shore soil and solidified material remaining at the site which contains site contaminants at levels above restricted residential soil cleanup objectives (SCOs). These materials will be isolated from the public by a minimum of 2 feet of soil meeting restricted residential SCOs, or another barrier acceptable to the NYSDEC and NYSDOH (e.g., asphalt). For the areas where underlying soil does not meet SCOs, a demarcation layer will be provided. For areas where solidified material underlies the cover, the material itself will serve as the demarcation layer due to the nature of the material. The two feet of clean soil cover currently

in place in OU1 will also be restored as necessary following OU2 remedial activities. This restoration will ensure that the remedy for OU1 will not be negatively impacted by the work proposed for OU2.

6. The remedy selected for Operable Unit 1 included the imposition of an institutional control. The following updates the requirements for that institutional control to be consistent with current regulations and guidance. The institutional control, in the form of an environmental easement will:

a) require 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) allow the use and development of the controlled property for restricted residential, commercial and industrial uses as defined by Part 375-1.8(g), though land use is subject to local zoning laws;

c) restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Department, NYSDOH or County DOH;

d) prohibit agriculture or vegetable gardens on the controlled property;

e) require compliance with the Department approved Site Management Plan;

7. The remedy selected for Operable Unit 1 required a Site Management Plan. The following updates the requirements for that plan to be consistent with current regulations and guidance, including 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 ensure the following institutional and/or engineering controls remain in place and effective:

i) Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

ii) Engineering Controls: The soil cover discussed in Paragraph 5.

iii) This plan includes, but may not be limited to: (1) Soil Management Plan which details the provisions for management of future excavations in areas of remaining contamination; (2) descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions; (3) a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;(4)provisions for the management and inspection of the identified engineering controls;(5)maintaining site access controls and Department notification; and (6) the steps necessary for the periodic reviews and certification of the institutional and 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;

ii) Monitoring the steps taken to protect the solidified soil from frost damage and wave erosion, and to isolate it from the environment;

iii) monitoring the success of restoration;

iv) a schedule of monitoring and frequency of submittals to the Department;

v) monitoring for vapor intrusion for any buildings developed on the site, as may be required pursuant to item 7.a.iii above.

8. The property owner or remedial party will provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.

Exhibit A

NATURE AND EXTENT OF CONTAMINATION

The principal waste product produced at the former MGP site was coal tar, which is an oily, dark colored liquid with a strong, objectionable odor. Unlike most materials labeled as "tar", this is not a semi-solid, viscous material. Rather, it has a physical consistency similar to motor oil, which enables it to move through the subsurface. Coal tar is referred to as a dense non-aqueous phase liquid or DNAPL since it is slightly heavier than water and will not readily dissolve in water. When released into the subsurface, it will sink through the groundwater until it reaches some less permeable material which it cannot penetrate. It can, under certain conditions, move laterally away from the point where it was initially released.

The tar contains high levels of volatile and semi-volatile organic compounds (VOCs and SVOCs). The principal VOCs are benzene, toluene, ethylbenzene, and xylenes. These compounds, collectively known as BTEX, are slightly soluble in water. Groundwater which comes into contact with tar or tar-contaminated soils will become contaminated with BTEX compounds. This contaminated groundwater can then move through the subsurface along with the ordinary groundwater flow.

The principal SVOCs in the tar are a group of compounds known as polycyclic aromatic hydrocarbons, commonly abbreviated as PAHs. PAH compounds are generally less soluble than BTEX, and are consequently less likely to dissolve in groundwater. This makes PAH compounds less mobile in the subsurface, so the highest levels of PAHs are normally found in close proximity to the tar from which they are derived. The specific semivolatile organic compounds of concern in soil and groundwater 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
dibenzo(a,h)anthracene	chrysene	fluoranthene	fluorene
indeno(1,2,3-cd) pyrene	2-methylnaphthalene	naphthalene	phenanthrene
pyrene			

In this document, PAH concentrations are referred to as total PAHs (TPAHs). The TPAH concentration is the sum of the concentrations of each PAH listed above.

All of the BTEX and PAH contaminants which dissolve in groundwater are subject to degradation by natural processes. Common soil bacteria are capable of using these chemical compounds as a food source, converting them to carbon dioxide and water. This degradation process takes place more rapidly when abundant oxygen is present in the groundwater, and can in many cases be expedited by the introduction of additional oxygen. However, contaminants which still remain in the tar itself, undissolved in water, remain beyond the reach of bacteria and can remain in their undegraded state indefinitely.

Figures 2 through 5 summarize the degree of contamination for the contaminants of concern in soil, groundwater, sediment and surface water and compare the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste/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 were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas identified at the site include locations where coal tar is present.

The extent of coal tar is shown on Figure 2. Some coal tar is present along the eastern edge of the area solidified in OU-1. Most of the contamination is found at depths of 10 feet or more below the ground surface.

However, one notable exception is the area immediately downgradient of the former MGP "drainage pits," just south of the jetty. Here tar is present in subsurface soil as shallow as 2.5 feet below the ground surface. This is also the only area coal tar was seen in the sediment.

Groundwater

The extent of groundwater contamination (both before and after completion of OU-1) is shown on Figure 4. The primary groundwater contaminants associated with the former MGP are benzene, toluene, ethylbenzene and xylene (BTEX). In OU-1, groundwater contamination in the bedrock in the upper terrace was addressed by removing the source material in the overburden, and treating coal tar in the bedrock with chemical oxidation.

Based on a comparison of the groundwater results before and after treatment, groundwater contamination has decreased in that treatment area. However, immediately downgradient of the solidified area, significant groundwater contamination is still present where the groundwater is still in direct contact with coal tar. The highest levels of groundwater contamination are directly downgradient of the former drainage pits.

Table 1 – Groundwater OU2 On-Shore Area

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Benzene	5,000 – 11,000	1	2 of 2
Toluene	11 - 1,500	5	2 of 2
Ethylbenzene	230 - 2,500	5	2 of 2
Xylene	130 – 3,300	5	2 of 2

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).

Based on the findings of the RI, the disposal of hazardous waste has resulted in the contamination of groundwater with benzene, toluene, ethylbenzene and xylene (BTEX). These contaminants are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process.

Soil

Subsurface soil samples were collected at the site during the RI. Since the area of OU-2 is limited to the intertidal zone and the Hudson River, surface material is addressed as sediment and not surface soil. The results indicate that underlying soils that are visibly impacted by coal tar exceed the unrestricted SCG for volatile and semi-volatile organics. The principal volatile organic chemicals of concern are the BTEX compounds, and the principal semi-volatile organic chemicals of concern are the PAH compounds. The BTEX compounds are generally co-located with the PAHs. At this site, remediation will be driven by PAHs, which are shown on Figure 3.

