Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
O&R 93B Maple Avenue, Haverstraw MGP Site

Operable Unit No. 2: Former Stream Channel & Off-Site Building Area
Village of Haverstraw, Rockland County, New York
Site Number 3-44-044

March, 2006

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

DECLARATION STATEMENT - RECORD OF DECISION

O&R 93B Maple Avenue, Haverstraw, Former MGP Inactive Hazardous Waste Disposal Site
Operable Unit No. 2: Former Stream Channel & Off-Site Building Area
Village of Haverstraw, Rockland County, New York
Site No. 3-44-044

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for Operable Unit 2 of the 93B Maple Avenue, Haverstraw, Former MGP site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for Operable Unit 2 of the 93B Maple Avenue, Haverstraw, Former MGP inactive hazardous waste disposal site, and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site have been addressed by implementing the interim remedial measure identified in this ROD. The removal of contaminated soil and waste from the site has significantly reduced the threat to public health and the environment. Therefore, a site management plan will be developed to monitor the remedy and ensure it continues to remain effective in the future.

Description of Selected Remedy

Based on the results of the Remedial Investigation (RI) for the O&R 93B Maple Avenue, Haverstraw, Former MGP site, the remedial measures taken to date, and the criteria identified for evaluation of alternatives, the NYSDEC has selected No Further Action. The components of the remedy are as follows:

- For tax parcels 73, 74 and 75 with the exception of the limited area noted in Figure 5, the excavation and off-site disposal of structures and contaminated soil above the 25 ppm total

PAHs remedial goal. Since the remedial cleanup goals were achieved for these parcels, no use restrictions will be required.

- For the portions of tax parcel 77 and 75 as identified on Figure 5, excavation was not possible and in situ chemical oxidation was utilized, but was unable to achieve the remedial goal. As excavation in this area is precluded by the building's presence, a site management plan will be developed to monitor the remedy and ensure it continues to remain effective in the future.

New York State Department of Health Acceptance

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

Declaration

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

MAR 24 2006

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

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SECTION 1: SUMMARY AND PURPOSE OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for Operable Unit 2 of the former Manufactured Gas Plant (MGP) Site located at 93B Maple Avenue in Haverstraw, NY. Operable Unit #2 (OU 2) of the site consists of the parcels on which a former stream passed through (lots 74, 75, and 76) after flowing through the former plant site and the property where the concrete block building at 93B Maple (lot 77) is located.

As more fully described in Sections 3 and 5 of this document, the production of manufactured gas and the generation of related byproducts have resulted in the disposal of hazardous wastes, including benzene, ethylbenzene, toluene, and xylene (BTEX), various polycyclic aromatic hydrocarbons (PAHs) and cyanide (CN). These wastes contaminated the soils and groundwater at the off-site building property and the historic stream channel of an unnamed stream that passed adjacent to the former plant site and discharged to a former ice pond. The discharge of these wastes resulted in:

- a significant threat to human health associated with potential exposure to contaminated subsurface soils and wastes.

- a significant environmental threat associated with the impacts from the contaminants to subsurface soils, surface water and groundwater.

During the course of the investigation certain actions, known as interim remedial measures (IRMs), were undertaken at the 93B Maple Avenue site in response to the threats identified above. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation/feasibility study (RI/FS). The IRMs undertaken at this site included removal of all of the former structures and contaminated overburden soils from operable unit 1, followed by OU2 which included a second excavation effort to remove all of the contaminated materials from the historic stream channel and bed, and the In Situ Chemical Oxidation (ISCO) of contaminated soils and NAPL underlying the 93B building.

Based on the implementation of the above IRMs, the findings of the investigation of this site indicate that the site no longer poses a significant threat to human health or the environment. Therefore, No Further Action with a Site Management Plan (SMP) was selected as the remedy for this operable unit of the site.

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

SECTION 2: SITE LOCATION AND DESCRIPTION

The 93B Maple Avenue site is located in the Village of Haverstraw, Rockland County, New York. The site is a rectangular, flat 0.21 acre parcel. The property is bounded by residential lots on Maple Avenue to the southwest, residential lots on Tor Avenue to the northwest, an alley to the northeast and residential lots to the southeast. The area is zoned for light industrial usage, it is predominately residential with some light industrial use nearby. Haverstraw Bay of the Hudson River is located approximately 800 feet to the east of the site. Please refer to Figures 1 and 2 for the above features.

An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. Operable Unit 1 (OU 1), consists of the tax parcel on which the former manufactured gas plant (MGP) existed (lot 78) and the adjacent lots where remedial excavation activities were completed that successfully removed the contaminants. Please refer to Figures 4 and 5, which shows the extent of the completed remedial excavation which generally constitutes OU 1.

The remaining operable unit for this site, which is the subject of this document, is identified as Operable Unit 2 (OU2) and consists of the contamination underlying the concrete building at 93B (lot 77) Maple Avenue, and the contaminated former stream channel that extends through the properties with street addresses of 95, 99, and 103 Maple Avenue (lots 75, 74 and 73 respectively). Please refer to Figures 4 and 5.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

A former manufactured gas plant (MGP) is a facility where gas for lighting and heating homes and businesses was produced. The plant at 93B Maple Avenue was constructed and began initial operation circa 1859. Manufactured gas was produced at this site using the coal gas process. Coal gas was produced by heating coal in retorts or beehive ovens, carbonizing the coal in the absence of air. The gas produced was then condensed and purified prior to distribution.

A New Historical Atlas of Rockland County (1876) and an 1884 lithograph shows the presence of a gas plant and a single gas holder. The plant was located on the northeastern side of the site along a railroad line and the holder was located along a small stream at the southwestern side of the site. This stream continued to the south, discharging into an ice pond, and then into an embayment of the Hudson River. According to the Haverstraw Department of Public Works (DPW), the stream was culverted and relocated by 1940. This culvert is located underneath the alleyway that runs parallel to Maple and West Avenues.

The site was acquired by Haverstraw Light and Fuel Company in 1894. The plant was believed to have shut down in 1893 or 1894, when operations shifted to the Clove and Maple Avenue site.

3.2: Remedial History

In 1997, Orange and Rockland Utilities (O&R) completed site assessments for both of the former manufactured gas plant sites in Haverstraw, New York. The results of this screening are presented in the, "Preliminary Site Assessment Report for Two Former Manufactured Gas Plant Sites, Haverstraw, New York", which identified the need for additional investigation and remediation of the site.

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 NYSDEC and Orange and Rockland Utilities Inc. entered into a Consent Order on Jan. 2, 1996. The order obligates O&R to investigate the former MGP sites in their service area. This order was superceded by a second order (#D3-0001-99-01) dated March 11, 1999, which clarified the obligation to investigate, and as necessary, remediate the 93B Maple Avenue, Haverstraw manufactured gas plant site.

SECTION 5: SITE CONTAMINATION

A remedial investigation study (RI) has been completed to determine the nature and extent of any contamination by hazardous substances at this site.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI for the site was conducted between September 1998 and February 1999. The field activities and findings of the investigation are described in the draft RI report.

During the IRM for OU 1, from November 2002 to November 2003 on the former plant parcel, excavation activities located the former stream channel and the wastes contained within it. These activities also identified the contamination underneath the concrete block building (lot 77).