Table 2 – Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Residential/ Ecological resources SCG[c] (ppm)	Frequency Exceeding Restricted SCG
VOCs:					
Acetone	Undetected-1.7	0.05	54/55	2.2	0/55
Benzene	Undetected-7.5	0.06	16/55	4.8	2/55
Toluene	Undetected-1.3	0.7	1/55	36	0/55
Ethylbenzene	Undetected-220	1	14/55	41	2/55
Xylene	0.02-38	0.26	15/55	.26	15/55
SVOCs:					
Acenaphthene	Undetected-1400	20	17/55	20	17/55
Acenaphthylene	Undetected-170	100	1/55	100	1/55
Anthracene	Undetected-760	100	2/55	100	2/55
Benzo(a)anthracene	Undetected-430	1	27/55	1	27/55
Benzo(a)pyrene	Undetected-360	1	26/55	1	26/55
Benzo(b)fluoranthene	Undetected-290	1	26/55	1	26/55
Benzo(k)fluoranthene	Undetected-84	0.8	23/55	3.9	15/55
Chrysene	Undetected-400	1	27/55	3.9	23/55
Dibenzo(a,h)anthracene	Undetected-39	0.33	23/55	0.33	23/55
Fluoranthene	Undetected-770	100	3/55	100	3/55
Fluorene	Undetected-680	30	6/55	30	6/55
Indeno(1,2,3-cd)pyrene	Undetected-130	0.5	26/55	0.5	26/55
Naphthalene	Undetected-4200	12	15/55	100	9/55
Phenanthrene	Undetected-2600	100	11/55	100	11/55
Pyrene	Undetected-1300	100	6/55	100	6/55
Benzo(ghi)perylene	Undetected-190	100	2/55	100	2/55
Fluoranthene	Undetected-770	100	3/55	100	3/55
Inorganics					
Arsenic	Undetected-22.4	13	1/55	13	1/55

Cadmium	Undetected-11.5	2.5	2/55	4.0	1/55
Chromium	2.92-27.5	30	0/55	41	0/55
Lead	4.08-520	63	24/55	63	24/55

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), The lower of the Soil Cleanup Objectives for restricted residential or protection of ecological resources.

The primary soil contaminants are polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene, and xylene (BTEX) associated with residues from the operation of the former MGP. As noted on Figure 5, the primary soil contamination is co-located with soils which are visually impacted by coal tar.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil. PAHs are considered the primary contaminants of concern in subsurface soils, to be addressed by the remedy selection process.

Surface Water

Surface water samples were collected from 3 locations in the Hudson River during the RI: adjacent to the site, upstream of the site, and downstream of the site. The results indicate that no site-related contamination is present in the Hudson River in the vicinity of the site at levels exceeding the Department's SCGs.

Table 3 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Ethylbenzene	Undetected-.1	4.5	0 out of 3
Xylene	Undetected-0.3	170	0 out of 3

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b-SCG: Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1) and 6NYCRR Part 703: Surface Water and Groundwater Quality Standards.

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

Sediments

Sediment samples were collected during the RI from the Hudson River in both the intertidal zone and the river bottom to assess the potential for impacts to river sediments from the site. The results indicate that sediments exceed the Department's SCGs for polycyclic aromatic hydrocarbons (PAHs). In addition to chemical analysis of the sediment samples, the Department used multiple lines of evidence to determine whether sediment is impacted by site related contamination and whether the impacted sediment has the potential to negatively impact the environment. These lines of evidence include visual observation of the sediment cores, the results of sediment probing, forensic

analysis of sediments to determine the source of the chemicals present, ecological toxicity testing, and surveying of benthic communities.

The results of the analytical data as well as the lines of evidence evaluation from the sediment investigation are shown on Figure 5.

Table 4 - Sediment

Detected Constituents	Concentration Range Detected (ppm)[a]	ERL[b] (ppm)	Frequency Exceeding ERL[b]	ERM [c] (ppm)	Frequency Exceeding ERM [c]
Polycyclic Aromatic Hydrocarbons (PAHs) Total	Undetected-1,238	4	47 out of 61	45	10 out of 61

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in sediment.
b - ERL: Effects Range – Low from the Department's "Technical Guidance for Screening Contaminated Sediments."
c - ERM: Effects Range – Medium from the Department's "Technical Guidance for Screening Contaminated Sediments."

The sediment contaminants of concern are PAH compounds. As shown on Figure 6, the primary sediment contamination is found along the shore of the former MGP and adjacent to the "mooring dolphins" which are structures where ships were secured while they delivered oil to the plant.

Some of the PAHs found in sediments were determined to be from sources other than the MGP. In particular, the area directly south of the site is impacted primarily by storm water discharge, and not the MGP.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of the sediment. PAHs are the site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of sediment.

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 contact with contaminated groundwater.

Soil

- Prevent ingestion/direct contact with contaminated soil.

Sediment

- Prevent direct contact with contaminated sediments.

Environmental Protection

Groundwater

- Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.
- Prevent discharge of contaminated groundwater to surface water.

Soil

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Sediment

- Prevent releases of contaminants from sediment that would result in surface water levels in excess of ambient water quality criteria.
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity.

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 Section 5:

Sediment Removal - General Discussion:

Alternatives 3-6 each require removal of contaminated sediments. In each of these alternatives, a pre-design investigation would be required to provide a more detailed delineation of the sediment to be removed. In particular, the areas north of the boat club dock and near the dolphins would require additional investigation. Multiple lines of evidence would be used to determine if the sediment is impacted by site-related contamination at levels which represent a threat to the environment.

It is anticipated that the sediment would be removed in the wet (i.e. without dewatering the excavation). Temporary sheeting would likely be required for deeper sediment excavation. Silt curtains or sheet piling would be required to control turbidity. Dredged sediments would be staged, dewatered, stabilized and characterized for off-site treatment/disposal. A temporary treatment system would be utilized at the site to treat sediment dewatering liquids. Treated water would be monitored to ensure it meets applicable requirements before being discharged to the local publically owned treatment works (POTW) or the Hudson River.

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.

Alternative 2: Site Management, Long Term Monitoring

The Site Management Alternative requires only institutional controls for the site, and would not include any active measures to remediate contamination. Institutional and engineering controls would be required as part of OU-1, including groundwater use restrictions and groundwater monitoring until such time that groundwater meets State standards. The cost of these controls was included in OU-1 and is not repeated here.

This alternative would include long-term monitoring of groundwater and sediment quality. The costs for this alternative do not include the costs of the institutional controls already considered for OU-1.

Present Worth: *$2,900,000*
Capital Cost: *$200,000*
Annual Costs: *$156,000*

Alternative 3: Restoration to Unrestricted Conditions:
Excavation of Deep and Shallow MGP Impacted Soil and Sediment

This alternative would include excavation of all shallow and deep coal tar impacted soils and sediments. Sediment removal would be accomplished with conventional excavation equipment. All excavated soils would be trucked off-site for off-site treatment or disposal, and the excavation would then be backfilled with clean soil.

Institutional and engineering controls would be required as part of OU-1, including groundwater use restrictions and groundwater monitoring until such time that groundwater meets State standards. The cost of these controls was included in OU-1 and is not repeated here.

This alternative achieves all of the SCGs discussed in Section 5.1.1 and soil meets the unrestricted soil clean objectives listed in Part 375-6.8(a).

Capital Cost:.....*$17,300,000*

Alternative 4: In-Situ Solidification of Deep Coal Tar Impacted Soil, Shallow Soil Removal,
Shallow MGP Impacted Sediment Removal;
Groundwater Monitoring and Institutional Controls

This alternative would include a partial removal of MGP impacted soil, and stabilization of the contamination at depth. MGP-impacted soils in the shallower fill material (up to 7 feet below ground surface) would be excavated and trucked off-site for proper treatment and disposal. MGP impacted soil below this elevation would be treated using in-situ solidification, a process in which soils are thoroughly mixed with Portland cement or similar materials. The result is a stabilized, low permeability monolith which would immobilize that contamination in its current location. Underlying soils which contain contaminants at levels above unrestricted SCOs will be isolated from the public by a minimum of 2 feet of soil meeting restricted residential SCOs, or another barrier acceptable to the NYSDEC and NYSDOH (e.g. asphalt). Appropriate steps will also be taken to protect the solidified soil from frost damage and wave erosion, and to isolate it from the environment. Groundwater monitoring and institutional controls would be provided as indicated in Alternative 2.

Sediments impacted by MGP contamination would be removed. A small area of deep sediment in the southeastern portion of the study area would be left in place.