The following activities were conducted to define the alignment and wastes contained within the former stream channel:

- Research of historical information;

- Excavation and disposal of contaminated soils and waste from parcel 75 (95 Maple Avenue);

- Installation of approximately 112 soil borings to observe subsurface geologic conditions and collect subsurface soil samples;

- Collection and analysis of approximately 137 subsurface soil samples, and 36 confirmation subsurface soil samples during the IRM, for a total of approximately 173 subsurface soil samples;

- Installation of 4 additional monitoring wells to evaluate groundwater flow, and dewater the phase II IRM excavation;

- Collection of 3 groundwater samples from temporary well points for analytical analysis to confirm groundwater quality near several private residences.;

The following activities were also conducted after the IRM for OU 1, to define the contamination observed under the concrete block building (lot 77);

- Approximately 34 borings were installed to observe subsurface geologic conditions and collect subsurface soil samples;

- Collection and analysis of approximately 15 subsurface soil samples.

- Collection and analysis of approximately 8 subsurface soils samples after the in situ chemical oxidation effort.

To determine whether the soil and groundwater contains contamination at levels of concern, data from the investigation were compared to the following SCGs:

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

- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".

- Background surface soil samples were taken from 17 locations, as shown on Figures 2 and 3, as part of the OU1 RI. The results of the analyses were compared to data from the RI (see Table 1) and a site remedial goal of 25 ppm total PAHs was defined to achieve unrestricted use.

Based on the RI results, in comparison to the SCGs and potential human and environmental exposure pathways, certain media and areas of the site required remediation. These are summarized below. More complete information can be found in the RI report, the Phase I IRM Construction Certification Report, the Phase II IRM Work Plan, and the Phase II IRM Construction Certification Report.

5.1.1: Site Geology and Hydrogeology

The site geology includes a fill layer at the current ground surface, underlain by layers of alluvium deposits and then a dense glacial till. The alluvium unit consists of loose materials deposited by running water, such as clay, silts, sands and gravels. The layer of fill material consists of gravel, loamy soil with cobbles, brick fragments, ash, cinders, coal, clinker, pottery and glass shards. The fill thickness ranges from approximately 8 to 15 feet.

Descending below the fill layer, the first subunit of the alluvium unit is a course-grained sand and gravel with some fine-grained material and cobbles. It ranges in thickness from 1 to 5 feet.

The second subunit is a clay unit. Its upper horizon is a massive gray and brown clay, which ranges in thickness from 1 to 16 feet. This layer grades at times to a clayey/silt, which ranges in thickness from 5 to 16 feet. This layer forms an effective confining unit beneath the site and was found to be continuous across the site and beneath the former stream channel area.

The groundwater at the site consists of a shallow, unconfined to semi-confined system due to the clay unit. Groundwater was encountered at the site within the upper alluvium and fill layers at a depth of 6 to 10 feet below ground surface. This shallow groundwater unit has approximately 11 to 15 feet of depth.

5.1.2: Nature of Contamination

As described in the design documents and final engineering certification report for the OU2 excavation, several groundwater, air, and soil samples were collected to characterize the nature and extent of contamination. These results were consistent with the data from the remedial investigation of the site and the Phase I excavation effort.

As summarized in Table 1, the main categories of contaminants which exceed their SCGs are volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). These contaminants have contaminated the overburden soils and groundwater on the site.

Specific VOCs of concern are benzene, toluene, ethylbenzene, and xylenes. These are referred to collectively as BTEX in this document. Benzene is a known human carcinogen.

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	

PAH concentrations referred to in this document are the summation of the individual PAHs listed above (i.e. total PAHs or TPAHs). The italicized PAHs are probable human carcinogens. The summation of the italicized PAHs is referred to in this document as cPAHs.

Tar is the major type of waste present at this site, and is typically found at former MGP sites. This tar is the predominant source of the BTEX, PAHs, and cyanide identified in various media at the site and discussed further in Section 5.1.3. MGP tars contain high levels of PAH compounds, often greater than 100,000 parts per million. These tars also may exceed SCGs for BTEX by several orders of magnitude.

These tars are reddish brown to black, oily liquids which do not readily dissolve in water. Materials such as this are commonly referred to as a non-aqueous phase liquid, or NAPL. Although most MGP tars are slightly more dense than water (DNAPL), the difference in density is slight. Consequently, they typically sink when in contact with water but can be found floating on top of the water surface, or suspended in the water column.

Typically site groundwater that comes into contact with the NAPL or impacted media, such as soil, results in the contamination of the groundwater and aqueous phase migration of the contaminants.

Certain metals were also found in excess of SCGs. Generally, these metal values were consistent with typical background concentrations or coincided with areas of identified site impacts (BTEX/PAHs).

In certain tar or heavily contaminated soil samples, enough benzene or other constituents may be present to require that the material be managed as a hazardous waste. During the design of the IRM, 13 samples were collected to make this determination for disposal purposes. The analyses performed included the Toxicity Characteristic Leaching Procedure (TCLP) and reactivity. The analytical results did not exceed hazardous threshold criteria.

5.1.3: Extent of Contamination

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

Chemical concentrations are reported in parts per billion (ppb) for groundwater and parts per million (ppm) for waste and soil. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in the soils and groundwater of OU 2.

The following are the media which were investigated and a summary of the findings of the investigation. Additional detail relative to the contamination attributable to the MGP site are available in the RI report and the ROD for OU 1.

Waste Materials

The NAPL observed was limited in volume, and appeared to have a consistency of used motor oil. Generally, the NAPL was observed as a DNAPL that was present in the former stream channel and certain more permeable soil units in contact with this channel, and a permeable soil unit under the 93B building that connected to the former holder on the site addressed by OU1. Figures 4 and 5 illustrate the extent of the NAPL observations in the former stream channel area, and the extent of the contamination under the 93B building.

The NAPL under the 93B building is limited to the southern half of the building and appears to have originated from the former holder structure, which was removed by the OU1 excavation. The NAPL migrated as fingers through the porous fill and sand lenses at the site.

The OU1 excavation was unable to access the contamination observed underneath the 93B building and an area of soil adjacent to this building on the 95 Maple lot.

A second area of NAPLwas identified between the concrete block building (93B) and 93A Maple. This area appears to be associated with a former stream channel that contains DNAPL and debris. The stream itself was relocated into the culvert to the immediate east of the site, sometime after the plant ceased to operate. The DNAPL present in the historic trace of this stream may be the result of historic plant discharges into the former stream.

The course of this former stream channel, and the waste within it, are shown on Figures 4 and 5. The channel was observed at times to be trapezoidal and cut into the top of the clay unit. The stream flowed to the south and discharged to a former ice pond located immediately to the south east of 103 Maple.

Potential contaminants in the remainder of the former ice pond that are associated with the 93B Maple site, will be addressed by future remedial efforts for the Clove and Maple Former MGP site. This site is located adjacent to the former ice pond, across Maple Avenue.

Surface Soil

Numerous samples were collected during the remedial investigation of the site from 0 to 2 inches in depth to define surface soil conditions on site, off site and in the general area (background). No additional surface soil sampling was performed as part of the OU 2 excavation effort.

These samples found the site and local area soils to contain PAHs as further detailed in Table 1A and 1G (Background Samples).