Present Worth:.....*$14,300,000*
Capital Cost:.....*$12,000,000*
Annual Costs:.....*$130,000*

Alternative 5: Shallow Soil Excavation, Coal Tar Recovery;
Shallow MGP Impacted Sediment Removal;
Groundwater Monitoring and Institutional Controls

This alternative would be similar to Alternative 4, but the deeper MGP impacted soils would be left in place with no action taken. Coal tar found in deeper (silty sand) soils would be recovered using extraction wells.

Shallow sediment would be removed as indicated in Alternative 4. Groundwater monitoring and institutional controls would be provided as indicated in Alternative 2.

Present Worth: *$13,900,000*
Capital Cost: *$11,700,000*
Annual Costs: *$124,000*

Alternative 6: Slurry Wall, Soil Cap and Coal Tar Recovery;
Sediment Capping, Groundwater Monitoring and Institutional Controls

This alternative is intended to rely primarily on physical barriers to prevent contact with the contaminated materials. It would include construction of a low permeability, vertical subsurface barrier to prevent MGP tar contamination in the subsurface soil from migrating into the Hudson River. It also would include 2 foot soil cover over the contaminated soil to prevent exposure to the environment or people.

The top 2 feet of sediment would be removed and trucked off-site from proper treatment and disposal. An engineered cap would isolate the contaminated sediment from the environment. Groundwater monitoring and institutional controls would be provided as indicated in Alternative 2.

Present Worth: *$13,300,000*
Capital Cost: *$9,800,000*
Annual Costs: *$200,000*

Exhibit D

TABLE 1
REMEDIAL ALTERNATIVE COSTS

Remedial Alternative	Capital Cost ($)	Present Worth of Annual Costs ($)	Total Present Worth ($)
No Action	0	0	0
Alternative 2: Site Management, Long Term Monitoring	$200,000	$2,700,000	$2,900,000
Alternative 3: Restoration to Unrestricted Conditions: Excavation of Deep and Shallow MGP Impacted Soil and Sediment	$17,300,000	$500,000	$17,800,000
Alternative 4: In-Situ Solidification of Deep Coal Tar Impacted Soil, Shallow Soil Removal, Shallow MGP Impacted Sediment Removal; Groundwater Monitoring and Institutional Controls	$12,000,000	$2,300,000	$14,300,000
Alternative 5: Shallow Soil Excavation, Coal Tar Recovery; Shallow MGP Impacted Sediment Removal; Groundwater Monitoring and Institutional Controls	$11,700,000	$2,200,000	$13,900,000
Alternative 6: Slurry Wall, Soil Cap and Coal Tar Recovery; Sediment Capping, Groundwater Monitoring and Institutional Controls	$9,800,000	$3,500,000	$13,300,000

Exhibit E

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4 "In-Situ Solidification of Deep Coal Tar Impacted Soil, Shallow Soil Removal, Shallow MGP Impacted Sediment Removal; Groundwater Monitoring and Institutional Controls" as the remedy for this site. The elements of this remedy are described in Section 7.2. The proposed remedy is depicted in Figure 6.

Basis for Selection

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

Alternative 4 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the balancing criterion described in Exhibit C. It would achieve the remediation goals for the site by removing the readily accessible contamination and immobilizing the contamination that cannot be readily excavated.

Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternative 2 (Site Management, Long Term Monitoring) would leave shallow sediment impacts in the Hudson River, which are not under the control of the remedial party or the State. As such, these controls would not be effective and this alternative will not be considered further. Alternative 3, by removing all soil contaminated above the "unrestricted" soil cleanup objectives, meets the threshold criteria. Alternatives 4 and 5 also comply with these criteria but to a lesser degree or with lower certainty. Because Alternatives 3, 4, and 5 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

There are only two remedial technologies available which could reasonably address sediment contamination at this site: dredging and capping. Capping would involve removal a minimum of 2 feet of existing material to make room for the cap while maintaining the depth of the river. As such, a capping alternative would require a significant amount of dredging. The difference is that the capping remedy would leave significant contamination in place, and attempt to isolate it from the environment with a protective layer. The dredging alternative would permanently remove that contamination. The dredging alternative would be more reliable and would be more effective in the long term. All other selection criteria, including protection of human health and the environment, compliance with SCGs, and cost; would be similar for both dredging and capping. As such, dredging is preferred over capping.

An additional consideration in remediating the sediment is whether to address an isolated area of MGP contamination which is at least 4 feet below the sediment surface. This contamination is effectively isolated from the environment.

In the on-shore and intertidal area, there are two zones of contamination. The first zone is significantly below the ground surface, and appears to have migrated through the subsurface from on-shore source areas. This contamination is deep enough that full excavation would be difficult to implement, and would be likely to damage the existing solidified mass created during the remedial program for OU1 of this project. The potential for damaging the OU1 remedy makes deep excavation (Alternative 3) less desirable than a barrier wall (Alternative 6) or ISS (Alternative 4). Alternative 5 addresses this contamination with coal tar recovery only, which would not be as effective as Alternative 6 which combines coal tar recovery with a barrier wall. ISS would generally be considered

more reliable than a barrier wall, and as such Alternative 4 would be preferred over Alternative 6. The choice comes down to deep excavation or ISS, and ISS is the most protective of the OU1 remedy.

The second zone of contamination in the on-shore and intertidal area is shallow. It appears to have been deposited as a surface deposit, possibly from the historic drainage pits. This material is readily accessible to standard excavation equipment. Many of the challenges that would normally make excavation near the Hudson River prohibitive are already being addressed by the sediment removal. The removal of this material, which is the most likely contamination to be contacted by both human and environmental receptors, is clearly the most attractive alternative. Removal of this material is included in Alternatives 3, 4, and 5. Alternative 6 proposes to cap these materials, but ongoing maintenance of this cap would be expected to be similar in cost to the cost of the added excavation, and would be less reliable than removal over the long term.