Subsurface Soil

BTEX and PAHs were identified as contaminants of concern in the subsurface soils. Analytically, the subsurface soils under the 93B building and the former stream channel area contained PAHs that ranged from non detect (ND) to 11,790 ppm. Table 1 presents a summary of the analytical results for these compounds.

Generally, the distribution of these compounds in the subsurface soils coincide with the presence of DNAPL or fill materials. The fill materials on and around the site were observed to contain ash, coal, clinker and other anthropogenic (resulting from the influence of human beings) materials which contain PAHs. However, the levels of PAHs found in this fill is an order of magnitude below those observed in NAPL, and NAPL contaminated fill and soils.

The distribution of NAPL in the subsurface is discussed under the previous heading of MGP Waste Material. As noted in that discussion, the clay layer underlying the site is effectively containing the contamination.

Groundwater

BTEX, PAHs and cyanide have been identified as contaminants in the groundwater on the site. As part of the OU 2 work, three temporary well points and 4 dewatering wells were installed in the former stream chase area. The results in the former stream channel area are in Table 1B.

All of the exceedances for groundwater standards for site related compounds are from on site monitoring well MW-1 and temporary well point SC-1F, located in close proximity to NAPL that was removed. The other 5 site wells and temporary well points did not have any exceedances of groundwater criteria for BTEX, PAHs, or cyanide compounds.

5.2: Interim Remedial Measures

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

As detailed in the Phase I IRM Construction Certification Report and the Operable Unit 1 Record of Decision, this excavation removed all of the MGP contaminated soils from the following parcel lots: 80 and 85 (87 Maple Ave.), 79 (91 Maple Ave.), 76 (93A Maple Ave.), 86.1 (6 Tor Ave.) and 78 to a level of 25 ppm of total PAHs. This excavation resulted in approximately 6,100 tons of soil being removed and sent for off site treatment and disposal.

As part of the OU 1 IRM additional NAPL contamination was observed underneath a portion of the concrete block building at the site (93B), and within the former stream trace. As a result of these observations, the OU 1 excavation was extended to 95 Maple Ave.

Based on those observations, additional investigation was completed and a second operable unit (OU2) with a separate IRM was initiated. This OU2 IRM included in situ chemical oxidization to remediate the residual NAPL that could not be excavated or extracted from underneath the 93B building by the first IRM. This work also targeted an area of soil on 95 Maple, tax parcel 75, that also could not be excavated due to the block building. Additional excavation was also implemented to remove the contamination in the former stream channel on parcels 74 and 73. Please refer to Figure 5.

The confirmatory samples for the excavation on parcel 75 were below the 25 ppm total PAH site remedial action objective for unrestricted residential use. The total PAH values in the 6 confirmatory samples ranged from ND to 13.8 ppm.

The confirmatory samples for the excavation on parcels 73 and 74 were effectively below the 25 ppm total PAH site remedial action objective for unrestricted residential use. Of the 36 confirmatory samples collected, 34 were below 25 ppm, and two were slightly above the objective at 29 and 31 ppm of Total PAHs.

Both of the samples that were over the cleanup objective, were collected at the bottom of the deep cofferdam excavation (approximately 15 feet below grade). As these samples appeared to be visually unimpacted, and the small value of the exceedances over the objective are within the statistically variation expected from the sampling and analytical procedures; the samples are believed to conform to the remedial action objective.

Additionally, individual levels of benzene and xylene were detected in 8 of the 36 confirmatory samples collected on parcels 73 and 74. These detections ranged from .13 to 2.5 ppm and 1.2 to 2.3 ppm respectively. However, all of the confirmatory samples met the SCG of 10 ppm for total BTEX. As residual levels of BTEX will be expected to bioremediate naturally in the near term, these samples indicate a successful removal of contamination associated with the subsurface soils.

The in situ portion of the Phase II IRM was focused on the contamination that remained under the 93B building, and those soils on the 95 Maple Avenue parcel which could not be excavated due to stability concerns for the concrete block building at 93B Maple.

Approximately 26 injection wells were installed in these areas to provide access to the subsurface contamination. Over 20,000 pounds of sodium persulfate, a chemical oxidant, and

catalyst were then injected over three separate dosing events. Confirmation samples were taken after the first and third events, to assess the effectiveness of the treatment. The results of these samples, as well as the pre-treatment characterization samples are included in Tables 1E and 1F.

Although some reduction in the overall values was observed, the treatments did not achieve the remedial action objective of 25 ppm for total PAHs. Additionally, the reductions observed for each treatment were much lower than anticipated, which indicated that multiple rounds of additional treatment were unlikely to achieve the remedial goal. Hence no further applications were made and the injection wells and downgradient collection trench were decomissioned.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 7 of the RI report.

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

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

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

Prior to implementation of the previous IRM for OU 1 of this site, and the implementation of additional remedial measures by the second phase IRM, the potential existed for exposure to site related contaminants in surface and sub-surface soil.

Given the completion of these IRMs, the potential for exposure to site related soil contaminants in concentrations that may represent a health concern has been eliminated, except for those chemically oxidized soils remaining under the 93B building and a limited area on 95 Maple. However, the institutional controls proposed for these areas will address the potential for exposure to the remaining contaminants in these areas as well.

5.4: Summary of Environmental Impacts

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

The Fish and Wildlife Impact Analysis, which is included in the March 2002 Fish and Wildlife Impact Analysis Report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

Due to the urban nature and small size of the site, it provides no wildlife habitat. The closest habitat of significance is Haverstraw Bay, in the Hudson River. The river is located approximately 1000 feet east and south east of the site, as shown on Figures 1 and 2. No pathways or negative impacts were identified from OU 1 or OU 2 to Haverstraw Bay. The potential for significant impacts are considered unlikely, due to the limited site size and available data from groundwater and the storm sewer system.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND SELECTED REMEDY

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

The proposed future use of the parcels is expected to continue to be residential for tax parcels 73, 74 and 75. Tax parcel 77 is expected to remain commercial.

Prior to the completion of the IRM described in Section 5.2, the remedial goals for this site were to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to BTEX and PAHs in subsurface soils, and former structures;

- the potential release of contaminants from subsurface soil and former plant structures into groundwater;

The NYSDEC believes that the IRM has accomplished these remediation goals by the complete excavation and off site treatment and disposal of contaminants from this operable unit of the site, specifically tax parcels 73, 74 and the majority of tax parcel 75, and the placement of institutional controls on the residual contaminants that remain after the in situ chemical oxidation for tax parcels 77 and a small portion of tax parcel 75.

The main SCGs applicable to this project are as follows:

- ambient groundwater quality standards are being met as the sources of groundwater contamination have been removed from the site, the primary groundwater contaminants of BTEX are readily biodegradable, and several volumes of contaminated groundwater were removed from the impacted area as part of the IRM dewatering efforts;

- no future wells will be installed at the site without the review and approval of the Rockland County Health Department, this existing institutional control will assure appropriate review of future groundwater use at the operable unit; and

- soil quality has been restored to conditions that will provide for unrestricted residential use as all of the contaminated site soils and contaminated structures have been removed and replaced with backfill that meets NYSDEC generic soil cleanup objectives for tax parcels 73, 74 and a majority of parcel 75.

- soil quality has been improved by multiple treatments of in situ chemical oxidation for a small portion of tax parcel 75 and tax parcel 77.