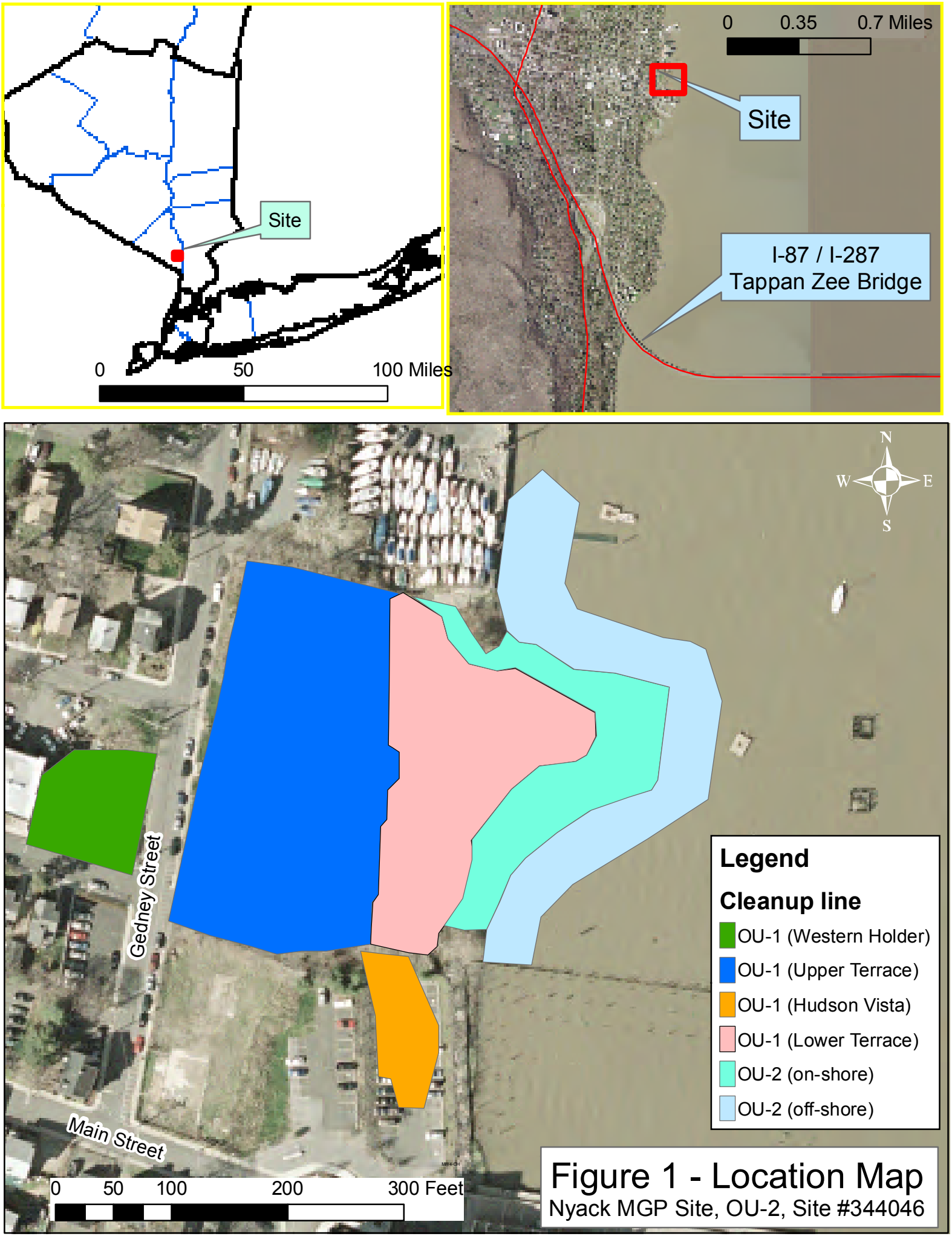


Figure 1 - Location Map

Nyack MGP Site, OU-2, Site #344046

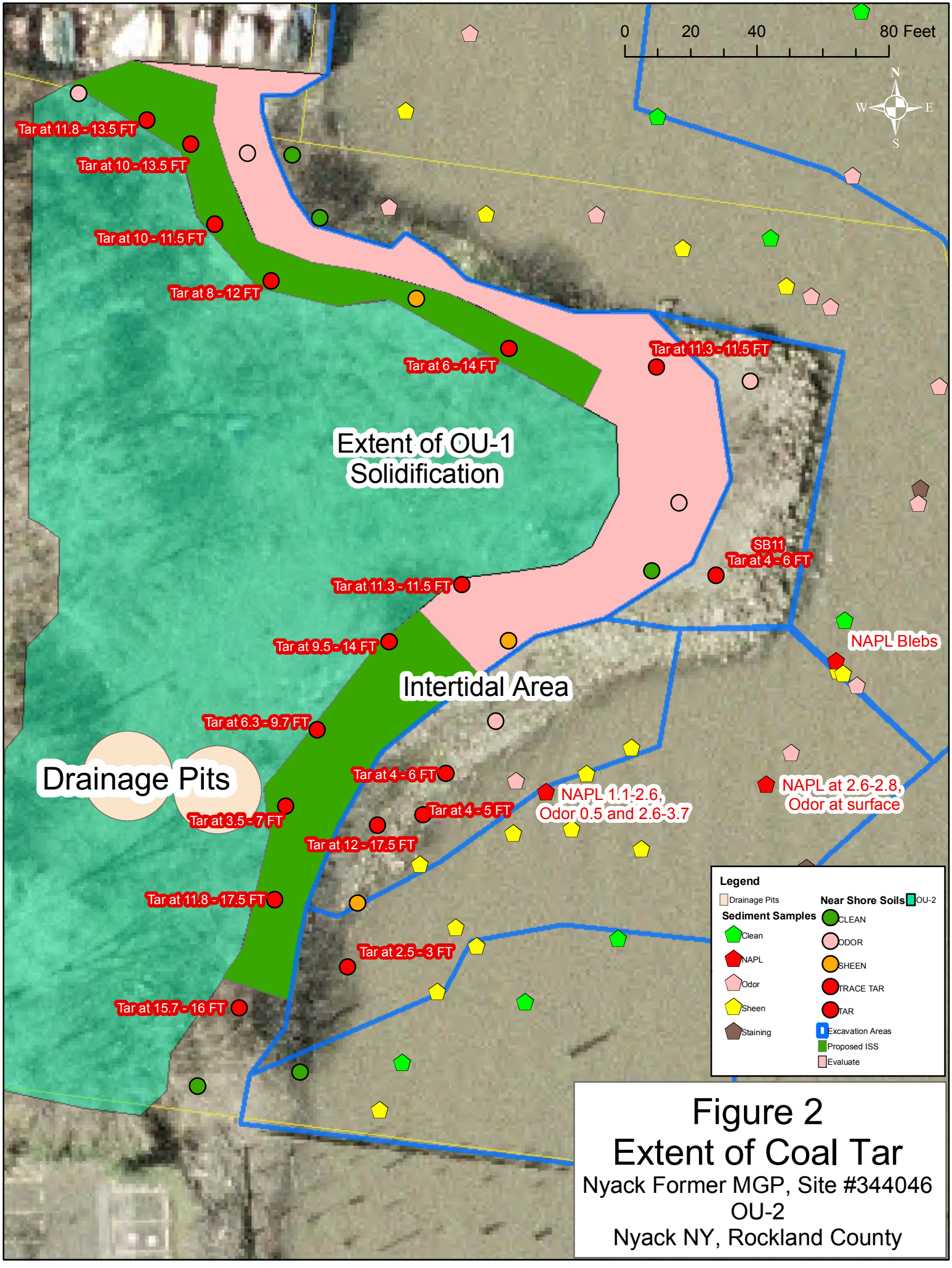


Figure 2
Extent of Coal Tar

Nyack Former MGP, Site #344046
OU-2
Nyack NY, Rockland County

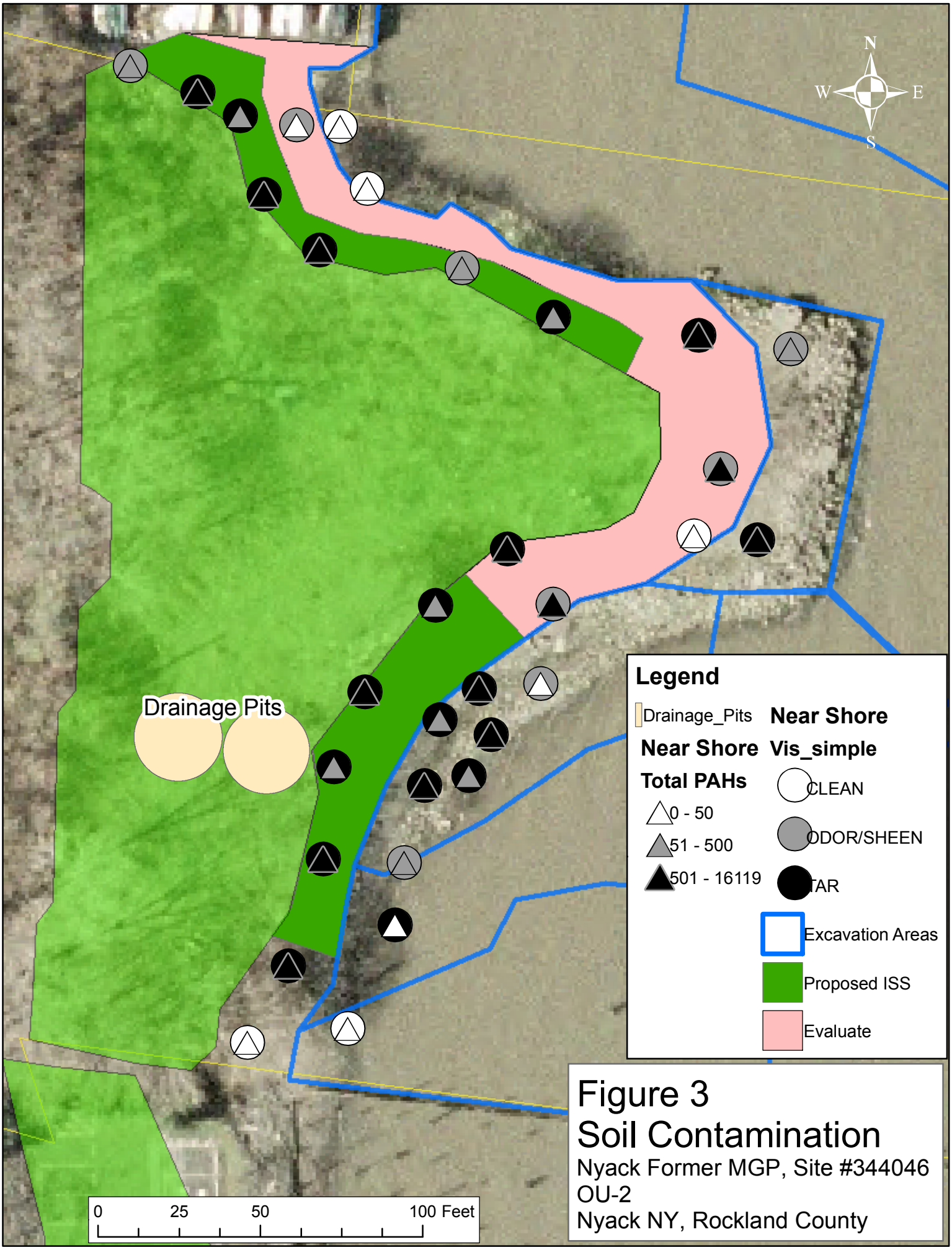
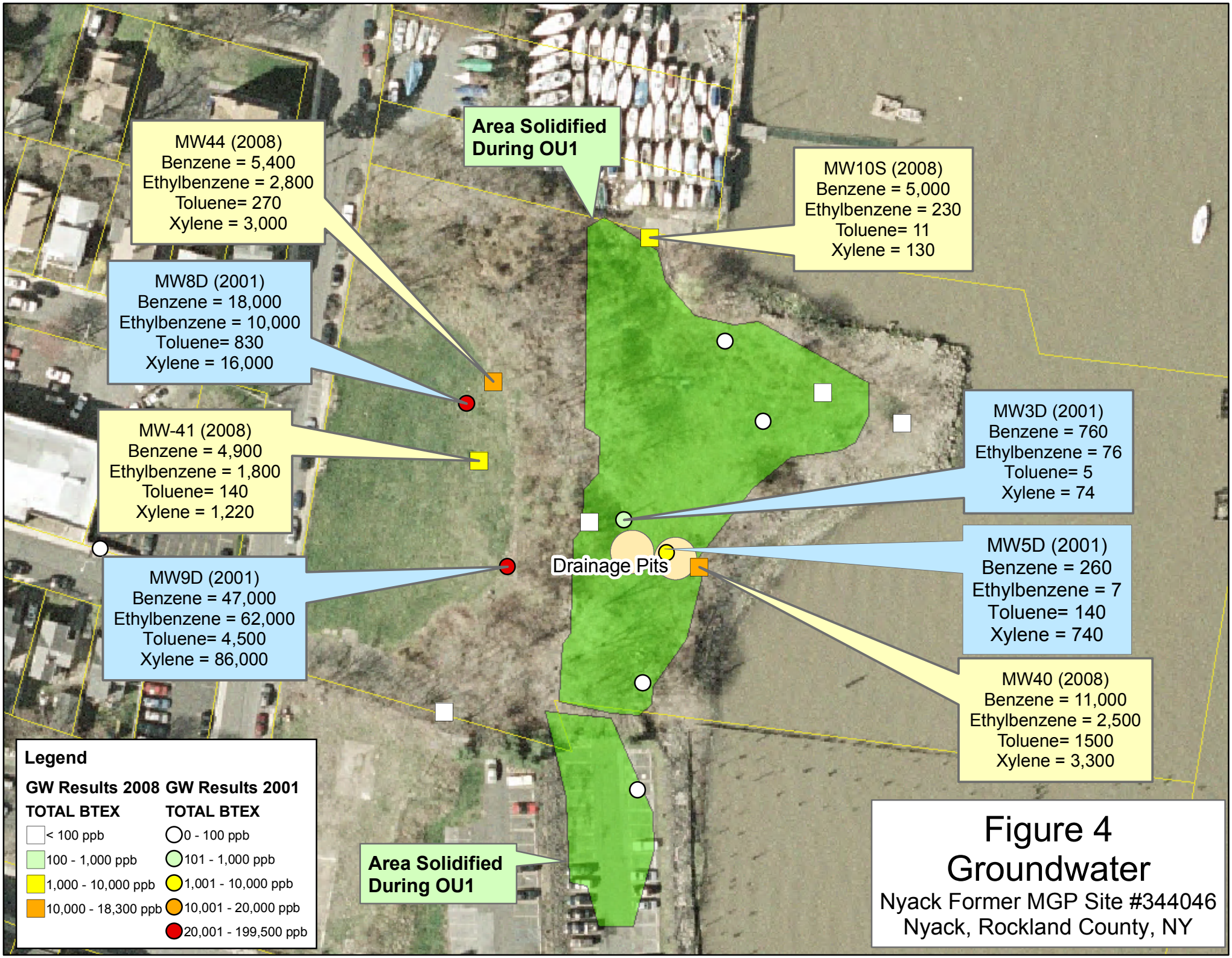


Figure 3
Soil Contamination

Nyack Former MGP, Site #344046
OU-2
Nyack NY, Rockland County


Area Solidified During OU1
MW44 (2008)
Benzene = 5,400
Ethylbenzene = 2,800
Toluene= 270
Xylene = 3,000
MW10S (2008)
Benzene = 5,000
Ethylbenzene = 230
Toluene= 11
Xylene = 130
MW8D (2001)
Benzene = 18,000
Ethylbenzene = 10,000
Toluene= 830
Xylene = 16,000
MW-41 (2008)
Benzene = 4,900
Ethylbenzene = 1,800
Toluene= 140
Xylene = 1,220
MW3D (2001)
Benzene = 760
Ethylbenzene = 76
Toluene= 5
Xylene = 74
Drainage Pits
MW5D (2001)
Benzene = 260
Ethylbenzene = 7
Toluene= 140
Xylene = 740
MW9D (2001)
Benzene = 47,000
Ethylbenzene = 62,000
Toluene= 4,500
Xylene = 86,000
MW40 (2008)
Benzene = 11,000
Ethylbenzene = 2,500
Toluene= 1500
Xylene = 3,300
Legend
GW Results 2008
TOTAL BTEX
< 100 ppb
100 - 1,000 ppb
1,000 - 10,000 ppb
10,000 - 18,300 ppb
GW Results 2001
TOTAL BTEX
0 - 100 ppb
101 - 1,000 ppb
1,001 - 10,000 ppb
10,001 - 20,000 ppb
20,001 - 199,500 ppb
Area Solidified During OU1
Figure 4
Groundwater
Nyack Former MGP Site #344046
Nyack, Rockland County, NY

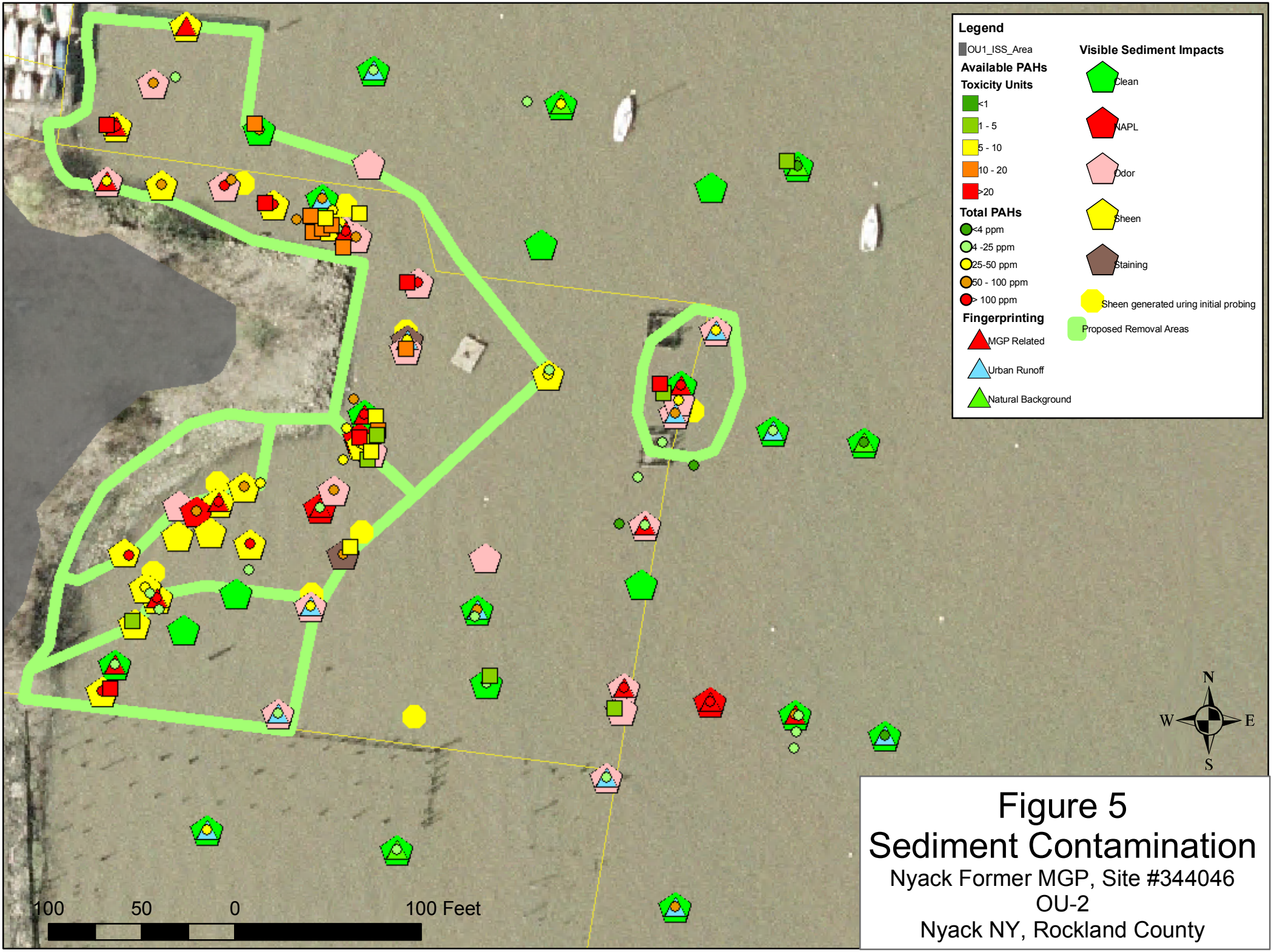


Figure 5
Sediment Contamination
Nyack Former MGP, Site #344046
OU-2
Nyack NY, Rockland County

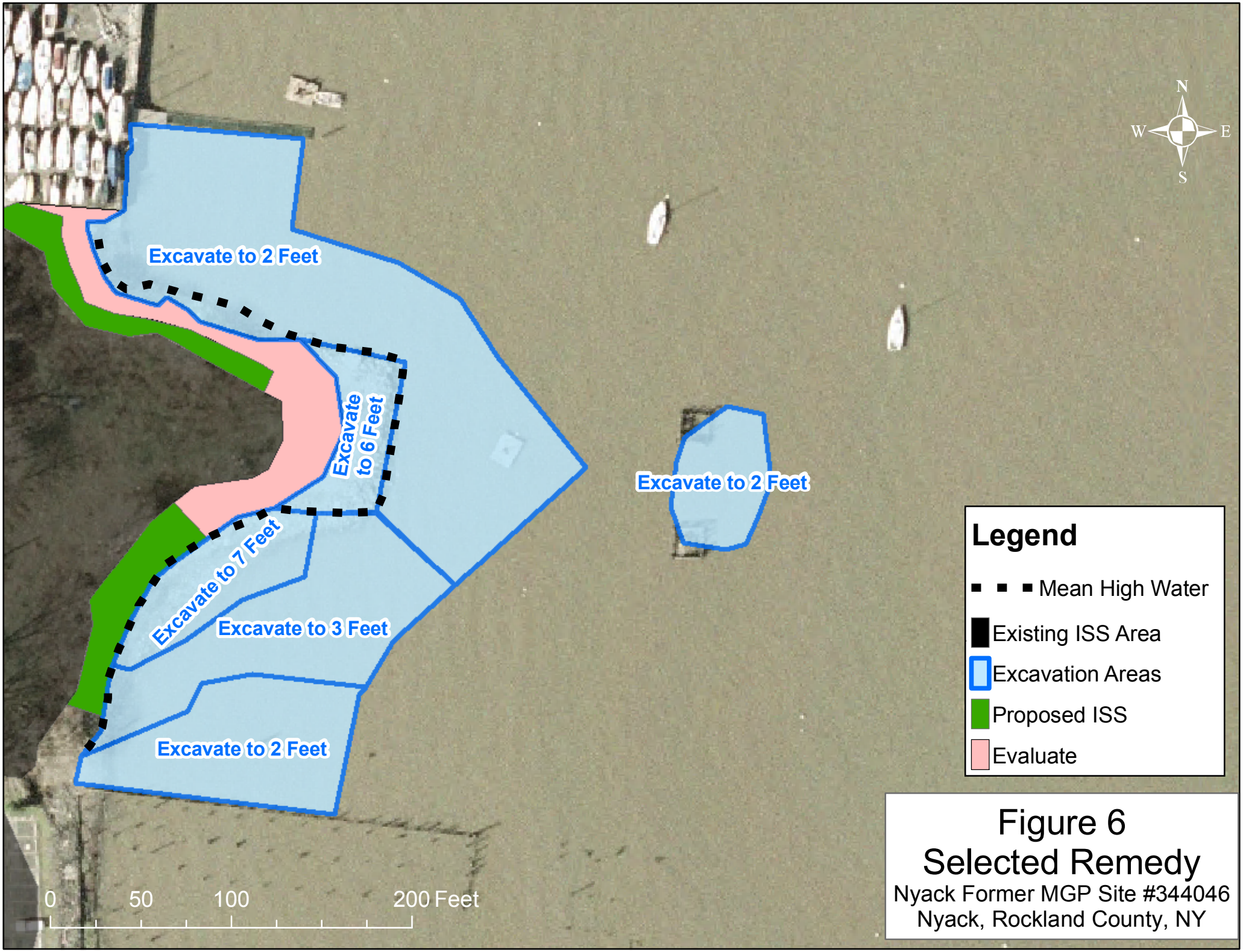


Figure 6
Selected Remedy

Nyack Former MGP Site #344046
Nyack, Rockland County, NY

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

OR - Nyack MGP
Operable Unit No. 2
Nyack, Rockland County, New York
Site No. 344046

The Proposed Remedial Action Plan (PRAP) for the OR - Nyack 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 March 31, 2011. The PRAP outlined the remedial measure proposed for the contaminated soil and groundwater at the OR - Nyack 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 14, 2011, which included a presentation of the remedial investigation, feasibility study (RI/FS) for the OR - Nyack MGP site 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 27, 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:

COMMENT 1: Is the Piedmont Pier Parking lot part of this site?