- soil vapor intrusion is not a concern for the existing building since indoor air monitoring before and during the in-situ oxidation did not identify detectable levels of contamination, the oxidation significantly decreased the volatile levels in the impacted soil remaining and clean groundwater is present beneath the building.

The following elements of the IRM have achieved the remediation goals and satisfy SCGs for the site:

- For tax parcels 73, 74 and 75 with the exception of the limited area noted in Figure 5, the excavation and off-site disposal of structures and contaminated soil above the 25 ppm total PAHs remedial goal. Based upon the achievement of the remedial goal, no site use restrictions are required.

- For tax parcels 77 and the small area of subsurface soil on parcel 75, identified on Figure 5, the multiple treatments via in situ chemical oxidation of those soils and NAPL where excavation was not possible. The treatment was not able to fully achieve the 25 ppm goal. However, since excavation in this area is precluded by the building's presence and the area of contamination is at least 8 feet below ground surface, as well as below the groundwater table, the potential for exposure to the remaining contamination is addressed and the current use of the site may continue.

Based on the results of the investigations at the site, the IRM that has been performed and the evaluation presented here, the NYSDEC has selected No Further Action as the preferred alternative for the site .

The basis for this selection is the NYSDEC's conclusion that No Further Action will be protective of human health and the environment and will satisfy all SCGs, as described above. Overall protectiveness is achieved through meeting the remediation goals listed above.

1. Since the site remedial cleanup goals were achieved or exposure to areas beneath the building and the area of parcel 75 identified on Figure 5 is addressed, for tax parcels 73, 74, 75 and 77 no use restrictions will be required.

2. A site management plan (SMP) will be developed and implemented which will: (a) require Orange and Rockland seek a formal agreement with the owners of parcels 75 and 77 to allow the removal of the remaining contamination, identified by Figure 5, should the building be demolished in the future; and (b) require Orange & Rockland provide a certification that the site management plan is being followed, on a periodic basis, until such time as the remaining contamination should be removed from parcels 75 and 77.

Therefore, the NYSDEC concludes that No Further Action is needed with the noted site management plan.

SECTION 7: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- Repositories for documents pertaining to the site were established.

- A public contact list, which included nearby property owners, elected officials, local media and other interested parties, was established.

- This contact list has been regularly updated to include interested parties and current mailing addresses.

- Fact sheets were mailed to the contact list, in english and spanish, to keep the community informed of site activities and public meetings.

- Door to door outreach was undertaken to supplement the mailings and local media.

- Public information meetings were held in December 2004 and October 2002 to keep the public abreast of upcoming site work and investigation results.

- A public meeting was held on March 15, 2005 to present and receive comment on the PRAP for Operable Unit 1.

- A public meeting was held on February 28, 2006, to present and receive comment on the PRAP for Operable Unit 2.

- A responsiveness summary (Appendix A) was prepared to address the comments received during the public comment period for the PRAP for Operable Unit 2.

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

TABLE 1 A
On Site (Operable Unit 1) Surface Soil Concentrations
93B Maple Avenue Former MGP Site
May 1997

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND	0.06	0/2
	Toluene	ND	1.5	0/2
	Ethylbenzene	ND	5.5	0/2
	Xylene	ND	1.2	0/2
	BTEX	ND	10	0/2
Semivolatile Organic Compounds	Total cPAHs	8 - 45	10	1/2
	Total PAHs	15 - 75	25	1/2
Inorganic	Cyanide	.39 - .75	NA	0/2

TABLE 1 B
Nature and Extent of Shallow Groundwater Contamination
Former Stream Channel Area (Operable Unit 2)
93B Maple Avenue Former MGP Site
October 2004

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND - 2 J	1	1/3
	Toluene	ND	5	0/3
	Ethylbenzene	ND	5	0/3
	Xylene	ND	5	0/3
	BTEX	ND - 2 J	NA	0/3
Semivolatile Organic Compounds	Total cPAHs	ND	NA	0/3
	Total PAHs	ND - 1	NA	0/3
Inorganic	Cyanide	ND - 4.8	200	0/3

TABLE 1 C
Nature and Extent of Subsurface Soil Contamination Pre IRM
Former Stream Channel Area (Operable Unit 2)
93B Maple Avenue Former MGP Site
June 2004 - October 2004

SUBSUBFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND - 4.4	0.06	25/124
	Toluene	ND - 15	1.5	6/124
	Ethylbenzene	ND - 190	5.5	8/124
	Xylene	ND - 230	1.2	19/124
	BTEX	ND - 438	10	10/124
Semivolatile Organic Compounds	Total cPAHs	ND - 2,650	10	32/124
	Total PAHs	ND - 11,790	25[d]	34/124
Inorganic	Cyanide	ND - 2.3	NA	0/124

TABLE 1 D
Post IRM Subsurface Soil Contamination
Operable Unit 2, Former Stream Channel Area
93B Maple Avenue Former MGP Site
April 2005 - May 2005

EXCAVATION BOTTOM SAMPLE	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND - 2.5	0.06	8/36
	Toluene	ND - .43	1.5	0/36
	Ethylbenzene	ND - .26	5.5	0/36
	Xylene	ND - 2.3	1.2	3/36
	BTEX	ND - 3.5	10	0/36
Semivolatile Organic Compounds	Total cPAHs	ND - 10.7	10	1/36
	Total PAHs	**ND - 31.1**	**25[d]**	**2/36**
Inorganic	Cyanide	NA	NA	0/3

TABLE 1 E
Nature and Extent of Subsurface Soil Contamination Pre IRM
In Situ Chemical Oxidation Area (Operable Unit 2)
93B Maple Avenue Former MGP Site
October 2003 - March 2004

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND - .12	0.06	3/8
	Toluene	ND - 5.7	1.5	3/8
	Ethylbenzene	ND - 71	5.5	3/8
	Xylene	.004 J - 230	1.2	3/8
	BTEX	.004 - 306	10	3/8
Semivolatile Organic Compounds	Total cPAHs	ND - 1,464	10	10/15
	Total PAHs	0.1 - 7,543	25[d]	10/15
Inorganic	Cyanide	NA	NA	NA

TABLE 1 F
Post IRM Subsurface Soil Contamination
Operable Unit 2, In Situ Chemical Oxidation Area
93B Maple Avenue Former MGP Site
May 2005

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	NA	0.06	NA
	Toluene	NA	1.5	NA
	Ethylbenzene	NA	5.5	NA
	Xylene	NA	1.2	NA
	BTEX	NA	10	NA
Semivolatile Organic Compounds	Total cPAHs	21 - 1,514	10	8/8
	Total PAHs	**41 - 9,774**	**25[d]**	**8/8**
Inorganic	Cyanide	NA	NA	NA

TABLE 1 G
Background Soil Concentrations
93B Maple Avenue Former MGP Site
June 1997 - December 2001

SURFACE SOILS	Contaminants of Concern	Concentration Range Detected (ppm)[a]
Volatile Organic Compounds (VOCs)	Benzene	ND
	Toluene	ND
	Ethylbenzene	ND
	Xylene	ND - .001
	BTEX	ND - .001
Semivolatile Organic Compounds	Total cPAHs	5 - 45
	Total PAHs	3.7 - 117
Inorganic	Cyanide	ND

For Table 1A-D

[a] ppb = parts per billion, which is equivalent to micrograms per liter, µg/l, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
µg/m^3 = micrograms per cubic meter
ppbv = parts per billion by volume

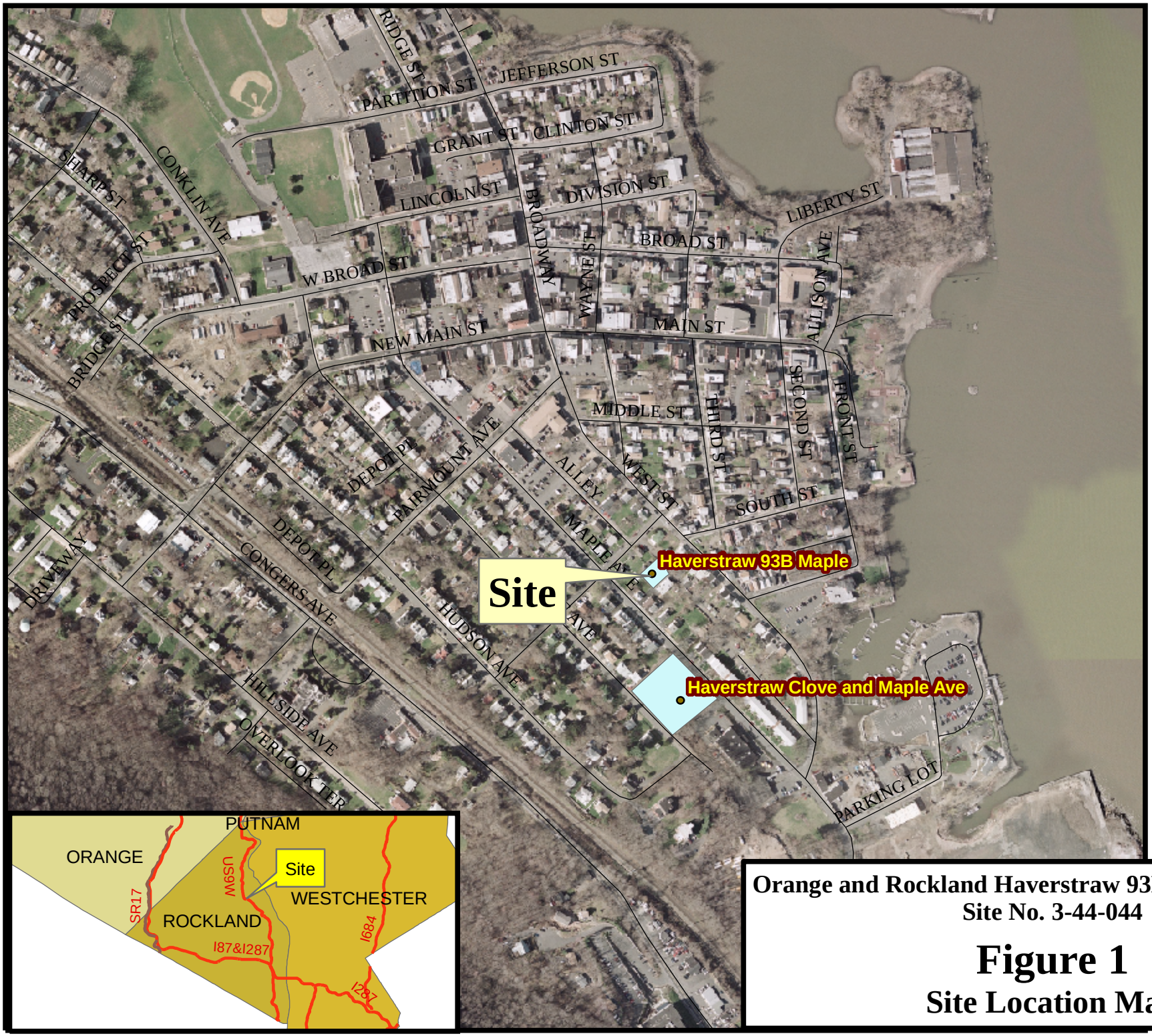
[b] SCG = standards, criteria, and guidance values;

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

[d] A local background value was used to establish unrestricted residential use

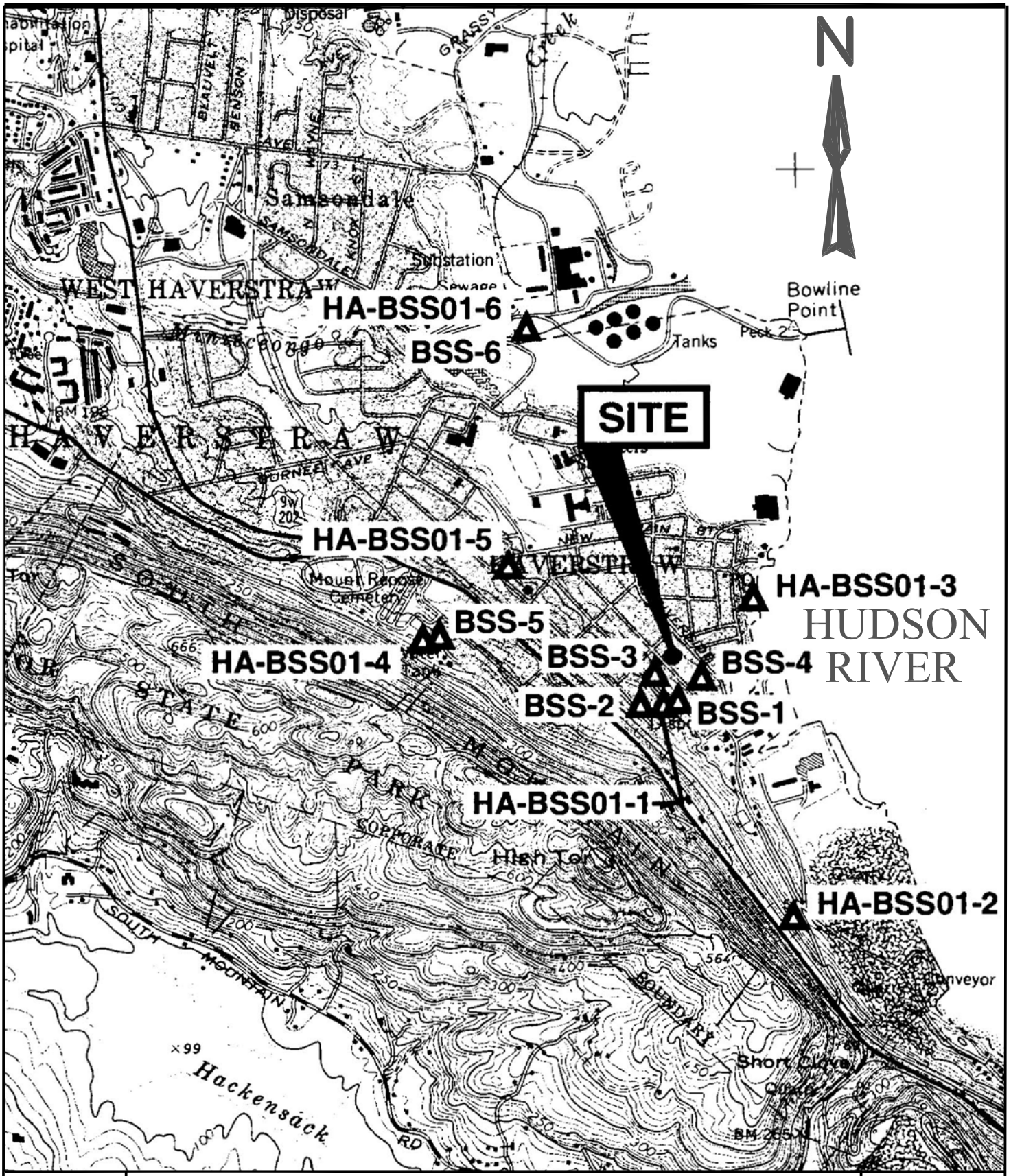
NT - Not tested for this parameter
ND - Not Detected
NA - None Available
J - Estimated value