RESPONSE 1: Yes. The parking lot was treated using in-situ solidification as part of Operable Unit No. 1 (OU1). This area is referred to as the “Hudson Vista” portion of that project.

COMMENT 2: What is the depth of the river in the vicinity of this project?

RESPONSE 2: From the shoreline, the river depth soon increases to a fairly uniform depth of approximately 10 feet.

COMMENT 3: Were people recently taking a “Penguin Plunge” exposed to contamination?

RESPONSE 3: No. This swimming event took place at Memorial Park, a significant distance south of the site. Access to the site is restricted by a fence which would discourage an organized swimming event.

COMMENT 4: In the summer, 30-40 people fish in the evenings near the site. Is there any health concern associated with this activity?

RESPONSE 4: Fishing and catching fish in itself would not pose a health concern as long as the people were practicing catch and release. The New York State Department of Health produces an annual Fish Advisory which provides recommendations on the amount fish that may be safely eaten from water ways throughout New York State. The Hudson River is included in this report. The Fish Advisory may be found on the NYSDOH website at http://www.health.state.ny.us/environmental/outdoors/fish/docs/fish.pdf .

COMMENT 5: In the sediment, how close to the surface is the contamination, and how far down does it extend?

RESPONSE 5: In the area where remediation is proposed, surface sediment (top 6") contains elevated levels of site-related chemicals (PAHs). In some areas, these impacts extend as deep as 7 feet below the mud line (i.e. the top of the sediment surface).

COMMENT 6: When in-situ solidification (ISS) is used at a site, can it be redeveloped?

RESPONSE 6: Yes. This technology is frequently used to improve the bearing strength of soils to support construction activities. The site management plan will describe the approvals needed prior to redevelopment which will ensure that the remedy remains protective of human health and the environment during and after redevelopment.

COMMENT 7: Will O&R have to pay any of this cost?

RESPONSE 7: Yes, O&R has the responsibility to pay for the cleanup of this site.

COMMENT 8: Does that mean our rates will go up?

RESPONSE 8: The Public Service Commission has allowed utilities to recover costs of environmental cleanups from rate payers. How this might affect residential utility rates is outside the scope of the Record of Decision.

COMMENT 9: Where do you take the soil you dig up?

RESPONSE 9: Soil can be sent to an appropriately permitted disposal facility (e.g., landfill) or treatment facility. The appropriate type of treatment and/or disposal will be evaluated during the remedial design.

COMMENT 10: Will there be dredging on the north side near the boat club?

RESPONSE 10: Yes, the dredging will extend north of the property line between the site and the Nyack Boat Club.

COMMENT 11: We (the boat club) have a ramp there. If it has to come out during the dredging, we'd want it put back the way it was afterwards.

RESPONSE 11: The remedy will require restoration of the disturbed areas of the boat club property.

COMMENT 12: During the OU1 remediation, the noise (machines, backup signals, diesel engines, the air handling fans, etc.) adversely affected the quality of our lives. The noise should be kept to an absolute minimum.

RESPONSE 12: Some noise during a large construction project is unavoidable. However, as was done during OU1, O&R and its contractors will work with the residents to minimize disruption.

COMMENT 13: There are kids trespassing on the site all the time.

RESPONSE 13: O&R has been made aware of trespassing on this site. Once the ice has cleared the Hudson River, O&R plans to extend the existing fence further into the river to discourage trespassing.

COMMENT 14: Does the size of the equipment determine the length of time the actual work will be taking place?

RESPONSE 14: Larger equipment can accelerate progress on a job, but for this job equipment size will likely be limited by the scope of the project. It is not a large enough project to justify the largest equipment.

COMMENT 15: If you use an excavator for ISS, don't you then have to deal with de-watering?

RESPONSE 15: No. ISS is generally conducted in saturated soils, when using either augers or an excavator.

COMMENT 16: How far south will the remedy extend?

RESPONSE 16: There was no evidence of site related contamination south of the site property line. No work south of the property line is anticipated at this time.

COMMENT 17: How far out in the river does this contamination go? How far out into the river will you need to go to establish an area of control?

RESPONSE 17: Site-related sediment impacts generally extend approximately 150 feet into the river. The alignment of controls will be determined during the remedial design. Controls could conceivably extend as far out as the mooring dolphins.

COMMENT 18: In the sediment, what is the density of both the mud as compared to the coal tar, and how with this effect the movement of tar?

RESPONSE 18: The specific gravity of the tar is just over 1. The specific gravity of mud is generally between 2 and 2.5. The density of the mud is high enough that the tar will move through pores within the mud the same way that it moves through pores in soil.

COMMENT 19: Why wasn't all this done the last time during OU-1?

RESPONSE 19: OU-1 presented fewer technical challenges than OU-2, because all of the contamination in OU-1 was on land. Consequently, it was possible to accelerate the cleanup of OU-

1 and get it completed first. For OU-2, we have the added complexity of working along the river bank and in the river itself, which creates a more complicated situation, both from an engineering perspective and due to the need to coordinate with other agencies such as the Army Corps of Engineers, which controls dredging activities.

COMMENT 20: I live on the second floor of a building on Gedney Way near the boat club, with a child who is bedridden with an immuno-deficiency condition. When you consider the noise, the time line, the possibility of adverse effects to the community, the whole idea proposed to address the situation is frightening to me. If it must go forward, what will you do to minimize the effect on our life and health? It goes beyond "exposure" issues to quality of life issues like the truck noise, cranes, back-up signals, pounding, auger sounds, etc.

RESPONSE 20: See Response 12.

COMMENT 21: Where are you in the EIS process?

RESPONSE 21: Environmental remediation is specifically exempted from the State Environmental Quality Review (SEQRA) process, so no environmental impact statement (EIS) is required. The environmental review, documentation of the analysis of alternatives and impacts as well as the public notice required as part of remedy selection (including this meeting) is considered to be addressed by the remedial program requirements.

COMMENT 22: Which alternative have you picked, and how much will it cost?

RESPONSE 22: Alternative 4 is the proposed remedy. The present worth of OU2 is $14,300,000.

COMMENT 23: When is the work scheduled to begin?

RESPONSE 23: It is assumed that the remedial design will take approximately 12 months to complete, however as noted above, the need to coordinate with the Army Corps of Engineers will likely extend this time frame. Due to the scale and complexity of this project, a start date in 2013 appears likely.

COMMENT 24: I'm a limnologist, whose daughter lives near this site. Because concrete fractures, I don't like using it for ISS. Bentonite is more flexible and would be the better alternative. Have you looked into using it in some combination with cement?