BTEX indicates the summation of benzene, toluene, Ethylbenzene and xylene
Total PAH indicates the total of all PAH compounds identified
Total cPAH indicates the total of the seven PAH compounds that are considered carcinogenic



Orange and Rockland Haverstraw 93B Maple MGP Site
Site No. 3-44-044

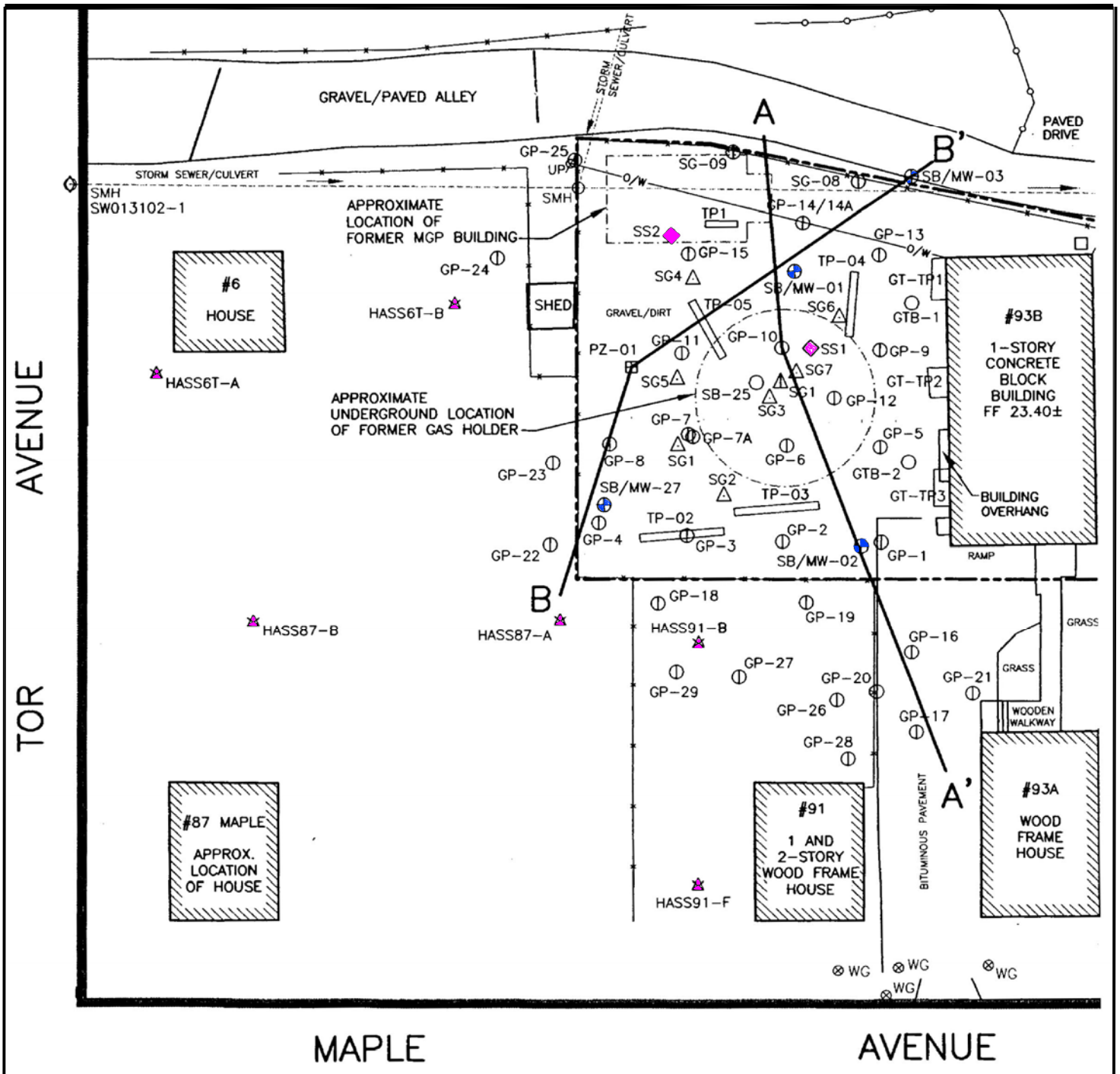
Figure 1
Site Location Map



O&R 93B MAPLE AVENUE, HAVERSTAW MGP SITE, 3-44-044
HAVERSTRAW (V), ROCKLAND COUNTY, NEW YORK

SITE LOCATION AND REGIONAL BACKGROUND SAMPLE LOCATIONS

FIGURE 2

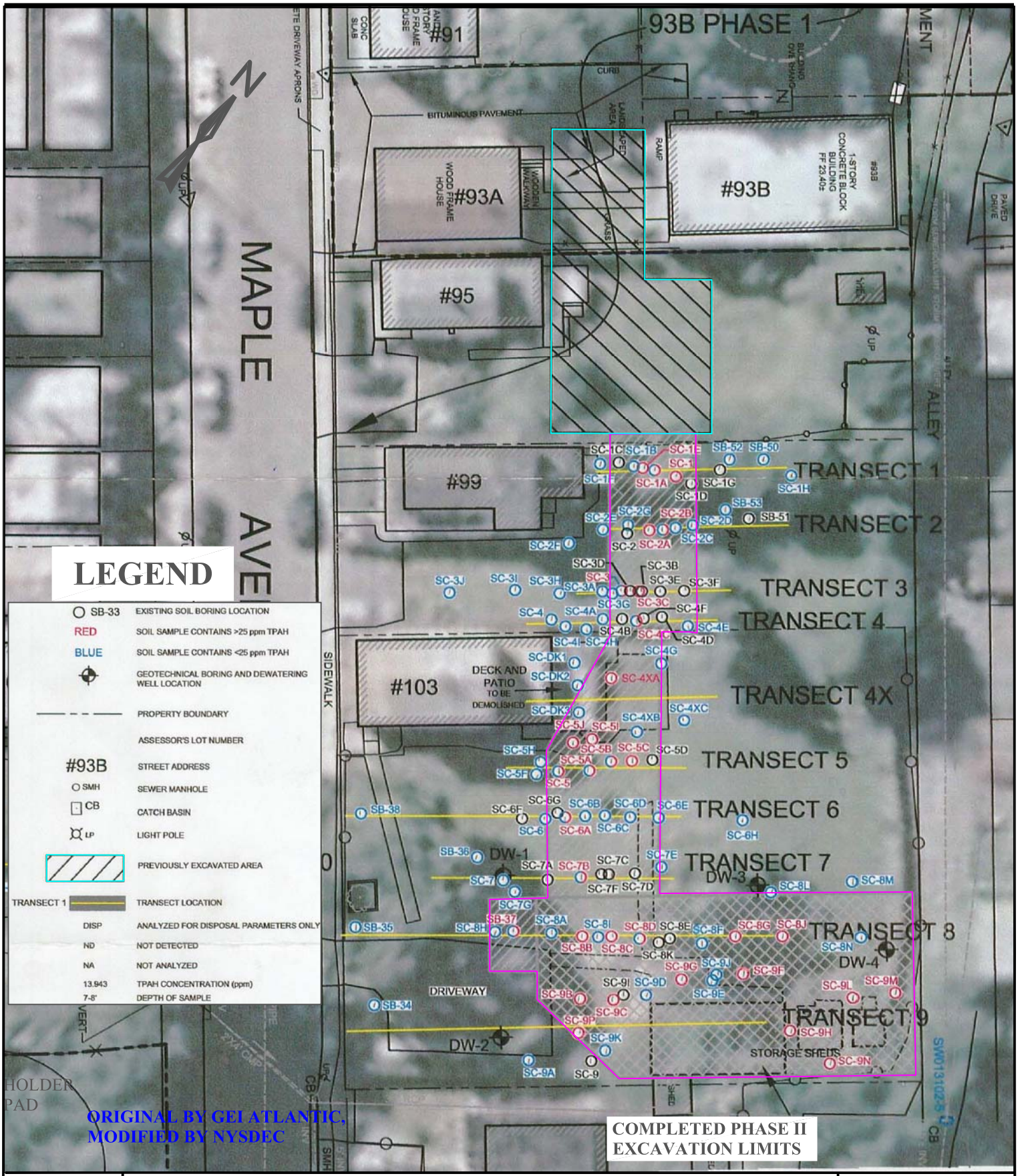


NOTES:
- XX-SSXX-X SURFACE SOIL SAMPLE
- GP-XX/SG-X GEOPROBE SUBSURFACE SOIL SAMPLE
- SB/MW-XX SOIL BORING/MONITORING WELL LOCATION
- SWXXXXXX-X SURFACE WATER SAMPLE LOCATION
- GTB-X GEOTECHNICAL BORING LOCATION
- GT-X GEOTECHNICAL TEST PIT LOCATION
- TP-XX TEST PIT LOCATION
- SG-1 SOIL GAS SAMPLE LOCATION
- PZ-XX PIEZOMETER LOCATION

O&R 93B MAPLE AVENUE, HAVERSTRAW MGP SITE, 3-44-044
HAVERSTRAW (V), ROCKLAND COUNTY, NEW YORK

SAMPLE LOCATIONS

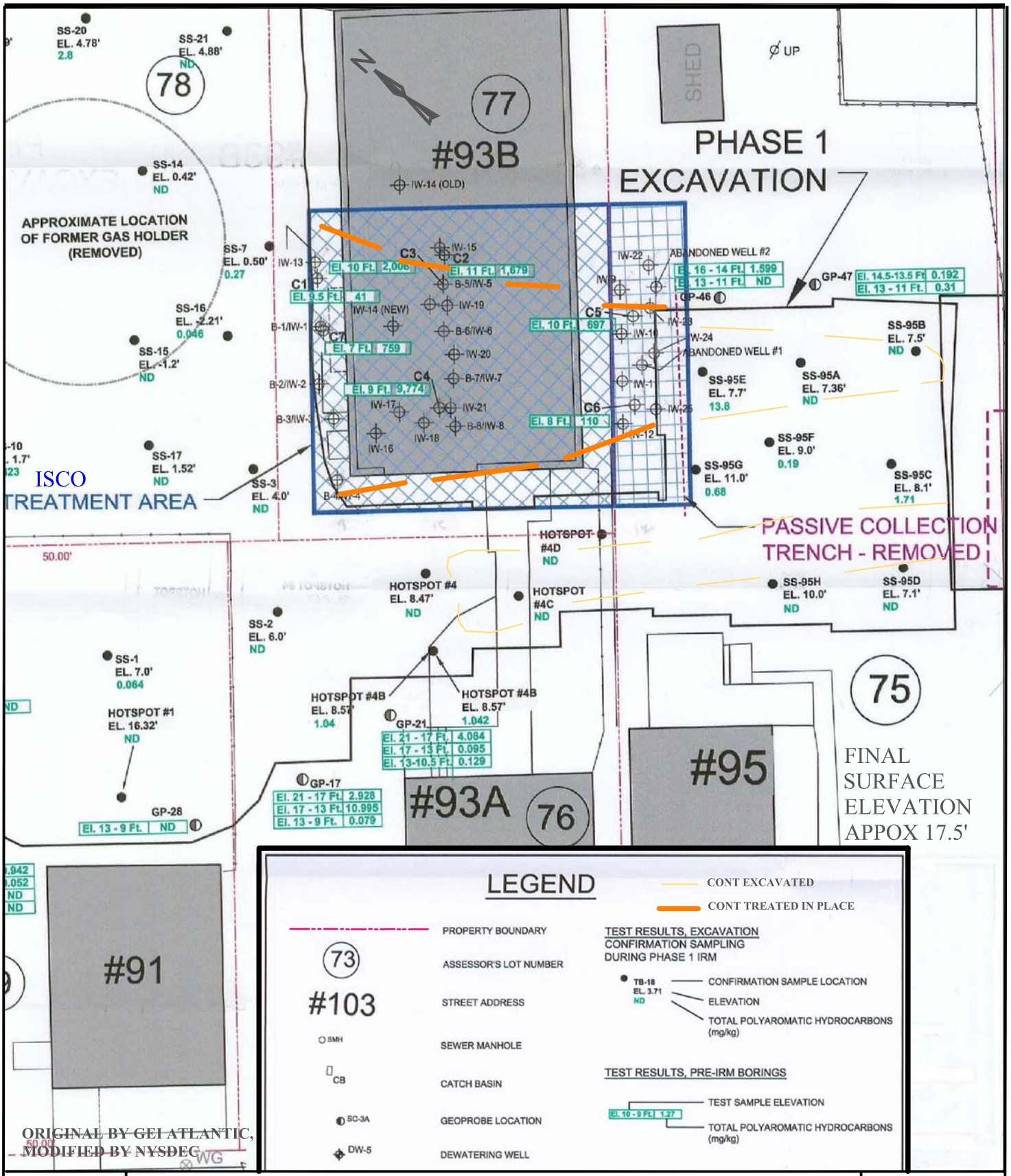
FIGURE 3



O&R 93B MAPLE AVENUE, HAVERSTRAW MGP SITE, 3-44-044
HAVERSTRAW (V), ROCKLAND COUNTY, NEW YORK

SITE LOCATION AND STREAM CHASE REMOVAL

FIGURE 4



O&R 93B MAPLE AVENUE, HAVERSTRAW MGP SITE, 3-44-044
HAVERSTRAW (V), ROCKLAND COUNTY, NEW YORK

IN SITU CHEMICAL OXIDATION CLOSEUP

FIGURE 5

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

O&R 93B Maple Avenue Former MGP Site
Operable Unit 2: Former Stream Channel and Off Site Building Area
Village of Haverstraw, Rockland County, New York
Site No. 3-44-044

The Proposed Remedial Action Plan (PRAP) for Operable Unit 02 of the O&R 93B Maple Avenue Former Manufactured Gas Plant (MGP) site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 7, 2006. The PRAP outlined the remedial measures proposed for the contaminated soils and groundwater at Operable Unit 2 of the O&R 93B Maple Avenue Former 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 **February 28, 2006**, which included a presentation of the Remedial Investigation (RI) and Interim Remedial Measure (IRM), 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. The public comment period for the PRAP ended on March 10, 2006.