RESPONSE 24: Bentonite generally is evaluated during the treatability study and will be evaluated as part of the OU-2 treatability study. The ISS used in OU1 used a combination of cement and bentonite to take advantage of properties of both materials. Based on the results of the treatability study for OU-2, an appropriate combination of materials will be employed for the in-situ stabilization.

COMMENT 25: What dredging equipment do you expect to be used at this site?

RESPONSE 25: The exact equipment will likely not be identified until the contractor is selected to allow the contractor the flexibility to select the best tools for the job.

COMMENT 26: Since there is no surface run-off at this time, if the coal tar is 10-12' below sedimentation, just leave it there.

RESPONSE 26: There is no guarantee that the tar will stay where it is. Based on the ability of this material to move through the subsurface in unpredictable ways, material that is present in sufficient concentrations to be mobile should be removed or treated to prevent contaminant migration.

COMMENT 27: How do I get a look at the drawings once the Remedial Design is developed?

RESPONSE 27: The remedial design will be placed in the document repository. We plan to present the remedial design in a public meeting prior to the start of construction.

COMMENT 28: I agree with your preference that once you dredge out the sediments, it would be better to leave it dredged and let the river fill it in rather than try to put in fill.

RESPONSE 28: Since this is a net depositional area, the Department would support allowing naturally transported and deposited sediment to make up at least some of this layer. Results of a recently completed sediment removal in Newburgh indicate that this deposition can result in a higher quality benthic habitat layer, and that accumulation of sediment will occur in a reasonable time frame. This would also be consistent with the Department's "green remediation" guidance (DER-31) by eliminating mining and transportation of the backfill that would otherwise be required.

COMMENT 29: Any thoughts of using the property for a park once the remediation has been completed?

RESPONSE 29: Orange and Rockland does not own the site, and thus does not control decisions on potential redevelopment. Relative to future development, both the OU1 and OU2 remedies would allow redevelopment for restricted residential use, which would allow for passive recreational use (e.g., a park). Redevelopment of the property following remediation will need to proceed through the established State and local planning, zoning and environmental reviews (including SEQRA, as applicable) which are required for other such projects.

The following comments were received in an e-mail from Betsy Blair on Thursday, March 17, 2011:

COMMENT 30: Are there any tidal wetlands or submerged aquatic vegetation in the remedial area?

RESPONSE 30: No, there are none.

COMMENT 31: What the backfill plans are for the proposed excavation areas (source of material)?

RESPONSE 31: The PRAP calls for restoration to be completed consistent with the requirements of 6 NYCRR Part 608, including the establishment of a minimum 2 foot thick clean substrate layer. See also Response 29 regarding the potential to allow natural sedimentation to account for some of this 2 foot layer. The final dredging plan will be developed in consultation with the Army Corps of Engineers.

COMMENT 32: What is the extent of the proposed "solidification" of the in-sediment contaminants.

RESPONSE 32: At this time, no solidification of sediments is anticipated. The solidification called for by the remedy will be between the high water mark and the 100 year flood elevation location.

Joseph S. Scarmato, Past Commodore, Nyack Boat Club submitted a letter dated March 23, 2011, which included the following comments:

COMMENT 33: Our property is used for recreational purposes by our members whose health and safety we are obliged to protect. To that end, we support your plan for testing and research to insure that a proper clean up of the residue of the former MGP plant is performed. We also wish to recognize the representatives of Orange and Rockland Utilities ("O & R"), especially Maribeth McCormick, for her conscientious communication and cooperative effort to see to it that while the necessary work goes on, it does so with minimal disruption to our club's activities.

RESPONSE 33: Comment noted.

COMMENT 34: We understand that one of the plans under consideration for the remediation of the captioned site involves the dredging of contaminated materials from the river bed adjacent to the shoreline of both the MGP site as well as our own property and that dredged areas are to be refilled to maintain the original river bottom contours with clean material of a similar type. Being primarily a sailing venue, we have an ongoing interest in maintaining suitable draft along our bulkhead so that we may launch and retrieve our vessels throughout the year. We have over the years, battled the natural effects of the river to deposit silt in the area adjacent to our bulkhead and have applied for navigational dredge permits in the past. In fact, we have recently filed for a new navigational dredge permit to remove approximately 10,000 yards of material in the area immediately north of the contaminated areas shown in your presentation. So, in considering the proposed work, we would like to make you aware of our application to dredge and request your consideration for the following proposals in formulating your final plans.

Your presentation delineates an area north of the property line between the MGP site and our property running north along our bulkhead approximately 100 feet where it is proposed that the bottom will be dredged and the spoils removed to a depth of 2-3 feet below the current bottom. Specifically with respect to this area, we request that once the spoils are removed, you allow this area to remain at the new lowered bottom level and to not re-fill this area to the current bottom contour.

RESPONSE 34: The Department appreciates the boat club's need for adequate draft in the near shore area and will seek to accommodate this need as the design proceeds. The final determination regarding the finished water depth will be made with input from the US Army Corps of Engineers.

COMMENT 35: Your presentation also delineates areas on the MGP site running east from the high water mark in to the river where dredging is proposed to remove contaminants. I note with interest that the estimate of the volume of spoils to be removed is coincidentally similar to the volume of material that we project to remove in our navigational dredging plan. Furthermore, we understand from discussions with Ms. McCormick that preliminary testing in our proposed dredging area have not shown there to be contaminants that would require removal by O & R. That being the case, we propose to offer this presumably clean bottom material to O & R for use in filling and restoring the removal areas on the MGP site. We have discussed this proposal with Ms. McCormick as well as Mr. Larry Wilson of your department both of whom believe that the idea holds promise for both

parties. The material is not contaminated, identical in nature to the material removed, close by and readily available. This would serve both our need for more navigable water along the bulkhead as well as save O & R and by extension the rate payers, the cost of securing and placing acceptable fill to restore the existing bottom contours with monolithic material. We would appreciate your giving these proposals your serious consideration in the formulation of the plans for the remediation of the Nyack MGP site.

RESPONSE 35: If the sediment in question meets the Department's backfill criteria, and if the physical challenges of handling the material can be addressed, then the Department will consider this concept if proposed by O&R. Eliminating the need to ship the dredged sediment off-site and to import clean fill onto the site would also be consistent with the Department's Green Remediation guidelines.

APPENDIX B

Administrative Record

Administrative Record

OR – Nyack MGP
Operable Unit No. 2
Nyack, Rockland County, New York
Site No. 344046

Proposed Remedial Action Plan for the OR Nyack MGP site, Operable Unit No. 2, dated February 2011, prepared by the Department.

Order on Consent, Index No. D3-0001-98-08, between the Department and Orange and Rockland Utilities Inc., executed on March 5, 1999.

"Feasibility Study Report Nyack Former MGP Site, Operable Unit 2, Nyack , New York, Site No. 3-44-046, August 2010", prepared by Arcadis.

"Remedial Investigation Report, Operable Unit 2, Former Manufactured Gas Plant Site, Nyack, NY" prepared by AECOM, April 24, 2009.

"Characterizing the Toxicity and Bioavailability of PAHs in Aquatic Sediments Collected Near Historic MGP Sites" January 31, 2006.

Letter report "Supplemental Sediment RI, Former Nyack (Gedney Street) MGP Site, Site Number 3-44-046" prepared by Retec, April 8, 2003.

"Investigation of Hydrocarbon Sources at the Former Manufacturing Gas Plant Site in Nyack, New York" prepared by META Environmental, Inc., February 19, 2003.

"Remedial Investigation Report Former Manufactured Gas Plant Site, Nyack, New York" prepared by Retec, January 11, 2002.