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

Comment 1: What about the area under the 93B building, will there be more digging?

Response 1: We are unable to excavate the soils under the building without demolishing the building. In situ chemical oxidation was employed as an alternate means of remediating the contamination under the building, but this method did not fully achieve our remedial goal of 25 ppm for total PAH levels. As the remaining contamination cannot be excavated without demolishing the existing building and does not present any current exposure to the public; the Record of Decision (ROD) provides for the existing building to remain and institutional controls be developed to ensure the contamination remains inaccessible to preclude any future exposures to the contaminants.

Comment 2: Our driveways from the alleyway are the only parking we have. Will any future work interfere with our parking, or cause vibration damage to our homes.

Response 2: The work for the 93B Maple Avenue Site is considered complete, with the

finalization of the ROD. It is unclear at this time, what remedial work will be required for the nearby Clove and Maple Site. However, the completed phases of IRM work successfully incorporated measures to minimize traffic problems with the alley way, as well as to prevent damage to any surrounding properties. Any future work would also be designed and operated in a similar manner.

Comment 3: Some of the vibrations were very loud and would rattle my dinner plates, but I could not feel them when I put my hands on the window sill.

Response 3: Vibrations and noise during major construction activities or in an urban environment are common. The IRM work utilized common construction equipment and was monitored with specialized equipment to not exceed industry standard values of vibration for construction to surrounding structures. Generally, buildings are not affected by noise and can tolerate a certain degree of vibration. At some level above this threshold, minor cosmetic damage could occur. There is the potential for more significant damage to possibly occur as these levels increase.

Comment 4: My house (private residence on West Street) had a preconstruction survey but I never received a copy of the video tape. Now I have cracks and leaking pipes. Who do I talk to about this?

Response 4: Regarding construction damage, the work was designed to prevent this. However, O&R will provide the video tape for the prework inspection of this specific residence, visit the building in question, and review the available monitoring data in an attempt to assess the issue. Any time there is concern with any aspect of the project, you can contact the NYSDEC project manager. The NYSDEC project manager will connect you with the appropriate person or information.

Comment 5: Was there any digging at 111 Maple Ave.?

Response 5: Only a small area of shallow excavation was necessary on this property to facilitate the remedial work at 104 Maple Ave. Landscaping work to restore the lawn was also completed on the 111 Maple avenue property.

Comment 6: Will the parking lot behind 111 Maple Ave. need to be dug up (remediated)? Will there be any future digging (remediation) at 111 Maple?

Response 6: This parcel, as well as all of the parcels associated with the former ice pond, are part of the O&R Clove and Maple MGP site. The need for any remedial work will be dependent on the results of the ongoing remedial investigation for that site.

Comment 7: When will this investigation (Clove and Maple MGP site) be completed?

Response 7: Field work is scheduled for 2006 with the goal of completing the remedial investigation of the site.

Comment 8: What were the probe holes in the parking lot behind 111 Maple that I observed?

Response 8: No remedial investigation work associated with either MGP site was performed in the parking lot area last year. The small probe holes may be from utility work for gas line leak detection.

Comment 9: Regarding the "Ice Pond", which is now the parking lot and apartments. What are the details on the "pond area". The parking lot there can flood for 3 or 4 days.

Response 9: The passage of more than 100 years makes it difficult to know the full details. Historic maps of the area, circa 1880, show an ice pond occupied a significant amount of the area between Maple and West Avenues to the south east of 104 Maple. Later maps indicate this area having been filled in and the borings logs from this area have confirmed up to 8 feet of fill. However, the drainage pattern of the neighborhood still flows to the former pond area.

Comment 10: My mother has lung cancer. Could her illness have resulted from exposure to contamination at this site? My mother was a smoker.

Response 10: Since the contamination associated with this site was present in the sub surface, the potential for casual exposure to site-related contamination was minimal. When there is minimal to no potential for exposure to a contaminant, there is little to no risk of an adverse health effect. The institutional and engineering controls discussed in Comment/Response #1 above, eliminates/prevents any potential for future exposures should any excavation be conducted. As you may be aware, individuals who smoke are at an increased risk of developing lung cancer. Based on information provided by the National Cancer Institute, 87 percent of all lung cancers are attributable to smoking.

Comment 11: There are concerns about prior or future use of contaminated water from local wells. What about the properties on West St.? When was public water supply started?

Response 11: We have no information indicating any wells are or were present in the areas where site contamination has been found. Public water has been available in the village since at least 1903. Today, public water is supplied from sources located outside of the area of concern. Public water is also required to be regularly tested for chemical contamination to confirm that it meets drinking

water standards. No new wells could be installed in the area of concern as the Rockland County Health Department would need to be notified and approve of any new water sources that are to be constructed.

Comment 12: What about the Head Start property?

Response 12: The data available from both MGP sites indicate that the Head Start property has not been impacted. However, the O&R property adjacent to the Head Start property is the Clove and Maple MGP site, which is contaminated.

Comment 13: When will it be known if other properties are affected?

Response 13: The Clove and Maple MGP Site is the subject of an ongoing Remedial Investigation (RI), which has identified contamination on the site. More data is needed to complete the remedial investigation and properly identify the extent of contamination, both on-site and off-site, associated with the Clove and Maple MGP site. Please see Comment/Response #7.

Comment 14: There is still concern about the parking situation. What about the alley and parking lot area? At least five houses are involved if it needs remediation?

Response 14: The NYSDEC has noted these concerns, please refer back to Comment/Response #2. Additionally, the NYSDEC will address concerns relative to the Clove and Maple site as that remedial program proceeds.

Administrative Record

O&R 93B Maple Avenue Former MGP Site
Site No. 3-44-044

1. Order on Consent, Index No. D3-0001-99-01, between NYSDEC and Orange and Rockland Utilities (O&R), executed on March 3, 1999.

2. "Preliminary Site Assessment Report for Two Manufactured Gas Plant Sites, Haverstraw, New York", August 1997, Remedial Technologies Inc.

3. "Draft Remedial Investigation Report, 93B Maple Avenue, Former Manufactured Gas Plant Site, Haverstraw, New York", March 29 2002, GEI Consultants Inc.

4. "Interim Remedial Measure Work Plan, 93B Maple Avenue Former Manufactured Gas Plant Site, Haverstraw, New York", August 2002, GEI Consultants Inc.

5. "Proposed Remedial Action Plan for the O&R 93B Maple Avenue Former MGP Site, Haverstraw, Rockland County, New York, Site Number 3-44-044", February 2005, New York State Department of Environmental Conservation.

6. "Interim Remedial Measures Certification Report, 93B Maple Avenue, Former Manufactured Gas Plant Site, Haverstraw, New York", March 2005, GEI Consultants, Inc.

7. "Interim Remedial Measure Certification Report, Phase II IRM, Operable Unit 02, 93B Maple Avenue, Former Manufactured Gas Plant Site, Haverstraw, New York", March 31, 2006, GEI Consultants.